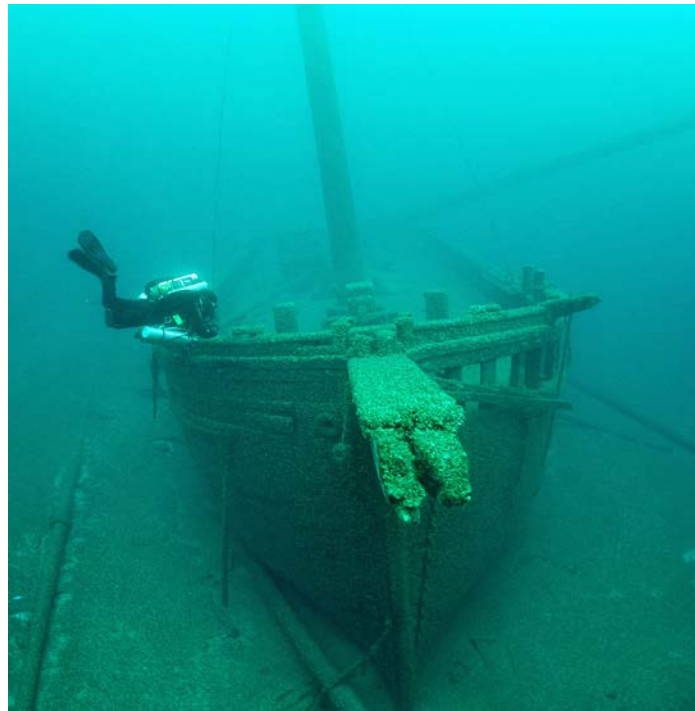


Proposed Wisconsin – Lake Michigan National Marine Sanctuary

Draft Environmental Impact Statement and
Draft Management Plan



National Oceanic and Atmospheric Administration (NOAA)
U.S. Secretary of Commerce
Penny Pritzker

Under Secretary of Commerce for Oceans
and Atmosphere and NOAA Administrator
Kathryn D. Sullivan, Ph.D.

Assistant Administrator for Ocean Services and Coastal Zone Management
National Ocean Service
W. Russell Callender, Ph.D.

Office of National Marine Sanctuaries
John Armor, Director
Matt Brookhart, Acting Deputy Director

Cover Photos: Top: The schooner *Walter B. Allen*. Credit: Tamara Thomsen, Wisconsin Historical Society. Bottom: Photomosaic of the schooner *Walter B. Allen*. Credit: Woods Hole Oceanographic Institution - Advanced Imaging and Visualization Laboratory.



Abstract

In accordance with the National Environmental Policy Act (NEPA, 42 U.S.C. 4321 et seq.) and the National Marine Sanctuaries Act (NMSA, 16 U.S.C. 1434 et seq.), the National Oceanic and Atmospheric Administration's (NOAA) Office of National Marine Sanctuaries (ONMS) has prepared a Draft Environmental Impact Statement (DEIS) that considers alternatives for the proposed designation of Wisconsin - Lake Michigan as a National Marine Sanctuary. The proposed action addresses NOAA's responsibilities under the NMSA to identify, designate, and protect areas of the marine and Great Lakes environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or aesthetic qualities as national marine sanctuaries. ONMS has developed five alternatives for the designation, and the DEIS evaluates the environmental consequences of each under NEPA. The DEIS also serves as a resource assessment under the NMSA, documenting present and potential uses of the areas considered in the alternatives. NOAA's preferred boundary alternative would designate 1,075 square miles of Lake Michigan for the protection of a nationally significant collection of historic shipwrecks and associated underwater cultural resources. NOAA's preferred regulatory alternative provides protection to underwater cultural resources, including a provision that prohibits anchoring or grappling into shipwreck sites. No significant adverse impacts to resources in the human environment are expected under any alternative. Long term beneficial impacts are anticipated if the proposed designation is finalized.

Lead Agency: National Oceanic and Atmospheric Administration

For Further Information Contact: Russ Green, Regional Coordinator, Northeast and Great Lakes Region at (920) 459-4425 or russ.green@noaa.gov

Comments Due: March 31, 2017

Public Comments May Be Submitted:

Online: Visit the federal eRulemaking portal at <http://www.regulations.gov>. In the search window, type NOAA-NOS-2016-0150, click the "Comment Now!" icon.

Mail:

Russ Green, Regional Coordinator
NOAA Office of National Marine Sanctuaries
University of Wisconsin-Sheboygan
One University Drive
Sheboygan, WI 53081

Dear Reviewer:

In accordance with provisions of the National Environmental Policy Act of 1969 (NEPA), the National Oceanic and Atmospheric Administration (NOAA) encloses for your review the Draft Environmental Impact Statement (DEIS) for proposed designation of Wisconsin - Lake Michigan as a National Marine Sanctuary. The DEIS considers five alternatives for the proposed designation.

On December 2, 2014, pursuant to Section 304 of the National Marine Sanctuaries Act and the Sanctuary Nomination Process (79 FR 33851), the State of Wisconsin submitted a nomination asking NOAA to designate Wisconsin – Lake Michigan as a National Marine Sanctuary. The nomination identified opportunities for NOAA to strengthen and expand on resource protection, education, and research programs by state of Wisconsin agencies and in the communities along the Lake Michigan coast. NOAA completed its review of the nomination in accordance with the Sanctuary Nomination Process and, on February 5, 2015, added the area to the inventory of nominations that are eligible for designation.

On October 7, 2015, a Notice of Intent was issued to prepare a draft environmental impact statement (DEIS) and draft management plan and to carry out a public scoping process (80 FR 60634; October 7, 2015). The proposed designation addresses NOAA responsibility under the NMSA to identify, designate and protect areas of the marine and Great Lakes environment with special national significance due to their conservation, recreational, ecological, historical, scientific, cultural, archaeological, educational, or aesthetic qualities as national marine sanctuaries.

NOAA's preferred boundary alternative (Boundary Alternative A) would designate a 1,075 square mile area of Lake Michigan for the protection and interpretation of a nationally significant collection of historic shipwrecks. NOAA's preferred regulatory alternative (Regulatory Alternative B) would prohibit moving, removing, recovering, altering, destroying, possessing or otherwise injuring, or attempting to move, remove, recover, alter, destroy, possess or otherwise injure a sanctuary resource. NOAA is also proposing to prohibit the use of grappling hooks and anchoring devices into shipwreck sites to protect fragile shipwrecks within the sanctuary from damage.

Designation under the National Marine Sanctuaries Act would allow NOAA to supplement and complement existing authorities of the State of Wisconsin and other Federal agencies to protect the collection of nationally significant shipwrecks and related maritime-cultural assets in this area. No significant adverse impacts to resources and the human environment are expected under any alternative. Long term beneficial impacts are anticipated if the proposed designation is finalized.

Public Meetings will be held as follows:

(1) Algoma, WI
Date: March 13, 2017
Location: Knudson Hall

Address: 620 Lake Street, Algoma, WI
Time: 6:30-8:30 p.m.

(2) Manitowoc, WI
Date: March 14, 2017
Location: Wisconsin Maritime Museum
Address: 75 Maritime Drive, Manitowoc, WI
Time: 6:30-8:30 p.m.

(3) Sheboygan, WI
Date: March 15, 2017
Location: University of Wisconsin-Sheboygan, Main Building, Wombat Room (Room 2114)
Address: 1 University Drive, Sheboygan, WI
Time: 6:30-8:30 p.m.

(4) Port Washington, WI
Date: March 16, 2017
Location: Wilson House
Address: 200 N. Franklin St., Port Washington, WI
Time: 6:30-8:30 p.m.

Written comments will be accepted until March 31, 2017 and can be submitted online or through the mail to the sanctuary official identified below.

Responsible Official: John Armor, Director, Office of National Marine Sanctuaries

Sanctuary Official: Russ Green, Regional Coordinator, Northeast and Great Lakes Region

Online:

Visit the federal eRulemaking portal at <http://www.regulations.gov>. In the search window, type NOAA-NOS-2016-0150, click the "Comment Now!" icon.

Mail:

Russ Green, Regional Coordinator
NOAA Office of National Marine Sanctuaries
University of Wisconsin-Sheboygan
One University Drive
Sheboygan, WI 53081


Sincerely,
John Armor
Director

About This Document

This draft environmental impact statement (DEIS) analyzes impacts and evaluates a reasonable range of alternatives (including a no action alternative) associated with the proposed designation of Wisconsin - Lake Michigan as a National Marine Sanctuary. This document is also a resource assessment document that details the present and future uses of the areas identified for possible designation.

The National Oceanic and Atmospheric Administration (NOAA) prepared this DEIS in accordance with the National Environmental Policy Act of 1969 (NEPA; 42 USC 4321 *et seq.*) as implemented by the Council on Environmental Quality regulations (40 CFR Parts 1500-1508), NOAA Administrative Order (NAO) 216-6A, which describes NOAA policies, requirements, and procedures for implementing NEPA, and the National Marine Sanctuary Act, which requires preparation of an Environmental Impact Statement for all sanctuary designations.

Accordingly, this document was preceded by a Notice of Intent to prepare a draft environmental impact statement (DEIS) and carry out a public scoping process (80 FR 60634; Oct. 7, 2015). The public scoping period commenced in October 2015 and ended on January 15, 2016, during which time three public meetings were held and NOAA received both written and oral comments on the concept of designating a sanctuary. NOAA received approximately 135 comments during that scoping period, the majority of which were strongly supportive of the concept. NOAA is the lead agency for this action. NOAA's Office of National Marine Sanctuaries (ONMS) is the implementing office for this action.

Recommended Citation

Office of National Marine Sanctuaries. 2016. Wisconsin - Lake Michigan National Marine Sanctuary Designation Draft Environmental Impact Statement. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Office of National Marine Sanctuaries, Silver Spring, MD.

Table of Contents

Abstract	2
About this Document	5
Acknowledgements	11
Acronyms	11
EXECUTIVE SUMMARY	12
Chapter 1: Introduction and Background	15
1.1 Introduction	15
1.2 National Marine Sanctuaries Act	15
1.3 Office of National Marine Sanctuaries	16
1.4 Comprehensive Management	17
1.5 National Historic Preservation Act of 1966	17
1.6 State Maritime Heritage Preservation and Management	17
1.7 The Sanctuary Nomination and Public Input Provided to NOAA through Public Scoping	18
Chapter 2: Purpose and Need for Action	21
2.1 Proposed Action	21
2.2 Purpose and Need for Action	21
2.2.1 Purpose of Action	21
2.2.2 Need for Action	22
Chapter 3: Alternatives	27
3.1 Introduction	27
3.2 Development of Alternatives	27
3.2.1 No Action Alternative	28
3.2.2 Sanctuary Boundary Alternatives	28
3.2.3 Sanctuary Regulatory Alternatives	28
3.2.4 Non-regulatory Programs for All Action Alternatives	29
3.3 No Action Alternative	29
3.4 Boundary Alternatives	31
3.4.1 Boundary Alternative A: 1,075 square miles (three-county boundary) - Preferred Alternative	31
3.4.2 Boundary Alternative B: 1,260 square miles (four-county boundary)	31
3.4.3 Boundary Alternatives Considered But Not Carried Forward	34

3.4.3.1	Nominated 875 square-mile boundary	34
3.4.3.2	Moving the lakeward boundary to the State of Michigan boundary	34
3.4.3.3	Addressing ports, harbors, and marinas in boundary alternatives	35
3.5	Regulatory Alternatives	36
3.5.1	Regulatory Alternative A: Adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources	37
3.5.2	Regulatory Alternative B: NOAA would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, with a broader prohibition on anchoring (Preferred Alternative)	37
3.5.2.1	Use of grappling hooks and anchors	38
3.6	Provisions that apply to both regulatory alternatives	38
3.6.1	Exemption for emergencies and law enforcement	38
3.6.2	Emergency regulation	39
3.6.3	Permits, Certifications and Authorizations	39
3.6.3.1	Authorizations of permits (primarily state permits)	39
3.6.3.2	Certifications	40
3.6.3.3	General permits	40
3.6.3.4	Special use permits	40
3.7	Regulatory Alternative Considered But Not Carried Forward	41
3.8	NOAA's Preferred Alternatives	41
Chapter 4:	Affected Environment	43
4.1	Introduction	43
4.2	Underwater Cultural Resources	43
4.2.1	Known Shipwrecks	44
4.2.2	Potential Shipwrecks within the Study Area	58
4.3	Human Uses	60
4.3.1	Tourism and Recreation	60
4.3.1.1	Tourism	60
4.3.1.2	Recreational Fishing	62
4.3.1.3	Recreational Boating	63
4.3.1.4	Recreational Scuba Diving and Snorkeling	63
4.3.2	Commercial activities	64
4.3.2.1	Commercial Fishing	64
4.3.2.2	Shipping	65
4.3.2.3	Other Commercial Activities	66
4.3.3	Socioeconomics	66

4.3.3.1 Population Density	68
4.3.3.2 Income and Employment	70
4.3.4 Military Exercise Area	71
4.3.5 Physical Environment	72
4.3.5.1 Geology	72
4.3.5.2 Climate	73
4.3.5.3 Water Quality	74
4.3.6 Biological Environment	74
4.3.6.1 Invasive species	75
4.3.6.2 Protected Resources	76
Chapter 5: Analysis of Environmental Consequences of Alternatives	77
5.1 Introduction	77
5.2 Affected resources and potential impacts	77
5.2.1 Types of Potential Impacts	78
5.2.2 Duration of Potential Impacts	78
5.2.3 Geographic Extent	79
5.2.4 Magnitude of Potential Impacts	79
5.3 Analysis of Environmental Consequences of Alternatives	80
5.3.1 Boundary Alternatives	80
5.3.2 Regulatory Alternatives	81
5.3.3 No Action Alternative	82
5.4 Consequences of No Action Alternative	82
5.4.1 Underwater Cultural Resources	82
5.4.2 Tourism and Recreation	82
5.4.2.1 Tourism	82
5.4.2.2 Recreational fishing	83
5.4.2.3 Boating	83
5.4.2.4 Scuba diving and snorkeling	83
5.4.3 Commercial Activities	83
5.4.3.1 Commercial fishing	83
5.4.3.2 Shipping	83
5.4.3.3 Other commercial activities	84
5.4.4 Socioeconomics	84
5.4.4.1 Population density	84
5.4.4.2 Income and employment	84
5.4.5 Military Exercise Area	84

5.4.6 Physical and Biological Environment	84
5.4.6.1 Physical	84
5.4.6.2 Biological	84
5.5 Consequences Common to Boundary Alternatives A and B, and Regulatory Alternatives A and B	86
5.5.1 Tourism and Recreation	86
5.5.1.1 Tourism	86
5.5.1.2 Recreational Fishing	87
5.5.1.3 Boating	87
5.5.2. Commercial Activities	87
5.5.2.1 Commercial fishing	87
5.5.2.2 Shipping	88
5.5.2.3 Other commercial activities	88
5.5.3 Socioeconomics	88
5.5.3.1 Population density	88
5.5.3.2 Income and employment	89
5.5.4 Military Exercise Area	89
5.5.5 Physical and Biological Environment	89
5.6 Consequences Unique to Each Alternative	91
5.6.1 Underwater Cultural Resources	91
5.6.2 Human Uses	92
5.6.2.1 Tourism	92
5.6.2.1 Scuba Diving and Snorkeling	93
5.7 Cumulative Impacts	94
Chapter 6: Additional Considerations	96
6.1 Consultation and Environmental Compliance	96
6.2 Environmental Justice	99
6.3 Relationship of Short-term and Long-term Productivity	99
6.4 Irreversible and Irretrievable Commitment of Resources	100
Index	101
Appendix A: Draft Management Plan	102
Appendix B: References	124

List of Figures

Figure 1: Map depicting the two boundary alternatives	13
Figure 2: NOAA’s National Marine Sanctuary System	16
Figure 3: Map depicting the two boundary alternatives	32
Figure 4: Map depicting the study area and exclusion of ports, harbors and marinas	33
Figure 5: Historic photo of schooner <i>Rouse Simmons</i>	44
Figure 6: Historic photo of steamer <i>Continental</i>	46
Figure 7: Historic photo of steamer <i>Francis Hinton</i>	46
Figure 8: Underwater image of schooner <i>Gallinipper</i>	47
Figure 9: Photomosaic of schooner <i>Home</i>	48
Figure 10: Underwater image of schooner <i>Northerner</i>	49
Figure 11: Historic photo of <i>Rouse Simmons</i> crew	50
Figure 12: Historic photo of steamer <i>Senator</i>	51
Figure 13: Underwater image of steamer <i>Vernon</i>	52
Figure 14: Historic photo of vessels in Sheboygan River	57
Figure 15: Number of anglers on charter trips in study area from 2011-2015	62
Figure 16: Density map depicting 2013 commercial vessel and passenger ferry activity	66
Figure 17: Study area for socioeconomic analysis relative to Boundary Alternative A	67
Figure 18: Study area for socioeconomic analysis relative to Boundary Alternative A	68
Figure 19: Proposed sanctuary boundary and overlap with R-6903 military training area	72

List of Tables

Table 1: Known and potential historic shipwrecks by boundary alternative	31
Table 2: Known shipwrecks within study area (Boundary Alternatives A and B)	52
Table 3: Potential shipwrecks with the study area (Boundary Alternatives A and B)	58
Table 4: Population, income and unemployment rates, 2014	69
Table 5: Age distribution by study area, 2014	69
Table 6: Race and ethnicity by study area, 2014	69
Table 7: Gender distribution by study area, 2014	70
Table 8: Income, poverty, and employment by study area, 2014	70
Table 9: Employment by sector and study area	76
Table 10: Summary of terms used to describe potential environmental impacts	80
Table 11: Summary of consequences for the “No Action” alternative	85
Table 12: Summary of boundary alternatives with shipwreck quantities	86
Table 13: Summary of regulatory alternatives	86
Table 14: Summary of consequences common to Boundary Alternatives A and B and Regulatory Alternatives A and B	90

Acknowledgements

This document was prepared by several staff members of NOAA's Office of National Marine Sanctuaries, including Ellen Brody, Great Lakes Regional Coordinator and Russ Green, Deputy Superintendent, Thunder Bay National Marine Sanctuary and Project Coordinator for the Proposed Wisconsin – Lake Michigan National Marine Sanctuary. Significant assistance also came from Office of National Marine Sanctuaries staff (Annie Sawabini, Jennifer Lechuga, Dayna Rignanese), Wisconsin Historical Society staff (John Broihahn, Tamara Thomsen, and Caitlin Zant), and Wisconsin Coastal Management Program staff (Mike Friis, Todd Breiby).

Acronyms

EPA – Environmental Protection Agency

DCR – Dry cargo residue

DEIS – Draft Environmental Impact Statement

MOA – Memorandum of Agreement

MPA – Marine Protected Area

NAO - NOAA Administrative Order

NEPA – National Environmental Policy Act

NMSA – National Marine Sanctuaries Act

NMSS – National Marine Sanctuary System

NOAA – National Oceanic and Atmospheric Administration

NOS – National Ocean Service

OLE – NOAA Office of Law Enforcement

ONMS – Office of National Marine Sanctuaries

WHS – Wisconsin Historical Society

WLMNMS – Wisconsin - Lake Michigan National Marine Sanctuary

USCG – United States Coast Guard

EXECUTIVE SUMMARY

The Proposed Wisconsin – Lake Michigan National Marine Sanctuary encompasses a 1,075-square-mile area of Lake Michigan adjacent to Manitowoc, Sheboygan, and Ozaukee Counties (Figure 1). The cities of Port Washington, Sheboygan, Manitowoc, and Two Rivers are the larger of the shoreline communities (these cities also co-authored the sanctuary nomination). The boundary includes 80 miles of shoreline and extends 7 to 16 miles from the coast. The proposed sanctuary would protect and interpret a nationally significant collection of underwater cultural resources, including 37 known shipwrecks and numerous other historic maritime-related features. Archival research indicates approximately 80 potential shipwrecks are yet to be discovered. The sanctuary would also enhance and facilitate broader lake conservation efforts as well as heritage tourism within the many communities that have embraced their centuries-long maritime relationship with Lake Michigan, the Great Lakes region, and the nation.

The historic shipwrecks in the proposed sanctuary are representative of the vessels that sailed and steamed this corridor, carrying grain and raw materials east as other vessels came west loaded with coal, manufactured goods, and people. Eighteen of the 37 shipwrecks are listed on the National Register of Historic Places. Many of the shipwrecks in the proposed sanctuary retain an unusual degree of architectural integrity, with 14 vessels virtually intact. Well preserved by Lake Michigan's cold, fresh water, the shipwrecks and related maritime heritage sites in and around the proposed Wisconsin – Lake Michigan National Marine Sanctuary possess exceptional historical, archaeological and recreational value.

Establishing a national marine sanctuary in Wisconsin waters would complement and expand existing state-led preservation efforts, research programs, and public outreach initiatives. Because this sanctuary would be in state waters, NOAA is proposing to co-manage the area with the State of Wisconsin. A sanctuary designation would enhance state preservation efforts due to its comprehensive management programs and focus on a specific area of Lake Michigan. The presence of a sanctuary would provide access to NOAA's extended network of scientific expertise and technological resources, enhance ongoing research, and provide an umbrella for the coordination of these activities. A sanctuary would support and build on the educational initiatives in place and provide programming and technology that could reach K-12, post-

graduate, and the general public across the state. A sanctuary designation, the local commitment to the sanctuary, the existing state agency interest, and NOAA's existing network of affiliated programs has the potential to create synergies that reach far beyond the proposed sanctuary boundaries.

This document is organized as follows:

Chapter 1 provides background on the National Marine Sanctuary System, state partners, and the public process leading up to the publication of the DEIS.

Chapter 2 outlines the purpose and need for designation of the area as a national marine sanctuary.

