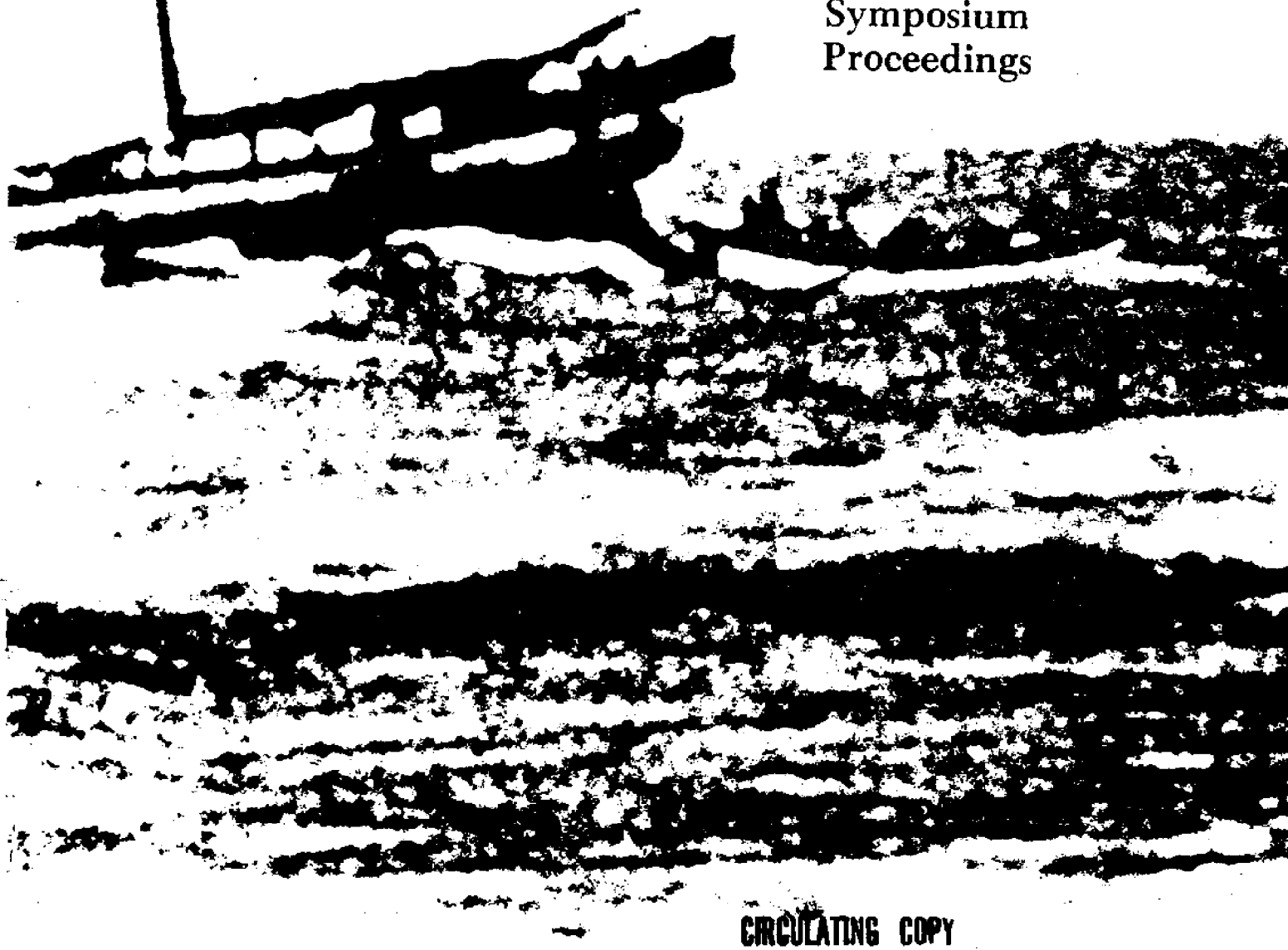
Underwater Parks

Symposium Proceedings



COOPERATIVE EXTENSION SERVICE
MICHIGAN STATE UNIVERSITY

Underwater Parks

Edited by Charles A. Hulse in consultation with Donald F. Holecek.

CONTENTS

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Foreword

The Underwater Park Symposium held March 29-31, 1979 at Michigan State University developed from a project funded through the Michigan Sea Grant program in the MSU Department of Park & Recreation Resources.

The department, which had been exploring the feasibility of underwater parks in the Great Lakes, launched the project in 1975. During the summer of that year, a shipwreck survey was undertaken in Thunder Bay in Lake Huron (off Alpena, Michigan). The purpose was to record the location and condition of wrecks in the areas with the possibility that an underwater park could be created around this shipwreck concentration. The subsequent years have been devoted to the study of shipwrecks as historical, recreational and economic resources.

Concentrating on the concept of shipwrecks as multi-functional resources in need of careful management and preservation, the study group at MSU sponsored this symposium in order to open lines of communication and further the free exchange of ideas among state agencies, divers, academicians and the business community. During the course of the symposium, papers and viewpoints were presented by speakers representing all aspects of concern with underwater cultural resources and underwater parks. Papers in this volume were selected in order to demonstrate the cross section of viewpoints on the use of shipwrecks in underwater parks. Those views not directly represented by a formal paper are briefly reviewed in the Summary and Conclusion section.

Through this publication, it is hoped that readers will be made aware of the extreme complexity of the situation and the need for inputs from many sectors of society. This is especially important in the process of developing workable management schemes to assume the wise use and protection of shipwreck resources.

Michigan's Underwater Resources--A Case Study

Thomas D. Warner*

Introduction

The Great Lakes have been referred to as a river of inland seas or this country's fourth shore. No matter how they are referred to, these massive freshwater bodies represent a truly significant water resource base.

Formed by the advance and retreat of glaciers, the five Great Lakes make up the largest body of freshwater in the world: over 95,000 square miles of surface area.[1] In addition, the Great Lakes and their connecting waterways form the world's largest inland-water transportation system. From the Thousand Islands River to Duluth, Minnesota, a ship travels more than 1,160 miles over the lakes.

The Great Lakes have no single headwater. They drain an extensive area of subartic, forested, agricultural and urbanized lands.

Of Michigan's official gross land and water area, 40% (24,688.000 acres) is covered by the Great Lakes (three-quarters of all U.S. Great Lakes waters). Michigan's Great Lakes shoreline totals over 3,250 miles or over two-thirds of the total U.S. Great Lakes shoreline.[2]

The Great Lakes have played a vital role in the development of this part of the North American continent and the State of Michigan. From early fur trading and copper mining to the movement of timber, iron ore, limestone, steel, grain and people, the Great Lakes have been an important transportation medium. Beyond their economic impact, the Great Lakes have been a significant resource for the region's active and passive recreationists: sightseers, boaters, fishermen, swimmers, skin/scuba divers, etc. . .

Great Lakes Underwater Resources

When we focus on Great Lakes Underwater Resources, what can the sport diver expect to see? Basically there are three readily identifiable resources of interest to the sport diver: 1) geological formations, 2) fish populations, and 3) shipwrecks.

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[1]King, B. A., and Johnathan Ela. The Faces of the Great Lakes. (Sierra Club Books, San Francisco, 1977.)

[2]Sommers, Lawrence M., Ed. Atlas of Michigan. (Michigan State University Press, East Lansing, Michigan, 1977.)

Geological formations would include primarily submerged reefs of unconsolidated material, sink holes and rock formations around coastal zones and islands in the Great Lakes. Major rock formations in the Great Lakes are found in Lake Superior and on the eastern or Georgian Bay side of Lake Huron.

Great Lakes fish populations, though not as varied or colorful as those in the oceans, do represent a resource of substantial interest to sports divers. The islands, reefs and shipwrecks of the Great Lakes provide shelter for forage fish such as alewives, ciscos, chubs, smelt and shiners; and for rough fish, including Lake sturgeon, carp, gar, bowfin, buffalofish and suckers.

In addition, the lakes provide a suitable environment for such coldwater game fish as lake, brown and rainbow trout, coho, king, and Atlantic salmon. Warmwater game fish include panfish, catfish, black bass, northern pike and musky.

The historical resources which hold the greatest interest for the region's sports divers, however, are the thousands of shipwrecks in the Great Lakes, which represent a broad spectrum of ship type, size and age.

Examples of ships now resting on the bottom of the lakes include wooden schooners, wooden ore carrying steamers, sidewheel passenger steamers, course freight wood and steel steamers, tugboats, self-propelled barges and large modern day bulk carriers - to name a few.

The 1975 Survey of Lake Huron Underwater Resources off Alpena County, Michigan - A Case Study

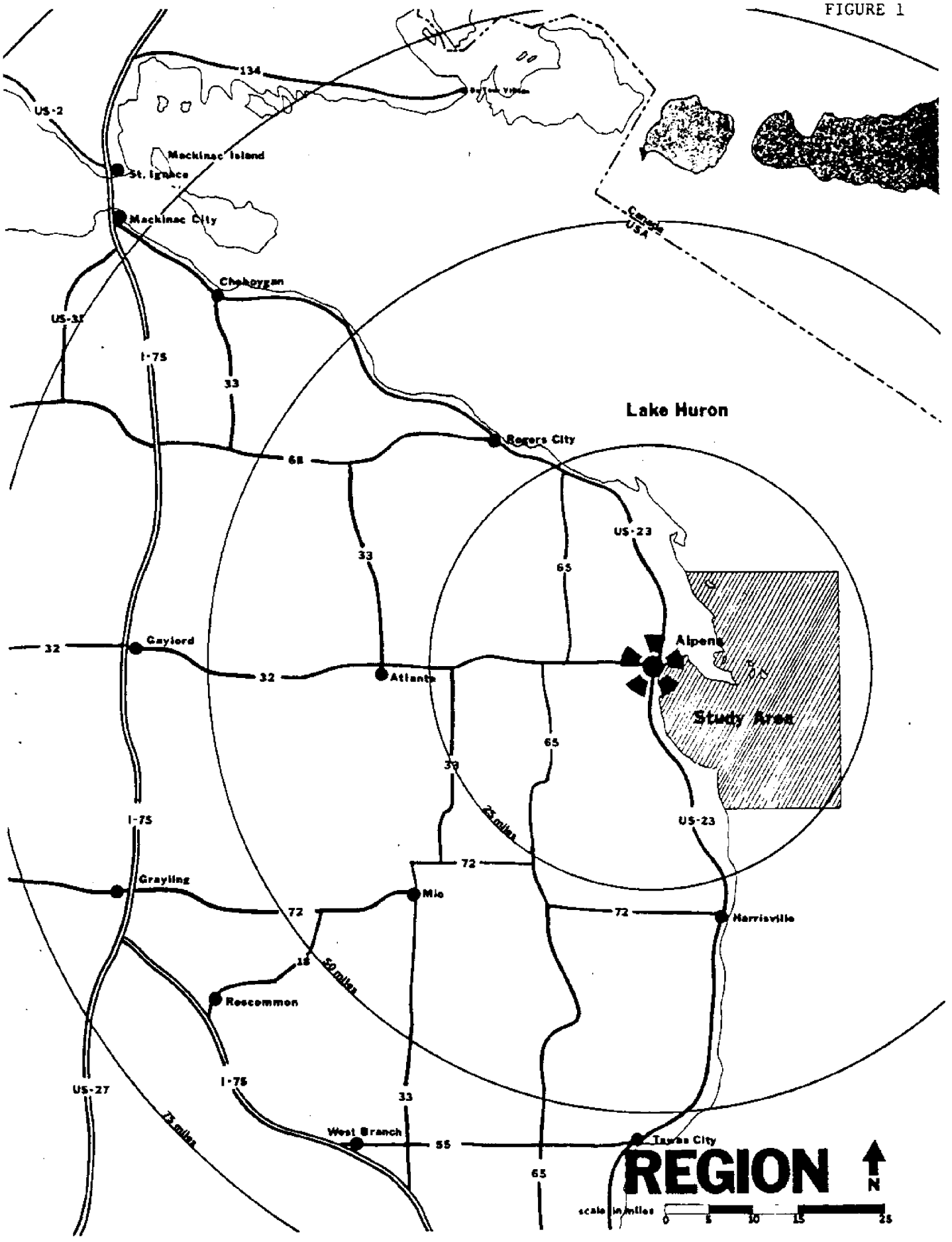
In the summer of 1973, after reading about the Michigan Department of Natural Resources' (DNR) interest in underwater shipwreck parks (a newspaper article on the DNR-funded study by Dr. Richard Wright locating Great Lakes shipwreck concentrations), Don Holecek and I developed a study proposal to investigate known shipwreck concentrations in Michigan's Great Lakes waters.

In two years, with the support of the Michigan History Division of the Michigan Department of State, the Michigan Department of Natural Resources, the Jesse Besser Foundation and County Commission of Alpena County, Michigan, and the Michigan Skin Diving Council, the Recreation Research and Planning Unit of the Michigan State University Department of Park and Recreation Resources was conducting the state's first underwater shipwreck survey.

The underwater survey, which also called for the investigation of general site diving conditions, geological formations and fish populations, was conducted in the Lake Huron waters off Alpena County, Michigan, in June of 1975 (see Figure 1). The Alpena County site was selected for the following reasons: 1) there was a known concentration of shipwrecks off this county, 2) an experienced dive boat operator, knowledgeable in area shipwreck locations, was available for the study, and 3) the existence of known underwater geological formations and fish populations of interest to sport divers.

The base of operations for the study was a small, privately owned peninsula north and east of the city of Alpena. The dive boat used for the survey was the 46-foot "Argo" owned and operated by George Baker, Jr., of Alpena, Michigan. The divers/underwater photographers for the survey were provided by the Michigan Skin Diving Council. Ten divers were used for each of the two weeks of diving.

FIGURE 1


134
US-2
Mackinac Island
St. Ignace
Mackinac City
Canada
USA
Cheboygan
US-31
I-75
33
Lake Huron
Rogers City
68
33
65
US-23
Gaylord
32
32
Atlanta
Alpena
Study Area
65
I-75
25 miles
US-23
72
Grayling
Mio
72
72
Harrisville
18
50 miles
Roscommon
I-75
US-27
33
75 miles
West Branch
55
Iosco City
65
REGION
N
scale in miles
0 5 10 15 25

In the two-week dive period off Alpena County, Michigan, dive teams located and photographed significant underwater resources.

Underwater Geological Formations

Three prime, underwater geological sites were located off Alpena County, Michigan (see Figure 2). . . The first, is the Rock Wall formation along the southeastern end of Thunder Bay Island. The sheer rock face, which caused the end of more than one ship, ranges from 20 to 60 feet in depth. Total length of the wall runs approximately a quarter mile. Along the wall are numerous large cracks and fissures. Forage fish frequent the wall and ribs, planks and other ship parts are scattered along the base of the wall.

. . A second geological dive site of interest off Alpena County is the "sinkholes" area of Misery Bay. The two underwater sinkholes located north and east of the town of Alpena were formed by the solution of subsurface limestone when the area's water table was lower than its present level. Once the two caverns were formed, the overhead rock collapsed, creating cylindrical holes in the limestone. As the water tables rose, the Misery Bay sinkholes were covered by Lake Huron waters. The two sinkholes have approximately 300-foot openings with the first sink being 70 feet deep and the second 20 feet deep. The number one, or deep, sinkhole has numerous cavern-like recesses and two springs located within the sink: one at a depth of 40 feet and one at a depth of 70 feet. Maximum visibility at the bottom of the number one sinkhole was 20 feet.

. . The third and final geological dive site located by the dive team was the North Point Reef. The submerged reef which forms the northern boundary of Thunder Bay is made up of unconsolidated rock of varying size. In addition, this reef is a prime location for sighting various fish species.

Fish Populations

Lake Huron off Alpena County, Michigan, is rich in various fish populations (see Figure 3). Around the shipwrecks and geological formations, a diver can usually see forage, rough and game fish species all at the same location. During the survey, alewives and carp were seen around most of the wrecks. Black bass, catfish and trout were the most frequently seen gamefish during the survey.

