Illinois Shipwrecks:

The Past

The Present

The Future

Daniel G. Yoder

Illinois-Indiana
Sea Grant Program

For additional copies, contact
Illinois-Indiana Sea Grant Program
University of Illinois
65 Mumford Hall
1301 West Gregory Drive
Urbana, Illinois 61801

IL-IN-SG-R-92-13 $5.00
100 October 1992
COMM-NA-98AA-D-SG058

Published by the Illinois-Indiana Sea Grant Program with program development funding from the National Sea Grant College Program, National Oceanic and Atmospheric Administration, U.S. Department of Commerce. This work is a result of research sponsored by NOAA, National Sea Grant College Program, Department of Commerce, under Grant COMM NA89AA D-SG058. A publication of The Board of Trustees of the University of Illinois. The U.S. Government is authorized to produce and distribute reprints for governmental purposes notwithstanding any copyright notation that may appear hereon.

Issued in furtherance of Cooperative Extension Work, Acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Donald L. Uchtmann, Director, Cooperative Extension Service, University of Illinois at Urbana-Champaign.

Illinois Shipwrecks:

The Past

The Present

The Future

Daniel G. Yoder
Graduate Research Assistant
Department of Leisure Studies
University of Illinois at Urbana-Champaign

Illinois-Indiana
Sea Grant Program

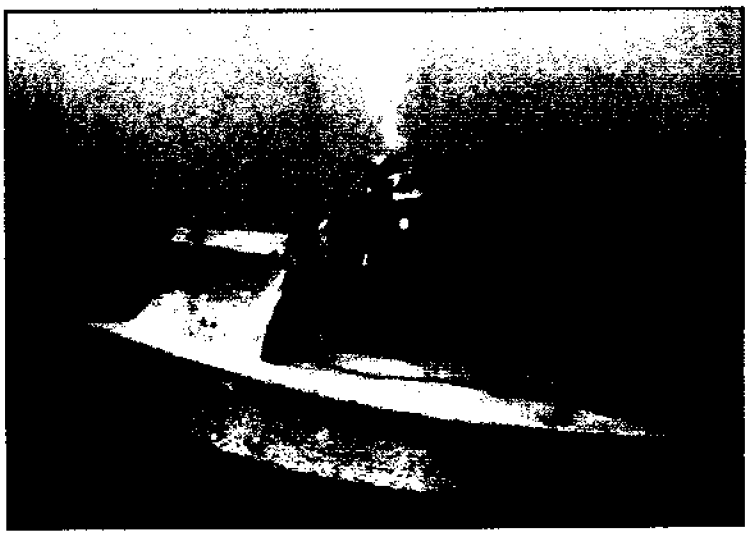
Contents

Introduction

Whether or not we are aware of it, each and every one of us is losing something of great value. Every day historical and archaeological artifacts are being taken from us, and they can never be replaced. This report will address a growing concern in the state of Illinois and across the country. It involves artifacts not only on our land, but in our seas, lakes, and rivers as well. These valuable resources are being discovered and destroyed at an alarming rate. It is an issue that must be addressed before it is too late.

Lake Michigan bottomlands are home to many valuable resources ranging from primitive camp sites and ancient oak stumps to more recent U.S. fighter planes. A captured German submarine from WWI and General Motors prototype cars from the 1920s lie undiscovered on the muddy bottom. A vast and surprising variety of other objects, large and small, valuable and not so valuable, are also in the lakes; however, most public attention has been directed to the lakes' sunken vessels.

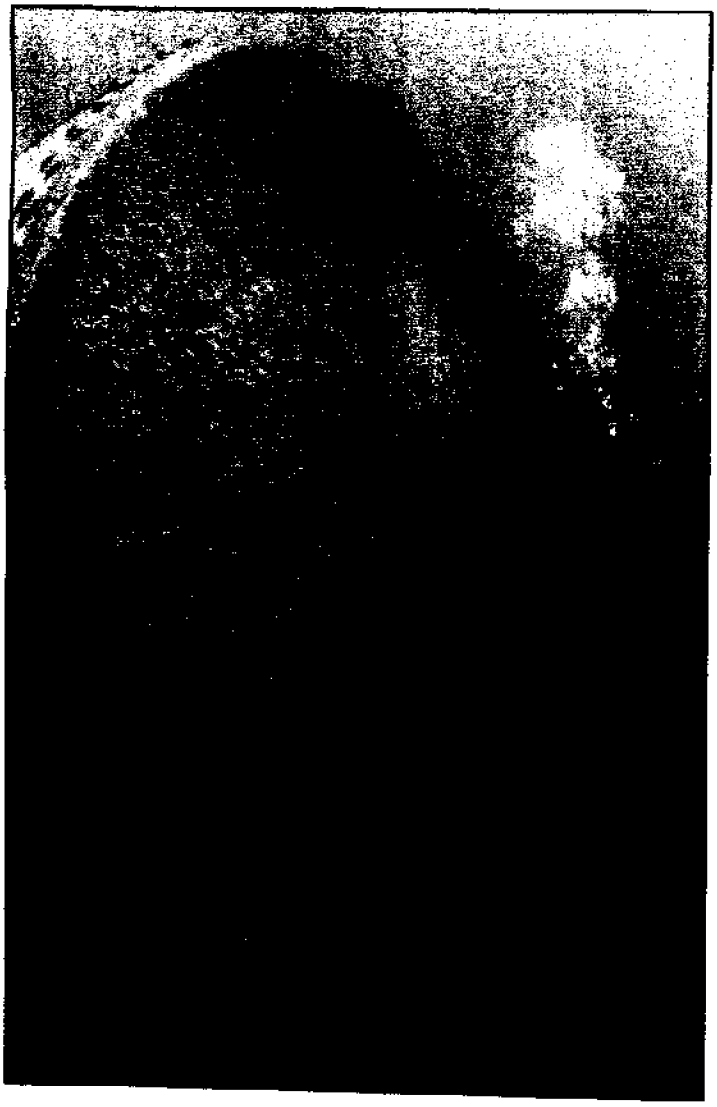
Estimates of the number of shipwrecks in the Great Lakes range from 6,000 to 10,000. Several hundred of these valuable resources lie in the Lake Michigan waters that are within the jurisdictional boundaries of the state of Illinois. The state also has a number of other waterways (rivers and canals) that, while not boasting such huge numbers, contain assorted ships and related resources. Objects thrown or lost from floating or sunken vessels, and wharves and piers, constitute the majority of these related resources.



End view of curving stern section on* City of St. Joseph *which sank in Lake Superior east of Eagle Harbor, MI, 21 Sept. 1942

A brief look at the history of Great Lakes shipping will help account for the large number of vessels on the lakes' bottoms. Lake Michigan, as well as the other Great Lakes, has served for hundreds of years as a major shipping medium for the movement of goods and people. Fur trading and copper mining provided the impetus to the initial large scale use of the lakes for transportation. Various bulk cargos (grain, iron ore, timber, etc.) were shipped from different points to the cities for processing. The ships that were performing this function can be likened to the trucks that haul materials along fairly predictable routes on a regular schedule. Today the lakes are still the site of an enormous amount of maritime activity.

Sunken Ships



End view of well- preserved ship's boiler, on Tioga *which ran aground in Lake Superior off Eagle River, MI, 26 Nov. 1919*

With the tremendous shipping activity taking place on the Great Lakes on a daily basis, it was inevitable that ships would be lost. Ships went down from a variety of causes (structural malfunctions and collisions with other vessels and objects in or near the water), but poor weather conditions appear to have played a direct or indirect role in the majority of ship accidents. Sudden storms with winds of 75 miles per hour and lasting for several days are not uncommon on the lakes. Many of the large cargo ships of the late nineteenth century were particularly vulnerable to the weather, and as a consequence never made it across the waters on their final voyages.

Several hundred of these vessels may lie on the bottom of Lake Michigan within Illinois jurisdictional boundaries. The state of Illinois has jurisdiction over 976,640 acres or 7 percent of the bottom of Lake Michigan, including 63 miles or 4 percent of the lake's shoreline. Many of the wrecks that have been located are remarkably well preserved, because the extremely cold fresh waters of the Great Lakes are relatively free of wood boring organisms commonly found in salt water. Divers have reported finding intact rope on nineteenth century shipwrecks. Undiscovered vessels lying in deeper and more remote waters of Lake Michigan may be even better preserved.

Obviously, these well preserved artifacts from the past are extremely valuable historical and archaeological resources. Those who imagine vessels carrying silver or gold will be disappointed. The holds of these cargo ships that plied the often treacherous waters of the Great Lakes certainly hold treasures, but they are treasures in the sense that they afford a wonderful glimpse into the region's maritime heritage.

Archaeologists can gather much information from sites which are complete and undisturbed. The position and location of the ship, the ship's cargo, the mechanics and structure of the vessel, and the personal artifacts of those who were aboard the ship

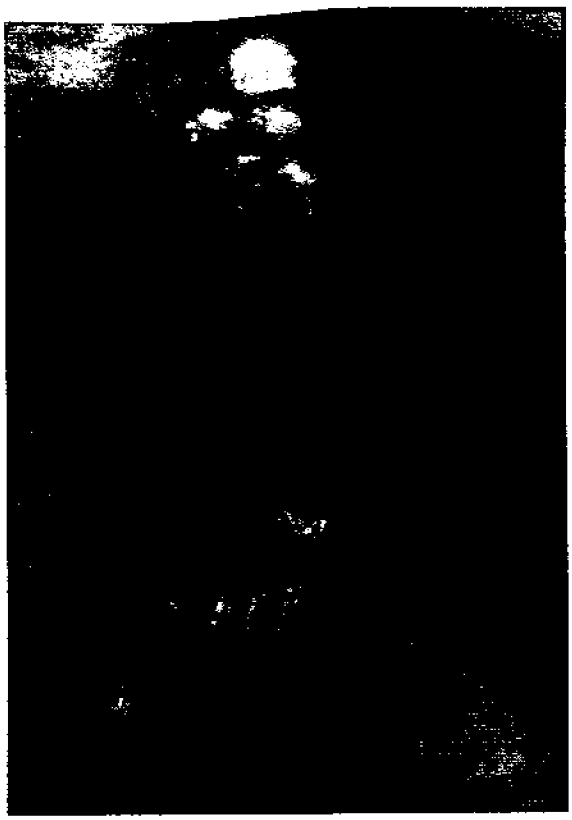
can provide detailed information about this period.

Unfortunately, while most people understand the value of protecting our natural resources, fewer understand that it is similarly important to protect our historical resources. These are fragile and non-renewable resources and if not properly managed can be forever lost.

On the average two or three new shipwrecks are discovered each year. More divers are using Lake Michigan each year, and as advances in cold water scuba gear allow divers to go deeper and stay down longer, more resources will be discovered. New equipment, the most notable being sonar, and techniques designed specifically for underwater searching have also led to increased wreck discoveries. Many estimate that there are thousands of ships lying yet undiscovered. Recreational divers have been responsible for the majority of recent discoveries of the valuable resources (Smiley and Holocek, 1982).

