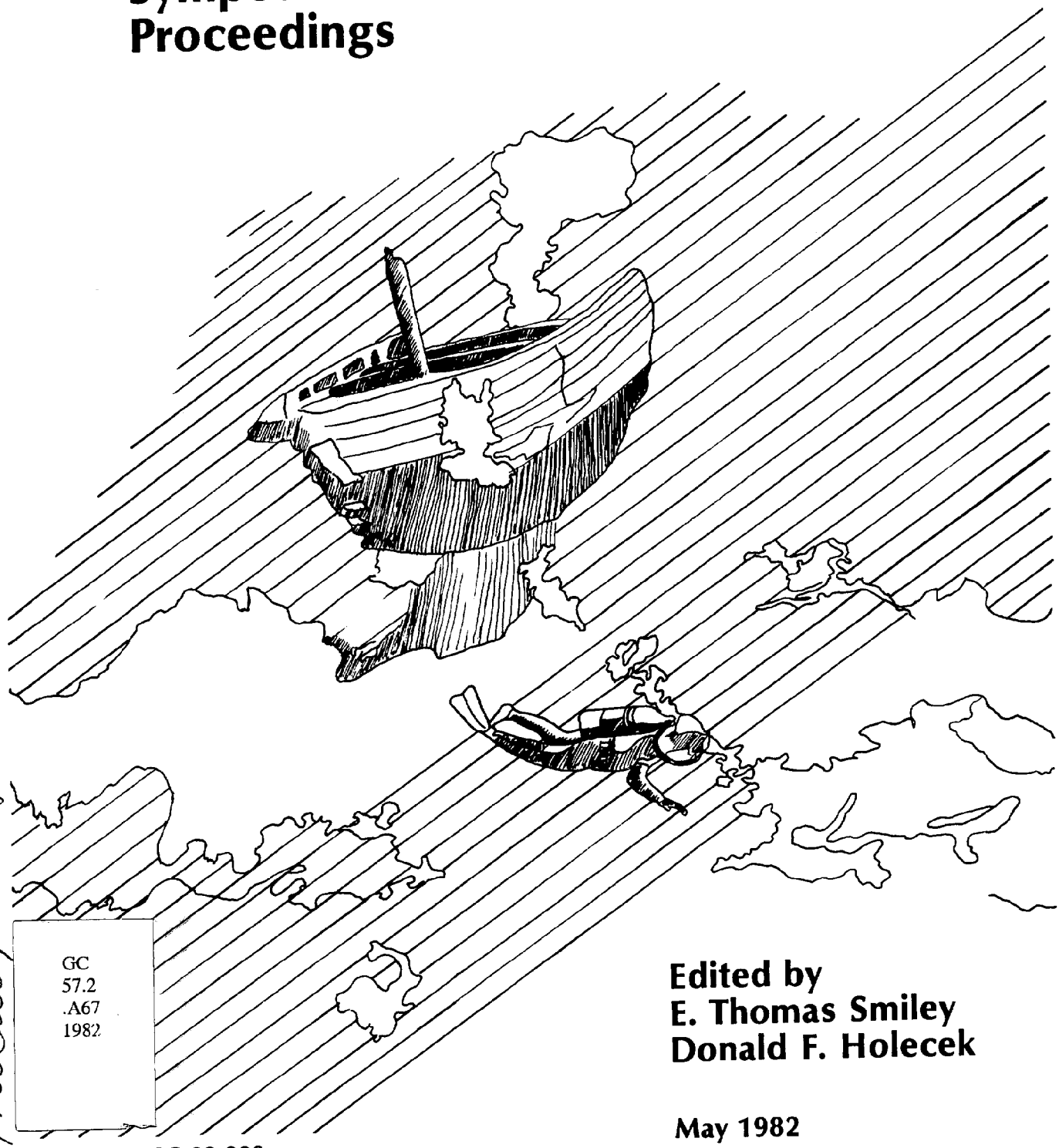
18618

Aquatic Park Management: Symposium Proceedings



Edited by
E. Thomas Smiley
Donald F. Holecek

May 1982

MICHU-SG-82-900

GC
57.2
.A67
1982

Michigan Sea Grant Program

AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

GC57.2 A67 1982

18618

AQUATIC PARK MANAGEMENT

Symposium Proceedings

E. Thomas Smiley

Donald F. Holecek

Department of Park & Recreation Resources

Michigan State University

Michigan Sea Grant Program

This research was sponsored by Michigan Sea Grant under grant #04-8-M01-134, Project R/CZ-10, from the Office of Sea Grant, NOAA, U.S. Department of Commerce and funds from the State of Michigan.

MICHU-SG-82-900

Table of Contents

Foreword

Symposium Papers

Fathom Five Provincial Park Operations and Management Considerations
Stan McClellan..... 1

Diver Safety Considerations in Aquatic Park Management
Lee H. Somers..... 13

Interpretation as a Management Tool for Underwater Parks
John A. Veverka and Sanfra A. Poneleit..... 19

Systematic Approach to Maintenance
Theodore J. Haskell..... 26

Historical Considerations for the Management of Underwater Preserves in Michigan
Charles A. Hulse..... 34

FOREWORD

The underwater park concept has come a long way in Michigan. The Department of Park and Recreation Resources at Michigan State University (MSU) held its first symposium on aquatic parks in 1979. There, attempts were made to determine the need for designation of preserves and to get interested people together to exchange ideas. When Public Act 184 became law in July 1980, Michigan moved into the next phase of aquatic park development.

With aquatic parks soon to be a reality in Michigan,* there will be a need to manage these areas. However, the state has no experience with operating facilities of this type. Thus, the MSU Department of Park and Recreation Resources, with financial support from the Michigan Sea Grant Program, brought together experts from several fields to discuss aquatic park management with members of the Michigan Department of Natural Resources and the History Division, Michigan Department of State. This exchange of information was intended to increase the awareness of potential problems and to provide possible solutions.

The number of participants in the symposium was kept small, and the atmosphere, informal to facilitate discussion. The purpose of these proceedings is to extend the symposium to a wider audience including public agency personnel who currently manage or who may soon develop underwater parks. Although the geographical focus of the symposium was Michigan's Great Lakes, much of the discussion has more general application and will be of interest to anyone concerned with the management of underwater parks.

Stan McClellan is the superintendent of Fathom Five Provincial Park, located in Tobermory, Ontario, Canada. This park has a resource base very similar to that of the Michigan areas, its prime attraction being a collection of relatively well-preserved shipwrecks. McClellan discussed how Fathom Five operates; some of the problems he has encountered; and solutions that have been developed to deal with them. As the manager of the only operating underwater park in the Great Lakes, his comments were especially relevant and enlightening.

Lee Somers is a nationally recognized diving safety expert at the University of Michigan. Safety will be a key consideration of underwater park managers. Somers drew his comments from several years experience as a Michigan Sea Grant researcher. His paper complements McClellan's and brings into focus the special problems of Great Lakes diving.

---

*Two underwater parks were established in summer 1981.

John Veverka is an interpretive consultant with Interpretive Associates. His paper points out the advantages of involving interpreters in aquatic parks, starting with the initial planning process.

Ted Haskell is a member of the MSU Department of Park and Recreation Resources. He has had extensive experience with the management of terrestrial parks and has applied the systems approach to management of aquatic parks. Again, this is an approach which should be initiated early in the planning to make optimal use of facilities.

Chuck Hulse is an archaeologist completing his Ph.D. program at Michigan State University. He has been studying Great Lakes shipwrecks and working with the Department of Park and Recreation Resources on the aquatic park project for several years. He presented historical considerations which should be accounted for in an aquatic park or preserve.

We are indebted to these speakers for the time and effort they donated to making the symposium a success. We appreciate the excellent questions which participants raised. The discussions they inspired enriched the symposium. The text which follows was developed from tapes made during the symposium with only minor editing to improve reader understanding.

FATHOM FIVE PROVINCIAL PARK

OPERATIONS AND MANAGEMENT CONSIDERATIONS

Stan McClellan, Superintendent

Fathom Five Provincial Park, Tobermory, Ontario, Canada

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

Background

The initial impetus to establish an underwater park came in 1968 from University of Waterloo student David Good. His term paper on the shipwreck resources of the Bruce Peninsula was widely distributed, and, in 1970, a proposal for an underwater park was made to the Ontario Department of Lands and Forests, now the Ministry of Natural Resources, by two employees, Tom Lee and Gary Sealy. Their proposal was readily accepted in principle. This proposal gave the park its name, Fathom Five, which comes from a passage in Shakespeare's "The Tempest," Act I, Scene 2.

In 1971, initial field studies were undertaken by contract consultants. These studies included geology, biology, history and user traffic flows. The area was already a popular sport diving mecca.

In 1972, a consulting firm, Strong, Morehead and Sigsby, prepared a concept master plan for the development of Fathom Five Park. This proposal was made public in April 1972 and in September 1972 the initial water base had been designated and placed under provincial park regulation. This area was about half of the present 45 square mile (11,655 hectare) water base. Park operation began in summer 1973 and consisted of a small office-information facility and water base patrol. This program has continued and expanded to its present format, which will be discussed in more detail shortly. Various management and planning studies have continued, including a rethinking of the initial concept plan. A new master plan is required to incorporate the changes in the original design. Some of the major changes being considered include removing the camping facilities and providing a land base for day use only. The architectural concepts have also been reconsidered and the initial idea of one large complex to house all facilities is no longer valid. Final details have not yet been prepared; however, it is likely that some facilities and services will be retained in the village of Tobermory while others, such as the visitor center, will be located on the land base. It is believed that the private sector and Cyprus Lake Provincial Park will meet camping requirements.

In December 1974, the water base boundary was enlarged to its present size, and by late 1975 the major portion of the proposed 320 acre land base had been acquired. In 1976, our Ministry funded the acquisition of a hyperbaric chamber which was donated and installed in the Tobermory Health Clinic.

During the past few seasons, several new operational management programs have been initiated to improve service to the public and to continue our mandate to protect resources. These new programs will be dealt with in greater detail as we go along.

Management/Operational Problem Solving

Actual development of the park land base facilities has not yet begun, nor has the final planning been completed for this portion of the park. However, a number of operational and management problems associated with the water base have been identified, and efforts toward their solution have been made. Early in our planning, a framework chart was established showing all possible areas of concern. Surprisingly enough, the problems that have actually shown up were on our chart, and in many cases have been solved. The solutions now form the basis of our operations.

Diving safety will always be a primary concern, not only to us in the Ministry but to the diving community. Early in our operations, we developed a set of standard visitor safety rules. While these are not enforceable regulations, our visitors have generally cooperated with and supported them. This widespread support results from the fact that our Ministry worked closely with the diving community to develop them. A group of representatives from our Ministry, and the diving community including the Ontario Underwater Council, the Association of Canadian Underwater Councils, N.A.U.I.A. Canada and P.A.D.I., and others, was formed to develop the safety program. This semi-informal group meets as required (at least annually) to discuss sport diving concerns. This forum has been a most definite advantage to our program and is to be highly recommended as a management tool.

