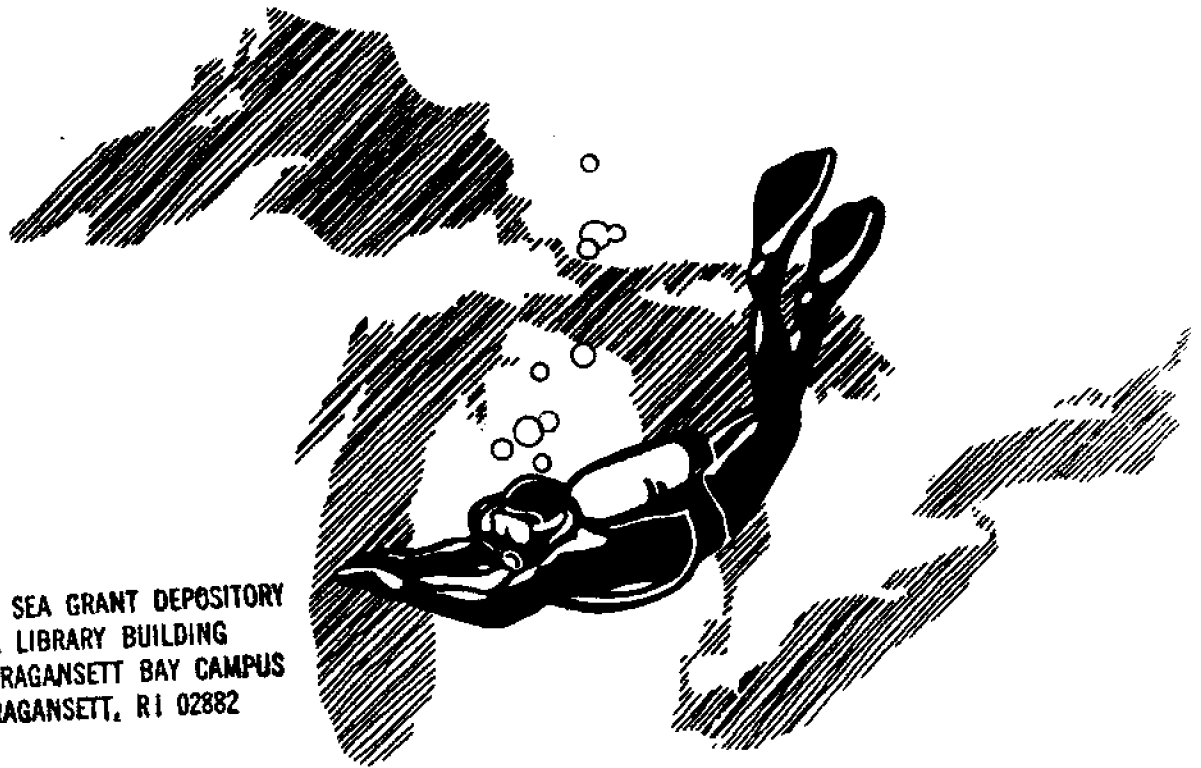


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# A Profile of Great Lakes Diver Activity, Travel, and Expenditure Patterns

Jon P. Peterson, Thord Sundstrom, Steve Stewart



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# **A Profile of Great Lakes Diver Activity, Travel, and Expenditure Patterns**

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## INTRODUCTION

In recent years, growing appreciation has evolved for the historical and recreational significance of the underwater resources of the Great Lakes. Improvements in diving technology have made these resources more accessible to sport divers. Historians and divers have become increasingly aware of the value of shipwreck resources. Recreational diving industry interests have recently begun to develop diver services and actively promote Great Lakes diving as a tourism product. In the State of Michigan for instance, the designation of state bottomland preserves (Halsey, 1986 and Kinnunen, et.al., 1986) has opened the way for active development of these areas as diving destination attractions.

In spite of these developments, little information exists on the activity and expenditure patterns of Great Lakes divers. Although recent research efforts in Michigan bottomland preserves have been conducted (Peterson, et.al., 1987; Peterson and Sundstrom, 1987; Kinnunen, et.al., 1987), the information from these efforts has only narrowly defined diver activity in these preserve areas. In order to enhance the broader potential for growth in Great Lakes recreational diving, information on diver expenditure patterns and Great Lakes diving activity also need to be documented. This survey effort and reported findings are an attempt to initiate that process and provide a profile of Great Lakes diving activity and related expenditure patterns.

## SAMPLE POPULATION AND PROCEDURES

Because of the difficulty in obtaining a representative list of those who dive in the Great Lakes, the sample population for the survey was derived from three sources. The names and addresses of 275 divers were obtained during survey work conducted by Michigan Sea Grant College Program staff in Michigan bottomland preserve areas during the summer of 1986. This segment of the sample was known to have been diving in Great Lakes waters during 1986. The remainder of the sample population was obtained by drawing the names of 650 divers from the mailing lists of two Michigan dive shops. In this manner, a list of 925 divers was generated. It is important to recognize that this sample may not be representative of the general diving population.

In January 1987, 925 divers were mailed a copy of the survey instrument and a pre-paid return envelope. Over the next two months, 330 surveys were returned, with 19 also returned as undeliverable due to an incorrect or non-forwardable address. Based on the 906 presumed delivered surveys, 330 were completed for a response rate of 36.4%.

As mentioned previously, there are some potential biases in the results which follow. The sample population may include a greater number of more experienced, active Great Lakes divers than the general population. Due to the manner in which the sample population was derived, it also is biased toward divers residing in Michigan. In fact, 84.4% of the sample population were Michigan residents and these divers may differ from the general population due to different diving-related opportunities or aspects unique to the state. Finally, 63.6% of the sampled population did not respond, and it is probable that these individuals differ from the responding divers.

Many of them may not dive in Great Lakes waters, and prefer diving in other locations with more favorable climatic or aquatic conditions. It is also possible that many of the nonrespondents are not as active as the respondents or may have dropped out of diving altogether.

## RESULTS AND DISCUSSION

The residence of the survey respondents is shown in Table 1. Because the greatest proportion of the sample was drawn from Michigan residents, it is not surprising that the majority of the respondents are also from Michigan. Nonetheless, the geographic area represented by the states in Table 1 is probably an accurate reflection of market area potential for Great Lakes diving, as evidenced by similar residence patterns identified in research into Michigan bottomland preserve diver residences (Peterson, et.al., 1987).