Unfortunately, many of these valuable resources have been irreparably damaged following their discoveries. Most shipwrecks are extremely fragile, and some have been damaged unintentionally by divers' misplaced kicks or grasps at the wrong moment. Some shipwrecks have received considerable damage from the anchors of other vessels. In an effort to get as close to the shipwrecks as possible anchors have often been dropped on these fragile remains.

This type of resource depletion is relatively minor and perhaps even forgivable in comparison to the damage that has been done purposely. Salvaging has been taking place in the Great Lakes for quite some time with reports of operations occurring before 1860. Large and small scale salvage operations pose a serious threat to these underwater resources.



Draft marks visible on Tioga rudder indicate weight of cargo.

Salvagers fall into two categories: those who salvage commercially with the aid of heavy equipment and elaborate and ingenious techniques, and those who salvage as a hobby or as an accessory activity to their primary activity of scuba diving. Both groups severely impact the shipwreck resource.

Salvage of both types is taking place in the Great Lakes today. The Coast Guard cutter *Mesquite* was intentionally scuttled in 1990 after it had been severely damaged. Within hours of its coming to rest on the bottom of Lake Superior recreational salvaging began. So many items were removed by divers that the shipwreck came to be referred to as the 'underwater mall' (Diving Times, 1991). The *Lady Elgin*, a side-wheeled steamer which sank off Chicago's north shore in 1860, is currently in danger of being salvaged by a commercial salvager. A federal court is in the process of determining if salvage efforts can be undertaken because

Set of mooring bitts used to secure dock lines on City of St. Joseph attract interest of salvagers.

the issue of the ownership of the vessel is unclear.

Recreational salvaging is not a recent phenomenon. When scuba gear became available to the public in the 1950s, Great Lakes divers adopted a 'finders keepers' rule [Vrana, 1989]. Within the diving community there developed an unwritten code of ethics for recreational salvaging. The diver who first discovered a shipwreck laid informal claim to the site and its contents; word quickly spread that only the diver who was responsible for the discovery had the privilege of removing artifacts at each site.

It appears that most of the early Great Lakes divers participated in the removal of artifacts from sunken vessels [Vrana, 1987a]. Several years of this type of behavior have done untold damage to this cultural resource. So much has been found and removed from the lakes' bottoms that one archaeologist was moved to comment that there is more stuff in divers' basements than in museums.

The current amount of salvaging by recreational divers is difficult to determine. There is mixed evidence to the claim that salvaging in the Great Lakes is decreasing. Chris Kohl, an authority on Great Lakes shipwreck diving and member of 'Save Ontario's Shipwrecks,' may have reflected the sentiments of many with his comment in *The Great Lakes Reporter* [1991, Jan.]: "Divers in Michigan feel that any wreck not in a preserve is fair game" (p. 10).

Recent experience indicates that salvaging is still a fairly common practice. On the other hand, and there is evidence to support this perspective, the salvage mindset may be giving way to a conservation or preservation ethic (Vrana, 1989).

In 1976, a bill was proposed in the state of Michigan which would have severely limited the kinds of salvaging which were taking place in the Great Lakes at that time; it was soundly defeated. Four years later almost identical legislation passed with very little resistance. It has been suggested that, during this four-year period, divers had witnessed a serious depletion of their shipwreck sites [Michigan Underwater Preserve Council, Inc., 1991]. Recreational divers were the driving force behind the legislation and implementation of shipwreck preserves in the state of Michigan as well as in other states.

Whether the salvaging is done by commercial salvage operators looking for something of value to private collectors, or by weekend divers who desire a small memento of their experience, it has become increasingly clear that uncontrolled salvaging is incompatible with other uses of the resource. Federal and state governments are recognizing the value of these resources and the continual threat to their preservation. As a result they have taken action in hopes of reducing and ultimately eliminating the unlawful salvaging of shipwrecks.

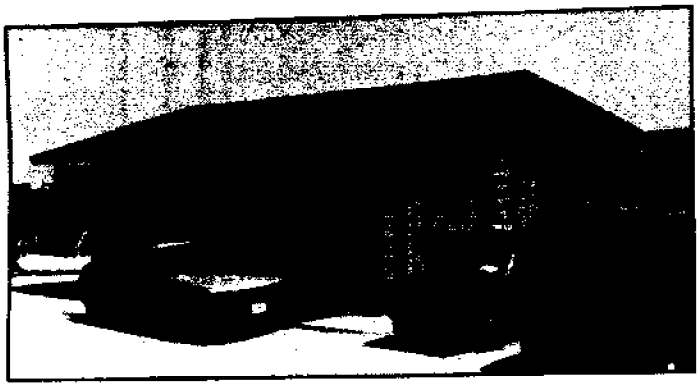
Sport Diving

One of the fastest growing forms of recreation in the Great Lakes is scuba diving. The Professional Association of Diving Instructors (PADI) cited 2,249,000 active divers in the U.S. in 1983. By 1987 their reports indicated a 24 percent increase with the overall number of active divers in the United States at 2,982,000. If rates of increase are maintained, by 1992 there would be 3,895,000 active divers in the country (PADI, 1988).

PADI figures for Midwest divers (including the states of Michigan, Wisconsin, Illinois, Indiana and Ohio) show similar rates of increase with 305,864 divers in 1983, 402,570 divers in 1987 and a projected 506,350 divers in 1992. There seems to be a significant increase in scuba diving interest as evidenced by a Gallup poll conducted in 1980 which indicated that 5 percent of Americans (approximately 11 million people) would like to try scuba diving in the future.

Charterboat operator provides site information to divers.

Shipwrecks as a Multiple Use Resource



Dive shops represent spin-off business of diving interest.

An understanding of the value of shipwrecks begins with their consideration as the multiple use resource that they truly are. There are obviously different groups who are interested in the shipwrecks of Lake Michigan; each group has its own particular perspective. Archaeologists, anthropologists and historians are primarily interested in the resource for its potential to provide insight into previous Great Lakes shipping activities. Scientists in other fields view the shipwrecks as an underwater laboratory useful in their particular research.

Recreational divers see sunken vessels primarily as a resource for personal benefits. Fishermen and wildlife specialists are likely to view the sites' key function as providing important habitat. First and foremost in the minds of dive shop and charterboat operators are the benefits that shipwrecks provide for the diving business. The commercial salvage sector may think of the sunken watercraft as a key resource for, among other things, the provision of materials for the building of novelty furniture and collectors' items, or for the recovery of valuable cargo such as copper for resale.

Since these wonderfully diverse resources are, according to federal law, held in trust by the states for all citizens, shipwrecks cannot be interpreted as the sole domain of any single group. If not managed properly, a sense of competition rather than cooperation may develop concerning the shipwrecks. Groups may feel that their own interests in the resource will be neglected, and this disposition often leads to conflict among the different users. It should be noted that some of these fears are substantiated by previous experiences. However, experience has also proven that agreements can be reached that afford access to all users.

Compromises have been arranged which promote proper resource usage. The cause of resource preservation has been furthered in the process. The overall protection and preservation of these valuable resources must be a priority for those responsible for the allocation of the rights to shipwreck usage. The multiple use concept which recognizes the diversity of the resource and its ability to meet a variety of needs can provide the various segments expressing different interests with a workable solution.

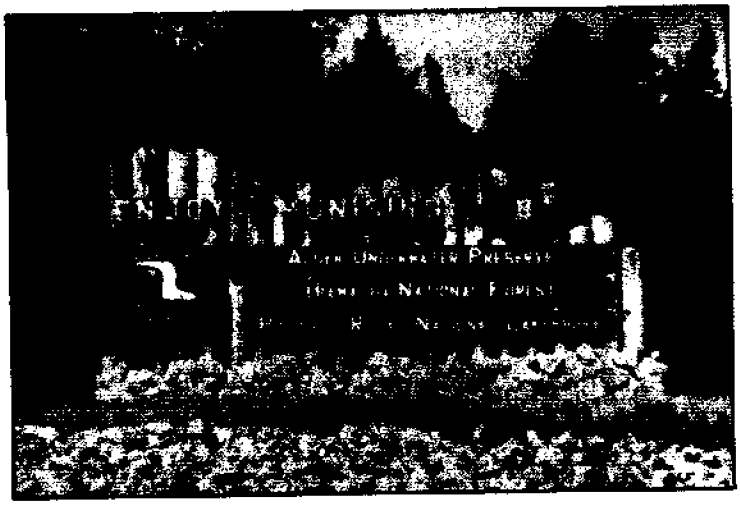
There is, in addition to the shared benefits, a shared set of responsibilities which should not be overlooked. This process of addressing the interests of all parties may be laborious and time consuming. In writing about the state of Michigan's experience, Vrana and Halsey (1991) noted, "One fact is clear, it has taken more than a decade to forge legislation accepted by various shipwreck interest groups" (p. 11).

The Michigan Example

Michigan has been very active in managing its underwater resources for a number of years and may serve as a valuable model for those states facing the same situation. Michigan currently oversees a total of nine underwater preserves: four in Lake Superior; four in Lake Huron; and one in Lake Michigan. These preserves include 1900 square miles of Great Lakes bottomland, an area roughly the size of the state of Delaware.

The first significant step taken in Michigan occurred in 1980 with the passage of Public Act 184. This legislation was in large part developed through the efforts of various citizens and local organizations, notably sports divers. P.A. 184 allowed for the protection and preservation of those properties which were determined to have cultural and recreational value. The total amount of lands designated as bottomland preserves could not exceed 5 percent of the submerged areas within the state's jurisdiction, and the preserves were to be managed by the Department of State and the Department of Natural Resources (Vrana, 1987b).

The Alger Underwater Preserve in Lake Superior and the Thunder Bay Underwater Preserve in Lake Huron were established in 1981. Successful experiences at these initial preserves led to the designation of the Straits of Mackinac Underwater Preserve in Lake Huron late in 1983; The Thumb Area Underwater Preserve in Lake Huron followed in 1985; and Lake Superior's Whitefish Point Underwater Preserve was established in 1986. Four more areas have been added to the list of preserves since, including the Manitou Passage Underwater Preserve (Lake Michigan), the Keweenaw Underwater Preserve (Lake Superior), the Marquette Underwater Preserve (Lake Superior) and the Sanilac Shores Underwater Preserve (Lake Huron).



