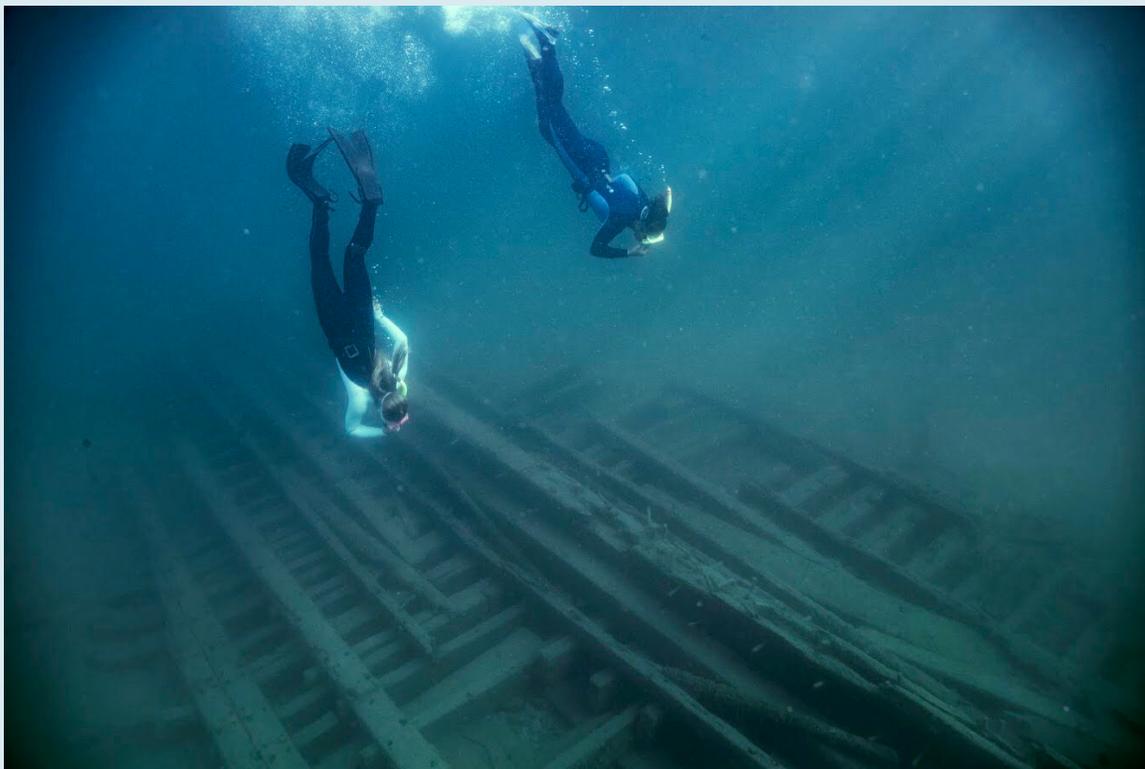


Market Economic Contributions of Recreating Users of the Great Lakes Maritime Heritage Center and Alpena Shipwreck Tours in Thunder Bay National Marine Sanctuary: Volume 1 (2018)



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Cover:

Two snorkelers investigate the wreck of *Monohansett* in Thunder Bay National Marine Sanctuary. Photo: Nick Zachar/NOAA



About the National Marine Sanctuaries Conservation Series

The Office of National Marine Sanctuaries, part of the National Oceanic and Atmospheric Administration, serves as the trustee for a system of underwater parks encompassing more than 620,000 square miles of ocean and Great Lakes waters. The 14 national marine sanctuaries and two marine national monuments within the National Marine Sanctuary System represent areas of America's ocean and Great Lakes environment that are of special national significance. Within their waters, giant humpback whales breed and calve their young, coral colonies flourish, and shipwrecks tell stories of our maritime history. Habitats include beautiful coral reefs, lush kelp forests, whale migration corridors, spectacular deep-sea canyons, and underwater archaeological sites. These special places also provide homes to thousands of unique or endangered species and are important to America's cultural heritage. Sites range in size from less than one square mile to more than 582,000 square miles and serve as natural classrooms, cherished recreational spots, and are home to valuable commercial industries.

Because of considerable differences in settings, resources, and threats, each marine sanctuary has a tailored management plan. Conservation, education, research, monitoring and enforcement programs vary accordingly. The integration of these programs is fundamental to marine protected area management. The Marine Sanctuaries Conservation Series reflects and supports this integration by providing a forum for publication and discussion of the complex issues currently facing the sanctuary system. Topics of published reports vary substantially and may include descriptions of educational programs, discussions on resource management issues, and results of scientific research and monitoring projects. The series facilitates integration of natural sciences, socioeconomic and cultural sciences, education, and policy development to accomplish the diverse needs of NOAA's resource protection mandate. All publications are available on the Office of National Marine Sanctuaries website (<http://www.sanctuaries.noaa.gov>).