Table 1. Diver Residence

	<u>Percent of Respondents</u>
Michigan	73.9
Wisconsin	6.7
Ohio	6.1
Illinois	4.3
Indiana	3.0
Minnesota	1.8
Iowa	1.2
Ontario	0.6
Other (Rhode Island, Florida, Kansas, Kentucky, North Dakota, New York, South Korea)	2.4

### Diving Involvement

All respondents were asked a number of questions related to aspects of their diving activity: 1) years of experience, 2) maximum preferred diving depth, 3) number of individual dives made in 1986, 4) level of investment in personal diving equipment, 5) certification status, and 6) whether they belong to an organized dive club. The responses to these questions are all indicators of the level of involvement on the part of the respondents, and also provide some insight into specific differing aspects of Great Lakes diver activity.

Table 2 presents information on the years of diving experience reported by the respondents. As shown, the respondents to the survey represent a broad range of diving experience, with the average of 9.44 years indicating a very experienced overall respondent population.

Table 2. Years Participated in Diving

Number of Years	Respondents	
	Number	Percent
0 - 4	103	31.3
5 - 9	90	27.4
10 - 14	63	19.1
15 - 19	39	11.9
20 +	34	10.3
	329	100.0

Average for all respondents - 9.44 years of experience

Respondents were also asked to indicate the maximum depth which they preferred to dive. This information is presented in Table 3. Although the average of 102.36 feet compares quite well with the commonly accepted safe limit of 100 feet for the average sport diver, a significant number of the respondents indicated much greater depths. This suggests again that many of the survey respondents are very experienced and therefore willing to dive these greater depths. These "deep divers" may also be a reflection of the enhancement of diver training and education, along with continuing advances in diving equipment and techniques in recent years.

Table 3. Maximum Preferred Diving Depth

Maximum Depth (feet)	Respondents	
	Number	Percent
0 - 50	37	11.6
51 - 100	156	48.9
101 - 150	103	32.3
151 - 200	20	6.3
over 200	3	0.9
	319	100.0

Average for all respondents -- 102.36 feet

In an attempt to assess the level of diving activity on the part of respondent divers, they were asked to indicate the total number of scuba dives they made during 1986. Note that this total includes any and all dives made during 1986, not just those made in Great Lakes waters. Table 4 summarizes these responses, and shows that there was a wide range of diving activity on the part of the respondents.

Table 4. Total Scuba Dives Made During 1986

Dives	Respondents	
	Number	Percent
none	30	9.2
1 - 10	93	28.4
11 - 20	54	16.5
21 - 30	38	11.6
31 - 50	40	12.2
51 - 70	36	11.0
71 - 100	21	6.4
over 100	15	4.6
	327	100.0

Average for all respondents - 31.12 dives

The investment in personal diving equipment was also seen as an important indicator of both diver interest and the economic significance of the sport. The results reported in Table 5 show that Great Lakes divers have made major investments in their equipment. The average of \$2479.86 compares fairly well with the average investment of \$1710 reported in the 1987 Skin Diver magazine reader survey (Skin Diver, 1987). Although the value reported from Great Lakes divers is higher than the Skin Diver survey, this may be due in part to the additional investment required for equipment necessary to dive the cold, deep waters of the Great Lakes.

Table 5. Investment in Personal Diving Equipment

Dollar Investment	Respondents	
	Number	Percent
0 - 500	27	8.3
501 - 1000	49	15.1
1001 - 1500	56	17.3
1501 - 2000	67	20.7
2001 - 3000	61	18.8
3001 - 5000	39	12.0
Over 5000	25	7.7
	324	100.0

Average for all respondents - \$2479.86

The current level of certification of divers was another aspect of the diving activity of Great Lakes divers which was of interest. The level of certification (including specialties) for the survey respondents is presented in Tables 6 and 7. As shown, these divers are very experienced, with 42.4% holding an advanced certification. In addition, 30.9% of the respondents to this survey held at least one specialty certification, with many holding more than one.

Table 6. Current Level of Certification

Certification	Respondents	
	Number	Percent
Advanced	140	42.4
Openwater	97	29.4
Basic	63	19.1
Dive Master	46	13.9
Instructor	38	11.5
Master Diver	24	7.3
Assistant Instructor	14	4.2
Not Certified	1	0.3
Any Specialty	102	30.9

(Based on 330 respondents, totals more than 100% due to multiple responses)

Table 7. Specialty Certifications

Specialty	Respondents	
	Number	Percent of Total
Rescue	34	10.3
Ice Diver	31	9.4
Equipment	30	9.1
Night Diver	28	8.5
Wreck Diver	25	7.6
Deep Diver	24	7.3
Underwater Photography	21	6.4
Search and Recovery	15	4.5
Limited Visibility	8	2.4
River Diver	7	2.1
Navigation	7	2.1
Cave Diver	6	1.8
Drysuit Diver	5	1.5
Boat Diver	5	1.5
Salvage Diver	4	1.2
Current Diver	4	1.2
Research Diver	4	1.2
Underwater Investigator	2	0.6
Commercial Diver	2	0.6
Accident Management	1	0.3
Medic Diver	1	0.3

(Based on 330 total respondents)



Finally, divers were also asked to indicate whether they were a member of an organized dive club. Since dive travel is often a club or group experience, membership in a dive club can be an important influence on how active divers are and also where they go diving. Furthermore, as seen in other studies (Peterson, et.al., 1987), information about possible travel locations is very often gained by divers through their participation in dive clubs. Based on the 321 divers responding to the question about dive club membership, 115 (36.4%) indicated that they were members of an organized club.

The results presented above seem to indicate that Great Lakes divers are an experienced, active group with significant investments of time and money in training and equipment. Similar traits were exhibited by Michigan Sea Grant research conducted in 1980 on shipwreck scuba divers who resided in the Great Lakes region (Holocek and Lothrop, 1980). Whether these traits are also true of the general diver population is difficult to say. The only broad-based research on the general diving population is conducted every two years by Skin Diver magazine. This research, although biased toward the readership for the magazine, nonetheless is based on a nationwide sample and does offer the opportunity to draw some comparisons.

