
Assessing the Economic Impact and Significance of Recreational Angling on Lake Erie Waters: Final Report



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Assessing the Economic Impact and Significance of Recreational Angling on Lake Erie Waters: Final Report

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Executive Summary

The overarching goal of the study was to assess the economic impact and significance of the recreational angling industry within the Pennsylvania section of Lake Erie. For a guiding framework, this study utilized an exploratory mixed methodology with three connected phases which resulted in 1,189 completed online and mail-back questionnaires (Phase I), 516 completed on-site questionnaires of Lake Erie anglers (Phase II), and approximately 15 hours of stakeholder interviews (Phase III). Readers are encouraged to review these findings as reflective of anglers within the Pennsylvania section of Lake Erie, and not representative of all Lake Erie anglers. Study results and analyses are further detailed throughout the various sections of this report.

Phase I key observations and findings:

- The majority of anglers surveyed in Phase I with either an online or mail-back survey were middle-aged white males from the local area or the state of Pennsylvania who had reported earning moderate levels of education and household income (see Section 2).
- Most anglers purchased either a Combination Trout-Salmon fishing permit, a Lake Erie fishing permit, an Adult Resident fishing permit, and/or a Lake Erie fishing permit and were likely to fish from either the shoreline or a private boat for either steelhead, walleye, or yellow perch.
- The primarily experienced, specialized, and skilled sample indicated they frequently fished the Pennsylvania section of Lake Erie and intended to fish in the 2017 Lake Erie angler season.
- Anglers strongly identified with the Pennsylvania section of Lake Erie and were moderately dependent and attached to the community and social elements associated with the area to engage in their angling pursuits.
- Anglers identified and largely attained a variety of reasons and motivations for visiting the Pennsylvania section of Lake Erie such as “to be outdoors”, “to get away from the regular routine”, “to do things with your companions” as well as “for the challenge or sport of fishing”.
- The majority of anglers indicated moderate levels of satisfaction with their overall 2016 Lake Erie angling season and were highly satisfied with the environmental conditions such as the water quality, cleanliness, and condition of the habitat.
 - However, anglers also noted moderate levels of satisfaction with the fishing opportunities, fish harvest, and social conditions within the Pennsylvania section of Lake Erie.
- On average, respondents noted that two anglers and five trips to the Pennsylvania section of Lake Erie in 2016 were covered by their annual expenditures.
- The highest proportion of angler expenditures among all anglers spending something were within the categories of automobile gasoline and oil, restaurants, bars, etc., and groceries.
- Anglers rarely reported spending within the categories of camping, parking, boat launching fees, boat mooring fees, tournament entry fees, and/or entertainment.

Phase II key observations and findings:

- During the Phase II on-site survey, the majority of anglers indicated being middle-aged white males from the local area or the state of Pennsylvania who had reported earning moderate levels of education and household income (see Section 3).
- Most anglers purchased either an Adult Resident fishing permit, a Lake Erie fishing permit, and/or a Combination Trout-Salmon fishing permit and were likely to fish from either a pier or the shoreline for yellow perch, walleye, or steelhead.
- The primarily experienced, specialized, and skilled sample indicated they frequently fished the Pennsylvania section of Lake Erie, were mostly repeat visitors, and intended to participate in the 2017 Lake Erie angler season.
- Anglers identified a variety of reasons and motivations for visiting the Pennsylvania section of Lake Erie such as “relaxation”, “enjoyment of nature”, “challenge seeking”, and “social and family togetherness”.
- The majority of anglers indicated moderate levels of satisfaction with their overall angling trip and were highly satisfied with both the social and environmental conditions within the Pennsylvania section of Lake Erie such as the number of anglers fishing nearby, the water quality, cleanliness, and condition of the habitat.
 - However, anglers also noted moderate levels of satisfaction with the fishing opportunities and fish harvest within the Pennsylvania section of Lake Erie such as the species caught and total number of fish caught.
- On average, respondents noted that two anglers were covered by their daily trip expenditures to the Pennsylvania section of Lake Erie.
- The highest proportion of angler trip expenditures among all anglers spending something were within the categories of bait, automobile gasoline and oil, and groceries.
- Anglers rarely reported spending within the categories of camping, parking, boat launching fees, and boat mooring fees.

Economic Impact and Significance key observations and findings:

- The overarching goal of the study was to assess the economic impact and significance of the recreational angling industry within the Pennsylvania section of Lake Erie (see Section 4).
- The total economic *impact* of the Pennsylvania section of the Lake Erie recreational angling industry upon Erie County, Pennsylvania was estimated to be \$40.6 million for the 2016 season.
 - Economic *impact* is the amount of money spent by non-local residents in a host economy (e.g., Erie County) that creates income and jobs for the local host economy.
- The total economic *significance* of the Pennsylvania section of Lake Erie recreational angling industry upon Erie County, Pennsylvania was estimated to be \$49.5 million for the 2016 season.
 - Economic *significance* is a measure of the importance or significance of the recreational angling industry within the local economy as it shows the size and nature of local and non-local economic activity associated with visits to the Pennsylvania section of Lake Erie.
- The average total amount spent by anglers residing *within Erie County Pennsylvania* during the 2016 season was \$454.
 - The highest expenditure categories among all anglers residing *within Erie County Pennsylvania* included automobile gasoline and oil, equipment, and groceries.
- The average total amount spent by anglers residing *outside of Erie County Pennsylvania* during the 2016 season was \$503.
 - The highest expenditure categories among all anglers residing *outside of Erie County Pennsylvania* included lodging, automobile gasoline and oil, and restaurants, bars, etc.
- Angler expenditures supported approximately 539 jobs within Erie County Pennsylvania in 2016. This included both wage and salary employees including both full and part-time workers.
 - The top industries within Erie County, Pennsylvania impacted by angler expenditures in 2016 included full-service restaurants, hotels and motels, and retail sporting goods and hobby stores.
- Angler expenditures provided more than \$13 million in income for Erie County Pennsylvania residents in 2016. This included all forms of employee compensation (e.g., wages and benefits) as well as proprietor income.
- A total of \$19.9 million of employee compensation, proprietor income, indirect business taxes, and other property type income was generated in Erie County, Pennsylvania as a result of angler spending in 2016.
 - For every \$1 spent on recreational angling within the Pennsylvania section of Lake Erie in 2016, \$1.65 was generated for the Erie County, Pennsylvania gross regional product.

Section 1. Introduction

Section 1-1. Study Background and Objectives

The state of Pennsylvania manages the smallest portion of Lake Erie, encompassing 76.6 miles of coastline. This Pennsylvania section of Lake Erie is home to a multitude of pristine public parks and recreation facilities. Nearly every one of these facilities serves the primary purpose of providing access to Lake Erie itself. This abundant access includes numerous angling related facilities such as boat launches, fishing piers, shorelines, and a large assortment of private and public concessions. The combination of highly sought-after ecological attributes in addition to an abundance of public access makes the Pennsylvania section of Lake Erie extremely favorable among a breadth of local, regional, and international anglers.

Within the overall Lake Erie watershed, the well-established recreational angling industry is a cornerstone of the economy and lifeblood for many residents. Lake Erie is the shallowest and southernmost of the five Great Lakes and is the fourth largest Great Lake in terms of surface area and the smallest Great Lake in terms of water volume. Due to Lake Erie's southernmost position, it is the warmest and most biologically productive of all of the Great Lakes in terms of angler yield. These ecological attributes allow Lake Erie (as well as Lake Michigan) to possess 114 native species of fish, the largest diversity of species within all of the Great Lakes. This highly diverse mixture of cold and warm water fish species attracts anglers from around the world to Lake Erie's unique and prolific waterways.

With such a valuable water resource, natural resource managers and stakeholders alike within the Lake Erie basin recognize the importance of providing credible economic data to policy makers in order to sustain this abundant angling resource for generations to come. However, there is little existing information on the economic impact and significance of the recreational angling industry within the Pennsylvania section of Lake Erie. Previous assessments are dated or investigated only specific components of the fishery. Moreover, no previous studies have focused specifically on the social and economic aspects of recreational angling on Pennsylvania Lake Erie waters. In response to these gaps, Pennsylvania Sea Grant commissioned The Pennsylvania State University to collect data and provide answers to these questions. This study was conducted from July 2016 to July 2017 and was funded through the generous contributions of Pennsylvania Sea Grant.

The purpose of this study was to collect, analyze, and interpret the following information:

- Angler socio-demographic profile
- Angler trip visitation patterns and license types
- Angler activity participation and fish species sought
- Angler levels of experience, specialization, and skill
- Angler place attachment with the resource
- Angler preferences for recreation opportunities
- Angler perceptions of satisfaction
- Angler perceptions of consumptive propensity
- Angler economic expenditures
- Angler economic impact and significance
- IMPLAN economic modeling
- Angler stakeholder perceptions of economic expenditures

Section 1-2. Methods

The overarching goal of the study was to assess the economic impact and significance of the recreational angling industry within the 76.6 mile Pennsylvania section of Lake Erie. This study assessed all forms of recreational angling within the Pennsylvania section of Lake Erie including shore angling, boat angling, and special event angling such as angler tournaments. For a guiding framework, this study utilized an exploratory mixed methodology with three connected phases: Phase I) mail back and online surveys of anglers, Phase II) on-site surveys of anglers, and Phase III) qualitative interviews with angler stakeholders.

Phase I

Phase I of the study consisted of a combined mail back and online survey of anglers who fished the Pennsylvania section of Lake Erie in 2016. Under current regulations, all individuals angling within the Pennsylvania section of Lake Erie or its bays and tributaries are required to obtain a specialized Lake Erie permit in addition to their Pennsylvania angler license from the Pennsylvania Fish and Boat Commission. These specialized permits are available in two forms: 1) The *Lake Erie Permit* which allows anglers to fish the Pennsylvania section of Lake Erie and its tributaries, or 2) The *Combination Trout-Salmon/Lake Erie Permit* which allows anglers to fish the Pennsylvania section of Lake Erie and its tributaries as well as other bodies of water in Pennsylvania.

The database of Pennsylvania fishing license holders is maintained by the Pennsylvania Fish and Boat Commission and served as the population and sampling frame for Phase I. To gather a diverse and representative sample, a random sample of 5,000 adult participants (18+) who purchased a 2016 Pennsylvania angler license with a Lake Erie permit or a Combination Permit were randomly selected from the Pennsylvania Fish and Boat Commission's database. Study participants were surveyed using a combined online and mail back survey protocol established by Dillman (1991) and the Dillman Total Design Method. It should be noted that upon investigation, 298 of the 5,000 respondents' addresses and/or contact information were found to be invalid and/or non-deliverable. Therefore, a final random sample of 4,702 adult participants (18+) who purchased a 2016 Pennsylvania angler license with a Lake Erie permit or a Combination Permit was utilized in this study.

The modified Dillman Total Design Method used in this study consisted of four separate contacts. First, all of the participants in the sample were mailed a recruitment letter. The recruitment letter described the survey's purpose, informed consent, and directed the recipient to a secure online survey platform where the online survey option could be completed. Participants were allowed 1-2 weeks to complete this step. Following that period, participants who had not completed the online survey option were then mailed a second recruitment letter as well as a paper version of the survey and a postage-paid reply envelope. This second recruitment letter described the survey's purpose, informed consent, and directed the recipient to complete either the online survey or the included paper survey and mail it back. Participants were allowed 1-2 weeks to complete this step. Following that period, participants who had not completed either the online survey or the paper mail back survey were then sent a third recruitment letter. This third recruitment letter described the survey's purpose, informed consent, and reminded the recipient to complete either the online survey or the paper survey which they had previously received in the last mailing. Participants were allowed 1-2 weeks to complete this step. Finally, participants who had not completed either the online survey or the paper mail back survey were then mailed a fourth and final recruitment letter as well as a paper version of the survey and a postage-paid reply envelope. This fourth recruitment letter described the survey's purpose, informed consent, and directed the recipient to complete either the online survey or the included paper survey and mail it back.

This survey protocol was based on the Dillman Total Design Method and was intended to achieve the highest possible response rate. A total of 4 contacts were made with potential study participants (4 recruitment letters and 2 full survey mailings). This method was also consistent with methods used by the Pennsylvania Game Commission for their in-house surveys of Pennsylvania hunters. Overall, Phase I of

the study, consisting of four separate mail back and online contacts, was conducted between the dates of January 24, 2017 and April 17, 2017. Within this sampling timeframe 606 mail back surveys and 583 online surveys were completed, yielding a combined 25% response rate (Table 1).

Table 1. Phase I Survey Response Rate

	Online Sub-Sample	Mail back Sub-Sample	Total
Respondents	583	606	1,189
Response Rate	12.40%	12.88%	25.28%
Percent of Overall Sample	49.03%	50.96%	100%

*Note. Overall Phase I sample based on $n=4,702$ (5,000 mailings minus 298 non-deliverable mailings)

Phase II

Phase II of the study consisted of a series of on-site face to face interviews with anglers along the Pennsylvania section of Lake Erie. Through conversations with Pennsylvania natural resource management agencies and local stakeholders, the research team identified priority locations being utilized by anglers within the Pennsylvania section of Lake Erie. These survey locations were individually selected based on their popularity among a wide range of anglers including shore anglers, boat anglers, and special event anglers such as angling tournaments. To gather a diverse and representative sample, a systematic sampling plan was developed in consultation with natural resource managers and local stakeholders to coincide data collection with peak angling use periods (Vaske, 2008).

The on-site survey was administered via tablet computers using the commercially available off-line data collection application iSurvey. A trained research assistant approached potential respondents, described the purpose of the study, and solicited respondents to participate in the survey, which was read aloud and took between 10 and 15 minutes to complete. If potential respondents indicated they did not partake in any form of angling that day, they were thanked for their time and excluded from the study. For further systematic sampling purposes, interviewers contacted every third person or party observed and requested their participation (Vaske, 2008). Only consenting adults (18+) were eligible to participate. Overall, the Phase II on-site survey was conducted throughout the priority survey locations from July 30, 2016 to July 15, 2017. This full year of sampling accounted for 40 total sampling days representing the four seasons of angler use within the Pennsylvania section of Lake Erie. In total, 578 surveys were attempted, yielding 516 completed surveys and an 89% response rate (Table 2).

Table 2. Phase II Survey Response Rate

	Total
Respondents	516
Response Rate	89.27%
Percent of Overall Sample	100%

*Note. Overall Phase II sample based on $n=578$

Phase III

Phase III of the study consisted of a series of qualitative interviews with various angler stakeholders within the Pennsylvania section of Lake Erie. A total of 9 qualitative interviews were conducted with stakeholders in June of 2017. The interviews were transcribed verbatim by the research team and then analyzed according to major themes. The purpose of these interviews was to corroborate estimates of economic impacts and significance derived from the surveys of anglers and to better understand stakeholders' perceptions of the economic conditions of the recreational angling industry within the Pennsylvania section of Lake Erie.

Section 2. Phase I Overall Results

Section 2-1. Angler Profile

In order to develop an angler profile, the Phase I study sample was asked to identify their gender, age, ethnic background, earned income level, and highest education level obtained (Table 3). The first column in Table 3 indicates the valid percentages and means for each category while the second column reflects the total sample size within each category.

- Sex/gender within the sample indicated that nearly 9 out of 10 anglers were male (88%) while 12% were female (Table 3).
- The average age of the adult sample was 50 years with 16% representing the 18-35-year age group, 27% representing the 36-50-year age group, 43% representing the 51-64-year age group, and 14% representing the 65 and older age group.
- A large majority of the anglers surveyed (96%) reported their race/ethnicity as White.
 - Other ethnicities reported included Asian, Hispanic, and African-American.
- Nearly three-quarters (73%) reported earned household incomes of \$50,000 or more while 27% reported earned household incomes less than \$50,000.
- Approximately one-third of anglers (35%) reported earning a high school degree or less, while 36% of the sample earned either a four-year college or professional degree.

Table 3. Phase I Angler Profile

Variable	% or Mean	n
<i>Gender</i>		
Male	87.7%	939
Female	12.3%	132
<i>Age</i>		
Average age	50 years	
18-35	16.0%	169
36-50	26.7%	281
51-64	43.3%	456
65 and Older	14.0%	148
<i>Race/Ethnic Background</i>		
White	95.6%	1029
African American	0.9%	10
Other	2.5%	26
<i>Income</i>		
\$25,000 or less	5.6%	57
\$25,000 to \$49,999	21.0%	212
\$50,000 to \$74,999	26.2%	265
\$75,000 to \$99,999	18.0%	182
\$100,000 to \$149,999	18.3%	185
\$150,000 or more	10.9%	110
<i>Education</i>		
Some High School	4.1%	44
High School graduate	30.4%	323
Some College	16.3%	173
Two Year College	13.0%	138
Four Year College	20.6%	219
Graduate or Professional Degree	15.7%	167

*Note. Percentages may not equal 100 because of rounding

Section 2-2. Trip Visitation Patterns and License Type

Information pertaining to anglers' trip visitation patterns and license information was collected to further understand the angler profile. The sample was asked to indicate their state and county of residency, the distance they traveled from their home to the study site, and the type of permit they purchased for the 2016 angling season. (Table 4).