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Report Availability

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Abstract

This report is part of a series of reports that focus on the use of two recreational venues associated with Thunder Bay National Marine Sanctuary. Data were collected from June 2018 to October 2018. Respondents were intercepted at the Great Lakes Maritime Heritage Center, the sanctuary's visitor center, and Alpena Shipwreck Tours, a glass-bottom boat that operates in the sanctuary. Users were residents of the region (defined as Presque Isle, Alcona, and Alpena counties) as well as visitors to the region. The users were intercepted at both locations and asked to participate in an on-site screener survey that recruited them into a longer survey. The longer survey focused on the importance and satisfaction of various characteristics related to their experience, their expenditures, and the activities they did while in the region. In total, 992 people were intercepted and 90% of them agreed to take the survey in the on-site screener survey. The response rate for the longer survey of those who completed the screener was 34.8%. This report, Volume 1, overviews person-day estimates, expenditure profiles, and economic contributions from user visitor expenditures. Volume 2 addresses the visitors' importance-satisfaction ratings for natural resource attributes, facilities, and services. Volume 3 in this series presents a socioeconomic profile of those recreating at Thunder Bay National Marine Sanctuary, including demographic profiles (e.g., age, gender, race-ethnicity, household size, household type, etc.), use, top recreation activities/points of interest, and additional detail on comparative person-days. Volume 4 is a technical appendix that explains the survey sampling methodology and the methods of estimation for volumes 1-3.

Key Words

Coastal recreation, Great Lakes, marine recreation, Thunder Bay National Marine Sanctuary, jobs, sanctuaries, shipwrecks, expenditures, output, economics, IMPLAN

Key Findings

Person-days, per-person per-day expenditures, and economic contributions

- The number of days spent in Michigan averaged 5.77 and the number of days spent in the Alpena study area averaged 3.47 for each trip. On average, respondents took 2.81 trips to the region.
- *Per-person per-day expenditures in the study area:* The lodging category of hotel/motel had the highest per-person per-day expenditure at \$11.27, and the second highest category was food and drinks bought at a restaurant or bar at \$7.02. Across all lodging, spending was \$14.23 per-person per-day. For activities, the highest spending was on water cruises and tours (including Alpena Shipwreck Tours) at \$2.92, followed by admissions to amusements, festivals, and other attractions such as lighthouses at \$1.27.
- *Economic contributions in the local economy:* In total, 467 jobs are supported annually by those who use the Great Lakes Maritime Heritage Center and/or Alpena Shipwreck Tours. Further, roughly \$40.0 million in output is supported by these activities annually. In total, \$4.0 million of local and state tax dollars are supported, and \$3.3 million in federal tax dollars are supported.
- *Economic contributions in local economy by resident status:*
 - Residents made up only 12% of total expenditures, whereas visitors spent 88% of total users' expenditures that supported the local economy.
 - Residents recreating supported \$4.8 million in output and 56 jobs in the three local counties in the study area.
 - Visitors recreating supported \$35.2 million in output and 411 jobs in the three local counties in the study area.

CHAPTER 1: INTRODUCTION

Background

In 2018, the National Marine Sanctuary Foundation conducted pilot surveys at two venues associated with Thunder Bay National Marine Sanctuary (TBNMS): the Great Lakes Maritime Heritage Center, the sanctuary's visitor center, and Alpena Shipwreck Tours, a glass-bottom boat that operates in the sanctuary. The survey took place from June 2018 to October 2018. Respondents were intercepted at both venues and asked to complete a short screener survey, and then recruited to complete a longer survey about the importance and satisfaction of various aspects of their experience, their expenditures, and the activities they participated in while in the region. Although the survey does not sample all users of TBNMS, this report does provide a representative snapshot of the larger user population, both residents of the region (Alpena, Presque Isle, and Alcona counties) and visitors to the area.

As discussed below, when screener respondents indicated they were willing to complete a longer survey, they were either given a mail survey to mail back or a postcard with an online link to SurveyMonkey to complete the survey at a later time. Findings from the longer survey include information about participants' demographics, number of days spent in the region, importance/satisfaction, attitudes and perceptions, and expenditures.

Survey Methodology

The survey methodology is presented in the technical appendix to this report (Schwarzmann et al., 2019) but is outlined again here. The survey was carried out in a two-tiered approach: first, an on-site screener survey, followed by a longer mailback or online survey.

Respondents from both Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center were approached and asked to complete the on-site screener (a short survey based upon whether the respondent was a visitor to the region or a resident of the region). The screener survey can be found in Appendix A of the Technical Appendix to this report (Schwarzmann et al., 2019). If the respondent completed the screener survey, they were then asked to complete a longer version of the survey using either a paper version they would mail back or online via SurveyMonkey.

Findings from the longer survey include information about respondents' demographics, number of days spent in the region, attitudes and perceptions, and expenditures. The response rate for the on-site short screener was roughly 90% (992 people intercepted). Roughly 35% of the 891 respondents who completed the screener and opted into the mail

survey completed the longer survey. Of those who completed the longer survey, roughly 80% of respondents did so online.