Shipwrecks

During the two-week dive period in June of 1975, 17 shipwrecks were visited, photographed and mapped (see Figure 4). Among 17 shipwrecks were five wooden schooners, six wood hulled steamers, a steel hulled steamer, three self-propelled barges, a Great Lakes tugboat and an ocean going freighter. The variety of sights on each of the shipwrecks seemed endless. Each wreck was different: owing to variations in vessel type, size, condition, depth and vessel location. Each wreck provided a unique recreational experience. For the midwest sport diver, the shipwrecks are a valuable water resource.

Conclusions

The Great Lakes, massive in size and economical and recreational impact, provide sport divers significant underwater resources to investigate. I believe that national attention on the shipwreck resource will eventually attract divers from all parts of the U.S. and Canada, if action is taken to protect the resource.

FIGURE 2

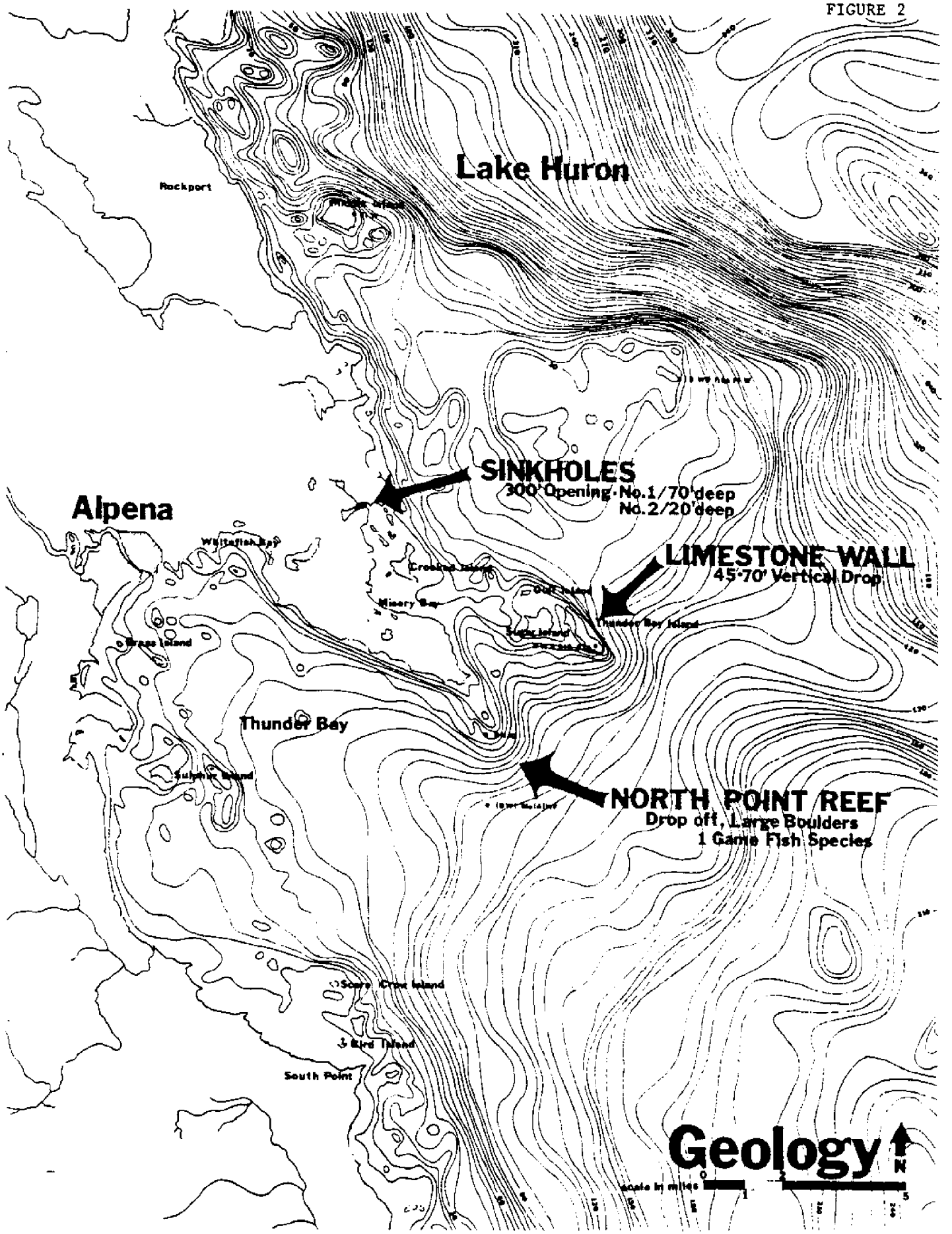

Lake Huron
Rockport
Middle Island
SINKHOLES
300' Opening - No. 1/70' deep
No. 2/20' deep
Alpena
LIMESTONE WALL
45-70' Vertical Drop
Crooked Island
Misery Bay
Gull Island
Thunder Bay Island
Sugar Island
Thunder Bay
Sulphur Island
NORTH POINT REEF
Drop off, Large Boulders
1 Game Fish Species
Scare Crow Island
Bird Island
South Point
Geology
N
scale in miles
0
1
2
5

FIGURE 3

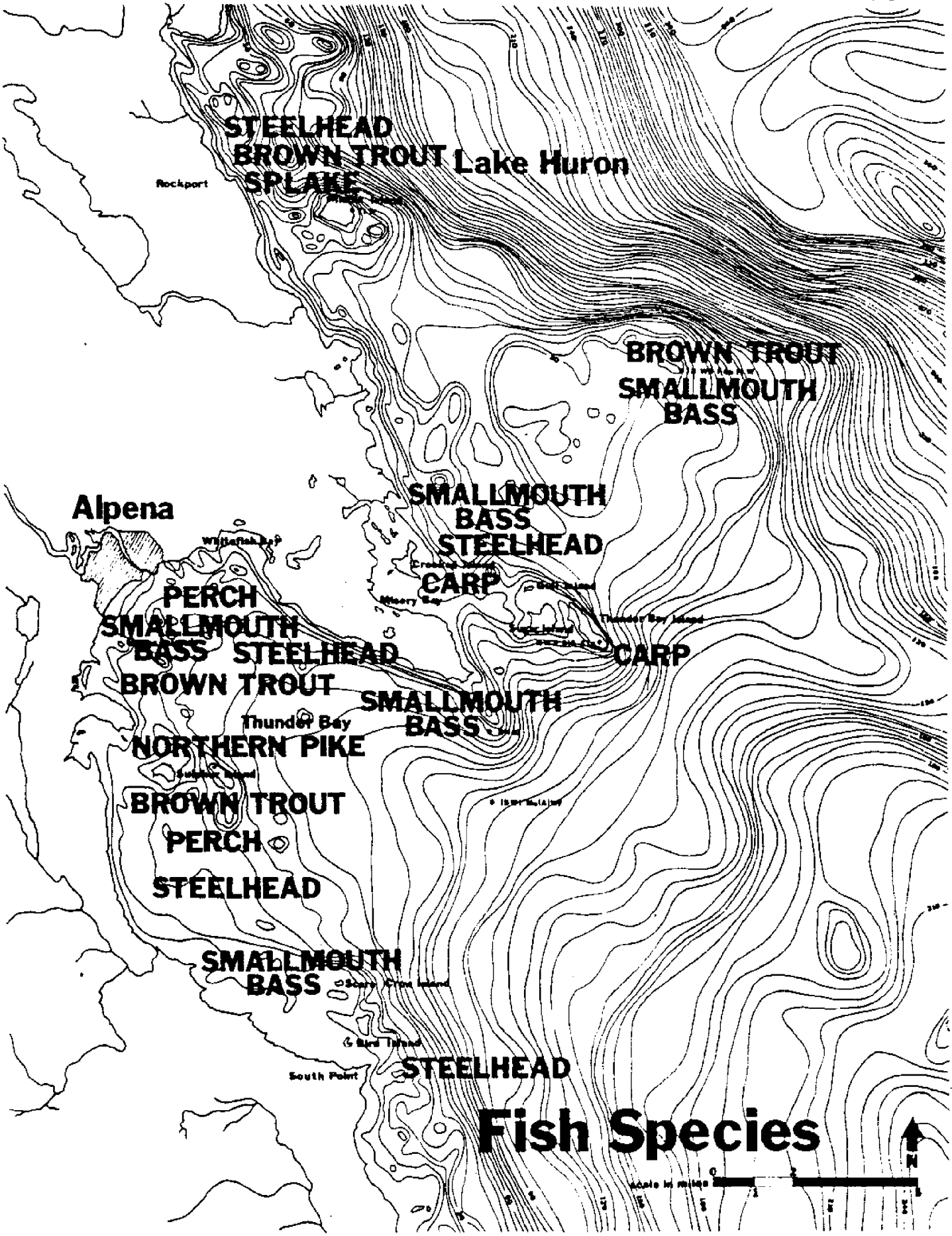
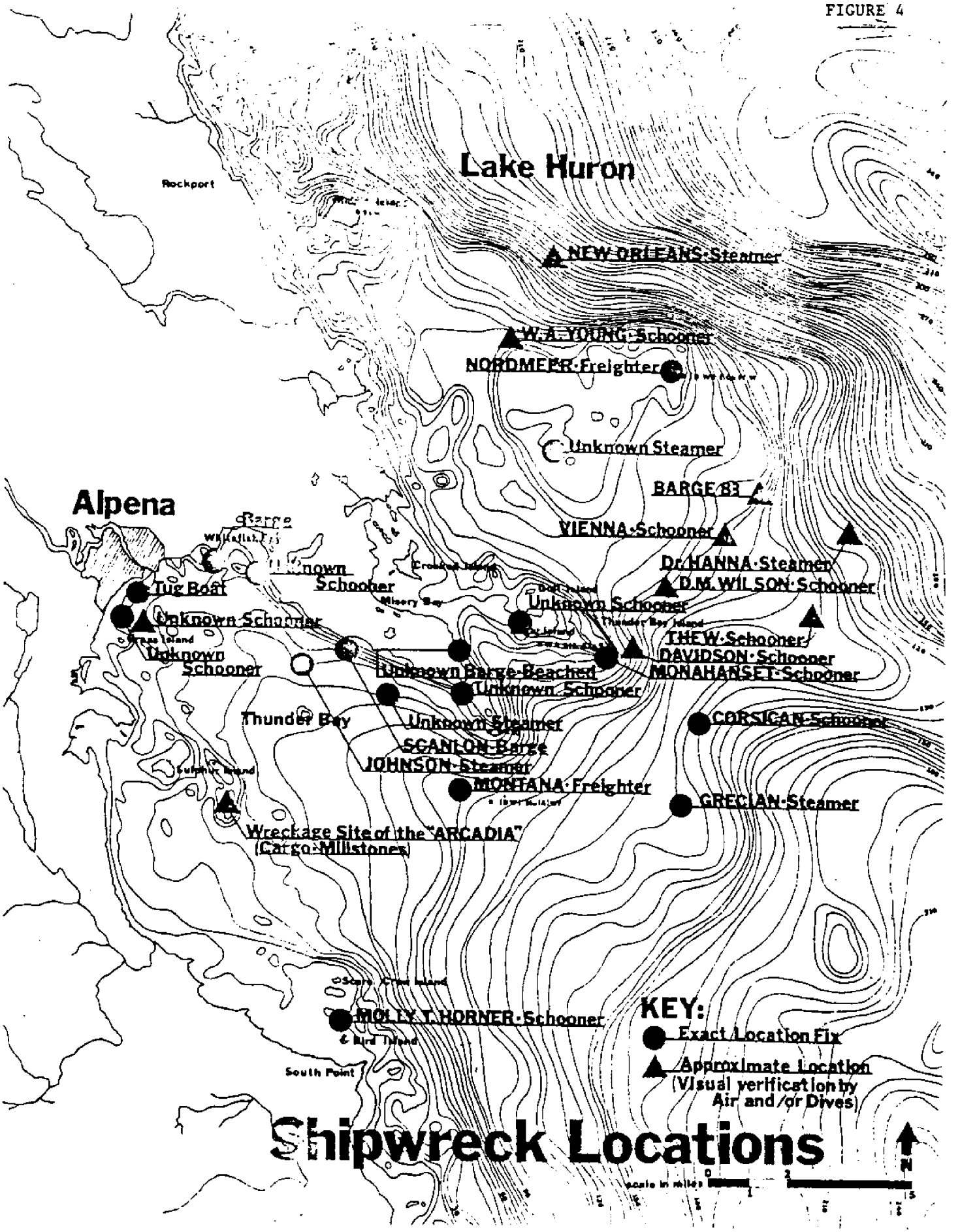

STEELHEAD
BROWN TROUT
SPLAKE
Lake Huron
Rockport
BROWN TROUT
SMALLMOUTH BASS
Alpena
SMALLMOUTH BASS
STEELHEAD
CARP
PERCH
SMALLMOUTH BASS
STEELHEAD
BROWN TROUT
CARP
SMALLMOUTH BASS
Thunder Bay
NORTHERN PIKE
BROWN TROUT
PERCH
STEELHEAD
SMALLMOUTH BASS
STEELHEAD
South Point
Fish Species
N

FIGURE 4


Lake Huron
Rockport
NEW ORLEANS·Steamer
W.A. YOUNG·Schooner
NORDMEER·Freighter
Unknown Steamer
BARGE 83
Alpena
VIENNA·Schooner
Dr. HANNA·Steamer
D.M. WILSON·Schooner
Tug Boat
Unknown Schooner
Unknown Schooner
Unknown Schooner
THEW·Schooner
DAVIDSON·Schooner
MONAHANSET·Schooner
Unknown Barge·Beached
Unknown Schooner
Thunder Bay
Unknown Steamer
CORSICAN·Schooner
SCANLON·Barge
JOHNSON·Steamer
MONTANA·Freighter
GRECIAN·Steamer
Wreckage Site of the "ARCADIA"
(Cargo-Millstones)
MOLLY T. HORNER·Schooner
South Point
KEY:
Exact Location Fix
Approximate Location
(Visual verification by
Air and/or Dives)
Shipwreck Locations
N

I don't believe the fish populations and geological features are threatened. However, I have seen the work of Great Lakes shipwreck salvage operators and their impact is devastating! Great Lakes shipwreck salvage must be regulated and vessels of historical significance must be protected.

It is hard even with the help of pictures to describe what was seen in the underwater survey of the Thunder Bay area of Lake Huron. The resources are there - at least for the moment.

History of Great Lakes Shipping and Shipwrecks

Richard J. Wright*

(The remarks of this paper are aimed primarily at both the underwater park administrator and the potential user of the park - the diver.)

Recreation, education and preservation are three elements which should be strongly interplayed in the use of the Great Lakes shipwrecks, and it must be emphasized that they are applicable both under and out of water. All three are aimed at the maritime and specifically at the Great Lakes maritime scheme.

Strenuous efforts must be made to preserve what few tangible evidences remain of the maritime tradition, more so along public trust lines than along private individual ones. Some of these evidences may and should remain under water - as is seen through the efforts of the Five Fathoms Park in Ontario Canada.[1] Those evidences which are endangered or, within a reasonable interpretation of inaccessibility, are beyond the reach of such a concept should likewise be preserved, preferably within the professional confines of a public museum. The public rather than the private sector is specified because the costs of professional expertise and operations normally are beyond private means.

Education is included because, in my experience with researchers, most have exhibited a lack of rudimentary knowledge of things nautical, much less of our relationship to the Great Lakes. Basically, researchers have not shown the discipline necessary to familiarize themselves with their historical surroundings.

Some of this ignorance can be overcome through the availability of valid publications dealing with the topic and the region. More realistically, the availability of professionally-developed nautical displays and museums can accomplish much in inculcating this feel for the past. Outstanding examples are the Hall of American Maritime Enterprise at The Smithsonian Institution (Washington, D.C.), Mariners Museum (Newport News, Virginia), and Mystic Seaport (Connecticut).

Recreation is the third element - and possibly even by this time - a by-product. During the diving season, the recreational opportunities are obvious. If the diving desires go beyond the recreational/educational, the diver has lost his game - the pot at the end of the rainbow seldom will be located. My concern for the recreational element is with the off-season, when it intertwines with the educational element. If the diver does not know what he is looking for, or, should he find something and not know what it is, he has lost the enjoyment of research and the total thrill of the find. The museum administrator has lost his purpose.