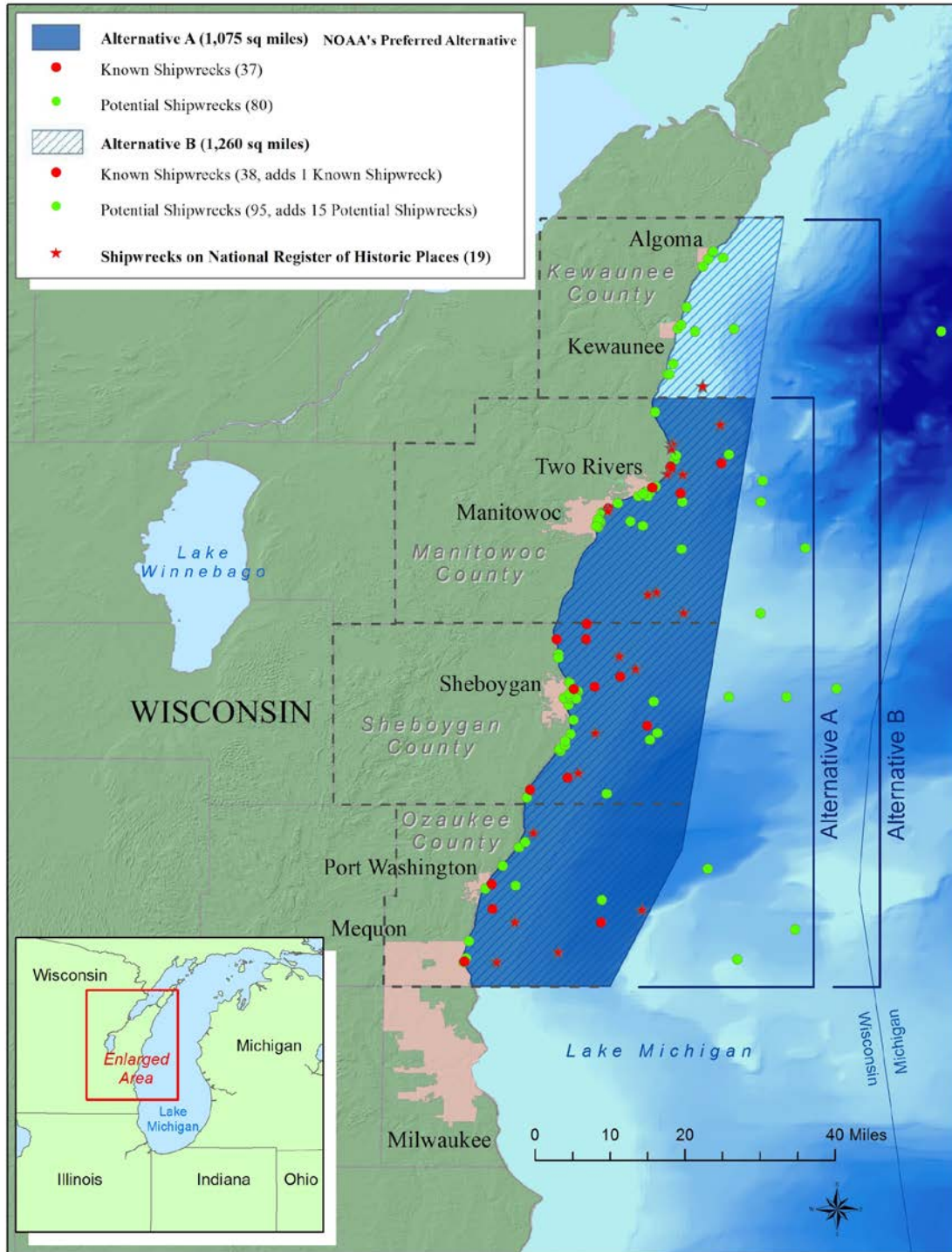


Figure 1. Map depicting the two boundary alternatives NOAA is considering for the proposed Wisconsin-Lake Michigan National Marine Sanctuary. Alternative A is NOAA's Preferred Alternative. Credit: NOAA.

This document is organized as follows:

Chapter 1 provides background on the National Marine Sanctuary System, state partners, and the public process leading up to the publication of the DEIS.

Chapter 2 outlines the purpose and need for designation of the area as a national marine sanctuary.

Chapter 3 provides a description of a range of alternatives. In addition to the preferred alternative, NOAA is evaluating a larger boundary alternative that would encompass the waters off a fourth country (Kewaunee), as well as a no-action alternative (i.e., not designating a national marine sanctuary). NOAA is also considering regulatory alternatives that provide increased protection for the proposed sanctuary's underwater cultural resources.

Chapter 4 describes the environment affected by a marine sanctuary designation, including a discussion of the cultural maritime landscape of the proposed sanctuary and an overview of shipwrecks and human uses within the proposed sanctuary.

Chapter 5 provides an analysis of the potential environmental impacts for each alternative. No significant adverse impacts to resources and the human environment are expected. Rather, long-term beneficial impacts are anticipated if the proposed action is implemented.¹

Chapter 6 highlights consultation and environmental compliance, environmental justice, relationship of short-term and long-term productivity, and irreversible or irretrievable commitment of resources per 40 CFR §1502.16.

¹ Under NEPA (42 U.S.C. 4321 *et seq.*), an environmental assessment would have sufficed to analyze the impacts of this action since NOAA is proposing that no significant impacts are likely. However, the NMSA requires NOAA to publish an environmental impact statement regardless of the intensity of the impacts of the proposed action.

Chapter 1

INTRODUCTION AND BACKGROUND

1.1 Introduction

To date, 13 national marine sanctuaries and two marine national monuments have been designated by the Secretary of Commerce, Congress or the President. These marine sanctuaries include both nearshore and offshore marine areas. Their designation provides protection for sensitive marine ecosystems, such as coral reefs and kelp forests, deep-sea habitats and geologic features such as canyons and seamounts, migration corridors and other habitats used by ecologically and economically important or protected marine species, and historically significant maritime archeological sites including shipwrecks and other cultural sites. In addition, these areas serve as valuable educational, recreational, scientific, and economic resources.

This section places the proposed action into the context of the mission of Office of National Marine Sanctuaries (ONMS), the provisions of the National Marine Sanctuaries Act (NMSA), and related federal and state legislation and preservation programs.

1.2 National Marine Sanctuaries Act

The NMSA (16 U.S.C. 1431 et. seq.) is the organic legislation governing ONMS (<http://sanctuaries.noaa.gov/library/national/nmsa.pdf>). The NMSA authorizes the Secretary of Commerce to designate as a national marine sanctuary any discrete area of the marine environment (including the Great Lakes) with special national significance due to its conservation, recreational, ecological, historical, scientific, cultural, archeological, educational or aesthetic qualities. Among the purposes and policies of the NMSA are the mandates to:

- Identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System, (16 U.S.C. 1431 (b)(1));
- Enhance public awareness, understanding, appreciation and wise and sustainable use of the marine environment, and the natural, historical, cultural, and archeological resources of the National Marine Sanctuary System (16 U.S.C. 1431 (b)(4));
- Support, promote, and coordinate scientific research on, and long-term monitoring of, the resources of these marine areas (16 U.S.C. 1431 (b)(5));
- To facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities. (16 U.S.C. 1431 (b)(6)).

The designation of the Wisconsin - Lake Michigan National Marine Sanctuary directly follows these directives from the NMSA.

1.3 Office of National Marine Sanctuaries

NOAA's Office of National Marine Sanctuaries is the federal program within the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS) charged with managing national marine sanctuaries. ONMS serves as the trustee for a network of underwater parks encompassing more than 600,000 square miles of marine and Great Lakes waters. The network includes a system of 13 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments (Figure 2). Few places on the planet can compete with the diversity of the National Marine Sanctuary System, which protects America's most iconic natural and cultural marine resources. The system works with diverse partners and stakeholders to promote responsible, sustainable ocean uses that ensure the health of our most valued ocean and Great Lakes places. The Office of National Marine Sanctuaries also leads the National Marine Protected Areas Center, the nation's hub for building innovative partnerships and tools to protect our special ocean. Sanctuary habitats include beautiful rocky reefs, lush kelp forests, whale migration corridors and destinations, spectacular deep-sea canyons, and underwater archaeological sites.

ONMS raises public awareness of sanctuary resources and conservation issues through programs of scientific research, monitoring, exploration, education and outreach. ONMS provides oversight and coordination of the sanctuary system by setting priorities for addressing resource management issues and directing program and policy development. To protect the living marine and non-living resources of sanctuaries, ONMS works cooperatively with the public in developing sanctuary management plans and regulations consistent with the NMSA.

NATIONAL MARINE SANCTUARY SYSTEM



Figure 2. NOAA's National Marine Sanctuary System. Credit: NOAA

1.4 Comprehensive Management

The NMSA includes a finding by Congress that ONMS will “improve the conservation, understanding, management and wise and sustainable use of marine resources” (16 U.S.C. 1431(a)(4)(A), §301(a)(4)(A)). The NMSA further recognizes that “while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of the marine environment” (16 U.S.C. 1431(a)(3), §301(a)(3)). Accordingly, ONMS subscribes to a broad and comprehensive management approach to meet the NMSA’s primary objective of resource protection.

Comprehensive sanctuary management serves as a framework for addressing long-term protection of a wide range of living, nonliving and marine heritage resources, while allowing multiple uses of the sanctuary to the extent that they are compatible with the primary goal of resource protection. The resources managed by the ONMS span diverse geographic, administrative, political and economic boundaries. Strong partnerships among resource management agencies, the scientific community, stakeholders and the public at-large are needed to realize the coordination and program integration that the NMSA calls for in order to comprehensively manage national marine sanctuaries.

1.5 National Historic Preservation Act of 1966

The National Historic Preservation Act of 1966, as amended (NHPA; Public Law 89-665; 16 U.S.C. 470 *et seq.*), is intended to preserve historical and archaeological sites in the United States of America. The act created the National Register of Historic Places, the list of National Historic Landmarks, and the State Historic Preservation Offices. Section 106 of the NHPA requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. The historic preservation review process mandated by Section 106 is outlined in regulations issued by ACHP (36 CFR Part 800). The Wisconsin State Historic Preservation Office, which implements section 106 of the NHPA, is located in the Wisconsin Historical Society.

1.6 State Maritime Heritage Preservation and Management

The Wisconsin Historical Society (WHS) is the State of Wisconsin’s principal historic preservation agency and charged under state statutes (44.02 and 44.30-44.31) with the research, protection, restoration, and rehabilitation of historic properties within Wisconsin. Under Wisconsin statute 44.47, the Society is also charged with the identification, evaluation, and preservation of Wisconsin’s underwater archaeological resources, including submerged prehistoric sites, historic shipwrecks, and aircraft on state-owned bottomlands. The State Historic Preservation Office within the WHS reviews federal, state, and local projects for their effect on historic and archaeological properties.

Recognizing the multiple-use values of underwater archaeological sites to scientists, historians, and recreationalists, these underwater remnants of our past are broadly termed “submerged cultural resources.” Submerged cultural resource management goes beyond the scope of traditional historic preservation programs, encountering diverse multiple-use concerns such as recreation and commercial salvage. The State of Wisconsin has additional management responsibilities for submerged cultural resources under federal law, including the National Historic Preservation Act of 1966 and the Abandoned Shipwreck Act of 1987 (Public Law 100-298). State legislation (1991, Wisconsin Act 269) and modifications to state law, in adherence with federal guidelines issued under the Abandoned Shipwreck Act, have provided Wisconsin with a more formalized and rational framework for underwater archaeological resource management. This legislation also authorizes the Society and the Wisconsin Department of Natural Resources to designate underwater preserves for the preservation and recreational development of underwater archaeological sites.

Created in 1988, the State Maritime Preservation and Archaeology Program works to survey, inventory, and evaluate Wisconsin’s underwater archaeological resources, develop preservation strategies, administer field management practices, and enhance public appreciation and stewardship for Wisconsin’s precious and fragile maritime heritage. The Maritime Preservation and Archaeology Program is within the State Historic Preservation Office.

To encourage preservation and visitation of these unique resources while fostering wider public appreciation for Wisconsin’s maritime cultural heritage, the WHS began the Wisconsin’s Maritime Trails Initiative in July 2001. The Maritime Trails encompass four stretches of Wisconsin coastline and links shipwrecks, lighthouses, historic waterfronts, historic vessels, museums, shore-side historical markers, and attractions. A fifth segment connects Wisconsin’s inland waterways offering a similar set of historic information and highlighting maritime related attractions. The resources highlighted along these trails illustrate the state’s diverse maritime heritage and links them within the overall context of Wisconsin’s, as well as the greater Great Lakes region’s, maritime heritage.

1.7 The Sanctuary Nomination and Public Input Provided to NOAA through Public Scoping

On December 2, 2014, pursuant to section 304 of the NMSA and the Sanctuary Nomination Process (SNP; 79 FR 33851), Wisconsin Governor Scott Walker, on behalf of the State of Wisconsin; and the Cities of Two Rivers, Manitowoc, Sheboygan, and Port Washington; the Counties of Ozaukee, Sheboygan, and Manitowoc, submitted a nomination asking NOAA to consider designating this area of Wisconsin’s Lake Michigan waters as a national marine sanctuary.

[http://www.nominate.noaa.gov/nominations/nomination_lake_michigan_wisconsin.pdf] The nomination is focused on protecting and interpreting a nationally significant collection of 37 shipwrecks, including 18 listed on the National Register of Historic Places. The nomination cited conservation goals to protect and conserve the Nation’s cultural heritage as well as opportunities to expand public access, recreation, tourism, research and education. Six major goals were defined by the nominators of the proposed Wisconsin-Lake Michigan National Marine Sanctuary:

1. Preserve and expand on the nearly 60-year investment the citizens of Wisconsin have made in the identification, interpretation, and preservation of shipwrecks and other maritime resources. Expand and deepen existing cooperative partnerships with communities, state and federal agencies, education institutions, advocacy groups, and professional organizations to study, interpret, and preserve these nationally significant archaeological and historic resources.
2. Promote a regional approach in establishing a Wisconsin national marine sanctuary. The State of Wisconsin's proposal is built on an existing foundation of regional collaboration. The cities of Port Washington, Sheboygan, Manitowoc and Two Rivers have strengthened this collaboration by working with the State of Wisconsin on the development of this proposal, which has significant benefits to each city and county and to the region.²
3. Promote the value and create a heightened appreciation of the Great Lakes' maritime heritage resources. Increase both physical and virtual access to the proposed sanctuary's maritime heritage resources and promote their recreational use.
4. Build and expand on state and local tourism initiatives and enhance opportunities for job creation. This will be accomplished in part by strengthening existing partnerships with the Wisconsin Department of Tourism, Wisconsin Harbor Towns Association, Convention and Visitor Bureaus, and local Chamber of Commerce and Tourism offices to promote Wisconsin's maritime heritage.
5. Build on NOAA's Office of National Marine Sanctuaries' presence in the Great Lakes and develop long-term sustainable partnerships with Thunder Bay National Marine Sanctuary and future Great Lakes sanctuaries through collaborative and active participation in the sharing of ideas, resources, and expertise. Build on NOAA's federal investment and expertise in the State of Wisconsin through the University of Wisconsin Sea Grant Institute and the Wisconsin Coastal Management Program to sustainably manage Wisconsin's maritime heritage resources and stewardship of the Great Lakes.
6. Enhance educational programming and public outreach through partnerships with local, state, and regional agencies and organizations to create innovative maritime heritage and Great Lakes educational programs, including: curriculum development, on-site field experiences, internships, job training, and STEM-focused initiatives that are a critical component of water-related research and employment opportunities for the 21st century.³

On October 7, 2015, President Obama announced that NOAA would initiate the sanctuary designation process for Wisconsin-Lake Michigan. That announcement initiated a 90-day public comment period during which NOAA solicited additional input related to the scale and scope of the proposed sanctuary, including ideas presented in the community nomination. NOAA hosted three public meetings in November 2015 and provided additional opportunity for comments through a web-based portal and by traditional mail until January 15, 2016.⁴ All comments received – through any of these formats – were made available to the public through the regulations.gov web portal.

² Upon further review of the proposed boundary, NOAA noted that Mequon (south of Port Washington) is in the boundary.

³ STEM is an acronym that refers to the academic disciplines of science, technology, engineering, and mathematics.

⁴ The web portal is available at <https://www.regulations.gov/#!docketDetail;D=NOAA-NOS-2015-0112>.

During this period, approximately 135 individuals provided input. In general, comments were strongly supportive of the goals of sanctuary designation, including the rationale for conservation of nationally-significant resources, considerations that enhance public use and recreation, considerations that enhance tourism and the local economy, and as a venue for education, science, and interpretation as described in the community nomination.

The comments underscored the need for conservation and interpretation, particularly the importance of educating users about the importance of the Great Lakes and the role that shipbuilding and shipping commerce has played in the history of the region and our nation. There was strong support from local communities, governments, and organizations favoring the designation of a sanctuary and offering opportunities to partner for education, research, outreach, and other activities.

Several commenters who support sanctuary designation did so with the expressed condition that designation should not in any way disrupt existing lake commerce. Specific concerns focused on the need for continued ability to dredge and maintain ports and the continued ability for ships to ballast in port and in open water.

The few comments in opposition to sanctuary designation were concerned about the cost of implementation, the possibility that designation would make metal detecting illegal, and that designation would be an unneeded level of government intervention.

There were several requests that NOAA consider expanding the proposed boundaries. Several comments suggested expansion north to include reported shipwrecks in Kewaunee County, and one commenter requested inclusion of Green Bay.

Chapter 2

PURPOSE AND NEED FOR ACTION

2.1 Proposed Action

The proposed action is to designate an area of Wisconsin state waters within Lake Michigan as a National Marine Sanctuary. The proposed designation will be based on evaluation of boundary and regulatory alternatives. The designation would help conserve a nationally significant collection of historic shipwrecks and other underwater cultural resources through the promulgation of a management plan that includes both regulatory and nonregulatory actions.

The proposed sanctuary will be co-managed by NOAA and the State of Wisconsin. In addition, if the Sanctuary is designated, an advisory council – representing a broad coalition of community groups – will be formed to provide advice to the NOAA sanctuary superintendent regarding the evolving priorities for site management and community requirements.

2.2 Purpose and Need for Action

2.2.1 Purpose of Action

The overarching purpose of this action is for NOAA to address the call for increased protection of underwater cultural resources as articulated in the nomination package for the Wisconsin-Lake Michigan National Marine Sanctuary (WLMNMS). The NOAA sanctuary nomination process establishes comprehensive criteria for designating new national marine sanctuaries, including requiring nominators to demonstrate the need for new or enhanced resource protection, and to articulate how an ONMS resource protection framework and associated regulations would supplement and/or enhance any existing framework (see Need for Action section). In the Wisconsin-Lake Michigan National Marine Sanctuary proposal, the State of Wisconsin and a network of coastal communities are driving the call for increased resource protection, with broad support from local government and non-government organizations.

Fundamentally, the purpose of this potential action is to supplement current Wisconsin state regulations and resource protection efforts in a way that will ensure long term protection. Managed to protect and conserve their resources and to allow uses that are compatible with the primary objective of resource protection, sanctuaries are especially well suited to meet the needs of the Wisconsin proposal. Indeed, the NMSA provides authority for comprehensive and coordinated conservation and management of special marine areas, and activities affecting them, in a manner which complements existing regulatory authorities (16 U.S.C. 1431(b)(2)).

A corresponding purpose of the proposed action is summarized in one of the three pillars of NOAA's mission, to conserve and manage coastal and marine ecosystems and resources (NOAA 2011). The NMSA authorizes the Secretary of Commerce to designate and manage special areas of the marine environment as national marine sanctuaries (16 U.S.C. 1431). Such designation is based on attributes of special national significance, including conservation, recreational, ecological, historical, scientific,

cultural, archaeological, education or aesthetic qualities. The NMSA recognizes that "while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of special areas of the marine environment" (16 U.S.C. 1431(a)(3)). Therefore, the NMSA promotes a broad and comprehensive approach to marine resource protection and management that includes underwater cultural resources. Embodied in this approach is a range of potential socioeconomic benefits derived from sound research, education and outreach, and community engagement. These benefits are identified in Wisconsin's nomination and form an additional and important purpose for the proposed action.⁵

Compatible use and long term resource protection is also an important part of NOAA's Next Generation Strategic Plan, which includes the long term goal of "resilient coastal communities and economies."⁶ Cultural resources are identified specifically in this goal's underpinning coastal management and planning:

While an increasing range of users will allow coastal communities to create diverse economies, care must be taken to ensure continued access to coastal areas, sustained ecosystems, maintained cultural heritage, and limited cumulative impacts.

Notably, the protection of nationally-significant submerged maritime heritage sites is deeply embedded in the NMSA's origin and subsequent application. The Civil War ironclad USS *Monitor* became the nation's first national marine sanctuary in 1975. In 2000, Thunder Bay National Marine Sanctuary (TBNMS), which is exclusively maritime heritage based, became the thirteenth and most recent national marine sanctuary; driven by interest from outlying coastal communities and a clear resource protection need, TBNMS was expanded from 448 to 4,300 square miles in 2014. Much of the purpose of this proposed action is to create in the Wisconsin-Lake Michigan NMS the successful regulatory framework, community engagement, research and resource protection, and socioeconomic benefits established at TBNMS and other national marine sanctuaries.

Specifically, the proposed action in this DEIS would provide long-term resource protection and comprehensive management for 37 known historic shipwrecks of special national significance, and other underwater cultural resources (i.e. docks, cribs, inundated prehistoric sites) located in a 1,075 square-mile area of Lake Michigan, and include Manitowoc, Sheboygan and Ozaukee Counties. The action will also provide protection for over 80 potential historic shipwrecks yet to be discovered. NOAA's proposed action would apply NMSA regulations, as well as Wisconsin-Lake Michigan National Marine Sanctuary-specific regulations, to the areas included in the preferred alternative.