Additionally, the data were tested for non-response bias, but that analysis revealed there was no non-response bias for the variables tested. For a more detailed explanation of the non-response bias tests and spatial weighting, see Schwarzmann et al. (2019).

Data Collected

Screening Survey

- User activities (e.g., whether first trip to the region)
- User satisfaction
 - Whether respondent would recommend the Great Lakes Maritime Heritage Center and Alpena Shipwreck Tours
 - Whether likely to visit Alpena Shipwreck Tours or the Great Lakes Maritime Heritage Center again
 - Whether likely to learn more about TBNMS
 - Whether likely to go diving/snorkeling/paddling
 - Level of overall satisfaction with Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center
- Characteristics of individual
 - Age
 - Gender
 - Group size
 - Transportation mode(s)
 - Sources of information used to learn about TBNMS prior to trip
- Importance of Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center
 - Influence that either Alpena Shipwreck Tours and/or the Great Lakes Maritime Heritage Center had on their travel plans
 - Agreement that the Great Lakes Maritime Heritage Center is an important cultural attraction
- Open-ended questions
 - How to improve Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center
 - The most memorable feature at Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center

Mailback/Online Survey

- Uses
 - Person-days in Michigan and Alpena
 - Person-days of activity
 - Locations visited
- Expenditures by category of expenditure

- Per household group per trip (last trip)
- Per person-trip (last trip)
- Per person-day (last trip and annual average)
- Total annual expenditure
- Importance-satisfaction ratings for 26 natural resource attributes, facilities, and services
- Demographics

Data Collection Sites

For each of the measures above, data were collected for both the Great Lakes Maritime Heritage Center and Alpena Shipwreck Tours. Table 1.1 presents the total sample size for respondents intercepted at Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center by resident status. The local region, for the purposes of this report, is composed of Presque Isle, Alpena, and Alcona counties (Figure 1.1).

Table 1.1 Sample sizes for estimation

	Alpena Shipwreck Tours			Great Lakes Maritime Heritage Center		
	Residents	Visitors	Total	Residents	Visitors	Total
Total Screeners Issued	49	269	318	96	578	674
Completed Screeners	49	237	286	93	512	605
Completed Mail Surveys	6	18	24	6	30	36
Completed Online Surveys	21	49	70	20	129	149
Completed Surveys	27	67	94	26	159	185
Completion Rate: Issued Screeners	55.1%	24.9%	29.6%	27.1%	27.5%	27.4%
Completion Rate: Completed Screeners	55.1%	28.3%	32.9%	28.0%	31.1%	30.6%