The Great Lakes divers identified above exhibit a greater investment of money in their equipment than those in the 1987 Skin Diver survey. The Great Lakes divers have also pursued greater amounts of training to enhance their diving skills, as evidenced by the many divers (30.9%) with at least one specialty certification. Skin Diver respondents averaged 6.5 years of experience versus the 9.44 years reported by the Great Lakes respondents. Finally, a greater amount of participation in an organized dive club was exhibited by the Great Lakes respondents (36.4%) versus those from Skin Diver (20%). All this suggests that Great Lakes divers responding to this survey may exhibit a greater level of involvement in the sport than the general U.S. diving population.

### Dive Travel Patterns

Survey respondents were asked a number of questions relating to their dive travel activity. Responses to these questions provide insight into the travel patterns of divers and indicate Great Lakes travel locations and the attributes they seek in traveling to these locations. Such information also has implications for the design and evaluation of Great Lakes recreational diving marketing strategies being used or developed in the region.

Respondents were asked to indicate the number of diving trips taken during 1986. These results are summarized in Table 8. As shown, there is a wide variety in the travel activity of the responding divers. A significant percentage (13.8%) did not take any diving trips during 1986, an indication that there is an element of the diving population which is relatively inactive in terms of dive travel. By contrast, the overall average of six trips and the percentage taking over ten trips is evidence that the respondents to this survey are very active in terms of their dive travel activity.

Table 8. Diving Trips Made in 1986

Trips	Respondents	
	Number	Percent
none	45	13.8
1	47	14.4
2	39	12.0
3	37	11.3
4	30	9.2
5	19	5.8
6 - 10	64	19.6
11 - 20	25	7.7
21 - 30	11	3.4
over 30	<u>9</u>	<u>2.8</u>
	326	100.0

Average for all respondents -- 6.01 trips

For those trips taken during 1986, the respondents indicated that they spent an average of almost twelve nights away from home. Table 9 presents the responses and range of overnight dive travel responses.

Table 9. Nights Away From Home for 1986 Diving Trips

Nights	Respondents	
	Number	Percent
0	56	17.1
1 - 5	65	19.9
6 - 10	69	21.1
11 - 15	48	14.7
16 - 20	33	10.1
21 - 30	32	9.8
31 - 40	14	3.0
over 40	<u>10</u>	<u>3.0</u>
	327	100.0

Average for all respondents -- 11.73 nights

Divers were also asked to indicate the number of Great Lakes trips they took every year since 1981. Table 10 summarizes this information for 1986. A significant percentage (26.8%) of the respondents did not take any Great Lakes trips during 1986. While this might suggest that a high percentage of the respondents do not dive in the Great Lakes, only 6.7% of the respondents in fact

do not dive in the Great Lakes (see Table 14 and related discussion). This again indicates that on a year-to-year basis, there are a significant percentage of divers who are not involved in dive travel activity. A comparison with the percentage of respondents who did not take any trips (13.8%) with those who did not take any Great Lakes trips (26.8%) during 1986 also suggests that some Great Lakes divers are only taking trips outside the Great Lakes region in some years.

Table 10. Number of 1986 Great Lakes Diving Trips

Trips	Number	Respondents	
		Number	Percent
0	87		26.8
1	61		18.8
2	46		14.2
3	32		9.8
4	17		5.2
5 - 10	55		16.9
11 - 20	13		4.0
over 20	14		4.3
	325		100.0
Average for all respondents -- 4.23 trips			

Table 11 shows the annual Great Lakes trip average for every year since 1981, based on the respondents who were diving in those years. Surprisingly, the yearly average remained fairly constant at about four trips, in spite of the increased development of Great Lakes diving services in many locations during this period. One might have expected that with the development and promotion of these services that dive trips in the Great Lakes would have increased during this period.

Table 11. Average Number of Great Lakes Trips Taken 1981-1986

Year	Average Number of Trips
1986	4.23
1985	4.19
1984	4.77
1983	4.22
1982	4.88
1981	5.63

Dive travel destinations for the respondents during the years 1984 through 1986 are shown in Table 12. Although the majority of trips were taken in the Great Lakes region in inland waters or the Great Lakes, the respondents also traveled to the wide variety of popular diving areas around the world.

Table 12. Locations of Diving Trips Taken During 1984-1986

Location	Respondents	
	Number	Percent
Great Lakes	286	87.7
Inland Lakes (G.L. Region)	244	74.8
Florida	123	37.7
Caymans	62	19.0
Bahamas	54	16.6
Other Carribean	54	16.6
Gulf States	48	14.7
Mexico	34	10.4
Hawaii	32	9.8
Virgin Islands	31	9.5
Bonaire	28	8.6
Bonne Terre Mines	22	6.7
California	15	4.6
Carolina Coast	15	4.6
New England	9	2.8
Central America	8	2.5
Quarries	7	2.1
Truk Lagoon	6	1.8
Other Pacific	6	1.8
Mediterranean	5	1.5
Jamaica	4	1.2
Tahiti	3	0.9
Australia	3	0.9
Nova Scotia	1	0.3

(326 responses, totals more than 100% due to multiple responses)

Locations of diving trips made in the Great Lakes region during this same period are presented in Table 13. It is not surprising that the first six locations are all areas with designations as either bottomland preserves or as an underwater park, and also areas with high concentrations of quality shipwreck resources. That these locations were identified as the most visited is also undoubtedly a function of the development and promotion of diver services in these areas. Furthermore, the total list of identified Great Lakes diving locations is good indication of the variety of locations and of the wider potential for further development of recreational diving opportunities in the Great Lakes.

Table 13. Locations of Great Lakes Trips Taken During 1984-1986

Location	Respondents	
	Number	Percent
Munising/Alger Preserve	162	53.5
Alpena/Thunder Bay Preserve	140	46.2
Tobermory/Fathom Five Park	120	40.0
Mackinac Straits Preserve	100	33.0
Huron County/Thumb Area Preserve	79	26.1
Whitefish Point Preserve	54	17.8
Southern Lake Michigan	35	11.6
Isle Royale	30	9.9
Grand Traverse Bay Area	28	9.2
St. Clair River	24	7.9
Lake Erie	20	6.6
Manitou Islands	18	5.9
Superior North Shore	17	5.6
Higgins Lake	11	3.6
Other Inland Lakes	11	3.6
Other Lake Superior	9	3.0
Apostle Islands	9	3.0
Saginaw Bay	7	2.3
Other Lake Michigan	6	2.0
Lake Ontario	6	2.0
North Channel Lake Huron	6	2.0
Green Bay	6	2.0
Lake St. Clair	3	1.0

(Based on 303 respondents, totals more than 100% due to multiple responses)

The respondents were asked to indicate the location where they had done the majority of their Great Lakes diving. Table 14 presents this information and looks much like Table 13, with the popular locations again being areas with numerous shipwreck resources and services for visiting divers. The wide range of locations identified by respondents as those where they had done the majority of their diving again points out that recreational diving activity is taking place throughout the Great Lakes region. Finally, as mentioned earlier, 6.7% of the respondents indicated that they did not dive in the Great Lakes, although these individuals did dive in other non-Great Lakes locations.