Sign welcoming visitors to Alger Underwater Preserve in Munising, MI

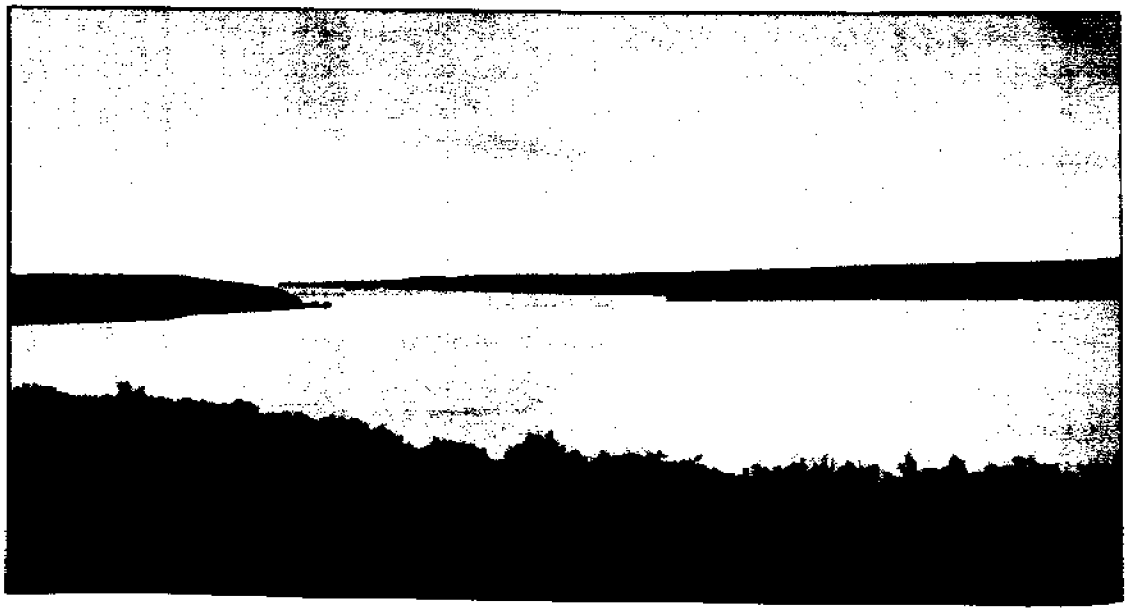
The positive public reception of the preserves proved to be an important factor in the passage of Public Act 452 which in 1988 stiffened penalties for the salvaging of shipwrecks, guaranteed recreational access and increased the amount of bottomlands available for underwater preserve designation from 5 percent to 10 percent.

Michigan's experience and that of other states (Florida, Texas and California) indicate that community organizations and private sector involvement in the preservation and management of abandoned watercraft is important. Vrana and Halsey (1991) note, "Although Public Acts 184 and 452 were steps in the right direction of institutional management, they authorized no funds for programs in maritime archaeology, aquatic resource management or park and recreation development" (p.5). Consequently, various volunteer organizations,

special interest groups and individual citizens have been vanguards in the shaping of Michigan's underwater preserve system. The Michigan Sea Grant Extension Program and the Michigan Underwater Salvage and Preserve Committee have contributed to the system in Michigan. Of particular importance is the Michigan Underwater Preserves Council, Inc., a non-profit organization designed to coordinate the development and promotion of all underwater preserves in Michigan.

For the most part Michigan seems to have had a positive experience with its series of preserves that protects and manages sunken vessels in the Great Lakes. A steady addition of shipwreck preserve areas over the past ten years suggests that the various resource users are finding the current process of resource allocation not only acceptable but desirable.

The circumstances regarding shipwreck resources for the state of Michigan are not identical to those of Illinois. For a number of reasons (specific shipping patterns, climatic conditions, etc.) wrecked vessels lying within the jurisdictional boundaries of the state of Michigan tend to be in clusters, while shipwrecks in Illinois waters tend to be scattered. Groups of sunken vessels obviously lend themselves more readily to preserve designation. On the other hand, there are obviously many similarities, and serious consideration must be given to the Michigan example as Illinois considers its own Lake Michigan shipwrecks.



Surface view of Alger Underwater Preserve

Economics

Economics is one of the key elements that demands attention when considering shipwrecks that lie within the Illinois jurisdictional boundaries of Lake Michigan. Diving is an $800 million industry employing 300,000 people, 17,000 of which are active scuba instructors. Currently in the United States there are 2,500 dive shops (PADI, 1984). Figures indicate that diving is growing in its popularity with increases in annual diving certification ranging from 2 percent to 4 percent (Diving Equipment Manufacturers Association, 1987).

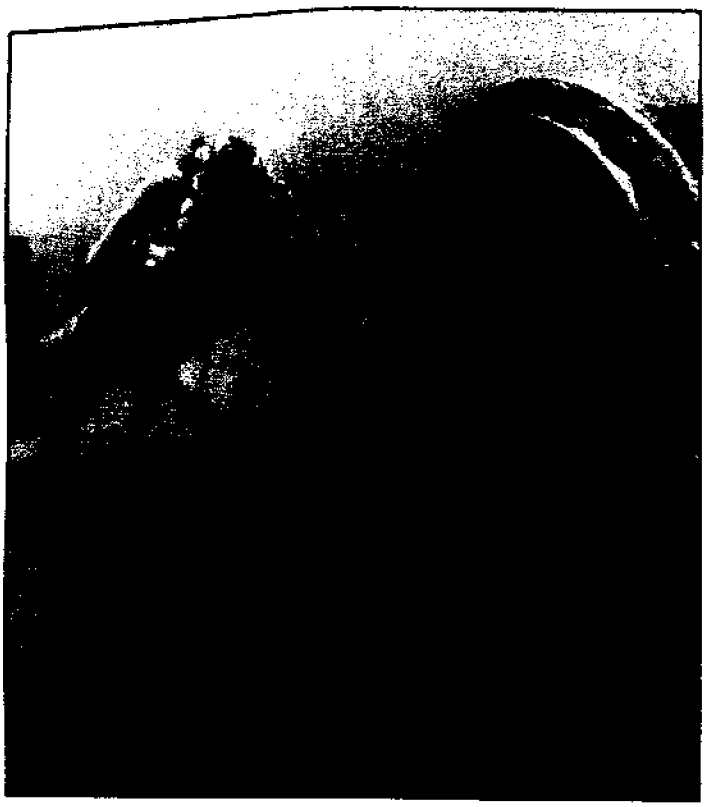
Divers and the associated scuba diving activities appear to have the potential for significant economic impact on local communities. Peterson, Sundstrom and Stewart (1987) provided a profile of the Great Lakes diver which yielded valuable insight into economic issues. The study found that Great Lakes divers spent an average of $2,497.86 on diving equipment. This was significantly higher than the average of $1,710.00 spent by the general diving population. This difference can possibly be attributed to the Great Lakes divers' need for additional cold water gear.

Participants in the study indicated that in 1986 they spent an average of $1,287.30 for their Great Lakes diving trips; the average number of trips taken in 1986 was 5.26; and the average expenditure per diving trip to the Great Lakes was $244.73. Furthermore, less than half (33.9 percent) of the money spent on these trips was spent for direct diving expenses such as scuba equipment and charterboats. The remaining two-thirds of the trip expenditures were for items or services indirectly related to diving such as transportation, lodging and entertainment. In addition, respondents indicated that one half of all expenditures for each trip were made in the communities near the dive site.

Diver prepares to suit up for a dive.

Diving destination studies may also be helpful in obtaining a reliable picture of the economic impact of diving. A survey of subscribers to *Skin Diver Magazine* (1989) indicated that 11 percent of those who took a diving trip in 1989 made a trip to a Great Lakes location.

Another study (Peterson, Sundstrom and Stewart, 1987) indicated that 87.7 percent of respondents made the Great Lakes one of their diving locations. Ninety-four percent of the divers in that study were from the states of Michigan, Wisconsin, Ohio, Illinois and Indiana. Divers also indicated their preferred diving locations on the lakes from 1984 through 1986. It is worthwhile to note that although many different locations were represented, the first six most popular locations were



Top of Tioga's steam engine illustrates quality of preservation

currently-established shipwreck preserves. Next in line for dive trip popularity was the southern part of Lake Michigan.

Specific diving site economic experiences merit attention. In the area near Munising, Michigan, approximately 1,600 divers visited the shipwrecks and spent about $700,000 in 1980. In 1984, after the designation of the nearby Alger Underwater Preserve, an estimated 6,000 divers and diving-related tourists spent $3.5 million in the area. A similar survey of 600 Alger Preserve divers indicated that 80 percent were from states other than Michigan and that 30 percent were from Illinois (Kinnunen, Peterson, Stewart and Swinehart, 1985).

Although John Pennicamp Coral Reef State Park in Florida is designed around resources that are somewhat different than those found in Lake Michigan, its economic experience is nonetheless interesting. Park statistics indicate that approximately 500,000 people visited the park between June 1987 and July 1988. If each person spent an average of $20 while in the park, sales and receipts in excess of ten million dollars would have been realized (Smith, 1989).

This information and that from other states suggests that there may be economic benefits for local communities that have valuable off-shore resources. Obviously, it is in the best interest of the various coastal communities with potential shipwreck resources to manage these resources in such a way so as not to delete or damage them for future users.

Divers are apparently interested in diving the Great Lakes and its sunken vessels. In fact, the quality of shipwrecks is the second most important attribute in the selection of a Great Lakes diving location (Peterson, Sundstrum and Stewart, 1987). PADI stated in a concept report to the President's Commission on American Outdoors in 1984 that, ". . . increasingly, American scuba divers are finding it difficult to locate places to participate in their chosen activity." The problem may lie in the proper management of shipwrecks to ensure that future generations will have the opportunity to benefit from these precious underwater resources.

Management of Shipwreck Resources

The majority of the shipwrecks lying within Illinois jurisdiction boundaries belong to the citizens of Illinois. This fact is made clear by a number of public acts, among them the Abandoned Shipwreck Act of 1987, which gave title of three categories of abandoned shipwrecks to the United States government. The federal government in turn transferred title and the corresponding responsibility of most shipwrecks to the respective states on whose submerged lands the shipwrecks lie. These valuable resources are not the sole domain of any one or two special interest groups; rather, they are held in public trust by the state of Illinois for all of its citizens. As a consequence, the state has an obligation to manage shipwrecks for the benefit of all.

It is essential to recognize that people in Illinois may have different interests and are likely to receive different benefits from the same resource. Important questions need to be addressed:

- What is the best way to manage these resources for the greatest number of users?
- How does the state ensure that all of its citizens have the opportunity to benefit from its sunken vessels?
- Is it, in fact, possible to achieve some semblance of compatibility in protecting shipwreck resources while also using them to provide diverse and enjoyable experiences?

The answers to these questions are not simple; and at this point no single definitive method exists. But we are not without pertinent information and experiences in similar situations which can be used as guide markers.

The process of appropriate management begins with a definite plan which recognizes and incorporates past experiences with current situations and information, and then attempts to prepare for future situations and resource demands. Vrana and Halsey (1991) write, "Management and planning are vital processes in the wise use of underwater cultural resources and in the protection of the resources for future users." They also state, "Resource management strategies are most effectively implemented after managers develop an understanding of shipwreck users and devise strategic plans" (p. 16).

Bottomland preserves and parks concepts have been used by several states in an effort to meet their obligations to protect shipwrecks while providing shipwreck usage. The two concepts, preserves and parks, should not, however, be used interchangeably.

Preserves are typically not developed and/or marketed to the extent that parks are. Most preserves lack entry fees and personnel. Swinehart (1988) likens the preserve concept to that of the wilderness area. The protection of the resource is certainly primary; there is, however, access to those who possess the necessary skills and desire to use the resource.

