Results from a 2014 survey of Lake Erie anglers

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Executive Summary

- This document reports on the results of a 2014 survey of Lake Erie anglers from Ohio requesting information on their fishing trips in 2013. The survey was sent to 3000 Ohio anglers, from whom we received 766 responses. Of these, 566 indicated that they took a fishing trip to Lake Erie in 2013.
- The typical respondent to our survey had household income of $55,000 per year. Around 95% of respondents were working or retired. The average age of respondents was 60, having 33 years of fishing experience. Most anglers use a boat when they fish (86%), with a large proportion owning a boat (77%).
- Respondents indicated they took an average of 17.6 trips during 2013. Individuals living closest to the shore, not surprisingly, took more trips. Most trips occurred in summer. Anglers visiting the western basin took 1.2 more trips per year on average in summer than visitors to the central basin.
- Anglers spent 5.5 hours per trip on average, with 85% of anglers seeking Perch and 73% seeking Walleye. A substantially smaller proportion focus on bass, trout, and other species. The average catch rate for our sample is 31 perch per trip and 5.1 Walleye per trip. This suggests a catch rate of 0.9 Walleye per hour and 5 Perch per hour. Both of these rates are higher than the average catch rate estimated by Ohio Department of Natural Resources, potentially suggesting that we have a particularly avid group of anglers in our sample, or that individuals have over-estimated their ability.
- Anglers spend around $88 per trip, although those living further away spend around $20 per trip more. The additional money is spent mainly on groceries, restaurants and other expenditures rather than fuel.
- Within our sample, 96% of respondents were aware of HABs and 84% had recently experienced an algal bloom. In response, over 50% of anglers have changed behavior, including changing their fishing location, not taking a trip, or spending less or more time fishing.
- Using the travel cost models, we find that the average trip is valued at $30 per trip in the central basin and $39 per trip in the western basin. The value per trip is lowest in summer and highest in fall and spring.
- We calculate the value of angling to be $2.69 per walleye caught in the western basin and $4.94 in the central basin. The value per perch caught in the western basin is $1.90 per fish, and in the central basin it is $1.22 per fish.
- Over the estimated 762,000 trips in Ohio in 2013, we estimate the total value of trips to individuals to be $27.1 million per year. Total direct expenditures in the economy are estimated as $67.1 million per year.

Results from a 2014 survey of Lake Erie anglers

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This report summarizes the results of a recent survey of Lake Erie Anglers. The survey focused on determining current angler activities and demographics, and assessing the impacts of harmful algal blooms (HAB) on their behavior. The survey of Ohio anglers was conducted in winter of 2014, asking about trip behavior during spring, summer and fall of 2013. We also asked a series of hypothetical questions about alternative trips in order to gauge their willingness to change behavior when faced with the environmental impacts of HABs. The remainder of this report summarizes the data collection process, the data analysis phase, and estimates of the value fishing trips to Lake Erie. The analysis of the effects of HABs on angler behavior are not provided in this report, given the complexity of that particular analysis (which is still in progress). Those results will be provided in future papers written by the research team.

Data Collection

The population of interest in this study consisted of Lake Erie recreational anglers licensed with addresses in Ohio. Following Dillman's Tailored Survey Design Framework, we conducted a general mail survey of Ohio anglers concerning sportfishing daytrips to Lake Erie (Dillman, 2007). Questionnaires were mailed to a sample of recent Ohio fishing license holders from 2011-2013 drawn from the Fishing License & Permit Sales database of the Ohio Department of Natural Resources, Division of Wildlife (ODNR). The sample was screened to include only anglers 18 years old or above, and those who purchased fishing licenses in at least one of the recent three most recent seasons. License holders were discarded if their entries in the ODNR database were missing key information (e.g. name or address).

We employed a stratified random sampling method, in which we oversample anglers from counties close to Lake Erie. Specifically, 2,500 anglers were drawn from counties alongside or close to the western or central basin of Lake Erie[1], while another 500 anglers were chosen from all other counties in Ohio. The number of sampled anglers from each county is proportional to the share of anglers from this county in the fishing license database. After pilot-testing the survey design with 16 separately randomly selected anglers, we mailed two rounds of surveys to these 3,000 sampled anglers. The first round of survey packets, which included a cover letter, a 14-page questionnaire, and a business reply envelope, were mailed out in mid-January, 2014. A sample survey is attached as an appendix. Due to confidentiality concerns, information on the respondents is not linked with the survey number. As a result, the second round of surveys went out to all 3,000 sampled anglers in early-March. A final reminder card was sent out late-March, 2014.

During the sampling phase, we broke the sample into three subsamples and employed three different modes of incentives for each of the subsample. The purpose of this exercise was to assess the effectiveness of the different incentives in enhancing response rates. For the first 1,000 anglers, a

[1] The counties alongside the shoreline of Lake Erie are Lucas, Ottawa, Sandusky, Erie, Lorain, and Cuyahoga; while the counties close to but not along the shoreline included in the survey are Wood, Seneca, Huron, and Medina.

$1 bill was included in the first round of mailings. For the other 2,000 anglers, a name card is included in the survey packet and each respondent could choose to fill that card out to enter a lottery to win Home Depot gift cards. For the second 1,000 anglers, three gift cards with $200, $150, or $100 were available for the lottery winners, while the last 1,000 anglers could enter the lottery to win one of the six gift cards valued at $75. Pilot-testing the survey design with anglers, conducting two rounds of surveys instead of one, and having follow-up reminder cards are all additional measures to increase the response rates.

In the survey questionnaire we asked anglers to focus on single-day fishing trips to Lake Erie taken in 2013. As a general guideline, we asked anglers to assume that if they spent more than 50% of their non-travel time engaged in fishing, they should record the trip as a fishing trip. To ensure that the results are representative of Lake Erie anglers, we asked the respondents to fill out the survey regardless of whether or not they fished in Lake Erie in 2013. The survey questionnaire totaled 14 pages and has six sections. In the first section, we present a map of Lake Erie, broken into grids, and we ask respondents to state the number of trips they took to each grid in three seasons: winter 2013 (January – March), summer 2013 (April - August), or fall 2013 (September – December). The grids follow the Ohio Department of Natural Resources creel survey methodology so we can have an exogenous measure of catch rate per grid. A map with the grids can be found in the survey in the appendix.