Ideally, the diver (and the museum personnel) must initially view lake history in its totality. He must be made conscious of the phases that lake transportation

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[1]Five Fathoms Park is an underwater park administered by the Division of Outdoor Recreation of the Ontario Ministry of Natural Resources.

went through to arrive at its present level. Without this historical perspective he will fail to grasp the meaning of ship "types," cargo, machinery, etc.

Without going into great detail, there have been four basic phases to the Lake transportation drama. Chronologically they do not coincide. Since there are no "time gaps," it means that they have operated simultaneously in some cases. It also is necessary to point out that a ship, no matter how romantic we may wish to paint it, is an economic and utilitarian tool. Commercially, there must be enough potential profit to justify the capital expenditure for its construction and operation.

Thus, prior to the opening of the Erie Canal in 1825, very few ships plied the Lakes - especially the Upper Lakes. There simply were not enough people - enough profitable trade - to justify their existence. By and large, such craft as there were, were built by "barn-builders," rather than professionally trained shipwrights. Toward the end of this phase, the first steamers were constructed, but most vessels were small schooners.

The next stage would be the "grain phase." It saw westward movement of dry goods and people and, ultimately, grain moving east toward Buffalo and Oswego. It also saw the introduction of the propeller-driven steamer and a growing awareness and activity in developing deeper and improved harbors and connecting channels. Along with this came larger and more numerous vessels - both sail and steam. Although I place 1870 as the end of this era, the grain trade obviously is still with us. However, as other trades developed, by about 1870 the grain trade merged with those trades. Other important considerations during those years were the opening of the Welland Canal (1829) and Soo Canal (1855).

As the Civil War ended (1865), the day of the lumber barons descended. This placed a different emphasis on ship needs and design. From roughly 1870-1910, this valuable natural resource was drained from Michigan, Wisconsin, Minnesota, and Ontario. Thanks to the lumber trade and dependence upon steam, the schooner had basically become a tow barge by the 1890's.

In about 1880, iron ore began to come from the North Country in large volume. This brought about more demands for deeper connecting waterways, technology applied to more efficient loading and unloading equipment, and radical ship design changes to meet the needs of a specialized trade. Along with this came the development of steel-hulled steamers. This trade, with some variations - safety devices, taconite ore, self-unloaders - is still with us. The development of the coal and limestone trades essentially followed iron ore. Lastly, the tanker appeared in the 1920's.

Why this historical run-down? Simply, where are the best places to look for shipwrecks and why? The various trades determined ship design and use. One must learn basic elements of ship recognition when exploring for wrecks. This, coupled with an understanding of basic trade routes or patterns, along with a smattering of local geography will explain much about their locations.

Vessel losses occurred because of stress of weather, collision and fire. Stress of weather could mean foundering or stranding. Collisions were caused by human error and/or poor visibility. Each lake has geographic features that provide long stretches of exposed water and places of shelter. Normally, prior to the advent of modern safety devices, ships were lost in significant numbers in the outer periphery of those desired "shelter spots." The vessels simply did not quite make it to safety. Those that were lost within the long open stretches essentially will be inaccessible to the ordinary diver and hold little interest for the underwater park advocate. Vessels that stranded were normally beaten to pieces by the

waves, were ground to kindling by ice, or were covered by the shifting sands in shallow water. Collisions occurred most frequently in restricted waters and in areas where traffic was likely to be heavy. Waters prone to fog, or in some cases, clouded by the smoke, and spots where traditional shipping routes crossed were also high risk areas.

Some fires resulted in the loss of wooden-hulled vessels, most of them occurring on steamers before 1910.

Vessel genealogy has fascinated man for the past century. Today a rather large audience around the world - some professionals, some hobbyists - trace maritime history, devising lists of vessels, steamship companies, ports, and shipwrecks within a locale. To do this they become proficient in recognizing the physical characteristics of individual ships, and they become more exacting in their desire for valid information.

Such things as rig (schooner, steamer, tug, etc.), numbers of masts, dimensions, name changes, exact dates, builders, etc., all take on added importance to them. However, this type of specialized information is scattered in dozens of sources in many different locations.

Enter our function at Bowling Green - at least for the Lakes region. While not pretending to have all of the answers, we are making the attempt to amass as much documentation as we can to assist in the preservation of the documentary sources. This is a first step in what we hope will be a general movement to preserve, study and appreciate the maritime scene of the Great Lakes. Now, instead of travelling to half a dozen different communities in hopes of finding data, it is possible to make one trip to one location in narrowing down a data search. Here one may find those dozen sources - newsprint, books, pamphlets, photographs, manuscript and naval architectural drawings.

There is a mounting interest in all directions of maritime history. Professionally, the North American Society for Oceanic History now holds annual conventions. There are private maritime historical societies and museums on all of this nation's seacosts - including the "Fourth Seacoast" - the lakes. Most publish a newsletter or journal. Maritime museums particularly are in vogue. These can be found on all five of the Great Lakes with each purporting to cover the whole, but realistically emphasizing their own geographic region. Some of the museums have municipal funding, one is federal and one is provincial. Most of them will never get beyond the underfunded nonprofessional status.

Lastly, there is considerable and varied interest in lake history, most of it nonprofessional. There is an attraction, a romance, connected with water and with ships which is contagious. The nonprofessional needs professional guidance which can be provided in the many forms already suggested. But there only is so much material to go around. Therefore, if it is to reach the audience who needs and wants it, the many petty jealousies and competition that traditionally have existed among the professional institutions must be replaced by more of a spirit of cooperation. Knowledge does nothing stuck away on an empty shelf. Artifacts kept under wraps only further deteriorate - unseen.

Solutions? Possibly a network among the professionals would open communications. More awareness within the recreation people may open more avenues along maritime lines. It does not sound impressive, but it would be a start in a better intellectual direction than currently exists.

Deep Reflections

James E. Fitting*

My first encounter with underwater resources, other than by bailing out an upland excavation unit in the Saginaw Valley after a severe rainstorm, was in 1965 when George I. Quimby and I worked with several divers in recovering prehistoric artifacts from a shallow harbor on Whitefish Bay. It soon became clear that these items came from shoreline and offshore dumping, but word of our "underwater Indian village" was soon spread far and wide. In addition to newsletters and newspapers, it even made the pages of Grit as a Ripley-like "Believe it or not" cartoon with fish swimming by submerged wigwams. Among the other errors that appeared was that of classifying Quimby and me, who stood on the shore the entire time, as "underwater archeologists."

Once started, a myth dies slowly. In 1966 we again worked with divers off Burnt Bluff on the Garden Peninsula. Through the University of Michigan, where I was then Curator of Great Lakes Archeology, we were carrying out a survey and excavation in the caves and making a record of the rock paintings there. It seemed logical that the caves extended below the surface of Bay de Noc. According to our divers, however, they did not, and off the rocky beach below the cliffs was a gently sloping talus pile of well-rounded boulders.

The search for the submerged past became a little more frantic seven years ago when I was finally called to follow the wake of Jacque Cousteau and "go off the deep end." In 1972 I was hired as State Archeologist for Michigan through the Michigan Department of State. There was some question at that time whether the Department of State or the Department of Natural Resources was responsible for administration of Michigan's bottomland resources. This was the first year that the Department of Natural Resources permit system was in operation; and at first, the Department of Natural Resources refused to let me, as an employee of the Department of State, even look at the pictures that were being sent in. Later I was allowed to look at them, and then I had to work very hard to convince my supervisors that this really was a Department of Natural Resources' problem and that I had better things to do than look at blurry pictures of unidentifiable objects.

The Secretary of State, however, decided that I should dive, and off I was sent to be certified and fitted for equipment. Prior to my first open water dive, department lawyers had drawn up a salvage permit (which was never issued) that required inspection dives by the State Archeologist. The fact that the permit applied to a professional salvage operation at well over 200 feet where master divers were using mixed gas was irrelevant.

The salvors were most cooperative as well and offered, in all sincerity, to take me down any time I wanted to go, even if they did have a Department of Natural Resources rather than Department of State permit. Again, I had to think fast to decline the offer.

I did apply for a Class I permit, which was granted and expired without being used. I also applied for a Class II Scientific permit on an open basis to allow

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*Science Applications, Inc., La Jolla, California.

me, as State Archeologist, to respond to emergency situations. I caught hell from both sides on that one. The Department of Natural Resources denied the permit request, possibly the only time a Class II permit application was ever denied, and the Department of State was unhappy that I should even have bothered asking for one from the Department of Natural Resources.

While all of this was going on, Tom Warner came into my office one day to talk about the possibility of a survey leading to an underwater park plan for the Thunder Bay area. It was a delight to even talk to someone who seemed interested in the resources and their interpretation rather than who should rule them. We kept trying to schedule a trip to Tobermorray, but I never did get there. Tom followed through on the Thunder Bay study as well and cajoled the two warring agencies into backing his ideas. The Michigan History Division provided some National Historic Preservation Act matching money as well. This took a great deal of talking at a time when traditional use for such funds was to put new paint on old buildings.

Another positive thing happened. In 1975, over 350 people met in Detroit to discuss underwater resources as a part of the Detroit local history conference. It was well attended, marked by an open discussion and dialogue and by an after dinner speech, closing on a positive note with several cooperative programs in the planning stage. There never was a second conference of this type.

In 1975 I left the state to go into private business. My interest in diving waned, and after one very disasterous experience that fall, I joined the 75 percent group of drop outs. While I was a private company, we bid and won a contract for an underwater resources inventory of Detour Harbor, underbidding Tom Warner and Don Holocek along the way. We did an adequate job on the project but in a most uncomfortable fashion, so uncomfortable that I have had no desire to dive again. Having exposed my sincere interest but total lack of credentials in the field, it is probably time to look at the bigger picture of Michigan's past and why an archeologist concerned with these pictures must look to underwater resources for assistance.

To understand this bigger picture, we must look back tens of thousands of years ago, to a time when the central part of North America was covered by glacial ice. This ice was more than a mile thick and was very dirty, full of boulders and gravel, which, along with the ice itself, compressed and altered the face of the land. Along the way, 200 million years of Michigan's geological history was picked up in the ice and deposited as moraines in Indiana and Illinois. The ice followed existing river valleys and gouged out the basins of the Great Lakes of today in the process.

And 20,000 years ago, a mere moment in geological time, the ice started to melt and there was land underneath. All kinds of weeds grew on this land which were soon followed by little spruce trees, animals and finally man. Sometime, around 12,000 years ago, people left the first remains that can be studied archeologically and, in a manner of speaking, human history began in the state.

Although settlements of this time period are rare, they form a consistent pattern. The glacial lakes, with the ice still blocking the St. Lawrence drainage, were much larger than they are today and emptied into the Mississippi through the Chicago outlet and into the Ohio River by way of the Maumee and Miami Rivers.

Before the development of the railroad and road systems of the past century, the lakes were traveled primarily by canoe, and it is very probable that 90 percent of all Native American archeological sites are within a quarter of a mile of a place where a canoe could be landed, either today or in the past. Locations where a canoe could have landed in the past are important because the sites of the earliest inhabitants are on sand ridges, representing fossil beaches, that are well above and well inland from today's lakes.

When down cutting occurred in the older outlets, and eastern drainage opened up a while later, the lake levels dropped very rapidly. At the same time, the forest cover was changing as pine replaced spruce, and hardwoods became established in the southern parts of Michigan. As the lake levels dropped, these new forests covered former beaches and lake beds.

The lakes dropped at a surprising rate until 7,000 years ago they were as much as 400 feet below modern levels and were little more than puddles in their present basins. They did not rise to their former levels until sometime around 5,000 years ago. Since human settlement followed the shoreline and river mouths, nearly 5,000 years of Great Lakes history and archeology is currently underwater. Nearly half of the entire period of human occupation in the state is primarily within the province of the underwater specialist.

Following this "empty" period in Michigan's past, was a period of pioneer settlement along new lake shores which started around 5,000 years ago. Most of the burial mounds in the state were built around 2,000 years ago, and by 1,000 years ago there were agricultural groups, probably with palisaded villages, well established in the southern parts of the state. The greatest period of pre-European population density seems to have been between A.D. 1000 and A.D. 1300. Between A.D. 1300 and the middle of the 17th century, when the first definite evidence of European contact appears, there was another very poorly understood occupational hiatus.

Brulé may have been in Michigan by 1622, and Nicolet certainly was there 23 years later. He passed through the Straits of Mackinac on his way to the Bay of Puants, or Stinkers, now known as Green Bay. With a strong sense of mission, albeit a poor sense of geography, he landed in a damask robe, fired his pistols in the air and claimed all of Wisconsin for the King of France, thinking that it was China.

The Jesuits had established a mission in the Apostle Islands by 1665 and another at Sault Ste. Marie by 1669. In 1670, they established a mission on Mackinac Island, which was moved to St. Ignace in 1671. By 1679 the Griffon, the first sailing vessel on the Great Lakes, had been launched. It sank in the fall of that year somewhere between Green Bay and Manitoulin Island, and shipwreck archeology was first made possible in the Great Lakes.

In terms of major population changes and cultural innovation, it might be stated that very little happened in the Great Lakes over the next 200 years to cause any major or radical changes. The British replaced the French as the outside traders, and they, in turn, were replaced by Americans. None of these changes were radical. Much to the chagrin of the French, English trading parties had been working at Michilimackinac as much as 80 years before the French-Indian war, and the line between British and "Royal Americans" was very thin by that time. Although the American Revolution of 1776 may have been formally over by 1781, the British remained in Detroit until 1795 and maintained a garrison on Michigan lands at Fort Collyer on Drumond Island until 1827.

For the first several decades of the 17th century, there were probably fewer than 500 Euramericans in Michigan. Major migration into the state started in 1820 and increased rapidly after the Civil War. Transportation was still largely by water, and interior roads were a joke. There is a story told about a southern-Michigan tavern where people stayed three nights in a row while pushing and pulling their wagon by it through the mud, working at this task each day and returning to the tavern to sleep at night.

Inland transportation became important with the railroad boom of the late 19th century followed by the development of highways in our own century. Great Lakes shipping was not eliminated by these innovations, but became more specialized in those areas where it held an economic advantage over upland transport. Virtually all of the shipwrecks within the proposed underwater parks or resource areas, date to this last century.

Unfortunately, these may be the only submerged resources with which we can deal. There are many submerged prehistoric resources, but they may be virtually impossible to locate. The largest burial mound in Michigan, in the Norton Mound Group near Grand Rapids, is only 16 feet high. The "average" mound may be little over one foot high. These are the most visible of prehistoric surface features, and most prehistoric archeological sites have, quite literally, no relief. I look at the silting which has taken place on shipwrecks submerged for less than 50 years and wonder what the silting of 20 or 70 centuries would do to a prehistoric site?

Basically, we have very little knowledge of the surface geology of the low water stages. There is no indication in the maps of Saginaw Bay that a canyon 400 feet deep once flowed through its boundaries, yet it must have, unless there was a waterfall of this height some place around Charity Island. The only way that we could approach the archeology of this time period would be through underwater geology and geography.

There is a whole range of underwater cultural resources for this historic period. I am sure many of you are familiar with the very exciting work along the Rainy River where entire canoe loads of trade goods, including loads of beads and flint lock muskets, have been recovered from where they tipped over in the rapids nearly 300 years ago. Similar resources could exist in Michigan rivers, particularly the St. Mary's, or in such places as East Moran Bay off St. Ignace where more than 6,000 people gathered to trade in the summer of 1695, according to Cadillac.

And finally we have the shipwrecks, those are unique time capsules sealed at the time of sinking, something rarely found at an upland archeological site of the same time period. Furthermore, they are sealed in a deep freeze situation with near perfect preservation of wood, leather and paper, and in some macabre instances even people. As a social and historical document, the wrecked ship is far more valuable to the archeologist and historian than one still in operation.

A major problem involving shipwrecks is how to manage these resources. There has been an "out of site, out of mind" attitude about them for a long time. A decade ago there was little concern for shipwrecks around Isle Royal and now they may be part of the first National Underwater Park. This is also true for the resources of Thunder Bay, Beaver Island and other potential park areas in Michigan. Knowing that the resources are there and need managing, creates problems, however,

On one hand, it is possible to take a strict preservationist perspective and argue that they should not be moved, touched or disturbed in any way. This strict

preservationist position is often based on a clear understanding of the inadequacies of the historical and archeological professions, and on the limitations of contemporary conservation and museology techniques. The archeologist, historian or museum administrator is often at a complete loss as to what to do with these resources if they are given to him.