2.2.2 Need for Action

Eighteen shipwreck sites within NOAA's proposed action are listed on the National Register of Historic Places (NRHP). Based on a set of national standards and review by the National Park Service, a listing on

⁵ The nomination document is available at:

www.nominate.noaa.gov/nominations/nomination_lake_michigan_wisconsin.pdf

⁶ NOAA's Next Generation Strategic Plan is available at: www.ppi.noaa.gov/ngsp/

the NRHP recognizes and validates the historical, archaeological, and cultural value of these sites, and helps to establish state ownership of historic shipwrecks via the Abandoned Shipwreck Act. A NRHP listing does not, however, constitute a resource management framework. With their national significance established under federal criteria, these 18 sites require the resource protection, research, and enhanced public access that are hallmarks of the National Marine Sanctuary System. Research indicates that most, if not all, of the remaining 18 known shipwreck sites in the preferred alternative are eligible for inclusion on the NRHP. Additionally, archival research indicates that approximately 80 potential historic shipwrecks are yet to be discovered, and these too have a high likelihood of being nationally significant. The State of Wisconsin has identified the need to seek a NRHP district listing for this area to include all shipwrecks, and views sanctuary designation as an important step in achieving this.

Threats to these nationally significant sites include both natural processes and human activities. Natural processes include the damaging impacts of wind, waves, storms, and ice, as well as the impact of invasive species such as zebra and quagga mussels that today cover most of Lake Michigan's shipwrecks. Human threats to underwater cultural resources include looting and altering sanctuary shipwreck sites and damaging sites by anchoring. These processes threaten the long term sustainability of historic shipwrecks and other underwater cultural resources, and negatively impact their recreational and archaeological value. These impacts include: anchor damage from visiting dive boats, damage due to unpermitted and poorly attached mooring lines, artifacts being looted, artifacts being moved within a shipwreck site, remotely-operated vehicle tethers entangled within a shipwreck, fishing gear entangled within a shipwreck, increased invasive mussel coverage, and the disturbance and natural deterioration of newly uncovered shipwrecks within the boundary's large swaths of shallow, sandy lake bottom.

Understanding, and eventually eliminating or mitigating negative human and natural impacts at maritime heritage sites, begins with acquiring baseline data and conducting long term monitoring. Wisconsin's Maritime Preservation and Archaeology Program has established baseline data at many sites within the preferred alternative, though due to limited resources is unable to effectively conduct comprehensive monitoring. A national marine sanctuary designation will substantially enhance the state's goal of "developing a systematic monitoring program with a quantitative component for shipwreck and other submerged cultural resources." Monitoring and evaluating negative impacts at sites is an essential first step toward mitigation and informs a range of resource protection measures including: permanent mooring buoy placements, anchoring best management practices, increased and/or targeted law enforcement, interpretive enforcement⁷, targeted education and outreach, and prioritizing future site documentation and potential physical interventions (i.e., recovering vulnerable artifacts). Because long-term monitoring data provide resource managers with the information necessary to identify resource changes over time, it is a well-established element of national marine sanctuaries.

Enhanced regulations are a necessary companion to monitoring efforts. Wisconsin state regulations designed to protect underwater cultural resources will be complemented by the NMSA, sanctuary-specific regulations and guidelines, and other federal regulations.

⁷ "Interpretive enforcement" refers to law enforcement approaches geared toward the widespread voluntary compliance of sanctuary regulations through education and outreach; often called "soft" enforcement.

Sanctuary regulations in the preferred alternative enhance Wisconsin underwater cultural resources law in the following ways: (1) sanctuary regulations apply to all shipwrecks, not just abandoned shipwrecks as provided in the Abandoned Shipwreck Act; (2) site specific activity use prohibitions may be established, such as the use of grappling hooks or other anchoring devices into shipwreck sites; (3) the sanctuary strengthens the existing state permit system, (4) sanctuary regulations help satisfy State and Federal Archaeology Program guidelines; and (5) sanctuary regulations afford the opportunity for greater civil penalties for resource damage.

Currently both federal and state regulatory authorities assist in the preservation of the historic shipwrecks and other cultural features in the proposed sanctuary. Both the National Historic Preservation Act of 1966 and the National Environmental Policy Act of 1969 create a public process whereby Federal agencies must assess alternatives or mitigation measures to minimize impacts to a resource by any action that is undertaken, licensed or permitted by a federal agency, or funded with federal dollars. However, preservation provisions in these laws apply to federal actions only, are project-specific and are not intended to be a comprehensive, long term resource management framework. On the state level, the provisions laid out in Wisconsin Statutes § 44.47 and §157.70 offer limited protections for underwater cultural resources. Wisconsin Statute 44.40 parallels the National Historic Preservation Act but is less comprehensive.

In response to a resource protection need identified by the State of Wisconsin, and to complement and strengthen state requirements for conducting all phases of field archaeology on state bottomlands, the sanctuary would have the ability to attach terms and conditions to state permits. This is viewed as a proactive way to mitigate the impacts of research activities and equipment that have the potential to damage sanctuary resources, a concern raised by the state of Wisconsin. This approach would reinforce Wis. Stat. § 44.47 (5), which reserves to the state "...the exclusive right and privilege of field archaeology on state sites," and establishes that field archeology on public lands must be carried out via permit.

Although damaging sanctuary resources via any activity is prohibited under sanctuary (and state) regulations, that prohibition alone does not afford an opportunity for the sanctuary to be proactive. Having knowledge of research activities that have a higher likelihood of damaging resources allows the sanctuary to weigh in on users' research methodologies and provide to users site specific information that may help to avoid damage (i.e., avoiding particularly sensitive areas of a wreck site). A companion outreach effort will ensure that users are aware of both the state permitting system, the sanctuary's role in permitting, and the potential benefits of aligning their efforts with the broader sanctuary research community and resource protection program.

Additionally, in an effort to better protect the often fragile shipwrecks within the sanctuary, the NMSA gives NOAA authority to establish site-specific use regulations to protect sanctuary resources, such as prohibitions on anchoring or grappling directly into a shipwreck site. Because the sanctuary seeks to promote public access, while also ensuring sound resource protection, an initial focus of the 5-year management plan will be the installation of permanent mooring systems at sanctuary shipwreck sites. The moorings will provide a secure and convenient anchoring point for users, eliminating the need for grappling. When moorings are not yet present, published guidelines will suggest best practices for anchoring near shipwrecks sites.

As an additional enforcement mechanism, NOAA may assess civil penalties for violation of sanctuary regulations or the National Marine Sanctuaries Section 307. Civil penalties for damaging underwater cultural resources within the preferred regulatory alternative would be substantially increased with a sanctuary designation. Current Wisconsin statutes provide for limited fines for “Whoever intentionally defaces, injures, destroys, displaces or removes any archaeological object or data belonging to the state...shall be fined not less than \$1,000 nor more than \$5,000.” Each violation of the National Marine Sanctuaries Act regulations, or any permit issued pursuant thereto, is subject to a civil penalty of not more than \$130,000. Each day of a continuing violation constitutes a separate violation. Additionally, response costs may be recouped: Under section 312 of the National Marine Sanctuaries Act, any person who destroys, causes the loss of, or injures any sanctuary resource is liable to the United States for response costs and damages resulting from such destruction, loss or injury, and any vessel used to destroy, cause the loss of, or injure any sanctuary resource is liable to reimburse the United States for response costs and damages from such destruction, loss or injury.

From a non-regulatory perspective, a national marine sanctuary designation will fulfill a state-identified need to create a bottomland preserve to protect historic shipwrecks. Wisconsin statutes provide that “the historical society may enter into agreements with federal and state agencies...regarding the preservation, management and use of submerged cultural resources and the management of bottomland preserves.” Wis. Stat. § 44.47 (5m) (c) provides for the establishment of state bottomland preserves: “The historical society and department of natural resources may, by rule, designate areas of the bed of any stream or lake as bottomland preserves for the purpose of enhancing preservation, management and public use of any submerged cultural resources within the bottomland preserve. A bottomland preserve may encompass more than one object or archaeological site.”

The intention of this statute is to strengthen submerged cultural resource protection in ways very similar to a national marine sanctuary. However, for a variety of reasons, this resource protection approach has not been adopted, including insufficient state funding, staffing and administrative resources. Designation of a national marine sanctuary ensures a stronger version of this resource protection approach. Additionally, supporting provisions in Wis. Stat. § 44.47 (5m) (d) (4) require the state historical society to consider “The existence of an entity that will assume responsibility for the management of the bottomland preserve.” Designation as a national marine sanctuary satisfies this provision, as well as others that require the state historical society to consider a resource inventory and management plan.

Sanctuary designation will strengthen and accelerate documentation and characterization of underwater cultural resources, which is fundamental to resource protection and monitoring, but can only be done in limited measure by the state. Wis. Stat. § 44.48 (1) (a), which addresses field archaeology, provides that “the state historical society shall prepare maps of the archeological resources of this state.” Importantly, national marine sanctuaries also serve as attractors for variety of federal, university, private and non-profit resources and expertise. This has been demonstrated at maritime heritage focused marine sanctuaries such as Thunder Bay NMS and Monitor NMS, where research and resource protection efforts have been substantially accelerated via partnerships, joint grant proposals, and in-kind support. The [2013 Thunder Bay NMS Condition](#) report chronicles these types of partnerships and positive research and resource protection outcomes; similar initiatives will be undertaken in the WLMNMS.

Additionally, there is a need to expand education and outreach efforts directed at long term preservation of shipwrecks, and to promote responsible use of sanctuary resources and help reduce human impacts to these. Because shipwrecks and other maritime heritage sites in Wisconsin are held in public trust by the state for all citizens, cultural value in this context embodies recreational and educational use; in short a compatible use conservation strategy must ensure that public access and recreation do not result in negative human impacts that diminish the historical and archeological value of these sites. Further, as in sanctuaries like Thunder Bay NMS, a wide range of tangential education and community engagement positive impacts can occur, including enhanced STEM education opportunities and increased heritage tourism, among many others. See the [Thunder Bay NMS education website](#) and [2014 highlights](#) for examples of such opportunities.

Chapter 3

ALTERNATIVES

3.1 Introduction

This section provides a comparative analysis of a reasonable range of possible federal actions in response to the resource protection needs identified in Chapter 2, in this case whether or not to designate a national marine sanctuary, and if so, what the sanctuary boundaries and regulations would be. The various alternatives are presented in this section with the boundary alternatives first, then the regulatory alternatives. The boundary alternatives are compared in terms of the number and variety of resources addressed in each alternative, as well as the human uses that exist in the area. The regulatory alternatives provide two alternatives for protecting underwater cultural resources.

A Draft Management Plan (DMP) is published with this DEIS. Management plans are sanctuary-specific planning and management documents used by all national marine sanctuaries. The DMP outlines a series of management goals and strategies in the areas of sanctuary resource protection, education and outreach, research, and operations. As detailed later in this chapter, the DMP compliments the proposed sanctuary regulations in key areas. The Management Plan would be applied consistently across the four action alternatives. The DMP is in Appendix A.

The purpose of the four action plans are as follows:

Resource Protection Action Plan: The purpose is to strengthen resource protection by conducting on-water resource protection activities, promoting responsible use of sanctuary resources, developing education initiatives, and enhancing enforcement efforts.

Education and Outreach Action Plan: The purpose is to enhance public awareness, understanding, and stewardship of the sanctuary, the Great Lakes, and the oceans.

Research Action Plan: The purpose is to outline the sanctuary's research objectives and priorities. Sanctuary research is conducted in support of resource protection, resource management, and education initiatives. The action plan is intended to guide the proposed sanctuary as well as working with potential sanctuary partners.

Sanctuary Operations and Administration Action Plan: The purpose is to create sanctuary infrastructure, staffing and program support to ensure effective implementation of the Management Plan.

3.2 Development of Alternatives

Section 1.7 of this document summarizes the public process by which the community-based nomination for a Wisconsin - Lake Michigan NMS began and subsequently moved into the designation phase. Both the boundary and regulatory alternatives for this action were developed in collaboration with a state agency working group. In particular, the Wisconsin Historical Society (WHS), as a key representative for the state during the sanctuary designation process, was interested in strengthening regulations pertaining

to underwater cultural resources; the WHS is charged with managing the state's underwater cultural resources. Consequently, the WHS worked closely with NOAA to develop regulations that would complement and/or enhance current protections under Wisconsin law. The overarching aim in developing these regulations is to increase protection under the law, while also creating complementary non-regulatory sanctuary programs (as articulated in the draft management plan), that ensure that the regulations do not create an undue burden on sanctuary users, and, ultimately, facilitate greater public access to what will be significantly better preserved and interpreted shipwreck sites into the future.

In addition to the No Action alternative, NOAA is presenting two boundary alternatives and two regulatory alternatives. The boundary alternatives reflect the State of Wisconsin's nomination to NOAA (Boundary Alternative A) and a larger boundary that responds to public comments from the public scoping period (Boundary Alternative B). The regulatory alternatives reflect an approach similar to protecting underwater cultural resources in other national marine sanctuaries (particularly Thunder Bay NMS) and a second approach that provides a higher level of protection. The Management Plan would be applied consistently across the four action alternatives.

Briefly, the alternatives are:

3.2.1 No Action Alternative

Under the No Action Alternative, NOAA would not move forward with the designation of the Wisconsin - Lake Michigan National Marine Sanctuary. As such, there would be no additional protective measures for the area's underwater cultural resources.

3.2.2 Sanctuary Boundary Alternatives

- A. 1,075-square-mile boundary (waters off Ozaukee, Sheboygan, and Manitowoc counties). Protects 37 known shipwrecks and approximately 80 to be discovered. This is NOAA's preferred boundary alternative. Note: this reflects a slight increase in boundary size from the nomination package; see Alternatives Not Carried Forward, section 3.5.3.
- B. 1,260 square-mile boundary (Ozaukee, Sheboygan, Manitowoc, and Kewaunee counties). Protects 38 known shipwrecks and approximately 95 to be discovered.

3.2.3 Sanctuary Regulatory Alternatives

- A. NOAA would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources (see section 3.6.1), including a prohibition on grappling into and anchoring on shipwreck sites with a mooring buoy.
- B. NOAA would adopt regulations similar to those used in other sanctuaries to protect sanctuary resources, with an additional regulation that prohibits grappling into and anchoring on all shipwreck sites. This is NOAA's preferred regulatory alternative.

NOAA is defining “sanctuary resource” as all prehistoric, historic, archaeological, and cultural sites and artifacts within the sanctuary boundary, including but not limited to, all shipwrecks and related components.

NOAA is defining “shipwreck site” as any sunken watercraft, its components, cargo, contents, and associated debris field.

3.2.4 Non-regulatory Programs for All Action Alternatives

In addition to the proposed alternatives described above, NOAA is also proposing non-regulatory programs that would apply to all the action alternatives. The non-regulatory programs are described in detail in the Draft Management Plan (DMP) issued as part of the proposed action (see Appendix A). The DMP describes all of the management actions and strategies that NOAA intends to implement in order to protect the nationally significant resources within the WLMNMS, to help conserve and promote the shipwrecks that have been located and those that await discovery. Each resource is a unique and fragile element in our nation’s history that the WLMNMS is dedicated to preserving, interpreting and promoting for future generations.

The DMP is comprised of four action plans (Resource Protection; Education and Outreach; Research; and Sanctuary Operations and Administration). It sets priorities to guide sanctuary programs and operations and provide the public with an understanding of the sanctuary’s strategies to conserve and promote the national maritime historic resources of the WLMNMS. The actions described are designed to strengthen and complement existing regulatory and non-regulatory protections currently in place under the State of Wisconsin.

NOAA proposes to work in full cooperation with the Wisconsin Historical Society, Wisconsin Department of Natural Resources, and the Wisconsin Coastal Management Program in their role as trustees for state resources on the DMP action plans. In addition, partnerships with private businesses, non-governmental organizations, educational and cultural institutions, and other local, state, and federal agencies provide expertise for scientific research and exploration, resources and capacities for site monitoring and enforcement, and support for education and outreach programs. The many partnerships developed over the course of this nomination and designation process have been, and will continue to be, critical to the success of the sanctuary.

The DMP is specific to NOAA’s actions but links to and identifies actions and responsibilities of partner management agencies, all of which will be an integral component of WLMNMS success. Public involvement has been valuable throughout the nomination and designation processes, and will continue to be valuable, through opportunities to volunteer and to participate on the Sanctuary Advisory Council.

3.3 No Action Alternative

Under the No Action Alternative, NOAA would not designate the Wisconsin - Lake Michigan National Marine Sanctuary. The long-term protection and management of Wisconsin’s underwater cultural resources would remain with existing state and federal authorities and programs. Under this alternative,

existing legal protection now provided by Wis. Stat. § 44.47 would not be strengthened by complementary sanctuary regulations. Dedicated state funding and staff support for Wisconsin's Maritime Preservation and Archaeology Program is limited. Without the designation of the Wisconsin - Lake Michigan NMS, NOAA resources would not be available to strengthen partnerships that assist in the comprehensive management of underwater cultural resources and to provide additional resources for education, research, monitoring, and enforcement.

Although the Archaeological Resources Protection Act of 1979 (ARPA) (16 U.S.C. 470aa *et seq.*) may establish some layer of federal protection to underwater cultural resources in the study area, it is triggered and wholly dependent on State or local law. ARPA establishes a permit system designed to address anthropological threats to archaeological resources located on public lands (owned and administered by the United States) and on the lands of Federally recognized Indian tribes. While the ARPA permit system was primarily established to address the domestic preservation of archaeological resources in the terrestrial environment, ARPA § 6(c) serves as a catch-all to reinforce state and local laws protecting such resources regardless of where the resources are located. ARPA § 6(c) further provides that “[n]o person may sell, purchase, exchange, transport, receive, or offer to sell, purchase, or exchange, in interstate or foreign commerce, any archaeological resource excavated, removed, sold, purchased, exchanged, transported, or received in violation of any provision, rule, regulation, ordinance, or permit in effect under State or local law” (*see* 16 U.S.C. 470ee(c)). This provision has been used to prosecute the attempted sale of archaeological resources stolen from private land, to enforce the illicit sale of artifacts stolen from a foreign state, and to protect maritime heritage (particularly the *R.M.S. Titanic*). Section 6(c) is implicated when an illicit sale or attempted sale of archaeological resources is conducted in interstate or foreign commerce and the action violates State or local law. However, the NMSA would fill this gap if Wisconsin - Lake Michigan NMS is designated by providing independent authority and a comprehensive management structure to protect the at-risk, nationally significant underwater cultural resources.

The National Historic Preservation Act of 1966 (NHPA) (16 U.S.C. 470 *et seq.*) also affords federal protection, but only to those 18 vessels in the study area that are currently listed in the National Register of Historic Places. Vessels lying outside this historic district would only be subject to protection under state law as described above. The NHPA establishes a Federal historic preservation program designed to avoid or minimize impacts to historic properties. The NHPA requires all federal agencies to consider whether their activities or undertakings will have an adverse effect on historic properties and to have preference for those that avoid or mitigate those effects. Section 106 of the NHPA specifically requires federal agencies to take into account the effects of any proposed federal, federally assisted, or federally licensed “undertaking” on any historic property that is included in, or eligible for inclusion in, the National Register of Historic Places. Section 106 of the NHPA does not prevent the undertaking from occurring and may not ultimately prevent an adverse effect; however, it does require a process, including consultation, which resolves those adverse effects through avoidance, minimization, or mitigation. However, the NHPA does not apply to private activities; the Act only applies to Federal undertakings. The NMSA would remedy this gap if Wisconsin - Lake Michigan NMS is designated because it would afford uniform protection to the underwater cultural resources regardless of whether such vessels are located within the historic district and the related NMSA regulations would apply to both private activities and Federal undertakings.

3.4 Boundary Alternatives

3.4.1 Boundary Alternative A: 1,075 square miles (three-county boundary) - Preferred Alternative

Boundary Alternative A is NOAA’s preferred boundary alternative. Under this alternative, NOAA would designate the 1,075-square mile area of Lake Michigan waters off Ozaukee, Sheboygan, and Manitowoc Counties as a National Marine Sanctuary (Figure 3). The sanctuary’s shoreward boundary would be defined by the Ordinary High Water Mark as defined by the State of Wisconsin, while the lakeward boundary would be drawn to include all known shipwrecks in each county, extending 16 miles offshore at its greatest extent. The harbors and marinas of Two Rivers, Manitowoc, Sheboygan, and Port Washington would not be included in the sanctuary (Figure 4).

Within this boundary alternative are 37 known shipwrecks, including 18 on the National Register of Historic Places. The sanctuary would provide comprehensive protection of underwater cultural resources as well as develop partnerships and resources for education, interpretation, personnel, research, and administration. This would provide significantly enhanced management of underwater cultural resources, as well as potential economic benefits to the coastal communities from Mequon to Two Rivers.

3.4.2 Boundary Alternative B: 1,260 square miles (four-county boundary)

Under Boundary Alternative B, NOAA would designate the 1,260-square-mile area that includes waters off Ozaukee, Sheboygan, Manitowoc, and Kewaunee Counties as a National Marine Sanctuary (Figure 3). The sanctuary’s shoreward boundary would be defined by the Ordinary High Water Mark as defined by the State of Wisconsin, while the lakeward boundary would be drawn to include all known shipwrecks in each county, extending 16 miles offshore at its greatest extent. The harbors and marinas of Kewaunee, Two Rivers, Manitowoc, Sheboygan, and Port Washington would not be included in the sanctuary (Figure 4). Within this boundary alternative, one additional known shipwreck (the *America*) would be added to those contained in Alternative A (it is also on the National Register of Historic Places). The sanctuary would provide supplemental protection of underwater cultural resources and supplemental resources for education, interpretation, personnel, research, and administration. This would lead to more comprehensive management of underwater cultural resources, as well as economic benefits to the coastal communities from Mequon to Algoma.

This boundary alternative is being considered in response to comments received during the public scoping period. The business community, several elected officials, and members of the public encouraged NOAA to add waters off Kewaunee County as part of the national marine sanctuary.

Table 1. Known and potential historic shipwrecks broken down by boundary alternatives.