In the second section, we presented six hypothetical choice experiment scenarios to determine individual preferences for fishing in Lake Erie. Each scenario had two alternative, "hypothetical" walleye fishing sites in the lake. The sites vary in five characteristics, including the expected walleye catch rate, water quality indicated by the size of harmful algal bloom, water clarity, distance from angler's house to their preferred boat ramps and the boating distance from the ramp to the fishing site. The anglers were asked to determine which site they preferred. The other sections of the survey asked about other attributes of the anglers or their fishing experience. In addition to obtaining general demographic information, we also obtained information on expenditures per trip, fishing equipment, and boat information.

General Information on Anglers

Of the total 766 responses obtained, 753 provided usable information for our general summary. Of these 753, 566 individuals indicated that they fished in 2013 (Table 1). Not surprisingly, the bulk of trips came from individuals living along or near the lake. While one expects a higher proportion of trips to Lake Erie from individuals living near the lake, we over-sampled those counties so expect a higher response rate from them. For example, the responses rate from counties near the lake was 25%, while the response rate for other counties in the state was only 10%. The proportion who stated that they fished in 2013 was also higher in counties near the lake, at 80% of total respondents. Outside the counties near the lake, 50% of respondents indicated that they fished in Lake Erie in 2013.

Individuals who took trips to Lake Erie in 2013 took an average of 17.6 trips to the Lake during the year (Table 2). Most trips occurred in summer and fall, with fewer trips in spring. Not surprisingly, anglers living closest to the shore took more trips per year on average (about 5 more) than the rest of Ohio's anglers. Trip taking behavior also adjusts across the lake during the year. Anglers take an average of 9.4 trips per year in the western basin, and 8.2 per year in the central basin (Table 3). The largest share of trips occurs in summer.

The respondents were mostly male, averaging 60 years of age, with over 30 years of fishing experience (Table 4). Most respondents are either working or retired. Average income is $54,000 per year. When asked whether they would have an opportunity to work more, 38% of respondents stated that they did have the option to work more hours. While many had the opportunity to work more, of those asked if they would want to work more or less, a number of respondents indicated they would like to work the same amount or less.

Table 1: Responses by county of individuals who did and did not fish.

Did Fish		Did Not Fish	
County Name	Frequency	County Name	Frequency
Lorain County	102	Summit County	29
Cuyahoga County	99	Cuyahoga County	22
Lucas County	69	Lucas County	21
Erie County	58	Lorain County	14
Ottawa County	53	Seneca County	10
Summit County	38	Erie County	9
Wood County	29	Wood County	9
Seneca County	23	Ottawa County	8
Sandusky County	22	Huron County	6
Huron County	21	Franklin County	5
Other Counties	52	Other Counties	54
Total	566	Total	187

Table 2: Average trips per person, by season. Nearshore are individuals located in counties near Ohio's coast. Other are individuals located in other parts of Ohio (Anglers only; N=566).

	Trips per Season		
	Total	Nearshore	Other
Spring	2.0	2.2	1.0
Summer	10.4	10.7	8.8
Fall	5.2	5.4	3.8
All	17.6	18.4	13.6

Table 3: Average trips per person by season and basin (Anglers only; N=566)

	Trips per Season		
	Western Basin	Central Basin	Total
Spring	1.0	1.0	2.0
Summer	5.9	4.5	10.4
Fall	2.6	2.6	5.2
All	9.4	8.2	17.6

Most anglers use a boat when fishing in Lake Erie, although around 12% are shoreline anglers (Table 5). Of course, we took the survey only in one year, so individuals who fished from the

shoreline in 2013 may have boated previously and vice-versa. A relatively large proportion of anglers own boats, and of the anglers who responded, average boat size is 23'. Around 54% of respondents drive their boats to the Lake each time, with the remainder keeping their boats at a marina. About half of all anglers have taken a charter.

Table 4: Demographic information on anglers (Anglers only; N is variable)

Demographics	All Anglers	
	Mean	Responses
Years of Experience	33	553
Male	0.97	557
Age	60	544
Education	Some College	555
% Employed	60%	553
% Retired	35%	553
% having option to work more	38%	387
Wage per Hour for Additional Work Hours	$50/hr	119
If you could, would you work more, the same, or less hours	Same to Less	223
Income	$54,000	500

Table 5: Use of boats for Lake Erie angling (Anglers only; N variable).

Boat Information	All Anglers	
	Mean	Responses
Typically use a boat	86%	560
Typically fish from shoreline	12%	560
Do you own a boat	77%	502
Boat Size (feet)	23	391
Drive Boat to Lake	54%	391
Have you ever taken a charter on Lake Erie	50%	550
How many charters have you taken in the last year	1.5	271

Most anglers in our sample targeted perch and walleye (Table 6). A smaller proportion focus trips on bass, trout and salmon. Catch rates for perch are relatively high, at 31 fish per trip for perch and 5.1 fish per trip for Walleye. The typical length of a trip is 5.5 hours, suggesting a catch rate of around 0.9 fish per hour. Ohio Department of Natural Resources (ODNR) reports walleye catch rates of 0.4 to 0.6 fish per hour in the central and western basins of Lake Erie, respectively (ODNR, 2014). Similarly, we estimate a perch catch rate of 5 fish per hour, while Ohio Department of Natural Resources reports a catch rate in the range of 2.5-3.5 fish per hour, depending on location. ODNR data are presumably based on creel surveys, which may provide a higher accuracy than the recall methods we have used. Some of the other fish mentioned in the "other" category include catfish, sheephead, and white bass.