Parks are typically more developed and are designed to appeal to a somewhat broader segment of the population. A gray area does appear to exist as a result of some preserves' efforts to enhance and market the shipwreck resource. Some sites have been enhanced with the addition of buoys,

mooring devices, plaques, signs and trail markers. Preserves in Florida have replaced missing or existing ships' cannons with stone replicas. There may be a tendency for preserves to evolve into parks.

In some cases states have followed a four-stage process in developing a plan for the wise use of their underwater cultural resources. Although there may be some differences in nomenclature and in some of the details, the process is similar in most states. The initial stage starts with the inventory of the resources.

The Underwater Archaeological Society of Chicago has compiled a listing of underwater resources within the Illinois state jurisdictional boundaries. The nature of the resource (remember that these are lost ships that are *believed* to be on the lakes' bottoms) prevents the compilation of a final, once-and-for-all list, but inventories must be initiated and expanded as new resources are inevitably discovered. More sophisticated electronic remote sensing equipment, better search techniques, and an increase in diver participation rates are factors contributing to an increase in shipwreck discovery rates in the Great Lakes.

Stage two of plan development involves assessment. Relatively few shipwrecks appear to have the characteristics which make them candidates for consideration of preserve status. Different state and local organizations use various criteria for assessment; some systems are rigid and allow for little 'intuition' while others are more flexible in the characteristics that are considered. The 1988 Florida State University Field School on Archaeology used a system with the following nine criteria to evaluate the preserve potential of 11 shipwrecks of the 1733 Spanish fleet located off the Florida Keys.

1. Visibility
2. Currents
3. Aquatic life
4. Coral structures
5. Ballast
6. Intrusive features (modern debris)
7. Location
8. Research potential
9. Overall park potential

Particularly pertinent for Great Lakes shipwrecks preserve potential are depth and support services. Many of the Great Lakes shipwrecks lie at depths of 200-400 ft., depths which are well beyond the safe diving limits of the majority of divers. In 1987 a survey answered predominantly by Great Lakes divers indicated that the maximum depth which divers preferred was 102.36 ft. (Peterson, Sundstrom and Stewart, 1987). It is worth noting that a study undertaken by Holocek and Lothrop (1987) nine years earlier indicated that the maximum preferred diving depth was 86.14 ft. Although not identical, the two sample populations were similar enough to allow for comparison.

Divers are apparently becoming increasingly capable and willing to dive greater depths each year. If, indeed, this is a genuine trend, there are several significant consequences. Shipwrecks that were at one time considered to be inappropriate as dive sites because of great depths may now be more acceptable. It could also be contended that with this increase in diving depths, those shipwrecks that were at one time considered safely hidden away, will be discovered and are, consequently, in need of protection.

On-shore support services are also to be considered in the process of underwater cultural resource evaluation. A Michigan

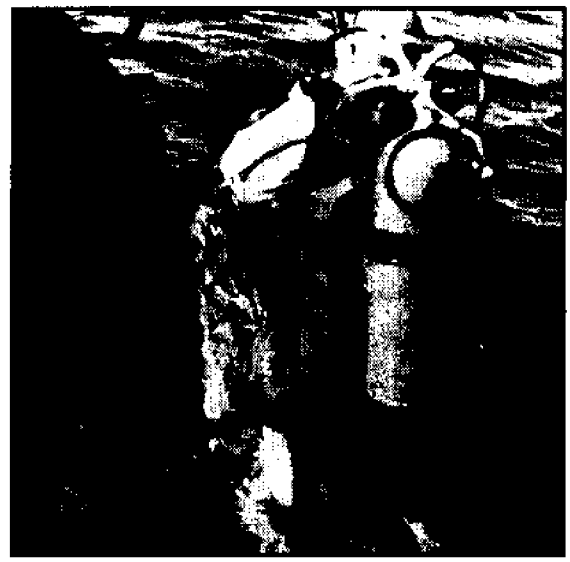
Sea Grant Extension survey in 1987 attempted to determine attributes considered important to Midwest divers in their selection of a diving location. Three of the top four attributes were related to on-shore facilities. The single most important attribute of a dive site was its proximity to dive shop services. Diver safety facilities and information about the diving site were attributes numbers three and four, respectively.

Stage three in the preserve process usually concerns citizen involvement and community development. The extensive local and private sector input in shipwreck preserves may be the result of their obviously vested interests in combination with the particular state's resources for additional projects.

Experiences in Florida and Michigan indicate that their preserve programs would have never come into existence without a great deal of local effort. Citizen participation and community involvement are likely to play an even larger role in the future of shipwreck resource preservation with the current trend of government downsizing.

The fourth and final stage of the strategic plan for the wise use of shipwrecks, utilized by several states, is marketing and promotion. Here again, the private sector and local community organizations have been in the forefront of the effort to attract tourists' and sports enthusiasts' dollars.

Within the two broad goals of sunken vessel protection and appropriate use there are several specific issues. Not only is the user affected by the resource, but the resource is in turn affected by the user. With this in mind, a number of tactics have been employed in an effort to reduce or eliminate visitor damage to the resource. Traditional law enforcement; management techniques, such as interpretation, registration and



New equipment permits divers to reach to increasingly greater depths.

charterboat licensing; and education have been used successfully to protect the resources (Smiley and Holocek, 1982). Although some minor damage may be expected on shipwrecks with preserve status, it would be much less disastrous than that currently taking place on vessels that are not within preserves.

Federal Legislation

In April of 1988 President Reagan signed the Abandoned Shipwreck Act of 1987 (Pub. L. 100-298; 43 U.S.C. 2101-2106) (See Appendix A). This instrumental law "established the title of states in certain abandoned shipwrecks and for other purposes." In doing so, Congress found that the individual states have the responsibility to manage a broad range of living and non-living resources in state waters and on each state's submerged lands; shipwrecks, if they met certain qualifications, were among the resources included.

Sunken vessels had to have been abandoned with the owner permanently relinquishing all rights. This particular aspect of the law is currently being challenged in the state of Illinois with the 1989 salvage rights case of the *Lady Elgin*. The salvager in this case contends that the *Lady Elgin*, a side-wheeled steamer which went down in Lake Michigan in 1860, is not an abandoned shipwreck.

The question of vessel ownership (whether by the state of Illinois or by the private salvager) is unclear. The salvager claims to have purchased the rights to the ship from the insurance company which was initially involved with the shipwreck. The courts are currently wrestling with the ownership issue, and their decision will consequently have tremendous impact upon this particular underwater resource and possibly many others.

Section 6 of the act mandates that abandoned shipwrecks must satisfy one or more of the following requirements:

1. Be embedded in submerged lands of the State
2. Be embedded in coralline formations protected by a state or on submerged lands of the State
3. Rest on submerged lands of a state and be included in or determined to be eligible for inclusion in the National Register

Section 7 of the Abandoned Shipwreck Act states that, "The law of salvage and the law of finds shall not apply to abandoned shipwrecks to which Section 6 of this Act applies."

Access to shipwrecks is described in Section 4 which also recognizes the diverse values and consequent variety of users. The law clarifies that, "State waters and shipwrecks offer recreational and educational opportunities to sport divers and other interested groups as well as irreplaceable State resources for tourism, biological sanctuaries and historical research." Reasonable access by the public to these resources is mandated in the legislation. Furthermore, states are required to develop policies to:

- Protect natural resources and habitat areas
- Guarantee recreational exploration of shipwreck sites
- Allow for appropriate public and private sector recovery of shipwrecks consistent with the protection of historical values and environmental integrity of the shipwrecks and the sites

States having resources that were specified in the law were encouraged to design and maintain parks or areas around the shipwreck resources in an effort to provide additional protection and greater utilization. The Secretary of the Interior was obligated to publish a document with guidelines that would, "assist states and the appropriate federal agencies in developing legislation and regulations to carry out their responsibilities under the act."

Abandoned Shipwreck Act of 1987 Guidelines

In the process of developing the Abandoned Shipwreck Act of 1987 Guidelines, the National Park Service gathered information from the public sector (Secretary of Commerce, state historical preservation officers, parks and recreational agency personnel, etc.) and the private sector (sport divers, dive shop operators, fishermen, salvors, historians, etc.). The ensuing guidelines were designed to:

- Maximize the enhancement of cultural resources
- Foster a partnership among sport divers, fishermen, archaeologists, salvors and other interests to manage shipwreck resources
- Facilitate access and utilization by recreational interests
- Recognize the interests of individuals and groups engaged in shipwreck discovery and salvage

States were encouraged to use the guidelines in their entirety or in part to establish programs to manage their shipwreck resources. Adoption of these guidelines to direct management strategies would automatically ensure that the states' efforts would be consistent with the Abandoned Shipwreck Act of 1987. Although the guidelines may be instrumental in shipwreck management programs it is explicitly stated, "The Abandoned Shipwreck Act Guidelines are advisory and non-binding."

The 30-page guideline document is written in four parts. The first defines several words and phrases used in the original act and in the guidelines themselves. Explanations, and in some cases, examples are given for the terms abandoned, embedded, historic and non-historic, shipwreck and submerged lands.

Included in this report is the key section of that document. It contains ten guidelines to aid federal and state agencies in carrying out their responsibilities as stated in the Abandoned Shipwreck Act of 1987 (see Appendix A). Although these guidelines address specific concerns, they allow the responsible agencies flexibility in establishing their own management programs which reflect the agency's and the resource's unique character.

The third part is the Abandoned Shipwreck Act printed in its entirety. As these guidelines must obviously be consistent with the act, it is advantageous for state and federal agencies to be thoroughly acquainted with their purpose and content.

Finally, there is a listing of 142 shipwrecks which are in the National Register of Historic Places. Brief sketches including name, location, depth and unusual characteristics of each shipwreck are included.

State Legislation

There appears to be considerable diversity from state to state in the amount and effectiveness of legislation regarding underwater cultural resources. Some states have extensive legislation, resulting in a great deal of regulation and policy. On the other hand, some states have very little legislation relating to shipwrecks, and often it is antiquated and ineffective.

Several states have either recently passed legislation or are in the process of preparing and/or adopting legislation to protect and more effectively use their underwater cultural resources. The timing of this recent surge in shipwreck legislation indicates that the Abandoned Shipwreck Act of 1987 has served to some extent as an incentive to states. Section 2 of the Act states, "The Congress finds that (a) States have the responsibility for management of a broad range of living and non-living resources in State waters and submerged lands; (b) and included in the range of resources are certain abandoned shipwrecks, which have been deserted and to which the owner has relinquished ownership with no retention."

The following examines the legislation of three states which have jurisdiction in at least one of the Great Lakes. The legislation regarding the underwater cultural resources of Michigan, Indiana and Wisconsin is compared to that which exists in Illinois. In addition, legislation from three coastal states that have an extensive history of sunken vessel management is provided (see Appendix B).