Alternative	Boundary	Known shipwrecks	Potential shipwrecks
Boundary A (NOAA’s preferred alternative)	1,075 square miles; 3 counties	37	80
Boundary B	1,260 square miles; 4 counties	38	95

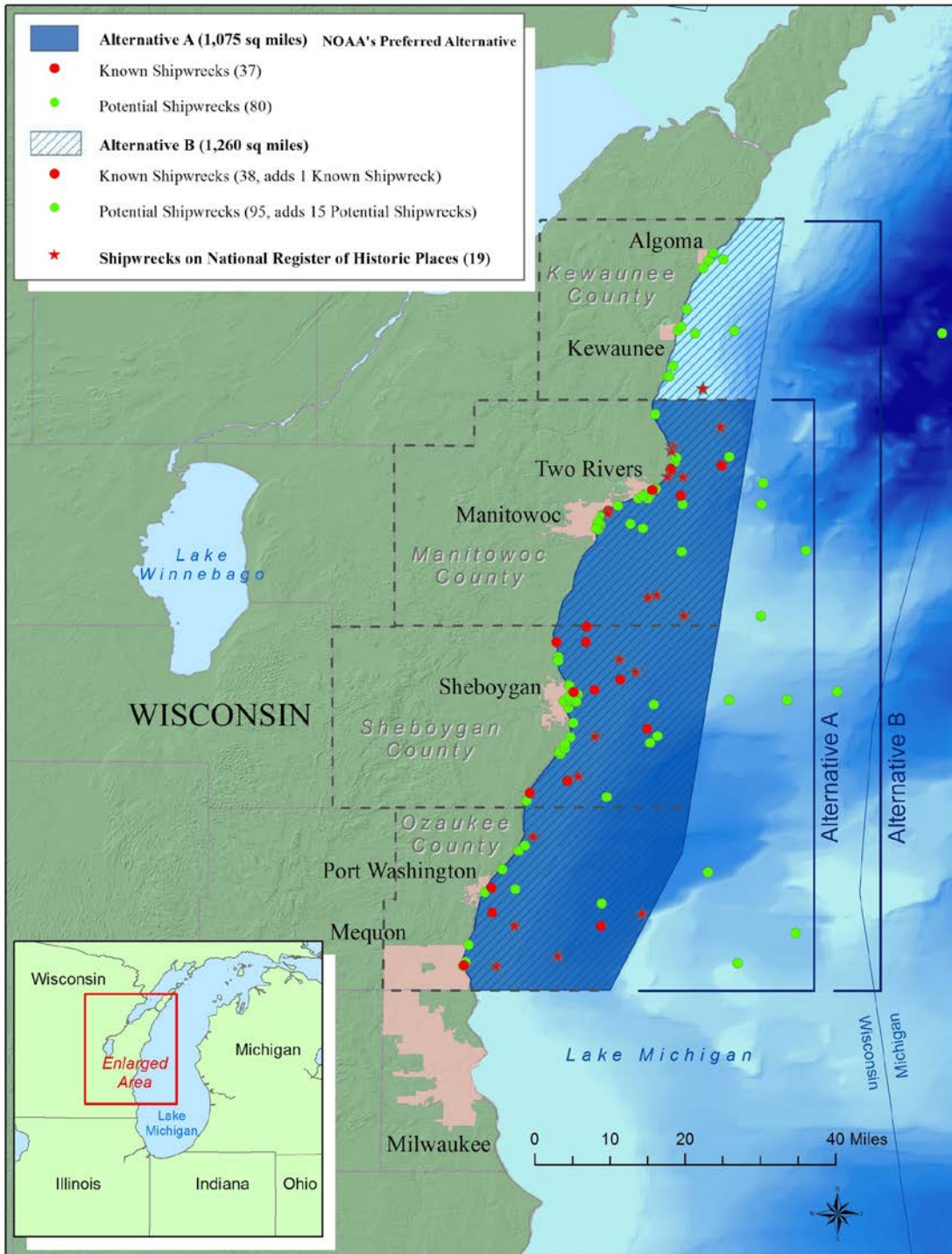


Figure 3. Map depicting the two boundary alternatives NOAA is considering for the proposed Wisconsin-Lake Michigan National Marine Sanctuary. Alternative A is NOAA's Preferred Alternative. Credit: NOAA.

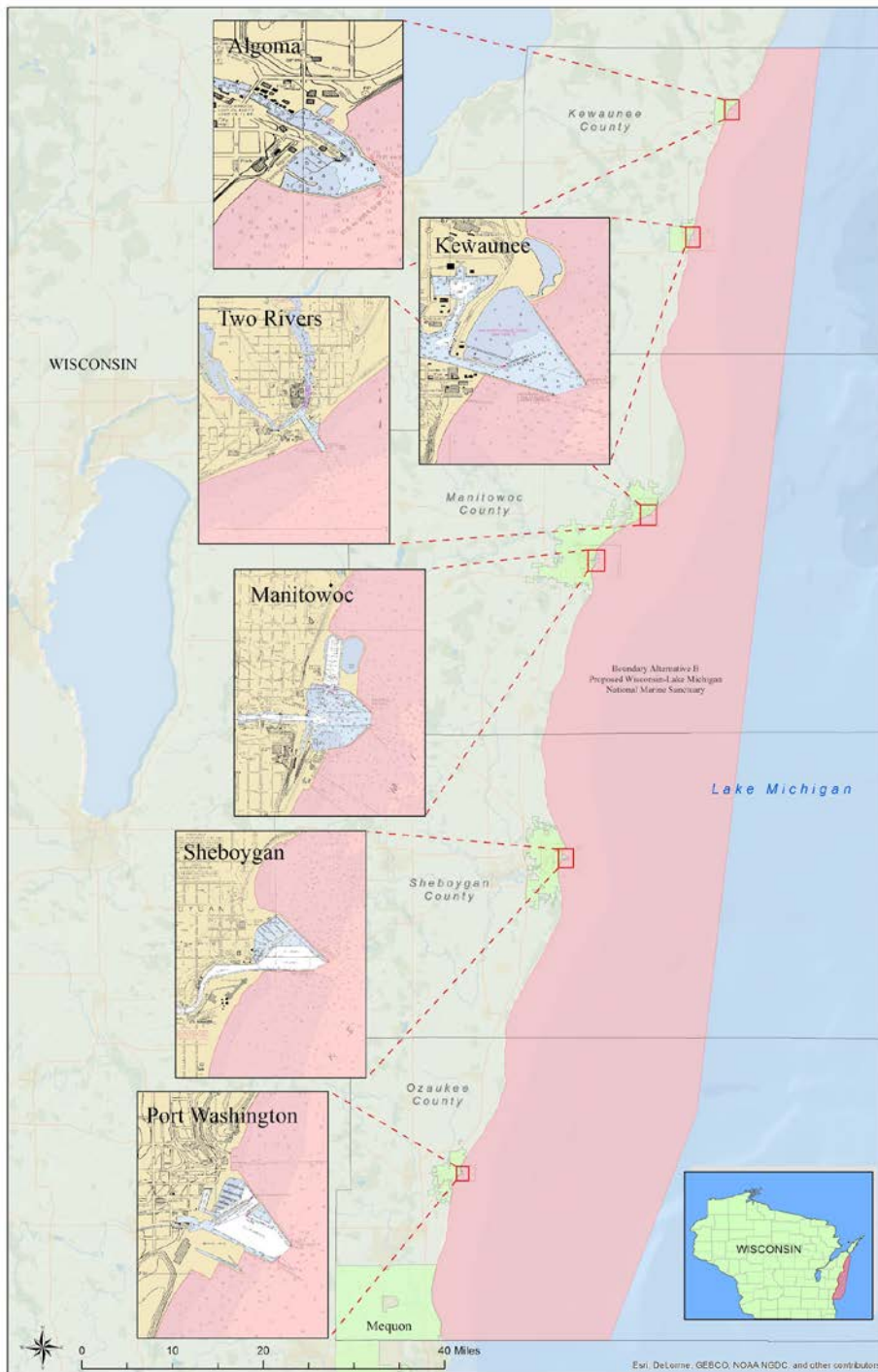


Figure 4. Map depicting the entire coastal area (four counties), and how ports, harbors, and marina would be excluded from both boundary alternatives. Credit NOAA.

3.4.3 Boundary Alternatives Considered But Not Carried Forward

3.4.3.1 Nominated 875 square-mile boundary

Boundary Alternative A is the boundary the State of Wisconsin submitted to NOAA in the sanctuary nomination package with minor adjustments based on public comments received during the comment period, resource protection considerations, and the ease and clarity of identifying the boundary. The 875-square-mile boundary was based on a 2008 Wisconsin Historical Society report that recommended this same area for a potential national marine sanctuary. After consultation with the State of Wisconsin, NOAA's adjustments include excluding harbors and ports, moving the south and north boundary lines to the county lines (to more clearly delineate the sanctuary), and expanding the southeast corner to include the wreck of the *Senator* (its location was previously unknown). This resulted in the proposed 1,075 square-mile boundary now identified as the current Boundary Alternative A.

3.4.3.2 Moving the lakeward boundary to the State of Michigan boundary

Additionally, NOAA considered the alternative of moving the lakeward boundary to the State of Michigan boundary. The primary reason for considering this boundary alternative is due to historic vessel traffic routes between Wisconsin and Michigan. While there are no known shipwrecks in this additional area, the chances for discovery are somewhat high given the number of ships that traveled this route. However, because this alternative adds considerable area to the sanctuary boundary, without any known shipwrecks within it, NOAA chose not to carry forward this alternative at this time because it does not meet the purpose and need of protecting known shipwrecks.

Clarification on original analysis

The following two shipwrecks (*Daniel Lyons* and *Lady Ellen*) were originally documented by the State of Wisconsin as being within Kewaunee County waters. As described below, they are no longer considered to be in the waters of Kewaunee County.

- *Daniel Lyons* was a 318-ton, three-masted canaller built by the George Goble and Sons shipyard in Oswego, New York. She collided with the *Kate Gillett* on 18 October 1878, sending her to the bottom northeast of Algoma in 110 feet of water. Her hull sides have collapsed, but her centerboard trunk remains upright and nearly all of her hull structure and rigging are extant. The *Daniel Lyons* site was surveyed by Wisconsin Historical Society in August 2005 and listed on the National Register of Historic Places in October 2007. An error occurred when determining the coordinates for this wreck when it was listed on the National Register of Historic Places. This error was recently corrected using newer technology and the new calculations place the canaller *Daniel Lyons* just over the border into Door County rather than Kewaunee County. The Wisconsin Historical Society made the necessary corrections to the National Register of Historic Places document in May 2016.
- *Lady Ellen* was a 38.25-ton, two-masted scow-schooner built by Captain William Henry in Ahnapee (Algoma), Wisconsin in 1875. She was abandoned in the Ahnapee River on 15 September 1897 when her owner/captain left to sail a newer, larger and more modern ship. Today

the wreck is partially submerged in a small cove on the north side of the Ahnapee River, west of the 2nd Street Bridge. Water depth on the site ranges from a few inches of water on the site's western edge to approximately 4.0 feet of water on the site's eastern edge. The site was surveyed by Wisconsin Historical Society in September 2011. As the *Lady Ellen* is within the Ahnapee River, it would not be within the sanctuary boundary.

3.4.3.3 Addressing ports, harbors, and marinas in boundary alternatives

To ensure compatible use with commercial shipping and other activities, NOAA is proposing to exclude the ports, harbors, and marinas of Algoma, Kewaunee, Two Rivers, Manitowoc, Sheboygan, and Port Washington from Boundary Alternatives A and B. This differs from the nominated boundary, which included ports, harbors, and marinas.

NOAA is excluding these areas based on comments by the Lake Carriers' Association, members of the shipping community, and some elected officials. They requested the ports not be included within the boundary to avoid any restriction or prohibition on port operations "critical to the local, regional, and national economies", including dredging.

Also, these commenters indicated that expansion would restrict or prohibit ballasting operations for vessels transiting the sanctuary, given U.S. Coast Guard and Environmental Protection Agency requirements that require certain vessels equipped with ballast tanks to "avoid the discharge and uptake of ballast water in areas within, or that may directly affect marine sanctuaries, marine preserves, marine parks, or coral reefs."

It is important to note that Section 602 of H.R. 4188 (Coast Guard Authorization Act of 2015) included the following language to address ballast water exchange in future Great Lakes national marine sanctuaries that protect underwater cultural resources:

(Sec. 602) The Howard Coble Coast Guard and Maritime Transportation Act of 2014 is amended to revise the declaration that bars the Secretary and the Environmental Protection Agency from prohibiting a vessel operating within the Thunder Bay National Marine Sanctuary and Underwater Preserve from taking up or discharging ballast water to allow for safe and efficient vessel operation if the uptake or discharge meets all federal and state ballast water management requirements that would apply if the area were not a marine sanctuary.

The bar on such a prohibition shall extend to any national marine sanctuary that preserves shipwrecks or maritime heritage in the Great Lakes, unless the sanctuary designation documents do not allow taking up or discharging ballast water in the sanctuary.

Regarding underwater cultural resources that may occur in the harbors and marinas of Two Rivers, Manitowoc, Sheboygan, and Port Washington, only two known wrecks (Julia and Lottie Cooper) occur in these areas, both in the Sheboygan harbor. Identified as state archaeological site SB-334, Julia is an iron sidewheel steamer built in 1843. The vessel was abandoned and sunk in seven feet of water off the Sheboygan Yacht Club. The hull was salvaged in 1939 and further fragments were recovered in 1992 through dredging by the city of Sheboygan. Sections of a hull plate were also recovered and were curated

at Duluth Canal Park Museum and Wisconsin Maritime Museum. Some unsalvaged hull remains may still be found at the site, although it has been extensively dredged.

Similarly, some fragments of the shipwreck *Lottie Cooper*, state archeological site SB-323, may be present in the Sheboygan Marina. A 252-ton, three-masted schooner built in 1876, the *Lottie Cooper* stranded at Sheboygan in a storm in April of 1894. The majority of the hull was recovered during marina enhancement projects, and is on display in a city park at the marina entrance. Because the remains of these shipwrecks are limited, fragmented, and largely disturbed, the state of Wisconsin and NOAA agreed that the benefit of including them in the sanctuary did not outweigh excluding the greater marina area. Both sites will continue to be protected by state law.

According to the Wisconsin Historical Society shipwreck database, there is potential for several other shipwrecks to be found in the ports and harbors within the sanctuary boundary. These shipwrecks are reported through historical sources, with exact locations not specified and the reliability of the sources not known. Moreover, these areas have been developed and dredged for many years, further suggesting that any new shipwrecks would already have been discovered. Although ports and harbors would be excluded from the sanctuary, Section 106 of the Historic Preservation Act ensures that these areas would be carefully considered for historical material during dredging or other harbor improvements (i.e., by requiring a historic resource survey).

For the reasons explained above, NOAA determined that the benefit of including the known and potential shipwrecks in harbors and ports to in the sanctuary did not outweigh the concerns raised by the Lake Carriers' Association. Thus, including harbors and ports did not meet NOAA's purpose and need to protect nationally significant shipwrecks while providing for compatible uses.

3.5 Regulatory Alternatives

NOAA is presenting two regulatory alternatives, each with three prohibitions. NOAA is also proposing the ability to issue emergency regulations if there is an imminent risk to sanctuary resources and if a temporary prohibition would prevent the destruction or loss of those resources. In addition to the three prohibitions under each alternative, the process to "authorize" state and federal permits is described, as well as NOAA's authority to issue General Permits or Special Use Permits.

The two regulatory alternatives are the same except for the anchoring provision.

In both regulatory alternatives, the definition of "sanctuary resource" is:

all prehistoric, historic, archaeological, and cultural sites and artifacts within the sanctuary boundary, including but not limited to, all shipwrecks and related components.

The definition of "shipwreck site" is: any sunken watercraft, its components, cargo, contents, and associated debris field.

3.5.1 Regulatory Alternative A: Adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources

Regulatory Alternative A would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, particularly the regulations of the Thunder Bay National Marine Sanctuary.⁸ The regulations would be consistent with the purpose and intent of Wis. Stat. § 44.47.

The proposed prohibitions for the Wisconsin-Lake Michigan NMS for this alternative are as follows:

- (1) Moving, removing, recovering, altering, destroying, possessing, or otherwise injuring, or attempting to move, remove, recover, alter, destroy, possess or otherwise injure a sanctuary resource.
- (2) Grappling into or anchoring on shipwreck sites that are marked with a mooring buoy.
- (3) Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the Act or any regulation or any permit issued under the Act.

3.5.2 Regulatory Alternative B: NOAA would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, with a broader prohibition on anchoring (Preferred Alternative)

Regulatory Alternative B is NOAA's Preferred Alternative. Under Regulatory Alternative B, NOAA would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, with an additional regulation that prohibits grappling into and anchoring on all shipwreck sites, not just those identified with mooring buoys.

The proposed prohibitions for the Wisconsin-Lake Michigan NMS for this alternative are as follows:

- (1) Moving, removing, recovering, altering, destroying, possessing, or otherwise injuring, or attempting to move, remove, recover, alter, destroy, possess or otherwise injure a sanctuary resource.
- (2) Grappling into or anchoring on shipwreck sites.
- (3) Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the Act or any regulation or any permit issued under the Act.

⁸ Regulations for the Thunder Bay National Marine Sanctuary, which manages underwater cultural resources, can be found at: <http://thunderbay.noaa.gov/pdfs/tbnmsregs.pdf>

3.5.2.1 Use of grappling hooks and anchors

As indicated above, the only difference between Regulatory Alternatives A and B is the broader prohibition on using grappling hooks and anchoring devices on all shipwreck sites, not just those marked with a mooring buoy. While both regulatory alternatives address the use of anchors and grappling hooks on often fragile sanctuary resources, the intent of NOAA's preferred alternative (B) is to better protect those shipwrecks that may not yet have a permanent mooring system, including those that are newly discovered and not yet known to the sanctuary.

The proposed regulation would include a prohibition using grappling hooks and anchoring devices into *any* shipwreck site. A weighted line (15 pound maximum) and surface float to locate and visibly "mark" a shipwreck site could be used, but dive boats could not be tied to this line. In this scenario, a dive boat could "mark" the wreck with a weighted line and surface float, then anchor outside of the shipwreck area, using the weighted line and surface float as a reference mark and descent/ascent line for divers.

Because the sanctuary seeks to promote public access, while also ensuring sound resource protection, an initial focus of the 5-year management plan will be the installation of permanent mooring systems at sanctuary shipwreck sites. The moorings will provide a secure and convenient anchoring point for users, eliminating the need for grappling to locate sites and for anchoring directly into a shipwreck site. The moorings will also provide clear notice to boaters of the presence of a known shipwreck site. Additionally, NOAA will prepare and make publicly available sanctuary maps to provide the public notice of the location of known and suspected shipwreck sites. Shipwreck sites not listed on maps would still be sanctuary resources and the prohibition on anchoring and grappling would still apply. The proposed management plan also includes activities related to surveying the sanctuary area and identifying additional shipwreck sites. As appropriate, and in consideration of resource management aims, NOAA would update the maps as new shipwreck sites are found.

When moorings are not yet present, published guidelines will suggest best practices for anchoring near shipwrecks sites. An example of a best practice could include instructions on using a weighted line and surface float to mark a wreck for divers to descend and ascend that is removed before the dive boat leaves the area.

3.6 Provisions that Apply to Both Regulatory Alternatives

The following provisions apply to both regulatory alternatives

- Exemptions for emergencies and law enforcement
- Emergency regulations
- Permits, certifications and authorizations

3.6.1 Exemption for Emergencies and Law Enforcement

NOAA is proposing to include an exemption from the three prohibitions described in the regulatory alternatives above for activities that respond to emergencies that threaten lives, property or the environment, or are necessary for law enforcement purposes.

3.6.2 Emergency Regulations

NOAA is also proposing the ability to impose emergency regulations if there is an imminent risk to sanctuary resources and a temporary prohibition would prevent the destruction or loss of those resources. The proposed language is:

“Where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource or quality; or minimize the imminent risk of such destruction, loss, or injury, any activity, including those not listed in Section 1, is subject to immediate temporary regulation. An emergency regulation shall not take effect without the approval of the Governor of Wisconsin or her/his designee or designated agency.”

3.6.3 Permits, Certifications and Authorizations

NOAA is proposing to include the authority to consider issuing general permits, special use permits, certifications, and authorizations to allow regulated activities to occur in the sanctuary under certain conditions. Because of the limited number of regulated activities described above, NOAA does not anticipate needing to frequently use these authorities, but having a range of options available will allow sanctuary managers flexibility to address proposed activities while protecting the sanctuary resources.

3.6.3.1 Authorizations of permits (primarily state permits)

NOAA is proposing to consider issuing authorizations at any time after the designation that would allow an otherwise prohibited activity if that activity is specifically authorized by any valid Federal, State, or local lease, permit, license, approval, or other authorization. The proposed authorization authority is intended to streamline regulatory requirements by reducing the need for multiple permits. This would allow NOAA the ability to authorize and, if warranted, add terms and conditions to the existing state public lands permit system pertaining to underwater cultural resources.

Early discussions with the State of Wisconsin identified a concern about the potential for research activities and equipment to damage historic shipwrecks. Although the sanctuary could prohibit these activities and then require a permit to conduct them, the existing state permit system already requires a permit for all phases of archaeological work on state bottomlands, including searching for shipwrecks, documenting sites, and excavating sites.

To strengthen this system, both regulatory alternatives include permit authorization authority for the sanctuary, allowing it to add terms and conditions to state-issued permits pertaining to all phases of archaeology on underwater cultural resources. In this scenario, NOAA would not require a separate NOAA permit to conduct archaeological activities in the sanctuary.

The State of Wisconsin would consult with NOAA on all permitting, and NOAA would have authorization authority and the ability to add terms and conditions to permits. In this scenario, the

sanctuary could review particular research methodologies and equipment being proposed in a permit application, and thereby be proactive in addressing potential damage to underwater cultural resources.