The preservationists have good reasons for taking the position that they are the ones to decide what is to be done. They have seen countless upland historic resources disappear until the once ubiquitous item has became unique. They have seen the past vanishing and alerted both the public and the lawmakers to the inherent dangers of losing one's past. Finally, they have been heard, and there is now a growing body of preservation legislation.

Preservation legislation brings a new group into the picture. These are the regulators. It is the regulators who make preservation work, and it strikes me that in most instances the regulators are neither resource users nor resource lovers. They are mechanically, rather than emotionally, involved in reading and interpreting the laws dealing with submerged resources.

In the case of underwater resources, there is a third group which is the largest of them all. This group, of course, is the divers. It would be tempting to call them the resource users, but, without further explanation, this would be unjust. First and foremost, they are the group which is intimately involved with the resources which the vast majority of the preservationists and regulators have never seen.

The unity of the "diving community" of five years ago seems to have been broken. The sport diver has seen that he cannot cast his lot with the commercial salvage operator, or at least with the more irresponsible of these operators. Dynamiting shipwrecks to get pieces of wood and metal for furniture hardly contributes to better sport diving. Even sport divers are apprehensive that they might not have any wrecks left on which to dive.

I have seen a maturity in the preservationists and regulators with the realization that an unenforceable permitting system is worse than none at all. There is a minimal permitting system for upland resource, very closely related to the method of recovery, which might furnish some sort of a model. Most upland areas, however, are in private ownership, and this has some impact on the situation. In these areas the state has encouraged the development of avocational, historical and archeological groups. This encouragement has included a strong element of education, and there are precedents for avocational archeological work being carried out under state permits on state land. I am thinking of several recent projects in the Tuscola Game Preserve which could serve as a model for the encouragement of underwater archeology in Michigan.

It is interesting to note further that the upland avocational archeologists have had a united group, the Michigan Archaeological Society, for nearly 30 years. This self-regulating group publishes The Michigan Archaeologist, the major archeology journal in Michigan.

Some steps have already been taken toward the development of such a system for underwater resources. Jack Morehand's use of avocational divers and particularly their involvement in the interpretive program at Isle Royal, is exemplary.

There is a tremendous amount of interest in underwater archeology in the state and a tremendous amount of energy being expended on it. This energy has been expended with little central direction and, in at least one important sense, most of it has been wasted. National Historic Preservation Act funding is available for archeological projects in Michigan, but there are some special conditions under which these grants are awarded. First, all work needs prior approval and must be carried out under professional supervision. It also needs to be matched on at least a 50/50 basis by either cash or by in kind services.

Several upland archeology projects have been carried out with these funds in the state, using in-kind match. These would include the Berrien Springs Jail study, the test program at the River Raisin Battlefield and Michigan Archeological Plan being developed by the Conference on Michigan Archeology. With appropriate direction and application, such funds could be obtained by avocational diving groups to contract for professional supervision and cover the expenses for underwater surveys and even excavation. Other problems, such as historical research, conservation and curation, would need to be considered in such proposals as well. Participation in such a program would provide a learning experience as well as a recreational experience, and an opportunity to contribute to what would hopefully be a useful scientific and historical study.

There are other advantages to public involvement in resource management as well. Carl Suskind has mentioned the ladies in La Jolla who immediately reported any violation of the La Jolla-San Diego Underwater Preserve. This system exists on an informal basis for upland resources in the state. Key regional archeologists can be contacted by the state archeologist to monitor projects, provide information on local resources, and, on a local level, become the protectors and interpreters of these resources. In British Columbia this system has been formalized with the appointment of archeological "wardens" for different parts of the province. If this were to be done for Michigan's underwater resources it would seem that the dive boat operators would make the most appropriate wardens. They could be put out of business by the destruction of underwater resources.

This brings me to my final point. Who are the real winners and real losers in the underwater preservation game? Do you think that the Department of State or the Department of Natural Resources really wants 8,799 ships' wheels and compasses? Both the preservationists and regulators probably view these resources as an unresolved headache. They have neither time, funds, or, possibly, inclination to develop a dynamic program in underwater interpretation in Michigan. If all of the shipwrecks in Michigan were to vanish overnight, the preservationists and regulators, who never knew they were there until a few years ago, would never miss them. A lot of divers would.

There is little in Great Lakes diving that compares with that of southern California or the Caribbean. It is the shipwrecks of the lakes, with their excellent freshwater preservation that makes diving fun. It is the sport divers who view and enjoy these resources the most and who are the people who should be most interested in their preservation.

But this has taken us away from the big picture. We can be certain that lake levels will change again and possibly disappear. The ice has only been gone for a little over 10,000 years, and it probably will return again. Our resources may increase, or vanish altogether.

At some time in the future, we might find that our own remains, both physical and cultural, are being studied by others, and that our own attempts at preservation

have vanished in a distant past. We will have become our own passenger pigeons. Before we become passenger pigeons, perhaps we can take time for a little hedonism before we are gone and give ourselves a little treat. That treat would be one of prolonging our own pleasures not by saving the past for today, but by taking today's enjoyment of the past and trying to save a little bit of it for tomorrow.

Recreational Interests in Underwater Resources

Richard Pryor*

Recreation Defined

A typical definition states the derivation as the Latin word recreare, which means to create anew, to become refreshed.

Elements common to several definitions include the following -

1) Recreation directly involves the individual.

2) It is entered into voluntarily.

3) It occurs during leisure time.

4) The motivating force is enjoyment and satisfaction as opposed to material gain.

5) Recreation is wholesome to the individual and his or her society. Resource-oriented recreation and outdoor recreation are essentially the same and are defined as those recreational activities which occur in an outdoor (natural) environment and which relate directly to that environment. With this brief description of recreation in mind let us consider principles of recreational interest in underwater resources.

Throughout the nation and the world, recreational interest in underwater resources has developed and increased with the implementation of regulations and conservation/protection measures designed to assure the resource's preservation. The history of the marine park movement, beginning in 1962 at the World Conference of National Parks when possibilities for such parks were first discussed, has in a short time stimulated some public interest, concern and participation in the movement. However, most measures and initial interest worldwide to set aside areas for marine-underwater park development have surfaced from within the park professional/scientific community, and these measures have in turn culminated in local, state and government regulations regarding these areas. It has historically been the case that the majority of the public, though favorably inclined toward underwater park-preserve development, simply is not aware of the existence, or need for, protection of these resources which are sometimes, figuratively speaking, in their own geographic backyard. Such is the case with park development of underwater resources in the Great Lakes. Recognizing certain resistance to protective measures by salvagers and treasure hunters, the vast majority of contacts and communications with divers and nondivers in the state reveals a real appreciation for protective measures designed to save these resources for archeological study and recreational possibilities into the future. Appropriate to this discussion of

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recreational interest is citation of the four main marine park management-designation approaches presented by Falk.[2]

1) Preservation - stresses protection for species and habitats; scientific research is allowed within the designated areas

2) Recreation - primarily oriented to active recreation and tourism, stressing heavily developed areas with land-oriented facilities as well as marine facilities.

3) Conservation/recreation - allows certain types of recreation activity, but overall conservation of the ecosystem is the foremost objective.

4) Multiple - allows for parks and reserves to be designated based on any or all of the three preceding approaches.

I favor this last management approach, 'multiple use,' which can accommodate the all-important recreational interests, yet provide for flexibility in protecting certain areas and individual features for scientific investigation. This approach allows the possibility for changing designated uses over time as activities have impact on the resource, and new aspects or areas of the resource are accommodated to changing demands.

To reiterate, most advances in preservation with associated recreational use regarding underwater resources can be attributed to 1) good research and 2) individuals in the resource professions and government with the foresight and desire to protect, conserve and/or preserve the resource. The public interest soon follows with favorable response to such action which increases with education, access and opportunities for observation.

World Recreation Interests in Underwater Resources

Previous consideration of underwater resources for protection, management and associated recreational interests is rather extensive throughout the world. Most recreational opportunities and facilities center on natural features of the marine environment such as the coral reefs at Florida's John Pennekamp Park, Underwater Park Preserves in California, Marine Parks for Recreation in Japan, but also include shipwreck-oriented underwater parks such as Truk Lagoon in the South Pacific and Fathom Five Provincial Park at Tobermory, Ontario. This last park sets a significant precedent for the recognized importance of this historical resource in the Great Lakes region, represented in the numerous shipwreck concentrations and individual sunken vessels. This Great Lakes underwater resource offers a unique and unusual recreational potential comparable in interest to both the marine coral reef parks and land-based historical sites.

If measures necessary for protection of Great Lakes shipwrecks are implemented through federal/state/local measures, the subsequent development of facilities for access to and observation of these resources through government or private means can look to several models for facilities already designed to accommodate scuba diving and nondiving recreation participants. Examples of existing facilities include underwater viewing rooms, towers and walkways now in use in Japan's 40-plus marine recreation parks and at Coral World in the Virgin Islands, glass bottom boats used at John Pennekamp Coral Reef State Park in Florida or observation submarines used at Lake Geneva, Switzerland.

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[2] Falk, James M., Marine Parks and Reserves In Other Countries (Lewis, Delaware: By the author, Master's Thesis, University of Delaware, Aug. 1978), p. 8.

The Potential Interest for the Michigan Experience

As with all recreational opportunities three main components are necessary for this underwater recreation experience. They are:

1) Resources
2) People
3) Access

In Michigan these components exist in combination, offering infinite possibilities for the development of this unique recreational experience!

The Sport Diver

With nearly 3,000 shipwreck locations known or speculated on Great Lakes bottomlands, approximately 12 major shipwreck concentrations[3] and some 300 licensed Great Lakes charter boat operators (currently utilized for fishing)[4], an instant link can be made for the potential occurrence of shipwreck dive experiences. With some 600,000 registered boats in Michigan (mostly private)[5], consideration of individual noncharter boatowner-divers, including those from out-of-state and all divers in general, the potential for diver-shipwreck recreational experiences is massive. Other attractions on Great Lakes bottomlands such as geological formations, for example, the off-shore limestone sinkholes at Alpena, and fish habitat both on and around shipwrecks direct further interest to the variety of underwater curiosities relevant to recreational experiences and underwater resources. Estimated annual diving participations from Michigan residents alone number some 500,000 and some 900,000 total hours according to a 1976 Michigan DNR Recreation Services survey.

The Tourist/Camper

In addition to this already-massive potential among divers for interest in experiences offered with shipwreck related resources, the potential nondiver interest is significant in light of visitations to current State of Michigan historic sites (see Table 1 below):

Table 1 - Michigan Historic Site Visitations*

Location	Annual Visitations
Ft. Mackinac	266,699
Ft. Michilimackinac	198,197
Ft. Wilkins	300,000
Fayette	135,000

*Data from Mackinac Island State Park Commission

[3] Warner, Thomas D., and Donald F. Holecek, "Underwater Parks: An Unexplored Recreation Frontier?" Parks and Recreation Vol. 13, No. 11 (November 1978): pp. 18-20.

[4] Michigan Charter Boats Inland Guides Directory (1979), Travel Bureau of Michigan. Department of Commerce, Lansing, Michigan.

[5] Telephone Interview with Phil Wells, Michigan Department of Natural Resources-Recreation Services, Lansing, Michigan, 16 March 1979.

Consider further that at Ft. Mackinac 44 percent of visitations are from out-of-state while at Ft. Michilimackinac approximately 28 percent are from out-of-state which implies regional significance for interest in Michigan's historical resources (data from Michigan Tourist Commission). Regarding tourism in general, there are 50 million person-trips annually with 40-45 percent of these trips from out-of-state residents and a total of $2 to 2.5 billion generated annually (Tourism is Michigan's No. 2 industry -- all above figures from Michigan Tourist Commission). One additional aspect for consideration in establishment of park facilities with potential for attracting recreational participants is the great interest in camping in Michigan. The 1976 Michigan DNR Recreation Services survey estimated 23 million annual camping days in the state.

Now, in consideration of all the above data, three major components for recreational activity interact to illustrate the complete recreation experience. Examining the original 3 components regarding potential interest for Michigan experience: resources, people and access, let us explore the development of this recreational resource by accepting access as a given and substituting management to establish a program feasibility stage for an "activity product output" utilizing these three elements.

Previous discussion has dealt with the researched extent of the resource and the measured activity participations that relate or could relate the recreational experiences with Great Lakes underwater resources. Now let us include the essential 'management' component. To establish, preserve and maintain these resources requires some management unit, federal/state/local with 1) jurisdiction over activities in the resource vicinity, 2) power to designate boundaries and uses within an area, 3) enforcement power and, 4) provision of facilities with maintenance, programs of interpretation and education concerning the importance and proper use of the resource by the public.

In Michigan both the Department of Natural Resources and Department of State have exhibited interest in the preliminary stages of protection of the state's Great Lakes Underwater Resources. The Michigan DNR has expertise in park development, management, facilities planning and enforcement and is an example of one entity capable of serving as the prime manager for our Great Lakes underwater resources. The Department of State has expertise in the historical-archeological aspects of these same resources. Helping to establish the background necessary for public awareness of the great historical significance of artifacts and events in the Great Lakes can further highlight and increase enjoyment of the recreational aspects of these resources.

The Outdoor Recreation Experience As Applied to Underwater Resources

A model exists for the typical outdoor recreation experience represented by five stages of involvement for the individual recreationist. This model emphasizes:

1) Anticipation/Planning
2) Travel to...
3) On-site experience
4) Travel from...
5) Recollection[6]

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[6]Jensen, Clayne K., Outdoor Recreation in America (Minneapolis: Burgess Publishing Company, 1977), p. 10.

At each stage of the model there are some direct benefits and indirect benefits. Direct benefits would accrue to the users of the resource and, in general, could apply to both divers and nondivers (with adequate access to the resource) including relaxation, companionship, exercise and new knowledge about the resource.

Indirect benefits would include renewal of the individual from work-related pursuits to increase one's ability to interact productively with co-workers and friends upon return from the recreation experience. Also dollar expenditures along the first four stages of the outdoor recreation experience would certainly benefit local economies and could thereby be classified as indirect benefits of the recreational experience.

Table 2 shows just a few costs and benefits in both specific intangible and monetary terms.

Table 2 - Typical Outdoor Recreational Experience

Anticipation (at home)	Travel To:	On-site Experience (in resource vicinity)	Travel From:	Recollection
Costs: Equipment purchase, training, planning time	Lodging, meals, fuel	Entrance fees; permits; impact on resource; transport to resource; equipment depreciation - use expenditures for accommodations	Lodging, meals, fuel	
Benefits: choice of one activity/place over other possibilities, planning, researching history, biology, increasing skills as in photography	Expenditures to local economies along route; scuba 2-4 trips/year travel several 100 miles	Esthetic appreciation; education; interpretation of the resource; expenditures for accommodations	Expenditures to local economies along route	Satisfaction of experience and possible reinforcement to experience activity again

(Costs and Benefits in Intangible and Monetary Terms are similar for diver/nondiver.)

If the typical outdoor recreation experience involves underwater resources, the occurrence depends on a number of variables initially including:

1) workable legislation or administrative rules to assure the continued existence of the resource (needed immediately); if the shipwrecks in particular are stripped of artifacts or destroyed in the pursuit of plunder both the historical and recreational opportunities similarly, will vanish

2) amount of public education: nondiver and diver programs, hearings and literature on the extent of the resource, significance and requirements for its perpetuation

3) equipment and transportation facilities located at or near the resource

4) total expenditures related to the recreation experience to be competitively priced compared with other alternative activities

5) planning in the development of the underwater recreation resource experience to facilitate the experience and minimize a) time, b) effort, c) costs involving travel to the site, on-site experience and d) travel from the site.

Depending on the involvement of the underwater recreation participant, diver or nondiver, we can see how proximity to the resource during the experience can vary with initial equipment expenditures ranging from zero for nondivers, to hundreds or thousands of dollars for divers in scuba, photo, and boating gear. So this resource can have great recreation potential for all income/skill levels and competitively generate significant expenditures compared to other recreation activities while serving as a satisfying and memorable tourist/vacation experience.

With an integrated approach utilizing the expertise of professionals in areas of historical and natural resource development and dissemination of information to the public for all-important feedback, the necessary linkages between 1) resource, 2) people, and 3) management can result in a successful partnership among these three components.