- Approximately three-quarters of respondents (74%) were Pennsylvania residents (Table 4).
- Among those who indicated they were Pennsylvania residents, the majority were from Erie County (19%), Allegheny County (16%), Westmorland County (6%), or Butler County (5%).
- On average, anglers indicated they traveled approximately 103 miles from their home to the Pennsylvania section of Lake Erie to partake in their activity.
 - Approximately one-quarter of anglers (28%) reported traveling 50 miles or less from their home to the Pennsylvania section of Lake Erie.
- The anglers in the sample were asked to indicate each of the angling licenses they had purchased during the 2016 Lake Erie season. Approximately four-fifths of survey respondents (80%) indicated they had purchased either a Combination Trout-Salmon & Lake Erie Permit (35%), an Adult Resident Permit (35%), and/or a Lake Erie Permit (10%).

Table 4. Phase I Anglers' Trip Visitation Patterns and License Type

Variable	% or Mean	n
<i>Residency Status</i>		
Pennsylvania resident	73.8%	929
<i>County of Residence</i>		
Erie County	19.2%	203
Allegheny County	15.6%	165
Westmoreland	5.6%	59
Butler	4.8%	51
<i>Distance Traveled from Home</i>		
Average total distance traveled	102.74 miles	933
Visitors travelling 50 miles or less	27.7%	258
<i>Angling License Type^a</i>		
Combination Trout-Salmon/Lake Erie Permit	35.3%	755
Adult Resident	35.2%	753
Lake Erie Permit	10.0%	215
Trout-Salmon Permit	8.2%	175
Adult Non-Resident	6.0%	129
Senior- Annual	1.9%	41
Senior- Lifetime	1.9%	41
1, 3, or 7-day Tourist	1.0%	21

*Note. Percentages may not equal 100 because of rounding

^aNote. Respondents could select more than one option therefore percentages may not equal 100

Section 2-3. Primary Angler Activity Participation & Fish Species Sought

Due to the multifaceted nature of outdoor recreation within the Pennsylvania section of Lake Erie, a wide variety of angler activities could take place simultaneously. In this study, anglers were asked to indicate which angling method was their *primary activity* during the 2016 fishing season. The respondents were categorized based on their primary activity response and placed into one of six categories: 1) *Private Boat*, 2) *Shoreline*, 3) *Pier*, 4) *Charter Boat*, 5) *Ice Angler*, or 6) *Rental Boat* (Table 5). Moreover, Lake Erie is home to a wide array of fish species. In this study, anglers were also asked to identify the one fish species they primarily targeted during the 2016 season within the Pennsylvania section of Lake Erie (Table 6).

- Of the entire sample, angling from a private boat represented more than two-fifths (41%), angling from the shoreline represented nearly two-fifths (39%), while angling from a pier (13%), angling from a charter boat (7%), as well as ice angling (>1%), and angling from a rental boat (>1%) represented the smallest angler segments (Table 5).
 - Approximately 50% of anglers' primary method of angling was from a shoreline or pier.
- In terms of the primary fish species sought, Steelhead (27%) and Walleye (26%) represented just over one-half, followed closely by Yellow Perch (18%), Smallmouth Bass (11%), and Largemouth Bass (9%) (Table 6).
 - Other primary fish species sought included Brown Trout (5%), Crappie (2%), Muskellunge (2%), and Bluegill/Sunfish (2%).

Table 5. Phase I Anglers' Primary Activity Participation

Activity Type	Valid Percentage	<i>n</i>
Angling from a private boat	40.5%	290
Angling from the shoreline	38.8%	278
Angling from a pier	12.6%	90
Angling from a charter boat	7.3%	53
Ice angler	0.6%	4
Angling from a rental boat	0.1%	1

*Note. Percentages may not equal 100 because of rounding

Table 6. Phase I Anglers' Primary Fish Species Sought

Species Type	Valid Percentage	<i>n</i>
Steelhead	26.6%	180
Walleye	25.6%	173
Perch-Yellow	17.6%	119
Bass-Smallmouth	10.9%	74
Bass- Largemouth	9.2%	62
Trout-Brown	5.0%	34
Crappie	1.9%	13
Muskellunge	1.6%	11
Bluegill Sunfish	1.5%	10

*Note. Percentages may not equal 100 because of rounding

Section 2-4. Level of Experience, Specialization, and Skill

Anglers have various levels of experience and specialization which can influence their connection and perception towards a natural resource. In this study, anglers were asked about their intentions to fish the 2017 Pennsylvania Lake Erie angler season as well as their level of experience with the Pennsylvania section of Lake Erie, and their level of experience with other non-Pennsylvania Lake Erie waters (Table 7). Anglers were also asked to identify their level of primary angling specialization based on three narratives. This self-rated specialization assessment asked anglers to self-classify as either *high specialization*, *moderate specialization*, or *low specialization* (Tables 8 and 9). Further, anglers were also asked to self-classify their level of skill based on five skill categories: *novice*, *amateur*, *intermediate*, *advanced*, or *expert* (Table 10).

- The majority of respondents (92%) reported they intend to fish the 2017 Lake Erie angler season (Table 7).
- Survey respondents noted they spent an average of 8 days in 2016 and an average of 18 total years fishing the Pennsylvania section of Lake Erie.
- Anglers also noted they spent an average of 13 days in 2016 and an average of 34 total years angling anywhere other than the Pennsylvania section of Lake Erie.
- The majority of anglers in the sample considered themselves to be either moderately specialized (58%) or highly specialized (32%) in their angling involvement based on the valid percentages for each narrative (Tables 8 and 9).
 - Moderately specialized anglers (58%) were described as individuals who dedicated a moderate amount of time and money to angling, were moderately skilled, and dedicated a moderate amount of time to learn more about angling.
 - Highly specialized anglers (32%) were described as individuals who dedicated a large amount of time and money to angling, were highly skilled, and dedicated a substantial amount of time to learn more about angling.
- About one-third of anglers self-classified their skill level as intermediate (34%), while more than half of the anglers sampled (57%) felt that their skill level was either advanced or expert.

Table 7. Phase I Anglers' Level of Experience

Variable	% or Mean	n
<i>Intent to Fish the 2017 PA Lake Erie Angler Season</i>		
Yes	92.0%	964
No	8.0%	84
<i>Total Days Fishing</i>		
Pennsylvania Lake Erie Waters	8.02 days	1009
Other non-Pennsylvania Lake Erie waters	13.26 days	944
<i>Total Years Fishing</i>		
Pennsylvania Lake Erie waters	18.19 years	1003
Anywhere other than Pennsylvania Lake Erie waters	33.61 years	833

*Note. Percentages may not equal 100 because of rounding

Table 8. Phase I Anglers' Activity Specialization Narrative Examples

Specialization Type	Narrative
High Specialization	Fishing is my most important activity compared to all other activities. I purchase increasing amounts of equipment to aid in fishing, participate in angling every chance I get, consider myself to be a highly skilled angler, and frequently read articles about fishing.
Moderate Specialization	Fishing is important, but I do other outdoor activities too. I occasionally read articles about fishing and purchase additional equipment to aid in fishing. My fishing participation is inconsistent, and I am a moderately skilled angler.
Low Specialization	Fishing is an enjoyable, but infrequent activity that is secondary to other outdoor interests. I am not a highly skilled angler, rarely read articles about fishing, and do not own much fishing equipment beyond the basic necessities.

Table 9. Phase I Anglers' Activity Specialization

Specialization Type	Valid Percentages	n
High Specialization	32.3%	340
Moderate Specialization	58.2%	612
Low Specialization	9.5%	100

*Note. Percentages may not equal 100 because of rounding.

Table 10. Phase I Anglers' Skill Level

Mean	Valid Percentages				
	Novice (1)	Amateur (2)	Intermediate (3)	Advanced (4)	Expert (5)
3.53	1.6%	8.2%	33.6%	48.6%	8.0%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Novice and 5 = Expert

Section 2-5. Place Attachment

Anglers have varying levels of attachment to natural resources. In this study, anglers were asked to indicate their level of attachment to the Pennsylvania section of Lake Erie. Three domains of place attachment were measured: 1) place identity, 2) place dependence, and 3) community and social attachment (Table 11). These three place attachment domains were measured on a five-point scale, with one representing “strongly disagree” and five representing “strongly agree”.

- Anglers strongly identified with the Pennsylvania section of Lake Erie, with more than three-fourths of the sample (78%) agreeing that the area meant a lot to them and nearly half of the sample (47%) agreeing that they were very attached to the area (Table 11).
- Anglers were moderately dependent on the Pennsylvania section of Lake Erie to engage in their primary angling pursuit. More than half of the respondents (56%) agreed that no other place could compare to the area. About two-fifths of respondents (41%) reported they would not substitute any other area for doing the types of fishing they do here. Moreover, about one-third of the sample (32%) disagreed that they would enjoy angling just as much at a lake other than Lake Erie.
- Respondents indicated that they were moderately attached to the community and social elements associated with the Pennsylvania section of Lake Erie. Nearly half of the sample (45%) agreed that people in the area were important to them. However, less than one-third of the respondents indicated they have many ties to the people in this area (28%) and many of their friends and/or family live in the area (27%).

Table 11. Phase I Anglers’ Place Attachment

Variable	Mean	Disagree (%)	Neutral (%)	Agree (%)
<i>Place Identity</i>				
This area means a lot to me	4.17	3.2%	19.0%	77.8%
I feel very attached to this area	3.33	23.7%	29.6%	46.6%
I identify strongly with this area	3.17	29.0%	31.1%	39.8%
<i>Place Dependence</i>				
No other place can compare to this area for the types of fishing I do here	3.63	16.3%	27.3%	56.3%
I wouldn’t substitute any other area for doing the types of fishing that I do here	3.28	24.6%	34.9%	40.5%
The fishing that I do here, I would enjoy doing just as much at a similar lake	2.93	31.9%	31.4%	36.7%
<i>Community and Social Attachment</i>				
The people in this area are very important to me	3.47	12.6%	42.3%	45.0%
I have many ties to the people in this area	2.75	45.7%	26.4%	27.9%
Many of my friends and/or family live in this area	2.53	54.0%	19.2%	26.9%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Strongly Disagree and 5 = Strongly Agree

Section 2-6. Recreation Experience Preferences

Anglers have a variety of reasons and motivations for visiting natural areas. In this study, survey respondents were asked to indicate the importance of various reasons for angling at the Pennsylvania section of Lake Erie as well as if those reasons were attained. The experience preference importance assessment was measured on a five-point scale with one representing “not at all important” and five representing “extremely important”. The experience preference attainment was measured on a five-point scale with one representing “not at all attained” and five representing “highly attained”. The angler experience preferences were categorized into the following domains: 1) enjoyment of nature, 2) relaxation seeking, 3) social motivation, and 4) challenge seeking. The difference between experience preference importance and experience preference attainment was represented as a gap score mean (Table 12).

- In general, “to be outdoors”, “to experience natural surroundings”, “to be close to nature”, “to get away from the regular routine”, “for relaxation”, and “to do things with your companions” were the primary reasons for visiting the Pennsylvania section of Lake Erie (Table 12).
- The social motivations of doing things with companions, family, and others sharing common interests were moderately important to the Lake Erie anglers.
- However, “to develop your skills”, “for the experience of the catch”, and “to get away from the demands of other people” were less likely to be important reasons for visiting.
- In terms of gap scores, the attainment scores closely matched the importance scores for most of the items measured. The majority of the experience preferences (67%) were successfully attained, while a minority of experience preferences (33%) were not attained.
 - Nearly each one of the unattained experience preferences revolved around the domain of “challenge seeking” (Table 12).

Table 12. Phase I Anglers’ Recreation Experience Preferences - Importance and Attainment

Variable	Mean^a	Mean^b	Gap
<i>Enjoyment of Nature</i>			
To be outdoors	4.46	4.47	0.01
To experience natural surroundings	4.27	4.29	-0.02
To be close to nature	4.33	4.32	0.01
<i>Relaxation Seeking</i>			
To get away from the regular routine	4.27	4.24	0.03
For relaxation	4.27	4.24	0.03
To get away from the demands of other people	3.93	3.97	0.04
<i>Social Motivations</i>			
To do things with your companions	4.25	4.21	0.04
To be with others who enjoy the same things as you	4.24	4.20	0.04
To do something with your family	3.93	3.91	0.02
<i>Challenge Seeking</i>			
For the challenge or sport	4.00	4.02	-0.02
For the experience of the catch	3.80	3.84	-0.04
To develop your skills	3.56	3.66	-0.10

*Note. Percentages may not equal 100 because of rounding.

^aResponse Code: 1 = Not at all Important and 5 = Extremely Important

^bResponse Code: 1 = Not at all Attained and 5 = Highly Attained

Section 2-7. Angler Satisfaction

Anglers were asked to evaluate their overall levels of satisfaction with angling in the Pennsylvania section of Lake Erie during the entire 2016 season in three separate ways. The first was an assessment of overall satisfaction measured on a six-point scale with one representing “very dissatisfied” and six representing “very satisfied” (Table 13). The second was a multi-item overall satisfaction measure consisting of six individual items measured on a five-point scale with one representing “strongly disagree” and five representing “strongly agree” (Table 14). The third assessment measured satisfaction on a five-point scale with one representing “very dissatisfied” and five representing “very satisfied” within four satisfaction domains: 1) setting/environmental conditions, 2) fishing opportunity, 3) fish/harvest, and 4) crowding/social conditions (Table 15).

- Overall satisfaction was moderate with nearly half of the sample (48%) indicating they were either “satisfied” or “very satisfied” with their overall 2016 Lake Erie angling season (Table 13).
- The multi-item overall satisfaction measure also found moderate levels of satisfaction among the sample with means ranging from 3.68 to 2.41 (Table 14). Three-fifths of anglers (60%) agreed that they thoroughly enjoyed their fishing season, while more than half of respondents (51%) disagreed that they could not imagine a better fishing season.
 - It should be noted that three items within this construct were reverse worded to prevent response bias. The means and valid percentages for these three reverse worded items should be interpreted as a double negative.
- Anglers reported high levels of satisfaction with the setting and environmental conditions for the Pennsylvania section of Lake Erie, with more than three-fifths of the sample (60%) reporting being satisfied with the water quality, cleanliness, and habitat conditions (Table 15).
- Respondents indicated moderate levels of satisfaction with the fishing opportunities within the Pennsylvania section of Lake Erie, with more than one-third of the sample (33%) reporting being satisfied with the amount of time spent fishing, opportunities to get out fishing, and the number of fishing trips made.
- Anglers noted moderate levels of satisfaction with fish and/or harvest related conditions for the Pennsylvania section of Lake Erie.
 - “Fighting quality of the fish” was the most highly rated among these items (65% satisfied).
 - Between one-third and one-half of the sample (35-46%) reporting being satisfied with the average weight of fish, the average length of fish, the total number of fish caught, and the number of fish biting.
- Respondents indicated moderate levels of satisfaction with the crowding and/or social conditions within the Pennsylvania section of Lake Erie, with more than one-third of the sample reporting being satisfied with the opportunity to fish without feeling crowded (48%), the competition with other anglers for fishing spots (40%), and the number of anglers fishing nearby (35%).

Table 13. Phase I Anglers' Overall Satisfaction Rating

Mean	Valid Percentages				
	Very Dissatisfied (1)	Dissatisfied (2)	Neutral (3)	Satisfied (4)	Very Satisfied (5)
3.37	6.0%	11.7%	34.6%	33.7%	14.0%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Very Dissatisfied and 5 = Very Satisfied

Table 14. Phase I Anglers' Multi-Item Satisfaction Rating

Variable	Mean	Disagree (%)	Neutral (%)	Agree (%)
I thoroughly enjoyed the fishing season	3.68	14.3%	25.3%	60.2%
The season was well worth the money I spent on it	3.32	24.8%	29.0%	46.1%
I cannot imagine a better fishing season	2.41	50.6%	37.2%	12.1%
The fishing season was not as enjoyable as expected ^a	2.59	50.1%	25.3%	24.6%
I do not want to have any more fishing seasons like this one ^a	2.70	26.2%	28.6%	45.1%
I was disappointed with some aspects of the fishing season ^a	3.05	38.3%	28.9%	32.7%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Strongly Disagree and 5 = Strongly Agree

^aNote. Item was reverse worded to prevent response bias. Findings should be interpreted as a double negative.