Table 6: Type of fish targeted and typical catch rate per angler (N =554)

Average Catch	% Anglers Targeting Species	# Caught on typical trip by those targeting
Perch	85%	31.0
Walleye	73%	5.1
Bass	14%	6.2
Trout	10%	1.9
Salmon	10%	0.8
Pike	1%	1.4
Other	20%	11.2

Gasoline is the largest expenditure item on trips, amounting to around 40% of total expenditures. This likely includes fuel for driving cars as well as boats. Across the typical individual, the remaining expenditures are fairly evenly split. Individuals living closer to the Lake Erie shoreline spend less per trip. While some of this is due to lower fuel costs, the main differences in expenditures for close and distant individuals lie in restaurant, grocery, and other expenditures.

Table 7: Typical expenditures on single day trips (N=554)

Expenditures	Average	Counties near shore $/trip	Rest of State
Beverages	$8.66	$7.84	$13.13
Gas	$38.81	$38.19	$42.20
Restaurant	$6.38	$5.58	$10.71
Grocery	$7.43	$7.14	$9.02
Bait	$12.20	$12.20	$12.17
Gear	$8.52	$8.85	$6.72
Other	$6.20	$5.21	$11.59
Total	$88.20	$85.01	$105.55

As might be expected given the large number of recent outbreaks of harmful algal blooms in Lake Erie, anglers are well aware of them (Table 8). Most anglers we surveyed have experienced harmful algal blooms in recent years, and of those who stated that they have experienced them, they experienced them an average of 6.8 times. The question in the survey did not specify a given time limit (i.e., we did not tell them to only consider the last year). We also asked anglers how they have responded to HABs. Over 50% of anglers in our survey stated that they changed location or decided

not to go fishing in response to HABs (Table 9). Another 10% chose to take a longer or shorter trip in response. We note that 35% did respond that they had made no changes.

Table 8: Awareness of harmful algal blooms (Anglers only; N variable)

Algal Blooms	All Anglers	
	Mean	Responses
Are you aware of algal blooms in Lake Erie	96%	553
Have you recently experienced an algal bloom in recent years	84%	552
How many times?	6.8	359

Table 9: Angler response to HABs (N Variable).

Behavior in response to HABs	Responses	% of Anglers
Changed fishing location	296	53%
Spent less time fishing	193	34%
Spent more time fishing	36	6%
Did not go fishing	91	16%
Have not affected my fishing	195	35%
I have fished for different species	32	6%

Travel Cost Analysis

This section develops a travel cost model of angler demand for fishing trips. Travel cost models estimate the demand for recreational trips using information on the number of trips visitors take and the price they pay for those trips. The price used in the model is derived from information on the distance traveled (hence the name travel cost). Additional information is contained in the model, including information on alternative sites and income. The data include 744 of the total observations in our sample, from which we are able to extract information on income. Recall that of these 744 individuals, only 566 took trips in 2013, thus our dependent variable, trips, includes a number of observations of individual anglers taking no trips.

For this analysis, we aggregate the data into two regions, the western basin and the central basin, and we estimate a common demand function for trips in each basin. We use angler specific distances for the sites they visited most often to determine the price for their trips. The price for each trip is determined as:

(1) P = (roundtrip miles)*$0.54/mile + wage*(roundtrip miles)/(45 miles per hour)*30%

Wages are determined by household income divided by 2000 hours per year. We further multiply wages by 30%, thus valuing leisure time at 30% of work time (Cesario, 1976). The price for alternative sites is determined similarly. The only other variable included in the model is income.

We are able to take advantage of the fact that we have obtained data on trips taken in three different seasons, and estimate models for each season. We thus have models for spring, summer and fall, for the western and central basins. We also estimate models for the aggregate fishing season.

Our results conform to basic economic principles in that the coefficient on own price is negative in all cases (Table 10). This indicates that higher prices lead to fewer trips, and vice-versa. Income is positive and significant in most regressions, indicating the income is a normal good such that higher income will induce more trips. The model for spring-time trips to the western basin does not fit well, yielding parameter estimates that are mostly insignificant.

The substitute price in most cases is positive and significant, indicating that higher prices for the alternative site will lead to more trips to the site in question. Thus, the alternative site is indeed a substitute. The parameter in the western basin in spring, however, is negative and significant, indicating a complementary relationship. Higher prices at the alternative site lead to fewer trips to the site in question.

With demand functions, we are able to estimate consumer surplus. Consumer surplus is a measure of the value of trips to consumers, or those taking the trips. This value arises from the fact that we observe individuals to take more trips to closer locations and fewer trips to more distant locations. As a result, we infer that individual anglers gain because they are willing to pay more for their trips than they actually have to pay.

Consumer surplus differs from the expenditures that consumers make on their trips. These expenditures have important implications for the local economy, but they do not tell us anything about the inherent value of recreational trips to anglers. They tell us that anglers were hungry and ate food, or bought some bait, but they do not reveal the value of the trip to the anglers. We do use information on gasoline purchases in our calculations of the price of a trip, as noted above, although we also include other costs associated with owning and maintaining a car. We also include information on the value of time in our calculation of price.

Our consumer surplus estimates are shown in Table 11. The per trip consumer surplus value is higher in the western basin than the central basin over the year, although seasonal results vary. Consumer surplus is greatest in the fall and lowest in the summer, although we note that we unable to obtain a season-specific consumer surplus estimate for spring in the western basin. Summer is the period from April to August, which encompasses the busiest walleye fishing season. Most trips occur during this time period. Fall is the main perch fishing season, which attracts significant interest in the lake.

These results allow us to calculate a value per fish. We do this for the two main targeted species, Walleye and Perch. We use the consumer surplus value per day in summer and divide through by Walleye catch rate of 5.1 fish per trip from our sample. Based on this calculation, we estimate that the value of each Walleye caught is $2.69 in the western basin and $4.94 in the central basin. Doing a similar calculation for Perch, but using the value of consumer surplus per trip in fall (since this is the main time of Perch fishing), we calculate that the value of Perch is $1.90 per fish in the western basin and $1.22 in the central basin.

The final calculation we can make with this research is to calculate the total value of the Lake Erie fishery in Ohio. ODNR (2014) estimates that there were 762,000 trips to Lake Erie in 2013. We use the hours of fishing provided by ODNR to calculate that anglers spend 11% of effort in the eastern basin, 26% of effort in the central basin, and 63% of effort in the western basin. For the eastern basin we use the central basin estimated value per trip for the season. This suggests that the value of recreational angling in Ohio on Lake Erie is $27.1 million per year.