I believe the information presented at this conference will show that the development of underwater resources in the Great Lakes, focusing primarily on shipwrecks and natural features with the intent of preserving, protecting and establishing recreational access, is feasible and can serve as a viable alternative to other recreational activities, both state and regional, offering an experience unique to the Midwest, attracting participants and acclaim nationwide.

Diving and Tourism

G. Tomasi*

Although the city of Munising has a population of 3,000 to 3,500 and the entire county has only 10,000 people, tourists spent $5.5 million there in 1975. This is important because most land in Alger County is owned by either the state or federal government, leaving little property on the tax rolls.

Tourism in Alger county supports 164 jobs, which is significant in a population base of 10,000. Among the many other reasons why shipwrecks should be preserved is that they create jobs, a reason which is important when approaching state legislators for money, support or both. I believe we should put an increased emphasis on the economic aspects of the project and thus reap the other benefits.

We have to understand that an underwater park or historical preserve would attract in this climate a special kind of tourist, namely, the diver. Michigan isn't like Florida where we can bring everybody out and let them snorkel or take a glass bottom boat into 15 feet of crystal clear water. It's important that areas designated as underwater parks have adequate interest areas next to them or close by to attract the family members that do not dive.

In Munising, Michigan, where we do our charter boating, there is a national park, numerous waterfalls and lots of attractions for the rest of the family while one person is diving. This is very, very essential if the park is to be used.

The economic potential of Great Lakes parks is still very significant if it appeals only to the diver. More than 250,000 sport divers were trained and certified in 1978 with the same amount expected in 1979. When sport diving certifications are increasing at 20 percent a year, the total number of divers increases every year, despite the dropout rate, which is perhaps 75 percent. There is proven potential for an underwater park in Michigan.

The following statistics may give some idea as to what diving activities can do to a community. In 1971 there were an estimated 50 divers on chartered boats in Munising, with approximately 20 more diving off private boats. This meant there were 70 divers on the Dreadmore, the Smithmore and the Hetler shipwrecks during the summer of 1971.

In 1978 approximately 500 divers were counted on charter boats and an estimated 250 on private boats, bringing the number of divers to about 750 in Munising. In addition, a number of these people brought their families and friends, which could account for an additional 250 people, using conservative figures. This would mean more than 1,000 people were in Munising because of the diving facilities there.

Most of these people came on weekends for an average stay of two days, or 2,000 tourist days in the city. The Department of Commerce states that a tourist spends an average of $32 per day per person, bringing the expenditure by tourists to $64,000. Although not all of this money was spent in Alger County, the major

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*Charter boat operator, Munising, Michigan

portion was, and the economic impact of $50,000 on a town the size of Munising is very important. Munising appreciates the divers, and this type of attitude is absolutely essential when considering the location for a park. It is a good idea for the park to be in a community which is already oriented toward divers. A friendly relationship with the local citizens and law enforcement is very helpful.

There are many considerations to be taken into account when selecting sites for underwater parks. As a charter boat captain, I must consider economics and the necessary considerations before investing money to get started in the business. First of all, one must look at the number of wrecks. You cannot take a group out on the same dive three times in a weekend, nor can you ask them to come back each year to see the same wreck unless its a super wreck or very large. You should have a variety of wrecks and ones which are in some special condition. Most divers would appreciate a ship that looks like a ship rather than a pile of timber.

Location is also a major factor to consider, especially protection from the weather. If you are a charter boat captain and you're going to get blown off the lake two days out of four, the economics are not practical. The situation in Munising is fortunate because the Grand Island is sitting right in the bay. There are wrecks on both the East and West sides of the island. In 1978 there were groups every weekend, and we did not miss a single run. Sometimes plans and schedules had to be changed, but we always went diving.

Another item worth mentioning here is depth. Although depths of 175 to 190 feet are fine for the individual who wishes to try it, I would not face this great a liability as the captain of a charter boat. I need wrecks that are intact, in a protected harbor and in about 60 to 100 feet of water.

The distance to the wrecks is also important. As a charter boat captain, I'm interested in how long it takes to get to the boat for two reasons. One is economics. If I've got short runs and good wrecks, that is very important to me. I can take one group out and come back in 3 hours, give them a 3-hour rest period and then take another group, doubling the booking.

Another aspect is sea sickness. Many people think a 4-hour ride is fantastic until they get out there in 4-foot swells and everybody starts turning green. Sometimes when you finally get to the site, two-thirds of the people don't want to dive, and others have lost interest. The distance effect is very important because people often want to do other things besides just dive when they are vacationing or out for the weekend.

Support services must be available for the diving operation. There has to be a reliable source of air and a reliable source of rental equipment, among other things. Dock space is necessary as are parking spaces and restroom facilities. As I mentioned, one of the most important ingredients in the charter boat business is the local attitude toward diving. If the divers come to a community and feel they are intruding or in the way, it is very difficult to get them to return.

Some challenges faced by the charter boat operator in Michigan are similar to those faced by those in California and Florida, but others are unique. First of all, in Michigan there is the short season. June, July and August are the only months which really can be scheduled. By September 15, we cross our fingers and hope bad weather doesn't kick up. Groups that come and dive on Memorial Day know the water is going to be frightfully cold because summer doesn't start in the Upper Peninsula until the 4th of July.

The boat is a considerable investment. It must be approved by the Coast Guard if there are over 6 passengers and by the Department of Natural Resources if there are less than 6. You must have a radio and fire extinguishing equipment on board.

Promotion is a problem. At the moment it is done by private individuals, but there is an ever-constant problem of getting the word out. It is very expensive to promote a business, and the regulations are a challenge whether you are dealing with the DNR, the Coast Guard or both.

Another challenge which the charter boat operator faces is pilfering. Rip-offs can amount to significant losses for the operator, the community and the state.

There are several ways in which the charter boat operator could use assistance. First of all, he needs help in the exploration for new wrecks. If the area is designated as a park or preserve or a place to be promoted for tourists, we ought to at least know everything that is under the water. The average charter boat operator doesn't have the time, equipment or money to do the complete underwater survey which is necessary.

We also need help exploring what other types of attractions are available, fish concentrations, underwater rock formations and other types of places a diver could enjoy.

To summarize, I see no conflict between tourism, charter boat operation, preservationists, conservationists and any other group. I do feel very strongly that economic impact should be used in all the efforts that can be made. The opportunity to create jobs should be a practical aspect, and because the Upper Great Lakes Commission is always interested in economic development, perhaps it is a source of assistance which needs to be explored.

Characteristics, Behavior and Expenditure Patterns of a Scuba Diving Population

Donald F. Holecek* and Susan J. Lothrop**

Introduction

Since the early 1600's the Great Lakes have served as a major transportation route for men, culture and commodities. The ships that ventured across these lakes influenced settlement patterns, life-styles, and the location of industrial development throughout the Great Lakes region. Unfortunately, many ships, and often their crews, met their demise in these waters.

Today, an estimated 3000 shipwrecks lie in Michigan Great Lakes waters.[1] The historical, cultural and recreational value of these potential resources is not widely recognized. As a consequence, the shipwrecks and the artifacts associated with them are rapidly being destroyed by man and nature. However, improvements in equipment and knowledge permit more people than ever before to explore the underwater environment in safety and comfort with only modest investments in equipment and skill development. Resulting growth in accessibility of shipwrecks, although increasing the probability of increased tampering by divers in search of shipwreck booty, has led to growth in awareness that public policy needs to be designed to manage our remaining underwater resources wisely.

The concern for shipwrecks demonstrated by recreation planners, historians, archaeologists, sport divers and other members of both the scientific and non-scientific communities has prompted the State of Michigan to draft legislation concerning the regulation of resources on the Great Lakes bottomlands under its jurisdiction. In recent years, two regulating bills have been passed in the House but have not been voted on by the Senate. Similar legislation[2] is currently being drafted: "...To preserve abandoned property of historical or recreational value on the bottomlands of the Great Lakes." In addition to statewide regulation, underwater parks-historical preserves have been proposed as a vehicle for protecting shipwrecks and other underwater resources in specific designated areas. It is not known when, where or how Michigan's underwater resources will be managed, but it is clear that interest is growing in these resources and in managing them wisely.

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[1] Warner, Thomas D., and Donald F. Holecek, "Underwater Parks: An Unexplored Recreation Frontier?" Parks and Recreation, 13 (November 1978), 20.

[2] Substitute for House Bill No. 4064.

Information of many kinds will be needed in order to develop underwater resources policy and management plans. Unfortunately, only minimal information is currently available. The purpose of the research reported here was to produce some needed information to assist those involved in the policy-planning process. This research represents but one output of a larger investigation into the feasibility of underwater park-preserves for Michigan's Great Lakes.

Many must recognize a use for, and the value of, materials before effective protective measures and utilization tactics can be formulated. Thus, the opinions of an important group of people who use shipwrecks -- scuba divers[3] -- are the subject of this report. It provides an overview of the characteristics, preferences and experiences of the scuba diving population in the Michigan, Ohio, Indiana area which was assumed to represent the prime market for possible future Michigan park-preserves. A survey was conducted to obtain this information. The methods employed are discussed in the next section of this report and findings are highlighted in subsequent sections.

Sample Population and Procedures

As the scuba diving subpopulation residing in Indiana, Michigan and Ohio could not be simply separated from the general population residing in this region, prohibitively expensive screening of the general population would have been necessary to generate a completely representative group of scuba divers to receive questionnaires. However, a listing of divers was found to be available from List Management, Inc., of New York City for a manageable fee. Taken primarily from National Association of Underwater Instructors (NAUI) information banks, this list consists of more than 11,000 divers residing in the three states who paid approximately $100 for a scuba diving course and invested an additional $100 in diving equipment between 1972 and 1977. In comparison to the general diving population, this list likely includes more individuals new to scuba diving who are probably younger as well. Since addresses were not updated, using this list would tend to further favor inclusion of the newer diver (because newer listings are more likely to be current than would older ones) and/or divers who do not change their residence frequently. Even though this list is clearly not representative of the general diver population, it appeared to be the best alternative, in light of research budget considerations, for obtaining desired information.

After purchasing the list, 800 divers were systematically selected to receive a questionnaire soliciting desired information. A greater proportion of divers were selected from Michigan than from Ohio and Indiana. The survey was conducted over an 8-week period during the summer of 1978. The first group of questionnaires was mailed on July 14, 1978. To counter probable bias in the list from which respondents were selected, respondents were asked to suggest other divers to receive questionnaires. Questionnaires were sent to these divers as their names and addresses were received. On August 2, 1978, a reminder postcard was sent to divers who had not responded to the initial mailing. And on August 14, 1978, a second mailing of the questionnaire was made. Questionnaires received after September 8, 1978, were not included in the survey results as computer analysis was initiated on that date.

A total of 956 questionnaires were ultimately mailed (800 to individuals from the purchased list and 156 to other divers identified by respondents themselves) of which 386 (40%) were returned. Approximately 200, or 21 percent, of the

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[3] A scuba diver is one who uses portable breathing devices to enable free underwater swimming.

questionnaires were not returned due to incorrect addresses or a person moving without leaving a forwarding address. Thus, out of the 756 presumably delivered questionnaires, 51 percent were returned by September 8, 1978.

There are three potential sources of bias in the results which follow. As mentioned, the list from which subjects were chosen likely includes a greater number of younger, recently certified divers than does the general diving population. Second, 21 percent of the individuals selected to respond did not receive an opportunity to respond because their questionnaire was not deliverable. These potential respondents are likely more mobile than respondents and may differ in other respects as well. Finally, 49 percent of the divers who actually received the questionnaire did not return it, and it is conceivable that these divers could differ from responding divers. Insufficient funds were available to eliminate or control these potential sources of bias.

General Findings

As mentioned, gathering information regarding the general characteristics of the scuba diving population in the Michigan, Ohio, Indiana area was the purpose of this study. Because an intended use of the data collected is to facilitate policy formation concerning Michigan's shipwrecks, similarities and differences between shipwreck and non-shipwreck divers were also a desired output of data analysis. For this report, shipwreck divers refer to only those divers who dive shipwrecks in Michigan.[4] This section contains findings on socio-economic characteristics, general diving related items and a series of items concerning shipwreck diving per se. In subsequent sections, respondent attitudes with respect to governmental regulation of Michigan's shipwreck resources is explored, and diver expenditures incurred during diving trips in 1977 are detailed.

Socio-Economic Characteristics

Scuba divers are the only group of recreationists with access to Michigan's currently undeveloped and unmanaged underwater resources and would be a prominent user group even if underwater park-preserves become a reality. Therefore, it is useful to identify some basic socio-economic characteristics of the scuba diving population. The profile generated from such information will aid researchers and policy makers in identifying the type of individuals who will most likely compose the prime market for future underwater park-historical preserves. A number of questions aimed at eliciting this information were included in the questionnaire.

The state of residence for the sampled population is shown in Table 1. Because a greater proportion of the sample was drawn from Michigan divers, it is not surprising that the majority of the respondents are from Michigan. The information contained in Table 1 is useful in assessing the popularity of shipwreck diving. About one out of every four (27%) respondents classified themselves as shipwreck divers; however, shipwreck diving is not equally popular in each of the three states. About 40 percent of Michigan divers participate in shipwreck diving, while only about 13% of the divers from Ohio and Indiana enjoy this activity. Differences in proximity to shipwrecks rather than differences in preferences may very well account for varying popularity of shipwreck diving from state to state.

The majority of divers are single (55%) males (86%) between 21 and 30 years (63%) of age. These results are fairly consistent with the 1977 survey of divers

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[4]The questionnaire contained the following question: "Do you dive shipwrecks in Michigan?" All respondents answering this question in the affirmative were classed as shipwreck divers.

Table 1 - State of Residence of Responding Divers*

State of Residence	All Respondents		Non-Shipwreck Divers		Shipwreck Divers	
	Number	Percent	Number	Percent	Number	Percent
Michigan	197	53.7	117	43.9	80	80.0
Ohio	114	31.1	102	38.2	12	12.0
Indiana	31	8.4	25	9.3	6	6.0
Other States	25	6.8	23	8.6	2	2.0
TOTAL	367	100.0	267	100.0	100	100.0

*This table cannot be used to judge the relative popularity of diving between these states because proportionally more Michigan divers were selected to receive questionnaires.

Table 2 - Highest Level of Education Achieved by Responding Divers

Highest Level of Education	All Respondents		Non-Shipwreck Divers		Shipwreck Divers	
	Number	Percent	Number	Percent	Number	Percent
Some High School	15	4.0	10	3.7	5	5.0
High School	74	19.9	48	17.7	26	25.7
Some College (includes associate degree)	150	40.4	103	38.0	47	46.5
B.A./B.S.	87	23.4	71	26.2	16	15.8
M.A./M.S.	31	8.3	26	9.6	5	5.0
Professional Degree (M.D., D.D.S., etc.)	12	3.2	10	3.7	2	2.0
Ph.D.	3	0.8	3	1.1	0	0.0
TOTAL	372	100.0	271	100.0	101	100.0

conducted by Skin Diver magazine. Although slightly more of the respondents to the magazine survey were married, it found scuba diving to be dominated by males between 25 and 35 years of age.

All but 4 percent of responding divers completed high school; the majority (76.1%) have at least some college education (see Table 2). Skin Diver found 72.2 percent of its respondents with some college education. Probably the most significant difference between shipwreck and non-shipwreck diver educational achievements is that only 22.8 percent of the former have college degrees, while 40.6 percent of non-shipwreck divers have graduated from college.

Gross household income for responding divers is reported in Table 3. The 1977 Skin Diver survey found the average household income of the responding divers to be $23,220. Our respondents' average household income was considerably less ($17,687). The average gross income is slightly higher for shipwreck divers, but the difference between these and non-shipwreck divers is not statistically significant. A possible explanation for this difference in household incomes will be suggested by the information on occupation to be discussed next.

Table 4 presents information collected on the occupations of responding divers. More shipwreck than non-shipwreck divers are employed as managers, craftsmen and operatives. On the other hand, more non-shipwreck divers are occupied as students or are unemployed, and it may be their low earnings which lower the average household income for the non-shipwreck diver group of respondents.

In summary, the responding divers overall appear to be fairly typical of the general population in this region with respect to income, occupation and education. Divers tend to be relatively young and predominantely unmarried. There is little to distinguish the shipwreck from the non-shipwreck diver, though the former tend less frequently to be college graduates with higher earnings than the latter.