Table 15. Phase I Anglers' Satisfaction Domains

Variable	Mean	Dissatisfied (%)	Neutral (%)	Satisfied (%)
<i>Setting/Environmental Conditions Satisfaction</i>				
Water quality in the areas you fished	3.86	6.1%	23.3%	70.5%
Cleanliness of fishing sites visited	3.79	8.2%	25.3%	66.5%
Habitat conditions in the areas you fished	3.65	9.1%	31.1%	59.7%
<i>Fishing Opportunity Satisfaction</i>				
Amount of time you spent fishing	3.70	12.2%	28.2%	59.7%
Opportunity to get out fishing	3.33	25.2%	27.8%	46.9%
Number of fishing trips made	3.01	34.7%	32.0%	33.3%
<i>Fish/Harvest Related Satisfaction</i>				
Fighting quality of the fish	3.79	7.0%	28.0%	65.2%
Average weight of fish caught	3.35	15.4%	38.6%	45.9%
Average length of fish caught	3.32	16.2%	39.6%	44.3%
Total number of fish caught	3.03	31.0%	33.2%	35.9%
Number of fish (of your target species) biting	2.99	32.3%	32.9%	34.7%
<i>Crowding/Social Condition Satisfaction</i>				
Opportunity to fish without feeling crowded	3.29	26.4%	26.0%	47.6%
Competition with other anglers for fishing spots	3.20	25.6%	34.8%	39.7%
Number of anglers fishing nearby	3.12	25.1%	40.4%	34.6%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Very Dissatisfied and 5 = Very Satisfied

Section 2-8. Perceptions of Consumptive Orientation

Anglers often have various perceptions towards catching and keeping fish. These “consumptive orientations” generally refer to an angler’s attitude toward the importance of catching and retaining fish, the number of fish caught, and the size of fish caught. Overall, they denote the degree to which anglers value the catch-related outcomes of the angling experience (Kyle et al., 2007). In this study, anglers were asked about their perceptions of four domains of consumptive orientation: 1) disposition of catch, 2) number of fish caught, 3) type of fish caught, and 4) catch orientation (Table 16). These four consumptive orientation domains were measured on a five-point scale, with one representing “strongly disagree” and five representing “strongly agree”.

- Regarding disposition of catch, about three-fourths of anglers were just as happy if they release the fish they catch (75%) and half disagreed that “bringing fish home to the table is an important outcome” (50%).
- Most anglers (67%) indicated that, “the more fish I catch, the happier I am”, but over half (54%) disagreed that “a full stringer is the best indicator of a good trip”.
- Anglers were more ambivalent about the type of fish caught. About half agreed that “the bigger the fish I catch, the better the fishing trip”, but they were more divided about the importance of catching a trophy fish.

Table 16. Phase I Anglers’ Consumptive Orientation

Variable	Mean	Disagree (%)	Neutral (%)	Agree (%)
<i>Disposition of Catch</i>				
I must keep the fish I catch for the trip to be successful	1.77	77.3%	14.2%	8.6%
I am just as happy if I release the fish I catch ^a	4.21	8.7%	15.8%	75.4%
Bringing fish home to the table is an important outcome	2.45	50.1%	21.7%	28.2%
<i>Number of Fish Caught</i>				
The more fish I catch, the happier I am	3.89	9.1%	25.0%	66.4%
A successful fishing trip is one in which many fish are caught	3.23	25.1%	29.6%	45.3%
A full stringer is the best indicator of a good trip	2.43	53.7%	23.3%	23.0%
<i>Type of Fish Caught</i>				
The bigger the fish I catch, the better the fishing trip	3.39	23.0%	27.3%	49.7%
It doesn’t matter to me what type of fish I catch ^a	3.07	35.0%	26.8%	38.2%
Catching a ‘trophy’ fish is the biggest reward to me	3.06	32.0%	30.1%	37.8%
<i>Catch Orientation</i>				
A fishing trip can be successful to me even if no fish are caught ^a	3.45	24.1%	24.3%	51.6%
When I go fishing, I’m not satisfied unless I catch something	2.86	39.3%	29.4%	31.2%
When I go fishing, I am just as happy if I don’t catch a fish ^a	2.75	45.0%	28.4%	26.6%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Strongly Disagree and 5 = Strongly Agree

^aNote. Item was reverse worded to prevent response bias. Findings should be interpreted as a double negative.

Section 2-9. Angler Economic Expenditures

A primary component of this research was to gather a more accurate profile of anglers' expenditures for economic impact analyses. In this study, anglers were asked a range of questions regarding their total monetary expenditures during the 2016 recreational angling season within the Pennsylvania section of Lake Erie. These questions established an assessment of the reported expenditures across the entire 2016 recreational angling season within the Pennsylvania section of Lake Erie. What follows in this section of the report is a description of annual economic expenditures spent in three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. Additional economic questions focused on annual angler trip profiles and itineraries is also included (Table 17).

Phase I Anglers' Economic Trip Profile

- On average, anglers noted that two people were covered by their annual trip expenditures to the Pennsylvania section of Lake Erie in 2016 (Table 17).
 - The vast majority of respondents (79%) reported one or two anglers being covered by their annual trip expenditures to the Pennsylvania section of Lake Erie.

- On average, anglers noted that five trips to the Pennsylvania section of Lake Erie in 2016 were covered by their annual expenditures (Table 17).
 - Nearly half of the respondents (44%) reported that four or more trips to the Pennsylvania section of Lake Erie were covered by their annual expenditures.
 - More than one-quarter of anglers (28%) reported that only one trip to the Pennsylvania section of Lake Erie was covered by their annual expenditures.

Table 17. Phase I Anglers' Economic Trip Profile

Variable	% or Mean	n
<i>Number of People Covered by Expenses</i>		
Average Number of People	1.91	818
One	41.1%	336
Two	37.5%	307
Three	11.2%	92
Four or more	10.1%	83
<i>Number of Lake Erie Fishing Trips Covered by Expenses</i>		
Average Number of Trips	4.99	800
One	27.5%	220
Two	15.9%	127
Three	12.8%	102
Four or more	43.9%	351

*Note. Percentages may not equal 100 because of rounding.

Phase I Summary of Proportion of Anglers Spending Something in Each Category

In this study anglers were asked how much they spent within 18 categories during the entire 2016 recreational angling season within the Pennsylvania section of Lake Erie. These expenditures were segmented across three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. The results in Table 18 provide the proportion or percentage of anglers' reporting annual expenditures in each of the categories.

- The highest proportion of angler expenditures in *Erie County* were in the categories of automobile gasoline and oil (76%), restaurants, bars, etc. (62%), and groceries (60%).
- The largest proportion of angler expenditures in *any other county in Pennsylvania* were in the categories of automobile gasoline and oil (45%), groceries (22%), and restaurants, bars, etc. (15%).
- The highest proportion of angler expenditures *outside of Pennsylvania* were within the categories of automobile gasoline and oil (16%), groceries (7%), and restaurants, bars, etc. (6%).
- Few anglers reported spending much within the categories of camping, parking, boat launching fees, boat mooring fees, tournament entry fees, and/or entertainment.

Table 18. Phase I Proportion of Anglers Spending Something in Each Category

Economic Expenditure Items	Location of Spending		
	In Erie County	In any other County in PA	Outside of Pennsylvania
The Number of Anglers Spending Something in Each Category			
<i>Travel Expenditures</i>			
Automobile gasoline/oil	75.8%	44.7%	16.0%
Boat gasoline/oil	27.4%	7.0%	0.3%
Airfare	---	---	0.4%
Rental vehicle	0.4%	---	---
Lodging	30.0%	1.0%	0.3%
Camping	0.7%	2.3%	0.8%
Parking	1.8%	0.1%	0.3%
Boat launching fees	1.7%	0.5%	2.1%
Boat mooring fees	1.2%	0.2%	0.3%
<i>Food and Beverage</i>			
Groceries	60.0%	21.8%	7.0%
Restaurants, bars, etc.	62.1%	14.9%	6.1%
<i>Other Shopping, Services, and Entertainment</i>			
Guide, charter fees, boat rental, tips	8.1%	0.3%	0.6%
Equipment (rod, reels, etc.)	33.7%	11.4%	4.0%
Tournament entry fees	2.0%	0.5%	0.5%
Lures and flies	42.2%	13.5%	4.8%
Bait (live, cut, prepared, etc.)	52.3%	10.7%	2.7%
Entertainment (movies, casino, etc.)	2.9%	0.8%	0.2%
Shopping (souvenirs, clothing, etc.)	10.1%	1.4%	0.8%

*Note: The top three proportions within each category are bolded

Phase I Summary of Specific Trip Expenditure Costs for Anglers Spending Something

In this study anglers were asked how much they spent within 18 categories during the entire 2016 recreational angling season within the Pennsylvania section of Lake Erie. These expenditures were segmented across three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. The results in Table 19 provide the average expenditures among anglers reporting spending something in each category. These numbers cannot be totaled because they are based on a varying number of anglers making the various types of purchases.

- The highest expenditure categories among anglers spending in *Erie County* included lodging (\$265), camping (\$181), and guide, charter fees, boat rentals, and/or tips (\$168).
- The largest expenditure categories among anglers spending in *any other county in Pennsylvania* included angler equipment (\$127), automobile gasoline and oil (\$121), and camping (\$102).
- The highest expenditure categories among anglers spending *outside of Pennsylvania* included automobile gasoline and oil (\$174), lodging (\$172), and groceries (\$101).

Table 19. Phase I Summary of Specific Trip Expenditure Costs for Anglers Spending Something

Economic Expenditure Items	Location of Spending		
	In Erie County	In any <i>other</i> County in PA	Outside of Pennsylvania
Average Amount Spent- Among Anglers Spending Something in Each Category			
<i>Travel Expenditures</i>			
Automobile gasoline/oil	\$114.26	\$121.35	\$174.21
Boat gasoline/oil	\$135.18	\$81.55	\$91.87
Airfare	---	---	\$450.00 ^a
Rental vehicle	\$187.00 ^a	---	\$285.71 ^a
Lodging	\$264.64	\$84.81 ^a	\$172.11
Camping	\$180.65	\$102.25	\$190.00 ^a
Parking	\$13.43	---	---
Boat launching fees	\$25.96	\$15.25 ^a	\$31.11
Boat mooring fees	\$195.50 ^a	---	---
<i>Food and Beverage</i>			
Groceries	\$120.58	\$90.71	\$100.62
Restaurants, bars, etc.	\$124.61	\$86.15	\$98.69
<i>Other Shopping, Services, and Entertainment</i>			
Guide, charter fees, boat rental, and/or tips	\$167.85	---	\$90.40 ^a
Equipment (rod, reels, etc.)	\$145.36	\$126.65	\$96.23
Tournament entry fees	\$83.05	\$34.40 ^a	\$29.25 ^a
Lures and flies	\$61.77	\$68.00	\$66.34
Bait (live, cut, prepared, etc.)	\$46.18	\$30.09	\$30.04
Entertainment (movies, casino, etc.)	\$67.48	\$25.28 ^a	---
Shopping (souvenirs, clothing, etc.)	\$84.03	\$41.83 ^a	\$56.71 ^a

^aNote. Sample size $n < 30$

*Note: The top three expenditures within each category are bolded

Phase I Summary of Specific Trip Expenditure Costs for All Anglers

In this study anglers were asked how much they spent within 18 categories during the entire 2016 recreational angling season within the Pennsylvania section of Lake Erie. These expenditures were segmented across three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. The results in Table 20 provide the average expenditures among all anglers in the sample. These averages include those spending nothing in various categories, and therefore can be totaled to indicate the average total amount spent for all categories.

- The average total amount spent by all anglers during the 2016 season in *Erie County* was \$494. The highest expenditure categories among all anglers within *Erie County* included automobile gasoline and oil (\$87), lodging (\$79), and restaurants, bars, etc. (\$77).
- The average total amount spent by all anglers during the 2016 season in *any other county in Pennsylvania* was \$124. The largest expenditure categories among all anglers within *any other county in Pennsylvania* included automobile gasoline and oil (\$54), groceries (\$20), and angler equipment (\$14).
- The average total amount spent by all anglers during the 2016 season *outside of Pennsylvania* was \$65. The highest expenditure categories among all anglers *outside of Pennsylvania* included automobile gasoline and oil (\$28), groceries (\$7), and lodging (\$5).

Table 20. Phase I Summary of Specific Trip Expenditure Costs for All Anglers

Economic Expenditure Items	Location of Spending		
	In Erie County	In any <i>other</i> County in PA	Outside of Pennsylvania
Average Amount Spent- Among All Anglers			
<i>Travel Expenditures</i>			
Automobile gasoline/oil	\$86.61	\$54.23	\$27.89
Boat gasoline/oil	\$37.04	\$5.76	\$3.41
Airfare	---	---	\$2.06
Rental vehicle	\$0.85	---	\$2.28
Lodging	\$79.26	\$1.09	\$5.44
Camping	\$12.81	\$2.36	\$1.53
Parking	\$0.24	---	---
Boat launching fees	\$0.75	\$0.07	\$0.64
Boat mooring fees	\$2.27	---	---
<i>Food and Beverage</i>			
Groceries	\$72.26	\$19.80	\$6.94
Restaurants, bars, etc.	\$77.32	\$12.79	\$6.00
<i>Other Shopping, Services, and Entertainment</i>			
Guide, charter fees, boat rental, and/or tips	\$13.64	---	\$0.52
Equipment (rod, reels, etc.)	\$49.01	\$14.45	\$3.81
Tournament entry fees	\$1.63	\$0.19	\$0.13
Lures and flies	\$26.09	\$9.20	\$3.17
Bait (live, cut, prepared, etc.)	\$24.17	\$3.23	\$0.80
Entertainment (movies, casino, etc.)	\$1.97	\$0.20	---
Shopping (souvenirs, clothing, etc.)	\$8.47	\$0.57	\$0.45
Total	\$494.39	\$123.94	\$65.07

*Note: The top three expenditures within each category are bolded

Section 3. Phase II Overall Results

Section 3-1. Angler Profile

In order to develop an angler profile, the Phase II study sample was asked to identify their gender, age, ethnic background, earned income level, highest education level obtained, and group size (Table 21). The first column in Table 21 indicates the valid percentages and means for each category while the second column reflects the total sample size within each category.

- Sex/gender within the sample indicated that nearly 9 out of 10 anglers were male (89%) while approximately 11% were female (Table 21).
- The average age of the adult sample was 49 years with 17% representing the 18-35-year age group, 28% representing the 36-50-year age group, 36% representing the 51-64-year age group, and 19% representing the 65 and older age group.
- A large majority of the anglers surveyed (90%) reported their race/ethnicity as White.
 - Other ethnicities reported included African-American, Asian, and Hispanic.
- More than half of the respondents (54%) reported earned household incomes of \$50,000 or greater while 46% reported earned household incomes less than \$50,000.
- Half of the respondents (50%) reported earning a high school degree or less, while 29% of the sample earned either a four-year college or professional degree.
- Anglers reported partaking in their activity with an average group size of two people.
 - Only 16% of the anglers recreated with groups of three or more people, while 44% recreated in groups of two, and 40% recreated alone.

Table 21. Phase II Angler Profile

Variable	% or Mean	n
<i>Gender</i>		
Male	89.1%	939
Female	10.9%	132
<i>Age</i>		
Average age	49.26 age	
18-35	16.8%	84
36-50	27.8%	139
51-64	36.2%	181
65 and Older	19.2%	96
<i>Race/Ethnic Background</i>		
White	90.1%	463
Black or African American	7.2%	37
Other	3.8%	14
<i>Income</i>		
\$25,000 or less	14.6%	47
\$25,000 to \$49,999	31.9%	103
\$50,000 to \$74,999	30.7%	99
\$75,000 to \$99,999	13.6%	44
\$100,000 to \$149,999	7.1%	23
\$150,000 or more	2.2%	7
<i>Education</i>		
Some High School	5.9%	30
High School graduate	44.5%	227
Some College	12.0%	61
Two Year College	8.2%	42
Four Year College	23.9%	122
Graduate or Professional Degree	5.5%	28
<i>Group Size</i>		
Average group size	1.80 people	
Visited alone	40.2%	205
Two people per group	43.5%	222
Three or more people per group	16.3%	83

*Note. Percentages may not equal 100 because of rounding

Section 3-2. Trip Visitation Patterns and License Type

Information pertaining to anglers' trip visitation patterns and license information was collected to further understand the angler profile. The sample was asked to indicate their state and county of residency, the distance they traveled from their home to the study site, the length of their stay, their site substitution preferences, and the type of permit they purchased for the 2016 angling season (Table 22).