Legislation in Michigan

In many respects the state of Michigan is the leader among Great Lakes states for the preservation and protection of shipwreck resources in the Great Lakes. Public Act 452 was approved in 1988 and clarified and strengthened certain areas contained in Public Act 184 of 1980. The act describes itself as:

An act to protect and preserve, and to regulate the taking of, aboriginal records and antiquities within this state; to preserve abandoned property of historical or recreational value on the bottomlands of the Great Lakes and regulate the salvage of abandoned property of historical or recreational value; to designate and regulate Great Lakes bottomland preserves; to prescribe the powers and duties of certain state agencies; to create a fund; and to prescribe penalties and provide remedies.

One of the strengths of the act is the mandate for the creation of the Underwater Salvage and Preserve Committee. Nine members make up the committee, and each represents a different perspective for viewing the shipwreck resource. Of particular interest is the fact that two of the appointees are required to have experience in recreational scuba diving. The committee is advisory in nature and makes recommendations in several areas including salvage permit issuance, appropriate legislation, and program operation.

Section 4 a-1 states that, "a person shall not recover, alter, or destroy abandoned property which is on, under, or over the bottomlands of the Great Lakes, including those within a Great Lakes bottomlands

preserve, unless the person has a permit issued jointly by the secretary of state and the department pursuant to section 4-c." In some limited situations such as those described in section 4-c, "persons may be issued licenses to recover abandoned property located on, in, or located in the immediate vicinity of and associated with a sunken aircraft or watercraft."

Another strength of the act is the authority it grants to the state of Michigan to establish Great Lakes bottomlands preserves. These preserves are areas that include the bottomland of the Great Lakes, the water above the area, and the surface of the water. The preserves offer special protection of abandoned property of historical, recreational, educational, and scientific value. Several factors are given which must be considered in the process of granting preserve status to an area. The bottomlands preserves' combined areas must not exceed 10 percent of the Great Lakes bottomland within the state of Michigan's jurisdiction. This 10 percent is double that which was indicated in P.A. 184.

Finally, the act makes very clear that none of the wording contained therein is to be considered as restricting scuba diving in the Great Lakes waters of Michigan. Section 4-g states, "Section 4-a to 4-d shall not be considered to impose the following limitations: A limitation on the right of a person to engage in diving for recreational purposes in and upon the Great Lakes or the bottomlands of the Great Lakes."

Legislation in Indiana

At this writing, Indiana is in the process of proposing legislation which would effect the preservation and protection of its underwater cultural resources. Proposed legislation 310 IAC 21 establishes provisions for navigable waterways, including rules concerning applicability, definitions and historic shipwrecks. Definitions of various terms are addressed in 310 IAC 21-2 and includes the words or phrases "abandoned shipwreck," "historic shipwreck," "historic site" (referenced to IC 14-3-3.4-1), "shipwreck" and "navigable."

Rule 3 (310 IAC 21-3) is entitled, "Shipwrecks and Historic Sites Located within Navigable Waterways." Contained within Rule 3 are the standards and procedures for the issuance of permits for scientific investigation of abandoned shipwrecks or historic sites. Also mentioned in Rule 3 is the fact that the rules are intended to effectuate the Abandoned Shipwreck Act of 1987.

The Division of Historic Preservation and Archaeology of the Department of Natural Resources administers the issuance of permits for abandoned shipwrecks and historic sites. Permits are required by any person wishing to remove, disturb, salvage or destroy an abandoned shipwreck or historic site located within a navigable waterway. The proposed legislation states that a plan must be included with application for a permit. No mention is made of recreational divers wishing to explore shipwrecks.

Legislation in Wisconsin

Assembly Bill 727 was introduced to the Wisconsin legislature in November of 1991. The bill was designed to create underwater preserves to protect and effectively use the sunken vessels in Lake Michigan which are the responsibility of the state of Wisconsin.

In addition, the bill authorized creation of a 16-member council of citizens and public officials to oversee the management of submerged cultural resources. The bill stiffened the penalty for damage and/or removal of underwater artifacts from Wisconsin waters. Appropriations for

two full-time staff persons to deal specifically with submerged cultural resources were requested.

In April 1992, the Governor of Wisconsin vetoed Assembly Bill 727. While the value of the creation of a submerged cultural resource program and board was recognized, the state's financial situation did not allow for increased expenditures. The co-authors of the bill intend to return to the legislature with a modified bill in the future.

Artifacts such as the cable visible on Tioga's deck winch, used to open hatches, are protected.

Legislation in Illinois

The legislation directly relating to shipwrecks within Illinois Great Lakes waters is contained in Chapter 127, section 133-c.00 through 133-d-6 of the Illinois State Code.

The Archaeological and Paleontological Resources Protection Act was last modified in 1990. The act is designed to protect and preserve, and to regulate the taking of aboriginal records and antiquities within the state of Illinois. There exists no legislation specifically for shipwrecks; shipwrecks are included among artifacts, historic and prehistoric human skeletal remains, mounds, earthworks, forts, village sites and mines under the general term of "archaeological resources." Although shipwrecks are included in the resources, the term is not defined.

The Illinois Historic Preservation Agency is responsible for the regulation, exploration and excavation of all archaeological resources located on public lands. Public lands are defined as any land owned by the state of Illinois or its agencies, a state university, or a unit of local government. No mention is made of Illinois' jurisdiction in Lake Michigan.

Section 133-c-3 deals with violations. This paragraph lists three broad areas in which violations may occur. It is unlawful for persons to disturb archaeological resources protected under the act; it is also unlawful for anyone to sell or exchange objects which were collected in violation of this act. Of particular importance is 133-c-3.3-a which states that it is unlawful for anyone to explore, excavate or collect any archaeological or paleontological resources protected by the act unless the person has first acquired a permit issued by the Illinois Historic Preservation Agency. Although

several of the terms used in the act are initially defined, the term "explore" is not.

The permit system is administered by the Illinois Historic Preservation Agency with consultation among the state's various land managing agencies. Regulations governing the issuance of these permits are mandated by the act. In addition, these permits must be issued for specific locations and time frames.

A system of maintaining information on located resources within the state is required. The Illinois State Museum and the Historic Preservation Agency are mandated to cooperatively develop these files. The files may be limited regarding access to ensure the safety of archaeological and paleontological sites.

The Illinois Historic Preservation Act (Chap. 127 Sec. 133-d) provides for, among other things, the Illinois Historic Sites Advisory Council. Consisting of fifteen members, the council is strongly resource preservation oriented. Various powers, most of which have to do with the National and Illinois Register of Historic Places, are assigned to the council. Additional powers and responsibilities of the agency are listed in 133-d-5-a. The agency is directed to "attempt to maximize the resources to the extent to which the preservation of Registered Illinois Historic Places is accomplished through active use, including self-sustaining or revenue-producing use and through involvement of persons other than the agency."

Historic sites in Illinois may be designated by the Illinois Historic Preservation Agency. In addition, historic sites which possess archaeological values may be dedicated as archaelogical preserves by the Illinois Nature Preserves Commission. Following designation or dedication, the agencies assume responsibilities for protecting the sites.

Conclusion

There is no question that the citizens of the state of Illinois are losing valuable and non-renewable underwater cultural resources in the form of shipwreck despoilation. While a discussion might be undertaken about the rate of loss of shipwreck resources, there is no denying that there are fewer historically valuable resources within Illinois jurisdictional waters now than there were 20 years ago, one year ago or even one month ago.

The cold, deep waters of the Great Lakes are helpful in preserving these underwater treasures of the past, but even the deepest and most remote shipwreck site is subject to some minor damage from the slow but relentless accumulation of silt on the lakes' bottoms. Those valuable cultural resources lying in shallow waters are affected by the movement of the waters, usually gentle, but on occasion turbulent because of the violent storms that are commonplace on the Great Lakes.

Zebra mussels pose a tremendous potential danger to these resources. Recent evidence indicates that these mussels can reduce intact shipwrecks to something resembling a coral reef in less than two years.

Much remains unknown about the effect of these mussels on the Great Lakes. Since they will attach themselves to virtually anything which has a hard surface, zebra mussels are particularly problematic for shipwrecks. Concern has been expressed that the sonar equipment which has recently proven so valuable in the discovery of many sunken vessels will be much less effective if the relics are covered with zebra mussels. Currently, this appears to be a threat only to those shipwrecks lying in waters with depths of 30 feet or less (Childs, 1991). Far greater and much more tragic than any damage done by the natural elements is that caused by man.

In the years to come, it appears certain that humans will continue to impact Great Lakes shipwreck resources. The possibility is very real that this negative impact will increase. Technical advances in diving equipment and remote sensing equipment will lead to the discovery of more abandoned sunken vessels each year. Trends indicate that greater numbers of divers will be using the Great Lakes, and many will be bound to the shipwreck sites that lie within Illinois jurisdictional waters in Lake Michigan. This *could* mean disaster for the resource, *but it is by no means inevitable.*

The reverse –a decline in the rate of shipwreck resource depletion—could also be true. Five or ten years from now it may be found that the damage to Great Lakes shipwrecks has been reduced significantly. The future of Illinois shipwrecks does not depend upon chance discoveries and freak changes in conservation ethics: the future of Illinois shipwrecks rests squarely on the shoulders of those who hold an interest in these precious resources.

Since there are various groups who view sunken watercraft as a resource that has different values and uses, so there must also be various groups who will play a role in the preservation and protection of the shipwrecks. The task of managing shipwrecks should not be left entirely up to public officials; it must be the cooperative task of

government agencies, private charterboat operators, diving instructors, educators, diving clubs, individual divers and salvors.

A future of cooperation and respect among the different shipwreck user groups is a future of shipwreck preservation, protection and appropriate usage; a future of competing interests, each of whom is unwilling to compromise and respect the other users, is a dismal future for shipwrecks.

A consensus must be achieved as to whether ten years from now people will dive and see broken, scattered shipwreck sites of limited value to anyone, or whether divers will go down with the purpose and expectation to see shipwreck sites that are maintained and retain their integrity. Leaders in the various fields associated with Great Lakes shipwrecks must decide that these are valuable historic, recreational and educational resources that must be preserved.

The volunteer is vital to the task of managing cultural resources. The essential need for volunteers has been evidenced in virtually all of the states that have effective shipwreck management programs. The Underwater Archaeological Society of Chicago has led the effort in Illinois to recognize, utilize and preserve these valuable artifacts of the past. The extensive efforts of this organization have resulted in the discovery, survey and recording of many sunken vessels in Illinois waters. It is likely that its commitment and that of other similar organizations will be indispensable in any successful management effort.

A successful management effort must begin with a plan that stresses appropriate multiple use *and* protection *and* preservation. The experiences of other states indicate that use and preservation do not have to be in direct conflict. Properly managed shipwrecks can provide a variety of benefits to a multitude of different groups, not only for the next few years but for generations to come. A perspective must be developed that will draw on the experiences of other shipwreck management programs and design a program that will fit our unique situation here in Illinois.

Smooth surfaces of ship's parts can attract zebra mussels. Tioga's reduction gear coupling is shown.