General Diving Information

All respondents were asked a number of questions pertaining to four aspects of diving: 1) certification status, 2) years of diving experience, 3) preference of maximum diving depth, and 4) level of investment in equipment. Their responses were coded and analyzed, and the results are presented below.

Table 5 indicates the level of certification achieved by the sample population. Although 98 percent of the responding divers are certified, shipwreck divers have achieved significantly higher levels of certification. This may indicate that shipwreck divers are more serious about their sport than their non-shipwreck diving counterparts.

Another important factor in assessing a diver's overall competency is his or her years of diving experience. Years of diving experience reported by respondents are presented in Table 6. In general, divers have been involved in diving for an average of 5.3 years. Shipwreck divers have been diving for a longer period than non-shipwreck divers. The fact that nearly 60 percent of the respondents have been diving for less than 4 years is noteworthy. This result suggests that: (1) the sport has grown very quickly in recent years, 2) diving is a sport exhibiting a high dropout rate, and/or 3) the sample included a disproportionate number of individuals new to the sport. As the bulk of respondents were drawn from a list of individuals who likely began diving between 1972 and 1977, it is logical to assume that this study's responding population is less experienced than the

Table 3 - Household Gross Income of Responding Divers

Household Gross Income	All Respondents Number	All Respondents Percent	Non-Shipwreck Divers Number	Non-Shipwreck Divers Percent	Shipwreck Divers Number	Shipwreck Divers Percent
0 - $ 5,000	51	14.6	43	17.1	8	8.2
$ 5,001 - $10,000	40	11.5	27	10.7	13	13.4
$10,001 - $15,000	66	18.9	47	18.7	19	19.6
$15,001 - $20,000	63	18.1	45	17.8	18	18.6
$20,001 - $25,000	50	14.3	37	14.7	13	13.4
$25,001 - $30,000	32	9.1	20	7.9	12	12.4
$30,001 - $35,000	15	4.3	9	3.6	6	6.2
$35,001 - $40,000	7	2.0	3	1.2	4	4.1
over $40,000	25	7.2	21	8.3	4	4.1
TOTAL	349	100.0	252	100.0	97	100.0
Average Household Income[1]	$17,687		$17,322		$18,635	
Difference Between the Means			$1,313			

[1] Pretests did not indicate that a significant number of divers would have household gross incomes of over $40,000. In order to derive an estimate for average household income it was necessary to arbitrarily establish an upper boundary for this income class. An upper limit of $45,000 was selected.

Table 4 - Occupation of Responding Divers

Job Category	All Respondents		Non-Shipwreck Divers		Shipwreck Divers	
	Number	Percent	Number	Percent	Number	Percent
Professional/Technical	96	26.3	72	27.2	24	23.7
Managerial/Administrative	40	11.0	25	9.5	15	14.9
Sales/Clerical	24	6.6	17	6.5	7	6.9
Craftsmen	24	6.6	11	4.2	13	12.9
Operative/Laborer	58	15.9	39	14.7	19	18.8
Farmer	2	.5	2	.8	0	0.0
Service	37	10.1	28	10.6	9	8.9
Retired	1	.3	1	.4	0	0.0
Student	64	17.5	52	19.7	12	11.9
Self-Employed	7	1.9	5	1.9	2	2.0
Unemployed	12	3.3	12	4.5	0	0.0
TOTAL	365	100.0	264	100.0	101	100.0

Table 5 - Highest Level of Diver Certification Achieved by Responding Divers

Level of Certification	All Respondents		Non-Shipwreck Divers		Shipwreck Divers	
	Number	Percent	Number	Percent	Number	Percent
Skin Diver	5	1.4	5	1.9	0	0.0
Basic Scuba Diver	155	41.9	131	48.7	24	23.8
Openwater/Sport Diver	121	32.7	85	31.6	36	35.6
Advanced/Specialty Diver	41	11.1	29	10.8	12	11.9
Assistant Instructor	15	4.1	6	2.2	9	8.9
Instructor	21	5.6	7	2.6	14	13.9
Commercial/Professional Diver	12	3.2	6	2.2	6	5.9
TOTAL	370	100.0	269	100.0	101	100.0

Table 6 - Number of Years Responding Divers Have Been Involved in Diving

Number of Years	All Respondents Number	All Respondents Percent	Non-Shipwreck Divers Number	Non-Shipwreck Divers Percent	Shipwreck Divers Number	Shipwreck Divers Percent
0 to 4 years	216	58.5	170	63.4	46	45.5
5 to 8 years	103	28.0	72	26.9	31	30.7
9 to 12 years	21	5.7	16	5.9	5	5.0
13 to 16 years	11	3.0	5	1.8	6	5.9
17 to 20 years	10	2.7	2	.8	8	7.9
21 to 24 years	2	.5	1	.4	1	1.0
25 to 29 years	5	1.4	1	.4	4	4.0
30 to 33 years	1	.2	1	.4	0	0.0
TOTAL	369	100.0	268	100.0	101	100.0
Average Number of Years	5.3 years		4.6 years		7.3 years	
Difference Between the Means				2.7 years*		

*Significant at $\alpha = .05$

general diving population. However, there is considerable opinion[5] to support a high dropout rate for scuba diving, and it is not possible to eliminate rapid growth in participation as also being important. It is not possible to determine objectively the relative importance of each of these factors in explaining the relatively short duration of involvement in diving found for this group of divers.

Although shipwreck divers, on the average, prefer to dive to a slightly greater maximum depth, (86.14 feet vs. 74.64 feet) than their non-shipwreck diving counterparts, the average difference is not statistically significant, as can be seen in Table 7. Furthermore, the vast majority of responding divers prefer diving depths of less than 100 feet, but the percentage of shipwreck divers willing to dive deeper than 100 feet is more than double that for non-shipwreck divers.

Investment in diving equipment was selected as another factor worth investigating as it would be of value in both assessing the economic importance of the sport and possibly relative interest in diving. As can be seen in Table 8, the shipwreck diver's average investment in diving equipment is more than double the amount invested by the non-shipwreck diver. At least part of the difference can be explained by the fact that 89 percent of the shipwreck divers claim to own their diving equipment, whereas only 55 percent of the non-shipwreck divers own their equipment. Thus, the non-shipwreck diver who owns his/her equipment probably has only slightly less invested in diving equipment than does the shipwreck diver.

A final area of interest involving financial investment in scuba diving involves chartering boats for diving trips. Asked if they had ever chartered a boat for a diving excursion, 71.3 percent of the shipwreck divers responded positively compared to only 38.2 percent of the non-shipwreck divers. In summary, the information given in Table 5 through 8 indicates that shipwreck divers have denoted more time to diving training, spent more years diving and have invested more money in the sport than their non-shipwreck counterparts.

Shipwreck Diving Information

Because shipwreck diving is taking place and would continue if park-preserves are designated and because little is known about this activity, the questionnaire included questions specifically pertaining to shipwreck diving. The 101 respondents involved in diving shipwrecks in Michigan were asked to answer questions concerning: 1) how they locate and gain access to wrecks, 2) where they prefer to dive shipwrecks in Michigan, and 3) their objectives in diving shipwrecks.

The majority of shipwreck divers (74.3%) have been diving shipwrecks for less than 5[6] years. Most frequently, they rely on the knowledge of friends and relatives to locate shipwreck dive sites. Newsletters are the least-used information source for locating shipwrecks, but this may be a result of a lack of newsletters pertaining to this subject. A complete tabulation of how divers acquire knowledge of shipwreck locations is presented in Table 9.

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[5]When these results were presented and discussed during the symposium most of the audience present agreed that a high dropout rate was a characteristic of the sport.

[6]Five years is likely a low estimate of years of involvement for the total shipwreck diving population because sampling in this study favored inclusion of respondents with fewer years of experience.

Table 7 - Maximum Depth to Which Responding Divers Prefer to Dive

Maximum Depth	All Respondents		Non-Shipwreck Divers		Shipwreck Divers	
	Number	Percent	Number	Percent	Number	Percent
0-50 feet	121	33.2	99	37.4	22	22.2
51-100 feet	184	50.6	133	50.1	51	51.5
101-150 feet	53	14.6	28	10.6	25	25.3
151-200 feet	3	.8	2	.8	1	1.0
over 200 feet	3	.8	3	1.1	-	-
TOTAL	364	100.0	265	100.0	99	100.0
Average Maximum Depth	77.77 feet		74.64 feet		86.14 feet	
Difference Between the Means				11.5 feet		

Table 8 - Level of Investment in Diving Equipment Reported by Responding Divers

Money Invested	All Respondents Number	All Respondents Percent	Non-Shipwreck Divers Number	Non-Shipwreck Divers Percent	Shipwreck Divers Number	Shipwreck Divers Percent
Less than $50	48	12.8	47	17.2	1	1.0
$ 51 - $ 199	63	16.8	56	20.4	7	6.9
$ 200 - $ 350	39	10.4	35	12.8	4	4.0
$ 351 - $ 500	48	12.8	42	15.3	6	5.9
$ 501 - $ 650	34	9.1	23	8.4	11	10.9
$ 651 - $ 800	41	11.0	22	8.0	19	18.8
$ 801 - $ 950	14	3.7	9	3.3	5	5.0
$ 951 - $1,100	21	5.6	14	5.1	7	6.9
$1,101 - $1,250	11	2.9	6	2.2	5	5.0
$1,251 - $1,400	8	2.1	5	1.8	3	3.0
over $1,400	48	12.8	15	5.5	33	32.6
TOTAL	375	100.0	274	100.0	101	100.0
Average Amount of Money Invested[1]	$580.41		$448.50		$938.28	
Difference Between the Means				$489.78*		

[1]Pretests did not indicate that a significant number of divers would have invested more than $1400 in diving equipment. In order to facilitate analysis, it was necessary to arbitrarily establish an upper limit of $1550. The result of this limitation may make the amount of money invested in diving equipment somewhat conservative.

*Significant at $\alpha = .05$

Information given in Table 10 shows the means divers use to gain access to shipwrecks. Personally owned boats are used most often. Yet, "charter boat," "clubs or friend's boat," and even simply "walking in" appear to be fairly popular means of accessing shipwrecks.

Shipwreck divers were also asked to list their favorite areas to dive shipwrecks in Michigan. The first three choices listed by each diver were used for comparison and tabulation. Only 77 (76.2%) shipwreck divers responded to this question. In total, there were 177 places listed which were tabulated by Michigan recreation planning regions. Figure 1 illustrates the percentage of total responses each of these areas received.

It is interesting to compare these responses to some suggested underwater park sites (shaded area of Figure 1 which are numbered 1-11)[7] Since four prime[8] suggested park sites (shaded areas #3, 4, 5, and 6 in Figure 1) are located off the coast of the two recreation planning regions located in Michigan's northern Lower Peninsula, it was expected that the majority of divers would choose these regions as their favorite areas for diving shipwrecks. About 35 percent of the divers did choose these regions; however, 23 percent of the divers selected the southeastern most region, making it the single most popular area. A possible reason for this one area's popularity is its location closest to the most populated area of the state. Shipwreck divers may dive this area more frequently than others reputed to be of higher quality simply because it is closer to where many of them reside. Planners of underwater park-historical preserves need to examine this hypothesis in greater depth. If the time and financial savings involved in diving closer to home outweigh higher quality opportunities at greater distances, then development of park-preserves should proceed accordingly.

A final question posed to the shipwreck divers concerns their objectives in diving wrecks. Seeking treasures, photographic interest, and personal/professional research are priorities to some divers, but 86 percent of the divers agree that they dive wrecks just to look at them. A tabulation of divers' objectives in diving shipwrecks is given in Table 11.

Government Regulation

An important input into policy formulation and selection is the degree of acceptability of policy alternatives to those who will be most directly impacted. A shipwreck regulatory policy would have impact on diver activity, and diver opinion as to acceptability of the impacts should be an important consideration to policy makers. All respondents receiving a questionnaire were asked to what extent they thought the state government should be involved in controlling government-owned[9] wrecks. The divers were asked to select the statement which fit their position on government regulation most closely. Their selections are summarized in Table 12.

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[7] "Shipwreck Lovers Push for Lake Parks." Detroit Free Press, December 1, 1975.

[8] Prime is used here in a subjective sense based upon the authors' knowledge of the quality of shipwrecks present in these areas in comparison to other areas.

[9] The State of Michigan supported by an Attorney General's opinion claims ownership of all abandoned property, including shipwrecks, on the bottomlands of the Great Lakes within its territorial waters.

Table 9 - How Divers Who Dive Shipwrecks in Michigan Acquire Knowledge of Shipwreck Locations

Means of Locating Shipwrecks	Number	Percent
Newsletters		
Yes	7	6.9
No	94	93.1
Magazines		
Yes	13	12.9
No	88	87.1
Friends/Relatives		
Yes	67	66.3
No	34	33.7
Charter Boat Crews		
Yes	37	36.6
No	64	63.4
Club Members		
Yes	37	36.6
No	64	63.4
Local Residents in Divesite Area		
Yes	40	39.6
No	61	60.4

Table 10 - How Divers Who Dive Shipwrecks in Michigan Gain Access to Shipwrecks

Means of Accessing Shipwrecks	Number	Percent
Charter Boat		
Yes	41	41.6
No	60	59.4
Personally Owned Boat		
Yes	55	54.5
No	46	45.5
Clubs' or Friends' Boat		
Yes	43	42.6
No	58	57.8
Walk In		
Yes	37	36.6
No	64	63.4

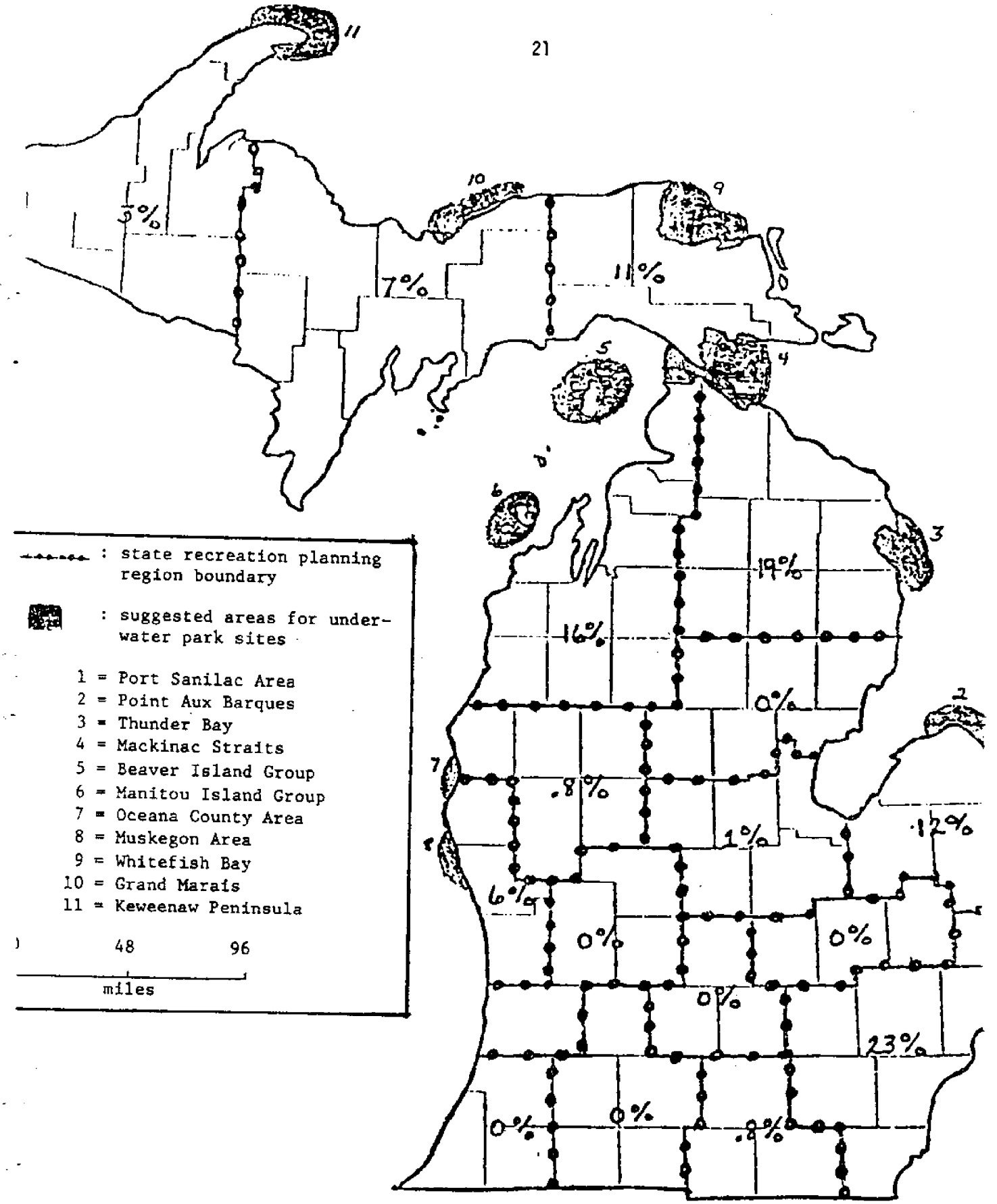

FIGURE 1 - Sample Shipwreck Divers' Favorite Areas to Dive Wrecks in Michigan. Designation of areas based on State Recreation Planning Regions.