Table 14. Location of the Majority of Great Lakes Diving Trips

Location	Respondents	
	Number	Percent
Munising/Alger Preserve	71	21.6
Alpena/Thunder Bay Preserve	59	17.9
Huron County/Thumb Area Preserve	38	11.5
Mackinac Straits Preserve	36	10.9
Tobermory/Fathom Five Park	36	10.9
Do Not Dive in the Great Lakes	22	6.7
Grand Traverse Bay Area	22	6.7
Other Lake Michigan	19	5.8
St. Clair River	15	4.5
Whitefish Bay	15	4.5
Inland Lakes	12	3.6
Lake Erie	8	2.4
Isle Royale	8	2.4
Lake Superior North Shore	8	2.4
Other Lake Superior	8	2.4
Lake Superior (Marquette)	7	2.1
Saginaw Bay	6	1.8
Other Lake Huron	6	1.8
Georgian Bay	4	1.2
Higgins Lake	3	0.9
Manitou Islands	3	0.9
Green Bay	2	0.6
North Channel Lake Huron	2	0.6
Lake St. Clair	1	0.3

(Based on 324 respondents, totals more than 100% due to multiple responses)

From the data above, it can be seen that Great Lakes recreational diving is taking place in a wide range of locations throughout the region, particularly in areas with diving attractions and services. As a means of assessing which factors were important to divers in selecting a Great Lakes location, the respondents were also asked to rank the importance of differing attributes of diving locations. These attributes, and their rank, are presented in Table 15.

Table 15. Attributes Important in Selecting a Great Lakes  
Diving Location

Attributes	NI	SI	VI	C	Mean
	1	2	3	4	
Percent of Respondents					
Dive Shop Services	2.3	23.2	51.1	23.5	2.96
Quality of Shipwrecks	2.9	22.7	58.6	15.9	2.87
Diver Safety Procedures and Facilities	6.1	25.5	46.1	22.3	2.85
Information about Diving Sites	4.5	25.5	54.8	15.2	2.81
Water Clarity	2.3	36.3	55.0	6.4	2.66
Well-marked Dive Sites	10.3	35.3	43.6	10.9	2.55
Availability of Dive Charters	18.8	33.0	33.7	14.6	2.44
Natural Beauty	9.6	46.6	39.2	4.5	2.39
Services in Area (Dining, Lodging)	11.3	51.4	31.5	5.8	2.32
Boat Launch and Marina Facilities	21.5	35.0	36.0	7.4	2.29
Weather-protected Dive Sites	18.1	58.7	22.3	1.0	2.06
Other Recreation Activities in the Area	31.4	54.4	13.6	0.6	1.83
Activities for Non-divers	42.4	41.7	14.6	1.3	1.75
Local Historical Attractions	43.1	43.4	12.9	0.6	1.71
Nearness to Home	38.6	52.3	8.8	0.3	1.71
NI = not important		VI = very important			
SI = somewhat important		C = crucial			

As shown, the respondents ranked factors specifically related to the diving activity very high. And, as evidenced in the discussion of travel destinations above, those areas which provide these basic diver services are currently attracting the most Great Lakes divers. Other factors related to support services (dining, lodging, boating facilities, and other recreation) are not necessarily as important in deciding where to go diving, although they are no doubt important in adding to the experience enjoyed by the diver once in the area. Finally, the low ranking for nearness to home is further indication of the willingness of divers to travel long distances in pursuit of diving in their favored locations.

#### Diver Spending Patterns

Survey respondents were also asked to indicate their spending, including travel, for all Great Lakes diving trips made during 1986. This distribution of spending for 1986 Great Lakes diving trips is presented in Table 16. Note that the values for each category of spending shown in Table 16 are only averages. As such, these values represent the averages for all the respondents who indicated "0" or any expenditure for the spending categories shown. It should also be recognized that there is a wide range of responses within individual spending categories. For instance, in the "boat expenses" category, there were divers who did

not incur any boat expenses (many of them likely were charterboat divers), others incurring a broad range (\$9 - \$500) of expenditures, and some divers making very substantial (\$500 - \$2500) expenditures.

For all of the spending categories, there were similar trends of respondents who made no expenditures, and others who made expenditures which ranged from tens of dollars to thousands. This suggests that there are differing segments of dive travelers within the sample population. These segments likely have differing spending patterns within categories, based on their travel and activity patterns.

Although this study does not examine or analyze these segments, it is nonetheless important to recognize that they likely exist. Differing segments of divers will create spending impacts which vary within the spending categories in Table 16. For instance, just as there are divers using private boats, there are also divers who only access the water through a charter service. Similarly, there may be resident divers who dive locally and do not spend great amounts, while others travel great distances to their diving location and make extended overnight stays.

As shown in Table 16, during the 1986 Great Lakes diving season, the respondents made significant expenditures in many categories while on their trips. Respondents averaged a total of \$1287.30 for all spending made on their Great Lakes trips. Well over half of the total spending was made in communities near the diving location, indicating that significant dollars are flowing into those areas with diver services.

Further analysis of this spending data on a per trip basis is shown in Table 17. The 220 respondents who indicated spending on Great Lakes trips made a total of 1157 Great Lakes trips during the 1986 season, resulting in an average of 5.26 trips for the year. Dividing the values in Table 16 by 5.26 trips, then, results in the per trip spending values for the categories shown in Table 17.