Various options are available for the protection and utilization of these valuable resources. They range from historic site designation to nature preserve designation to park preserve designation to a number of other options. No single choice is best for all situations; rather, the situation must be carefully analyzed and that option complete

Dive rescue unit prepares for practice dive.

with its advantages and its disadvantages, which meets the greatest needs while at the same time preserving the resource must be selected. While it will surely be impossible to completely satisfy the needs and desires of everyone involved, it is possible to design a plan that will address and manage the major issues for the greatest benefit to the greatest number of people.

Legislation that is restrictive rather than enabling will block any efforts towards wise and appropriate shipwreck usage. Legislation that is vague in wording and intent will never lead to proper management. Legislation that does not recognize the fact that all of the citizens of Illinois are entitled to benefits from the state's underwater cultural resources is an obstruction none can afford.

An important step in the process that cannot be overlooked is the education of divers, various other users of shipwrecks and the general public. Some of the destruction of these artifacts is no doubt attributable to ignorance rather than to maliciousness. There are a variety of methods by which the educational process may proceed. These methods may involve:

- Placing greater emphasis on environmental issues at the time of diver certification
- Taking programs and information into the schools
- Coordinating demonstrations and displays at museums and other locations

An effective educational process will entail an integration of various programs. Projects or programs that fully recognize the vital nature of education are more likely to succeed.

The citizens of tomorrow will inherit the results, good or bad, of the efforts of today. The decisions and the subsequent actions that are undertaken for Illinois' underwater cultural resources in the next five years will have far-reaching consequences. These consequences will determine whether or not future generations will gain a thorough understanding and appreciation of this region's rich maritime heritage from first-hand observations or only a lifeless and superficial description of past events and people. Proper management of Illinois' shipwrecks today will encourage the continuation of such efforts in the twenty-first century.

The future of the underwater cultural resources of Illinois is too significant to allow a "whatever-will-happen" approach. Illinois must go beyond passively accepting the future for its shipwrecks: Illinois must act now to create a promising future for the sunken vessels and the citizens to whom the state has a responsibility.

Appendix A

Abandoned Shipwreck Act of 1987

Public Law 100-298
100th Congress

An Act

Apr. 28, 1988
[S. 858]

To establish the title of States in certain abandoned shipwrecks, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Abandoned Shipwreck Act of 1987.
Maritime affairs.
43 USC 2101 note.

SECTION 1. SHORT TITLE.

This Act may be cited as the "Abandoned Shipwreck Act of 1987".

43 USC 2101.

SEC. 2. FINDINGS.

The Congress finds that—

(a) States have the responsibility for management of a broad range of living and nonliving resources in State waters and submerged lands; and

(b) included in the range of resources are certain abandoned shipwrecks, which have been deserted and to which the owner has relinquished ownership rights with no retention.

43 USC 2102.

SEC. 3. DEFINITIONS.

For purposes of this Act—

(a) the term "embedded" means firmly affixed in the submerged lands or in coralline formations such that the use of tools of excavation is required in order to move the bottom sediments to gain access to the shipwreck, its cargo, and any part thereof;

(b) the term "National Register" means the National Register of Historic Places maintained by the Secretary of the Interior under section 101 of the National Historic Preservation Act (16 U.S.C. 470a);

(c) the terms "public lands", "Indian lands", and "Indian tribe" have the same meaning given the terms in the Archaeological Resource Protection Act of 1979 (16 U.S.C. 470aa-47011);

(d) the term "shipwreck" means a vessel or wreck, its cargo, and other contents;

(e) the term "State" means a State of the United States, the District of Columbia, Puerto Rico, Guam, the Virgin Islands, American Samoa, and the Northern Mariana Islands; and

(f) the term "submerged lands" means the lands—

(1) that are "lands beneath navigable waters," as defined in section 2 of the Submerged Lands Act (43 U.S.C. 1301);

(2) of Puerto Rico, as described in section 8 of the Act of March 2, 1917, as amended (48 U.S.C. 749);

(3) of Guam, the Virgin Islands and American Samoa, as described in section 1 of Public Law 93-435 (48 U.S.C. 1705); and

(4) of the Commonwealth of the Northern Mariana Islands, as described in section 801 of Public Law 94-241 (48 U.S.C. 1681).

SEC. 4. RIGHTS OF ACCESS.

Cultural programs.
Historic preservation.
Environmental protection.
42 USC 2103.

(a) ACCESS RIGHTS.—In order to—

(1) clarify that State waters and shipwrecks offer recreational and educational opportunities to sport divers and other interested groups, as well as irreplaceable State resources for tourism, biological sanctuaries, and historical research; and

(2) provide that reasonable access by the public to such abandoned shipwrecks be permitted by the State holding title to such shipwrecks pursuant to section 6 of this Act,

it is the declared policy of the Congress that States carry out their responsibilities under this Act to develop appropriate and consistent policies so as to—

(A) protect natural resources and habitat areas;

(B) guarantee recreational exploration of shipwreck sites; and

(C) allow for appropriate public and private sector recovery of shipwrecks consistent with the protection of historical values and environmental integrity of the shipwrecks and the sites.

(b) PARKS AND PROTECTED AREAS.—In managing the resources subject to the provisions of this Act, States are encouraged to create underwater parks or areas to provide additional protection for such resources. Funds available to States from grants from the Historic Preservation Fund shall be available, in accordance with the provisions of title I of the National Historic Preservation Act, for the study, interpretation, protection, and preservation of historic shipwrecks and properties.

Grants.

SEC. 5. PREPARATION OF GUIDELINES.

43 USC 2104.

National parks, monuments, etc.
Federal Register, publication.

(a) In order to encourage the development of underwater parks and the administrative cooperation necessary for the comprehensive management of underwater resources related to historic shipwrecks, the Secretary of the Interior, acting through the Director of the National Park Service, shall within nine months after the date of enactment of this Act prepare and publish guidelines in the Federal Register which shall seek to:

(1) maximize the enhancement of cultural resources;

(2) foster a partnership among sport divers, fishermen, archeologists, salvors, and other interests to manage shipwreck resources of the States and the United States;

(3) facilitate access and utilization by recreational interests;

(4) recognize the interests of individuals and groups engaged in shipwreck discovery and salvage.

(b) Such guidelines shall be developed after consultation with appropriate public and private sector interests (including the Secretary of Commerce, the Advisory Council on Historic Preservation, sport divers, State Historic Preservation Officers, professional dive operators, salvors, archeologists, historic preservationists, and fishermen).

(c) Such guidelines shall be available to assist States and the appropriate Federal agencies in developing legislation and regulations to carry out their responsibilities under this Act.

SEC. 6. RIGHTS OF OWNERSHIP.

43 USC 2105.

(a) UNITED STATES TITLE.—The United States asserts title to any abandoned shipwreck that is—

(1) embedded in submerged lands of a State;

(2) embedded in coralline formations protected by a State on submerged lands of a State; or

(3) on submerged lands of a State and is included in or determined eligible for inclusion in the National Register.

Public information. Historic preservation.

(b) The public shall be given adequate notice of the location of any shipwreck to which title is asserted under this section. The Secretary of the Interior, after consultation with the appropriate State Historic Preservation Officer, shall make a written determination that an abandoned shipwreck meets the criteria for eligibility for inclusion in the National Register of Historic Places under clause (a)(3).

(c) TRANSFER OF TITLE TO STATES.—The title of the United States to any abandoned shipwreck asserted under subsection (a) of this section is transferred to the State in or on whose submerged lands the shipwreck is located.

Gifts and property. Indians.

(d) EXCEPTION.—Any abandoned shipwreck in or on the public lands of the United States is the property of the United States Government. Any abandoned shipwreck in or on any Indian lands is the property of the Indian tribe owning such lands.

(e) RESERVATION OF RIGHTS.—This section does not affect any right reserved by the United States or by any State (including any right reserved with respect to Indian lands) under—

(1) section 3, 5, or 6 of the Submerged Lands Act (43 U.S.C. 1311, 1313, and 1314); or

(2) section 19 or 20 of the Act of March 3, 1899 (33 U.S.C. 414 and 415).

43 USC 2106.

SEC. 7. RELATIONSHIP TO OTHER LAWS.

(a) LAW OF SALVAGE AND THE LAW OF FINDS.—The law of salvage and the law of finds shall not apply to abandoned shipwrecks to which section 6 of this Act applies.

(b) LAWS OF THE UNITED STATES.—This Act shall not change the laws of the United States relating to shipwrecks, other than those to which this Act applies.

(c) EFFECTIVE DATE.—This Act shall not affect any legal proceeding brought prior to the date of enactment of this Act.

Approved April 28, 1988.

LEGISLATIVE HISTORY—S. 858:

HOUSE REPORTS: No. 100-514, Pt. 1 (Comm. on Interior and Insular Affairs) and Pt. 2 (Comm. on Merchant Marine and Fisheries).
SENATE REPORTS: No. 100-241 (Comm. on Energy and Natural Resources).
CONGRESSIONAL RECORD:
Vol. 133 (1987): Dec. 19, considered and passed Senate.
Vol. 134 (1988): Mar. 28, 29, Apr. 13, considered and passed House.

Appendix B

Guidelines for State and Appropriate Guidelines for State and Appropriate Federal Agencies when Developing Legislation and Regulations to Carry out their Responsibilities under the Abandoned Shipwreck Act of 1987:

1. Establishing State Shipwreck Management Programs

It is noted that many states have abandoned shipwrecks that are now the states' responsibility. This would include states that are landlocked but contain navigable rivers or lakes. Some states have programs currently in place; several others do not. Specific guidelines include:

States should involve interest groups in shipwreck program development and management activities. States should work jointly with a variety of private groups and individuals and other state and federal agencies not only to initiate programs but to maintain and monitor them as well.

States should establish a shipwreck advisory board. This advisory board would consist of various private citizens and public officials. The board's duties would consist of reviewing, evaluating, providing advice and making recommendations concerning shipwreck management to various state agencies.

States should assign responsibility for state-owned sunken vessels to the appropriate agencies. As it is unlikely that any single state agency would have complete jurisdiction over a shipwreck site, it is therefore advised that the responsibility be divided among various state agencies, each of which has pertinent expertise.

States should establish regulations, policies or procedures for the long-term management of state owned abandoned watercraft. These regulations should provide for appropriate use by a variety of resource users.

States should provide adequate staff, facilities and equipment. Eight categories of questions are listed in the guidelines to help determine appropriate levels in each area to meet the shipwreck management goals.

States should cooperate and consult with state and federal agencies. To effectively implement a statewide program of management, other organizations and agencies must be involved. Twelve different agencies are listed.

Establish a consultation procedure to comment on state and federal activities that may adversely affect state-owned shipwrecks. Agencies who are responsible for shipwreck management should be contacted when other state or federal agencies have plans which pose a threat to the resource.

Use the National Register of Historic Places criteria. Regulations in 36 Code of Federal Regulations (CFR) (part 60) should be utilized by the state to determine eligibility for inclusion on the list.