During the 1979 season, there were four fatal diving accidents, both of them double, i.e. two people at one time. We had never had a double fatality before, and we had two of them in one month - a very sad situation, as all diving accidents are. Most diving accidents result from some failure on the part of the individual. The Coroner's inquest into these two accidents recommended that our Ministry develop procedures for diver registration in the park. Well, we started thinking about that. Just because a diver comes in and registers, is that going to keep him from dying or possibly getting injured? We concluded that there had to be a pretty good reason for registering and that there had to be some exchange of information during the registration process. We again talked it over with our diving committee, and some of them were not too thrilled about the idea of registration -- it was going to be an inconvenience. The way it turned out is not as bad as most of them thought.

In 1980, we initiated a mandatory diver registration program. Considering the minimal lead time and the problems associated with such an undertaking, the first season of this new program was quite successful. Most divers provided excellent cooperation. Regulations under the Parks Act were established requiring each diver to register prior to diving in the park. This past summer, we emphasized education, and kept enforcement to a minimum. The primary purpose was to provide our staff with the opportunity to outline safety rules, dispense informative pamphlets and answer questions regarding the park and local conditions. At the present time, there is no registration fee. Registration is required annually and is valid from the date of issue to the end of our fiscal year. Visitors are encouraged to drop into the center on subsequent visits, but there is no requirement that they do so. During registration, the visitor is also provided with a plastic disk (see Figure 1) which is used to indicate proof of registration and is to be worn on some piece of equipment when in the water.



Figure 1.

Diver Registration ID

Figure 2.

Diving Permit Application

Diving Permit Application

Fathom Five Provincial Park

PLEASE PRINT

Mr. ☐
Mrs. ☐ .....
Ms. ☐

Address .....

.....

Club Affiliation .....

Ministry Use:

Remarks ..... Issue Date .....

..... Permit No. .....

Divers are required to fill out an application form (see Figure 2) in our office, which includes name, address and club affiliation. Initially, it was suggested that they also include the name of their certifying body. Now the question has come up -- why don't we check certification? We do not discourage people from being certified; in fact, we really think it is important. However, there are a number of legal and other implications associated with checking diver certification. First, if we demanded certification, we would be showing some kind of assessment. If I check your certification, I say "Okay, you are fine. You can dive in the park." If something happens, the family comes and says, "It should have been safe, since you let them in." The second issue is which certifying organizations do you accept? A guy may come along with a certification card from an organization that you never heard of, but you cannot say "Sorry, you are not allowed to dive in the park because your certifying organization is not on our list." He could be the best diver that is going to come through your area. So for these reasons we did not demand proof of certification. The final reason is a lot of diving instructors bring their students to the park to practice open water diving and, of course, these divers are not yet certified.

When divers register, we briefly describe the park and give them a pamphlet called "Diving and the Shipwrecks of Fathom Five Provincial Park," with park diving rules listed on the back. Several of these rules are not enforceable. They are common-sense rules made up together with the diving fraternity. The pamphlet also lists some regulations, including the registration requirement. We generally ask divers if this is their first visit. If it is, our discussion is more extensive than it would be for a group of people we know who have been visiting for ten years. We remind them of the rules, point out their location in the pamphlet, and talk a bit about weather and diving conditions. The pamphlet also includes a description of the various wrecks in the park. For example:

> Number 13. Charles P. Minch, Schooner, built Vermillion, Ohio, 1867. Length 154 feet. Depth 20-50 feet. She was driven onto the rocks in October 1898. The wreckage is broken up and spread over the bay with the main portion being found close to the shore near the head of the cove. This is an excellent site for all levels and experience.

The question has come up "why do we put dangerously deep wrecks such as the Forest City (depth to 150 feet) in the pamphlet?" All sorts of problems would be created if we decided to ban a wreck from diving. We would have a tremendous enforcement problem. Someone would have to sit above the wreck 24 hours a day because divers would dream up all sorts of ways of sneaking out to it. It would become a competitive situation to see who could make the dive without being caught. Thus, deep wrecks were left in this publication; divers must make their own decisions.

In the summer of 1980, 5,394 people registered to dive in the park. More than 700 divers indicated a return visit. Some people visited at least ten times but never indicated a return visit. Conservatively, there were an estimated 7,000 diving visitors in the park. The average diver makes three dives per visit; thus there were over 20,000 dives in the park. The statistical breakdown of park users since 1973 and registration statistics appear in Tables I and II respectively. Our park personnel had personal contact with some 24,000 people last summer, indicating that three-fourths of our visitors are non-divers.

TABLE I - 1980 FIGURES VALID MAY 9 - OCTOBER 13

Year	Visitor Centre	Evening Programs (# of programs) (# of participants)	Special Talks (# of talks) (# of participants)	Water Contacts	(1978) Day User Survey	Registered Divers	Total
1973	6417	-	21 1742	-	-	-	8159
1974	2501	1 204	4 134	-	-	-	2839
1975	6562	3 452	8 246	-	-	-	7260
1976	5970	3 409	11 510	-	-	-	6889
1977	5060	3 578	16 668	1053	-	-	7359
1978	5384	6 975	13 254	613	1123	-	8349
1979	7020	7 1228	15 390	713	-	-	9351
1980	15800	5 1100	14 430	738	-	5294	23362

TABLE II - STATISTICS RE: DIVER REGISTRATION

Total Registrations (May 16 - October 13) - 5294

Male - 4262

Female - 1032

Indicated Club Affiliation - 3278

Home Location

Canadian - 3589

Ontario	-	3481	New Brunswick	-	4
Quebec	-	75	Nova Scotia	-	3
British Columbia	-	11	Saskatchewan	-	2
Manitoba	-	6	Yukon	-	1
Alberta	-	6			

United States - 1700

Michigan	-	868	West Virginia	-	4
New York	-	284	Florida	-	4
Ohio	-	234	Minnesota	-	3
Pennsylvania	-	120	Washington, D.C.	-	3
Illinois	-	64	Virginia	-	2
Indiana	-	47	California	-	2
Wisconsin	-	43	Kentucky	-	2
Maryland	-	6	Texas	-	1
Connecticut	-	6	North Carolina	-	1
New Jersey	-	5	Mississippi	-	1

Other - 5

Great Britain	-	2
Switzerland	-	2
Sweden	-	1

Indicated Certification Body - 1168

N.A.U.I.	-	390
P.A.D.I.	-	352
A.C.U.C.	-	183
Y.M.C.A.	-	113
N.A.S.D.S.	-	68
S.S.I.	-	31
P.D.I.C.	-	19
B.S.A.C.	-	12

Jurisdictional overlaps between various federal and provincial agencies are a concern; however, most are dealt with through cooperative efforts. The major overlap occurs on the water base because federal laws maintain general jurisdiction of the surface with control over navigation while the province holds the rights to the lake bed or bottom lands. It is important to note that the park boundary controls the bottom lands only. None of the islands within the boundary are part of the park. Many islands are privately owned and visitors are not permitted to trespass. Flowerpot Island is part of a National Park (Georgian Bay Islands) and does, of course, cater to the public. Early in 1980, the federal government acquired a number of islands which had been privately owned, and is determining what might be done with them. There have been three suggested directions for the area:

a) all revert to provincial park status - part of Fathom Five
b) all become a national park, including Fathom Five
c) develop both independently, but cooperatively.

No decision has been made at this time.

One of our major concerns, and a primary mandate is protection of the 19 known shipwrecks and various geological formations. Anchors of visiting vessels have caused irreparable damage to several of the sites, and, in 1979, we began installing mooring buoys. This is a joint program with the federal government because it affects surface navigation. The regulations which permit this program are made by the federal government under the boating restriction regulations, a part of the Canada Shipping Act. The sites were designated as restricted to boating except by authorization of permit. The authority to issue permits was designated by the federal ministry to the province (i.e. the park). The permits carry certain restrictions, such as forbidding anchoring into a wreck site. Either the mooring buoy or the natural bottom must be used. The regulation applies only to vessels under 15 gross tons. Several of the dive charter vessels exceed this weight, but we have had excellent cooperation from all vessel operators. They have all taken out annual commercial agreements (permits). Vessel permits are available free of charge for short term or seasonal use (see Figure 3). Again, the main purpose is to advise users of our programs and to encourage resource protection. In addition to protecting the sites from damage, use of mooring buoys provides other benefits. Sites are easier to locate and a subtle form of scheduling takes place. (The buoys serve as parking spaces, thereby establishing a carrying capacity for the number of vessels on any wreck at one time.) In addition, safer diving seems to result as there is a direct shot line to the site, and the buoys are quite popular with the visitors.

Other operational considerations which we have had to deal with included: the charter and tour boat services, the several hundred adjacent land owners and their rights of access. While we do not yet have all the answers to the total management and operation of an underwater park, we believe that we have made significant gains. We hope, our successes will continue along with the cooperation of the related groups and agencies, and Fathom Five will be truly a unique underwater park.

1980 Operational Program

Visitor Information Centre: This facility is located adjacent to the Little Tub Harbour in Tobermory and is open daily from early May to mid-October. Over the past winter, it was completely remodelled and now provides considerably more public

Figure 3.

Vessel Permit

RB № 0401

VESSEL PERMIT

Owner/
Operator .....

Vessel No. .....

No. of Persons .....

Purpose .....

Issued .....

Expires .....

Ministry of
Natural
Resources

Ontario
Owen Sound District

RB № 0401

VESSEL PERMIT

FATHOM FIVE PROVINCIAL PARK

RESTRICTED BOATING AREAS

Expires .....

RETAIN ON VESSEL (see over)

CONDITIONS AND RESTRICTIONS

1. This permit allows the holder and his vessel to enter the designated boating restricted areas for the following purposes: observation, sport diving, sport fishing or authorized research.
2. No vessel may anchor into a wreck site. Anchorage must be into the natural bottom of the lake bed or on sites with mooring buoys, only to the buoy provided for that purpose.
3. All diving activities must be indicated by use of a clearly visible dive flag (red with white diagonal) flown within 100' (30m) of the activity.
4. All vessels must use extreme caution when operating in the area of indicated diving activities.
5. No vessel may be anchored or moored unattended. At least one responsible person must be on board at all times.
6. All applicable federal and provincial laws are applicable within the restricted areas and will be fully enforced.

NOTE: Violation of any of the above may result in the cancellation of this permit and/or charges.

display area and space. Publications applicable to both the park and the area in general are available. Displays include the park, its resources and history, and an automatic audio/visual show about diver safety. Diver registration and boating permits are also issued here by the staff who are also available to provide additional direction and information as required.

surface with control over navigation while the province holds the rights to the lake bed or bottom lands. It is important to note that the park boundary controls the bottom lands only. None of the islands within the boundary are part of the park. Many islands are privately owned and visitors are not permitted to trespass. Flowerpot Island is part of a National Park (Georgian Bay Islands) and does, of course, cater to the public.

Patrol Program: Regular water base patrols are carried out using the vessel "COLLINS H", a 25' twin inboard/outboard boat. The patrols serve several functions, including information, direction, safety, resource protection, public relations, and on occasion, emergency services and transport.

Special Programs: In the evenings, films, slide presentations, and equipment demonstrations are presented to the public at the amphitheatre at Cyprus Lake Provincial Park. Several talks including resource information and management are also available to interested groups, usually divers, with advanced reservation. Also available are site specific sessions either ashore or on board charter vessels prior to a dive which may be arranged by contacting the park in advance. Occasionally, during the off season interpretors present talks throughout the province at the request and expense of interested groups.