Although damaging sanctuary resources via any activity is always prohibited under sanctuary regulations, that basic protection does not afford an opportunity for the sanctuary to be proactive. Aligning with, and strengthening, the state-required permit for research activities that have a higher likelihood of damaging resources allows the sanctuary to weigh in on users' research methodologies and provide to users site specific information that may help to avoid damage (e.g. avoiding particularly sensitive areas of a wreck site while using a remotely operated vehicle). Such a proactive approach also allows the sanctuary to better incorporate non-sanctuary conducted research into its monitoring efforts.

A companion outreach effort will accompany this regulation, ensuring that users are aware of both the regulation and the potential benefits of aligning their efforts with the broader sanctuary research community and resource protection programs.

3.6.3.2 Certifications

The certification process essentially “grandfathers in” existing activities while seeking to minimize the impact on sanctuary resources through terms or conditions worked out during the certification process. In this process, NOAA is proposing to consider allowing an otherwise prohibited activity if that activity is specifically authorized by any valid Federal, State, or local lease, permit, license, approval, or other authorization. NOAA will consider issuing certifications for such activities that are in place at the time the sanctuary designation becomes effective, provided that the holder of such authorization or right complies with NOAA’s certification procedures and criteria within the timeline NOAA lays out to complete certifications.

3.6.3.3 General permits

Similar to other national marine sanctuaries, NOAA is proposing to consider the general permits only for the purposes of sanctuary education, research, and management. NOAA would execute this permit authority using the existing procedure and review criteria that require permit applicants to provide a description of the proposed activity, a timeline, information on the equipment, personnel and their qualifications, methodology to be used, and potential effects of the activity on sanctuary resources.

3.6.3.4 Special use permits

Special use permits (SUPs) are established in Section 310 of the National Marine Sanctuaries Act (16 U.S.C. § 1441; NMSA) to allow NOAA to issue permits to authorize specific activities in a sanctuary if the permit is necessary (1) to establish conditions of access to, and use of, any sanctuary resource or (2) to promote public use and understanding of a sanctuary resource. Special use permits are generally issued for concessionaire-type activities and other commercial activities that require access to the sanctuary to achieve a desired goal. The activities that qualify for SUPs are set forth in the Federal Register (78 FR

25957; May 3, 2013). Categories of SUPs may be changed or added to through public notice and comment. The list of national categories subject to the requirements of special use permits is:

- 1) The placement and recovery of objects associated with public or private events on non-living substrate of the submerged lands of any national marine sanctuary.
- 2) The placement and recovery of objects related to commercial filming.
- 3) The continued presence of commercial submarine cables on or within the submerged lands of any national marine sanctuary.
- 4) The disposal of cremated human remains within or into any national marine sanctuary.
- 5) Recreational diving near the USS Monitor.
- 6) Fireworks displays.
- 7) The operation of aircraft below the minimum altitude in restricted zones of national marine sanctuaries.

The SUP for recreational diving near the USS *Monitor* and the SUP for operation of aircraft would not apply in the proposed sanctuary because USS *Monitor* is located in a different sanctuary, and because there is no proposed minimum altitude in restricted zones for this proposed sanctuary. SUP applications would be reviewed to ensure that the activity is compatible with the purposes for which the sanctuary is designated and that the activities carried out under the SUP be conducted in a manner that does not destroy, cause the loss of, or injure Sanctuary resources. NOAA also requires SUP permittees to purchase and maintain comprehensive general liability insurance, or post an equivalent bond, against claims arising out of activities conducted under the permit. The NMSA allows NOAA to assess and collect fees for the conduct of any activity under a SUP. The fees collected could be used to recover the administrative costs of issuing the permit, the cost of implementing the permit, and the fair market value of the use of sanctuary resources.

3.7 Regulatory Alternative Considered but Not Carried Forward

A regulation to require a permit to search for underwater cultural resource sites in the sanctuary was considered but rejected. To establish such a permit system, the sanctuary would have to prohibit the activity, which NOAA deems unnecessary at this time. NOAA instead proposes to rely on the current state system of permitting, and strengthening it where appropriate, by adding terms and conditions to Wisconsin's already required Public Lands Field Archaeology Permit (Chapter 44, Subchapter II, Section 44.47).

3.8 NOAA's Preferred Alternatives

NOAA's preferred alternatives are Boundary Alternative A (1,075 square miles) and Regulatory Alternative B (adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, with an additional regulation that prohibits grappling and anchoring into shipwreck sites). This

protects the greatest number of known historic shipwrecks for a given area, as well as a large number of sites that have not yet been discovered. It also complements and strengthens current state regulations and permitting, and offers a proactive approach to reducing damage to sanctuary sites. The boundary is consistent with the nomination put forth by the state and coastal communities, and the proposed regulations reflect significant input from the State of Wisconsin.

Chapter 4

AFFECTED ENVIRONMENT

4.1 Introduction

Consistent with NEPA requirements, this section provides a narrative and tabular description of resources within Boundary Alternatives A and B, and Regulatory Alternatives A and B. The Affected Environment section focuses primarily on the human uses of the environment, which includes underwater cultural resources in the proposed sanctuary. This section also includes some relevant aspects of the physical and biological environment.

The area under consideration as a national marine sanctuary in Wisconsin contains an extraordinary collection of underwater cultural resources. For purposes of this section, this area is referred to as the “study area.”

4.2 Underwater Cultural Resources

The Great Lakes and their connecting waterways provide a natural highway extending over a thousand miles into the heart of North America. For millennia before European contact, these inland seas and tributaries served as important lines of trade and communication for Native Americans. Over the past 300 years, these waters have been further exploited by Euro-Americans and have greatly contributed to the growth of the North American interior. Marine transport on the Great Lakes played a crucial role in the exploration, settlement, and industrialization of the region.

During the nineteenth and early twentieth centuries, the Great Lakes evolved from an isolated maritime frontier on the western edge of the Atlantic World into the Nation’s busiest and the world’s most significant industrial waterway, where innovative ships and technologies moved raw materials and agricultural products in larger quantities and at lower costs than at any previous time in history. During this period entrepreneurs and shipbuilders on the Great Lakes launched tens of thousands of ships of many different designs. Sailing schooners, grand palace steamers, revolutionary propeller driven passenger ships, and industrial bulk carriers transported America’s business and industry. In the process they brought hundreds of thousands of people to the Midwest and made possible the dramatic growth of the region’s farms, cities, and industries. The Midwest, and indeed the American nation, could not have developed with such speed and with such vast economic and social consequences without the Great Lakes.

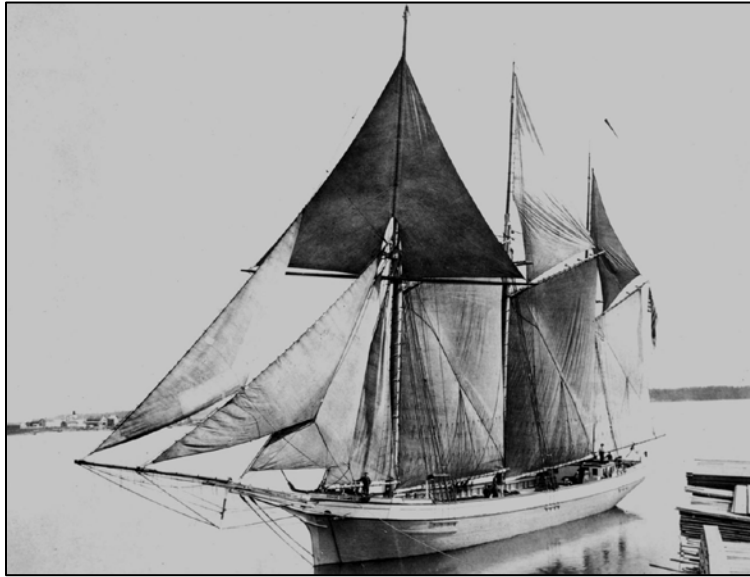


Figure 5. While en route to Chicago in November 1912, the schooner *Rouse Simmons* was lost with all hands during a violent, but not uncommon, Lake Michigan storm. Thousands of schooners like this sailed the Great Lakes in the late 1800s, driving America's economy. Located in the proposed sanctuary, the well-preserved wreck of the *Simmons* is a tangible reminder of the essential, and often dangerous, role played by Great Lakes ships and crews in our nation's past. Credit: Thunder Bay Sanctuary Research Collection.

In 2008, the Wisconsin Historical Society (WHS) conducted a comprehensive study of Wisconsin's shipwrecks in *Wisconsin's Historic Shipwrecks: An Overview and Analysis of Locations for a State/Federal Partnership with the National Marine Sanctuary Program*. Based on this report and subsequent research, the WHS provided documentation on the area's maritime cultural resources in Ozaukee, Sheboygan, Manitowoc, and Kewaunee Counties, which provided the foundation for the sanctuary nomination; much of the Affected Environment section of the DEIS comes from that report.

Additionally, important contextual historical information, as well as a rationale for the national significance of Wisconsin shipwrecks can be found in *Great Lakes Shipwrecks of Wisconsin*, a National Register of Historic Places Multiple Property Document produced by the State of Wisconsin and on file with the National Park Service.

The area under consideration as a national marine sanctuary in Wisconsin contains an extraordinary collection of underwater cultural resources demonstrated by the listing of 19 shipwrecks on the National Register of Historic Places. This description applies to resources in the largest area being considered (Alternative B), which is defined as the waters off the following counties: Ozaukee, Sheboygan, Manitowoc, and Kewaunee. For purposes of this section, this area is referred to as the "study area."

4.2.1 Known Shipwrecks

Known shipwrecks in the study area represent vessels constructed in Michigan, New York, Ohio, Illinois, and Wisconsin. Vessel types include schooners, a brig, canallers, scows, wood and steel steam propellers,

steam paddles, barges, a dredge, and tugs. The 38 known vessels within this area include (ship name followed by build date):

Advance (1853) A 180-ton, two-masted schooner built in Milwaukee, Wisconsin; she spent most of her career in the Lake Michigan lumber trade until she foundered southeast of Sheboygan on 8 September 1885, taking five of her crew with her. Today, she lies in 85 feet of water with her hull broken, but her centerboard trunk remains upright and all of her major hull components are extant.

Ahnapee (1867) A 80-ton, two-masted scow schooner built in Chicago, Illinois, and lengthened at Milwaukee in 1876. She ran aground on Sheboygan's North Point in a fog in 1884. Despite salvage attempts, she was declared a total loss. Today, she lies broken and scattered in 0 to 7 feet of water. Pieces of her hull occasionally wash ashore on North Point following heavy wave action.

Alaska (1869) A 85-ton, two-masted scow schooner built in Sheboygan, Wisconsin, primarily for the Lake Michigan lumber trade. While sailing light to pick up lumber in Ahnapee, Wisconsin on 23 March 1879, she was pushed ashore near Two Creeks. Great efforts were made to free and relaunch the craft, but it ultimately could not be made seaworthy and was set adrift and abandoned. She came to rest south of Rawley Point in 5 feet of water. Today the *Alaska's* bow, deck machinery, centerboard trunk, some rigging implements, and much of her hull structure, remain intact on the site beneath the shifting sand.

America (1873) A three masted schooner, *s* carried cargos mainly on lower Lake Michigan, typically consisting of lumber and ice. A casualty of a night-time collision just south of Kewaunee, the wreck sits upright on a sand bottom in 130 feet of water. The wheel was recovered and is located in the Wisconsin Maritime Museum, while the anchor is at the Rogers Street Fishing Village in Two Rivers, Wisconsin. This is the only additional shipwreck in Boundary Alternative B.

Arctic (1881) A 71-ton steam tug built for the Goodrich Steamship Company by the Rand and Burger shipyard in Manitowoc, Wisconsin; she was built with a reinforced bow for ice breaking. Abandoned in 1930, she was beached north of Manitowoc and today lies broken in 15 feet of water near the wreckage of the *Francis Hinton*. The wreck site consists of the lower hull and portions of the hull sides, a firebox boiler, propeller blade, engine mounts, rudder and other artifacts.

Atlanta (1891) A 1,129-ton wooden propeller built in Cleveland, Ohio for the Goodrich Transportation Company; she spent most of her life sailing the passenger and package trade routes between Lake Michigan ports until she caught fire and burned to the waterline on 18 March 1906. Today, she lies in 17 feet of water south of Sheboygan.

Byron (1849) Little is known about the little trading schooner, *Byron*. Just under 40 feet in length, the tiller-steered, two-masted schooner sank on 8 May 1867 loaded with sundries. Today, she lies in 135 feet of water 12 miles southeast of Sheboygan with her hull intact except for her decking. The *Byron* is listed on the National Register of Historic Places.

Continental (1882) A 1,506-ton wooden steam barge built by the George Presley shipyard in Cleveland, Ohio; she ran aground while running empty north of Rawley Point Lighthouse on 12 December 1904 (Figure 6). She broke up over the winter, and today her hull lies in 15 feet of water. Her compound steam engine remains upright and intact, breaking the water's surface near the beach. The *Continental* is listed on the National Register of Historic Places.

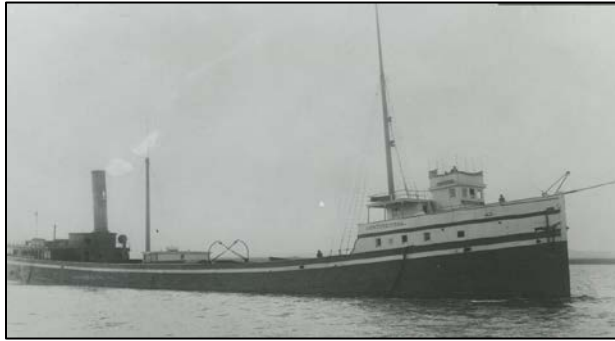


Figure 6. The steamer *Continental* marks an important milestone in the transition from wood to steel shipbuilding. Today, it is an accessible shallow water shipwreck site presenting a unique recreational opportunity. Credit: Thunder Bay Sanctuary Research Collection.

Ella Ellinwood (1870) A 158-ton, schooner built in East Saginaw, Michigan, she ran aground south of Port Washington on 29 September 1901. The vessel's location is reportedly known but not on record with the State.

Floretta (1868) A 260-ton, two-masted canaller built in Detroit, Michigan; she was carrying a rare cargo for schooners on Lake Michigan when she foundered off Manitowoc on 18 September 1885 – iron ore. Today, she lies somewhat broken in 170 feet of water. Her centerboard trunk remains upright, but like most wooden vessels that sank carrying iron ore, her hull is broken with much of her lower hull covered in ore. Her two intact hull sides lay next to her lower hull. Nearly all of her standing and running rigging are extant. The *Floretta* is listed on the National Register of Historic Places.

Francis Hinton (1889) A 417-ton, wooden steam barge built by the Hanson and Scove shipyard in Manitowoc, Wisconsin; she came ashore in a storm on 16 November 1909 north of Manitowoc (Figure 7). Today, she lies broken in 20 feet of water with her hull sides collapsed and her boiler, engine, and propeller intact. The *Francis Hinton* is listed on the National Register of Historic Places.

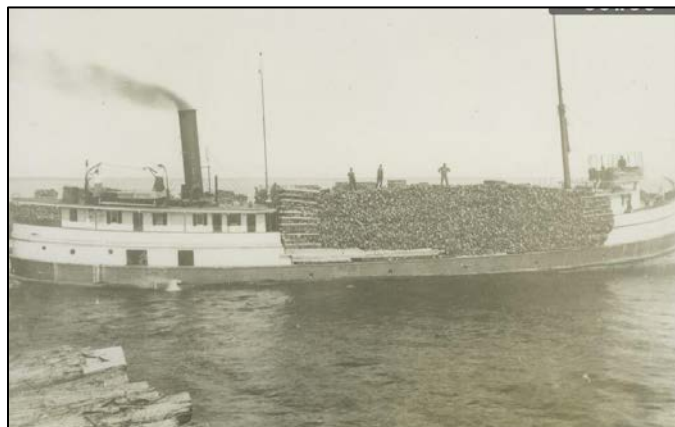


Figure 7. The steamer *Francis Hinton* loaded to capacity with forest products to feed the insatiable building demands of Milwaukee, Chicago, Detroit and other rapidly growing cities in the nineteenth century. Credit: Thunder Bay Sanctuary Research Collection.

Gallinipper (1833) A 95-foot, two-masted schooner originally built as the *Nancy Dousman* in Black River, Ohio in 1833, her name was changed to the *Gallinipper* prior to her foundering northeast of

Sheboygan on 5 July 1851 while empty. Today, she lies at 210 feet on a slight list to starboard with her hull completely intact and one of her masts still standing (the other is on display at Roger Street Fishing Village in Two Rivers) (Figure 8). The *Gallinipper* is Wisconsin's oldest known shipwreck, having ties to early Wisconsin settlement and the fur trade, and is an excellently-preserved example of a very early hull type. The *Gallinipper* is listed on the National Register of Historic Places.



Figure 8. A view toward the stern of the nearly intact schooner *Gallinipper*, built in 1833. Credit: Wisconsin Historical Society.

Helvetia (1873) A 793-ton, three-masted schooner built in Tonawanda, New York; she was cut down to a schooner barge and continued to sail until she was abandoned and scuttled northeast of Sheboygan on 10 September 1921. Today, she lies in 165 feet of water with much of her lower hull intact.

Henry Gust (1893) A 37-ton, wooden steam-powered fish tug built by the Milwaukee Shipyard Company in Milwaukee, Wisconsin, she was scuttled off Two Rivers in 1935. Today, she lies in 85 feet of water with her lower hull largely intact as well as her boiler, engine, and propeller.

Hetty Taylor (1874) A 84-ton, two-masted schooner built in Milwaukee and sailed as trading schooner until she capsized in a storm southeast of Sheboygan on 26 August 1880. Today, she lies mostly intact in 110 feet of water. The *Hetty Taylor* is listed on the National Register of Historic Places.

Home (1843) This 85-foot, two-masted schooner was built in Black River, Ohio and was sunk in a collision southeast of Manitowoc on 17 October 1858 with a load of slabwood. Today, she lies intact in 170 feet of water with the collision damage visible on her starboard bow. Her foremast is on display at Rogers Street Fishing Village, but her mainmast remains in place, having fallen towards the port quarter (Figure 9). The *Home* is listed on the National Register of Historic Places.

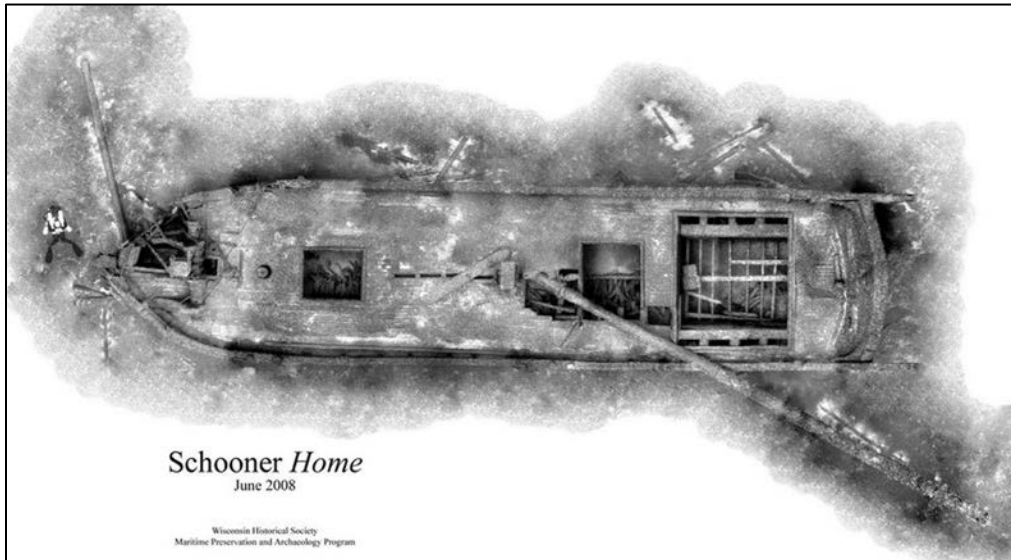


Figure 9. A photomosaic of the schooner *Home*, conveying the site's high degree of archaeological and recreational significance. Credit: Wisconsin Historical Society.

Island City (1859) This 54-ton, two-masted schooner was built in St. Clair, Michigan and served as a trading schooner until she foundered on 8 April 1894. She was owned by the same family that owned the scow schooner *Tennie and Laura*, which lies just a few miles to the northeast. Today, the *Island City* lies in 135 feet of water. Her hull is broken up, but all major hull components are extant. The *Island City* is listed on the National Register of Historic Places.

I.H. Johnson (1866) A 91-ton, two-masted scow schooner built in Dover Bay, Ohio. On 23 September 1890, the *I.H. Johnson* collided with the *Lincoln Dall* off Centerville, Wisconsin. Attempts to salvage the vessel were unsuccessful and she was abandoned. Today, the ship is broken in 90 feet of water. The vessel's location is known to some divers but is not on record with the State.

La Salle (1874) A 307-ton, three-masted canaller built in Tonawanda, New York. On 25 October 1875 while carrying wheat from Chicago, she unslipped her rudder while abreast Rawley Point, and before she could come to anchor, she struck bottom and drifted shoreward where she became imbedded in quicksand. Today *La Salle* rests in 12 feet of water. Her bow is intact, iron deck knees line her hull sides and much of her rigging remains on the site.

Linda E. (1937) A 29-ton, steel fish tug built by Burger Ship Building Company in Manitowoc, Wisconsin. The *Linda E.* went missing on 11 December 1998 with her crew of three men. She was located seven miles off Port Washington in June 2000 by the Coast Guard Cutter *Acacia* sitting upright, with collision damage evident, in 260 feet of water.

Lookout (1855) A 226-ton, three-masted schooner built in Buffalo, New York that carried grain, coal and lumber during her 45-year career. On 29 April 1897, she sailed too close to the point and stranded off Rawley Point. Today the vessel lies partially imbedded in quicksand in 10 feet of water; her bow, centerboard trunk and much of her starboard side are exposed from the gelatinous sand.