- A vast majority of respondents (97%) indicated that fishing was the primary purpose of their trip (Table 22).
- For day trip anglers, the average length of stay within the Pennsylvania section of Lake Erie was 5 hours. For anglers staying overnight in the area, the average length of stay was 3 nights.
- The vast majority of anglers (91%) identified themselves as Pennsylvania residents.
- Among those anglers who indicated they were Pennsylvania residents, the majority were from Erie County (51%), Allegheny County (13%), Westmorland County (4%), Butler County (3%), or Washington County (3%).
- On average, anglers indicated they traveled approximately 69 miles from their home to the Pennsylvania section of Lake Erie to partake in their activity.
 - More than half of the respondents (56%) reported traveling 50 miles or less from their home to the Pennsylvania section of Lake Erie.
- Anglers were asked what they would have done if they were unable to fish the Pennsylvania section of Lake Erie that day.
 - More than half of the respondents (51%) noted they would have fished somewhere else other than the Pennsylvania Lake Erie waters if they could not have fished there that day, while 34% of anglers noted that would have simply stayed home and come back another time if they were unable to fish within the Pennsylvania section of Lake Erie that day.
- The anglers in the sample were also asked to indicate each of the angling licenses they had purchased during the 2016 Lake Erie season. The vast majority of survey respondents (85%) indicated they had purchased either an Adult Resident Permit (31%), a Lake Erie Permit (28%), and/or a Combination Trout-Salmon & Lake Erie Permit (26%).

Table 22. Phase II Anglers' Trip Visitation Patterns and License Type

Variable	% or Mean	n
<i>Fishing was the Primary Purpose of the Trip</i>		
Yes	97.1%	494
No	2.9%	15
<i>Length of Stay</i>		
Day trip	4.95 hours	328
Overnight trip	2.97 days	161
<i>Residency Status</i>		
Pennsylvania resident	91.0%	470
<i>County of Residence</i>		
Erie County	50.8%	262
Allegheny County	13.0%	67
Westmoreland County	3.7%	19
Butler County	3.1%	16
Washington County	3.1%	16
<i>Distance Traveled from Home</i>		
Average total distance traveled	68.78 miles	487
Visitors travelling 50 miles or less	55.8%	271
<i>If Unable to Fish PA Lake Erie Waters</i>		
Fished somewhere else other than PA Lake Erie Waters	51.1%	257
Traveled elsewhere for a different activity	6.4%	32
Traveled to Erie County for another activity	8.2%	41
Stayed home and come back another time	34.4%	173
<i>Fishing License Type^{ab}</i>		
Adult Resident	31.7%	359
Lake Erie Permit	28.3%	320
Combo Trout-Salmon/Lake Erie Permit	26.3%	297
Senior- Lifetime	8.8%	99
Adult Non-Resident	2.6%	29
1, 3, or 7 day Tourist	1.0%	11
Senior- Annual	0.6%	7

*Note. Percentages may not equal 100 because of rounding

^aNote. Respondents could select more than one option therefore percentages may not equal 100

^bNote. Due to a data entry error the *Trout-Salmon Permit* variable was excluded from this analysis

Section 3-3. Primary Angler Activity Participation & Fish Species Sought

Due to the multifaceted nature of outdoor recreation within the Pennsylvania section of Lake Erie, a wide variety of angler activities could take place simultaneously. In this study, anglers were asked to indicate which angling method was their *primary activity on this trip today*. The respondents were categorized based on their primary activity response and placed into one of six categories: 1) *Private Boat*, 2) *Shoreline*, 3) *Pier*, 4) *Charter Boat*, 5) *Ice Angler*, or 6) *Rental Boat* (Table 23). Moreover, Lake Erie is home to a wide array of fish species. In this phase of the study, anglers were also asked to identify the one fish species they primarily targeted on this trip today within the Pennsylvania section of Lake Erie (Table 24).

- Of the entire sample, angling from a pier represented nearly two-fifths of the anglers (38%), angling from the shoreline represented nearly two-fifths (36%), while angling from a private boat (22%), angling from a charter boat (3%), as well as angling from a rental boat (>1%), and ice angling (>1%) represented the smallest angler segments (Table 23).
 - The vast majority of anglers (97%) reported fishing from a pier, the shoreline, or a private boat.
- In terms of the primary fish species sought, Perch (49%) and Walleye (17%) were the most targeted species, followed by Steelhead (10%), Smallmouth Bass (9%), and Largemouth Bass (6%) (Table 24).
 - Other primary fish species sought included Bluegill/Sunfish (6%), Trout (1%), and Crappie (1%).

Table 23. Phase II Anglers' Primary Activity Participation

Activity Type	Valid Percentage	<i>n</i>
Fishing from a pier	38.3%	197
Fishing from the shoreline	36.2%	186
Fishing from a private boat	22.2%	144
Fishing from a charter boat	3.1%	16
Fishing from a rental boat	---	---
Ice fishing	---	---

*Note. Percentages may not equal 100 because of rounding

Table 24. Phase II Anglers' Primary Fish Species Sought

Species Type	Valid Percentage	<i>n</i>
Perch-Yellow	49.0%	245
Walleye	17.4%	87
Steelhead	10.4%	52
Bass-Smallmouth	9.4%	47
Bass-Largemouth	6.0%	30
Bluegill Sunfish	5.6%	28
Trout	1.2%	6
Crappie	1.0%	5

*Note. Percentages may not equal 100 because of rounding

Section 3-4. Level of Experience, Specialization, and Skill

Anglers have various levels of experience and specialization which can influence their connection and perception towards a natural resource. In this study, anglers were asked about their intentions to fish the 2017 Pennsylvania Lake Erie angler season as well as their level of experience with the Pennsylvania section of Lake Erie, and their level of experience with other non-Pennsylvania Lake Erie waters (Table 25). Anglers were also asked to identify their level of primary angling specialization based on three narratives. This self-rated specialization assessment asked angler to self-classify as either *high specialization*, *moderate specialization*, or *low specialization* (Tables 27). Further, anglers were also asked to self-classify their level of skill based on five skill categories: *novice*, *amateur*, *intermediate*, *advanced*, or *expert* (Table 28).

- The majority of respondents (98%) reported they intend to fish the 2017 Lake Erie angler season (Table 25).
- A large majority of the anglers (93%) noted they were repeat visitors to the Pennsylvania section of Lake Erie.
- Anglers noted they spent an average of 5 days per month and an average of 54 days per year fishing the Pennsylvania section of Lake Erie.
- Anglers also noted they spent an average of 28 total years fishing within the Pennsylvania section of Lake Erie and an average of 31 total years angling in waters other than the Pennsylvania section of Lake Erie.
- The majority of anglers in the sample considered themselves to be either highly specialized (54%) or moderately specialized (31%) in their angling involvement based on the valid percentages for each narrative (Tables 26 and 27).
 - Highly specialized anglers (54%) were described as individuals who dedicated a large amount of time and money to angling, were highly skilled, and dedicated a substantial amount of time to learn more about angling.
 - Moderately specialized anglers (31%) were described as individuals who dedicated a moderate amount of time and money to angling, were moderately skilled, and dedicated a moderate amount of time to learn more about angling.
- Nearly half of the anglers sampled (45%) felt that their skill level was either advanced or expert while about two-fifths of anglers (43%) self-classified their skill level as intermediate.

Table 25. Phase II Anglers' Level of Experience

Variable	% or Mean	n
<i>Intent to Fish the 2017 PA Lake Erie Fishing Season</i>		
Yes	98.0%	498
No	2.0%	10
<i>First Time versus Repeat</i>		
First time visitor	2.1%	11
Repeat visitor	92.6%	478
<i>Level of Experience</i>		
Average days per month fishing PA Lake Erie Waters	5.23 days	467
Average days per year fishing PA Lake Erie Waters	53.60 days	457
Average total years fishing PA Lake Erie Waters	27.92 years	487
Average total years fishing non-PA Lake Erie waters	30.58 years	482

*Note. Percentages may not equal 100 because of rounding

Table 26. Phase II Anglers' Activity Specialization Narrative Examples

Specialization Type	Narrative
Highly specialized	Fishing is my most important activity compared to all other activities. I purchase increasing amounts of equipment to aid in fishing, participate in angling every chance I get, consider myself to be a highly skilled angler, and frequently read articles about fishing.
Moderate specialization	Fishing is important, but I do other outdoor activities too. I occasionally read articles about fishing and purchase additional equipment to aid in fishing. My fishing participation is inconsistent, and I am a moderately skilled angler.
Low specialization	Fishing is an enjoyable, but infrequent activity that is secondary to other outdoor interests. I am not a highly skilled angler, rarely read articles about fishing, and do not own much fishing equipment beyond the basic necessities.

Table 27. Phase II Anglers' Activity Specialization

Specialization Type	Mean	n
Highly specialized	53.7%	277
Moderate specialization	31.2%	161
Low Specialization	15.2%	78

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Low specialization and 3 = High specialization

Table 28. Phase II Anglers' Skill Level

Mean	Valid Percentages				
	Novice (1)	Amateur (2)	Intermediate (3)	Advanced (4)	Expert (5)
3.53	8.7%	3.9%	42.8%	23.8%	20.7%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Novice and 5 = Expert

Section 3-5. Recreation Experience Preferences

Anglers have a variety of reasons and motivations for visiting natural areas. In this study, survey respondents were asked to indicate their satisfaction with a variety of recreation experience preferences. The recreation experience preferences were categorized into the following domains: 1) relaxation, 2) enjoyment of nature, 3) challenge seeking, and 4) social and family togetherness. These recreation experience preferences were measured on a five-point scale with one representing “very dissatisfied” and five representing “very satisfied” (Table 29)

- In general, anglers were the most satisfied with the recreation experience preferences of “relaxation”, and “enjoyment of nature” when visiting the Pennsylvania section of Lake Erie (Table 29).
- While “challenge seeking” and “social and family togetherness” received lower satisfaction scores while visiting the Pennsylvania section of Lake Erie.
- Anglers felt moderately satisfied with their *challenge seeking opportunities*.
 - For instance, approximately 71% of the anglers reported either satisfied or very satisfied with the opportunity to improve their fishing skills.

Table 29. Phase II Anglers’ Recreation Experience Preferences

Variable	Mean	Dissatisfied (%)	Neutral (%)	Satisfied (%)
<i>Relaxation</i>				
Opportunity to get away from the regular routine	4.79	0.2%	4.7%	95.2%
Peacefulness of fishing site	4.75	0.4%	4.7%	95.2%
<i>Enjoyment of Nature</i>				
Opportunity to experience nature	4.78	0.2%	4.7%	95.1%
Opportunity to be outdoors	4.75	0.8%	5.1%	94.2%
<i>Challenge Seeking</i>				
Challenge and sport of fishing	4.70	1.2%	6.1%	92.8%
Opportunity to improve your fishing skills	3.83	18.0%	11.2%	70.8%
<i>Social and Family Togetherness</i>				
Opportunity to do things with your companions	4.70	0.2%	8.6%	91.2%
Opportunity to do something with your family	4.51	2.6%	12.6%	84.9%
Combined catch between you and your fishing partners	3.08	41.6%	14.5%	43.0%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Very Dissatisfied and 5 = Very Satisfied

Section 3-6. Angler Satisfaction

Anglers were asked to evaluate their overall levels of satisfaction with angling in the Pennsylvania section of Lake Erie during their visit that day in three separate ways. The first was an assessment of overall satisfaction measured on a six-point scale with one representing “poor” and six representing “perfect” (Table 30). The second was a multi-item overall satisfaction assessment consisting of six individual items measured on a five-point scale with one representing “strongly disagree” and five representing “strongly agree” (Table 31). The third assessment measured satisfaction on a five-point scale with one representing “very dissatisfied” and five representing “very satisfied” within four satisfaction domains: 1) crowding/social conditions, 2) setting/environmental conditions, 3) fishing opportunity, and 4) fish/harvest (Table 32).

- Overall satisfaction was moderate with more than one-third of the sample (36%) reporting a satisfaction rating of either “excellent” or “perfect” and 39% indicating “good” or “very good”.
- The multi-item overall satisfaction measure indicated relatively high levels of satisfaction among the sample with means ranging from 4.55 to 2.18 (Table 31). Nearly three-fourths of anglers (72%) agreed that they thoroughly enjoyed their fishing trip, while more than half of the respondents (68%) disagreed that the fishing trip was not as enjoyable as expected.
 - It should be noted that three items within this construct were reverse worded to prevent response bias. The means and valid percentages for these three reverse worded items should be interpreted as a double negative.
- Respondents indicate high levels of satisfaction with the crowding and/or social conditions for the Pennsylvania section of Lake Erie, with more than 93% of the sample reporting being satisfied with the opportunity to fish without feeling crowded, the competition with other anglers for fishing spots, and the number of anglers fishing nearby.
- Anglers reported high levels of satisfaction with the setting and environmental conditions for the Pennsylvania section of Lake Erie, with most of the sample (72-95%) reporting being satisfied with the weather, water quality, cleanliness, and habitat conditions (Table 32).
- Respondents indicated moderate levels of satisfaction with the fishing opportunities within the Pennsylvania section of Lake Erie, with nearly half of the sample reporting being satisfied with the species of fish caught (47%) and opportunity to catch a trophy fish (46%).
- Most of the anglers sampled (87%) were satisfied with the amount of time spent fishing that day.
- Anglers noted moderate levels of satisfaction with fish and/or harvest related conditions within the Pennsylvania section of Lake Erie, with about half of the sample (43-50%) reporting being satisfied with the fighting quality of fish, average weight of fish, average length of fish, total number of fish caught, and the number of fish biting.

Table 30. Phase II Anglers' Overall Satisfaction Rating

Mean	Valid Percentages					
	Poor (1)	Fair (2)	Good (3)	Very Good (4)	Excellent (5)	Perfect (6)
3.75	8.3%	16.9%	20.3%	18.7%	17.7%	18.1%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Poor and 6 = Perfect

Table 31. Phase II Anglers' Multi-Item Satisfaction Rating

Variable	Mean	Disagree (%)	Neutral (%)	Agree (%)
The trip was well worth the money I spent to on it	4.55	1.4%	8.2%	90.4%
I thoroughly enjoyed the fishing trip	3.89	18.3%	9.7%	72.0%
The fishing trip was not as enjoyable as expected ^a	2.18	67.5%	8.9%	23.6%
I do not want to go on any more fishing trips like this one ^a	2.43	59.1%	9.5%	31.4%
I cannot imagine a better fishing trip	3.44	34.6%	9.1%	56.3%
I was disappointed with some aspects of the fishing trip ^a	2.79	45.5%	9.3%	45.1%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Strongly Disagree and 5 = Strongly Agree

^aNote. Item was reverse worded to prevent response bias. Findings should be interpreted as a double negative

Table 32. Phase II Anglers' Satisfaction Domains

Variable	Mean	Dissatisfied (%)	Neutral (%)	Satisfied (%)
<i>Crowding/Social Condition Satisfaction</i>				
Number of anglers fishing nearby	4.77	0.2%	4.7%	95.1%
Competition with other anglers for fishing spots	4.75	0.6%	5.3%	94.1%
Opportunity to fish without feeling crowded	4.74	0.2%	6.7%	93.0%
<i>Setting/Environmental Conditions Satisfaction</i>				
Cleanliness of the fishing site	4.75	0.4%	4.9%	94.8%
Habitat conditions in the area you fished	4.72	1.4%	4.7%	93.9%
Water quality of fishing site	4.71	1.4%	4.7%	93.9%
Quality of the weather today	3.86	23.4%	4.9%	71.7%
<i>Fishing Opportunity Satisfaction</i>				
Amount of time you spent fishing today	4.51	5.9%	7.6%	86.6%
Species of fish caught	3.14	40.5%	12.5%	46.9%
Opportunity to catch a trophy fish	3.13	38.8%	15.2%	46.0%
<i>Fish/Harvest Related Satisfaction</i>				
Fighting quality of the fish	3.23	35.6%	15.0%	49.3%
Average weight of fish caught	3.19	37.3%	12.6%	50.0%
Average length of fish caught	3.19	37.3%	12.8%	49.8%
Number of fish (of your target species) biting	3.08	41.3%	12.1%	46.7%
Total number of fish caught	2.97	44.4%	12.8%	42.8%

*Note. Percentages may not equal 100 because of rounding.

*Note. Response Code: 1 = Very Dissatisfied and 5 = Very Satisfied

Section 3-7. Angler Economic Expenditures

A primary component of this research was to gather a more accurate profile of anglers' expenditures for economic impact analyses. In this survey, anglers were asked a range of questions about their monetary expenditures during their entire trip that day to the Pennsylvania section of Lake Erie. These questions established an assessment of the reported expenditures within one single angling trip (from the time the angler left home until the time the angler returned home) during the 2016 recreational angling season within the Pennsylvania section of Lake Erie. What follows in this section of the report is a description of trip expenditures in three specific geographic areas: 1) Erie County, Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. Additional economic questions focused on per trip angler trip profiles and itineraries are also included (Table 33).