Table 11 - Shipwreck Divers Objectives in Diving Shipwreck

Objectives	Number	Percent
Treasure/Trophy		
Yes	30	29.7
No	71	70.3
Photography		
Yes	27	26.7
No	74	73.3
Personal/Professional Research		
Yes	19	18.8
No	82	81.2
Just to look at the Wrecks		
Yes	36	85.1
No	15	14.9

Table 12 - Responding Divers' Views on the Role of State Government in Controlling Shipwreck Salvage Activities

	All Respondents		Non-Shipwreck Divers		Shipwreck Divers	
	Number selecting option	Percent	Number selecting option	Percent	Number selecting option	Percent
Minimal Control	41	14.0	31	14.2	10	13.7
Allow salvage of items that can only be taken without tools	32	11.0	20	9.1	12	16.4
Ban all salvage in selected areas	54	18.5	36	16.4	18	24.7
Require permits to salvage anything of historical or recreational value	108	37.0	90	41.1	18	24.7
Allow salvage without restriction or permit in all but designated areas	57	19.5	42	19.2	15	20.5
TOTAL	292	100.0	219	100.0	73	100.0

As the third and fifth items are quite similar, they can be combined in one category retitled the "underwater park-historical preserve" option. The percentage of all respondents favoring this option equals 38 percent. It equals 35.6 percent and 45.2 percent for the non-shipwreck and shipwreck subpopulations respectively. The underwater park-historical preserve option and the permit system of regulation are clearly the most popular. Although less than 15% of responding divers appear to be against any significant government intervention in the use of shipwrecks, there appears to be no favored regulatory policy alternative. The support for government intervention evidences in these data is encouraging to those interested in the future of historically and recreationally valuable shipwrecks, but the failure of any one regulatory option to achieve a most-favored status poses a potential problem for policy makers. The difference of opinion as to how the use of shipwrecks should be regulated possibly accounts for the difficulties the state has encountered in obtaining legislation or rules needed to accomplish regulation. With clear support for some form of regulation in the diving community, it would appear that some compromise policy is feasible and should be actively pursued.

Expenditure Patterns

For some time now, planner-policymakers have recognized the value of systematic impact assessment of policy alternatives. The objective of such assessments is basically to identify those alternative uses of scarce resources which are most beneficial to society. Economic impact is usually included in these assessments, and one objective of this study was to produce some data needed to begin to estimate the economic impact of the sport of scuba diving.

If the divers were actively involved in scuba diving in 1977, they were asked to fill in a table pertaining to each individual diving trip. They were asked to give such information as: 1) list of trips taken in 1977, 2) number of people in each diving party, and 3) a breakdown of personal expenditures per trip.

Non-shipwreck divers and shipwreck divers differ significantly in most areas concerning general diving trip characteristics. As shown in Table 13, shipwreck divers took more trips in 1977, traveled a greater number of miles from home to the dive site area and participated in the activity with a greater number[10] of people in the diving party. Shipwreck divers also probably spend more nights away from home on diving trips.

The expenditure patterns of the two diving subpopulations are shown in Table 14 individually and in combination. Shipwreck divers spend slightly more money annually in all but one category (hotel/motel accommodation); however, information in Figure 2 suggests both groups of divers allocate their total annual expenditures similarly between expenditure categories. Average per-trip expenditures equal $103.38 for shipwreck divers and $111.68 for non-shipwreck divers. The fact that both groups of divers spend about $100 per trip leads to the conclusion that differences in total expenditures are due to number of trips taken per year rather than expenditures per trip.

Although the quality of the data needed to assess the economic importance of scuba diving is variable, it is now possible to develop some crude, preliminary estimates which can be refined as more exact information becomes available. Listed

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[10] In chartering dive boats, the per-person charge is generally lower than the larger the party size. Thus, it may be that shipwreck divers join together in relatively large parties to cut their costs.

Table 13 - 1977 Diving Trip Information From Non-Shipwreck Divers and Shipwreck Divers

	Number of Cases	Sample Mean	Difference Between the Means
Number of Trips in 1977			
Non-Shipwreck Divers	108	2.26	
Shipwreck Divers	60	3.68	1.42*
Total Number of Miles from Place of Residence to Divesite Area			
Non-Shipwreck Divers	108	898.77	
Shipwreck Divers	60	1475.81	577.04*
Total Number of Nights Spent Away from Home on Diving Trips			
Non-Shipwreck Divers	108	7	
Shipwreck Divers	60	11	4
Total Number of People in Diving Party			
Non-Shipwreck Divers	108	12	
Shipwreck Divers	60	26	14*

*Significant at $\alpha = .05$

Table 14 - Expenditure Pattens of Non-Shipwreck Divers and Shipwreck Divers During 1977 Diving Trips

	Number of Cases	Sample Means	Difference Between the Means
Total Expenditures in Commercial Establishments(restaurants, etc.)			
Non-Shipwreck Divers	108	$ 60.24	$42.92*
Shipwreck Divers	60	$103.16	
Total Expenditures in Grocery Store Purchase			
Non-Shipwreck Divers	108	$ 24.52	$22.13*
Shipwreck Divers	60	$ 46.65	
Total Expenditures in Hotel/Motel Lodgings			
Non-Shipwreck Divers	108	$ 56.93	$ 7.25
Shipwreck Divers	60	$ 49.68	
Total Expenditures in Campground Lodgings			
Non-Shipwreck Divers	108	$ 10.39	$ 7.62
Shipwreck Divers	70	$ 18.01	
Total Expenditures on Boat Charter			
Non-Shipwreck Divers	108	$ 48.96	$21.35
Shipwreck Divers	60	$ 70.31	
Total Expenditures on Diving Equipment			
Non-Shipwreck Divers	108	$ 26.73	$ .55
Shipwreck Divers	60	$ 27.28	
Total Expenditures on Miscellaneous Items			
Non-Shipwreck Divers	108	$ 24.62	$40.75
Shipwreck Divers	60	$ 65.37	
TOTAL EXPENDITURES ON DIVING TRIPS IN 1977			
Non-Shipwreck Divers	108	$252.39	$128.06
Shipwreck Divers	60	$380.45	

*Significant at α = .05

Figure 2 -- How the Shipwreck and Non-Shipwreck Diving Subpopulations Allocate Their Expenditures Per Diving Trip

Expenditure	Non-Shipwreck Divers %	Shipwreck Divers %
Boat Charter	19.4	18.5
Campground Lodging	4.1	4.7
Commercial Establishments	24.0	27.0
Diving Equipment	10.6	7.2
Grocery Store Purchases	9.7	12.3
Hotel/Motel Lodging	22.6	13.1
Miscellaneous	9.6	17.2

below are some of the data and assumptions which will be used to generate these estimates.

1. The list from which the sample was taken contained 11,000 names. These divers reside in Michigan, northern Ohio and northern Indiana. This does not include all divers in these regions because it covers the period from 1972-77. If one is willing to assume that the number of divers on the list who do not dive in Michigan is equal to the number of divers not included on the list who do dive in Michigan is about equal, then 11,000 may be a reasonable estimate of Michigan's diving population's size.

2. The average respondent in this study reported an investment of $600 in diving equipment.

3. The average respondent in this study reported spending about $300 per year during diving trips.

4. The "rule of thumb" estimate of the multiplier impact of tourist expenditures is about 2.0.

Thus, the total investment in equipment of divers who dive in Michigan is: 11,000 divers x $600 = $6,600,000. The annual expenditures on dive trips for this population is: 11,000 divers x $300 = $3,300,000 per year. Since these expenditures are made while divers are away from home, their impact falls upon the communities where they are spent, and these initial expenditures stimulate subsequent rounds of spending by those who receive them. Thus, the total impact of these expenditures is: $3,300,000 in the first round x 2.0 (the tourism multiplier) = $6,600,000. It should be noted that some unknown portion of diver trip expenditures are made outside Michigan. Although the above are but crude estimates, they do provide some insight into the magnitude of the economic impacts of scuba diving in Michigan.

Conclusions

The major element of this report has been to identify general characteristics and diving habits of scuba divers in the Michigan, Ohio, Indiana area. It was felt that this information would be of value in planning for Michigan's shipwreck resources while providing a benchmark for future studies. Since the major attraction of such underwater park-historical preserves in the Great Lakes would be the vast array of shipwrecks, special attention was given to those divers having interests in diving shipwrecks.

Survey results show that scuba diving is dominated by young, well educated males with fairly high levels of discretionary income. In general, the divers have been involved in sport for approximately 5 years, prefer a diving depth of 75 feet and have invested approximately $500 in diving equipment. Shipwreck divers differ somewhat from these general patterns. They have been diving for a greater number of years, have achieved higher levels of certification and have invested slightly more money in diving equipment. The fact that shipwreck divers devote more time and invest more dollars in training and pursuing scuba diving further suggests a sincere interest in this particular aspect of the sport.

Shipwreck divers tend to show greater concern for Michigan's shipwreck resources than non-shipwreck divers. Although 85 percent of diver respondents favor some restrictions on salvaging shipwreck booty, shipwreck divers strongly prefer

designating no salvage or park-preserve areas while the combined responding population was about equally split between regulations involving permits and designating protected area.

Finally, the data were stretched to provide some crude estimates of the economic importance of scuba diving in Michigan. No estimates were made of the recreational value to current and potential users whether they be divers or home diving users. Of course, the archaeological and scientific values of shipwrecks must also be incorporated into the tabulating of shipwreck benefits and costs. No information has been presented for the cost side of the ledger, and there surely will be some costs to take into account. Thus, there is need for considerably more information before a complete economic analysis can be made as to the best use for Michigan's shipwreck resources.

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Fathom Five Provincial Park--Working Example of an Underwater Park

S. McClellan*

Fathom Five Provincial Park is administered by the Division of Outdoor Recreation of the Ontario Ministry of Natural Resources. Classed as a natural environment park, it is unique in that it is the first of 132 parks in the provincial system with prime emphasis on the aquatic environment and associated resources.

History

The initial impetus came in 1968 from University of Waterloo student David Good, who prepared a paper on the shipwreck resource of the Bruce Peninsula. This paper was widely distributed, and in 1970 a proposal was made to the Department of Lands and Forests, now the Ministry of Natural Resources, by two employees, Tom Lee and Gary Sealy. Their proposal for Fathom Five Provincial Park was readily accepted in principle. It was this proposal that gave the park its name, Fathom Five, which incidentally comes from a passage in the Shakespearean play "The Tempest," act 1, scene 2.

In 1971 the initial field studies were undertaken by a number of contract staff. These studies included geological, biological, historical and user traffic flows, noting that the area was, among other things, a popular sport diving mecca.

In 1972, a consulting firm, Strong, Morehead and Sigsby, were contracted to prepare a concept master plan for the development of Fathom Five. This proposal was made public in April of 1973, and in September of 1972, the initial water base was designated and placed into provincial park regulations. This area was about half of the present 45 square mile water base.

Basic park operations were initiated in 1973 and consisted of an office/visitor information center and a water base patrol program. This program has continued and expanded to its present format, which will be discussed in more detail shortly.

Various management and planning studies continued, including a rethinking of the concept plan. It has now been determined that a new master plan is required to incorporate the changes necessary from the original consultants' plan. These include the removal of camping facilities and a new architectural approach. It has been decided to have no camping on the land base facilities of the park, as it is believed that both the private sector and Cyprus Lake Provincial Park will fulfill the needs of the area.

In December 1974, the water base boundary was enlarged in regulation to cover its present size of 45 square miles, and by late 1975 the major portion of the land base had been acquired. In 1976, our Ministry funded the acquisition of a

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hyperbaric chamber which was donated and installed in the St. Edmunds Township medical clinic.

Management Problem-Solving

Although actual development of the park facilities has not yet begun, a number of operational management problems have been identified, and efforts at their solution have been made.

Diving visitor safety is a prime concern, and one of the steps taken in this direction was the preparation of a set of standard safety rules to be used by the visitor. Although these are not enforceable regulations, we have received good cooperation and support. The pamphlet prepared was agreed to by a committee of advisors representing the major diving bodies in Ontario and included representatives from the Ministry, the Ontario Underwater Councils, the Association of Canadian Underwater Councils and NAUI Canada. A monitoring program is carried out each season and all infractions recorded. At the end of the season, these governing bodies receive copies. If, during the season, problems arise with members of the various organizations, reports are sent to them for possible disciplinary action. This system appears to be effective, and peer pressure from the organization would seem to be a most effective method of handling most situations. Full reports on any diving accident, either injury or fatal, are also included.

Jurisdictional overlaps between federal and provincial departments are also a concern; however, most are dealt with through cooperative sessions. The basic overlap occurs on the water base due to the federal laws maintaining general jurisdiction on the surface with all control over navigation and the province holding the rights to the lake bed or bottom lands. It is important to note here that the park boundary is for the water and land beneath it only. All of the islands located within the boundary are not part of the park. Most are privately owned, and visitors are not permitted to trespass. Flowerpot Island is a National Park and does, of course, cater to the visiting public.

Another major concern is the protection of the resource features such as the 19 shipwrecks and geological formations found in the park. A new program being implemented this season hopefully will add to our efforts to protect the wreck sites. Anchor damage from visiting vessels has caused irreparable damage to several sites, and we are in the process of installing mooring buoys on several sites to prevent this.

This is a joint program with the federal government, and the regulations which permit this program were made by the federal government as it does affect surface navigation. Included in the program is a permit system and specific rules governing navigation within certain areas. It is expected that this year's emphasis will be on an educational approach to inform users of the program.

Some of the other considerations which we have had to deal with to date include the commercial charter and tour boat services, adjacent land owners, of which we have several hundred, and their various rights of access.

We have not yet come up with all the answers to the efficient management of the underwater park. We believe, however, that significant gains have been made, and hopefully the cooperative efforts of the past will continue.

1979 Operational Program

This year's program for the visitor includes four major components:

Visitor Information Center, located adjacent to the Little Tub Harbour is open daily from early May until mid-October. This facility functions primarily as a focus to the visitor as an information outlet. Publications and displays are available and staff provide direction and information as required.

The water base patrols are carried out regularly with the vessel "Collins H," a 25' twin inboard/outboard boat. The patrols serve the following functions; information/directive service; visitor safety, resources protection and on occasion emergency services and transport.

A number of evening programs are held, providing the public with park-oriented shows. These include films, slide talks and demonstrations.

A special services program is available to interested groups on advance reservation. These take the form of talks presented to the group and include resource information and management messages. Also available are site specific orientation sessions aboard vessels at the dive site. Any group interested may arrange either type by advance reservation with the park by contacting us at the following: Fathom Five Provincial Park, Box 66, Tobermory, Ontario, NOH-2RO.

Staffing and Budget

We operate primarily with seasonal staff in the Ontario parks system. At Fathom Five, I have three staff in addition to myself. This includes a clerk/receptionist, a park warden and an interpreter.

The operational budget, which covers seasonal staff salaries and all operational aspects such as programs, utilities, rent, maintenance etc., is $32,000. In addition, special staff programs for resource inventories, the buoy installation and maintenance add another $12,000.