Staffing and Budget

In the Ontario parks system, we operate primarily with seasonal staff. At Fathom Five, I have five seasonal workers in addition to myself. Three are long-term and two work about three months during the summer. The special youth programs group added one additional student staff member in 1980. This staff includes a park warden and a visitor services staff, who doubles up as the clerk. The operational budget, which covers seasonal staff salaries, and all operational costs such as programs, utilities, rent, maintenance, etc., is $47,950. Special programs for resources inventories and buoy installation, acquisition, and maintenance adds another $11,700.

Future Direction

Property for the land base component of the park has been acquired, but, as yet, no development has taken place. Planning and designs have yet to be completed, and at this time there is no firm time commitment to this. As mentioned earlier, discussions with the federal government are currently underway regarding their recent acquisition of islands. In the meantime, we plan to continue our present program, and we hope to add improvements to it. Our experiences have shown that a freshwater underwater park is a valid idea, and we wish Michigan every success in its effort.

QUESTIONS AND ANSWERS

Question: John Schwartz (Michigan Sea Grant Extension Agent, Tawas City, Michigan)

What would the provincial park system think of putting in an artificial wreck, similar to what Texas had done with Liberty ships off the Gulf Coast, as a fish habitat and diving site?

Answer: We would consider taking a ship but we would not want to get into the business of purchasing ships. If a wreck could be put into an area that hardly had anything, we would certainly be interested, but as I say, there is no funding.

Question: John Schwartz

Here in Michigan I have talked to several people who have boats they would like to sink, but there are many permits required. It has not even been decided if it would be allowed anyway.

Answer: When a 145 foot ship grounded recently at Tobermory, we had to get approval from the federal government to put it in shallow water. It had to be positioned away from any navigational area. The environmental people made sure that all of the pollutants were removed, and then we wanted to make sure there were no entrapment areas -- all the glass, doors, and hatch covers were removed. We cut holes in any areas that could trap divers. It would be a way of putting some wreck sites in adjacent to a land facility. Our land base has no shipwrecks near it. If we could put a new wreck in shallow water, it would be the number one site for the next couple of years. Everybody would want to see the new wreck, and we would have the divers in much shallower water for a while, which is a real plus.

Comment: Lee Somers (Research Oceanographer, University of Michigan)

I think that would be a major tourism stimulus for some of the areas now that are weak for diving wrecks; for example, the western coast of Michigan.

Question: Dave Armour (Mackinac Island State Park).

What kind of public reaction did you get toward your park when these people were killed last summer? Were you accused of luring people to their deaths?

Answer: We do not get accused of things like that. It does get a lot of bad press, as you might expect. If the diver had drowned in Parry Sound or some other place outside of the park, there might have been a little thing in the paper, "Diver killed while diving in Parry Sound." But, when it happens at Fathom Five, headlines appear like, "Killer waters of Fathom Five claim another diver." Because it is a park, it does receive a little additional publicity. It is very hard to get across to these people that we have to expect more incidents in that area because there are more divers. In any area, if you start putting twenty thousand dives a year into it, you are going to have the same death statistics we have.

It is something you are going to have to face. When I first started up there, they suggested to me that I prepare a set of rules that would prevent all diving accidents in the park. I said, "Fine, just ban diving." You can avoid airplane crashes

and car accidents in the same way. But, obviously this is impractical. I think the main things are education and information. The diver training organization will have to do the education. The Natural Resources Department will have to provide information on local conditions and facilities, and remind people of safety aspects in their training. Then, individuals will have to make their own decisions on their participation. If we can come up with something that will assist them, then I am all for it. However, just putting a whole bunch of laws on the books is not going to do it. Everybody knows you don't drink and dive but we lost one this summer that way. The other twelve people in the boat knew he had been drinking heavily, but they let him go into the water anyway. I issued his tag to him three hours before, and he was sober then. I didn't know he was going to go on a boat ride and drink a half bottle of rye before he went into the water. How much control can you have over an individual?

Question: Jim Hane (State Parks Division, MDNR)

In Michigan we have been hoping that the private sector would pick up on some of this activity at our preserves. After listening to you today I have questions about this. They could pick up on camping, food service, and lodging, but when it comes to enforcement, regulation, and interpretive services, do you see the private sector role in this? Could it be different? Could government take a back seat?

Answer: In some aspects, certainly. There are some interpretive services available through contract services. We have started investigating the possibility of volunteer programs -- many of your national parks have volunteer programs. We are looking at the possibility of some volunteers assisting us on patrols. We will not go out on our boat with fewer than two people. Our staff is not allowed out in the boat alone. You could get out on the lake and if something occurred you might have to try to help somebody at the same time you are driving the boat. That extra person, say a volunteer from the diving community would be a great help. There are certain things you can use the private sector to assist with on either a voluntary or contract basis. The operation of our visitor center could probably be contracted out as long as you insure that the contractor presented the message you desired.

Question: Bruce Andrews (Law Enforcement Division, MDNR)

We are going to rely on our present conservation officers for law enforcement. We will also be relying a great deal on divers and charter boat operators to report violations.

Answer: You will find a lot of them will assist you in that way.

Question: Paul Baerman (Snell Environmental Group)

Have you had any adverse comments from the general public about the government spending money for the enjoyment of a relatively select few?

Answer: We haven't had any direct comments on that. We have enlarged our visitor center and put in a few things that had nothing to do with diving life, such as flowers and other displays that people could enjoy whether they dive or not. When it was just a very small contact area, we were very limited in what we could have, and most of the displays were about diving. A lot of the public coming in said it was just for

divers, and then they would leave. There were not too many complaints, but certainly it is something that would cross people's minds.

Question: Paul Baerman

Has the Canadian government explored the possibility of exposing more of the general public to the wrecks themselves, for example in a shallow situation, an underwater walkway with portholes or some way that people could go down and get a closer view of the wrecks?

Answer: In the initial concept plan, there was a proposal for an underwater walkway. That would be an ideal nondiving visitor facility if it ever got off the ground. We would like to see some type of viewing facility, whether it is a walkway or a window or even a fabricated pool. The pool would be the way to go because it could be protected from the elements. We get huge seas at certain periods of the year, thirty and forty foot waves which could severely damage a shallow-water facility.

DIVER SAFETY CONSIDERATIONS IN AQUATIC PARK MANAGEMENT

Lee H. Somers

Research Oceanographer, University of Michigan

Several items that I was going to talk about have been covered by someone with much greater authority than I - Stan McClellan - so I am very pleased to be able to cut my presentation. I did want to give a perspective on this state's diving population, and that, in turn, helps me make assessments of safety management. A Gallup poll of leisure activities released in 1980 indicated that one percent of Americans participate in scuba diving, and two percent participate in snorkling. That really does not put diving at a great level of importance. However, of those polled 56 percent indicated that they would like to participate in scuba diving if given the opportunity. That was the top activity indicated. It is estimated that about five percent of the United States population has tried scuba diving at one time or another.

Historically, people have looked at an area as a place to go. This has been replaced now by a consideration of what they will do when they arrive. We have heard the pros and cons of management of facilities. I like the term Stan uses of "aquatic park." The ideal park would burden the state with all kinds of outlays of money for the development of tremendous facilities that would address the non-diving population, providing an intellectual, historical, and educational experience. From the standpoint of top activities, people swim, people fish, and go boating. All of these activities must be considered along with hiking and camping as potential uses of an area.

What about the diving population in Michigan? These are rather subjective figures that are based in part on hard-to-obtain objective information. First, about two percent of the divers trained in the United States are trained in Michigan. About 400,000 divers are trained in the United States each year. Again, projecting on training alone, if two percent of the estimated 2 million divers in the United States, are in the Michigan area, we are dealing with about 40,000 divers or potential divers in Michigan. Among the things that have to be considered from the standpoint of management of aquatic parks is safety. Many of these concerns have already been expressed. Access to the area, development of concessions, private sector involvement (meaning charter boats), the supply of air - all of these become safety factors. Exactly how they are managed and what type of regulations or controls these operators will be required to operate under become important. I was very pleased to hear about the marking of the wrecks at Tobermory and the permanent mooring systems to reduce anchor damage. I know this is also very important from a standpoint of safety. There are going to be people who might not have been able to find that wreck, who are now finding it, and are going to it. That could be negative, from the standpoint of protecting the wreck, but the tag or directional lines to move the people from the descending buoy line to the wreck all are positive factors from the standpoint of diving safety. Sometimes a considerable swim is necessary to move from a boat that is improperly anchored to the wreck site. This puts the person down on the wreck in less-than optimum physical condition. One Michigan wreck diving accident in 1980 was related to improper anchorage. The anchor was fouled; there was an attempt to remove or retrieve the anchor and during that process the divers were separated. One person died in that incident. At the end of dives, people go into the water to retrieve or dislodge anchors; this may extend the allowable dive time. Nitrogen accumulated in earlier diving may

cause decompression sickness. This is not common in the Great Lakes region, but we see it in the Caribbean Islands, and it could become a problem as we are moving into greater usage. Regardless of what you call it -- regulation, control, usage limitations, permits, etc. -- I think that there is going to be a positive move to control the number of people who are allowed on a wreck site at one time. When Stan mentioned 160 divers on the Arabia at 110 feet, one shuddered. It is not just the risk of them running into each other, but the risk of separation of groups and buddies. Divers may go up to other people's boats. You may panic over the thought that you have lost your buddy or when all of a sudden you find you are diving with another group. We are dealing with more than just physiological factors at 110 feet in the dark, cold water. We are dealing with psychological factors as well.

Should we regulate the users of a site depending on their qualifications? Do we look at certification? I don't have the answer to that. Although the information has been pretty sketchy in Michigan State Police reports, in Michigan inland lakes more accidents involving uncertified divers occur than at Tobermory. Also, a significant number of our divers have not received formal training. One of the greatest problems we have faced in Michigan has been the diving friend training another person; that is, a non-instructor training another person to dive. From 1965-1978, 26 percent of the fatal diving accidents were on the first scuba dive. I am bringing these factors up because we have to look at who we are going to be attracting into a park area.

Another safety concern is the qualification of charter boat operators, and those persons who provide diving services such as selling supplies, air, or who train divers in the parks. What type of regulation should the State place on the concessions? For example, if there was an instructional concession at Isle Royale right now, and they initiated a deep diving course, the macho diver patch would be awarded to persons who are diving to 275 feet. I could see people going up and paying fifteen hundred dollars to some enterprising concessionaire to teach such a course. It would be absurd on the part of the State to endorse such an activity. We do have to look at a State responsibility in accident management. This can only be partially taken up by the concessionaires. Charter boat operators should have requirements for the equipment that they carry and the training that their personnel have. But, ultimately, it comes down to diving accident management and enforcement, probably the most difficult factors. You might as well not have a law if you do not have the capability of enforcing it.