Mahoning (1847) A 119-foot brig built at Black River, Ohio; she was lost while being towed to Milwaukee for repairs on 4 November 1864. Today, the *Mahoning* lies broken in 55 feet of water southeast of Port Washington. Most of her hull structure is extant, including her bow knee and an early centrifugal salvage pump that was aboard at the time of her loss. The *Mahoning* is one of a handful of square-rigged vessels discovered in Wisconsin waters.

Major Anderson (1861) A 434-ton, three-masted barkentine built in Cleveland, Ohio. She was bound for Chicago with 750 tons of coal from Erie, Pennsylvania, when in early October 1871 she became lost in smoke which hung over the lake from regional fires and stranded south of Rawley Point. Although her rigging and deck machinery were salvaged, today, her lower hull remains intact and well-preserved under an estimated ten feet of sand. The *Major Anderson* is listed on the National Register of Historic Places.

McMullen and Pitz Dredge (1918) The *McMullen and Pitz Dredge* was only a year old when she foundered between Manitowoc and Sheboygan in a storm on 18 November 1919. Today she lies upright and intact in 85 feet of water.

Niagara (1846) A 225-foot wooden sidewheel steamer that was built in Buffalo, New York, and carried passengers and package freight on a regular route between New York and Wisconsin. She caught fire and burned to the waterline northeast of Port Washington on 24 September 1856, taking more than 60 of her passengers with her. Today, the *Niagara* lies broken in 55 feet of water, but her engine, boilers, walking beam, and paddles are extant. The *Niagara* is listed on the National Register of Historic Places.

Northerner (1851) A 77-ton, two-masted schooner built in Clayton, New York; she worked in the lumber trade until she foundered in a storm southeast of Port Washington on 29 November 1868. Today, she lies intact in 135 feet of water with a unique scroll head still intact (Figure 10). The *Northerner* is listed on the National Register of Historic Places.



Figure 10. Maritime archaeologists from the Wisconsin Historical Society document the schooner *Northerner*, resting in 135 feet of water in the proposed sanctuary. Credit: Wisconsin Historical Society.

Pathfinder (1869) A 634-ton, three-masted schooner built by the Campbell, Owen and Co. shipyard in Detroit, Michigan; she stranded 2.5 miles north of Two Rivers on 18 November 1886. Today, she lies broken in 10 feet of water. The *Pathfinder* is listed on the National Register of Historic Places.

Robert C. Pringle (1903) A 141-ton, wooden steam screw built in Manitowoc, Wisconsin, as the excursion boat *Chequamegon* before she was converted to a work tug. While towing the steamer *Venezuela* enroute to Sandusky, Ohio, she struck a submerged object and sank off Sheboygan on 19 June 1922. Today, she lies upright and completely intact in 300 feet of water southeast of Sheboygan.

Rouse Simmons (1868) A 205-ton, three-masted double centerboard schooner built by the Allen McClellan and Co. shipyard in Milwaukee, Wisconsin, she foundered off Two Rivers on 23 November 1912 while carrying a load of Christmas trees to Chicago. Today, she lies upright and intact in 165 feet of water, including her cargo of evergreen trees. The *Rouse Simmons* is listed on the National Register of Historic Places.



Figure 11. Captain Schuenemann, center, of the schooner *Rouse Simmons* was lost with his ship and crew on Lake Michigan in 1912. Several of the historic shipwrecks in the proposed sanctuary also represent the final resting place of sailors and passengers. Credit: Chicago Historical Society.

S.C. Baldwin (1871) A 412-ton, wooden steam barge built by the Campbell, Owen and Co. shipyard in Detroit, Michigan; she is reportedly the first double-decked wooden steam barge built on the Great Lakes. She foundered on 27 August 1908 north of Two Rivers. Today, she lies broken and scattered in 70 feet of water. The *S.C. Baldwin* is listed on the National Register of Historic Places.

Selah Chamberlain (1873) A 1,207-ton, steam barge built in Cleveland, Ohio; she collided with the *John Pidgeon Jr.* in a dense fog off Sheboygan on 14 October 1886. She quickly sank, taking five of her crew with her. Today, the *Selah Chamberlain*'s hull is largely broken, but her twin boilers, steeple compound engine, sternpost, propeller, and rudder remain upright and intact.

Senator (1896) A 4,408-ton, steel steamer built in Wyandotte, Michigan; she was carrying 264 new Nash automobiles when she collided with the steamer *Marquette* in a dense fog southeast of Sheboygan on 31 October 1929 (Figure 12). Located in 2005, she is upright and intact in 460 feet of water. The *Senator* is listed on the National Register of Historic Places.



Figure 12. The steamer *Senator* with a deck load of Nash automobiles. The 400-foot vessel sank with the loss of nine crew after 1929 collision on busy Lake Michigan. Credit: Thunder Bay Sanctuary Research Collection.

Silver Lake (1889) A 105-ton, two-masted scow schooner built in Little Point Sable, Michigan; she sailed in the lumber trade until she was cut nearly in two by the *Pere Marquette* on 28 May 1900. Today, she lies upright and intact in 210 feet of water northeast of Sheboygan. Her hull is fractured from the collision, but her foremast remains standing with a rigged yard. The *Silver Lake* is listed on the National Register of Historic Places.

Tennie and Laura (1876) A 57-ton, two-masted scow schooner built in Manitowoc, Wisconsin; she sailed in the lumber trade until she capsized in a gale on 2 August 1903 northeast of Milwaukee. Today, the *Tennie and Laura* lies upright and intact in 325 feet of water southeast of Port Washington with both masts still standing. The *Tennie and Laura* is listed on the National Register of Historic Places.

Toledo (1854) A 128-foot, steam screw built in Buffalo, New York; she sailed in the passenger and package trade until she foundered off Sheboygan on 22 October 1856 with the loss of approximately 40 lives. Today, she lies broken and scattered in 20 feet of water just north of the Sheboygan entrance.

Unidentified wreckage (b) In 10 feet of water, six miles north of Sheboygan, lies the broken and scattered remains of a wooden vessel. Tentatively identified as a schooner, more work needs to be done on this site for further analysis.

Vernon (1886) A 694-ton, wooden propeller built by the J. P. Smith shipyard in Chicago, Illinois, she worked as a package freighter for the Booth Fish Company for one year when she foundered northeast of Two Rivers on 29 October 1887. Today, she lies intact in 210 feet of water with her cargo of general merchandise intact in her holds (Figure 13).



Figure 13. The bow of the intact wooden steamer *Vernon*, sunk in 1887 with a full cargo of package goods. Credit: Wisconsin Historical Society.

Walter B. Allen (1866) A 296-ton, two-masted canaller built in Ogdensburg, New York; she was being towed to the shipyard for repairs when she foundered northeast of Sheboygan on 17 April 1880. Today, she lies upright and completely intact in 170 feet of water. Both of her masts were upright until the winter of 2006-2007, when the mainmast broke at deck level and toppled to the port side. The steam pump that was used to keep her afloat remains lashed to the deck. The *Walter B. Allen* is listed on the National Register of Historic Places.

Table 2. Known shipwreck sites within study area (Boundary Alternatives A and B). Note: there is only one additional known shipwreck in Boundary Alternative B, the schooner *America* located in Kewaunee County.

	Name / Build Date	Vessel Type	Condition	Depth	NRHP Listed	County
1	Ahnapee (1867)	Scow schooner	Surf Zone	5		Sheboygan
2	Alaska (1869)	Scow schooner	Surf Zone	5		Manitowoc
3	Advance (1853)	Schooner	Deep/Broken	85		Sheboygan
4	Arctic (1881)	Tug	Surf Zone	10		Manitowoc
5	America (1873)	Canaller	Deep/Broken	85	Yes	Kewaunee
6	Atlanta (1891)	Steam screw	Surf Zone	20		Sheboygan
7	Byron (1849)	Schooner	Deep/Intact	135	Yes	Sheboygan
8	Continental (1882)	Steam screw	Surf Zone	15	Yes	Manitowoc
9	Ella Ellinwood (1870)	Schooner	Surf Zone	12		Ozaukee
10	Floretta (1868)	Schooner	Deep/Broken	170	Yes	Manitowoc
11	Francis Hinton (1889)	Steam screw	Surf Zone	15	Yes	Manitowoc
12	Gallinipper (1833)	Schooner	Deep/Intact	220	Yes	Ozaukee
13	Helvetia (1873)	Schooner-barge	Deep/Intact	165		Sheboygan
14	Henry Gust (1893)	Tug	Deep/Broken	80		Manitowoc
15	Hetty Taylor (1874)	Schooner	Deep/Intact	110	Yes	Sheboygan
16	Home (1843)	Schooner	Deep/Intact	165	Yes	Manitowoc

17	Island City (1859)	Schooner	Deep/Broken	135	Yes	Ozaukee
18	I.H Johnson (1866)	Scow schooner	Deep/Broken	90		Sheboygan
19	La Salle (1874)	Schooner	Surf Zone	12		Manitowoc
20	Linda E. (1937)	Tug	Deep/Intact	260		Ozaukee
21	Lookout (1855)	Schooner	Surf Zone	8		Manitowoc
22	Mahoning (1847)	Brig	Deep/Broken	55		Ozaukee
23	Major Anderson (1861)	Barkentine	Surf/Intact	10	Yes	Manitowoc
24	McMullen and Pitz Dredge (1918)	Dredge	Deep/Intact	85		Sheboygan
25	Niagara (1846)	Steam paddle	Deep/Broken	65	Yes	Ozaukee
26	Northerner (1851)	Schooner	Deep/Intact	125	Yes	Ozaukee
27	Pathfinder (1869)	Schooner	Surf Zone	10	Yes	Manitowoc
28	Robert C. Pringle (1903)	Steam tug	Deep/Intact	300		Sheboygan
29	Rouse Simmons (1868)	Schooner	Deep/Intact	165	Yes	Manitowoc
30	S.C. Baldwin (1871)	Barge	Deep/Broken	75	Yes	Manitowoc
31	Selah Chamberlain (1873)	Steam screw	Deep/Broken	85		Sheboygan
32	Senator (1896)	Steam screw	Deep/Intact	460	Yes	Ozaukee
33	Silver Lake (1889)	Scow schooner	Deep/Intact	210	Yes	Sheboygan
34	Tennie and Laura (1876)	Scow schooner	Deep/Intact	325	Yes	Ozaukee
35	Toledo (1854)	Steam screw	Surf Zone	20		Ozaukee
36	unidentified wreckage (b)	Unknown	Surf Zone	10		Sheboygan
37	Vernon (1886)	Steam screw	Deep/Intact	210		Manitowoc
38	Walter B. Allen (1866)	Schooner	Deep/Intact	170	Yes	Sheboygan

National Register of Historic Places listings and additional historical significance of shipwrecks in the study area

The National Register of Historic Places is the official list of the Nation's historic places worthy of preservation (including shipwrecks). Authorized by the National Historic Preservation Act of 1966, the National Park Service's National Register of Historic Places is part of a national program to coordinate and support public and private efforts to identify, evaluate, and protect America's historic and archeological resources. Wisconsin has 61 shipwreck sites statewide listed on the National Register, more than any other state in the country. Nineteen of the listed shipwrecks are located within the proposed sanctuary. The sites have been listed under all four of the National Register criteria: (A) sites associated with significant events that have made a contribution to the broad patterns of our history; (B) sites that are associated with the lives of significant persons; (C) sites that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master; and (D) sites that have yielded, or may be likely to yield, information important in history or prehistory.

Within the study area, the shipwrecks listed on the National Register of Historic Places include (ship name followed by build year): *America* (1873) *Byron* (1849), *Continental* (1882), *Floretta* (1868), *Francis Hinton* (1889), *Gallinipper* (1833), *Hetty Taylor* (1874), *Home* (1843), *Island City* (1859), *Major Anderson* (1861), *Niagara* (1846), *Northerner* (1851), *Pathfinder* (1869), *Rouse Simmons* (1868), *S.C. Baldwin* (1871), *Senator* (1896), *Silver Lake* (1889), *Tennie and Laura* (1876), and *Walter B. Allen* (1866).

As detailed in each site's nomination package, these shipwrecks represent a cross-section of vessel types that played critical roles in the expansion of the United States and the development of the Midwest during a significant period in our Nation's history. These ships sailed and steamed to eastern ports carrying grain and raw materials. They returned west with loads of coal and with settlers crammed aboard great palace steamers. Great Lakes' shipbuilders adapted to the changes in cargo and built vessels able to stand up to the demands of the Great Lakes lumbering and iron ore industries. Small trading or lake shoring schooners provided both economic and cultural links between Wisconsin's developing communities.

Shipwrecks in the study area also include a broad range of vessel types and are illustrative of a critical period in the development of the Western Lake Michigan maritime cultural landscape, the expansion of the United States, and the settlement and development of the Midwest (1830-1950). Highlights include:

- Wisconsin's two oldest shipwrecks discovered to date, the *Gallinipper* (1833) and the *Home* (1843), both of which remain largely intact.
- Schooners of several types, including scows, canallers, and lakeshorers. The *Tennie and Laura* and *Silver Lake* represent two intact examples of an especially unique vessel class on the Great Lakes—the scow schooner. Little historical and archaeological data exists regarding scow schooners; these two vessels, with intact hulls and standing rigging, are exceptional examples and are particularly important because they influenced scow construction throughout the world.
- Two of the five known Wisconsin examples of a unique and poorly-understood vessel type—the double-centerboard schooner. The best-preserved of these vessels, the *Rouse Simmons*, (often referred to as the Christmas Tree Ship), is one of the most celebrated shipwrecks in all the Great Lakes. The *Silver Lake* is the only known example of a double centerboard scow- schooner on the Great Lakes.
- Three examples of canallers—which were boxy, purpose-built vessels— were designed to barely squeeze through the Welland Canal locks with the largest possible amount of cargo. Several canallers are located in Wisconsin, but the best-preserved example, the *Walter B. Allen*, also contains a relatively intact ship's yawl, the only known yawl boat in Wisconsin waters.
- Trading schooners, which were small vessels typically 90 feet or less in length, rarely traveled beyond Lake Michigan, but were critical to the local economy. Frequently carrying goods to market from the owner's home port, these little-documented vessels were the lifeblood of hinterland communities and allowed a connection between remote communities and larger markets around the lake. Several trading schooners are represented in this region, including *Hetty Taylor*, *Byron*, *Home*, *Island City*, *Northerner*, and *Silver Lake*.
- Several steam barges, including the *Francis Hinton*. The historical importance of this Manitowoc-built vessel is enhanced by the presence of other steam barge shipwrecks and the architectural drawings of the *Sidney O. Neff*. The drawings and shipwrecks provide an excellent opportunity to compare steam barge construction through time. Wooden bulk carriers like the *Continental* and the *S.C. Baldwin* provided vital links to regional and national markets. The *S.C. Baldwin* is reportedly the first double-decked steamer built on the Great Lakes.

- The side-wheel steamer *Niagara*, one of Wisconsin's most significant vessels because it is representative of the early Great Lakes passenger trade. The *Niagara* was lost while carrying nearly 300 passengers—60 died in the accident—most of them immigrants coming to settle in the Midwest. Palace steamers like the *Niagara* set the standard for fast and luxurious lake travel and served as a primary carrier of immigrants to Wisconsin and other states along Lake Michigan's shore.
- Few package steamers are represented in Wisconsin's archaeological record, but the most intact example is the *Vernon*, which lies northeast of Two Rivers. Not only does the *Vernon*'s hull and machinery remain intact, so does her cargo of sundries, including a large number of woodenware manufactured in Peshtigo that remain neatly packed in boxes.
- Other sites add diversity to the collection of vessels in the proposed sanctuary. The *Mahoning* is a rare example of an early Great Lakes square rigger, the brig. The *McMullen and Pitz Dredge* is an excellently-preserved example of a vessel that was vital to Great Lakes commerce yet is largely forgotten—the steam dredge. The *Henry Gust* is an excellent example of an early fish tug, a vessel that is rarely represented in the archaeological record. Both steam screws and steam paddles have been identified, as well as an icebreaking tug (*Arctic*) and a barkentine (*Major Anderson*).

The structural remains of the shipwrecks have been the focus of documentation research in this area, and the integrity and variation of those remains are significant on a national level. In addition to the shipwrecks themselves, their cargos illustrate complex and intertwined local and regional ecological and economic changes through time. The cargos remain largely intact and include general merchandise, sundries, locally-made woodenware items, Christmas trees, cordwood, iron ore, and a collection of 264 1929 Nash automobiles. The shipwrecks and associated debris fields are stark physical reminders of the lives of the men and woman who lived, and sometimes died, on the lakes. Many of the shipwrecks represent the chief asset of a family-owned business, or the savings of a small group of local investors. Preserving these shipwrecks preserves their stories and informs the present and the future.

Researchers believe that many other shipwrecks, maritime cultural features, and ancient sites wait to be discovered, taking into consideration the long history of the use of this nationally important transportation corridor, the shifting sands that characterize the coastline, and the development and application of new technologies.

Archaeological integrity of known shipwrecks in the study area

The collection of shipwrecks in the study area is nationally significant because of the architectural and archaeological integrity of the shipwrecks, the representative nature of the sample of vessels, their location on one of the nation's most important transportation corridors, and the potential for the discovery of other shipwrecks and submerged pre-contact cultural sites. Fourteen of the known shipwrecks are intact with a high level of archaeological integrity. Three vessels, *Tennie and Laura*, *Gallinipper*, and *Silver Lake*, all possess standing masts. The *Silver Lake* is especially noteworthy in that its foreyard is still rigged on her foremast. The study area also possesses the best-preserved shipwreck in Wisconsin the

Robert Pringle. This steam tug is completely intact. These vessels were built during the zenith of settlement and commercial development. Several of the vessels had short careers and as a result their original designs remain largely unaltered.

Additional Maritime Heritage Sites and the Maritime Cultural Landscape

Shipwrecks are not the only underwater cultural resources located within the proposed sanctuary boundaries. Cribbs, docks, pier footings, and pilings are located near the major harbors of Two Rivers, Manitowoc, Sheboygan, and Port Washington, and piers which serviced many smaller communities whose docks are no longer maintained include but are not limited to Two Creeks, Hika Bay, Haven, Amsterdam, Belgium, and Ulao. A U.S. Army airfield at Camp Haven in northern Sheboygan County was maintained from 1949-1959 as an anti-aircraft firing center for Reserve and National Guard units. As a result, many drone radio-operated aircraft and targets have been reported in the waters in the vicinity of what is now Whistling Straits PGA Golf Course. Additionally, jettisoned cargos of many of the vessels transiting the region both historic and modern have been reported on the bottomlands.

South of Two Rivers lies a Manitowoc crane, bulldozer and slag, the cargo from an overturned barge lost from a vessel in the mid-1980's, and caissons used in bridge construction were lost from a vessel south of Sheboygan. Furthermore, lost salvage equipment and other artifacts dot the lake bottom, some in association with shipwrecks, some not.

In addition, the region has the potential for submerged pre-contact sites along the shoreline. As the first Europeans and later Americans moved into the region, they encountered Native American communities that maintained strong ties to the shoreline in Manitowoc, Sheboygan, Ozaukee, and Kewaunee Counties, even as non-Indian settlement increased. Lakeshores have long been magnets for human settlement in the Great Lakes. Drowned former beaches, sheltered areas along older shorelines, submerged relic river/stream-lake confluences, and lake plateaus within the proposed sanctuary boundaries have high potential for containing inundated pre-contact archaeological sites. The recent discovery of 9,000-year-old Caribou hunting features on the bottom of Lake Huron testifies to the potential for this type of site preservation and identification.

As described by the National Park Service, a cultural landscape is a geographic area including cultural and natural resources, coastal environments, human communities, and related scenery that is associated with historic events, activities or persons, or exhibits other cultural or aesthetic value (NPS 1997). The mid-Lake Michigan region is comprised of many shoreline features such as beached shipwrecks, lighthouses, aids to navigation, abandoned docks, working waterfronts, and additional Native American sites.

Specifically, the study area has five lighthouses, three breakwater lights, and three historic lifesaving stations: the Manitowoc Breakwater Lighthouse, Rawley Point Lighthouse, North Pier Lighthouse (moved to Rogers Street Fishing Village), Port Washington Light Station, Kewaunee Pierhead Lighthouse, Sheboygan Breakwater Light, Port Washington Breakwater Light, Algoma Pierhead Light, the Kewaunee Lifesaving Station, the Two Rivers Lifesaving Station (now Coast Guard Station), and the Sheboygan Lifesaving Station (now Coast Guard Station).

The national importance of this area is highlighted because of its intimate association with the evolution of transportation, settlement, and industry in Wisconsin, from frontier to industrial heartland, expanding the Atlantic Maritime landscape inland. Many of Wisconsin's commodities were shipped beyond Lake Michigan to eastern Great Lakes ports. These distant ports returned goods, supplies, and immigrants to Wisconsin, creating a diverse regional economic and cultural universe that evolved and changed over time. The natural environment, along with the region's rich history has established a dynamic cultural and industrial landscape. The legacy of these historic maritime landscapes, both physical and intangible, offer a rare opportunity to explore human responses to the problems and opportunities associated with the development of settlement, commerce, and industry over time.



Figure 14. Great Lakes vessels preparing to spend the winter in the Sheboygan River in 1908. The shoreline is choked with lumber to feed the city's booming furniture industry. Similar to other industries throughout the Great Lakes, both the raw materials and finished products were transported by water in the holds of ships that continually evolved to meet new economic demands. Credit: Thunder Bay Sanctuary Research Collection.