Phase II Anglers' Economic Trip Profile

- On average, anglers noted that two people were covered by their trip expenditures during their entire trip that day to the Pennsylvania section of Lake Erie in 2016 (Table 33).
 - The vast majority of respondents (80%) reported one or two anglers being covered by their trip expenditures during their entire trip that day to the Pennsylvania section of Lake Erie and only a small proportion of visitors (7%) said that their expenditures covered 4 or more people.

- The vast majority of anglers (91%) indicated that they did spend some money within various categories during their entire trip that day to the Pennsylvania section of Lake Erie in 2016.
 - Only a small proportion of anglers (10%) indicated that they spent no money within any of the specific expenditure categories during their entire trip that day to the Pennsylvania section of Lake Erie in 2016.

Table 33. Phase II Anglers' Economic Trip Profile

Variable	% or Mean	n
<i>Number of Anglers Covered by Expenses</i>		
Average Number of People	1.90	493
One	36.7%	181
Two	42.8%	211
Three	14.0%	69
Four or more	6.5%	32
<i>Proportion of Anglers Spending Money on Trip</i>		
Yes (spent money on trip)	90.5%	465
No (did not spend money on trip)	9.5%	49

*Note. Percentages may not equal 100 because of rounding.

Phase II Summary of Proportion of Anglers Spending Something in Each Category

In this study anglers were asked how much they spent within 18 categories during their entire trip that day to the Pennsylvania section of Lake Erie. These expenditures were segmented across three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. The results in Table 34 provide the proportion or percentage of anglers' reporting trip expenditures in each of the categories.

- The highest proportion of angler expenditures in *Erie County* were in the categories of bait (63%), automobile gas and oil (40%), and groceries (36%) (Table 34).
- The highest proportion of angler expenditures in *any other county in Pennsylvania* were in the categories of automobile gasoline and oil (23%), groceries (1%), and bait (1%).
- The highest proportion of angler expenditures *outside of Pennsylvania* were within the categories of automobile gasoline and oil (7%), groceries (1%), and boat gasoline and oil (<1%).
- Few anglers reported spending much within the categories of parking, boat launching fees, and boat mooring fees.

Table 34. Phase I Proportion of Anglers Spending Something in Each Category

Economic Expenditure Items	Location of Spending		
	In Erie County	In any <i>other</i> County in PA	Outside of Pennsylvania
The Proportion of Anglers Spending Something in Each Category			
<i>Travel Expenditures</i>			
Automobile gasoline/oil	39.6%	23.1%	6.7%
Boat gasoline/oil	14.4%	1.3%	0.4%
Airfare	---	---	---
Rental vehicle	---	---	---
Lodging	15.7%	0.4%	---
Camping	2.4%	---	---
Parking	---	---	---
Boat launching fees	---	---	---
Boat mooring fees	---	---	---
<i>Food and Beverage</i>			
Groceries	35.6%	1.3%	1.1%
Restaurants, bars, etc.	34.5%	0.9%	0.2%
<i>Other Shopping, Services, and Entertainment</i>			
Guide, charter fees, boat rental, tips	3.4%	---	---
Equipment (rod, reels, etc.)	3.2%	---	---
Tournament entry fees	4.3%	---	---
Lures and flies	3.9%	---	---
Bait (live, cut, prepared, etc.)	63.1%	1.3%	---
Entertainment (movies, casino, etc.)	3.0%	---	---
Shopping (souvenirs, clothing, etc.)	3.9%	---	---

*Note: The top three proportions within each category are bolded

Phase II Summary of Specific Trip Expenditure Costs for Phase II Anglers Spending Something

In this study anglers were asked how much they spent within 18 categories during their entire trip that day to the Pennsylvania section of Lake Erie. These expenditures were segmented across three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. The results in Table 35 provide the average expenditures among anglers reporting spending something in each category. These numbers cannot be totaled because they are based on a varying number of anglers making the various types of purchases.

- The highest expenditure categories among anglers spending in *Erie County* included guide, charter fees, boat rentals, tips, etc. (\$357), lodging (\$196), and tournament entry fees (\$151).
- The highest expenditure categories among anglers spending in *any other county in Pennsylvania* included restaurants, bars, etc. (\$101), boat gas and oil (\$64), and automobile gas and oil (\$39).
- The highest expenditure categories among anglers spending *outside of Pennsylvania* included automobile gasoline and oil (\$58) and groceries (\$54).

Table 35. Phase II Summary of Specific Trip Expenditure Costs for Anglers Spending Something

Economic Expenditure Items	Location of Spending		
	In Erie County	In any <i>other</i> County in PA	Outside of Pennsylvania
	Average Amount Spent- Among Anglers Spending Something in Each Category		
<i>Travel Expenditures</i>			
Automobile gasoline/oil	\$35.76	\$39.01	\$57.61
Boat gasoline/oil	\$51.38	\$64.16^a	---
Airfare	---	---	---
Rental vehicle	---	---	---
Lodging	\$196.12	---	---
Camping	\$113.81 ^a	---	---
Parking	---	---	---
Boat launching fees	---	---	---
Boat mooring fees	---	---	---
<i>Food and Beverage</i>			
Groceries	\$45.96	\$21.66 ^a	\$54.00^a
Restaurants, bars, etc.	\$75.77	\$101.25^a	---
<i>Other Shopping, Services, and Entertainment</i>			
Guide, charter fees, boat rental, tips	\$356.87	---	---
Equipment (rod, reels, etc.)	\$104.73	---	---
Tournament entry fees	\$151.25	---	---
Lures and flies	\$37.39	---	---
Bait (live, cut, prepared, etc.)	\$11.08	\$11.66 ^a	---
Entertainment (movies, casino, etc.)	\$138.92 ^a	---	---
Shopping (souvenirs, clothing, etc.)	\$99.16	---	---

^aNote. Sample size $n < 30$

*Note: The top three proportions within each category are bolded

Phase II Summary of Specific Trip Expenditure Costs for All Anglers

In this study anglers were asked how much they spent within 18 categories during their entire trip that day to the Pennsylvania section of Lake Erie. These expenditures were segmented across three specific geographic areas: 1) Erie County Pennsylvania, 2) any other counties in Pennsylvania, and 3) anywhere outside of Pennsylvania. These averages include those spending nothing in various categories, and therefore can be totaled to indicate the average total amount spent for all categories.

- The average total amount spent by all anglers during their entire trip that day in *Erie County* was \$136. The highest expenditure categories included lodging (\$31), restaurant, bars, etc. (\$26), and groceries (\$16) (Table 36).
- The average total amount spent by all anglers during their entire trip that day in *any other county in Pennsylvania* was \$11. The highest expenditure categories included automobile gasoline and oil (\$9), restaurants, bars, etc. (\$.86), and boat gasoline and oil (\$.82).
- The average total amount spent by all anglers during their entire trip that day *outside of Pennsylvania* was \$5.06. The highest expenditure categories included automobile gas and oil (\$4), equipment (\$.64), and groceries (\$.58).

Table 36. Phase II Summary of Specific Trip Expenditure Costs for Anglers

Economic Expenditure Items	Location of Spending		
	In Erie County	In any <i>other</i> County in PA	Outside of Pennsylvania
Average Amount Spent- Among All Angers			
<i>Travel Expenditures</i>			
Automobile gasoline/oil	\$14.15	\$8.99	\$3.84
Boat gasoline/oil	\$7.40	\$0.82	---
Airfare	---	---	---
Rental vehicle	---	---	---
Lodging	\$30.72	---	---
Camping	\$2.68	---	---
Parking	---	---	---
Boat launching fees	---	---	---
Boat mooring fees	---	---	---
<i>Food and Beverage</i>			
Groceries	\$16.35	\$0.27	\$0.58
Restaurants, bars, etc.	\$26.17	\$0.86	---
<i>Other Shopping, Services, and Entertainment</i>			
Guide, charter fees, boat rental, tips	\$12.25	---	---
Equipment (rod, reels, etc.)	\$3.37	---	\$0.64
Tournament entry fees	\$6.49	---	---
Lures and flies	\$1.44	---	---
Bait (live, cut, prepared, etc.)	\$6.99	\$0.15	---
Entertainment (movies, casino, etc.)	\$4.18	---	---
Shopping (souvenirs, clothing, etc.)	\$3.83	---	---
Total	\$136.02	\$11.09	\$5.06

*Note: The top three proportions within each category are bolded

Section 4. Economic Impact and Significance Analysis

Section 4-1. Economic Impact and Significance Analysis

The overarching goal of the study was to assess the economic impact and significance of the recreational angling industry within the Pennsylvania section of Lake Erie. In this study anglers were asked to identify both their county and state of residence as well as how much they spent within 18 expenditure categories during the entire 2016 recreational angling season within the Pennsylvania section of Lake Erie. For this portion of the analysis, anglers were segmented into two distinct geographic groups based on their residency status: 1) Anglers residing *within* Erie County Pennsylvania and 2) Anglers residing *outside of* Erie County Pennsylvania. The results in Table 37 provide the average expenditures among anglers in these categories.

- The average total amount spent by all anglers residing in *Erie County Pennsylvania* (i.e., local residents) during the 2016 season was \$459 (Table 37).
 - The highest expenditure categories among Erie County residents included automobile gasoline and oil (\$92), equipment (\$91), and groceries (\$68).
- The average total amount spent by all anglers residing *outside of Erie County Pennsylvania* (i.e., non-local residents) during the 2016 season was \$503 (Table 37).
 - The highest expenditure categories among residents living outside of Erie County included lodging (\$97), automobile gasoline and oil (\$85), and restaurants, bars, etc. (\$85).
- Expenditures in the categories of lodging, automobile gasoline and oil, restaurants and bars, and groceries accounted for 67% of the total spending among residents living outside of Erie County.

Economic Impact

- The total economic impact of the Pennsylvania section of Lake Erie recreational angling industry (within Erie County Pennsylvania) averaged \$40.6 million for the 2016 season.

Economic *impact* is the amount of money spent by non-local residents in a host economy (e.g., Erie County) that creates income and jobs for local residents. The total economic *impact* was based on the 80,853 non-local residents who purchased a Lake Erie or Combination Trout-Salmon & Lake Erie fishing permit for the 2016 Pennsylvania fishing season. Interpreted another way, this finding means that the non-Erie County residents fishing the Pennsylvania section of Lake Erie brought an average of \$40.6 million into Erie County in 2016.

Economic Significance

- The total economic significance of the Pennsylvania section of Lake Erie recreational angling industry (within Erie County Pennsylvania) averaged \$49.5 million for the 2016 season.

Economic *significance* is a measure of the importance or significance of the recreational angling industry (rather than impacts) within the local economy as it shows the size and nature of economic activity associated with visits to the Pennsylvania section of Lake Erie. Economic *significance* analysis includes the effects of spending by all anglers, both those who reside in the local area and those who do not. The total economic *significance* was based on the 100,010 anglers who purchased a Lake Erie or Combination Trout-Salmon & Lake Erie fishing permit for the 2016 Pennsylvania fishing season.

Table 37. Summary of Economic Analysis for All Anglers

Economic Expenditure Items	Residency Status	
	Erie County Residents	Any Residents <i>Outside of Erie County</i>
Average Amount Spent- Among All Anglers		
<i>Travel Expenditures</i>		
Automobile gasoline/oil	\$92.28	\$85.37
Boat gasoline/oil	\$61.42	\$31.93
Airfare	---	\$0.03
Rental vehicle	---	\$1.04
Lodging	\$0.34	\$96.65
Camping	\$4.87	\$14.55
Parking	\$0.29	\$0.24
Boat launching fees	\$0.91	\$0.71
Boat mooring fees	\$2.23	\$2.29
<i>Food and Beverage</i>		
Groceries	\$67.90	\$73.21
Restaurants, bars, etc.	\$44.21	\$84.66
<i>Other Shopping, Services, and Entertainment</i>		
Guide, charter fees, boat rental, tips	\$8.06	\$14.86
Equipment (rod, reels, etc.)	\$91.18	\$39.96
Tournament entry fees	\$0.73	\$1.82
Lures and flies	\$40.84	\$22.96
Bait (live, cut, prepared, etc.)	\$41.35	\$20.62
Entertainment (movies, casino, etc.)	\$1.57	\$2.06
Shopping (souvenirs, clothing, etc.)	\$1.01	\$10.07
TOTAL	\$459.19	\$503.03

*Note: The top three expenditures within each category are bolded

Section 4-2. IMPLAN Analysis

To more accurately assess the economic implications of the recreational angling industry within the Pennsylvania section of Lake Erie, IMPLAN input-output economic modeling software was utilized. IMPLAN is widely considered to be the most commonly employed and accurate input-output economic modeling software (Crompton, 2010; Dwyer et al, 2006). In essence, IMPLAN is a system that tracks the transactions and flow of money throughout an economy (Crompton, 2010). IMPLAN estimates economic metrics by utilizing a multiplier matrix that accounts for the interconnections amongst more than 400 economic sectors within a study area (Dixon et al., 2013). The IMPLAN software creates a model of the study area to assess the economic effects of new money into a study area's economy. The following sections identify and summarize several economic components of the Erie County recreational angling industry within the Pennsylvania section of Lake Erie including: Direct effects, indirect effects, induced effects, employment, labor income, value added, output, tax implications, and industry beneficiaries.

IMPLAN Analysis- Economic Terminology and Definitions:

- **Direct Effects:** The first-round effects of visitor spending. For instance, the amounts that restaurateurs, hoteliers, and others who received the initial dollars spent on goods and services with other industries in the local economy and pay employees, self-employed individuals, and shareholders who live in the host economy.
- **Indirect Effects:** The ripple effects of additional rounds of recirculating the direct effects dollars by local businesses and local governments. For instance, additional jobs and economic activity are supported when businesses purchase supplies and services from other local businesses, thus creating indirect effects of visitor spending.
- **Induced Effects:** The other ripple effects generated by the direct and indirect effects, caused by employees of impacted businesses spending some of their salaries and wages in the area economy. For instance, employees use their income to purchase goods and services in the local economy generating further induced effects of visitor spending.
- IMPLAN analysis results are presented in the following categories:
 - **Employment:** The total number of individuals employed from visitor spending. This includes both wage and salary employees which include both full and part-time workers.
 - **Labor Income:** The sum of employee compensation and proprietor income. This includes all forms of employee compensation (e.g., wages and benefits) as well as proprietor income.
 - **Value Added:** The sum of employee compensation, proprietor income, indirect business taxes (e.g., sales tax, excise tax, import tax), and other property type income (e.g., rent, mortgage, interest). Value added is the preferred measure of the contribution of an activity to gross regional or state product as it measures the value added by that activity net of the costs of all non-labor inputs to production.
 - **Output:** The value of sales by all industries in the study area. It should be noted that *output* is considered an esoteric measure with limited practical application and should be interpreted with caution.

IMPLAN Analysis- General Implications:

- **Employment:** A total number of 539 individuals were employed in Erie County Pennsylvania as a result of angler expenditures in 2016. This included both wage and salary employees which comprised both full and part-time workers. In other words, recreational angler expenditures supported approximately 539 jobs within Erie County Pennsylvania in 2016 (Table 38).
- **Labor Income:** A total of \$13.1 million of employee compensation and proprietor income was generated in Erie County Pennsylvania as a result of angler spending in 2016. This included all forms of employee compensation (e.g., wages and benefits) as well as proprietor income. Said another way, recreational angler expenditures provided more than \$13 million in income for Erie County Pennsylvania residents in 2016 (Table 38).
- **Value Added:** A total of \$19.9 million of employee compensation, proprietor income, indirect business taxes, and other property type income was generated in Erie County Pennsylvania as a result of angler spending in 2016.
 - In other words, for every \$1 spent on recreational angling within the Pennsylvania section of Lake Erie, \$1.65 was generated for the Erie County Pennsylvania gross regional product (Table 38).
- **Output:** The total value of sales by all industries within Erie County Pennsylvania was \$37.7 million as a result recreational angler spending in 2016 (Table 38). It should be noted that *output* is considered an esoteric measure with limited practical application and should be interpreted with caution.

Table 38. Summary of IMPLAN Analysis

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	424.94	\$8,656,191	\$12,065,876	\$23,773,742
Indirect Effect	49.74	\$1,995,291	\$3,452,973	\$6,326,810
Induced Effect	63.84	\$2,516,233	\$4,362,251	\$7,610,131
Total Effect	538.53	\$13,167,716	\$19,881,102	\$37,710,684

IMPLAN Analysis- Industry Beneficiary Implications:

- A total number of 539 individuals were employed in Erie County Pennsylvania as a result of angler expenditures in 2016. This included both wage and salary employees which comprise both full and part-time workers (Table 38).
 - However, the vast majority of those individuals (79%) were employed within one of seven primary industries in Erie County Pennsylvania as a result of angler expenditures in 2016 (Table 39).

- The top industries within Erie County Pennsylvania impacted by recreational angler expenditures in 2016 included full-service restaurants, hotels and motels, and retail sporting goods and hobby stores (Table 39).