What are the classes of users that we see? Unfortunately, we are going to see the casual diver, who dives maybe one to two times a year on vacation. We are going to see open-water training activities conducted here. There is a great need for places to take open-water trainees after they complete their pool instructions. This initial open-water dive is important since most instructors like to make it a fun outing. The objective of the recreational diving businesses is to keep people diving so they keep buying equipment. Therefore, it is extremely important that this first exposure be a quality exposure. You are also going to have the expert, of course, who is coming from Illinois, Ohio, or even Ontario, to take a look at these wreck areas, because diving gets pretty boring after awhile if you don't have some new areas to investigate. Then there will be what I classify as probably one of the most dangerous groups. They are the "attracted" group. The attracted group are those people who have gone to film festivals and have seen some very excellent underwater wreck footage that has been photographed by very fine divers and photographers around the Midwest. But for the novice to duplicate these dives is dangerous since these films were produced on

wrecks that are totally out of reason for the recreational diver to visit. Yet, these divers are attracted like magnets to this. As the charter boat services going to these wrecks become more visible, the diving population is oriented more and more towards these wrecks. That brings up the other problem -- how do you keep divers off deep wrecks? Do you keep them off? Again, it boils down to education. Unless an enforcement officer stands guard 24 hours a day over prohibited wrecks, divers are probably going to find a way to dive on the deep wrecks.

Now, to talk about accidents in the United States, there are roughly 160 fatalities per year. In Michigan, fatalities between 1965 and 1978 numbered 48. This is roughly three fatalities per year. From 1959 to 1965, there were 20 fatalities, or roughly three fatalities per year. So we have maintained a fairly constant average of three or four fatalities in the state of Michigan per year. Now the one area that we do not have good statistics on is decompression sickness and non-fatals. We know decompression sickness cases are developing through wreck diving that are never reported. We hear about them through rumor, and we can only say that the symptoms exhibited were temporarily caused by decompression sickness. This year, we have had a dramatic increase; we saw about six decompression and air embolism incidents at our chamber. This is not as many as Tobermory sees in their concentrated area, but we are picking up more and more at our facility.

What are the characteristics of the most likely diving accident in Michigan? The diver will be male. Out of 48 incidents we have only lost one female up to 1978. The accident will occur in June, July or August; the diver will be 16-25 years old. This is based on what we have collected so far. There is not yet enough statistical information to indicate a change, but we may very well be seeing a change. From 1959 to 1973, nearly all diving accidents occurred in small lakes and ponds. However, since 1973, about half of the fatalities occurred in the Great Lakes. Accidents have always been thought to occur in deep water. In the state of Michigan, the majority of the diving accidents happened in 40 feet of water or less. This is related to the small-lake phenomenon. Generally, accidents occurred under calm surface water conditions. From 1972-1978, no accidents occurred from charter boats. It is the inexperienced diver who has been getting into trouble. Around 80 percent of the accident victims had less than one year of diving experience and, as I have indicated, 26 percent were on their first dive. People think accidents are correlated to divers diving alone. In reality, most of our accident victims were in the water with one or more buddies. Whether that buddy was really a good buddy or not, we have no way of determining but victims were not in the water alone. A significant number did not wear any type of personal flotation device, and it was subjectively determined that the presence of a personal flotation device, had it been used, would have saved some persons. Most accidents occurred on the surface. When we talk about forty feet of water or less, that is where the body was found, that does not necessarily mean that the victim died at forty feet. Judging by the descriptive information we have gotten, most of the fatalities occur on the surface. Unfortunately, the buddy in the water appears to lack training in rescue, either self-rescue or rescue of the second party. Improved education can be a major factor in developing a safer diver. Park developments should emphasize education rather than hard-core regulation. This may be the most positive approach to maintaining a safer climate for the diver in that park. There are mechanisms for reminding the population that they are in a new environment.

The diver is ultimately responsible for his or her own safety. The park itself cannot create safety by requiring the diver to be certified. However, there are ways

the park management can encourage safety. The operators of charter boat concessions and their personnel should be knowledgeable about diving and divers. There could be an ongoing educational program on the boat which would lead to prevention of some accidents. The key is PREVENTION. In California, many of the charter boats include a dive master program. A boat operator provides a dive master who assists with diver rescue, prevents divers who are not properly equipped from going into the water, and helps with the alcohol problem. The dive master on the boat is hired by the boat operator or works in conjunction with the operator as a concessionaire. On the other hand, many groups provide their own dive masters, and the boat operator only takes them to the spot. I do not know which is more feasible. A dive master requirement may provide better quality control.

What about sight and depth control? I would love to be able to keep people from diving on some of the deep wrecks that are going to lead to fatalities. However, there seems to be very little regulatory power that can be initiated to stop people who are unprepared and irresponsible. I hope peer pressure and the pressure of the diving community working in conjunction with the State can be a major force. The availability of proper first aid supplies and oxygen, and the knowledge of how to manage specific diving accidents immediately at the scene is important.

The history of diving accidents in Michigan started to change dramatically in 1979. Three out of the four fatal diving accidents occurred on Great Lakes wrecks; previously more diving accidents took place in the inland lakes. Two out of three of these diving accidents which occurred on the Great Lakes wrecks were from charter boats. Accidents occurred in 115, 120, and at least 250 feet of water. There were also three non-fatal accidents which I will discuss next.

The first of these occurred at the Straits of Mackinac in 110-120 feet of water. Everything went well on the dive during the ascent, until at about 40 feet one of the divers experienced an air deflation. He signaled the other divers, both of whom were carrying artifacts in their hands which had to be dropped. They began buddy breathing or sharing air. This exercise failed them, which is not uncommon. Buddy breathing is a very difficult thing to pull off in real situations. The divers then initiated a positive buoyancy ascent by blowing up a CO_2 cartridge to inflate their buoyancy system and shoot them to the surface. On the surface, the divers looked at each other, and there was some type of conversation indicating they were okay. One diver, however, lost consciousness in the water after the others were on the boat. He was rescued, brought on the boat, and given oxygen. He came to with some discomfort and partial paralysis on one side, a text book case of air embolism. Emergency personnel took the diver to a commercial diving recompression chamber located some three hours away. Now, here is something that has to be taken into account in the management of accidents. The person was placed in the chamber. The available physician was not really knowledgeable about diving accidents. The diver was placed in the chamber and treated on a Navy Table Four, which is an obsolete treatment table even though it is still in the Navy manual. When the diver entered the chamber, he had partial paralysis of one side; some thirty hours later he came out with total paralysis from the mid-chest down. He was then transferred to the University of Michigan Hospital in a very dehydrated state because he was not managed properly with fluids and IVs during treatment. They were just not equipped for this. We ran fourteen separate hyperbaric treatments on him. He is now recovering, and is able to walk with canes. The results are good, but it is going to be a long hard pull for him. This brings up some concern from my standpoint which probably falls out of your official jurisdiction but which, needless to say, you must

consider in the development of any facility which is going to involve diving -- the management of a case of decompression sickness or air embolism. The Canadians have taken upon themselves the responsibility of placing a recompression chamber with a qualified physician at Fathom Five Park. Therefore, victims of a non-fatal accident can be treated immediately after the boat gets to shore. This greatly increases the chance of survival without permanent damage. Even with that near-immediate treatment, some victims will be lost. Where should a unique treatment facility that may never be used in a year, or may be used only three or four times in one year, be located? At a clinic or at a local hospital? At the visitor center? Not only is the facility a problem, but also needed are qualified medical personnel to make the medical decisions and administer the treatment.

In Michigan right now there are two recognized hyperbaric chambers at the University of Michigan; one at the hospital and one at my laboratory. As of January 1982, there will be another one at Kalamazoo. I am now working extensively with people in Alpena about seeing what can be done in that area, and we are working in the Traverse City area to try to place a chamber in that area. We hope, by this summer (1981), there will be at least three well-supported chambers in the state.

How critical is it if the chamber is not directly on-site? Through proper first aid, many divers have been very fortunate. Many cases we treat are quite severe; we don't see some of them until 24 to 36 hours after the accident. Our success rate has been very high. The cost of the chamber depends on the chamber's size and capabilities. The cost of puttng in the type that I would recommend for the average medical facility adjacent to an underwater park would be $45,000-$49,000. This expense is high, but is justified from the standpoint of a small hospital which can use it to deal with smoke inhalation, carbon monoxide poisoning, and gas gangrene as well as diving accidents. Larger chambers are certainly desirable because the physician and support personnel can be inside the chamber with the victim all the time. Should the chamber be put on location? It is ideal, if you have all the support factors that are required: the physician, the money, the proper location. If the chamber is not on location, if you can arrange for some intelligent decision-making on location and for transportation to a facility that has the capabilities, you can save many lives. First aid for cases of decompression sickness include the use of aspirin, a good introduction of fluids, monitoring the victim, and the use of pure oxygen. These treatments can gain a lot of ground before even coming to the recompression chamber. For air embolisms, people have been placed on oxygen and maintained in a thirty degree angle head down position during transport to the chamber. With this simple procedure, total recovery has occurred in several cases.

Next, let us consider the recovery of the drowned diver from the bottom. I have eleven single space pages on an attempt to recover a victim from 250 feet down on a wreck site at Isle Royale. What are recreational divers doing down there? It is just like climbing a mountain, it is a place to go; it becomes a challenge and away they go. That wreck site has been popularized by several individuals who have traveled around the State of Michigan showing pictures of the wreck. These films create a strange attraction for these divers. It encourages them to take on a situation that I consider an irrational act. To reach this wreck, divers must go to a depth of 250-275 feet. Commercial divers switch to helium-oxygen to eliminate the problems of nitrogen narcosis at these depths; they generally make the switch somewhere between 150-180 feet. Also, commercial divers who dive to that depth must have a diving bell to come into for safety and decompression. In the state of Michigan commerical divers are

prohibited from diving beyond 130 feet with conventional scuba gear. Recreational divers can dive to any depth they desire. In fact, this becomes a problem with the recovery of a body by state personnel. It is against health and safety regulations of both the Department of Labor and the Department of Public Health for employed divers to go beyond 130 feet with scuba gear, and if they exceed the 230 foot mark they must have a large diving bell in the water and be using mixed gases. Thus, recovery of the body of a recreational diver from great depths is quite a problem.

Another consideration in the management of diving accidents is that a person who has been submerged for a short time may not necessarily be a fatality. There is a revivable victim there as long as we can get to him or her within thirty minutes or so. How elaborate do you want your diver rescue capability to be? We now have the ability to make a rescue instead of a recovery. This is primarily a result of advancements made by people right here in Michigan on management of coldwater near-drowning. So we now have a decision to make from the standpoint of an accident management team. I think more will be said about this in other Sea Grant workshops as time goes on.

We have considered the on-site management of decompression sickness and air embolism, and the necessity of all people knowing the proper first aid. Both of these items will fall very heavily on charter boat operators. Accident management also involves, in my opinion, the educational process. Where there are large visitor centers, I feel it would be proper to have an ongoing safety/first aid AV presentation. The use of local hospitals and the education of local physicians will be important. Whether there is a chamber there or not, they are going to be the first formal medical people to deal with the accident. They have to become involved at some point. We have talked abut the recompression chamber, should it be local, should it be somewhere else, as far as three or four hours away? If it is not local, then there must be a first aid management team and transportation for the accident victim. Again, in our training process, we must include the EMTs and paramedics. What should be the State's role in this educational process? I cannot answer that particular question. Somebody has to take the initiative to stimulate this education whether it be a service agency like Sea Grant or a state agency like the DNR.