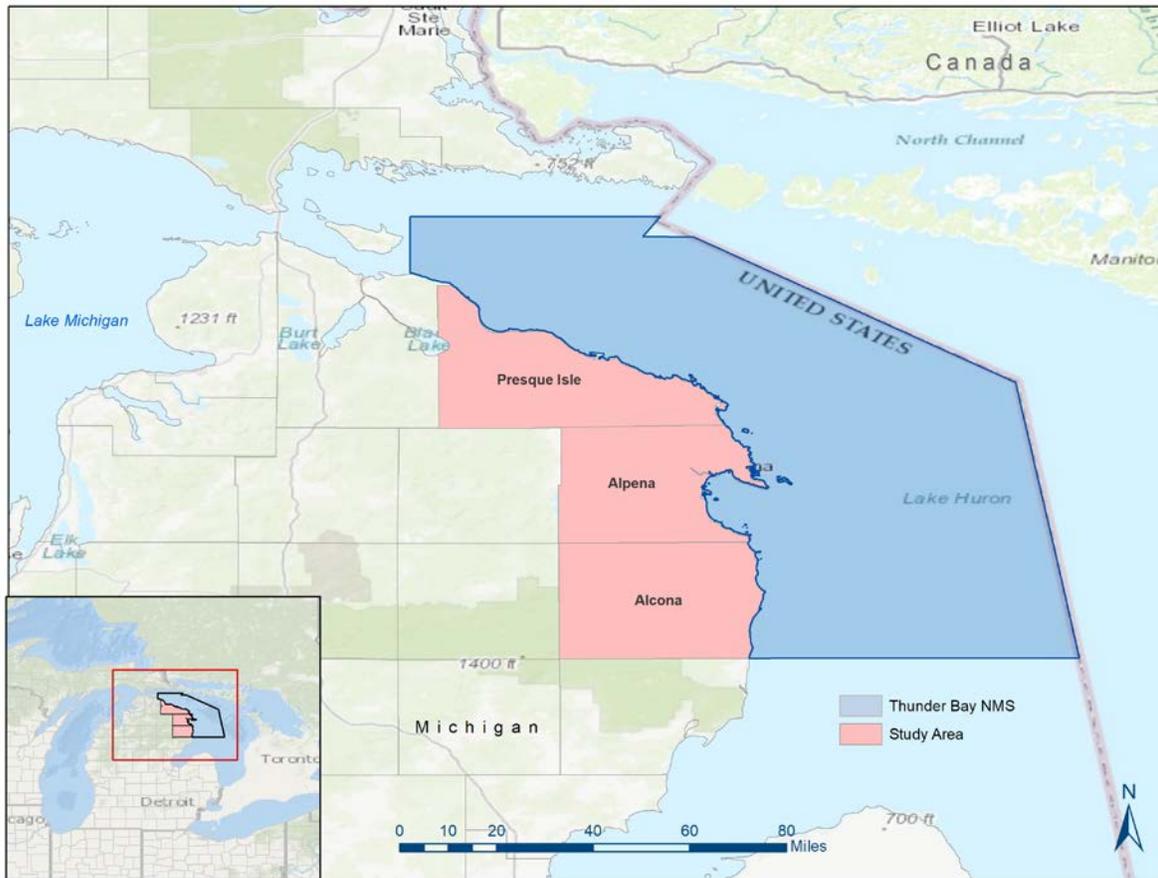


Figure 1.1 Alpena region
Image: Developed by National Marine Sanctuary Foundation in ArcGIS

Chapter 2 discusses expenditures and Chapter 3 presents the market economic impacts. For more details on respondents' importance-satisfaction ratings as well as respondents' sociodemographic characteristics, activities, and use profiles, please refer to volumes 2 and 3, respectively, in this series.

CHAPTER 2: PERSON-DAYS AND EXPENDITURES

This chapter presents person-day visitation estimates as well as annual expenditures and per-person per-day expenditures. Person-day results are first overviewed before presenting expenditure estimates. For a detailed explanation of how person-days and person-trip expenditures were calculated, please see Schwarzmann et al. (2019).

Person-Days

Before discussing expenditures, it is important to understand visitation person-days to the region. Respondents were asked to report the number of days they spent in Michigan and Alpena as part of the trip in which they were intercepted for the survey. They were also asked how many trips they have taken within the past 12 months. Before estimating the number of person-days and activity participation rates, the data were analyzed for outliers and missing values. See Schwarzmann et al. (2019) for more information the outlier analysis.

Residents spent an average of 7.93 days per trip in Michigan, with 7.29 of those days in the Alpena region. Visitors spent an average of 5.49 days in Michigan, and 2.89 days in the Alpena region, per trip. Residents of the region on average make roughly nine trips annually to the area, whereas visitors make roughly two trips annually.

Sample estimates were used to extrapolate population person-days. In total there were 7,865 adult visitors to Alpena Shipwreck Tours and 80,287 to the Great Lakes Maritime Heritage Center. Although the total number of visitors to each location is known, many of the visitors at each site visited both. This must be accounted for in estimates or double counting will ensue with extrapolating individual estimates to population spending. Extrapolating from the sample to the population, of those that went to Alpena Shipwreck Tours, 6.1% went only to the boat and not the Great Lakes Maritime Heritage Center. Knowing this, it is possible to estimate the total number of unique visitors, which is 80,767.

Table 2.1 shows the sample statistics for person-days reported for several different activities and the number of total person-days by activities from those who visited either the Great Lakes Maritime Heritage Center or Alpena Shipwreck Tours. The top three activities by participation rate were visiting the Great Lakes Maritime Heritage Center (93.1%), going to beaches/swimming (25.9%), and hiking (22.4%). The Great Lakes Maritime Heritage Center had the highest number of adults per group at 2.7 participating in the activity, and Alpena Shipwreck Tours had the second highest with an average of 1.4 adults.

Table 2.1 Activity participation and person-days

Activity	Participation Rate	Person-Days
Great Lakes Maritime Heritage Center	93.1%	80,287
Alpena Shipwreck Tours aboard the glass bottom boat <i>Lady Michigan</i>	9.7%	7,865
Paddling/kayaking to visit shipwrecks	2.8%	2,293
Scuba diving from a charter boat	0.0%	-
Scuba diving from a private boat	0.3%	255
Scuba diving from the shore	0.9%	764
Snorkeling from a charter boat	0.3%	255
Snorkeling from a private boat	0.6%	510
Snorkeling from shore, kayak, stand up paddleboard, or canoe	0.6%	510
Fishing from a charter boat	0.6%	510
Fishing from a private boat	3.8%	3,057
Fishing from the shoreline	4.7%	3,822
Kayaking/canoeing	9.5%	7,644
Stand-up paddle board	2.2%	1,783
Private/rental power boat or jet-ski	2.8%	2,293
Sailing	1.9%	1,529
Biking (road or trails)	6.6%	5,350
Hiking	22.4%	18,090
Camping	11.7%	9,427
Beaches/swimming	25.9%	20,892
Other	15.5%	12,484

The participation rate for iconic or popular destinations that people may visit on their trip that are near the sanctuary were also estimated (Table 2.2). Nearly half (41.6%) of respondents reported visiting the Great Lakes Maritime Heritage Trail. The next most popular destination was the New Presque Isle Lighthouse, with approximately a quarter, 23.3%, of respondents visiting, followed by visiting the Old Presque Isle Lighthouse (21.8%).