Table 10: Travel cost model results (N=744)

	Western Basin			
	Spring	Summer	Fall	Combined
Intercept	-0.030	1.595***	0.625***	1.935***
Own Price	-0.001	-0.073***	-0.017***	-0.026***
Substitute Price	-0.003**	0.043***	0.012***	0.015***
Income ($10000)	0.001	0.026***	0.026***	0.021***
Psuedo R2	0.009	0.133	0.178	0.149
N	744	744	744	744
	Central Basin			
	Spring	Summer	Fall	Combined
Intercept	0.796***	1.857***	0.636***	2.503***
Own Price	-0.033***	-0.04***	-0.027***	-0.033***
Substitute Price	0.017***	0.035***	0.013***	0.017***
Income	0.007***	0.015**	0.032***	0.027***
Psuedo R2	0.187	0.256	0.271	0.32
N	0.796***	1.857***	0.636***	2.503***

Table 11: Consumer surplus by trip, predicted trips, and seasonal consumer surplus

Districts	**Season**	**Average Consumer Surplus per trip**	**average predicted trips**	**Avg Seasonal Consumer Surplus**
Western Basin	spring		0.71	
Western Basin	summer	$13.73	4.17	$57.23
Western Basin	fall	$58.81	1.79	$105.28
Western Basin	all year	$38.78	6.66	$258.25
Central Basin	spring	$30.54	0.78	$23.82
Central Basin	summer	$25.21	3.44	$86.74
Central Basin	fall	$37.67	1.86	$70.06
Central Basin	all year	$30.01	6.08	$182.43

Summary & Conclusions

This document reports on the results of a recent survey of Ohio anglers fishing on Lake Erie. The survey seeks to determine the current distribution of recreational trips, the types of species sought, catch rates, and demographic information. In addition, we also asked anglers about their views on Harmful Algal Blooms (HABs). For this report, we summarize part of the data focusing on existing trip taking behavior, demographic information about anglers, and the types of fishing in which they are engaged. Future documents will report on outcomes of the full analysis of HABs.

Our survey was sent to 3000 Ohio anglers, 2500 of whom live near the Lake. The other 500 live in the rest of the state of Ohio. We received 753 responses, with 566 respondents indicating that they took trips in 2013. From this, there were 744 usable responses from individuals who fished in 2013. This report summarizes information from a sample of 566 individuals who provided responses to all questions. The travel cost estimates are based on the full sample of 744 individuals who provided information on trips and income.

The typical angler in our survey had household income of $55,000 per year. Around 95% of anglers stated they were working or retired. The average age of anglers was 60, with individuals have 33 years of fishing experience. These results suggest that the responding anglers were fairly experienced anglers in general. Most anglers we surveyed use a boat (86%), with a fairly large proportion owning a boat (77%).

They are also fairly avid in their angling, taking an average of 17.6 trips per year. Individuals living closest to the short, not surprisingly, take more trips each year, averaging 18.4 per year. The bulk of trips occurs in summer, followed by fall, and spring. Anglers visiting the western basin tend to take 1.2 more trips per year on average, mostly in the summer.

Anglers spent around 5.5 hours per trip on average, with 85% of anglers seeking Perch and 73% seeking Walleye. A substantially smaller proportion focus on bass, trout, and other species. The average catch rate for our sample is 31 perch per trip and 5.1 Walleye per trip. This suggests a catch rate of 0.9 Walleye per hour and 5 Perch per hour. Both of these rates are higher than the average catch rate estimated by Ohio Department of Natural Resources, potentially suggesting that we have a particularly avid group of anglers in our sample, or that individuals have over-estimated their ability.

In general, anglers spend around $88 per trip, with those living nearshore spending closer to this amount and individuals living in other parts of the state spending around $20 per trip more. The additional money is spent mainly on groceries, restaurants and other expenditures.

Within our sample 96% of respondents were aware of HABs and 84% had recently experienced an algal bloom. In response, over 50% of anglers have changed behavior, including changing their fishing location, not taking a trip, or spending less or more time fishing. WE find that 35% report they did not change their behavior in response to HABs.

Our travel cost analysis provides information on the value of angling to the anglers who engage in the activity. Using the travel cost models, we show that the average trip is valued at $30 per trip in the central basin and $39 per trip in the western basin. The value per trip is lowest in summer and higher in fall and spring. Total trips, however, are greatest in summer. Using this value, we calculate

the value of angling to be $2.69 per Walleye caught in the western basin and $4.94 in the central basin. The value per Perch caught in the western basin is $1.90 per fish, and in the central basin it is $1.22 per fish. Over the estimated 762,000 trips in Ohio in 2013, we estimate the total value to be $27.1 million per year. Total expenditures on trips amounts to $88 per trip, or $67.1 million per year.

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Appendix: Survey

Lake Erie Angler Survey

The Ohio State University

College of Food, Agricultural and Environmental Sciences

Department of Agricultural, Environmental, Development Economics

School of the Environment and Natural Resources

This survey asks you about recreational fishing trips you take to Lake Erie in Ohio. Although we have designed this survey minimize the amount of reading, there is significant background information in this document. This information relates to specific issues we are addressing with the survey, and terminology. Please take the time to read this survey carefully and to answer the questions to the best of your ability.

We very much appreciate your willingness to join with your fellow anglers and fill out this survey. Your responses will help us better understand the link between water quality, harmful algal blooms, and the Lake Erie fishing experience. Thanks in advance!

SECTION I: YOUR 2013 LAKE ERIE FISHING TRIPS

The next 3 pages contain maps of Lake Erie. Please write directly on the maps and state the **number** of trips you have taken, or plan to take, to each grid within the Lake during the time period stated. If you did not take a trip to a grid during the period stated, leave the grid blank.

Thus, for each grid on the map in which you have taken a trip or plan to take a trip, fill in the number of trips taken (or planned) during the period requested.

We are interested only in your **day** fishing trips. A day trip is one where you travel to the recreation site and return to your home on the same day.