To sum up, we know the population with whom we are dealing; we know of the population that dives. We must consider that, at some point, there will be a considerable training process involving the local community which includes hospital and paramedic support personnel. We have to take into account rules versus regulation, and the involvement of the diving community. Peer pressure within the diving community may prove to be one of the best mechanisms we have to prevent diving accidents, but we also must look at enforcement, the development of regulations, and the management of diving accidents on the scene. Education, I feel, becomes the dominant factor, and education is going to cost somebody some money. I do not feel the educational process and expense can fall entirely on the private sector.

INTERPRETATION AS A MANAGEMENT TOOL FOR UNDERWATER PARKS

John A. Veverka and Sandra A. Poneleit

Interpretive Consultants with Interpretive Associates, E. Lansing, Michigan

The use of interpretation as a management tool in parks is not a new idea (Sharpe and Gensler, 1978). Many park systems, including the National Park Service, (NPS) use the talents of interpretors in their overall park management strategy. For example, Mr. Bill Dunmire, former Chief of Interpretation for the National Park Service, in 1976 outlined new goals for NPS interpretation:

> Interpretation should be employed by park management as a primary means of achieving all management objectives affecting the public. Interpretors should think of themselves as an integral part of the management team and should actively participate in developing and reviewing park-wide objectives and programs (Dunmire, 1976).

Interpretation is a useful management tool because it accomplishes important organizational objectives (Freed and Stenman, 1980).

1. Interpretation increases visitor enjoyment and understanding.

2. Interpretation serves as the eyes and ears of an agency - keeping management in touch with a variety of clients and publics, providing immediate feedback from these groups.

3. Interpretation plays a central role in public involvement in the planning process - explaining management alternatives and describing the impact of policy on resource quality.

4. Interpretation can explain the role and mandate of the agency so that the general public can understand the agency function and hence its derivation of policy.

Sharpe (1976a) also states that a major objective of interpretation is to accomplish management goals. This may be done in two ways:

1. Interpretation can encourage thoughtful use of the recreation resource on the part of the visitor, helping reinforce the idea that parks are special places requiring special behavior.

2. Interpretation can be used to minimize human impact on the resource by guiding people away from fragile or overused areas into areas that can withstand heavier use.

This paper examines the use of interpretation as a management tool for underwater parks and illustrates the importance of interpretive services as a part of an effective park management program. The use of interpretation as a management tool can be used to help manage: 1) the visitors' experiences and behavior at the park, 2) the protection and use of the resource, and 3) overall park planning and operation. Each of these three major areas will be explored in more detail in the text that follows.

Interpretation and the Visitor

According to Matthiessen (1968), "where underwater areas, such as parks and preserves are established, the public must be prepared for the new experience. Interpretive buildings should be established, skilled interpretors employed, and the communication arts used to tell the underwater story." Because interpretors are usually well-trained in working with the public and in planning and designing programs and services for park visitors, they can play a major role in visitor management. Areas where interpretation can be of great aid in this regard include, but are not limited to:

Diver Safety - Diver safety is a major area of concern for underwater parks. Park staff members need to devote some special attention to the unique potential hazards in their areas:

> Marine parks attract visitors from the interior, and these visitors are usually unacquainted with the marine park environment. In addition to a cooler moderate climate and the intertidal zone, the marine park harbors dangers not found in terrestrial parks. It is the duty of the park staff to see that visitors are informed of such hazards as poisonous or dangerous organisms, underwater obstructions, tidal fluctuations, fast moving currents, and complications from local weather conditions. Shouldn't communicating this safety information be one of the duties of the interpretive staff? (Sharpe and Odegaard in: Sharpe and Gensler, 1978).

It is not hard to see how most of these concerns can apply to freshwater underwater parks as well. Interpretive programs and publications, as well as other forms of media, can help the diver to better understand and appreciate the rules and regulations for safe diving practices. In addition, interpretive publications on diving safety could be made available at dive shops, charter or tour boat concessions, or other outlets to help educate the divers.

Rules and Regulations of the Park - Through interpretive programs, exhibits, brochures, personal visitor contacts, audio-visual programs, etc., visitors to the underwater park could gain a better understanding and appreciation for the rules of the park and why they are needed. According to Sharpe and Gensler, (1978:1) "interpretation has been used to develop in the visitor an understanding and appreciation of park values, and even an understanding of the agency providing the park lands." If visitors have a better understanding of the park regulations, enforcement problems as well as related management problems may be reduced.

Pre-visit and On-site Orientation - Through interpretive publications and other forms of media, visitors can receive an interpretation of what to expect during their visit to an underwater park, including interpretation of the park's rules. This can be applied to both diving and nondiving visitors. Such pre-visit orientation may help to provide a better-planned visit. At the park, signs, exhibits, brochures, and programs can be used to orient the visitor to the park and its facilities. Included would be the location of parking, rest rooms, and the visitor center, and information about charter boat services, interpretive program locations and times, and so on. A well-planned on-site orientation program will also help to direct visitor flow through the park area's land base.

Vandalism - Vandalism to the ships or other resources in an underwater park is a major management concern. Interpretive services can assist visitors in gaining a greater

awareness of the educational and historical value of the underwater resources. Through well-planned and executed interpretive programs, vandalism may be reduced (Harrison, 1976).

Interpretive Programs and Services - Assuming there is a land based access point for the underwater park, a visitor/interpretive center would be a key facility to have available for public access during park operating hours. Programs on such topics as Great Lakes history, shipwrecks of the Great Lakes, diving safety, etc., could be utilized to help control the number of visitors at the park as well as their location in the park. This could be accomplished through program planning and scheduling. For example, to help control crowds waiting for a charter or tour boat to go on a diving or sightseeing trip, interpretive programs offered just prior to the trip (as an orientation for the trip) could help control congestion in the area by the boat docks. By effective program scheduling, visitor flow in and through the park can be appropriately managed.

Underwater guided interpretive tours, interpretive boat tours, underwater interpretive signs, and self-guiding trails can also be used to help direct visitor flow under or above water, as well as to interpret some of the major management concerns of the agency.

Interpretive services are already in use at several underwater parks, such as Fathom Five Underwater Park located at the tip of the Bruce Peninsula at Tobermory, Ontario. For the estimated 250,000 nondiving visitors to Tobermory and Fathom Five Park, interpretive displays and boat tours allow them to learn about the historical importance of Great Lakes shipping in the development of this region (Warner and Holecek, 1978).

Interpretation and the Resource

Using interpretation as a management tool for protection of the resource is closely tied to the concepts presented in the previous section. Through a park's interpretive program and services, visitors can be made more aware of the value of the resource and the need for its protection. Programs can be aimed at helping visitors better understand the negative effects of vandalism, souvenir taking, or littering on the park. Also, through the use of interpreter-conducted programs, more control of visitor actions may be encouraged for resource protection of very sensitive areas. Underwater trails and interpretive underwater signs may encourage the use of less sensitive underwater areas, for example. In short, interpretive programs and services may help to direct divers to recommended diving locations, assist them in site selection and understanding site resources, as well as to help protect the underwater resources.

Interpretive programs conducted on land could help the nondiving visitor better appreciate the underwater resources as well, and may even encourage some visitors to take up diving. A well-educated visitor (diving or nondiving), understanding the value of the underwater park, will be one of the best mechanisms for the protection of the underwater resources.

Interpretation in Relation to Park Planning and Operation

This is the third major area where interpretation can serve as a management tool. While it incorporates information discussed in the previous two sections, there are some additional roles that interpretation can play in the management of an underwater area.

One area of management where interpretation can play a major role, is in the agency image. interpretors and interpretive services can be the main public relations tool of the underwater park. Interpretors can conduct programs for school groups, civic organizations, and dive clubs. They can serve as guest speakers, prepare news articles, and play numerous other roles in the sphere of public relations work.

In a general way, interpretation can help solve enforcement problems (as mentioned earlier) by giving the visitor a better understanding of park regulations.

By identifying concepts and areas to be interpreted (together with design considerations) in the early stages of park planning, interpretation may help decrease management problems at existing or potential sites. Many agencies have an interpretive planner as a member of their park planning teams and may develop an interpretive plan for the park as a part of the park master planning process.

The Park Interpretive Plan as a Management Tool

In previous sections of this paper, we have looked at a few of the many roles and uses of interpretation as a management tool. One of the best ways to handle management issues is to plan ahead to avoid having them occur at all (offensive management). In this regard, the development of an interpretive plan for an underwater park is an important document. The plan should consider many issues, both educational as well as managerial in nature. One important note is that many topics covered in an interpretive plan are not usually covered in a park master plan. Thus, the interpretive plan should complement and supplement the overall park plan.

An interpretive plan for an underwater park (or any park for that matter) should contain six major sections. Based on the Peart and Woods (1976) planning model, these sections are: 1) Why?; 2) What?; 3) Who?; 4) How, when, where?; 5) So what?; and 6) Implementation and Operations.

WHY?- The WHY section of the interpretive plan for an underwater park sets forth the policies, goals, and objectives for the park's interpretive programs and services. These would include any management-oriented goals and objectives as well. For example, one objective of interpretive programs might be to reduce vandalism and salvaging of ships located in the underwater park.

WHAT? - The WHAT section is the resource analysis and inventory (that is, what is going to be interpreted). The interpretive significance of the resources located in the park (shipwrecks, geological formations, natural history and historical sites, etc.) would be researched and explained, and their locations mapped. Objectives for the resources inventoried (management objectives for the future use of the resource or site, visitor access, etc.) would also be developed.

WHO? - The WHO section is the visitorship analysis. Both a demographic as well as a psychological analysis of the visitorship (or potential visitorship) should be conducted. The psychological analysis looks at not only who is coming to the park (divers and nondivers), but tries to determine why they are coming, their motivations and expectations for the visit. This information is vital to planning programs and services for visitors, as well as planning for management. For example, it would be important to know something about the divers coming to the park, their level of awareness of park rules, rules for safe diving, or other management concerns and their attitudes toward these issues.

HOW/WHEN/WHERE? - This component of the interpretive plan details how, when, and where interpretive programs and services are to be offered. The section should cover programs planned for each resource inventoried in the WHAT? section, and for the park in general. For example, one of the programs planned for in this section might be a required one-hour orientation to the underwater park and its rules and regulations, to be held at the interpretive center daily for all first-time divers visiting the park.

SO WHAT? - This is the evaluation component of the interpretive plan, outlining methods and strategies for assessing the effectiveness of the interpretive programs and services. This might include in-house research to see if vandalism problems exist, or are increasing or decreasing. Wagar (1976) lists numerous methods for evaluating interpretive programs and services, which include questionnaires, suggestion boxes, direct measures of behavior, auditing by an "expert," and other techniques.

Implementation and Operations - This section of the plan spells out just how the plan will be implemented and how the total program will operate. It covers such areas as budget, staff needs and scheduling, equipment needs and maintenance, and overall implementation recommendations and timetables. This could include when and in what order services or facilities are to be developed, when staff should be hired, and so on.

As a general guideline for interpretive planning, it might be helpful to provide a matrix for the development of an interpretive plan (Table 1). The matrix could be based on the Peart and Woods planning model, which illustrates a "priority of consideration" for each component of an interpretive plan during five phases of plan development. This would serve as an example only and could be modified as needed.