Table 2.2 Nearby iconic and popular locations to visit

Activity	Participation Rate
Great Lakes Maritime Heritage Trail	41.6%
New Presque Isle Lighthouse	23.3%
Old Presque Isle Lighthouse	21.8%
Art galleries or exhibits	18.0%
Great Lakes Lore Maritime Museum	17.7%
40 Mile Point Lighthouse	16.1%
Sturgeon Point Lighthouse	14.8%
Visit brewery	12.6%
Ocqueoc Falls State Park	12.3%
Onaway State Park	11.0%
Visit winery (tasting)	10.4%
<i>Joseph Fay</i> shipwreck (on beach near Forty Mile Point Lighthouse)	9.8%
Alpena Wildlife Sanctuary/Duck Park/Sportsman Island	9.5%
Thompson Harbor State Park	7.3%
Besser Museum for Northeast Michigan	6.9%
Harrisville State Park	4.4%
Hoefft State Park	3.5%
Rockport State Park/Besser Natural Areas	3.2%
Middle Island Lighthouse	1.3%
Negwegon State Park	1.3%
Sailing lessons	0.0%

Expenditures

This section presents spending per-person per-day for trips and in the nearby region. Per-person per-day expenditures for the trip were calculated by taking the reported expenditures for the trip and dividing each expenditure item by the number of people that expenditure covered. This gives the researchers the per-person expenditure. The next step is to divide the per-person expenditure by the number of days spent in Michigan. This last step provides the per-person expenditures per-day for Michigan.

To obtain the per-person per-day expenditures, the expenditures in the study area were divided by the number of people that expenditure covered. This provides the per-person expenditure for the Alpena region. The next step is to take that estimate and divide it by the number of days in the Alpena region. This gives the per-person per-day expenditure for the study area.

It is possible that the per-person per-day spent for the trip is less than the per-person spending for the study area. For example, assume someone spent \$200 on food in Michigan and \$195 of that was in Alpena. The person spent nine days in Michigan and eight of them in Alpena. This means the person spent \$22.22 for their per-person per-day expenditure on food in Michigan, but the per-person per-day expenditure in the study area was \$24.38.

Table 2.3 presents the spending per-person per-day for the sample by trip and in the study area. The lodging category of hotel/motel had the highest per-person per-day expenditure at \$11.27 for the study area, and the second highest category was food and drinks bought at a restaurant or bar at \$7.02. Across all lodging within the study area, spending was \$14.23 per-person per-day. For activities, the highest spending in the study area was on the water cruises and tours (including Alpena Shipwreck Tours) at \$2.92, followed by admissions to amusements, festivals, and other attractions such as lighthouses at \$1.27.

Table 2.3 Per-person, per-day expenditures for trip and in study area

	Spending Per-Person Per-Day for Trip	Spending Per-Person Per-Day in Study Area
Activities		
Scuba diving or snorkeling on shipwrecks via private boat	\$0.00	\$0.00
Scuba diving or snorkeling on shipwrecks via charter	\$0.00	\$0.00
Snorkeling/diving equipment purchase or rental	\$0.05	\$0.03
On-the-water cruises and tours (including Alpena Shipwreck Tours)	\$5.18	\$2.92
Fishing charters	\$0.41	\$0.50
Personal watercraft rental	\$0.14	\$0.18
Boat launch or marina fees	\$0.12	\$0.10
Fuel for boats	\$0.11	\$0.04
Land-based sightseeing tours	\$0.13	\$0.11
Admission to amusement, festivals, and other attractions (e.g., lighthouses and museums)	\$1.47	\$1.27
	Spending Per-Person Per-Day for Trip	Spending Per-Person Per-Day in Study Area
Other Activities		
Equipment purchased for recreation (bicycles, kayaks, paddle boats, stand up paddleboards)	\$0.63	\$0.10
Rental of equipment for recreation (bicycles, kayaks, paddle boats, stand up paddleboards)	\$0.04	\$0.09
Fees or costs for beach access or hiking	\$0.30	\$0.29
Equipment purchased for recreation (swimming, camping, hiking)	\$0.46	\$0.21
Rental of equipment for recreation (swimming, camping, hiking)	\$0.15	\$0.44
Guided service tours (not listed above)	\$0.05	\$0.11
Tickets for motion pictures, theaters, musical performances, concerts, etc.	\$0.39	\$0.14
Wine tasting	\$0.89	\$0.54
Other, please specify:	\$3.12	\$0.83