Table 16. Total Spending by Divers on 1986 Great Lakes Trips

Category of Spending	Spending in Dollars		Total
	To and From the Diving Location	Near the Diving Location <sup>a</sup>	
Diving Equipment, Air, Dive Shop Services	92.88	89.06	181.94
Dive Charter Fees	21.47	90.36	111.83
Lodging <sup>b</sup>	44.74	123.96	168.70
Restaurant Food and Beverages	63.05	113.12	176.17
Groceries <sup>c</sup>	43.63	63.24	106.87
Boat Expenses <sup>d</sup>	41.89	60.57	102.46
Auto Expenses <sup>e</sup>	133.64	46.41	180.05
Air Fare, Car Rental <sup>f</sup>	24.17	15.02	39.19
Boat Rentals, Slip and Launch Fees	20.19	21.15	41.34
Entertainment <sup>g</sup>	33.72	67.75	101.47
Shopping and Other	<u>26.91</u>	<u>50.37</u>	<u>77.28</u>
Totals	\$ 546.29	\$ 741.01	\$ 1287.30

a Defined as being within 10 miles of the diving location

b Includes hotels, motels, resorts, cottages rentals, and camping fees

c Includes food, snacks, beverages, and alcohol

d Includes gas, oil, etc.

e Includes gas, oil, etc.

f Also includes the cost of operating a private plane

g Includes night clubs, bars, and other recreation such as sightseeing, fees for local attractions, etc.

Table 17. Spending Per Trip by Great Lakes Divers During 1986

Category of	Spending in Dollars		Trip Total
	To and From the Diving Location	Near the Diving Location	
Diving Equipment, Air, Dive Shop Services	17.66	16.93	34.59
Dive Charter Fees	4.08	17.18	21.26
Lodging	8.50	23.57	32.07
Restaurant Food and Beverages	11.99	21.50	33.49
Groceries	8.29	12.02	20.31
Boat Expenses	7.96	11.52	19.48
Auto Expenses	25.41	8.82	34.23
Air Fare, Car Rental	4.60	2.85	7.45
Boat Rentals, Slip and Launch Fees	3.84	4.02	7.86
Entertainment	6.41	12.88	19.29
Shopping and Other	<u>5.11</u>	<u>9.58</u>	<u>14.69</u>
Totals	\$ 103.85	\$140.87	\$ 244.72

The spending figures presented above demonstrate the range of the potential economic impact for dive travel to communities in the Great Lakes. The average expenditure by divers per trip during 1986 was \$244.73, with over half of this amount spent in the local communities near the diving location. Most significantly, these spending impacts extend across a variety of service and retail businesses.

The distribution of total and local trip spending is shown in Figures 1 and 2, respectively. These figures demonstrate the impact of diver expenditures across the economy, and most of these expenditures are not directly related to the diving activity. In fact, only 33.9% of total spending is for goods and services (dive shop, charter, boat rental and expenses) directly related to the diving activity.