Summary

This paper was designed to serve as a general summary of how interpretation can be used as an effective management tool for underwater parks. Interpretation can play a major role in such areas as visitor safety, protection of the resource, public relations, and overall management of the underwater park. Interpretation can be used to help accomplish both the educational and management goals of a park.

Development and implementation of an interpretive plan for each underwater park would be an important auxiliary mechanism for helping to provide strategies to avoid management problems (offensive management), as well as being of key importance to planning for an enjoyable, safe, and memorable recreational experience for both diving and nondiving visitors.

The use of interpretation should be an integral part of any park management system, for interpretation is one of the best means to reach and educate park visitors about the resource while providing them with a positive and memorable experience.

* * * * * * * * * * *

Acknowledgements

The authors would like to thank Dr. Donald F. Holecek, Department of Park and Recreation Resources, Michigan State University, for his assistance in the preparation of this paper.

Table 1. Interpretive Plan Development Matrix

Considerations	Planning phases				
	1st	2nd	3rd	4th	5th
Establish policies, goals, and objectives for the overall plan	x				
Analyze resources to be interpreted (inventory)	x				
Generate theme for park		x			
Generate sub-themes for each site to be interpreted at the park			x		
Generate site objectives for each site inventoried			x	x	
Generate program objectives for each site inventoried		x	x		
Conduct visitorship analysis	x	x			
Isolate specific target groups		x	x		
Propose both pre-orientation and on-site orientation systems				x	x
Provide HOW/WHEN/WHERE approaches to interpretation for each site where interp. is planned (this is mainly for master planning)			x	x	
Develop an evaluation system for the interpretive planning process	x				
Evaluate the planning process against its stated objectives	x	x	x	x	x
Develop an evaluation system for interpretive programs/services			x	x	x
Plan for (consider) I & O concerns such as:					
1. Budget	x	x	x	x	x
2. Staffing needs	x	x	x	x	x
3. Facility needs		x	x	x	x
4. Equipment needs			x	x	x
5. Program operation costs/needs			x	x	x
6. Program/services scheduling				x	x

REFERENCES

Dunmire, William W. 1976. Servicewide Goals for Interpretation. In Touch 1(12):2-3. National Park Service, Division of Interpretation, Washington, D.C.

Freed, Mike and Broc Stenman. 1980. Interpretation for Resource Management. The Interpreter 11(4):27-30, Spring.

Harrison, Anne. 1976. Problems: Vandalism and Depreciative Behavior. Chapter 24 IN: Interpreting the Environment. G.W. Sharpe, ed., John Wiley and Sons, Inc., New York. pp. 473-495.

Hulse, Charles A. and Donald F. Holecek, eds. 1979. Underwater Parks Symposium Proceedings. Michigan State University Extension Bulletin E-1350, Cooperative Extension Service, Michigan State University, E. Lansing, Michigan. 62 pp.

Jubenville, Alan. 1978. Outdoor Recreation Management. W.B. Saunders Company, Philadelphia.

Matthiessen, Erard A. 1968. The Underwater World and its Interpretation. Chapter 12 IN: Manual of Outdoor Interpretation, J. J. Shomon, ed., National Audubon Society, New York. pp. 89-93.

Peart, Bob and John G. Woods. 1976. A Communication Model As A Framework for Interpretive Planning. Interpretation Canada 3(5):22-25.

Ross, Terence L. and George H. Moeller. 1974. Communicating Rules in Recreation Areas. USDA Forest Service Research Paper NE-297, Northeastern Forest Experiment Station, Upper Darby, PA.

Sharpe, Grant W. 1976a. An Overview of Interpretation. Chapter 1 IN: Interpreting the Environment, G.W. Sharpe, ed, John Wiley and Sons, Inc., New York. pp. 3-22.

_____. 1976b. Marine Interpretation. Chapter 23 IN: Interpreting the Environment, G.W. Sharpe, ed., John Wiley and Sons, Inc., New York. pp. 443-471.

Sharpe, G.W. and Gail L. Gensler. 1978. Interpretation as a Management Tool. Journal of Interpretation 3(2):3-9, November.

Sharpe, G.W. and C.H. Odegaard. In press. Outdoor Recreation Management. Unpublished manuscript, to be published by John Wiley and Sons, New York.

Wagar, J. Alan. 1976. Evaluating the Effectiveness of Interpretation. Journal of Interpretation 1(1), Summer.

Warner, Thomas D. and Donald F. Holecek. 1978. Underwater Parks: An Unexplored Recreation Frontier? Park and Recreation 13(11):18-20,36; November.

SYSTEMATIC APPROACH TO MAINTENANCE

Theodore J. Haskell

Associate Professor and Extension Specialist

MSU Department of Park and Recreation Resources

What we will discuss today is basic material for organizing a management plan or maintenance plan for an area to be used for park and recreation purposes. So often in the past, procedures for maintenance have just evolved. An area opens up and managers do what has to be done, and they keep on doing it for four or five years. Often there is a lot of overlap and inefficiency, and sometimes the areas are destroyed by misuse. Our position in the MSU Department of Park and Recreation Resources is that you should have a systematic approach to maintenance. If you follow a certain sequence of things to do, you have, in effect, a string that holds this whole handful of beads together and makes it into something more meaningful and useable.

My first experience with underwater parks was at Hanama Bay in the Hawaiian Islands. It is a magnificent place. It is on the southeast corner of the Island of Oahu. It is a volcano cone. The sea broke part of the rim and filled it with water. As time went on, a coral reef built up across the opening. A few years ago, the Hawaiians realized that pollution was beginning to wipe out this tremendously valuable asset. This living, functional coral reef was in an essentially protected location so the state developed the Hanama Bay State Park.

The park personnel have established an approach sequence to orient visitors to the park. First, you have a view of the whole area and then as you come down the trail to the beach there is a very interesting visitor center. This area has been zoned. Interpreting material introduces you to the area. The first display explains "here is how you classify your abilities as a swimmer" according to your ability for snorkeling and scuba diving, and so forth. That classification is then related to zones in Hanama Bay that are safe for divers and swimmers of those relative abilities. The zone map points out what things can be seen out on the reef, in the shallows, and so forth. Park lifeguards are also able to interpret the various areas to the swimmers.

The Process

We have a double responsibility if we are going to be in a park business, which is: 1) to provide a safe, enjoyable recreation experience and, 2) to protect the resource. That often is quite a challenge. The "systematic approach" is what lets us accomplish these two objectives.

Let's consider a quick review of the process. In park and recreation work, we begin with the recreation needs of the people. For whatever reason, what "recreates" John Veverka may not be the same thing that "recreates" John Schwartz. One may want to go out discoing and the other may want to curl up by the fireplace with a good book.

You begin with needs. These are expressed in our system in legislation which is rather specific in the form of laws. These are implemented through policies, which are guidelines to give us direction. Then the process is broken down further into

various management procedures and practices. Finally, it comes down to the scope of an agency's procedures and practices - we have certain goals, objectives, programs and facilities.

For example, you may have a goal that "we are going to increase the number of divers qualified to go out into the deep water." If we look back at Hanama Bay, we would likely try to increase the number of divers who are able and who are willing to go out and visit the reef. To do that, you might establish a series of objectives, including training programs, certification, qualification and so forth. These things have to be specific, measurable, and realistic. The latter are the criteria for writing good objectives. Working with citizen groups, you find that they have a sense of direction, but they lack the expertise to quickly reduce this sense of direction to some things that are specific, measurable, and realistic.

There are four questions and five steps that have to be considered as we begin our program.

First question: what is the objective? The person who doesn't know where he is going may end up somwhere else.

Second question: what is our legal authority? This relates back to state statutes, federal laws, and city ordinances. You've got to have some authority if you are going to spend the public's money.

Third question: how will it be paid for? Is it going to be revenue producing and pay for itself; is it going to be paid for with taxes; or is it going to be subsidized by grants? Before you start spending any money you had better have some idea where the money is going to come from.

Finally, what do you have to work with. Make a list of the available resources that you have; land, water, people, equipment -- all of these non-financial resources.

Now we come down to my "systematic approach": we have five steps - why, how, where, when and who, and how much?

No. 1 - What are the needs of the user? How many people want to fish? How many people want to scuba dive? How many people want to hike? How many people want to go swimming?

No. 2 - Then, for areas that will allow for these needs we set up groups of standards. Those standards, like objectives, should be specific and measurable and realistic. The standards are then applied to specific locations.

No. 3 - This creates a maintenance plan. If we expand the concept to include various activities, we could call it a management plan. This may include a security plan that involves all the law enforcement levels. We may also have a management plan for fire protection, diver rescue and so forth. But basically it consists of applying standards to specific areas in the park.

No. 4 - To implement the plan, we set up schedules and work programs.

No. 5 - We convert them to cash, and we have our proposed budget.

Use of Park Land

One of the basic things to this kind of planning is an understanding about how people use park land. If you have very few visitors, four or five a year, you can have a completely natural area for hunting, fishing, swimming, hiking, whatever, and they will hardly make an impact on the area. But as the number increases over time, we find that it is no longer possible to maintain an ecologically natural area. We must move up to what I call a cultivated areas -- cultivated zone. This is where we cut the grass and fertilize it, trim the trees, and do a number of things to make the area safer and to keep "human erosion" from destroying it. Sometimes that isn't even enough, and so we move up to what I call the constructed area. This is where we pave and bring in trees and planters, and put up protective railings. Parts of this campus are like this. This campus, of course, is a blend of all three areas.

In a constructed area you can handle a tremendous amount of human activity. Disneyland is an example. Since it is all constructed, it can be quickly reconstructed as it wears out. When a natural area wears out, it takes 50 or a 100 years, or maybe even 200 years to replace. If the soil is eroded away, it is going to take even longer than that for Mother Nature to put the soil back. So, in essence, as the number of people using our land increases, we had better increase the development levels to cope with them.

Looking at Land Use

These land use levels work out as a kind of a blend. Any park has a mix of development types. Some park managers would like to have a park be all one thing, but it never is. Even when you build a trail through a natural area, you are moving a little bit toward creating a cultivated area. When you put a black-top road through an otherwise natural area, even if you don't allow people to leave the road, you have added a small percent of "constructed" to the mix. We find that with a national or state park where the area is big, a lot of it is going to be natural, and a relatively small amount, cultivated and constructed. In a regional park, the mix may include a little more constructed because we will have a proportionately larger number of people per acre. An urban park may be heavily constructed.

Where does an underwater park fit in - should I include a blue sector. We could do that except that in the terms of our model, in most cases, the water part of the underwater park would fall into the essentially natural area, but as soon as you begin putting in breakwaters and things like that, it begins to be constructed. I'm not sure what an analogy would be in the cultivated area. There are a lot of constructed things that are put in, particularly on the edge, where the land and water come together. Remember that even an underwater park must have supporting areas on land for parking, shelters, rest rooms, service buildings, etc., and perhaps even a campground.

When we begin to develop our plan and consider our areas, there are a number of ways that we can classify them. Land use runs, in effect, from a wilderness to a formal garden along a large yardstick. As you move toward more and more cultivated and more and more constructed in the mix, you have to increase the amount of maintenance or the people will love it to death. Human erosion will destroy an area if you do not put something back into it through maintenance procedures.