	Spending Per-Person Per-Day for Trip	Spending Per-Person Per-Day in Study Area
Lodging		
Hotel/motel	\$10.80	\$11.27
Bed & breakfast	\$0.32	\$0.47
Cabin	\$1.22	\$0.37
Campground fees	\$1.10	\$1.50
Cottage/condo/rental home	\$1.23	\$0.62
Other, please specify:	\$0.00	\$0.00
	Spending Per-Person Per-Day for Trip	Spending Per-Person Per-Day in Study Area
Food & Beverages		
Food purchased at a grocery store (or farmers market)	\$3.53	\$2.77
Food and drinks bought at restaurants and bars	\$9.02	\$7.02
Food and drinks purchased on a vessel charter or tour	\$0.13	\$0.17
Other, please specify:	\$0.21	\$0.18
	Spending Per-Person Per-Day for Trip	Spending Per-Person Per-Day in Study Area
Transportation		
Rental automobile, motor home, trailer, motorcycle, etc.	\$0.88	\$0.49
Gas & oil for automobile or RV	\$4.76	\$3.57
Automobile or RV parking fees & tolls	\$0.01	\$0.01
Taxi fare	\$0.00	\$0.00
Ferry	\$0.17	\$0.15
Train	\$0.00	\$0.00
Bus fare (e.g., day passes and package tours)	\$2.37	\$0.04
Airline fare	\$2.29	\$0.19

	Spending Per-Person Per-Day for Trip	Spending Per-Person Per-Day in Study Area
Miscellaneous Expenditures		
Binoculars	\$0.01	\$0.01
Camera and supplies – film, batteries, memory stick or card, film development	\$0.18	\$0.01
Footwear	\$0.48	\$0.07
Clothing (including foul weather gear, hats, sweatshirts, etc.)	\$2.08	\$2.58
Sunblock and other sundries	\$0.07	\$0.04
Souvenirs, art, and gifts (not including clothing)	\$1.70	\$1.29
Other, please specify:	\$0.74	\$0.40

Next, Table 2.4 presents the total spending annually of the (extrapolated) population of interest in Michigan and in the study area. To calculate these estimates, the total unique estimated individuals (80,767) that visited both the Great Lakes Maritime Heritage Center and Alpena Shipwreck Tours was multiplied by the per-person per-day expenditures for each expenditure item to estimate the spending per-day in both the state and study area. These figures are then multiplied by the number of days spent on average across all users for each trip in Michigan (5.77 days) and the Alpena study area (3.47 days). On average respondents took 2.81 trips to the region. The number of average trips multiplied by the number of average days per-trip is the total estimate of days annually.

For the study area, the lodging category of hotel/motel had the highest line-item expenditure at \$8.9 million, and the second highest category was food and drinks bought at a restaurant or bar at \$5.5 million. Across all lodging, spending was \$11.2 million annually. For activities, the highest spending was on-the-water tours (including Alpena Shipwreck Tours) at \$2.3 million, followed by admissions to amusements, festivals, and other attractions such as lighthouses at \$1.0 million. For scenic and sightseeing transportation and supporting industries (e.g., fishing charters, wine tasting, land-based sightseeing tours), spending annually was estimated at \$3.5 million.

Table 2.4 Total annual spending in Michigan and study area

	Total Spending in Michigan	Total Spending in Study Area
Activities		
Scuba diving or snorkeling on shipwrecks via private boat	\$5,141	\$3,092
Scuba diving or snorkeling on shipwrecks via charter	\$0.00	\$0.00
Snorkeling/diving equipment purchase or rental	\$70,879	\$24,736
On-the-water cruises and tours (including Alpena Shipwreck Tours)	\$6,778,097	\$2,299,820
Fishing charters	\$539,853	\$394,230
Personal watercraft rental	\$176,973	\$145,453
Boat launch or marina fees	\$151,994	\$77,300
Fuel for boats	\$144,750	\$30,202
Land-based sightseeing tours	\$167,267	\$88,337
Admission to amusement, festivals, and other attractions (e.g., lighthouses and museums)	\$1,920,423	\$997,983
	Total Spending in Michigan	Total Spending in Study Area
Other Activities		
Equipment purchased for recreation (bicycles, kayaks, paddle boats, stand up paddleboards)	\$818,776	\$77,300
Rental of equipment for recreation (bicycles, kayaks, paddle boats, stand up paddleboards)	\$58,046	\$67,489
Fees or costs for beach access or hiking	\$393,900	\$225,476
Equipment purchased for recreation (swimming, camping, hiking)	\$598,652	\$163,258
Rental of equipment for recreation (swimming, camping, hiking)	\$197,817	\$347,850
Guided service tours (not listed above)	\$70,952	\$83,484
Tickets for motion pictures, theaters, musical performances, concerts, etc.	\$517,174	\$110,582
Wine tasting	\$1,165,404	\$424,918
Other, please specify:	\$4,079,294	\$650,593