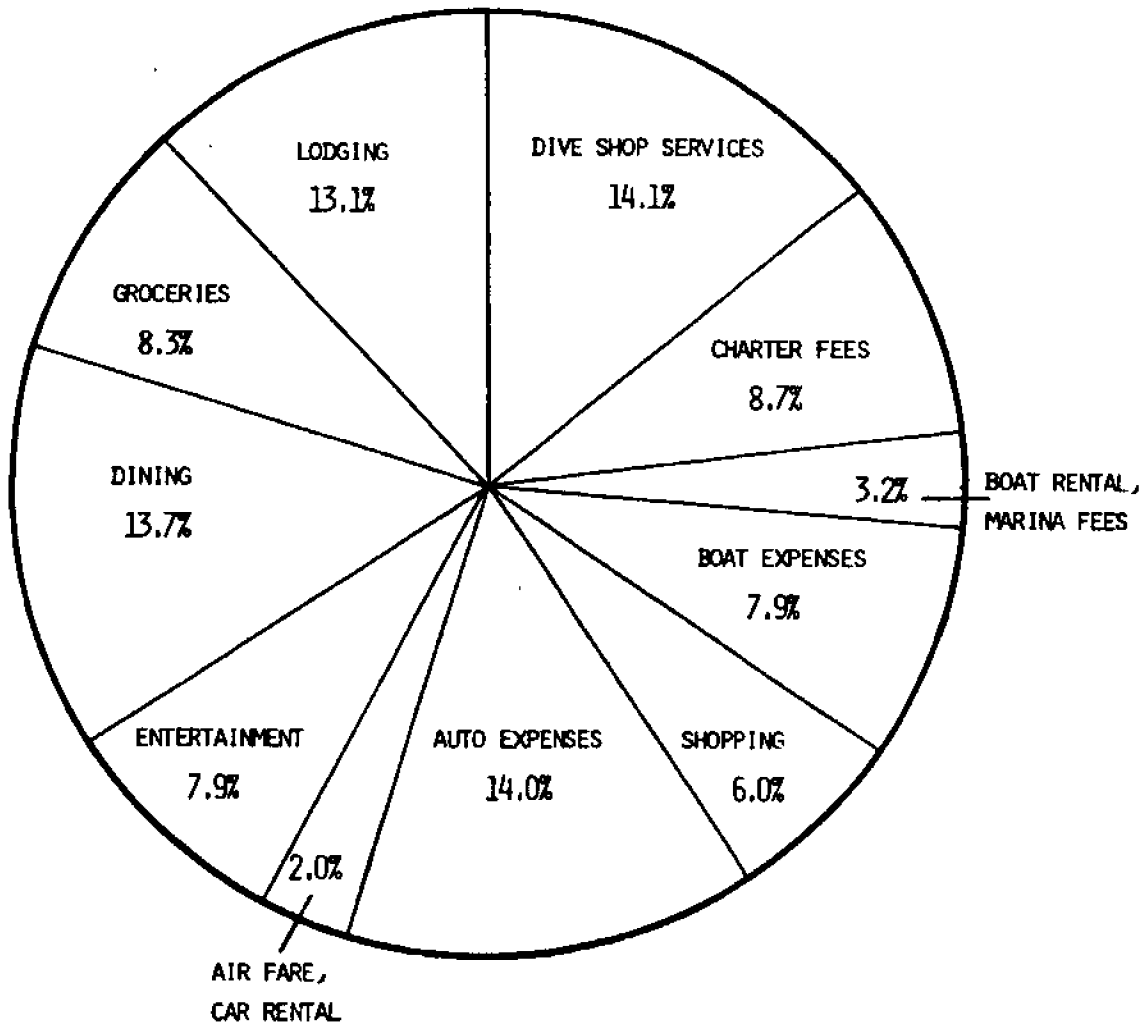


Figure 1. Allocation of Total Trip Spending  
By Great Lakes Divers in 1986

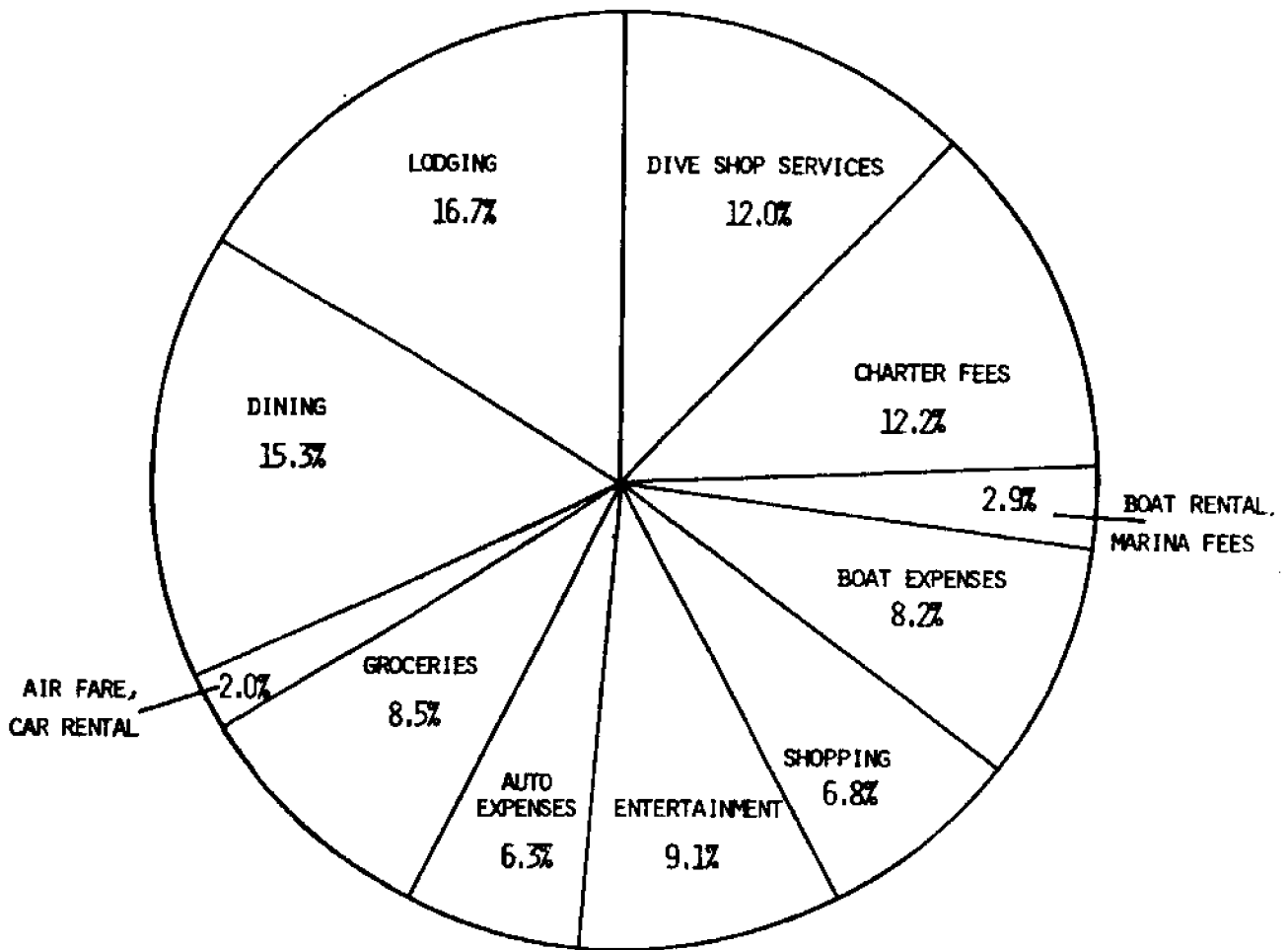


Figure 2. Allocation of Local Spending By Great Lakes Divers  
in 1986

## CONCLUSIONS

That there is a population of Great Lakes divers who actively seek dive travel locations in the region has been shown. The survey results suggest that Great Lakes sport divers are experienced; as evidenced by the years of involvement in the sport, amount of investment in equipment, and levels of training exhibited by the respondents. Furthermore, these divers are very mobile in terms of their dive travel patterns and pursue diving opportunities in a wide array of locations within the Great Lakes region and throughout the world. As a consequence, they also create potentially significant economic impacts while engaging in their dive travel. Many of these expenditures are not directly related to the activity of diving and accrue to a variety of service and retail businesses throughout local and regional economies.

Communities in coastal areas of the Great Lakes with identified and accessible underwater resources would do well to recognize the economic potential of these resources when attempting to market them to divers. Underwater resources, when complemented by services for visiting divers, create the opportunity for development of these communities as destination attractions for sport divers.

Appendix A presents a spreadsheet program for estimating sport diver spending, based on the spending data from this study. This program provides estimates of the potential economic impact of sport diver activity on a community. While these spending estimates should be carefully interpreted, a community or business can estimate the likely spending impacts resulting from the development of services to accommodate sport divers.

Communities wishing to enhance economic potential through the development of sport diving services should, however, also recognize the implications of differing market segments of divers. Just as the activity and travel patterns of diver segments may differ, so will the expenditure patterns of these segments. As a consequence, identifying and reaching divers with effective marketing strategies will be necessary to fully capture economic potential. Finally, although diver segments have not yet been defined, this study indicates that there certainly are sport divers willing to make the investment of time and money to actively participate in Great Lakes recreational diving.

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APPENDIX A

LOTUS 1-2-3 PROGRAM FOR ESTIMATING SPORT DIVER SPENDING

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In considering the spending impacts of sport divers, as presented in this study, we have looked at the spending of a "typical" individual diver on both an annual and per trip basis. This gives a good indication of the impact of each diver in the locality near the dive site(s), and in transit to and from the dive site(s).

Many individuals, however, will ask "What do these spending impacts mean for my local area, or my business?" In order to directly address these questions on a site-specific basis, a spreadsheet template, using Lotus 1-2-3 (Version 1-A), was developed which allows the analysis of spending impacts for any number of divers making any number of dive trips annually. The template user enters the number of divers, and the average number of dive trips per year per diver. The template then calculates the spending impacts of that diving population for both the local and in-transit areas. In addition, the effects of inflation can be taken into consideration if the user wants to adjust the 1986 data.