What we have here are three things: the level of development which we just talked about; the amount of use it gets; and what we call a visibility factor. For example, the front yard of the State Capitol has a high visibility. The Governor sees it, the legislators see it, visiting potentates and V.I.P.s see it...hundreds and hundreds of people driving through the center of town see it; it has high visibility. We also have another factor, what I call "the unique, special, the only-one-for-miles." This, of course, usually tends to increase the number of people that come to see it and it also increases the visibility. The floral clock at the north end of the Niagara Falls Park on the Canadian side might be an example of this unique, only-on-for-miles kind of thing. A great many tourists will stop for just a few minutes to look at it and to take some pictures. Thus, these features need a high level of maintenance.

Classifying the Areas

If you are starting out with a brand new underwater park and are still in the design stages, you should look at areas for the mix of development you are going to have. A wilderness or a hiking trail are low use; a nature trail, a tent camp or a picnic area are medium use; roadside parks, softball fields, and floral gardens are all high use areas. Then we look at how much use there is going to be. Finally, you should take into account the visibility factor.

On the basis of this, you can classify your area. Most of the systems use a kind of A.B.C. classification. If you had all "highs," like an urban mini-park, that might be classified as an "A", a very intensively maintained area. A footpath through the wilderness would be classified as "low," not in terms of value, but in terms of its need for maintenance. Maybe once a year sombody walks through this wilderness trail, and if there are a few beer cans they take them out with them. In that urban mini-park, someone may have to pick up the trash four times a day.

The next step begins with objectives. These can be general or specific. Decide how people will use the area. To take care of these objectives, you prepare a series of standards. The standards are then applied to a specific area in a maintenance plan. These plans have two parts; a written part and a graphic part. The written part includes books, manuals, procedures. The graphic part includes maps, photos, sketches, overlays and so forth.

The Three-S Approach

There is a relationship between these factors which Vern Hartenburg calls the three-S approach...site, standard, and supervision. The site may be a natural area or a very intensively developed area. The standards say what should be done and how often. Finally, there is supervision. Who is going to do the work and how often are they going to do it? Who judges what is well done?

I'd like to spend a few minutes talking about standards because this is a subject that is basic to a maintenance plan. Too often the only place that there are any real standards is in somebody's mind. The supervisor may have different standards than the foreman, different standards than the worker, and different standards than the ball player. The use of a written standard improves the communicaton so that at least all parties are concerned about the same things. For example, a standard for ball diamonds can be arranged in table form, including the maintenance items, backstop, player benches, diamond, fenced warning tracks, and irrigation. The statement on purpose

indicates intent; to provide safe playable diamonds for three intensity levels of play, called Class A, Class B, and Class C, with a system of standards set up for each level of play or activity. This can also be done for turf maintenance, for road maintenance, for trail maintenance, and so forth.

In each case, there is a classification level set up according to the use. For trail maintenance, you might have grading, litter pickup, brush control, and so on. There would be a statement concerning how often each task is to be done.

Standards are used in management to control operations. They are pre-established measures. They should be worked out before the fact. When you bring the people in to discuss use of the area, you discuss the standards that you are going to setup. Once you have established them, you have something by which success in achieving your objective can be measured. The key is measurement.

Another definition of standard is the description or designation of conditions which will exist when the job is "well done." You may recall when you were a kid, or maybe even yet, you scrubbed up the kitchen floor. When you finished, you thought it was pretty good, but your mother came in and said "When are you going to finish that dirty floor?" Your definition of well done and hers were not identical.

These things can become very detailed. There is a danger in making your standards so detailed, that the worker, for example janitors, will get to the point where they are so concerned about sweeping thirty strokes a minute that they forget that the objective is to have a clean floor. Our basic objectives, you remember, are to provide a safe, satisfying experience and to protect the resource. Finally, these standards should be written down and included in an operations manual and maintenance plan.

Kinds of Standards

There are two kinds of standards. The first is a classification standard, based on how an area is to be used and how these predictions are used to design an area. For example, if you are going to play baseball you have to have a field of certain dimensions. If you are going to play soccer, you have to have different dimensions than if you were going to play football. As you think about your underwater park design, you must think about underwater park useage. The point is that you have to set up these use areas in terms of classifications for certain kinds of uses, and we have to do certain things to the area. For example, if we are bringing people down a steep slope, then switchbacks have to be made to provide a certain grade.

The other kind of standard is a performance standard, the measure of the work accomplished. Going back to our football field analogy, our performance standard is to make ten yards within four downs. These performance standards: How long should it take sombody to clean five rest rooms or mow five acres?

Criteria for Standards

Maintenance work traditionally has been harder to measure than production work. How long does it take you to fix a faucet at home? "It depends," but if you are installing a brand new faucet with clean threads you can be quite precise in estimating.

1. Standards should be achievable in terms of whatever the technology is.

2. Standards should be communicable in terms understandable to both parties.

3. Standards have to be realistic. The standard should be in balance with the objective.

It has been said that you "don't build a backhouse with a micrometer." In other words, the standards should be sufficiently detailed for the purpose but not more. For building an outhouse, you need a ruler but measuring to the inch is probably good enough. On the other hand, when working on the engine of your car, you have to have more precision.

The "standards approach" has this powerful advantage. It encourages new methods and procedures, not on a "let's sit down and talk about it" basis, but on a basis of "let's try it out, measure what happens, and then decide whether we want to do it again." If you do not have a system of standards, all you have is a gut feeling that something is wrong. You have no way to put your finger on what this deviation is. So these are our standards, and we now take the standards and apply them to specific areas on the maps of the parks. Here is one that looks a little more like a potential underwater park situation. This is the maintenance plan for Chickamunga Dam Reservation. The standards are the written part. The cross-hatching on the map shows where the standards are applied.

Of course, there are your water areas. You can map the underwater portion and show the people where the acceptable uses would be. The swimmers of a certain ability can dive to a certain depth. You could indicate that with this system of colors. Set the maintenance standards to match what we might call activity standards. Swimmers of a certain ability can use certain areas and that is all in writing. Your lifeguards know it; your park security personnel know it; and your program leaders know it. It is a good system; it communicates. You can have a copy in the main office, five hundred miles away. If you call up on the phone, both people can look at the same map and can communicate effectively.

Now, having developed the plan, we are going to talk about the next part, and in many cases the most important part -- that is, the "make it happen" part. Because until you make it happen, it doesn't count for anything. The payoff is when people can use it. That is our objective. I might like to have two thousand acres of beautifully maintained estate, and if it is my estate, that is great for me. But if I am a public park manager, the people are supposed to be getting some benefit out of it. Otherwise, I am wasting the tax money or the money that they pay at the gate.

Implementing the Plan

In implementing a plan, you need a work plan - planned work. Second, you need a system of work load control. Next, you set up time schedules and finish with reports and records. Now you might say "aren't reports and records the same?" They could be, but I like to differentiate. I consider the record is the basic data: how many people used our underwater park on a certain day; how many tourists compared with how many students. That is data; that is a record. When you send the data in, in the form of a report, you should look for something else. You should look for a professional judgment - "There were fifty swimmers; this was below average." You add judgment factor. Data plus judgment by the professional or manager becomes a report.

When we implement a maintenance plan, there are a series of steps. We identified the various tasks that have to be done. Some, like cleaning rest rooms, cutting grass, and sweeping the sand out of the gutter are routine. They can be set up on lists and at certain times of the year, certain times of the month, certain times of the day these things are done. You should prepare written job instructions for each one of these. For the non-routine things, you should set up a work order system. In other words, routine is to empty the trash container, non-routine is to repair it when somebody backs a truck into it and smashes it. Then you must assign responsibility for routine or non-routine work to someone. Next you should establish a system to implement it. Basically, this job schedule work program is the implementation system for the plan. You get plans, projects, planning inputs, into special (the non-routine) and the routine area. Inspections are made by every one of the department heads and workers and include input from the public and the political decision-makers. These are developed in lists as part of the major plans.

On a weekly or a monthly basis at department head level, there is a priority allocation made. Then allocation of work orders are made out to the divisions and crews. You also request equipment or materials, and there must be enough lead time here to allow time to order. With some things the lead time will be long enough that you will only order once a year. If you are going to need it by Memorial Day and it takes four months to get it, you can see how you have to back the order up to February 1st. When the crew needs it on Memorial Day, it will be there ready and waiting. This could be anything from weed killer to shovel handles to first aid bandages to whatever. Time here is the critical part; you need to plan. So priority allocation here may be working ahead on some events that might not take place for several months. Other management tools include: calendars, lists, charts, critical path networks and things of that sort. Then implement it. When the work is completed, the crews make a daily report which assembles into a weekly report. The monthly and annual reports into budget planning and into operation planning.

Before we go into a new thing like underwater parks where there is not much data, remember, as you start operations, that it is very important that you get this new data -- make the records, and make the reports so they can be useful.

Estimating Future Costs

There are three methods of estimating cost in the future. 1. Supervisor's method where the experienced supervisory says "it will take about three hours to clean up that beach area." The supervisor knows about how long it takes. It is usually a "gut feeling." 2. Historical data method: that is, how long it took you the last time, the last year, and how long it took somebody else. 3. Work sample method: Sometimes you don't have any historical data. It is a brand new operation and a brand new piece of equipment. What happens when you do not have any experienced supervisors? Some people say that you just have to guess. Well, there is a better way than guessing, and that is the work sample. You go out and do an hour or a day of whatever it is -- tree planting, or cleaning the beach or whatever. As soon as you have generated a sample record on your own beach, you then can plug it back in for the beach and season as a whole. The essence is you take a sample of what is to be done, and you use that to project the whole job. The supervisor's estimate does a couple of things that the other ones do not do very well. The supervisor can make allowance for the individual workers he has on the job. Supervisors should know what skills his workers have and how well motivated they are. Secondly, the supervisor can make allowances for weather conditions. He may say "Ordinarily we can plant twenty trees a day, but the ground

is frozen and the wind is cold. If we get fifteen in this kind of weather, we will be doing pretty well." In other words, the supervisor's estimate should actually be used in connection with other methods.

SUMMARY

We have spent this time talking about Park Maintenance procedures. The process takes us from needs to legislation to management procedures. We have talked about four questions we have to answer: 1) What is it we are going to do?; 2) What is our authority to do it?; 3) How is it going to be paid for?; 4) What resources do we have? We have talked about maintenance planning where you set up the standards and apply them to a geographical area. We use written and graphic forms to facilitate effective communications. Then we have talked about ways that we can implement the plan.

You are starting out with something new -- underwater parks. We have tried here to give you a framework. You have to go out now and "swim in your own park." Plug it in and use it. This system has been in operation for quite a while in different places of the country. It is a system that will allow you to come up with answers, and it is also a system that will provide continuity. It will continue to run even though people will come and go.