Future Direction

Currently we are in negotiations to obtain the land required for the access route into the land base, and when completed, final planning and design for the road access and development can be carried out. It is expected that this development can then be phased over several years, and funding will be available to progress with this work.

Facilities for the land base include a recreational dive center, a visitor center, day-use facilities such as picnicking areas and trails system and possibly a resource research center. The underwater walkway will likely be reconsidered to be some form of underwater viewing facility; however, this aspect requires considerable planning and design consideration prior to any commitment.

As mentioned, we do not have all the answers for the development and management of an underwater park. We have, however, been involved for several years, and believe that our approach is valid, and the idea of an underwater park can be a reality on the Great Lakes.

An Archaeological Perspective on the Value of Great Lakes Shipwrecks

Charles A. Hulse*

Shipwrecks in the Great Lakes are a vast untapped resource which is rapidly undergoing destruction by man and the natural elements. In the past, these resources have been largely ignored by both the general public and by professional scholars. However, with the development of underwater technology and the advent of inexpensive diving equipment, interest in these resources has blossomed during the last decade. This interest in underwater cultural resources has been coupled with an increased awareness of the historical and archaeological value of these resources and with the recognition of the need for the preservation, protection and management of underwater sites.

The State of Michigan, through prompting by various groups including archaeologists, historians, divers and the general public, has been made aware of the value of this resource and is in the process of drafting legislation towards the regulation of Michigan's bottomlands. The right of regulation, as well as the means of regulation, are a hot point of contention between the state and various sectors of the sport diving community. Clearly, the issue of underwater cultural resources is a complicated one with many special interest groups involved with various aspects of the situation. The state, private recreational divers, charter boat operators, archaeologists, historians and recreational specialists all have interests in Great Lakes shipwrecks, although with different points of orientation. Within each of these categories is also a wide range of opinion over the value and use of wrecks. Among sport divers, opinions cover the gamut of possibilities from no state regulation/open treasure hunting to a desire for careful regulation and control on salvaging. The intent of this is to express the archaeological/historical position on shipwrecks in the Great Lakes and to present suggestions as to the wise use of a limited resource.

From the archaeological standpoint, shipwrecks are, first and foremost, cultural resources of historical and anthropological value which belong to all people of the state. These resources do not belong solely to historians or archaeologists, nor to recreational divers or other special groups of private individuals. They belong to the state and are accordingly administered by state agencies on behalf of all citizens of the state. The role of archaeologists is ultimately to explore scientifically these symbols of our past and to interpret them for the benefit of all people. Through the techniques of archaeology, anthropologists are able not only to understand the specific events of the past, but also to inquire into the nature of human behavior. The "why" of human actions as well as the "where," "when," "how" and "by whom" are the interests of archaeologists. Shipwrecks are studied not only for their form and the objects they contain, but also for what they can tell us about life in the past and how it relates to life today.

The interpretation of shipwrecks as artifacts of the past is accomplished through scientific investigation. The better preserved and intact the wreck is, the more can be learned from it. However, a great deal can be learned from a little bit, and theoretically every vessel can provide some information of

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historical and archaeological value. Salvaging artifacts from a vessel destroys the completeness of the picture that can be obtained from it. In its pristine state, a shipwreck is a time capsule which freezes the events and actions of a particular time and place. The actual process of sinking often disrupts this state, and some information is invariably lost. In other cases, this process causes little damage in the composition of the lost vessel.

The archaeologist is not only interested in specific artifacts, but is also concerned with the combination of artifacts found on the wreck and the relationships between these artifacts in terms of both function and space. Display of artifacts in public museums is the last step of the process of scientific exploration. Artifacts are placed on display only after careful recording, mapping, study and analysis. To take an object off a wreck only for the purpose of display destroys the scientific value of that object and reduces it to a mere curiosity. If a similar artifact is recovered by the proper means, then both the scientific value and the aesthetic value are preserved.

The need for a wreck to be as complete as possible is the main reason why archaeologists so strongly object to "treasure hunting" or salvaging of historically valuable wrecks. Taking objects only for personal gain or as symbols of diving prowess destroys that information which really belongs to all people of the state. Our cultural heritage should certainly be more important than a few dollars worth of artifacts, many of which deteriorate if not treated properly. Unfortunately, the lure of silver and gold (which has so thoroughly permeated our culture through literature, television, movies, and the advertising media) encourages taking before thinking.

The protection of shipwrecks from senseless destruction must begin with a program of management and evaluation. From a practical standpoint, the management of archaeological resources revolves around the term "historically valuable resources." Although all wrecks have the potential for being valuable, some are not. Another role of the archaeologist is to evaluate wrecks in order to determine whether they are indeed worthy of protection. Such factors as age of the vessel, condition, cargo, location, rarity, etc., should be taken into account. Then, according to the specific situation, some wrecks could be open to salvage while others should be totally protected. It must be stressed that the process of evaluation should be left up to trained professionals who are aware of the nature and potential of the resource.

The archaeological viewpoint is quite clear - it is in favor of preservation and scientific study and against any type of salvaging which destroys historically valuable information. It is a science of people and for people. Because of this stand against salvaging, many individuals in the sport diving community have considered archaeologists to be against diving. This is certainly not the case. The fact that some wrecks are of great archaeological value does not mean they cannot be seen, explored and enjoyed by divers. Rather, diving and archaeology should go hand in hand. Through the use of diving technology, archaeologists are able to investigate those wrecks, and the information obtained is then used to educate divers in the history of the wreck - which in turn, enriches the diver's experience.

The sport diver has a great deal to contribute to the study of the past. Many divers with an interest in history have at the present time no means for expressing their interest in a constructive manner. What is needed is a method by which divers and archaeologists can interact and exchange information and ideas. The location and condition of wrecks are known better to the diving community than to archaeologists. Likewise, archaeologists have the training in the proper methods by

which those wrecks can be scientifically investigated. A program which allows divers to participate in excavations or archaeological research would benefit both groups - and ultimately be a positive contribution to the public as a whole. Hopefully, greater interaction between divers and the scientific community can come about in the near future.

One key to the protection of shipwrecks lies with the development of a program to manage and wisely use these resources. The majority of the dive community appears to favor some means of protection either through legislation, the formation of preserve areas, or through some preservation of a representative cross section of wrecks. This view is shared with many charter boat operators whose livelihood depends on the preservation of wrecks. Likewise, the scientific community agrees that some management scheme must be developed to assure protection for possible future study. One possibility as a management scheme is the underwater park/historical preserve concept.

The historical park-preserve concept in Michigan and across the nation is not new by any means. For many decades, parks have been centered around historic sites for the purpose of providing recreational and educational opportunities for the public. Historical interpretive parks such as Fort Michilimackinac, Fort Mackinac, Colonial Williamsburg and many others offer unique opportunities to learn about this nation's history and development, while at the same time providing a means for outdoor recreational activities.

Underwater park-preserves could provide similar opportunities for recreation and education as do these above-water sites. Shipwrecks could be viewed by divers, and interpretive programs could provide information on Great Lakes seafaring history, economics, etc. At the same time, these vessels would be protected by law and enforced through various means to assure their protection. The park-preserve concept allows divers the facilities for recreational diving, while at the same time assuring that shipwrecks will be preserved for future generations of both divers and the nondiving public. These preserves also would form a base for scientific study by archaeologists and would provide a format for greater interaction between divers and scientists.

Park-preserves could be created through action by the State Department of Natural Resources, the Marine Sanctuary Program of the National Oceanic and Atmospheric Administration, or as historic districts within the National Register of Historical Sites. These park-preserves could be formed around concentrations of shipwrecks and could be combined with a shore-based visitor center and docking facility. Shipwrecks of historical value which lie outside concentration areas could be protected by some other means. Charter boats could provide transportation to wreck sites within the park-preserves and could assist in enforcing rules against the salvage of artifacts.

The underwater park-historical preserve concept does not solve all the problems of the state. Lack of legislation as well as state funds for administration, still limits the scope with which the state can become involved in underwater cultural resources. This concept does, however, provide a practical means by which resources can be managed, protected, and used by the many different groups in the state. From the perspective of one archaeologist, park-preserves are one means for the protection of valuable non-renewable resources.

Concluding Statements

During the last three days in March 1979, nearly 70 people met to discuss their common interest in Underwater Resources. Participants included: university scientists from seven universities; individuals representing Michigan's major organized sport diving organizations; dive charter boat operators; local, state and federal government agency personnel; representatives from the news media, including media specializing in water based recreation; history-archaeological professionals; film makers and professional divers. There was a great deal of productive interaction during the three days which is, unfortunately, impossible to share with those not in attendance. However, some of the formal presentations made during the institute are reproduced here in the hope that they will serve as a stimulus to continued discussion of important recreational/historical resources which have received much too little attention in the past.

The papers published in this volume have been selected in order to give a cross section of viewpoints on the topic of underwater parks and the subject of cultural resources. The viewpoint of historians is articulated by Wright in his overview of Great Lakes marine history and the importance of documentary evidence. Hulse provides the position of the archaeologist/cultural preservationist in his discussion of shipwrecks as underwater cultural resources. An excellent example of a working underwater park in Canada is presented by McClellan on Fathom Five Provincial Park, while future hopes for a similar park in Michigan waters is provided by Warner in his report on Thunder Bay. The recreational aspect of shipwrecks as park resources is provided by Pryor as well as Holecek and Lothrop. In addition, this latter study provides the attitudes of divers regarding underwater parks and shipwreck protection. Also, it provides some insights into the economic importance of shipwrecks from the perspective of the charter boat operator. General comments by Fitting pull together many elements across all viewpoints and provide a unique evaluation of the situation from a broader perspective.

These papers as a whole provide a representation of attitudes held by many of those individuals which attended the 1979 symposium. Several viewpoints are, however, not directly represented by papers and should be discussed if the total picture is to be achieved. Most notably, the views of sport divers and positions held by representatives of several state departments should be discussed.

Since many of those individuals who both attended and participated in the symposium were divers, it was hoped that a unified position for this group could be clearly outlined. This, however, did not prove to be the case, although a number of diver organizations, dive shops, and diver services were represented. Viewpoints among divers ranged from a total disdain of any regulation of salvage to an expressed desire for stringent state controls on salvage. Among divers, there appears to be major differences of views between those groups which feel the resource should be protected and those which believe that the recreation is more important than the resource. The paper by Holecek and Lothrop on diver attitudes is particularly valuable in quantifying the relative numbers of divers which adopt each of the various views. One essential fact that emerges from this paper is that nearly all divers responding to the survey favored some form of preservation measures either through the formation of designated park-preserves or through salvage permit systems. This response demonstrates divers' desire for the protection of historically valuable shipwrecks as well as those wrecks with inherent recreational value. On the other hand, the view of "Treasure hunters" with no concern for preservation is minimally represented both in the Holecek-Lothrop study and among those attending the symposium.

One factor which was predominant among divers was the fear that the state would eventually move from salvage restrictions to broader regulation of sport diving. The question of personal freedom is one of the major stumbling blocks in opening communication between divers and state agencies. Although the formal and informal discussions held at this symposium indicate that the sport diving community holds no one view on the direction for underwater resources policy, it should be stressed that most divers favor the protection of shipwrecks either out of awareness of their historical or recreational significance.

The viewpoint of the state is also not directly represented by a paper in this volume and should be discussed along several lines. First of all, two state departments are directly involved with the issue of Great Lakes shipwrecks. The Department of State, represented through the Michigan History Division, is charged by both state and federal legislation with the protection of historical, architectural and archaeological resources such as shipwrecks. The state's position towards shipwrecks is clearly one of preservation and protection. John Halsey, the State Archaeologist, is concerned with both the theoretical and practical aspects of cultural resources. During his presentation at the symposium, he expressed the state's concern with protection of underwater cultural resoures of all kinds but tempered his remarks with the view that the state does not currently have the capabilities to deal with these resources. He also felt that state universities neither have the facilities nor the personnel to undertake major shipwreck excavations in the near future. Mike Smith, Director of the State Museum, also noted that the state presently does not have the ability to curate and conserve recovered cultural material from shipwrecks. The position of the History Division is therefore supportive of the ideals of underwater cultural resource preservation but is unable to take active roles in promoting research of a substantive nature. The lack of state legislation regarding state regulation of bottomlands, coupled with a modest budget, creates a position for the History Division which does not encourage expansion of current capabilities to cover underwater resources.

The other state agency which is involved with underwater resources is the Michigan Department of Natural Resources (DNR). Speakers from this agency, Bruce Andrews, Chairman of the State Underwater Salvage Committee, and James Hane, Chief of Advanced Planning and Special Studies, brought forth several important points in their discussion of underwater parks and the protection of underwater resources. First of all, the need for communication between various groups was stressed as being essential for the solution of problems regarding regulating salvage in the Great Lakes. As Bruce Andrews mentioned on numerous occasions, the state has no desire to restrict the recreation of sport diving; however, he did make it very clear that the destruction of historically and recreationally valuable underwater resources could not be tolerated since they belong to all people of the state. Both Andrews and Hane feel that some type of state regulation is necessary to protect these resources. Legislation which has been proposed and which will hopefully soon be adopted would provide the legal basis for state administration of underwater resources including shipwrecks. Until this is accomplished, the DNR will continue its current system of salvage permits, which is under the control of the Underwater Salvage Committee.

The subject of underwater parks really brought out many of the questions regarding underwater resources. This topic acted as a focal point for demonstrating the extreme complexity of the situation. Papers presented by Warner and McClennan on potential and existing underwater parks in the Great Lakes demonstrated that these are both practical and feasible. Underwater parks can perform numerous functions including: 1) stimulating tourism and economic development (as Holecek, Lothrop and Pryor have pointed out), 2) providing as basis for the management and

protection of historically valuable resources (Hulse), and 3) as a possible basis for business enterprises such as charter boat operations (Tomasi).

The question of underwater parks as a management scheme was brought up several times by all members of the symposium. One of the major outcomes was the realization by all parties that not nearly enough is known about the location and extent of shipwreck concentrations. Although Dr. Wright attempted to define shipwreck locations through an analysis of historical documents in 1975, he failed to arrive at exact locations for most wrecks. The primary wreck concentrations which are currently recognized by the DNR have been based on both Dr. Wright's study and information gathered from sport divers. The one exception is the area off of Alpena County, Michigan, which was at least partially surveyed in 1975 by researchers from Michigan State University's Department of Park and Recreation Resources. As one diver pointed out during the symposium, the wreck concentrations currently popular for diving are located near support facilities (dive shops, charter boat operators, air compressors, etc.). He suggested that there were probably many other individual, and concentrations of, shipwrecks available which would be popular if better support facilities were available nearby. There was general agreement with this diver's observation indicating a clear need for better information on shipwreck locations, conditions, importance and other information as input into the development of an underwater resources development and management strategy. Bruce Andrews mentioned that what is currently needed is some form of blanket restriction on salvage of historically valuable wrecks, until a reasonably complete inventory of underwater resources can be completed and a plan for their wise use developed.

This symposium accomplished a number of major goals dealing with shipwreck resources in the Great Lakes. First of all, lines of communication have been opened between university departments, several state agencies, the business community and the amateur and professional diving communities. It is hoped that these lines will remain open and the free exchange of ideas will continue so that sensible public policy can be established by the state. The desire expressed by Chuck Hulse for greater cooperation among archaeologists, historians and divers also shows that the potential is great for the scientific study of wrecks using the expertise of recreational divers.

Preservation of wrecks for scientific study, recreational diving and as a core for business enterprise was stressed during this symposium, and the economic, historical and recreational value of shipwrecks was clearly demonstrated.

The State Department of Natural Resources is currently able to establish underwater parks in the Great Lakes but is somewhat reluctant until more planning is done and until appropriate sources for funding have been identified. Sport diver representative Jess Sobas proposed that the state should perhaps establish a test park on a trial basis perhaps in the Alpena area. This test park could be then carefully monitored to test the impact on wreck resources and the effect on local businesses and the economy of the area. Many of those attending the symposium felt that this suggestion may warrant further consideration by the state.

Finally, the symposium opened many peoples' eyes to the need for further study on the exact nature of the underwater resource base. The fact that we really do not know enough about the number, location and condition of wrecks in the Great Lakes was clearly apparent during many presentations. Perhaps this realization will give added impetus to the further study of these valuable resources. - Donald F. Holocek and Charles A. Hulse