Multiple documents have been written highlighting the national importance of this region as a unique maritime cultural landscape, including an analysis of the proposed sanctuary region from the cultural landscape perspective, *A Cultural Landscape Approach (CLA) Overview and Sourcebook for Wisconsin's Mid-Lake Michigan Maritime Heritage Trail Region* (Jensen and Hartmeyer 2014). Additionally, David J. Cooper and Paul Kriesa's Multiple Property Documentation for Wisconsin's submerged shipwrecks, *Great Lakes Shipwrecks of Wisconsin: The Early Industries: Fishing, Lumber, Mining, and Agricultural, 1800-1930; Settlement, 1800-1930; and Package Freight, 1830-1940* (1990), identifies historic contexts associated with the maritime resources found within the proposed sanctuary boundaries.

4.2.2 Potential Shipwrecks within the Study Area

Archival research by the Wisconsin Historical Society (WHS) indicates potential for an additional 95 historic shipwrecks to be discovered within the study area (Table 3). Vessel data on many of these potential shipwrecks can be found at: wisconsinshipwrecks.org/Shipwrecks

Table 3. Potential shipwreck sites within the study area (Boundary Alternatives A and B), based on archival research.

Name / Build Date	Vessel Type	Casualty Type	Probable Condition	County
A.V. Knickerbocker (1840)	Schooner	Stranded	Surf Zone	Ozaukee
Abiah (1848)	Schooner	Foundered	Deep	Sheboygan
Abner Howes (1859)	Scow schooner	Stranded	Surf Zone	Kewaunee
Andromeda (1847)	Schooner	Foundered	Deep	Kewaunee
Baltimore (1847)	Steam paddle	Stranded	Surf Zone	Sheboygan
Belle (1860)	Steam screw	Burned	Deep	Ozaukee
Belle Wallbridge (1857)	Schooner	Stranded	Surf Zone	Sheboygan
Bessie Boalt (1868)	Schooner	Foundered	Surf Zone	Manitowoc
Big Z (1844)	Schooner	Stranded	Surf Zone	Sheboygan
Blue Belle (1867)	Scow-schooner	Stranded	Surf Zone	Sheboygan
Bohemian (?)	Schooner	Stranded	Surf Zone	Ozaukee
Boss (1882)	Tug	Foundered	Deep	Manitowoc
Brilliant (1856)	Schooner	Stranded	Surf Zone	Sheboygan
Buccaneer (1943)	Oil screw	Stranded	Surf Zone	Kewaunee
C.G. Breed (1862)	Brig	Foundered	Deep	Manitowoc
C.S. Davis (1870)	Schooner	Stranded	Surf Zone	Manitowoc
Challenge (1852)	Schooner	Stranded	Surf Zone	Sheboygan
Collingwood (1855)	Schooner	Foundered	Deep	Ozaukee
Commerce (1857)	Schooner	Foundered	Surf Zone	Sheboygan
Conquest (1853)	Schooner	Unknown	Surf Zone	Sheboygan
Dan Tindall (1858)	Schooner	Abandoned	Surf Zone	Manitowoc
Dart (1867)	Schooner	Stranded	Surf Zone	Manitowoc
David Wagstaff (1863)	Schooner	Foundered	Deep	Sheboygan
Dawn (1888)	Scow-schooner	Stranded	Surf Zone	Kewaunee
Delaware (1846)	Steam screw	Stranded	Surf Zone	Sheboygan
Dispatch (1857)	Schooner	Stranded	Surf Zone	Manitowoc
E.G. Wolcott (?)	Schooner	Stranded	Surf Zone	Sheboygan
E.M. Portch (1867)	Schooner	Collided	Surf Zone	Sheboygan
Edith H. Koyen (1890)	Scow-schooner	Abandoned	Surf Zone	Kewaunee
Emily Cooper (?)	Schooner	Stranded	Surf Zone	Manitowoc
Eva M. Cone (1857)	Schooner	Stranded	Surf Zone	Ozaukee
Express (1864)	Scow-brig	Collided	Deep	Sheboygan
F.C. Clark (1849)	Brig	Stranded	Surf Zone	Manitowoc

Flora (1849)	Brig	Stranded	Surf Zone	Kewaunee
Florence M. Dickinson (1855)	Schooner barge	Foundered	Deep	Kewaunee
Frank W. Gifford (1868)	Schooner	Foundered	Deep	Kewaunee
Greyhound (1853)	Brig	Stranded	Surf Zone	Sheboygan
Guiding Star (1869)	Schooner	Stranded	Surf Zone	Ozaukee
Hampton (1845)	Brig	Foundered	Deep	Sheboygan
Hannah Eddy (1864)	Schooner	Foundered	Surf Zone	Sheboygan
Hercules (1854)	Scow	Foundered	Surf Zone	Sheboygan
Humko (1946)	Yacht	Burned	Deep	Manitowoc
Iowa (1852)	Barge	Stranded/Burned	Surf Zone	Kewaunee
J.M. Jones (1855)	Schooner	Collided	Deep	Manitowoc
James Navagh (1857)	Schooner	Stranded	Surf Zone	Manitowoc
Jennifer (1964)	Oil screw	Foundered	Deep	Ozaukee
John Irwin (1845)	Brig	Stranded	Surf Zone	Manitowoc
Joseph G. Masten (1867)	Bark	Stranded	Surf Zone	Manitowoc
Julia Smith (1847)	Schooner	Stranded	Surf Zone	Kewaunee
L.B. Shepard (1855)	Schooner	Foundered	Surf Zone	Manitowoc
Levant (1854)	Schooner	Foundered	Deep	Sheboygan
Lexington (1838)	Steam paddle	Stranded	Surf Zone	Ozaukee
Libbie Carter (1882)	Scow-schooner	Unknown	Deep	Manitowoc
Lynx (1905)	Scow-schooner	Abandoned	Surf Zone	Sheboygan
Magellan (1873)	Schooner	Collided	Surf Zone	Manitowoc
Major Barnum (1849)	Schooner	Stranded	Surf Zone	Manitowoc
Margaret A. Muir (1867)	Schooner	Foundered	Deep	Kewaunee
Mary Ann Scott (1871)	Scow-schooner	Stranded	Surf Zone	Manitowoc
Mary B. Hale (1857)	Schooner	Stranded	Surf Zone	Manitowoc
Milton (1867)	Scow-schooner	Foundered	Deep	Manitowoc
Minnesota (1847)	Schooner	Stranded	Surf Zone	Manitowoc
Mojave (1864)	Bark	Foundered	Deep	Sheboygan
Montgomery (1866)	Schooner	Stranded	Surf Zone	Sheboygan
Mosher (1890)	Steam screw	Unknown	Unknown	?????
Mount Vernon (1849)	Scow schooner	Stranded	Surf Zone	Kewaunee
Nora (1869)	Schooner	Collided	Deep	Sheboygan
Northport Belle (1869)	Steam paddle	Abandoned	Surf Zone	?????
Ocean Eagle (1855)	Brig	Collided	Surf Zone	Sheboygan
Octavia (1849)	Schooner	Stranded	Surf Zone	Kewaunee
Oliver Culver (1855)	Schooner	Stranded	Surf Zone	Manitowoc
Our Son (1875)	Schooner	Foundered	Deep	Manitowoc
Ottawa (1853/1854)	Steamer	Burned	Surf Zone	Kewaunee
Petrel (1847)	Schooner	Collided	Surf Zone	Sheboygan
Phoenix (1845)	Steam screw	Burned	Surf Zone	Sheboygan
Planet (1855)	Barge	Foundered	Surf Zone	Manitowoc
Polynesia (1885)	Schooner	Foundered	Deep	Sheboygan

R.H. Becker (1867)	Scow-schooner	Stranded	Surf Zone	Sheboygan
R.J. Sanborn (1860)	Schooner	Stranded	Surf Zone	Manitowoc
R.P. Mason (1867)	Schooner	Burned	Deep	?????
Richard Roe (1857)	Schooner	Stranded	Surf Zone	Manitowoc
Saint Ignace (1882)	Scow	Foundered	Deep	Ozaukee
Saint Peter (1868)	Schooner	Foundered	Deep	Ozaukee
Scow No. 2 (?)	Scow	Stranded	Surf Zone	Manitowoc
Sea Bird (1875)	Schooner	Stranded	Surf Zone	Kewaunee
Sea Bird (1920)	Gas screw	Burned	Surf Zone	Kewaunee
Sheboygan (1869)	Steam paddle	Burned	Surf Zone	Manitowoc
Silver Cloud (1869)	Scow-schooner	Stranded	Surf Zone	Ozaukee
Sir William Wallace (1836)	Schooner	Stranded	Surf Zone	Sheboygan
Thomas Spear (1880)	Tug	Burned	Surf Zone	Kewaunee
Transit (1854)	Schooner	Abandoned	Deep	Kewaunee
W.F. Allen, Jr. (1853)	Schooner	Stranded	Surf Zone	Sheboygan
Wellan (<1839)	Schooner	Abandoned	Surf Zone	Sheboygan
White Oak (1867)	Scow-schooner	Stranded	Surf Zone	Sheboygan
William A. Reiss (1901)	Steam screw	Stranded	Surf Zone	Sheboygan
Winona (1863)	Schooner	Stranded	Surf Zone	Sheboygan
Wollin (1854)	Schooner	Stranded	Surf Zone	Sheboygan

4.3 Human Uses

4.3.1 Tourism and Recreation

4.3.1.1 Tourism

The natural, recreational, historical, and cultural resources located in Wisconsin’s central Lake Michigan coastline are integral to the region’s economy, support a vibrant quality of life, and create a unique sense of place. The region’s position along the Great Lakes coast has been vital to its economic development. Historically, the lakes served as the regional highway, allowing people and goods to move freely even when roads and other infrastructure was lacking or rudimentary. During the last half of the 20th century and continuing into the 21st century, the rugged and relatively undeveloped coast began to attract tourists, who come for the area’s hunting, fishing, boating, and natural beauty, and to visit the network of historic lighthouses and dive the many shipwrecks.

Tourism continues to be one of Wisconsin’s most important economic resources. The Department of Tourism identified statewide tourism spending in 2015 as \$19.3 billion, up 4.4% from 2014. Within the study area, according to *Tourism Economics: An Oxford Company*, a robust tourism economy across Ozaukee, Sheboygan, Manitowoc, and Kewaunee counties captures more than \$440 million a year in visitor spending, with tourism activities supporting more than 7,840 equivalent full-time jobs, generating more than \$183 million in labor income and \$952 million in total business sales, while contributing \$56

million in state and local taxes. [*Wisconsin Department of Tourism 2015 Economic Impact Study – Tourism Economic – May 2016*]

Each community in the proposed sanctuary draws tourists who value Lake Michigan, whether it is a maritime museum or the opportunity to get out on the water. Within the proposed sanctuary, the car ferry SS *Badger* carries passengers and automobiles between Manitowoc, Wisconsin and Ludington, Michigan. In service since 1953, it is the last coal-fired passenger vessel operating on the Great Lakes, and was designated a National Historic Landmark on January 20, 2016. This historic vessel affords passengers a unique, historic experience while transiting the breadth of Lake Michigan.

Lake Michigan and its waterfront are an epicenter of recreational activities for both tourists and local residents. Between Memorial Day weekend and Labor Day weekend, a 103-day peak season of water activities generates more than \$6.3 million in visitor spending from surfboard, kayak, and stand-up paddleboard rentals, boat launch fees and dock rentals, marina slip rentals, and charter fishing trips (State of Wisconsin sanctuary nomination to NOAA, December 2, 2015). According to the Wisconsin State Comprehensive Outdoor Recreation Plan (2011-1016) (SCORP), kayaking and stand-up paddle boarding are two activities that are increasing in popularity. The Lake Michigan Water Trail, developed by Bay-Lake Regional Planning Commission, Wisconsin Coastal Management Program, Wisconsin Department of Natural Resources, and National Park Service, exemplifies the collaborative projects developed to enhance and expand on these recreational water activities. The Lake Michigan Water Trail runs through the study area and was highlighted in the SCORP report as a good example of partnerships providing recreational opportunities.

From an aesthetic and public recreation perspective, the study area includes a number of scenic beaches that attract tourists and support natural features. Port Washington shows off its majestic lakeside scenery with a sandy beach at the foot of Lake Park Bluffs; Sheboygan's Kohler-Andrae State Park features sand dunes and miles of public access beach along the coastline; and Point Beach State Park near Manitowoc/Two Rivers was one of Travel Channel's top picks for the best beach in the Midwest. Point Beach contains the Rawley Point Lighthouse.

Natural areas include: Riveredge Nature Center in Ozaukee County, which spans 380 acres of various habitats and supports ecosystem projects such as rearing and releasing lake sturgeon into the Milwaukee River; Lion's Den Gorge Nature Preserve (Port Washington), which represents one of the last stretches of undeveloped bluff land along the Lake Michigan shoreline and is adjacent to a 44-acre wetland complex owned by United States Fish and Wildlife Service (USFWS) for enhancing populations of migratory birds and other wildlife; Sanderling Nature Center (Sheboygan County), which sits amidst the dunes overlooking Lake Michigan, featuring exhibits and interactive kiosks as well as a rooftop observation deck for viewing Lake Michigan vessels and waterfowl; and Woodland Dunes (Two Rivers), a 1300-acre nature preserve of globally significant habitat and fourteen forested ridge and swale wetlands that represent the ancient lakeshore.

4.3.1.2 Recreational Fishing

As the scope of the Wisconsin – Lake Michigan NMS regulations is proposed to be limited to the protection of underwater cultural resources, there is no direct anticipated effect on fishing. However, because recreational fishing is an important activity that would occur in the proposed sanctuary, the status is summarized below.

The sport fishery has large economic impacts on Wisconsin’s central Lake Michigan coast. Using data from 2011 to 2015, each year charter fishing captains take out an average of 43,000 anglers (Figure 15). These ports are also home to many local Lake Michigan anglers and many people from outside the area (both Wisconsin residents and non-residents). Offshore fishing trips primarily target the introduced Chinook Salmon, as well as Coho Salmon, Rainbow Trout, and Brown Trout.

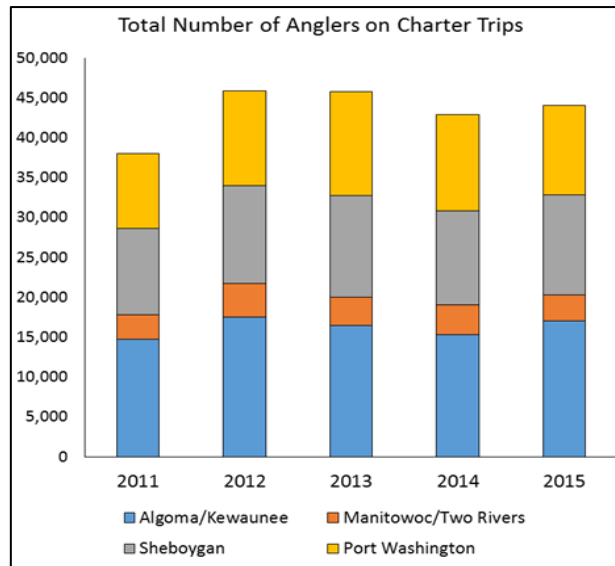


Figure 15. Number of sports fishery anglers on charter trips in study area from 2011-2015. Credit: Titus Seilheimer, based on Wisconsin DNR data.

This excerpt from a 2016 Wisconsin Department of Natural Resources Report quantifies the status and trend of Wisconsin’s Lake Michigan sport fishing:

Wisconsin’s Lake Michigan open water fishing effort was 2,728,083 hours during 2015, 3.38% above the five-year average of 2,638,836. Effort was slightly above the five-year average for some fishery types despite lower effort in the moored and stream fisheries. Most notable are the charter boat and ramp effort increasing slightly (at 8.11% and 6.71%, respectively), a below average moored boat effort (-16.45%), and the pier fishery at an (17.76%) increase in effort during 2015. Wisconsin Lake Michigan trout and salmon anglers had a challenging season in 2015. Overall harvest was down, with 269,978 salmonids harvested, the lowest harvest since 1978; the harvest rate decreased to 0.0990, fish per hour, the lowest harvest rate since 1992 (0.0980 fish per hour). Chinook again comprised the majority of the catch, with a harvest of 113,973, which is the lowest harvest since 1994, which had 99,755 fish harvested.

Fishing for Coho salmon was once again poor in 2015 with only 41,010 fish harvested which was a substantial decrease from the 2011 peak of 157,367 fish harvested. Another unusually cold winter and spring hampered Lake Michigan fishing in 2015 with Chinook salmon fishing being best later in the season from late June-Early August. Despite most other salmonids being down in harvest, Lake trout harvest increased to 35,715 fish harvested in 2015, the highest harvest since 2002. The open-water Yellow Perch harvest was 99,322 fish, a decrease from 2014. The majority of the catch was comprised of the 2010, 2011 and 2012 year-classes. Walleye harvest was

estimated at 99,302 fish, an increase from 2014. The Northern Pike catch was considerably higher in 2015 with 2,641 fish harvested, compared to 814 fish harvested in 2014. Smallmouth Bass harvest was 9,422 fish, also an increase from 2014.⁹

4.3.1.3 Recreational Boating

There are municipal marinas in Algoma, Kewaunee, Two Rivers, Manitowoc, Sheboygan, and Port Washington. Recreational boating continues to have a strong economic impact in Wisconsin, as reported in the March 2007 U.S. Army Corps of Engineers Great Lakes Boating Recreational Study. Wisconsin showed the strongest growth in registered boaters between 1999 and 2006 and this increase is demonstrated by the high rates of marina occupancy. These data, coupled with the significant impact of marinas to the local and regional economy, exemplify the strong recreational boating culture not only in the state, but in Wisconsin's central Lake Michigan region. The Wisconsin Marine Association, University of Wisconsin Sea Grant Institute, and Wisconsin Coastal Management Program work collaboratively to promote recreational boating and environmental stewardship for boaters and marinas through the Wisconsin Clean Marina Program. Boaters and marina managers recognize the importance of protecting the resource they enjoy and utilize for their livelihood.

Wisconsin's central Lake Michigan region boasts several sailing initiatives, including Sail Sheboygan, one of four Olympic training centers for sailors in the U.S., and the only one on fresh water, which hosts a variety of international sailing events, attracting the world's most competitive crews. The Sailing Education Association of Sheboygan (SEAS) and the Sheboygan Youth Sailing Club work collaboratively to provide maritime education, removing social and economic barriers to marine access and watersport participation.

4.3.1.4 Recreational Scuba Diving and Snorkeling

Wisconsin's historic shipwrecks hold a fascination for divers and snorkelers because of the natural beauty of the lakes and the magnificent preservation of these underwater museums. The variation in depths and proximity to shore of the shipwrecks means they are accessible to divers of all skill levels. Sport diving has continued to grow as a recreational activity and recently many divers are taking advanced certifications allowing them to explore deeper shipwrecks, many of which remain largely intact. As visibility has increased, divers, kayakers, paddle boarders, and snorkelers have become more common sights along the coastline. Shallow water shipwrecks near Two Rivers provide opportunities for snorkelers, while the range of shipwreck depths offer provide opportunities for both novice and advanced divers.

⁹ Sport Fishing Effort and Harvest, Brad Eggold and Brandon Wambach / 2016 Annual Meeting Milwaukee, Wisconsin March 21
http://dnr.wisconsin.gov/Reports/LakeMichiganFisheriesTeamWisconsin
Department of Natural Resources.

There are about 12 dive charters businesses operating out of Milwaukee, Chicago, Wilmette, Green Bay, and the coastal communities in the proposed sanctuary. Two dive shops, including one recently opened, are in the coastal communities within the proposed sanctuary.

4.3.2 Commercial activities

4.3.2.1 Commercial Fishing

As the scope of the Wisconsin – Lake Michigan NMS regulations is proposed to be limited to the protection of underwater cultural resources, there is no direct anticipated effect on fishing. However, because commercial fishing is an important activity that would occur in the proposed sanctuary, the status is summarized below.

The Lake Michigan ecosystem was transformed in the 19th and 20th centuries by pollution, habitat degradation, the introduction of exotic species, and the unrestricted harvest of native species. Even today the presence of dozens of exotic species, together with irreversible losses of some near-shore wetland and tributary habitats, precludes the full restoration of the fish community that was present at the time of European settlement. But, strides have been made. With chemical and organic pollution limited and habitat degradation slowed, state, federal, and tribal fisheries agencies have been able to develop a successful inter-jurisdictional fisheries management program that provides exceptional opportunities for both sport and commercial fishers.¹⁰

Over the past 25 years Wisconsin has moved toward a smaller and better regulated commercial fishery targeting four species – Lake Whitefish, Yellow Perch, Rainbow Smelt, and Bloater Chubs. Today, the Lake Whitefish fishery is strong, as populations of Yellow Perch, Rainbow Smelt, and Bloater Chubs have declined markedly over the past twenty years.¹¹

Commercial fishing is an important part of the heritage of Lake Michigan and continues to have a presence in the proposed sanctuary. There are two active commercial fishing ports in Two Rivers and Sheboygan; historically Port Washington also had an active commercial fishery. The primary commercial species in Lake Michigan is Lake Whitefish, a cousin to trout and salmon. Other less common commercial species in Lake Michigan include the Bloater (also a whitefish relative) and the Rainbow Smelt, a non-native species but culturally important species.

Within the proposed sanctuary, commercial fishing trap nets are set off Two Rivers/Manitowoc and Sheboygan. The nets are designed to catch whitefish and allow other non-target species to be released unharmed. Nets are marked with several flags. There may be other buoys that mark additional anchors. Overall, the net, buoy lines and anchors may be over a 1/4 mile long. Early in the season, trap nets may be set in water between 25 and 150 feet in depth. Between June 29 and Labor Day, the nets are set in

¹⁰ Lake Michigan Integrated Fisheries Management Plan, 2003-2013

¹¹ Lake Michigan Integrated Fisheries Management Plan, 2015-2024 (public discussion draft – July 2014)

water 60 to 150 feet deep. The leads extend towards shore and the nets are anchored on the bottom and may be 45 feet high.

Trawling activity also takes place for both commercial fishing and for research. Current state law does not allow trawling for whitefish. However, Wisconsin Sea Grant is conducting a study to determine the impact of using trawl nets to collect whitefish without adversely affecting salmon, trout and walleye. In this study, trawling is being studied in a limited area that is approved by the Wisconsin Department of Natural Resources. There is at least one recent example of trawling activity inadvertently snagging part of a shipwreck.