Use applicable standards and guidelines. A variety of guidelines are suggested:

- National Parks Service (NPS) Abandoned Shipwreck Act Guidelines
- Secretary of the Interior (SI) Guidelines for Archaeological and Historical Preservation

- National Parks Service (NPS) Guidelines for Recording Historic Ships
- SI Standards for Historic Vessel Preservation Projects

Prosecute persons who willfully violate the states' shipwreck management programs. Interest groups should be educated regarding the shipwreck management laws. Appropriate fines should be determined, and procedures should be established to confiscate illegal artifacts and restore damaged resources and sites.

Provide legal recourse for persons affected by the state's shipwreck management program. Persons should have the right to appeal a state's decision on various matters regarding the management of abandoned submerged vessels; this includes the state's evaluation of the historical significance of a shipwreck.

2. Establishing Federal Shipwreck Management Programs

Federal agency programs are not germane to this article.

3. Funding Shipwreck Programs and Projects

It is recognized and noted that sunken vessels management programs can be extremely expensive. Mention is also made, however, that revenues can be generated through properly designed and managed programs. Specific guidelines include:

Fund shipwreck management programs and projects from annual appropriations. Not only should these be funded from year to year, but multi-year budgets should be considered for those projects which will inevitably require several years for their completion.

Collaborate with other state and federal agencies to reduce costs. Not only would costs be reduced, but more thorough and extensive programs could be administered.

Fund projects from the Historical Preservation Fund (HPF). The Abandoned Shipwreck Act clearly states that HPF grants may be used for the study, interpretation, protection and preservation of sunken vessels. However, HPF grants are contingent upon appropriation by the U.S. Congress.

Fund projects using Coastal Zone Management Grants. Advice is offered regarding several specific projects and activities for which these funds are available.

Use other appropriate federal funding authorities. This is not applicable to the states' situations.

Encourage other state and federal agencies and nations to co-sponsor shipwreck activities. Many shipwrecks have historical connections to other states and countries; these can be instrumental in arranging joint projects.

Encourage volunteers to participate in sunken vessel projects. Examples of tasks which can be performed by either groups or individual volunteers are listed in the guidelines.

Encourage scientific and educational organizations to participate in shipwreck projects. Several ideas are given regarding institutions' interests in shipwreck projects.

Require commercial salvors to post performance bonds. In an effort to ensure competency by a commercial salvor contracting with the state for a salvage operation, a performance bond for the work being performed would be required.

4. Surveying and Identifying Shipwrecks

If, in fact, shipwrecks are multi-use resources owned by the citizens of the states on whose property they rest and are held in trust by that state, notice should be given to the public regarding the location and characteristics of historically significant shipwrecks. The first step in the process is to begin a systematic survey of submerged lands to locate and identify shipwrecks. Additional guidelines include:

Preparation of an archaeological assessment for the survey area. To narrow the search for abandoned sunken vessels much effort should be put into determining the potential of a submerged area to yield shipwrecks. Factors that might increase an area's potential are reports of watercraft losses, shipwreck sightings, navigational hazards and the area's proximity to other shipwrecks.

Rank of survey areas in order of importance. Those areas with a combination of high potential of shipwreck discoveries and greatest possibility of damage from uninformed divers, trawlers, etc. should be surveyed first; those areas with little evidence of containing shipwrecks and in less accessible areas should be surveyed later.

Coordination of archival research and field research efforts with other state and federal agencies. The authors of the guidelines recognize the importance of sharing research results with the appropriate state and federal agencies.

Utilization of scientific methods and techniques to conduct field research. With the availability of highly advanced technical equipment and specialized searching techniques, surveys can and should be performed thoroughly.

Recording of shipwreck locations. A standard coordinate system should be employed to register as precisely as possible the shipwreck location.

Ground-truthing of shipwrecks. Once shipwrecks are discovered they should be thoroughly inspected by either remotely operated devices or by divers. Care should be exercised to keep site disturbances to a minimum.

Provision for the treatment of human remains found in abandoned vessels. If possible, human remains should be left undisturbed: in situations in which there is a likelihood that remains will be disturbed, they should be removed and cared for properly.

Confirmation of the abandonment of shipwrecks. Since all vessels on submerged lands are not necessarily abandoned, this determination is extremely important.

Provision of adequate public notice of shipwreck sites. Several methods of informing the public of shipwreck locations are given. The guidelines note that even in cases in which exact shipwreck locations could be detrimental to the resource, general locations should be listed.

5. Documenting and Evaluating Shipwrecks

A thorough documentation and evaluation of the submerged vessel and its site are critical as it is helpful in the management of the resource and also aids in the interpretation and evaluation efforts. Additionally:

Photographic records should be made of each shipwreck.

Collection and evaluation of information about each shipwreck's history values and uses should be made.

Historically significant shipwrecks should be nominated to the National Register of Historic Places and/or state historical registers.

An inventory of all shipwrecks should be prepared. Information should include, among other things, vessel name and owner, wreck date and cause, location, vessel condition and type.

Documentation of shipwrecks should be maintained. It is recommended that more than one copy of documentation be kept in different places to help inform the public and to prevent loss of documentation. Documents should be made available to the public. State and federal agencies should determine if it is desirable to make known the exact locations of shipwrecks; if not, only general locations should be given.

6. Providing for Public and Private Sector Recovery of Shipwrecks

States are mandated to manage shipwrecks for the benefit of the public, and since there are a variety of different components of the public with different interests and uses for shipwrecks, salvaging of sunken vessels is an important consideration. Clearly, the salvage of shipwrecks by either the public or by the private sector has great potential to damage the resource for other uses. Salvage of state-owned abandoned vessels must be in the public interest. The following specific guidelines have that in mind. The state should:

Establish policies, criteria and procedures for the appropriate public and private sector recovery of state-owned shipwrecks. After consultation with public and private groups and individuals, specific policies should be determined. This may involve a permit system operated by an agency of the state.

Authorize only those recovery activities at state-owned shipwrecks that are deemed in the interest of the public. A series of questions are suggested to help agencies determine what salvage operations are in the public's interest.

Protect particular state-owned shipwrecks from salvage, be it public or private, groups or individuals. Some shipwrecks have characteristics that will be undeniably damaged if salvage is permitted. These are to be afforded special protection.

Require any recovery of state-owned shipwrecks to be performed in a professional manner. At times recovery may be deemed in the public interest, and regardless of whether the salvage is done by the public or private sector, it must be undertaken appropriately.

Allow public and private recovery at non-historic sites without archaeological or historic conditions. Some of the submerged vessels owned by the state may be non-historic, and recovery activities on those resources should be allowed.

As appropriate, transfer title to artifacts and materials recovered from state-owned shipwrecks by the private sector to such parties. Specific suggestions are given to accomplish this.

Disseminate information on public or private recovery activities to the general public and the scientific community. Various methods to accomplish this dissemination are suggested.

Discourage the display of intact ships. This type of recovery is prohibitively expensive and is difficult to maintain once recovered.

7. Provide Public Access to Shipwrecks

Section 4 of the Abandoned Shipwreck Act addresses the issue of public access, and says, "State waters and shipwrecks offer recreational and educational opportunities to sport divers and other interest groups, as well as other irreplaceable state resources for tourism, biological sanctuaries and historical research." Furthermore states are encouraged to develop policies to, "guarantee recreational exploration of shipwreck sites." The guidelines recognize that this increased public

access could lead to resource depletion and offer the following guidelines to aid the states.

Guarantee recreational exploration of publicly-owned shipwreck sites. If the shipwreck site is not adversely impacted by visitors, users should be permitted access to the resource without permits or licenses.

Establish lists of shipwrecks having recreational value. Various user groups can be helpful in compiling a list of underwater cultural resources which would include location, name, depth and a brief sketch of the vessel and its site.

Facilitate public access to shipwrecks. Various suggestions are made and include placement of buoys and anchor moorings, distribution of information and the establishment of on-shore services.

Consult with interest groups prior to imposing restrictions on access. Restrictions on shipwreck site access should be approached very carefully and seriously considered only after discussion with various public and private interest groups.

Regulate access at few, if any, shipwrecks. Five situations are offered which might lead to limitations of access. The guidelines recommend that each site be carefully considered on an individual basis.

Provide adequate public notice of restrictions. Suggestions are made as to the proper methods of notifying interested parties of restricted access to shipwrecks.

8. Interpreting Shipwreck Sites

The act recognizes the importance of interpretation and specifically mentions that HPF grants can be used for such purposes. Well designed and administered interpretive programs can be instruments in the development of a public appreciation and understanding of shipwrecks. The following guidelines are set forth.

Present information on the vessel's history and its different values and uses. A list of important areas of interpretation is offered to help states.

Disseminate information of shipwreck projects through publications, lectures, exhibits and professional papers. Several resources, covering a broad range of interest groups, are presented as ideas for informing both the public and private sectors.

Build models of vessels. In some situations, actual diving to the shipwreck site is impractical; in those cases models of the shipwrecks can be extremely valuable in the process of shipwreck interpretation.

Include interpretive materials in underwater preserves and parks. Trails around underwater cultural resource sites with markers to point out noteworthy features should be considered.

Encourage public and private interest groups to disseminate information on shipwreck activities. Museums and visitor centers are key locations at which to inform the public. The guidelines also suggest that those private interests who have legal artifacts be encouraged to make those artifacts available for public display.

Require permittees, licensees and contractors to disseminate information about recovery activities at historic shipwrecks. It is suggested that one of the requirements for the receipt of a permit be an agreement by the salvager to make recovered artifacts available to the public.

9. Establishing Volunteer Programs

The use of volunteers can be helpful in two main ways. First, recognizing the budgetary restrictions faced by a majority of the states, volunteers can perform a number of tasks for which the states have insufficient funds. Second, it is noted that volunteers can be helpful to the formation of partnerships between private groups and state agencies. Specific guidelines are:

Use volunteers in shipwreck projects. Divers and non-divers possess an array of skills useful to the state agencies that are interested in the management of their shipwrecks.

Maintain lists of volunteers. These lists should include not only names and addresses but also the volunteers' skills and interests.

Distribute information on shipwreck projects to interested parties. A number of suggestions are made to state agencies in order to disseminate information to potential volunteers.

Ensure that volunteers are properly trained and supervised. Qualified professionals should supervise volunteers once they are trained to make sure that the work is performed appropriately.

Cooperate with the private sector in designing and teaching special methods courses for sport divers. Courses must be the product of cooperative efforts between educational professionals in the field and officials from professional diving associations. Divers must be aware of and practice non-destructive archaeological methods.

Recognize private sector contributions to shipwreck discovery, research and preservation. Four methods of recognition are:

- Naming shipwrecks after the discoverer
- Issuing certificates or plaques to volunteers
- Naming volunteers in publications and at exhibits
- Giving artifacts to volunteers when appropriate

10. Creating and Operating Underwater Parks/Preserves

The Abandoned Shipwreck Act encourages states to establish parks and/or preserves as they help to:

- Provide additional protection to the shipwrecks
- Increase the public's awareness and appreciation of shipwrecks
- Provide recreational opportunities
- Generate tourism revenues
- Provide for protection of natural resources within the boundaries of the park/preserve

Seven guidelines for creating and operating these park and preservations are offered for consideration.