	Total Spending in Michigan	Total Spending in Study Area
Lodging		
Hotel/motel	\$14,141,065	\$8,878,074
Bed & breakfast	\$424,170	\$371,040
Cabin	\$1,599,093	\$287,556
Campground fees	\$1,441,849	\$1,181,816
Cottage/condo/rental home	\$1,615,667	\$491,338
Other, please specify:	\$0.00	\$0.00
	Total Spending in Michigan	Total Spending in Study Area
Food & Beverages		
Food purchased at a grocery store (or farmers market)	\$4,619,461	\$2,178,379
Food and drinks bought at restaurants and bars	\$11,808,889	\$5,526,928
Food and drinks purchased on a vessel charter or tour	\$165,806	\$133,505
Other, please specify:	\$280,033	\$142,542
	Total Spending in Michigan	Total Spending in Study Area
Transportation		
Rental automobile, motor home, trailer, motorcycle, etc.	\$1,153,634	\$382,635
Gas & oil for automobile or RV	\$6,234,068	\$2,808,525
Automobile or RV parking fees & tolls	\$16,306	\$3,975
Taxi fare	\$5,784	\$0.00
Ferry	\$217,153	\$118,269
Train	\$0.00	\$0.00
Bus fare (e.g., day passes and package tours)	\$3,108,008	\$27,828
Airline fare	\$2,994,797.39	\$146,097
	Total Spending in Michigan	Total Spending in Study Area
Miscellaneous Expenditures		
Binoculars	\$12,445	\$7,484
Camera and supplies – film, batteries, memory stick or card, film development	\$241,545	\$8,348
Footwear	\$622,924	\$52,177
Clothing (including foul weather gear, hats, sweatshirts, etc.)	\$2,722,702	\$2,030,796
Sunblock and other sundries	\$87,756	\$32,495
Souvenirs, art, and gifts (not including clothing)	\$2,228,707	\$1,017,380
Other, please specify:	\$964,732	\$315,152

CHAPTER 3: ECONOMIC CONTRIBUTIONS TO LOCAL ECONOMY

When people recreate in an area and spend money, their expenditures contribute to local area economies. Using IMPLAN, an input-output modeling software, this spending can be traced through the local economy to understand how jobs, income, gross regional product, and tax generation are supported. This chapter quantifies those economic effects.

Study Area

The first step to estimating the economic contributions of an activity to the local region (hereafter, the “study area”). For TBNMS, the study area is composed of the sanctuary’s three neighboring counties in Michigan: Presque Isle, Alpena, and Alcona. This is consistent with past studies that have used this study area for TBNMS (University of Michigan, 2013). As a reminder, Figure 1.1 shows the region denoting the counties defined for the study area.

The economic profiles presented below in Table 3.1 present the total labor income (the sum of employee compensation and proprietor income; see Table 3.2 for additional definitions) and employment for each county in the study area. These baseline figures can be used for comparison purposes to determine what percentage of employment and income recreational activities in the study area contribute to the regional economy.

Table 3.1 Study area county profile of labor income and employment

Study Area County	Total Labor Income (2017\$)	Employment
Alpena	\$672,040,405	16,083
Alcona	\$104,435,156	3,355
Presque Isle	\$172,254,585	4,868
Total	\$948,730,147	24,305

Source: IMPLAN (2019)

IMPLAN

The IMPLAN input-output model was used to estimate the contributions of spending on total output/sales, value-added, income, and employment, including the multipliers for study area spending. Using the expenditures profiles presented earlier in Chapter 2, the economic impacts of recreational activities at Alpena Shipwreck Tours and the Great Lakes Maritime Heritage Center was estimated. Table 3.2 presents a detailed explanation of the terminology used in this report as defined by IMPLAN.

Table 3.2 IMPLAN economic indicators' definitions

Indicator	Definitions and Relationships
Employment	Total annual average jobs. This includes self-employed and wage and salary employees, and all full-time, part-time, and seasonal jobs, based on a count of full-time/part-time averages over 12 months.
Labor Income	Defines the total value paid to local workers within a region. Labor income is the income source for induced household spending estimations. Labor Income = Employee Compensation + Proprietor Income
Value Added	Composed of labor income, indirect business taxes (IBT), and other property type income (OPTI), value added demonstrates an industry's value of production over the cost of its purchasing the goods and services required to make its products. Value added is often referred to as gross regional product. Value Added = Labor Income + IBT + OPTI
Output	The total value of an industry's production, composed of the value of intermediate inputs and value added. In IMPLAN, this is typically viewed as the value of a change in sales or the value of increased production. However, annual production is not always equal to annual sales. If production levels are higher than sales, surpluses become inventory. Because inventory does not drive additional impacts in the year it was produced, in IMPLAN, direct industry sales = direct output. Output = Intermediate Inputs + Value Added

Source: Day (2011).

Economic contributions are defined as direct, indirect, or induced. In short, direct effects are those that occur within the sector of the expenditure. Indirect effects occur as a result of spending within the primary sector on goods and services from other sectors. Induced effects result from the wage earners within the study area spending money on goods and services within the region. The indirect plus induced effects make up what is generally referred to as the “multiplier” effects. These impact types are explained in Table 3.3.