We recognize that many of you spend some of your time on your fishing trip doing other things, such as site-seeing, water-skiing, or visiting friends or relatives. As a general guideline, please assume that a day trip is primarily for fishing if you spend more than 50% of your non-travel time engaged in fishing.

The three time periods for which we ask you to report your trips

Winter 2013 (January through March)

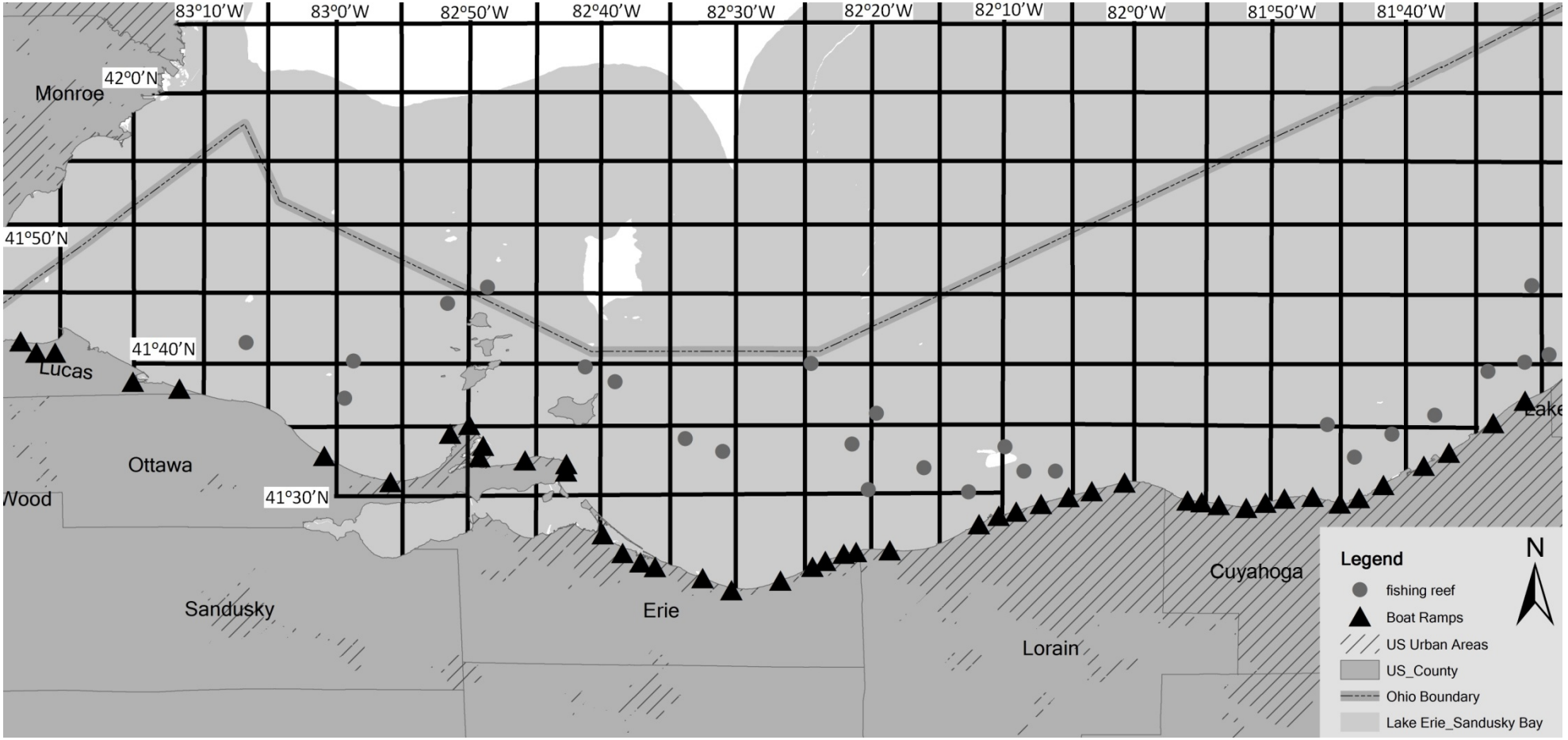
Spring/Summer 2013 (April – July)

Fall 2013 (August – December) – We are asking about your planned trips this fall.

FISHING SITE CHOICES FOR APRIL TO JULY 2013

Writing directly on the map below, **state the number of day trips for fishing you took to each grid** during the period **April – July, 2013**. Please mark your number of trips for the specific grid to which you took the trips. Since some trips may have included time spent in two or more grids, please attribute the entire trip to the grid in which you spent the most time. Please write your answers as clearly as possible. If you did not take a trip to any particular grid, please leave it blank.