- Approximately 160 individual jobs within the *full-service restaurant* industry were generated in Erie County Pennsylvania as a result of angler spending in 2016. In other words, recreational angler expenditures employed approximately 160 restaurant employees (e.g., servers, hostesses, cooks, bartenders) at various sit-down eateries throughout Erie County Pennsylvania in 2016 (Table 39).

- About 94 individual jobs within the *hotel and motel* industries were generated in Erie County Pennsylvania as a result of angler spending in 2016. Said another way, recreational angler expenditures employed approximately 94 hotel and motel employees (e.g., front desk clerks, managers, housekeeping staff) at various short-term lodging facilities throughout Erie County Pennsylvania in 2016 (Table 39).

- Approximately 62 individual jobs within the *retail sporting goods and hobby store* industries were generated in Erie County Pennsylvania as a result of angler spending in 2016. In other words, recreational angler expenditures employed approximately 62 retail sporting goods and hobby store employees (e.g., cashiers, managers, sales representatives) at various shopping outlets throughout Erie County Pennsylvania in 2016 (Table 39).

Table 39. Summary of IMPLAN Analysis- Industry Beneficiaries

Industry Type	Employment	Labor Income	Value Added	Output
Full-Service Restaurants	159.57	\$2,913,903	\$3,324,623	\$7,061,388
Hotel and Motels	94.16	\$2,020,080	\$3,810,526	\$7,824,530
Retail - Sporting goods and Hobby Stores	62.14	\$1,264,408	\$1,640,140	\$2,852,158
Other Accommodations	33.41	\$396,069	\$550,287	\$1,176,511
Other Amusement & Recreation Services	27.23	\$510,501	\$693,050	\$1,406,772
Retail - Gasoline Stores	25.83	\$632,059	\$768,787	\$1,444,071
Retail - Food and Beverage Stores	25.29	\$908,323	\$1,200,901	\$1,791,929
Total Effect	427.63	\$8,645,343	\$11,988,314	\$23,557,359

Section 5. Stakeholder Interviews

Phase III of the study consisted of a series of qualitative interviews with various angler stakeholders within the Pennsylvania section of Lake Erie. A total of 9 qualitative interviews were conducted with stakeholders in June of 2017 (Table 40). The purpose of these interviews was to corroborate estimates of economic impacts and significance derived from the surveys of anglers and to better understand stakeholders' perceptions of the economic conditions of the recreational angling industry within the Pennsylvania section of Lake Erie. The interviews were transcribed verbatim by the research team and then analyzed according to major themes. Responses were each reduced into a small, manageable set of themes. This process involved looking for common responses and grouping them into themes. "Themes (i.e. categories) are broad units of information that consist of several codes aggregated to form a common idea" (Creswell, 2013, p. 186). When necessary, sub-themes are highlighted to provide the reader with a more detailed understanding of stakeholder responses. Please note that the total number of responses to each theme may differ from the total number of responses aligned with each subtheme because some individuals made multiple points in their response to the questions.

Table 40. Overview of Recreational Angler Stakeholders

Stakeholders	<i>n</i>
Small/local bait and tackle shop operators	2
Large/corporate bait and tackle shop operators	2
Recreational charter boat operators	5
Total	9

Section 5-2. Synthesis of Stakeholder Interviews

Question 1: “What kind of influence does the recreational angling industry have on the Erie, Pennsylvania community?”

- A significant economic influence and impact (6)
- Increased permit pricing has decreased economic activity (3)
- The presence of invasive species has decreased economic activity (2)

Question 2: “Based on your experience with your business, how have the economic conditions of the recreational angling industry within Pennsylvania Lake Erie waters changed over the past few decades?”

- The fishery has declined leading to significant economic reduction (5)
- Local and small angling shops are closing (4)
- Baby Boomer and youth angling has decreased (3)
- Perch and Steelhead stocks and interest have decreased (2)
- The economic condition of the fishery has increased substantially (2)

Question 3: “Based on your experience with your business, what is the current economic condition of the recreational angling industry within Pennsylvania Lake Erie waters?”

- The economic condition of the fishery is declining (4)
- Perch stocks are decreasing and Walleye stocks are increasing (3)
- Angling is in a downtrend (2)
- The Lake Erie Permit is hurting the fishery (2)
- The economic condition of the fishery is excellent

Question 4: “What do you feel is your organization’s economic contribution to the recreational angling industry within Pennsylvania Lake Erie waters?”

- Attract many anglers that require restaurants and hotels (4)
- Previous contribution was significant, but current contribution becoming insignificant (3)
- Cost effective Walleye, Perch, and Steelhead angling (2)
- Decrease in bait provisions and availability (2)

Question 5: “How do you feel that in state versus out-of-state anglers contribute to the economic value of the recreational angling industry within Pennsylvania Lake Erie waters?”

- Out-of-state anglers have significantly larger economic contributions (7)
- There are more in-state than out-of-state anglers (3)
- Locals anglers have lower economic contributions (3)
- Non-local anglers spend much more (2)

Question 6: “Recognizing that there are other states and countries that also contribute to the economics of the Lake Erie angling industry, what do you see other states and countries doing well?”

- Ohio has the best facilities and overall fishery (4)
- Other states have excellent fisheries outreach, marketing, and awareness (4)
- Other entities offer more fish species diversity (3)
- Other entities have excellent access and facilities (2)
- Other entities offer free fishing days to entice new anglers (2)

Question 7: “If you could ask natural resource managers to improve some things about the management of the PA Lake Erie waters fishery, what would you ask them to do?”

- They are doing a great job (7)
- Decrease the cost of angler permits (6)
- Increase angler facilities and access (6)
- Focus on engaging and recruiting youth anglers (5)
- Improve stocking habits (4)
- Increase awareness, promotion, and marketing (3)
- Decrease the number of law enforcement entities and agencies (2)
- Properly allocate the money from the Lake Erie Permit (2)

Section 6. Summary and Conclusions

Phase I Summary and Conclusions

The Phase I quantitative results published in this report consisted of a combined mail back and online survey of anglers who fished the Pennsylvania section of Lake Erie in 2016. The context and questions within Phase I asked anglers to provide information pertaining to their *entire* 2016 recreational angling season within the Pennsylvania section of Lake Erie. This portion of the study was conducted between the dates of January 24, 2017 and April 17, 2017 ($n = 1,189$). A summary of the collective visitor characteristics, behaviors, attitudes, perceptions, and economic expenditures was provided in the main body of this report. This summary and conclusion section provides a brief highlight of key findings that may be of interest to natural resource managers and partner organizations.

In terms of the visitor profile, anglers to the Pennsylvania section of Lake Erie were more likely to be white (96%), male (88%), and middle-aged (only 16% reported that they were 18-35 years old). The average age across all visitors was 50 years old, while 57% indicated that they were over 50 years old. When combining the household income categories, more than two-thirds (73%) reported a household income of \$50,000 or more, while 27% reported household incomes less than \$50,000. Approximately one-third of the sample (35%) possessed a high school degree or less, while 36% earned either a four-year college or professional degree. The vast majority of anglers utilizing the Pennsylvania section of Lake Erie were from the state of Pennsylvania (74%) and traveled an average of 103 miles from their home. However, more than one-fourth (28%) traveled 50 miles or less from their home to fish the Pennsylvania section of Lake Erie.

Under current regulations, all individuals angling within the Pennsylvania section of Lake Erie or its bays and tributaries are required to obtain a specialized Lake Erie permit in addition to their Pennsylvania angler license from the Pennsylvania Fish and Boat Commission. These specialized permits are available in two forms: 1) The Lake Erie Permit which allows anglers to fish the Pennsylvania section of Lake Erie and its tributaries, or 2) The Combination Trout-Salmon/ Lake Erie Permit which allows anglers to fish the Pennsylvania section of Lake Erie and its tributaries as well as other bodies of water in Pennsylvania. The vast majority of anglers (80%) indicated they had purchased either a Combination Trout-Salmon & Lake Erie Permit (35%), an Adult Resident Permit (35%), and/or a Lake Erie Permit (10%).

The anglers in this study indicated various forms of angling as their primary activity participation within the Pennsylvania coastal section of Lake Erie. Private boat anglers (41%) were identified as any anglers participating in angling related activities while on any type of privately owned waterborne vessel (either motorized or non-motorized). Shoreline anglers (39%) were recognized as any individuals partaking in angling related activities while on the shores of Lake Erie. Pier anglers (13%) were identified as any individuals partaking in angling related activities while on a pier (e.g., North Pier). Finally, charter boat anglers (7%) were classified as any anglers participating in angling related activities while on any type of commercially operable waterborne vessel (either motorized or non-motorized). In terms of primary fish species sought, about half of the sample (53%) reported their primary targeted fish species was either Steelhead (27%) or Walleye (26%) followed closely by Yellow Perch (18%), Smallmouth Bass (11%), and Largemouth Bass (9%).

In terms of continued participation, level of recreation experience, specialization, and skill, most anglers (92%) reported they intend to fish the 2017 season. Overall angling frequency was moderate with

anglers noting an average of 8 days per year and an average of 18 total years fishing within Pennsylvania section of Lake Erie. The sample was also determined to be moderately to highly specialized and skilled. This moderate to high level of recreation specialization indicated that the majority of anglers in this study dedicated a significant amount of time and money to their activity, were moderately to highly skilled, and contributed substantial time to learning more about angling in an effort to advance their skillset. These high levels of participation, specialization, and skill amongst anglers were consistent with similar research conducted within the Pennsylvania section of Lake Erie in 2015.

The recreation experience questions provided data about place perceptions, visitor motivations, and satisfaction. The data clearly showed that anglers strongly identified with, were moderately dependent upon, and moderately attached to the Pennsylvania section of Lake Erie for their angling activities. Findings indicated that anglers were motivated and interested in experiencing the outdoor natural surroundings available along the Lake Erie coastline. Enjoying nature, being outdoors, escaping the regular routine, relaxation, and being with similar people were the primary reasons for visiting with the majority of respondents citing these reasons as important. Overall satisfaction was found to be moderate amongst anglers, with the highest levels of satisfaction being associated with the setting and environmental conditions within the Pennsylvania section of Lake Erie such as the water quality, cleanliness, and habitat conditions.

Almost 8 out of 10 respondents (77%) indicated they disagreed with the statement, “I must keep the fish I catch for the trip to be successful”. Furthermore, approximately 75% of the anglers agreed or strongly agreed with, “I am just as happy if I release the fish I catch”. These findings suggest anglers may favor a catch and release mandate and that keeping a fish may not be their ultimate goal and motivation. Based on these preferences, anglers may be less reliant upon fish stocking procedures on Lake Erie.

The economic expenditures portion of Phase I asked anglers a range of questions regarding their total monetary expenditures and the location of those expenditures during the 2016 recreational angling season within the Pennsylvania section of Lake Erie. Anglers noted that an average of five trips and two people were covered by their annual trip expenses. The largest expenditures reported were for automobile gasoline and oil, groceries, and food and drinks at restaurants and bars. In general, anglers spent the most across all spending categories during the 2016 recreational angling season in Erie County, Pennsylvania (an average of \$494 per season) followed by expenditures in other various Pennsylvania counties outside of Erie County (an average of \$124 per season). Anglers fishing within the Pennsylvania coastal section of Lake Erie spent by far the least amount of money across all expenditure categories anywhere outside of Pennsylvania (an average of \$65 per season). These expenditures suggest that the recreation angling industry within the Pennsylvania section of Lake Erie made significant contributions to the local, state, and regional economies in 2016. Moreover, the expenditure data suggest that anglers spend considerable personal financial resources within and outside of Erie County, Pennsylvania relative to recreational angling.

A high level of attachment and experience use history suggests anglers are dependent on the attraction, the Pennsylvania section of Lake Erie. Hence, the economic impact from anglers is caused by the existence of the attraction (Crompton, 2010). The non-local anglers (e.g., those residing outside of Erie County) accounted for the economic impacts within the region. The angling opportunities in Erie County attract out of town visitors who spend money in the local economy. This new money from outside the host economy generates income and employment opportunities for local residents (Crompton, 2010). Natural resource managers and partner organizations should leverage the importance of this attraction to entice policy-makers to support economic development vehicles.

Phase II Summary and Conclusions

The Phase II quantitative results published in this report consisted of a series of on-site face to face interviews with anglers along the Pennsylvania section of Lake Erie. The context and questions within Phase II asked anglers to provide information pertaining to their entire trip *that day* within the Pennsylvania section of Lake Erie. This portion of the study was conducted between the dates of July 30, 2016 to July 15, 2017 ($n = 578$). A summary of the collective visitor characteristics, behaviors, attitudes, perceptions, and economic expenditures was provided in the main body of this report. This summary and conclusion section provides a brief highlight of key findings that may be of interest to natural resource managers and partner organizations.

In terms of the visitor profile, visitors to the Pennsylvania section of Lake Erie were more likely to be white (90%), male (89%), and middle-aged (only 17% reported that they were 18-35 years old). The average age across all visitors was 49 years old, while 55% indicated that they were over 50 years old. When combining the household income categories, more than half (54%) reported a household income greater than \$50,000, while 46% reported household income less than \$49,999. One-half of the sample (50%) possessed a high school degree or less, while 29% earned either a four-year college or professional degree.

The vast majority of anglers utilizing the Pennsylvania section of Lake Erie were from the state of Pennsylvania (91%) and traveled an average of 69 miles from their home, while more than one-half (56%) traveled 50 miles or less from their home to fish the Pennsylvania section of Lake Erie. A majority of the visitation involved day trips (67%) which lasted an average of 5 hours. Among the 33% who stayed overnight in the area, their average length of stay was 3 nights. The average group size was 1.8 adults with approximately 40% of visitors recreating alone. The majority of these findings are consistent with research conducted solely at Presque Isle State Park (Mowen et al., 2013). Programs incentivizing anglers to increase their party size, number of trips, and length of stay may result in an increase in visitor spending.

The anglers in this study indicated various forms of angling as their primary activity participation within the Pennsylvania coastal section of Lake Erie. Pier anglers were the largest segment in the sample (38%) followed closely by shoreline anglers (36%). Private boat anglers (22%) included any respondents participating in fishing while on any type of privately owned waterborne vessel (either motorized or non-motorized). Finally, charter boat anglers comprised just 3% of the on-site sample. In terms of primary fish species sought, about half of the sample (49%) reported their primary targeted fish species was Yellow Perch, followed by Walleye (18%), Steelhead (10%), Smallmouth Bass (9%), and Largemouth Bass (6%).

In terms of continued participation, level of recreation experience, specialization, and skill, nearly all anglers (98%) reported they intend to fish the 2017 season. Overall angling frequency was high with anglers noting an average of 5 days per month, 54 days per year, and 28 total years engaged in their angling within the Pennsylvania section of Lake Erie. The sample was also determined to be moderately to highly specialized and skilled. This moderate (31%) to high (54%) level of recreation specialization indicated that the majority of anglers in this study dedicated a significant amount of time and money to their activity, were moderately to highly skilled, and contributed substantial time to learning more about angling in an effort to advance their skillset.

The recreation experience questions provided data about visitor motivations and satisfaction. Findings indicated that anglers were motivated and interested in relaxation and experiencing the outdoor natural surroundings available along the Lake Erie coastline. Escaping the regular routine, peacefulness, enjoying nature, being outdoors, the challenge of angling, and being with companions were the primary

reasons for visiting, with the majority of respondents citing these reasons as satisfying. Overall satisfaction was found to be moderate amongst anglers, with the highest levels of satisfaction associated with the social and environmental conditions within the Pennsylvania section of Lake Erie such as the opportunities to fish without feeling crowded, the water quality, cleanliness, and habitat conditions.

The economic expenditures portion of Phase II asked anglers a range of questions regarding their total monetary expenditures and the location of those expenditures during their entire trip *that day* within the Pennsylvania section of Lake Erie. The vast majority of anglers (91%) indicated that they spent some money that day on their angling trip. The largest expenditures reported were for automobile gasoline and oil, bait (live, cut, and/or prepared) and groceries. In general, anglers spent the most across all spending categories on their entire trip within Erie County, Pennsylvania (an average of \$136 per trip) followed by expenditures in other various Pennsylvania counties outside of Erie County (an average of \$11 per trip). Anglers fishing within the Pennsylvania coastal section of Lake Erie spent by far the least amount of money across all expenditure categories anywhere outside of Pennsylvania (an average of \$5 per trip). These expenditures reaffirm that the recreation angling industry within the Pennsylvania section of Lake Erie made significant contributions to the local, state, and regional economies in 2016.