Table 3.3 Impact type definitions

Type of Contribution	Definition
Direct effect	The effect of spending by recreators at each business they purchased goods or services from within the study area.
Indirect effect	The result of a sector purchasing goods and services to produce their product from other industries located within the study area.
Induced effect	Results from spending of employee wages that stem from both the direct and indirect effects within the study area.

Economic Contributions by Resident Status

The next several tables present the economic contributions resulting from the expenditures explained in Chapter 3 that were estimated from IMPLAN. Although expenditure estimates by resident status were not estimated due to the sample size, it is possible to estimate the percentage of contributions attributed (i.e., estimated) to residents and visitors using the percentage of total expenditures that were either residents (12.0%) or visitors (88.0%).

Results of the economic contributions to the Alpena study area of the expenditures made in the study area are shown below for total contributions and by resident status in tables 3.4, 3.5, and 3.6. In total, 467 jobs are supported annually by those who use the Great Lakes Maritime Heritage Center and/or Alpena Shipwreck Tours. Further, \$14.8 million in labor income and \$39.9 million in output is supported by these activities annually. Annual local, state, and federal tax dollars supported from the spending can also be estimated (full results not shown here). In total, \$4.0 million of local and state tax dollars were supported and \$3.3 million in federal tax dollars were supported.

Table 3.4 Total economic contributions

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	365	\$11,444,768	\$15,597,187	\$28,206,858
Indirect Effect	48	\$1,651,430	\$2,688,876	\$5,740,686
Induced Effect	55	\$1,688,237	\$3,198,187	\$6,004,586
Total Effect	467	\$14,784,435	\$21,484,250	\$39,952,130

Table 3.5 Economic contributions from residents

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	44	\$1,373,632	\$1,872,016	\$3,385,463
Indirect Effect	6	\$198,209	\$322,726	\$689,013
Induced Effect	7	\$202,627	\$383,855	\$720,686
Total Effect	56	\$1,774,467	\$2,578,597	\$4,795,162

Table 3.6 Economic contributions from visitors

Impact Type	Employment	Labor Income	Value Added	Output
Direct Effect	321	\$10,071,137	\$13,725,171	\$24,821,395
Indirect Effect	42	\$1,453,221	\$2,366,150	\$5,051,674
Induced Effect	48	\$1,485,610	\$2,814,332	\$5,283,899
Total Effect	411	\$13,009,968	\$18,905,653	\$35,156,969

As mentioned earlier, these estimates can be compared to the baseline figures in the local study area economy (Table 3.7). Users’ expenditures contribute to roughly 2% of the local labor income as well as employment in the study area.

Table 3.7 Comparison of total labor income and employment for expenditures supported within study area economy

	Labor Income		Employment	
	<i>Study Area Total</i>	<i>Contribution from Users</i>	<i>Study Area Total</i>	<i>Contribution from Users</i>
Total number	\$948,730,147	\$14,784,435	24,305	467
% of local economy		1.6%		1.9%

CHAPTER 4: CONCLUSIONS AND FUTURE RESEARCH

When residents and visitors travel to TBNMS, they spend money that trickles through and supports the local economies. Knowing the total number of users and using surveys to collect recreators' expenditures, total expenditures in the region associated with the Great Lakes Maritime Heritage Center and Alpena Shipwreck Tours were estimated. Then IMPLAN was used to estimate the contribution these expenditures make to the local study area in terms of jobs, labor income, tax revenue, etc.

It is estimated that the majority of the direct total annual expenditures were from visitors (88%); this intuitively makes sense given visitors come from outside the region, might be staying for a longer time, and need to purchase additional items for their stay (such as lodging and rentals). For example, lodging was the highest per-person per-day expenditure. State agencies might use this information targeting their recreation marketing plans for TBNMS. Further, sanctuary management may use this information to better understand recreation sub-groups and their expenditures.

Limitations

Developing an understanding of visitation, visitors' expenditures, and users' various activities in and around the sanctuary helps both management and the local community. While this study developed a significant body of socioeconomic information, it was limited to only those who use Alpena Shipwreck Tours or the Great Lakes Maritime Heritage Center. In other words, this study did not capture the entire population of users, including those who visit the sanctuary but do not visit the Great Lakes Maritime Heritage Center or Alpena Shipwreck Tours. It is possible that the users who visit the sanctuary but do not visit these two sites could have different results than what is presented herein. Additionally, the sample size was not sufficiently large enough to develop expenditure profiles for visitors and residents due to the large variation in responses.

Future Research

Future work will seek to survey the entire population of users, including those who visit the sanctuary but do not visit the Great Lakes Maritime Heritage Center or Alpena Shipwreck Tours. Additionally, ensuring a large enough sample to discern expenditure estimates by resident status (visitor vs. resident) will be a focus in future studies. More generally, NOAA Office of National Marine Sanctuaries and TBNMS staff can use this information as groundwork to inform future studies and understand who the users are, what they are doing, how they perceive the condition of natural resources they use during their activities, and how they value those resources.

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AMERICA'S UNDERWATER TREASURES