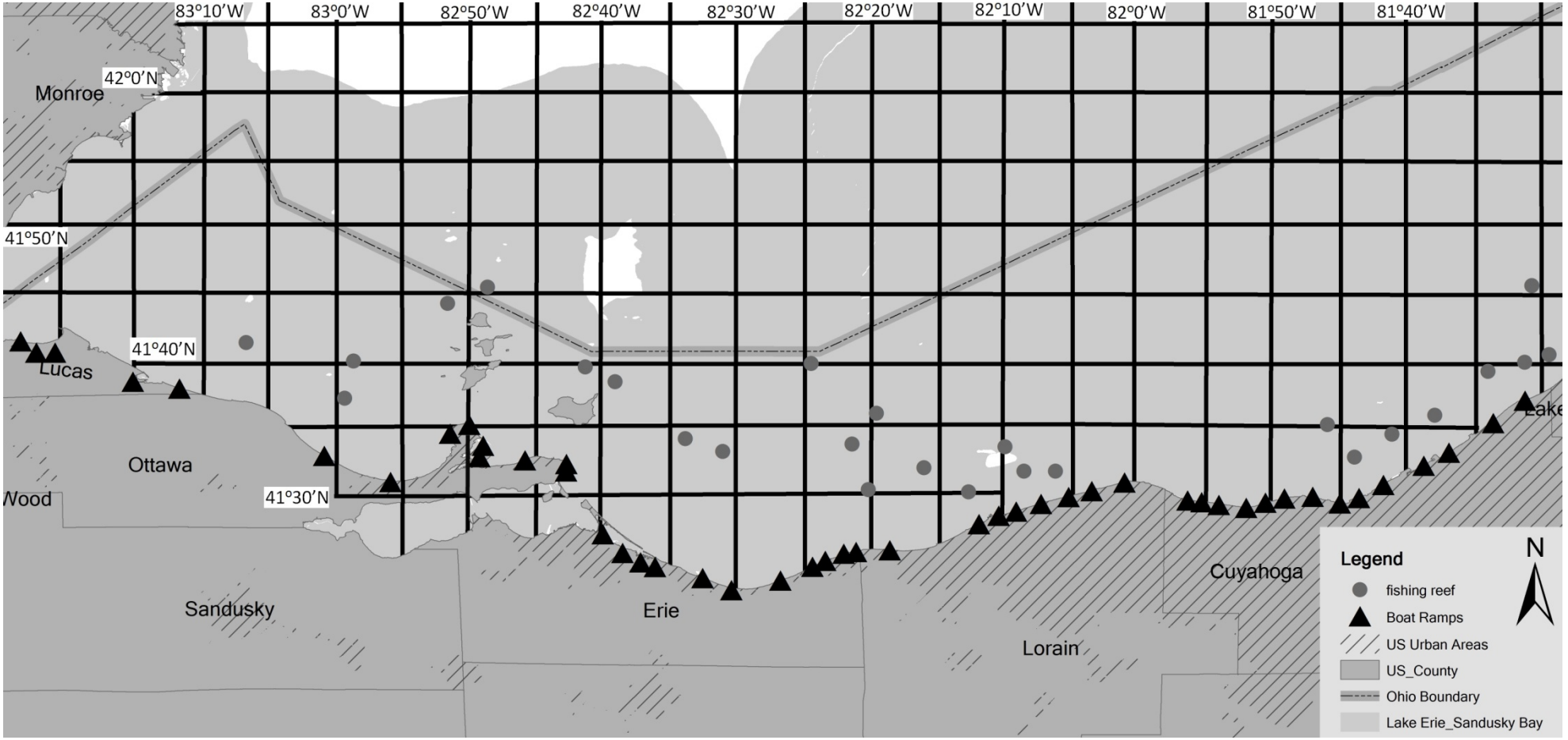
Please also circle the approximate location of the boat ramps (denoted as triangle in the maps) you most often used.



FISHING SITE CHOICES FOR JANUARY TO MARCH 2013

Writing directly on the map below, **state the number of day trips for fishing you took to each grid** during the period **January – March, 2013**. Please mark your number of trips for the specific grid to which you took the trips. Since some trips may have included time spent in two or more grids, please attribute the entire trip to the grid in which you spent the most time. Please write your answers as clearly as possible. If you did not take a trip to any particular grid, please leave it blank. Please also **circle the boat ramps** (denoted as triangle in the maps) from where you mainly used to launch the boat this winter.

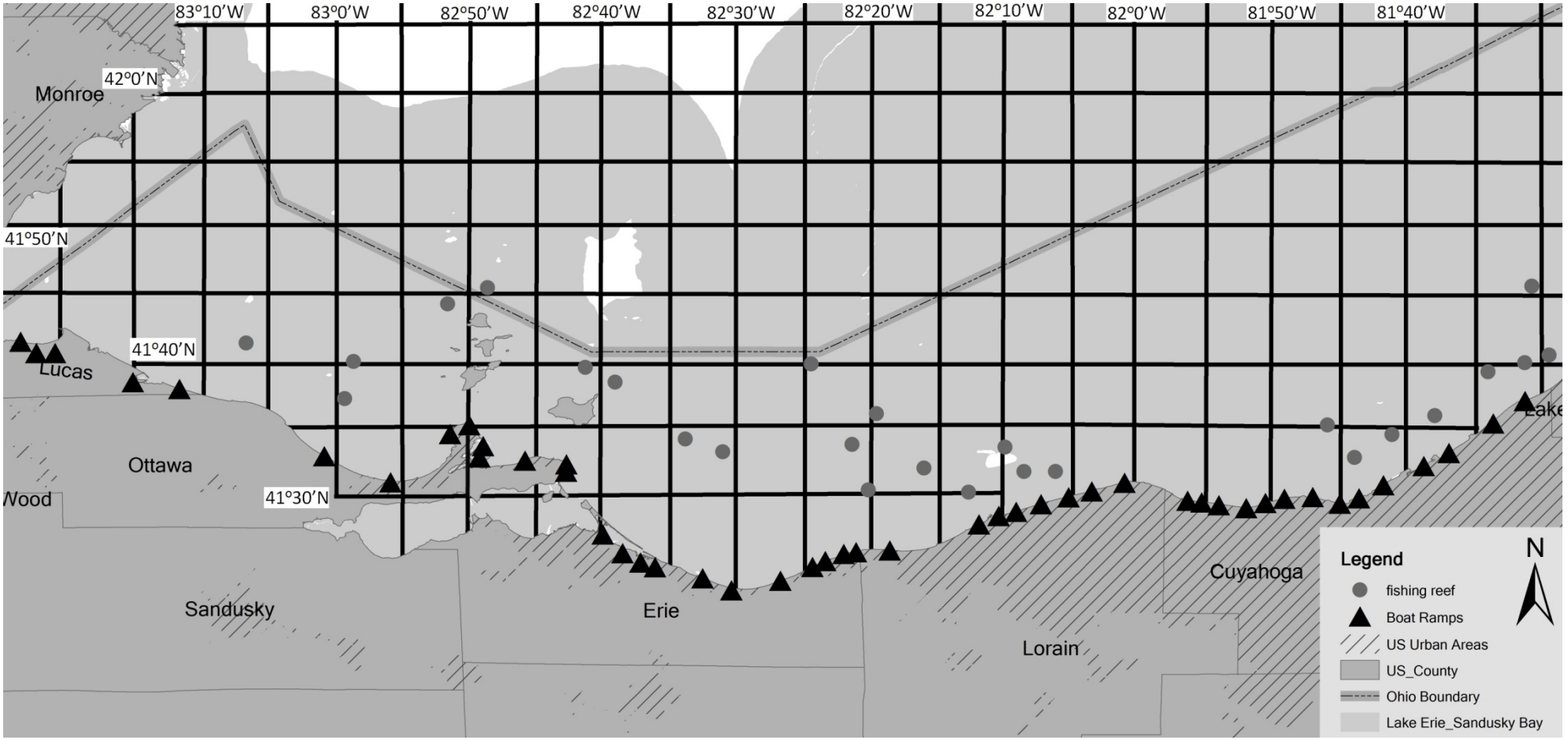
Please also circle the approximate location of the boat ramps (denoted as triangle in the maps) you most often used