Economic Impact and Significance Summary and Conclusions

The overarching goal of the study was to assess the economic impact and significance of the recreational angling industry within the 76.6 mile Pennsylvania section of Lake Erie. The economic impact and significance analysis portion of this study asked anglers to identify both their county and state of residence as well as how much they spent within 18 expenditure categories during the entire 2016 recreational angling season within the Pennsylvania section of Lake Erie. For those anglers residing within Erie County Pennsylvania, the average total amount spent during the 2016 season was \$459 and the largest expenditures reported were for automobile gasoline and oil, groceries, and angling equipment such as fishing rods and reels. For anglers residing outside of Erie County, the average total amount spent during the 2016 season was \$503 and the largest expenditures reported were for overnight lodging and accommodations, automobile gasoline and oil, and food and drinks at restaurants and bars. The relative similarity in total annual expenditures by local and out-of-county residents reflects the fact that county residents made many more low cost fishing trips while out-of-county visitors made fewer trips with higher expenses.

These differences were corroborated in the on-site survey conducted in Phase II of the study. One of the differences between Phase I and Phase II was the proportion of anglers who earned more than \$50,000 dollars in annual salary. In Phase I, 73% of the respondents indicated they earned more than \$50,000, while only 52% of the anglers in Phase II earned more than \$50,000. This income difference along with other differences may be caused by response biases (Marquis & Polich, 1986). Amongst anglers' profile characteristics, Phase I results represented less Pennsylvania residents (74%) compared to Phase II (91%). Phase I survey respondents traveled an average of 34 miles more than Phase II survey respondents. Furthermore, only 19% of Phase I survey respondents were Erie county residents, while more than half (51%) of the anglers sampled on-site in Phase II were Erie county residents. Lastly, Phase I anglers indicated they fished an average of 8 days over a 12-month period; whereas Phase II anglers reported fishing an average of 53 days over a 12-month period.

Economic significance is a measure of the importance or significance of the recreational angling industry (rather than impact) within the local economy as it shows the size and nature of economic activity associated with visits to the Pennsylvania section of Lake Erie. Economic significance analysis

includes the effects of spending by all anglers, both those who reside in the local area and those who do not. The total economic significance of the Pennsylvania section of the Lake Erie recreational angling industry (within Erie County Pennsylvania) was estimated to be \$49.5 million for the 2016 season. Economic impact is the amount of money spent by non-local residents in a host economy (e.g., Erie County) that creates income and jobs for local residents. The total economic impact of the Pennsylvania section of the Lake Erie recreational angling industry (within Erie County Pennsylvania) was estimated at \$40.6 million for the 2016 season. Interpreted another way, this means that the non-Erie County residents fishing the Pennsylvania section of Lake Erie brought an average of \$40.6 million into Erie County in 2016 through their trip spending.

To further and more accurately assess the economic implications of the recreational angling industry within the Pennsylvania section of Lake Erie, IMPLAN input-output economic modeling software was utilized. In essence, IMPLAN is a system that tracks the transactions and flow of money throughout an economy (Crompton, 2010, Dwyer et al., 2006). IMPLAN estimates economic metrics by utilizing a multiplier matrix that accounts for the interconnections amongst more than 400 economic sectors within a study area (Dixon et al., 2013). The IMPLAN software creates a model of the study area to assess the economic effects of new money into a study area's economy.

In terms of output implications, 539 individuals were employed in Erie County Pennsylvania as a result of angler expenditures in 2016. In other words, recreational angler expenditures supported approximately 539 jobs within Erie County Pennsylvania in 2016. This included both wage and salary employees which comprised both full and part-time workers. A total of \$13.1 million of employee compensation and proprietor income was generated in Erie County Pennsylvania as a result of angler spending in 2016. Said another way, recreational angler expenditures provided more than \$13 million in income for Erie County Pennsylvania residents in 2016. This included all forms of employee compensation (e.g., wages and benefits) as well as proprietor income. A total of \$19.9 million of employee compensation, proprietor income, indirect business taxes, and other property type income was generated in Erie County, Pennsylvania as a result of angler spending in 2016. In other words, for every \$1 spent on recreational angling within the Pennsylvania section of Lake Erie, \$1.65 was generated for the Erie County Pennsylvania gross regional product.

Of the 539 individual jobs that were created in Erie County, Pennsylvania as a result of recreational angler expenditures in 2016, the vast majority of those jobs (73%) were within three primary industries: full-service restaurants, hotels and motels, and retail sporting goods and hobby stores. These included approximately 160 full-service restaurant employees (e.g., servers, hostesses, cooks, bartenders) at various sit-down eateries, about 94 hotel and motel employees (e.g., front desk clerks, managers, housekeeping staff) at various short-term lodging facilities, and approximately 62 retail sporting goods and hobby store employees (e.g., cashiers, managers, sales representatives) at various shopping outlets throughout Erie County Pennsylvania in 2016.

This report offers a snapshot of recreational anglers within the Pennsylvania section of Lake Erie. It provides basic data concerning anglers' socio-demographic characteristics, trip visitation patterns, experience preferences, level of satisfaction, levels of experience, resource attachment, and economic expenditures. In total, this study provides a baseline from which to confirm on-going management and/or to suggest new directions for resource and fisheries managers. Study results suggest that the economic contributions of the recreational angling industry within the 76.6 mile Pennsylvania section of Lake Erie are considerable. Collectively, the information in this report should help give managers and stakeholders further insights that will aid in the sustained health and quality of Lake Erie.

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Appendix A. Staff, Students Supported, and Outreach/Extension

Graduate and post-doctoral students in the Recreation, Park and Tourism Management program were employed on this project. Major tasks completed by the students included assisting with the design of the outdoor recreation survey, survey data collection, and assistance with the data analysis and preparation of project reports and outreach materials. Study results informed the development of the graduate and postdoctoral student research. The following is a description of the staff, support, and outreach.

a. Students Supported

- i. Number of Undergraduate Students = 0)
- ii. Number of Graduate Students = 2 (Joel Tom Mueller, Jerrica Oliver)
- iii. Degrees Awarded = 0

b. Staff

- i. Number of full-time faculty = 2
 - Dr. Alan Graefe (0.73 months)
 - Dr. Andrew Mowen (0.73 months)
- ii. Number of full-time employees = 1
 - Dr. Michael Ferguson

c. Publications

- i. Total publication = 0

d. Volunteer Hours

- i. Total volunteer hours = 0

e. Outreach/Extension

- i. Number of meetings, workshops, or conferences, and number of attendees = 4; 400 attendees
- ii. Number of public or professional presentations, and number of attendees = 4; 400 attendees

Appendix B. Impact and Accomplishment Statement

Collaborative research between Pennsylvania Sea Grant and The Pennsylvania State University determined that the recreational angling industry within the Pennsylvania coastal section of Lake Erie provided a substantial economic impact and significance to the host economy of Erie County, Pennsylvania. To date, there is little existing information on the economic impact and significance of recreational fisheries on Lake Erie. Previous assessments are dated or investigated only specific components of the Lake Erie fishery. No previous study has focused on all aspects of recreational angling within the Pennsylvania section of Lake Erie. This study provided a current and comprehensive assessment of the economic impact and significance of all recreational angling within the Pennsylvania section of Lake Erie and its tributaries. For a guiding framework, this study utilized an exploratory mixed methodology with three connected phases which resulted in 1,189 completed online and mail-back questionnaires (Phase I), 516 completed on-site questionnaires of Lake Erie anglers (Phase II), and approximately 15 hours of stakeholder interviews (Phase III).

The primarily localized, experienced, specialized, middle-aged, and attached samples in this study demonstrated they were dedicated and committed to the recreational angling industry within the Pennsylvania section of Lake Erie. As a result of these values, study results suggest that local anglers (e.g., those residing within Erie County Pennsylvania) spent an average total of \$454 during the 2016 season and that non-local anglers (e.g., those residing outside of Erie County Pennsylvania) spent an average total of \$503 during the 2016 season. As a result of these expenditures, the total economic impact of the Pennsylvania section of Lake Erie recreational angling industry upon Erie County, Pennsylvania was \$40.6 million for the 2016 season while the total economic significance of the Pennsylvania section of Lake Erie recreational angling industry upon Erie County Pennsylvania was \$49.5 million for the 2016 season. Moreover, these angler expenditures supported approximately 539 jobs within Erie County Pennsylvania in 2016 and provided more than \$13 million in income for Erie County, Pennsylvania residents in 2016. While the state of Pennsylvania manages the smallest portion of Lake Erie, encompassing 76.6 miles of coastline, the economic contribution of the recreational angling industry within this section is significant. On average, each mile of the Pennsylvania section of Lake Erie generated approximately \$530,000 of economic impact for the 2016 season.

Appendix C. Phase I Mail-back and Online Survey Instrument

Lake Erie Angler Survey



The Pennsylvania State
University



Pennsylvania Sea
Grant

The Pennsylvania State University and Pennsylvania Sea Grant are requesting your participation in a brief survey regarding the economic impact and value of recreational fishing on Lake Erie waters. The information you provide will help state and local officials better understand the economic importance of angling on Lake Erie.

Your participation in this survey is completely voluntary, but very important. Rest assured your answers will remain confidential and no personal identifying information will be collected.

Please return this survey in the postage-paid return envelope provided.

You can also complete this survey online.

If you choose to do so, please go to www.sites.psu.edu/anglersurvey and enter your Survey ID Code (the code is located on the letter accompanying this survey)

THANK YOU FOR YOUR COOPERATION!

If you have any questions, comments, or concerns please contact:

Dr. Alan Graefe
Principal Investigator
The Pennsylvania State University
Email: gyu@psu.edu

Dr. Michael Ferguson
Project Manager
The Pennsylvania State University
Email: mdf220@psu.edu

Lake Erie Angler Survey

Section 1: 2016 Lake Erie Fishing Season Activities and Species

Please tell us about your fishing experience during the 2016 fishing season within Pennsylvania Lake Erie waters. The 2016 Lake Erie Fishing Season ran from January 1, 2016 to December 31, 2016. The term PA Lake Erie waters refers to the PA portion of Lake Erie, Presque Isle Bay, and all tributaries, rivers, and creeks flowing into the PA section of Lake Erie.
Please report all answers referring only to your personal experience.

1. Did you fish in Pennsylvania Lake Erie waters during the 2016 Lake Erie Fishing Season?
 Yes [If **yes**, please continue on to Question 2]
 No [If **no**, please skip ahead to Question 29 in Section 4]

2. Which of the following activities did you participate in during the 2016 Lake Erie Fishing Season? [Check ALL that apply]	3. Which of those activities was your primary activity that you most commonly engaged in during the 2016 Lake Erie Fishing Season? [Check only ONE]	
Question 2 answer(s):	Question 3 answer:	
<input type="checkbox"/>	Fishing from the shoreline	<input type="checkbox"/>
<input type="checkbox"/>	Fishing from a pier	<input type="checkbox"/>
<input type="checkbox"/>	Fishing from a private boat	<input type="checkbox"/>
<input type="checkbox"/>	Fishing from a rental boat	<input type="checkbox"/>
<input type="checkbox"/>	Fishing from a charter boat	<input type="checkbox"/>
<input type="checkbox"/>	Ice fishing	<input type="checkbox"/>
<input type="checkbox"/>	Other [please identify] _____	<input type="checkbox"/>

4. During the 2016 Lake Erie Fishing Season....
- a. Which fish species did you target? [Check **ALL** that apply]
- b. Which **one** fish species did you target the most? [**CIRCLE** only **ONE**]

- | | | | |
|--|---|--|---|
| <input type="checkbox"/> Bass- Largemouth | <input type="checkbox"/> Catfish- Channel | <input type="checkbox"/> Northern Pike | <input type="checkbox"/> Salmon- Pink |
| <input type="checkbox"/> Bass- Smallmouth | <input type="checkbox"/> Catfish- Bullhead | <input type="checkbox"/> Perch- White | <input type="checkbox"/> Sheephead |
| <input type="checkbox"/> Bass- Rock | <input type="checkbox"/> Crappie | <input type="checkbox"/> Perch- Yellow | <input type="checkbox"/> Steelhead |
| <input type="checkbox"/> Bass- White | <input type="checkbox"/> Gar- Longnose | <input type="checkbox"/> Rainbow Smelt | <input type="checkbox"/> Suckers/Redhorse |
| <input type="checkbox"/> Bluegill/ Sunfish | <input type="checkbox"/> Gar- Spotted | <input type="checkbox"/> Round Goby | <input type="checkbox"/> Trout- Brown |
| <input type="checkbox"/> Bowfin | <input type="checkbox"/> Grass Pickerel | <input type="checkbox"/> Salmon- Coho | <input type="checkbox"/> Trout- Lake |
| <input type="checkbox"/> Burbot | <input type="checkbox"/> Muskellunge | <input type="checkbox"/> Salmon- King | <input type="checkbox"/> Walleye |
| <input type="checkbox"/> Common Carp | <input type="checkbox"/> Other [Please ID]: _____ | | |

Lake Erie Angler Survey
Section 2: 2016 Lake Erie Fishing Season Angler Expenditures
Please help us understand the economic impact of Lake Erie anglers by providing some economic information. Considering **all of your** 2016 Lake Erie Fishing Season trips, how much did you spend in each of the following categories during the 2016 fishing season?

<i>"On all of my 2016 Lake Erie Fishing Season trips (combined) I spent..."</i>	Location of Spending		
	In Erie County	In any <i>other</i> County in PA	Outside of Pennsylvania
Travel Expenditures			
5. Automobile gasoline/oil	\$	\$	\$
6. Boat gasoline/oil	\$	\$	\$
7. Airfare	\$	\$	\$
8. Rental vehicle	\$	\$	\$
9. Lodging (hotel, motel, etc.)	\$	\$	\$
10. Camping	\$	\$	\$
11. Parking	\$	\$	\$
12. Boat launching fees	\$	\$	\$
13. Boat mooring fees	\$	\$	\$
Food & Beverage			
14. Groceries (food, ice, beverages, etc.)	\$	\$	\$
15. Restaurants, bars, take-out meals, etc.	\$	\$	\$
Other shopping, services, and entertainment			
16. Guide/charter fees/boat rental fees/ tips	\$	\$	\$
17. Equipment (rod, reels, etc.)	\$	\$	\$
18. Tournament entry fees	\$	\$	\$
19. Lures and flies	\$	\$	\$
20. Bait (live, cut, prepared, etc.)	\$	\$	\$
21. Entertainment (movies, casino, etc.)	\$	\$	\$
22. Shopping (souvenirs, clothing, etc.)	\$	\$	\$
23. Other [please identify]:	\$	\$	\$

24. Considering all of the expenditures that you just reported above...

a. How many people did these expenditures cover during the 2016 Lake Erie Fishing season?

_____ people [If these expenditures only covered you, please write '1']

b. How many 2016 Lake Erie fishing trips did these expenditures cover?

_____ trips [If these expenditures only covered one trip, please write '1']

Lake Erie Angler Survey

Section 3: 2016 Lake Erie Fishing Season Satisfaction

Please tell us about your satisfaction with fishing in the Pennsylvania Lake Erie waters by answering the following questions.