HISTORICAL CONSIDERATIONS FOR THE MANAGEMENT OF UNDERWATER PRESERVES IN MICHIGAN

Charles A. Hulse

Ph.D. Candidate, Department of Anthropology, Michigan State University

Introduction

The concept of underwater park/historical preserves revolves around two basic premises: 1) that underwater historical resources such as shipwrecks have value both as historical/archaeological phenomena as well as recreational features; and, 2) that these resources can be both protected and used without harm to the resource. These two assumptions form the theoretical basis for research at Michigan State University funded by Michigan Sea Grant and administered through the Department of Park and Recreation Resources. The current phase of research on underwater park-preserves involves the formation of management guidelines to assist the Michigan DNR in designating and regulating underwater preserves as mandated in the recently adopted House Bill 4601. These guidelines will be directed toward the long-term goal of underwater resource management for the benefit of protecting resources of historical or recreational value.

To designate, evaluate, and manage underwater preserves in a sound and sensible manner, a number of questions must be answered regarding the location, condition, and extent of the resource base. This paper raises some of these basic questions and provides some partial answers.

Question #1 -- What are the resources that must be managed?

According to House Bill 4601 (an amendment to Act 173 of the Public Acts of 1929; now designated as Act 184 of the 1980 Public Acts) the resources of historical or recreational value include, but are not limited to: anything "relating to, or illustrative of, Michigan history, including the statehood, territorial, colonial, and historical and prehistoric Indian periods." Pilling (1977) notes that there are seven major types of historical resources that may occur on the bottomlands. These are: 1) shipwrecks; 2) items from a shipwreck but not attached to it: 3) items dropped or thrown from vessels; 4) pilings of former fishweirs, docks, wharfs, dams, etc.; 5) items dropped or thrown from docks or wharfs; 6) bottomland dumps; and, 7) former dry-land sites that are presently wholly or partially submerged. Although this list should not be regarded as complete, it seems to illustrate the wide variety of resources on Michigan's bottomlands. Since shipwrecks are the most widely known and publicized of historical resources, they are often mistakenly believed to be the only sites worthy of protection and scientific investigation. Rather, shipwrecks are only one type of archaeological site which can provide valuable information on Michigan's historic past. The new legislation recognizes this fact, and it seems reasonable to assume that the state should give equal protection to all resources that have this historic value. Underwater preserve areas should therefore protect all types of historic sites on the bottomlands and not only the more obvious shipwrecks.

Question #2 -- Where are these historic resources located?

As a provision of the new legislation, up to five percent of the total bottomland area of Michigan can be designated as preserve areas. In area, this translates into approximately 1,930 square miles (Sommers, 1977). Although this seems like a great deal of space, it should be remembered that there are 6,000 to 10,000 shipwrecks in the Great Lakes, with perhaps a quarter of these lying within Michigan waters. In addition, that leaves almost 37,000 square miles of the bottomlands outside of possible preserve areas. The five percent area allotted for the preserve system should be used wisely if the maximum number of historic sites are to be protected. To facilitate the efficient and intelligent use of this area, the locations of historic sites must be carefully documented prior to the establishment of preserves. After all, it would be very foolish to create a preserve area containing only a few historic sites when another area of similar size could protect far more (assuming that the resources are of equal historic value).

At the present time, the State of Michigan does not have sufficient information on underwater cultural resources to begin an extensive designation program for preserve areas. The only sites currently known are those in use by the diving community. For the most part, these shipwrecks represent a biased view of the total possible shipwreck population and are a fraction of the total number of historic sites yet to be found in the bottomlands. New wreck sites are discovered each season, and, as electronic remote sensing equipment becomes more sophisticated, new discoveries will most likely increase at an even greater pace.

Despite the importance of these historic resources, no comprehensive academic research has been conducted to examine potential site locations or wreck patterning. Wright's (1972) study attempted to deal with the location of wrecks, but fell way short of arriving at any meaningful understanding of the problem at hand. Since that study was conducted by a researcher at an out-of-state university, the State of Michigan does not currently have access to even the raw data that was used in the research. This necessitates time consuming correspondence every time historical information on a particular vessel is sought. What is clearly needed is a comprehensive study of Michigan shipwrecks, as well as the creation of a state data file so that the precious five percent area can be used to the fullest extent.

Question #3 -- What is the historical significance of these resources?

The question of historical significance is very complex and cannot be dealt with in great detail at this time. However, some basic suggestions can be made which would begin to address this problem. First, land sites are evaluated for historical significance through a criteria system developed for the National Register of Historic Places. Generally speaking, these same criteria can be applied to underwater historic resources with only slight modification. To accomplish this, sites must be evaluated on a site-by-site basis by qualified individuals familiar with the resource. A typically trained land-based archaeologist would not have the needed expertise to evaluate sites such as shipwrecks. Therefore, a specialist in marine archaeology, preferably with a Ph.D. in anthropology, is needed to evaluate shipwrecks for historical significance. This evaluation process is the key to the preserve concept since the legislation specifically mandates that "historically valuable" cultural resources are to be protected. Not all shipwrecks have historic value, nor do all underwater sites of the other types mentioned previously. A process of evaluation for historical significance is an essential ingredient

for the formation of underwater preserves in Michigan. This evaluation process must be undertaken prior to the designation of preserves. If preserves are created first and evaluated later, then it may be found that these sites contained within a given preserve area are of little or no historic value. Although the legislation also mentions that recreational value is to be considered, it would be unwise to designate preserves based solely on this principle. Since there are many shipwreck sites that are both historically and recreationally important, an effort should be made to search for sites with multiple use potential. It should also be remembered that the new legislation was an amendment to an existing antiquities act and that the emphasis should therefore be on the historic aspect of underwater resources and not solely on the recreational potential of the sites.

Question #4 -- What will be the impact of the preserve system on the resource base?

Just as in the previous three questions, the answer is basically that we do not currently have enough information to assess the problem. Regarding the effects of the preserve system on underwater cultural resources, it can be assumed that, if no specific management proedures are established to limit access, the use of these resources will significantly increase. The preserve system, as it is now being formulated by the Michigan DNR, will not severely limit diving on underwater historic sites such as shipwrecks. The question then remains as to the effects of increased use on these sites. This depends to a large extent on the type of use that these sites will receive. If use is limited to visual reconnaissance only with salvage or relic collecting actively discouraged, then the impact on the resource would be considerably minimized. If, however, these restrictions are either not required or not actively enforced, then it is very likely that significant damage will be sustained which will severely limit the value of the resource for both recreation and for historical and archaeological investigation. The archaeological component of cultural resources is particularly sensitive to even small amounts of disturbance. Sport divers often selectively salvage vessel parts or cargo, and such activity would be disastrous to the resource base. This result could prove to be the exact opposite of the state's intentions and would not fulfill the mandate of the new legislation.

Damage to the historic and recreational resource base could be lessened by numerous means. These are discussed in a recent Michigan Sea Grant publication (Hulse and Holecek, 1980), and will not be reiterated in detail in this discussion. There is, however, one major point that is worth repeating. Namely, that it would be prudent to initially establish one preserve area (perhaps in Alpena/Thunder Bay) then to closely monitor that area for damage. This would prevent the wholesale destruction that could result if many preserve areas were established at one time without the knowledge of the effect upon the resource. A test area would provide the state with valuable information on the extent and type of impacts that would occur so that future preserve areas could be managed in the most resource and cost-efficient manner possible. Alpena would be an excellent candidate for this test since it contains many known wreck sites that are of only moderate historical value. It would be unwise to create preserve areas over resources that have not been assessed for historical significance, since the likelihood of their destruction would increase.

Question #5 -- How can harm to the resource base be eliminated?

This is a question that has no single solution. Rather, the protection of underwater cultural resources in preserve areas will most likely be accomplished by a combination of varied mechanisms, including traditional law enforcement, management directions, and public education. Law enforcement, for example, is only one means of protection

available and alone cannot promise full protection of the resource. If an individual wants to steal from a historic site, it is probable that the person will eventually succeed despite attempts at enforcement. What is needed, therefore, are methods which attempt to modify behavior away from destructive actions. The use of interpretation, for example, offers this advantage while both providing an entertaining and educational experience. John Veverka discussed this subject in greater length so that repetition here is not necessary. It should be cautioned that interpretation alone is not the cure-all for this problem. Again, what is needed is a combination of protection devices so that interpretation, law enforcement, and other management techniques can complement each other's strong and weak points. Management procedures such as diver registration, charter boat licensing, and a zonal approach to use, all offer other means by which the preserve areas could be better protected. This latter approach (zonal management) consists of an evaluation process by which such factors as historical significance and recreational value can be assessed. Based upon this process, some portions of a preserve area would be managed differently than others. If a site such as a shipwreck is found to be historically and archaeologically important, then that site could be declared off limits to use. This would result in a reduced area to be physically enforced and would fulfill the protection mandate of the new legislation. Again, the problem remains that the state does not currently have the personnel qualified to evaluate resources for historical value. Clearly, what is needed is a specialist in underwater archaeology to evaluate and monitor the preserve system.

Since the sport diving community causes much of the destruction of cultural resources, another option available is to work with this group to better understand their actions. Rapport between state officials and the diving community is an absolute necessity in the management and protection of sites. To this date, the relations between the two have been very strained, with many of the problems resulting from a mutual lack of understanding about diving and the role of the state in the management process. The sport diving community could be one of the state's greatest assets in the protection program if they would be consulted in the planning process.

Question #6 -- How can we answer questions #1-5 without spending any money?

This is probably the central question to the whole preserve system, especially with the economic downturn currently felt by Michigan. Despite the hard times now upon us, there are still ways to fund and administer the preserve program. Federal monies linked to recreation, tourism, or historic preservation have not yet dried up and are potential revenue sources that need only be tapped through creative grant writing. Likewise, many of the topics discussed in this paper could be dealt with by volunteers from the state's community. Needs such as criteria for determining historical or recreational value could be met through greater interaction between state decision makers and university archaeologists, recreational specialists, and professional organizations. Other parts of the preserve program such as the protection schemes could be financed through local municipalities which border the areas or by volunteer organizations involved with interpretation or local history. The means of financing and operating the preserves that is decided upon will direct and limit the scope of the program. All these matters must be considered prior to the creation of preserves so that management and protection of the resource base can begin at the time of designation. It would be counter-productive to have preserves created on paper without the desire or ability to manage them in a practical manner.

Conclusion

These six basic questions must be answered before underwater preserves in Michigan are designated. Pressure on state government to designate preserves before these questions are resolved will result in the loss of a valuable resource to the state, as well as the continued loss of credibility in state government by all parties concerned. The legislation adopted by state government was an expression of concern for the protection of a declining, valuable resource. Without a concern for not only the letter, but also the spirit of this law, the state cannot hope to make the preserve system fulfill its mandated function.

REFERENCES CITED

Hulse, Charles and Donald Holecek. 1980. Michigan's Coastal Waters: A Pilot Study in Underwater Cultural Resources. Michigan Sea Grant. Ann Arbor, Michigan.

Pilling, Arnold R. 1977. Archaeologist, Wayne State University, personal communication.

Sommers, Lawrence M. 1977. Atlas of Michigan. Michigan State University Press. East Lansing, Michigan.

Wright, Richard J. 1972. Inventory of Shipwrecks within Michigan Coastal Waters. M.S. on file, Michigan Department of Natural Resources, Lansing, Michigan.

US Department of Commerce
NOAA Coastal Services Center Library
2234 South Hobson Avenue
Charleston, SC 29405-2413