PLANNED FISHING SITE CHOICES FOR AUGUST TO DECEMBER 2013

Writing directly on the map below, **state the number of day trips for fishing you plant to take to each grid** during the period **August – December, 2013**. Please mark your number of trips for the specific grid to which you plant to take the trips. Since some trips may include time spent in two or more grids, please attribute the entire trip to the grid in which you plan to spend the most time. Please write your answers as clearly as possible. If you do not plan to take a trip to any particular grid, please leave it blank.

Please also circle the approximate location of the boat ramps (denoted as triangle in the maps) you plan to use



SECTION II: QUESTIONS ABOUT YOUR FISHING TRIPS

1. What is your home zip code? _____ Home county? _____

If you took any single day trips to Lake Erie this year, or plan to during the remainder of the year, please answer questions 2 – 4. If you took no single day trips or plan to take no single day trips to Lake Erie this year, skip to question 5.

2. For your typical single day trip, how many hours do you spend fishing (please check one)?

_____ 1 – 2 hours _____ 3-4 _____ 5-6 _____ 7-8 _____ more than 8 hours

3. For your typical single day trip, how many people go fishing with you?

_____ Number of Adults (including yourself)

_____ Number of Children

4. For your typical single day fishing trip to Lake Erie, how much do you spend in each of the following categories?

$_____ Beverages
$_____ Gas
$_____ Restaurant
$_____ Groceries
$_____ Bait / Tackle
$_____ Gear
$_____ Other (please specify: _____)

If you took any overnight trips to Lake Erie this year, or plan to during the remainder of the year, please answer questions 5 – 7. If you took no overnight trips or plan to take no overnight trips to Lake Erie this year, skip to question 8.

5. For your typical overnight trip how many people go fishing with you?

_____ Number of Adults (including yourself)

_____ Number of Children

6. For your typical overnight fishing trip to Lake Erie, where do you usually stay for the night?

_____ Hotel/motel
_____ Rented a house, condo, or apartment
_____ Camping or RV
_____ Stay with family or friends at their residence
_____ Other(please specify: _____)

7. For your typical overnight fishing trip to Lake Erie, how much do you spend in each of the following categories?

$_____ Beverages
$_____ Gas
$_____ Restaurant
$_____ Groceries
$_____ Lodging
$_____ Bait / Tackle
$_____ Gear
$_____ Other (please specify: _____)

SECTION III: QUESTIONS ABOUT YOUR FISHING EQUIPMENT AND GEAR

8. When you use a private boat to fish on Lake Erie, what are the names of the boat ramps or marinas that you use most often? Please name the top three that you use in order from most used to least used.

A) _____

B) _____

C) _____

9. Do you or does anyone in your household own a boat?

_____ Yes _____ No (Skip to question 19)

10. What is the size of your boat (please check the appropriate box)

_____ <10 feet _____10'-15' _____ 16'-20' _____ 21'-25' _____ 26-30' _____>30'

11. What is the horsepower of your motor?

_____ No motor # horsepower = _____

12. Do you typically drive your boat to Lake Erie each time you fish there?

_____ Yes _____ No

13. Do you keep your boat at a marina on Lake Erie?

_____ Yes (Go to question 14) _____ No (Go to question 16)

14. If yes, please identify the name and location of the marina/harbor:

Name of harbor/marina: _____

Zipcode of harbor/marina: _____

15. What is the distance from your home to the marina?

_____ miles

16. How long does it typically take you to get from your home to the harbor/marina where you keep your boat?

_____ hours _____ minutes

17. Have you ever chartered a boat on Lake Erie specifically to go fishing (this includes going on a "head" boat)?

_____ Yes (go to question 18)

_____ No (skip to question 21)

18. How many times in the past year have you chartered a boat on Lake Erie for fishing?

_____ times

19. What is the name of the marina or city where you typically have chartered a boat on Lake Erie?

    Name of city or marina: _____

20. For chartered trips, please name up to three marina or port cities you use when you visit Lake Erie. Please name these in order from most used to least used.

    A) _____

    B) _____

    C) _____

21. On your typical trip to Lake Erie, which type of fish do you target (check all that apply) and how many do usually catch? For your usual catch, please estimate

    _____ Yellow Perch (Number caught per trip _____)
    _____ Walleye (Number caught per trip _____)
    _____ Smallmouth Bass (Number caught per trip _____)
    _____ Steelhead Trout (Number caught per trip _____)
    _____ Salmon (Number caught per trip _____)
    _____ Northern Pike (Number caught per trip _____)
    _____ Other, please specify _____ (Number of "other" caught per trip _____)

SECTION IV: QUESTIONS ABOUT YOUR DEMOGRAPHIC INFORMATION

22. How many years have you been fishing in Lake Erie?

    _____ Years

23. What is your gender?

    _____ Male _____ Female

24. In what month and year were you born?

    _____ Month _____Year

25. What is the highest level of education you have completed?

_____ Some High School or less
_____ High School graduate or GED
_____ Some College or trade/vocational school
_____ College Graduate
_____ Graduate School – Master's Degree
_____ Graduate School – Doctorate Degree

26. Which best describes your employment status?

_____ Working as paid employee – full time
_____ Working as paid employee – half time
_____ Working – self employed
_____ Not working – on temporary layoff from work
_____ Not working – looking for work
_____ Retired
_____ Work at home
_____ Volunteer
_____ Full-time Student
_____ Other, please explain _____.