25. Please rate your satisfaction with your **2016 Lake Erie Fishing Season** for each of the following items on a scale of 1-5, with 1 being *very dissatisfied* and 5 being *very satisfied*.
[Circle **ONE** number for each item]

	Very Dissatisfied ←————→ Very Satisfied				
	(1)	(2)	(3)	(4)	(5)
Total number of fish caught	(1)	(2)	(3)	(4)	(5)
Cleanliness of fishing sites visited	(1)	(2)	(3)	(4)	(5)
Competition with other anglers for fishing spots	(1)	(2)	(3)	(4)	(5)
Amount of time you spent fishing	(1)	(2)	(3)	(4)	(5)
Number of fish (of your target species) biting	(1)	(2)	(3)	(4)	(5)
Habitat conditions in the areas you fished	(1)	(2)	(3)	(4)	(5)
Average weight of fish caught	(1)	(2)	(3)	(4)	(5)
Opportunity to fish without feeling crowded	(1)	(2)	(3)	(4)	(5)
Average length of fish caught	(1)	(2)	(3)	(4)	(5)
Number of fishing trips made	(1)	(2)	(3)	(4)	(5)
Fighting quality of the fish	(1)	(2)	(3)	(4)	(5)
Water quality in the areas you fished	(1)	(2)	(3)	(4)	(5)
Number of anglers fishing nearby	(1)	(2)	(3)	(4)	(5)
Opportunity to get out fishing	(1)	(2)	(3)	(4)	(5)

26. Please rate your agreement with each of the following items about your **2016 Lake Erie Fishing Season** on a scale of 1-5, with 1 being *strongly disagree* and 5 being *strongly agree*.
[Circle **ONE** number for each item]

	Strongly Disagree ←————→ Strongly Agree				
	(1)	(2)	(3)	(4)	(5)
I thoroughly enjoyed the fishing season	(1)	(2)	(3)	(4)	(5)
The fishing season was not as enjoyable as expected	(1)	(2)	(3)	(4)	(5)
I cannot imagine a better fishing season	(1)	(2)	(3)	(4)	(5)
I do not want to have any more fishing seasons like this one	(1)	(2)	(3)	(4)	(5)
I was disappointed with some aspects of the fishing season	(1)	(2)	(3)	(4)	(5)
The season was well worth the money I spent to on it	(1)	(2)	(3)	(4)	(5)

27. People have many potential reasons for fishing. We would like to know what motivated you to fish during the **2016 Lake Erie Fishing Season**. Please indicate (1) how **important** each of the experiences listed below was to you as a reason to fish, and (2) the extent to which you **attained** each of these experiences while fishing. [Circle **ONE** number in each category]

	IMPORTANCE					ATTAINED							
	Not at all Important		↔			Extremely Important		Not at all Attained		↔			Highly Attained
To be outdoors	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To do something with your family	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
For the experience of the catch	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
For relaxation	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To experience natural surroundings	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To do things with your companions	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To develop your skills	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To get away from the demands of other people	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To be close to nature	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
For the challenge or sport	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To get away from the regular routine	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			
To be with others who enjoy the same things you do	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)			

28. Please rate your agreement with each of the following fishing statements on a scale of 1-5, with 1 being *strongly disagree* and 5 being *strongly agree*. [Circle **ONE** number for each item]

	Strongly Disagree ↔ Strongly Agree				
	(1)	(2)	(3)	(4)	(5)
The more fish I catch, the happier I am	(1)	(2)	(3)	(4)	(5)
I am just as happy if I release the fish I catch	(1)	(2)	(3)	(4)	(5)
When I go fishing, I'm not satisfied unless I catch something	(1)	(2)	(3)	(4)	(5)
The bigger the fish I catch, the better the fishing trip	(1)	(2)	(3)	(4)	(5)
A full stringer is the best indicator of a good trip	(1)	(2)	(3)	(4)	(5)
I must keep the fish I catch for the trip to be successful	(1)	(2)	(3)	(4)	(5)
A fishing trip can be successful to me even if no fish are caught	(1)	(2)	(3)	(4)	(5)
It doesn't matter to me what type of fish I catch	(1)	(2)	(3)	(4)	(5)
A successful fishing trip is one in which many fish are caught	(1)	(2)	(3)	(4)	(5)
Bringing fish home to the table is an important outcome of fishing	(1)	(2)	(3)	(4)	(5)
When I go fishing, I am just as happy if I don't catch a fish	(1)	(2)	(3)	(4)	(5)
Catching a 'trophy' fish is the biggest reward to me	(1)	(2)	(3)	(4)	(5)

Appendix D. Phase II On-Site Survey Instrument

Lake Erie Economic Angler Research – On-site Survey

Hello, my name is _____. Penn State University and PA Sea Grant are requesting your voluntary participation in a brief survey regarding the economic impact and value of recreational angling within the PA Lake Erie waters. The information you provide will help better inform stakeholders of the economic importance of angling on Lake Erie. Your participation is voluntary and all information will be kept confidential.

1. Which of you has had the most recent birthday and is at least 18 years of age? [Focus all questions towards **that user**]
2. May I have about 10 minutes of your time to complete this survey? ___ Yes ___ No
 - a. [If NO] Why not? _____

For each of the following questions please tell me about your fishing experience on **this trip today** within Pennsylvania Lake Erie waters. The term *PA Lake Erie waters* refers to the PA portion of Lake Erie, Presque Isle Bay, and all tributaries, rivers, and creeks flowing into the PA section of Lake Erie. Please report your answers referring only to your personal experience.

3. Which of the following activities did you participate in during your trip today? [Select ALL that apply]	4. Which of those was your primary activity during your trip today? [Select only ONE]
Question 3 answer(s):	Question 4 answer:
<input type="checkbox"/> Fishing from the shoreline	
<input type="checkbox"/> Fishing from a pier	
<input type="checkbox"/> Fishing from a private boat	
<input type="checkbox"/> Fishing from a rental boat	
<input type="checkbox"/> Fishing from a charter boat	
<input type="checkbox"/> Ice fishing	
<input type="checkbox"/> Other [please identify]	
<input type="checkbox"/> Primary activity something other than fishing [If YES, read below]	

“Unfortunately we are not targeting your user type for this research. Thank you for your time and have a great day.”

5. Besides this site, did you use any other PA Lake Erie fishing sites on this trip today? [Select ALL that apply]

<input type="checkbox"/> Presque Isle State Park	<input type="checkbox"/> Shades Beach Park	<input type="checkbox"/> Walnut Creek Access
<input type="checkbox"/> Northeast Marina	<input type="checkbox"/> Elk Creek Access	<input type="checkbox"/> NE Twp Conservation Area
<input type="checkbox"/> Freeport Beach	<input type="checkbox"/> Lampe Marina	<input type="checkbox"/> Shorewood Park
<input type="checkbox"/> Avonia Beach Park	<input type="checkbox"/> Dobbins Landing	<input type="checkbox"/> Chestnut St Boat Launch
<input type="checkbox"/> Other [please identify]: _____		
6. ***FLASHCARD*** On this trip today, which fish species group did you target? [Select ALL that apply]

<input type="checkbox"/> Bass- Largemouth	<input type="checkbox"/> Burbot	<input type="checkbox"/> Muskellunge	<input type="checkbox"/> Sheephead	<input type="checkbox"/> Trout
<input type="checkbox"/> Bass- Smallmouth	<input type="checkbox"/> Carp	<input type="checkbox"/> Perch	<input type="checkbox"/> Smelt	<input type="checkbox"/> Walleye
<input type="checkbox"/> Bass- Rock	<input type="checkbox"/> Catfish	<input type="checkbox"/> Pike	<input type="checkbox"/> Steelhead	
<input type="checkbox"/> Bass- White	<input type="checkbox"/> Crappy	<input type="checkbox"/> Salmon	<input type="checkbox"/> Suckers	
<input type="checkbox"/> Bluegill/ Sunfish	<input type="checkbox"/> Eels	<input type="checkbox"/> Other [please identify]: _____		
7. ***FC*** On this trip today, which **one** fish species group was your primary target? [Circle ONE primary species in Q6]
8. ***FC*** How many total fish of each species group did you catch on today’s trip? [If none please leave the cell blank]

<input type="checkbox"/> Bass- Largemouth	<input type="checkbox"/> Burbot	<input type="checkbox"/> Muskellunge	<input type="checkbox"/> Sheephead	<input type="checkbox"/> Trout
<input type="checkbox"/> Bass- Smallmouth	<input type="checkbox"/> Carp	<input type="checkbox"/> Perch	<input type="checkbox"/> Smelt	<input type="checkbox"/> Walleye
<input type="checkbox"/> Bass- Rock	<input type="checkbox"/> Catfish	<input type="checkbox"/> Pike	<input type="checkbox"/> Steelhead	
<input type="checkbox"/> Bass- White	<input type="checkbox"/> Crappy	<input type="checkbox"/> Salmon	<input type="checkbox"/> Suckers	
<input type="checkbox"/> Bluegill/ Sunfish	<input type="checkbox"/> Eels	<input type="checkbox"/> Other [please identify]: _____		

Please help us understand the economic impact of Lake Erie anglers by providing some economic information. For the following categories, please provide the location and estimated amount of money you (and other members of your party) have spent or will spend **on this entire fishing trip**, from the time you left home until you return home.

9. Did you or other members of your party spend any money on this entire fishing trip?
 Yes [If YES- continue on to Q10] No [If NO- skip ahead to Q30]

FLASHCARD	Location of Spending		
	In Erie County	In any <i>other</i> County in Pennsylvania	Outside of Pennsylvania
Travel Expenditures			
10. Automobile gasoline/oil	\$	\$	\$
11. Boat gasoline/oil	\$	\$	\$
12. Airfare	\$	\$	\$
13. Rental vehicle	\$	\$	\$
14. Lodging (hotel, motel, etc.)	\$	\$	\$
15. Camping	\$	\$	\$
16. Parking	\$	\$	\$
17. Boat launching fees	\$	\$	\$
18. Boat mooring fees	\$	\$	\$
Food & Beverage			
19. Groceries (food, ice, beverages, etc.)	\$	\$	\$
20. Restaurants, bars, take-out meals, etc.	\$	\$	\$
Other shopping, services, and entertainment			
21. Guide/charter fees/boat rental fees/ tips	\$	\$	\$
22. Equipment (rod, reels, etc.)	\$	\$	\$
23. Tournament entry fees	\$	\$	\$
24. Lures and flies	\$	\$	\$
25. Bait (live, cut, prepared, etc.)	\$	\$	\$
26. Entertainment (amusement park, movies, casino, etc.)	\$	\$	\$
27. Shopping (souvenirs, clothing, outlets, etc.)	\$	\$	\$
28. Other [please identify]: _____	\$	\$	\$

29. How many people do these trip expenditures cover? group members [If the visitor is alone please write '1']
30. In total, about how much did you and other members of your party spend on this **entire trip**, from the time you left home until you return home? \$.00

Please tell us about your satisfaction with fishing in the PA Lake Erie waters by answering the following questions.

31. We would like to know how satisfied you were with your overall trip **today**. On a scale of 1-6, with 1 being *poor* and 6 being *perfect*, how satisfied were you with this trip? [Select **ONE** number]

Poor	Fair	Good	Very Good	Excellent	Perfect
(1)	(2)	(3)	(4)	(5)	(6)

Please rate your satisfaction with your fishing trip **today** for each of the following items on a scale of 1-5, with 1 being *very dissatisfied* and 5 being *very satisfied*. [Select **ONE** number]

FLASHCARD	Very Dissatisfied	Dissatisfied	Unsure	Satisfied	Very Satisfied
32. Number of fish (of your target species) biting	(1)	(2)	(3)	(4)	(5)
33. Opportunity to be outdoors	(1)	(2)	(3)	(4)	(5)
34. Total number of fish you caught	(1)	(2)	(3)	(4)	(5)
35. Opportunity to get away from the regular routine	(1)	(2)	(3)	(4)	(5)
36. Combined catch between you and your fishing partners	(1)	(2)	(3)	(4)	(5)
37. Amount of time you spent fishing today	(1)	(2)	(3)	(4)	(5)
38. Opportunity to do things with your companions	(1)	(2)	(3)	(4)	(5)
39. Competition with other anglers for fishing spots	(1)	(2)	(3)	(4)	(5)
40. Opportunity to fish without feeling crowded	(1)	(2)	(3)	(4)	(5)
41. Number of anglers fishing nearby	(1)	(2)	(3)	(4)	(5)
42. Opportunity to experience nature	(1)	(2)	(3)	(4)	(5)
43. Species of fish caught	(1)	(2)	(3)	(4)	(5)
44. Opportunity to catch a trophy fish	(1)	(2)	(3)	(4)	(5)
45. Average weight of fish caught	(1)	(2)	(3)	(4)	(5)
46. Average length of fish caught	(1)	(2)	(3)	(4)	(5)
47. Opportunity to improve your fishing skills	(1)	(2)	(3)	(4)	(5)
48. Fighting quality of the fish	(1)	(2)	(3)	(4)	(5)
49. Opportunity to do something with your family	(1)	(2)	(3)	(4)	(5)
50. Cleanliness of fishing site	(1)	(2)	(3)	(4)	(5)
51. Peacefulness of fishing site	(1)	(2)	(3)	(4)	(5)
52. Habitat conditions in the areas you fished	(1)	(2)	(3)	(4)	(5)
53. Challenge and sport of fishing	(1)	(2)	(3)	(4)	(5)
54. Water quality	(1)	(2)	(3)	(4)	(5)
55. Quality of the weather today	(1)	(2)	(3)	(4)	(5)

Please rate your agreement with each of the following items about your fishing trip **today** on a scale of 1-5, with 1 being *strongly disagree* and 5 being *strongly agree*. [Select **ONE** number]

	Strongly Disagree	Disagree	Unsure	Agree	Strongly Agree
56. I thoroughly enjoyed the fishing trip	(1)	(2)	(3)	(4)	(5)
57. The fishing trip was not as enjoyable as expected	(1)	(2)	(3)	(4)	(5)
58. I cannot imagine a better fishing trip	(1)	(2)	(3)	(4)	(5)
59. I do not want to go on any more fishing trips like this one	(1)	(2)	(3)	(4)	(5)
60. I was disappointed with some aspect of the fishing trip	(1)	(2)	(3)	(4)	(5)
61. The trip was well worth the money I spent to take it	(1)	(2)	(3)	(4)	(5)

These final questions allow us to understand more about Lake Erie anglers.
Please tell us a little bit about yourself and keep in mind that all responses are kept confidential.

62. What type of fishing license do you have? [Select **ALL** that apply]
- Adult Resident Senior - Annual Combination Trout/Salmon/Lake Erie Permit
 Adult Non-Resident Senior - Lifetime Lake Erie Permit
 1, 3, or 7 day Tourist Respondent unaware [If selected, another permit should also be selected]
 Other [please identify]: _____
63. Do you intend to fish the **2017** fishing season within the PA Lake Erie waters? Yes No
64. On average, how many **hours** did you (or will you) spend fishing PA Lake Erie waters today? _____ hours
65. Was this your first fishing trip to the PA Lake Erie waters? Yes [If YES- skip to Q68], No
66. Including today, how many **days** in the last **month** (30 days) have you fished PA Lake Erie waters? _____ days
67. Including today, how many **days** in the last **year** (12 months) have you fished PA Lake Erie waters? _____ days
68. How many **years** (total) have you fished PA Lake Erie waters? _____ years
69. How many **years** (total) have you been fishing? _____ years [*This includes PA Lake Erie waters and other waters]
70. ***FLASHCARD*** How would you rate your skill as an angler in comparison to other anglers on a scale of 1-5, with 1 being *novice* and 5 being *expert*? [Select **ONE** number]
- | | | | | |
|--------|-----|--------------|-----|--------|
| Novice | | Intermediate | | Expert |
| (1) | (2) | (3) | (4) | (5) |
71. ***FC*** Please select the narrative that best describes you as an angler within PA Lake Erie waters. [Select **ONE** option]
- | | |
|-------|---|
| _____ | Fishing is my most important activity compared to all other activities. I purchase increasing amounts of equipment to aid in fishing, participate in angling every chance I get, consider myself to be a highly skilled angler, and frequently read articles about fishing. |
| _____ | Fishing is important, but I do other outdoor activities too. I occasionally read articles about fishing and purchase additional equipment to aid in fishing. My fishing participation is inconsistent, and I am a moderately skilled angler. |
| _____ | Fishing is an enjoyable, but infrequent activity that is secondary to other outdoor interests. I am not a highly skilled angler, rarely read articles about fishing, and do not own much fishing equipment beyond the basic necessities. |
72. How many people are in your group today? _____ Adults _____ Children (under 18 years of age)
73. Was your trip today part of an overnight trip or is it a day trip?
- a. Day Trip Yes No
- i. [If YES] How many total hours will you be spending at this site during today's visit? _____ hours
- b. Overnight Trip Yes No
- i. [If YES] How many total days will you be spending away from home on this trip? _____ days
- ii. [If YES] How many of these days will you be fishing on PA Lake Erie waters? _____ days
74. Was fishing the primary purpose of your trip today? Yes No
- a. [If NO] Please specify primary trip purpose: _____

75. What would you have done if you could not fish PA Lake Erie waters today? [Select ONE]
 Fished someplace else other than PA Lake Erie waters Stayed home and come back another time
 Traveled somewhere else for a different activity Other [please identify]: _____
 Traveled to Erie County for another activity _____
76. What is your state of residence? _____
 Visitor is from another country [Please identify country: _____]
77. What is your county of residence? _____ [If visitor is from another country indicate N/A]
78. What is your home ZIP code? _____ [If visitor is from another country indicate N/A]
79. What is the one-way distance from your home to this PA Lake Erie fishing site today? _____ miles
80. What is your age? _____
81. Gender: Male Female [Interviewer can select for the visitor]
82. *FLASHCARD* What is the highest level of formal schooling you have completed? [Select ONE option]
 (1) Less than high school (4) Some college (7) Graduate or professional degree
 (2) Some high school (5) Two year college (8) Refused
 (3) High school graduate (6) Four year college
83. *FLASHCARD* With which racial group do you most closely identify? [Select ONE option]
 (1) White (4) American Indian/ Alaskan Native (7) Other
 (2) Black/ African American (5) Native Hawaiian/ Other Pacific Islander (8) Refused
 (3) Asian (6) Spanish/Hispanic/Latino
84. *FLASHCARD* In what income category does your household fall? [Select ONE option]
 (1) Under \$25,000 (4) \$75,000-\$99,999 (7) Don't Know/ Refused to answer
 (2) \$25,000-\$49,999 (5) \$100,000-\$149,999
 (3) \$50,000-\$74,999 (6) \$150,000 or more
85. If you could ask managers to improve some things about the PA Lake Erie fishery, what would you ask them to do?

Thank you for taking the time to complete this survey!