Consult with various interest groups. Experience indicates that input from different user groups and other affected groups is critical to the success of any park or preserve.

Prepare an environmental and economic impact assessment. This report should be comprehensive, and every effort must be made to ensure its impartiality. Copies should be made available not only to state and federal agencies, but to the private interest groups and the general public.

Specify the unit's purpose, significance, boundaries and any special conditions or restraints.

Develop a general management plan. This will help in determining the direction which each preserve or park will follow.

Develop a resource management plan. A number of resource-related issues would be addressed in this plan, and it would be revised periodically.

Interpret and facilitate public access to shipwreck sites in parks and preserves. Efforts should range from the placement of buoys and on-site markers for divers to dock-side exhibits and printed materials for non-divers.

Protect shipwreck sites located within parks and preserves. If efforts are made to increase public use of these valuable shipwreck resources, corresponding efforts must also be made to protect the shipwrecks from the different sources of damage.

Appendix C

Legislation for Submerged Cultural Resources in California, Florida and South Carolina

California: Senate Bill 1453 was approved in 1989. It amended Section 6254.10 of the Govern-ment Code and added sections 6313 and 6314 to the Public Resources Code. In the effort to protect and preserve the underwater cultural resources of the state of California, the States Lands Commission is directed to administer the Shipwreck and Historic Maritime Resources Program (Sec. 6313 and 6314 of the Public Resources Code.)

The bill directs that, "The State Lands Commission, with the assistance of the State Office of Historical Preservation, shall identify, compile and maintain an inventory of shipwreck sites of archaeological or historical significance and shall make the listing available to the public." Any vessel lying in state waters more than fifty years is considered to be historically significant.

A permit system, operated by the commission in cooperation with the State Office of Histori-cal Preservation, shall be used for salvage operations and recreational recovery activities. Salvage permits are required for all salvage operations. Recreational recovery permits are issued for exploration and excavation with small hand tools; however, no recreational recovery permits are issued for shipwrecks that are deemed archaeologically or historically significant. Finally Section 6309g notes, "The commission shall not require a permit for any recreational diving activity which does not disturb the surface or remove objects or materials from a submerged archaeologi-cal sites or submerged historic resource as defined in Section 6313."

Florida: The Florida Historical Resources Act of 1989 (Chapter 267 of Florida State Law) deals with the management of the state's historic properties. These properties expressly include sunken or abandoned ships. Section 267.061-2-b states that, "It is further declared to be the public policy of the state that all treasure trove, artifacts and such objects having intrinsic or historical and archaeological value which have been abandoned on state-owned lands or state-owned sovereignty submerged lands shall belong to the state with the title thereto vested in the Division of Historical Resources of the Department of State for the purposes of administration and protec-tion." Among other directives it is the responsibility of the division to:

> Cooperate with federal and state agencies, local governments and private organizations and individuals to direct and conduct a comprehensive statewide survey of historic resources and to maintain an inventory of such resources.
>
> Cooperate with local governments and organizations and individuals in the development of local historical preservation programs.
>
> Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an appreciation of Florida history and culture.

Specify the unit's purpose, significance, boundaries and any special conditions or restraints.

Develop a general management plan. This will help in determining the direction which each preserve or park will follow.

Develop a resource management plan. A number of resource-related issues would be addressed in this plan, and it would be revised periodically.

Interpret and facilitate public access to shipwreck sites in parks and preserves. Efforts should range from the placement of buoys and on-site markers for divers to dock-side exhibits and printed materials for non-divers.

Protect shipwreck sites located within parks and preserves. If efforts are made to increase public use of these valuable shipwreck resources, corresponding efforts must also be made to protect the shipwrecks from the different sources of damage.

Appendix C

Legislation for Submerged Cultural Resources in California, Florida and South Carolina

California: Senate Bill 1453 was approved in 1989. It amended Section 6254.10 of the Government Code and added sections 6313 and 6314 to the Public Resources Code. In the effort to protect and preserve the underwater cultural resources of the state of California, the States Lands Commission is directed to administer the Shipwreck and Historic Maritime Resources Program (Sec. 6313 and 6314 of the Public Resources Code.)

The bill directs that, "The State Lands Commission, with the assistance of the State Office of Historical Preservation, shall identify, compile and maintain an inventory of shipwreck sites of archaeological or historical significance and shall make the listing available to the public." Any vessel lying in state waters more than fifty years is considered to be historically significant.

A permit system, operated by the commission in cooperation with the State Office of Historical Preservation, shall be used for salvage operations and recreational recovery activities. Salvage permits are required for all salvage operations. Recreational recovery permits are issued for exploration and excavation with small hand tools; however, no recreational recovery permits are issued for shipwrecks that are deemed archaeologically or historically significant. Finally Section 6309g notes, "The commission shall not require a permit for any recreational diving activity which does not disturb the surface or remove objects or materials from a submerged archaeological sites or submerged historic resource as defined in Section 6313."

Florida: The Florida Historical Resources Act of 1989 (Chapter 267 of Florida State Law) deals with the management of the state's historic properties. These properties expressly include sunken or abandoned ships. Section 267.061-2-b states that, "It is further declared to be the public policy of the state that all treasure trove, artifacts and such objects having intrinsic or historical and archaeological value which have been abandoned on state-owned lands or state-owned sovereignty submerged lands shall belong to the state with the title thereto vested in the Division of Historical Resources of the Department of State for the purposes of administration and protection." Among other directives it is the responsibility of the division to:

> Cooperate with federal and state agencies, local governments and private organizations and individuals to direct and conduct a comprehensive statewide survey of historic resources and to maintain an inventory of such resources.
>
> Cooperate with local governments and organizations and individuals in the development of local historical preservation programs.
>
> Take such other actions necessary or appropriate to locate, acquire, protect, preserve, operate, interpret, and promote the location, acquisition, protection, preservation, operation, and interpretation of historic resources to foster an appreciation of Florida history and culture.

The Historic Preservation Advisory Council is established to enhance public involvement and participation in the preservation and protection of the state's historical resources. The council advises the division on a number of matters regarding historical resources.

Research permits are available for exploration and salvage of archaeological sites. Chapter IA-32.03-1 states that, "Only reputable museums, universities, colleges or other historical, scientific or educational institutions or societies will be considered as valid research applicants."

Chapter IA-31 provides procedures for the conducting of exploration and salvage of historic shipwreck sites. IA-31.0035-2 mandates that any person desiring to conduct activities of operations to explore for, excavate or salvage archaeological materials from sovereignty submerged lands may do so only if authorized by the division by an exploration or salvage agreement.

South Carolina: To preserve and encourage the scientific and recreational values of shipwrecks, South Carolina adopted the Underwater Antiquities Act of 1991. The act specifies a permit system administered by the South Carolina Institute of Archaeology and Anthropology for the management of its underwater cultural resources.

Persons may use and enjoy shipwrecks if their use does not disturb historic property or the surrounding area. A hobby license is required for those persons desiring to undertake recreational small scale search and recovery of historic properties. Items recovered under a hobby license must be reported to the institute but can be retained by the finder if certain qualifications are met. Instructional licenses are required for groups without hobby permits who desire to collect artifacts. Similar conditions and limitations apply to instructional licensees as do to hobby licensees. Intensive survey permits are required by institutions who want to pursue large scale salvage operations. The institute may then secure a data recovery permit for further salvage efforts if the proposed salvage meets the criteria set forth. Exclusive licenses are the final category of permits and may be issued to commercial applicants. The salvager must abide by an extensive list of regulations which are listed in the act.

References

Childs, Chet. (1991). Mussels prompt documentation of Lake Michigan's shipwrecks. *The HELM: Happenings and Educational Activities around Lake Michigan.* Illinois-Indiana Sea Grant Program. 8 (2) p. 3.

"Court OKs Illinois salvage effort." (1991, winter). *Diving Times: The Journal of Great Lakes Sport Diving,* p. 1.

Development of a National Underwater Parks Plan. (1984). *Professional Association of Diving Instructors Concept Report to the President's Commission on the American Outdoors.*

"Diving boom sparks moves to preserve shipwrecks." (1991, Jan.). *The Great Lakes Reporter,* p. 10.

Diving Equipment Manufacturers Association Report, (Dec.1987).

"Diving Michigan's Underwater Preserves." (1991). Michigan Underwater Preserve Council, Inc.

Holecek, Donald F., and Susan J. Lothrop. (1980). *Shipwreck vs. non-shipwreck scuba divers: characteristics, behavior, and expenditure patterns.* (Report No. MICHU-SG-80-205). Michigan Sea Grant Program.

Kinnunen, R., J. Peterson, S. Stewart, and C. Swinehart. (1985). Sea Grant research and community development make Michigan's bottomland preserves a reality. *Marine Parks and Conservation: Challenge and Promise.*

National Park Service. (1990). *Abandoned Shipwreck Act Guidelines.* (Publication No. 55-233). Federal Register. Washington, D.C.: U.S. Government Printing Office.

Peterson, J. P., T. Sundstrom and S. Stewart (1987). *A profile of Great Lakes diver activity, travel, and expenditure patterns.* (Report No. MICHU-SG-87-508). Michigan Sea Grant College Program.

Smiley, Thomas E., and Donald F. Holecek (1982). *Aquatic park management: Symposium proceedings.* (Report No. MICHU-SG-82-900). Michigan Sea Grant College Program.

Smith, Roger C. (Ed.). (1990). *Establishing an Underwater Preserve in the Florida Keys.* Tallahassee, FL: Florida Department of State.

Swinehart, Carol Y. (1988). Buried treasures-Michigan's bottomland preserves. *Extension Revie* 59 (2), pp. 10-11.

Vrana, Kenneth J. (1989). *Michigan bottomlands preserves inventory.* (Report No. MICHU-SG-89-500). Michigan Sea Grant College Program.

Vrana, Kenneth J. (1987a). Managing shipwrecks in a national park: the Isle Royale experience. In D.J. Lenihan (Ed.), *Submerged Cultural Resources Study of Isle Royale National Park,* (pp. 475-524) National Park Service, Santa Fe.

Vrana, Kenneth J. (1987b). Isle Royale's submerged history: An experience in preservation. In J.R. Marshall (Ed.). *Shipwrecks of Lake Superior.* (pp. 90-93). Duluth, MN: Lake Superior Port Cities, Inc.

Vrana, Kenneth J., & Halsey, J.R. (1991, January). *A review of shipwreck allocation and management in Michigan: Why 5% wasn't enough.* Paper presented at the Conference on Historical and Underwater Archaeological Meetings, Richmond, VA.

1989 Subscriber's Survey. (1989). *Skin Diver Magazine.*

Editors: Nancy Riggs
Robin Goettel

Designer: Krista Sunderland

Photo credits: Ron Kinnunen
Michigan Sea Grant College Program
Marquette, MI
Pp. 5,6,7,8,9,13,22

Mark Rowe
Calumet, MI
Pp. 1,2,3,4,10,18,21

Printed on recycled paper.