To illustrate how this template is set up and works, we have reproduced below a sample printout and a listing of the formulae upon which the results are based. These formulae, of course, are directly based upon the spending data presented in Tables 16 and 17.

The user needs to make only four entries in order to obtain the spending impacts of any sport diver population. In cell F16, the number of sport divers to be considered is entered. This might be the total number of divers expected over an entire season, or the number expected as part of an individual dive club outing. In our example, we have entered "100".

In cell F18, the number of dive trips that each of our divers listed in cell F16 takes each year is entered. The range for this entry can be quite variable, but we have chosen to enter "5.26", which was the overall average as determined in this study. If one entered "1" in this cell, the results would show the spending that accrues from one trip by the number of divers entered in cell F16.

The next two entries deal with adjustments for inflation. In cell F26, the user enters the current year. We have entered "1987", indicating that the data are one year old.

We are then asked to enter the average annual inflation rate since 1986 into cell F27 if we wish to adjust the data for inflation. We have entered "1.3", indicating that we estimate the rate of inflation since 1986 has been 1.3%. If we had not wished to adjust for inflation, we would have entered a "0" in cell F27, and the results would have reflected unadjusted data.

While the ability to adjust for the effects of inflation will enable this template to be utilized for a longer period of time, users should realize that basic spending patterns may change over significant time periods, and inflation adjustments will not account for these changes. Such adjustments would, however, tend to give a closer approximation of current dollar spending, assuming constant spending patterns over time,



than unadjusted data would provide.

Given these four simple inputs, the template generates two columns of spending results, each divided into two components. The left column is labeled "Spending per Dive Trip x #", with the "#" representing the number of divers entered in cell F16, or in our case, 100. This means that the output in this column represents data that would result from one trip involving "#" sport divers (100 in our example). This would prove informative to businesses in the locality of dive sites, for example, who wanted to know the effects of attracting a dive group comprised of 100 individuals from another state.

The right column is labeled "Total Annual Spending", and represents the total spending that would accrue from a total of "#" sport divers (100 in our example), taking an average of "\*" dive trips per year. The number "\*" would be the entry that had been made in cell F18, or in our case, 5.6. The results shown in this column would be of great interest to a local chamber of commerce, for instance, interested in the local spending for a given year resulting from a group of 100 divers making 5.6 dive trips to that particular area.

An alternative way of using the template would be to enter a "1" in cell F18 (dive trips per year), and "#" divers in cell F16. The result would be the spending resulting from one dive trip taken by "#" divers. The numbers in both columns would be the same under these conditions.

In reviewing the template rows, the results are self-explanatory. Spending is designated as being either "Travel/Non-Area Spending", or "Local Spending". The former is shown in the upper part of the results section, with the latter being shown in the lower half. Individual entries show the spending associated with specific business types, ranging from lodging, groceries, and auto expenses, to dive charter fees, entertainment, and shopping. In this way, various business segments of a local community can easily see the revenue that would come to them from sport diving activity in their area.

As an example, suppose that you owned a restaurant in Dive Corners, Michigan. If you estimated that 100 divers would do all their diving (5.26 trips/year) locally, you would expect that approximately \$11,605 (cell F52) would flow to the local restaurants from these divers. This would also be equivalent to the spending generated by 526 divers making only one trip to the area (100 divers x 5.26 trips = 526 diver trips). The totals for all local spending are shown in cells D60 and F60.

The results in the "Travel/Non-Area Spending" section show much the same, except that this spending is not in the area of the dive site(s), and may be geographically widespread. Thus, the local spending results will likely be of most interest to the user. The individual entries are arranged the same as for those in the local spending section, and the "Travel/Non-Local Spending" totals are shown in cells D46 and F46.

The final totals (cells D62 and F62) reflect the column totals. Cell D62 shows \$25,112.41, signifying that this amount was spent, both locally and non-locally, by 100 divers, per trip. Cell F62, showing \$132,091.26, is the total spending from 100 divers making an average of 5.26 trips per year.



FORMULAE FOR "DIVING.WKS"

Cell	Formula
A26	+F26-1985
E29	+F16
E32	+F16
D35	@IF(F27=0,17.66,17.66*(1+(F27/100))^A26)*F16
F35	+(D35*F18)
D36	@IF(F27=0,4.08,4.08*(1+(F27/100))^A26)*F16
F36	+(D36*F18)
D37	@IF(F27=0,8.50,8.50*(1+(F27/100))^A26)*F16
F37	+(D37*F18)
D38	@IF(F27=0,11.99,11.99*(1+(F27/100))^A26)*F16
F38	+(D38*F18)
D39	@IF(F27=0,8.29,8.29*(1+(F27/100))^A26)*F16
F39	+(D39*F18)
D40	@IF(F27=0,7.96,7.96*(1+(F27/100))^A26)*F16
F40	+(D40*F18)
D41	@IF(F27=0,25.41,25.41*(1+(F27/100))^A26)*F16
F41	+(D41*F18)
D42	@IF(F27=0,4.60,4.60*(1+(F27/100))^A26)*F16
F42	+(D42*F18)
D43	@IF(F27=0,3.84,3.84*(1+(F27/100))^A26)*F16
F43	+(D43*F18)
D44	@IF(F27=0,6.41,6.41*(1+(F27/100))^A26)*F16
F44	+(D44*F18)
D45	@IF(F27=0,5.11,5.11*(1+(F27/100))^A26)*F16
F45	+(D45*F18)
D46	@SUM(D35..D45)
F46	@SUM(F35..F45)
D49	@IF(F27=0,16.93,16.93*(1+(F27/100))^A26)*F16
F49	+(D49*F18)
D50	@IF(F27=0,17.18,17.18*(1+(F27/100))^A26)*F16
F50	+(D50*F18)
D51	@IF(F27=0,23.57,23.57*(1+(F27/100))^A26)*F16
F51	+(D51*F18)
D52	@IF(F27=0,21.50,21.50*(1+(F27/100))^A26)*F16
F52	+(D52*F18)
D53	@IF(F27=0,12.02,12.02*(1+(F27/100))^A26)*F16
F53	+(D53*F18)
D54	@IF(F27=0,11.52,11.52*(1+(F27/100))^A26)*F16
F54	+(D54*F18)
D55	@IF(F27=0,8.82,8.82*(1+(F27/100))^A26)*F16
F55	+(D55*F18)
D56	@IF(F27=0,2.85,2.85*(1+(F27/100))^A26)*F16
F56	+(D56*F18)
D57	@IF(F27=0,4.02,4.02*(1+(F27/100))^A26)*F16
F57	+(D57*F18)
D58	@IF(F27=0,12.88,12.88*(1+(F27/100))^A26)*F16
F58	+(D58*F18)
D59	@IF(F27=0,9.58,9.58*(1+(F27/100))^A26)*F16
F59	+(D59*F18)
D60	@SUM(D49..D59)
F60	@SUM(F49..F59)
D62	+D46+D60
F62	+F46+F60