27. If you are currently employed, do you have the option of working additional hours to increase your total income?

_____ Yes (Got to question 28)

_____ No (Skip to question 29)

28. If you answer "Yes" to question 27, what would your hourly wage for additional hours be?

$_____ per hour

29. If you answered "No" to question 27, and you could have the option of working more or less hours, which would you prefer?

_____ Work more hours

_____ Work the same number of hours

_____ Work less hours

30. Which of the following categories best describes your total household income before taxes in year 2012?

_____ Less than $10,000 per year
_____ $10,000 to $15,000 per year
_____ $15,000 to $20,000 per year
_____ $20,000 to $25,000 per year
_____ $25,000 to $30,000 per year
_____ $30,000 to $35,000 per year
_____ $35,000 to $40,000 per year
_____ $40,000 to $50,000 per year
_____ $50,000 to $60,000 per year
_____ $60,000 to $75,000 per year
_____ $75,000 to $100,000 per year
_____ $100,000 to $125,000 per year
_____ $125,000 to $150,000 per year
_____ More than $150,000 per year

31. What is your marital status?

_____ Married

_____ Living with partner

_____ Single – Never married

_____ Widowed

_____ Divorced

_____ Other

32. Including yourself, how many people live in your household?

_____ Number of Adults

_____ Number of Children

SECTION V: HYPOTHETICAL QUESTIONS ABOUT YOUR PREFERENCES TOWARDS DIFFERENT FISHING SITES

The purpose of this section of the survey is to determine your preferences regarding fishing in Lake Erie. We will present to you four scenarios. Each scenario will have two alternative walleye fishing trips. The alternatives will vary across several characteristics, including the catch rate, water quality and clarity, and distance from your house or your preferred boat ramp.

In each scenario, we would like you to choose the walleye fishing trip that you prefer. Considering the levels of the attributes of each trip, simply choose the trip that is most appealing to you. Here is a brief description of the attributes over which we would like you to choose:

Walleye Catch Rate: The typical walleye catch rate in Lake Erie is estimated by Ohio Department of Natural Resources to be about 0.5 fish per person per hour of fishing for the typical angler. The choices include rates from 0.25 to 1.25 walleye per person per hour.

Probability of an Algal Bloom: In recent years, the number of algal blooms in Lake Erie has increased. This attribute is measured in terms of the probability of experiencing an algal bloom, which is estimate to range from <1% to 5% in a typical year.

Water Clarity: Water clarity has increased markedly since the 1970s, but there are many locations where the water is relatively murky. This attribute is measured on a relative scale from 1 to 10, with 1 being a low level of clarity and 10 being very clear.

Distance from the boat ramp to the fishing site: This attribute measures the amount of time you would need to ride in your boat from the time you leave the boat ramp to the time you first fish. This attribute is measured in time increments from 10 minutes to 60 minutes of boating time.

Distance from home to boat ramp: This attribute measures the distance you would travel from your home to a boat ramp to fish a given site. It is measured in miles from 10 miles to 50 miles.

Scenario 1:

Consider the alternative fishing sites described by the attribute levels given and choose which site you would prefer on a given fishing occasion. Check the box below the particular site for the one you would choose. You can choose neither by checking the box marked "Neither".

Attribute	**Site A**	**Site B**	**Neither**
Walleye Catch Rate (# of fish caught per person per hour)	0.75/hr	1.0/hr	
Probability of experiencing an algal bloom (% chance per trip)	<1%	3%	
Water Clarity (1 = very murky; 10 = very clear)	2	5	
Time in boat driving to fishing site (# of minutes)	10	25	
Distance from house to boat ramp (miles)	15	30	
Which Site do you MOST prefer (Please check the box for your preferred option)	**Site A** ☐	**Site B** ☐	**NEITHER** ☐

Scenario 2:

Consider the alternative fishing sites described by the attribute levels given and choose which site you would prefer on a given fishing occasion. Check the box below the particular site for the one you would choose. You can choose neither by checking the box marked "Neither".

Attribute	**Site A**	**Site B**	**Neither**
Walleye Catch Rate (# of fish caught per person per hour)	0.75/hr	1.0/hr	
Probability of experiencing an algal bloom (% chance per trip)	<1%	3%	
Water Clarity (1 = very murky; 10 = very clear)	2	5	
Time in boat driving to fishing site (# of minutes)	10	25	
Distance from house to boat ramp (miles)	15	30	
Which Site do you MOST prefer (Please check the box for your preferred option)	**Site A** ☐	**Site B** ☐	**NEITHER** ☐

Scenario 3:

Consider the alternative fishing sites described by the attribute levels given and choose which site you would prefer on a given fishing occasion. Check the box below the particular site for the one you would choose. You can choose neither by checking the box marked "Neither".

Attribute	**Site A**	**Site B**	**Neither**
Walleye Catch Rate (# of fish caught per person per hour)	0.75/hr	1.0/hr	
Probability of experiencing an algal bloom (% chance per trip)	<1%	3%	
Water Clarity (1 = very murky; 10 = very clear)	2	5	
Time in boat driving to fishing site (# of minutes)	10	25	
Distance from house to boat ramp (miles)	15	30	
Which Site do you MOST prefer (Please check the box for your preferred option)	**Site A** ☐	**Site B** ☐	**NEITHER** ☐

Scenario 4:

Consider the alternative fishing sites described by the attribute levels given and choose which site you would prefer on a given fishing occasion. Check the box below the particular site for the one you would choose. You can choose neither by checking the box marked "Neither".

Attribute	Site A	Site B	Neither
Walleye Catch Rate (# of fish caught per person per hour)	0.75/hr	1.0/hr	
Probability of experiencing an algal bloom (% chance per trip)	<1%	3%	
Water Clarity (1 = very murky; 10 = very clear)	2	5	
Time in boat driving to fishing site (# of minutes)	10	25	
Distance from house to boat ramp (miles)	15	30	
Which Site do you MOST prefer (Please check the box for your preferred option)	**Site A** ☐	**Site B** ☐	**NEITHER** ☐

Thank you for filling out our survey! Please fold your survey and send it back to us in the stamped business envelope provided.