Appendix B

1986 GREAT LAKES DIVER SURVEY

1. How many diving trips did you take during 1986? \_\_\_\_\_
2. Altogether, how many nights did you spend away from home on all diving trips taken during 1986? \_\_\_\_\_
3. What is the total number of scuba dives you made in 1986? \_\_\_\_\_
4. How many diving trips did you take in Great Lakes waters during 1986? \_\_\_\_\_
5. Please indicate the locations of any diving trips made during the past three years. (Check all that apply)  

<input type="checkbox"/> Great Lakes	<input type="checkbox"/> Bahamas	<input type="checkbox"/> Hawaii	<input type="checkbox"/> Mediterranean
<input type="checkbox"/> Inland Lakes	<input type="checkbox"/> Caymans	<input type="checkbox"/> Florida	<input type="checkbox"/> Virgin Islands
<input type="checkbox"/> Gulf States	<input type="checkbox"/> Bonaire	<input type="checkbox"/> Mexico	<input type="checkbox"/> Australia
<input type="checkbox"/> Other Caribbean	<input type="checkbox"/> California	<input type="checkbox"/> New England	<input type="checkbox"/> Carolina Coast
<input type="checkbox"/> Other (Please specify)	_____		
6. Please indicate the locations of diving trips taken in Great Lakes waters during the past three years. (Check all that apply)  

<input type="checkbox"/> Munising	<input type="checkbox"/> Whitefish Bay	<input type="checkbox"/> Lake Erie
<input type="checkbox"/> Mackinaw Straits	<input type="checkbox"/> Isle Royale	<input type="checkbox"/> Apostle Islands
<input type="checkbox"/> Tobermory	<input type="checkbox"/> Southern Lake Michigan	<input type="checkbox"/> Superior North Shore
<input type="checkbox"/> Thunder Bay/Alpena	<input type="checkbox"/> Manitou Islands	<input type="checkbox"/> Michigan Thumb/Huron Co.
<input type="checkbox"/> Other (Please specify)	_____	
7. In which Great Lakes location have you done the majority of your diving?  
\_\_\_\_\_
8. How many diving trips in Great Lakes waters did you take in each of the following years? (If no Great Lakes trips were made in some years, please write "0" in the appropriate space.)  
1986 \_\_\_\_\_ 1985 \_\_\_\_\_ 1984 \_\_\_\_\_ 1983 \_\_\_\_\_ 1982 \_\_\_\_\_ 1981 \_\_\_\_\_
9. How many years have you participated in scuba diving? \_\_\_\_\_
10. Approximately how much have you invested in your personal diving equipment? \$ \_\_\_\_\_

**PLEASE READ CAREFULLY**

11. We would like to know your expenditures, including travel, for all Great Lakes diving trips made during 1986. Include all trip expenditures whether or not they are related to diving.

Please record your expenditures in the correct column. If you made expenditures while traveling to and from the diving area, record them in the column "to and from the area".

Please make your best estimates and do not leave any spaces blank. If you can't recall how much you spent in a given category, please write "?" in the space. Likewise, if you made no expenditures in a category, please enter "0" in the space.

**1986 GREAT LAKES DIVING TRIP EXPENSES**

CATEGORY	To and From The Area	Near (within 10 miles) of The Diving Location
Diving equipment, air, dive shop services	\$	\$
Dive charter fees		
Lodging - Hotels, motels, resorts, cottage rentals, camping fees		
Restaurant food and beverages		
Groceries, food and snacks, take-out beverages (including alcohol)		
Boat expenses - gas, oil, etc.		
Auto expenses - gas, oil, etc.		
Air fare, car rental, etc.		
Boat rentals, transient slip fees, launch fees		
Entertainment and other recreation (including bars, night clubs, fishing, sightseeing, etc.)		
Other trip expenses (parking, shopping, gifts)		

12. Are you a member of an organized dive club? ( ) yes ( ) no

13. What is the maximum depth (in feet) which you prefer to dive? \_\_\_\_\_

14. How important are each of the following attributes of diving locations when deciding where to go diving in the Great Lakes?

	Not Important	Somewhat Important	Very Important	Crucial (wouldn't go to location without it)
Availability of dive charters. . . . .	( )	( )	( )	( )
Nearness to home . . . . .	( )	( )	( )	( )
Quality of shipwrecks. . . . .	( )	( )	( )	( )
Water clarity. . . . .	( )	( )	( )	( )
Activities for non-divers. . . . .	( )	( )	( )	( )
Natural Beauty . . . . .	( )	( )	( )	( )
Weather-protected dive sites . . . . .	( )	( )	( )	( )
Diver safety procedures and facilities . . . . .	( )	( )	( )	( )
Boat launch, marina facilities . . . . .	( )	( )	( )	( )
Information about diving sites . . . . .	( )	( )	( )	( )
Services in area (restaurants, lodging). . . . .	( )	( )	( )	( )
Local historical attractions . . . . .	( )	( )	( )	( )
Dive Shop Services (air refills) . . . . .	( )	( )	( )	( )
Well-marked dive sites . . . . .	( )	( )	( )	( )
Other recreation activities in area. . . . .	( )	( )	( )	( )
Other (specify and rate importance)				
_____ . . . . .	( )	( )	( )	( )
_____ . . . . .	( )	( )	( )	( )
_____ . . . . .	( )	( )	( )	( )

15. What is your current level of diving certification? (Please check all that apply)

( ) Basic                      ( ) Openwater                      ( ) Advanced                      ( ) Dive Master

( ) Instructor                      ( ) Asst. Instructor                      ( ) Master Diver                      ( ) Not Certified

( ) Specialties (Please specify) \_\_\_\_\_

16. Where is your permanent residence located? \_\_\_\_\_

(City)                                      (State or Province)

THANK YOU