Commercial fishers are interested in using trawl nets as a catch method. Currently, state law only allows smelt trawling and limits them to catching whitefish using gill and trap nets, a limitation that shortens their fishing season by several months each year. Net season only runs from April to October.

The U.S. Geological Survey's Great Lakes Science Center (GLSC) has conducted bottom trawl surveys near Port Washington (and other areas of the Lake Michigan) for many decades. The Lake Michigan bottom trawl survey has played a critical role in understanding the ecosystem dynamics and in managing the fisheries of Lake Michigan. Its primary role is to provide annual estimates of prey fish abundance to guide the decision of state agencies in the stocking of certain species of fish.¹²

4.3.2.2 Shipping

Commercial shipping on the Great Lakes carries the raw materials that drive the nation's economy. The scale and value of inter-lake commercial shipping on the Great Lakes is demonstrated via statistics compiled by the Lake Carriers' Association (LCA), which represents 17 American companies that operate 56 U.S.-flag vessels ("lakers") on the Great Lakes.

Collectively, LCA members transport about 90 million tons of dry-bulk cargo per year in the Great Lakes. They employ more than 1,600 men and women and provide annual wages and benefits of approximately \$125 million. In turn, the cargos carried by LCA members generate and sustain more than 103,000 jobs in the United States and have an economic impact of more than \$20 billion. LCA vessels carry significant tonnage through the proposed sanctuary area. The 2013 commercial vessel and passenger ferry activity for Lake Michigan is shown in Figure 16.

The Port of Manitowoc handles bulk commodities, newly constructed yachts, and passengers on the S.S. *Badger* ferry. The port is also home to a marine contracting firm that services Lake Michigan ports in Wisconsin and Michigan. In the Port of Sheboygan, docking for commercial cruise ships and other larger vessels is provided along a newly reconstructed seawall at the mouth of the Sheboygan River.¹³

¹² (<http://www.glsc.usgs.gov/deepwater-ecosystems/deepwater-ecosystems-prey-fish-assessment/lake-michigan-benthic-prey-fish>)

¹³ (<http://www.wcpaports.org/ports>)

Commercial ships loading and unloading at these ports, as well as other ships transiting Lake Michigan, conduct ballasting as part of routine vessel operations and safety.

The State of Wisconsin has determined that dry cargo residue (DCR) sweeping (the practice of washing dry cargo residue off a ship’s deck and into the water) is illegal in state waters. Because the sanctuary is proposed to be jointly managed by NOAA and the State of Wisconsin, and because all bottom lands within the proposed sanctuary are state-owned, sanctuary designation will not alter this situation.

4.3.2.3 Other Commercial Activities

In addition to the commercial fishing and shipping activities referenced above, potential offshore commercial wind energy activities may take place in the proposed sanctuary. It should be noted that both boundary alternatives in this DEIS exclude harbors and marinas from the sanctuary boundary. Consequently, those areas are not part of the Affected Environment.

4.3.3 Socioeconomics

This analysis addresses the socioeconomic factors of the proposed sanctuary, including population density, income and employment, and economic value and use. In this analysis, two Study Areas are used (Figures 17 and 18). A Study Area profile includes a characterization of the area where the social and economic impacts of the resource use take place and an overview of what is currently known about the uses of the natural and cultural resources that exist within the Study Area. The two study areas in this analysis include Primary Counties and Secondary Counties.

Study Area 1 (Figure 17) contains the three-county area proposed as Boundary Alternative A. Study Area 2 (Figure 18) contains the four-county area proposed as Boundary Alternative B.

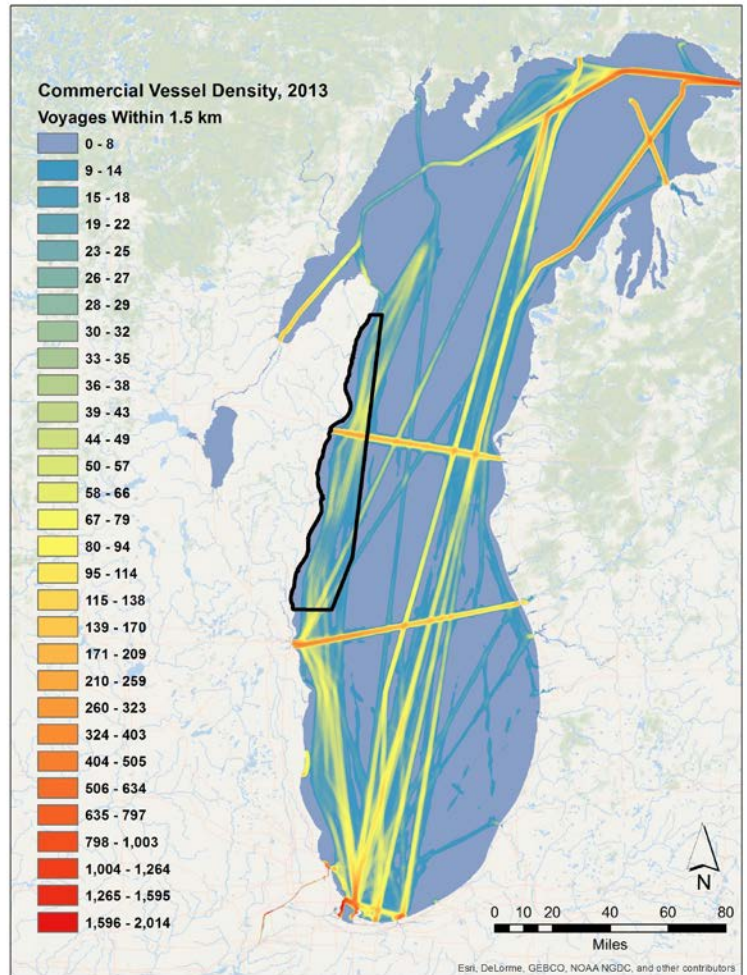


Figure 16. Density map depicting 2013 commercial vessel and passenger ferry activity in Lake Michigan, derived from Automatic Identification System (AIS) data. Credit: MarineCadastre.gov//ESRI/ONMS.

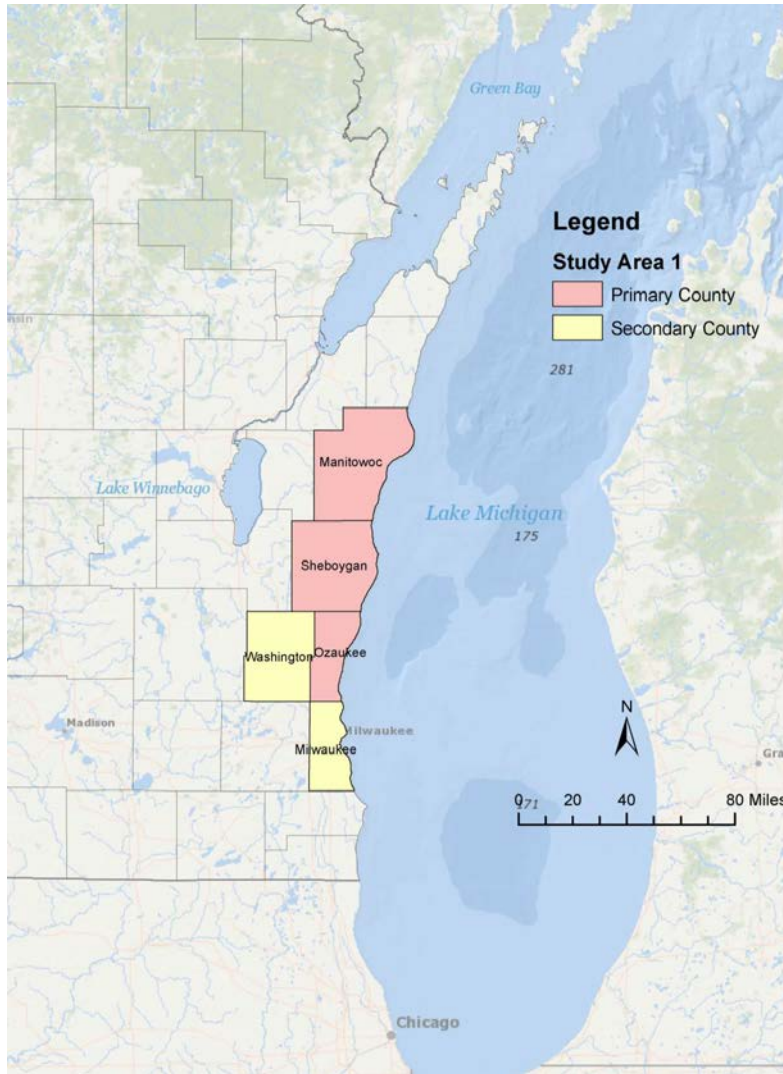


Figure 17. The study area for socioeconomic analysis relative to Boundary Alternative A. Credit NOAA/ONMS.

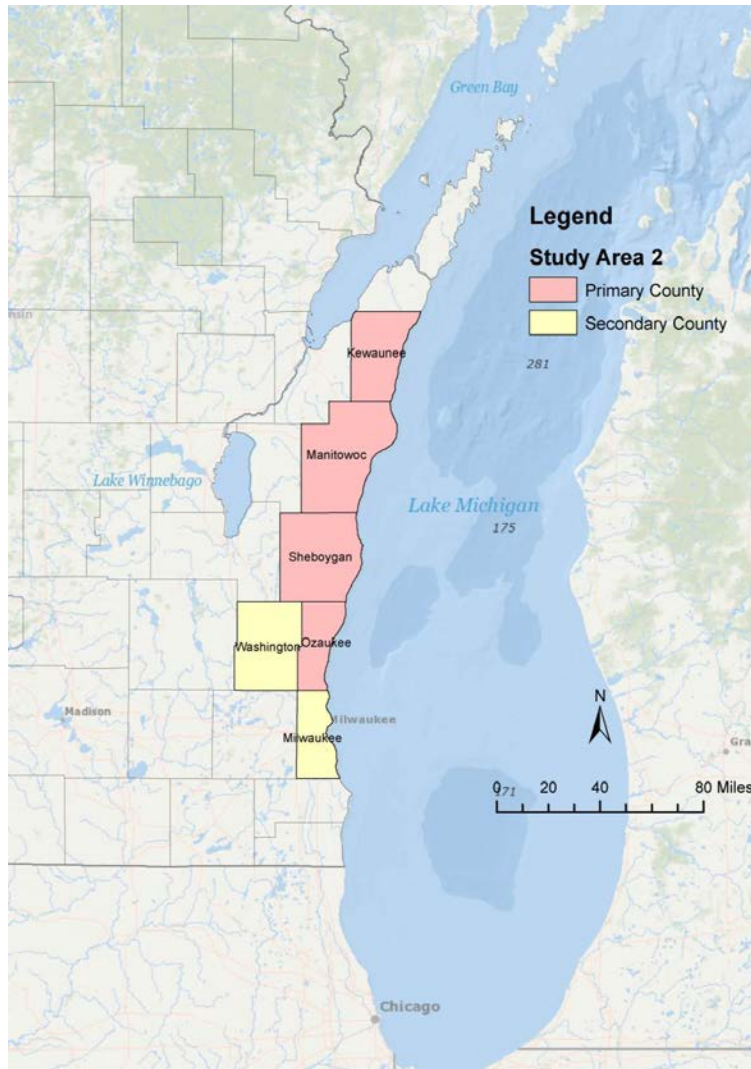


Figure 18. The study area for socioeconomic analysis relative to Boundary Alternative B. Credit NOAA/ONMS.

4.3.3.1 Population Density

Population density is an indicator of the extent of pressures that the study area’s population might have on the sanctuary resources. Population density varies widely across Study Area 1 with a high of 3,962 people per square mile in Milwaukee to a low of 136 in Manitowoc. Study Area 2 population densities vary more than that of study Area 1 with a high of 3,962 people per square mile in Milwaukee and a low of 60 people in Kewaunee (Table 4). Although population density is higher in the study areas, relative to Wisconsin and the US, population growth is lower in the study areas. From 2010-2014, population growth in both study areas was roughly 0.70 versus 3.11% for the U.S. The projected population growth from 2014 through 2020 is 1% and 1.1% for Study Areas 1 and 2 compared to 5.59% for the US and 4.84% for Wisconsin (Woods and Poole, 2016).

Table 4: Population, Income and Unemployment Rates, 2014

County	2014 Population	Population Change (%) 2010-2014	2014 Population Density ¹
Kewaunee	20,444	-0.64	60
Manitowoc	80,160	-1.4	136
Milwaukee	956,406	0.858	3,962
Ozaukee	87,470	1.28	375
Sheboygan	115,290	-0.11	225
Washington	133,251	1.02	309
Study Area 1 Total	1,372,577	0.69	2,841
Study Area 2 Total	1,393,021	0.67	2,801
Wisconsin	5,757,564	1.19	105
U.S.	318,857,056	2.98	87

¹Number of people per square mile

Sources: U.S. Department of Commerce, Bureau of the Census and the Bureau of Economic Analysis, Regional Economic Information System.

The next three tables present information on the distribution of selected demographics. The age distribution across the two study areas, Wisconsin and the U.S. are fairly similar. See Table 5 for more detailed information.

Table 5: Age Distribution by Study Area, 2014

Age	US	Wisconsin	Study Area 1	Study Area 2
Under 5	6.4	6.1	6.9	6.9
5 to 19	13.1	20.1	20.2	20.2
20 to 34	20.5	19.6	22	21.9
35 to 44	13	12.3	12.5	12.5
45 to 54	14.1	14.8	13.7	13.7
55 to 64	12.3	13.1	12	12
65 to 74	7.6	7.7	6.5	6.5
75 and over	6.1	6.7	6.2	6.2

The proportion of white persons in the study areas is smaller than that of the U.S. and Wisconsin. Additionally, there is a larger proportion of Black or African Americans in the study areas than the U.S. or Wisconsin. However, there are fewer Hispanics and Latinos in the study areas than the U.S. or Wisconsin. Table 6 presents the full details.

Table 6: Race and Ethnicity Distribution by Study Area, 2014

Race/Ethnicity	US	Wisconsin	Study Area 1	Study Area 2
White	77.4	87.8	74.05	70.34
Black	13.2	6.6	19.35	19.07
Asian	5.4	2.6	3.57	3.52
Hispanic	17.4	6.5	11.07	10.94
Other	3.9	2.9	2.95	2.93

Table 7 presents gender differences across study areas. In all areas, there are more females than males. However, there is a higher portion of females in both study areas compared to the U.S. and Wisconsin.

Table 7: Gender Distribution by Study Area, 2014

Gender	US	Wisconsin	Study Area 1	Study Area 2
Male	49.2	49.7	48.7	48.8
Female	50.8	50.3	51.3	51.2

4.3.3.2 Income and Employment

Table 8 below shows the per capita income, poverty and unemployment rate of the two study areas. Although the per capita income in 2014 was higher in both study areas (\$50,009 and \$48,699, Study Area 1 and Study Area 2 respectively) than the U.S., the persons below poverty was higher in both study areas (around 17% for each) than for the US (15.6%).

Table 8: Income, Poverty and Employment by Study Area

County	2014 Per Capita Income (\$)	2014 Persons Below Poverty (%)	2014 Unemployment Rate (%)
Kewaunee	42,152	10	5.1
Manitowoc	42,519	9.9	6.1
Milwaukee	41,507	21.9	6.9
Ozaukee	71,126	5	4.2
Sheboygan	46,328	9.3	4.6
Washington	48,564	6.2	4.6
Study Area 1 Total	50,009	17.54	6.3
Study Area 2 Total	48,699	17.43	6.3
Wisconsin	44,186	8.9	5.4
U.S.	46,046	15.6	6.2

Table 9 shows that the larger sectors of employment in the study areas are manufacturing, healthcare assistance, government and government enterprise, and finance and insurance.

Table 9 Employment by Sector and Study Area

Sector	Wisconsin	Study Area 1	Study Area 2
Government and government enterprises	10.86	9.8	9.8
Other Services, except public administration	2.53	2.5	(D)
Accommodation and Food Services	1.87	1.9	2
Arts, Entertainment and Recreation	0.62	1.0	1
Health Care and Social Assistance	8.80	11.0	(D)
Educational and Health Services	1.04	2.7	(D)

Administrative and Waste Management Services	2.33	3.1	(D)
Management of Companies or Enterprises	2.58	4.1	(D)
Professional, Scientific and technical services	3.99	5.4	5.4
Real estate and rental and leasing	0.89	1.1	1.1
Finance and insurance	4.39	6.3	6.2
Information Services	1.66	1.5	(D)
Transportation and warehousing	2.42	(D)	(D)
Retail trade	4.29	3.8	3.8
Manufacturing	13.46	14.2	14.2
Construction	3.87	2.6	2.6
Trade, transport and Utilities	0.62	(D)	(D)
Mining and Logging	0.14	(D)	(D)
Forestry, fishing and related activities	0.21	(D)	(D)
Farm earnings	1.40	0.5	0.6

4.3.4 Military Exercise Area

Within the proposed sanctuary is a military exercise area (Overwater Range R-6903) used by the Air National Guard and administered by the Combat Readiness Training Center at Volk Field, Wisconsin (Figure 19). The 288 square mile area stretches between Port Washington and Manitowoc and is about two miles from the closest shoreline. Since the late 1950s, this range has been used for training involving air-to-air missiles, air-to-air gunnery, rocketry, aircraft intercepts, air-to-air refueling, bombing, surface-to-surface firing, radar checks, and air combat maneuvers. Since the 1970s the area has been used chiefly for air-to-air exercises.¹⁴ Active since World War II, the area has been indicated on NOAA Chart 14901 since the early 1990s, following the discovery of a sidewinder missile by local fishermen.

¹⁴ Report to the Honorable F. James Sensenbrenner, House of Representatives, General Accounting Office, March 1992.

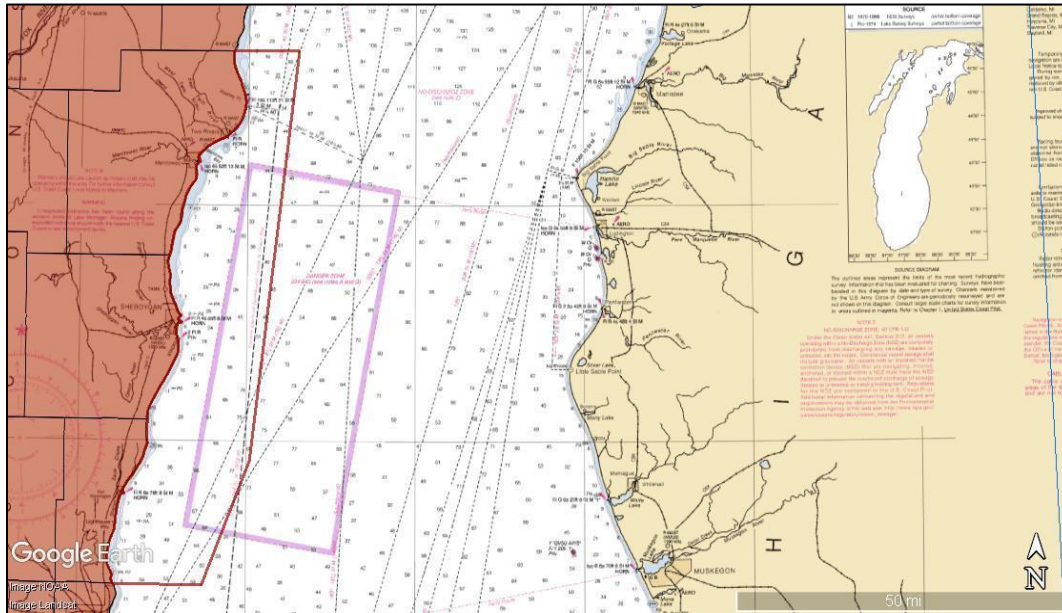


Figure 19. Proposed sanctuary boundary (red), and overlap with R-6903 military training area (purple). Credit: Google Earth/ONMS.

4.3.5 Physical Environment

Because the scope of Wisconsin – Lake Michigan NMS regulations is limited to the protection of underwater cultural resources, NOAA does not anticipate any direct effects on the physical environment from the proposed action, as further discussed in Chapter 5. However, it is possible that research opportunities on the physical environment could increase, due simply to the broader awareness of the area brought forth by the sanctuary’s presence and ability to facilitate research; the activities would have a positive impact on these resources by helping to improve awareness, as well as their management and protection.

4.3.5.1 Geology

Lake Michigan is the second largest of the Great Lakes with a surface area of 22,300 square miles, making it the largest freshwater lake entirely in the United States and the 5th largest lake in the world. Lake Michigan is an ecologically rich ecosystem and contains the world’s largest collection of freshwater sand dunes along with many wetlands, prairies, and savannas providing essential habitat to a great diversity of life. The lake supports fish for food, sport, and culture. The proposed sanctuary includes a glacier-sculpted shoreline and nearshore areas of the lake that are dominated by the Niagara limestone formation, which is visible along some of the shoreline. The area is located within a diverse ecological sub-basin as identified by The Nature Conservancy in their 2012 report, Lake Michigan Biodiversity Conservation Strategy. The deepest part of the proposed sanctuary is about 492 feet.

The central Lake Michigan shoreline is a mixture of sand beaches and steep bluffs. Land use is mainly

agricultural, with moderately sized urban areas along the shoreline, and scattered natural areas. Larger natural areas within this area are public lands, such as state parks and county properties, as well as privately owned forest and wetlands. Numerous tributaries provide spawning habitat for salmonid and other native fish species.

Just to the east of the proposed sanctuary, lies the ecologically important Mid-Lake Plateau, or Mid-Lake Reef Complex. This underwater reef system separates the northern and southern basins of Lake Michigan and is comprised of three limestone ridges. The Mid-Lake Plateau contains a significant Lake Trout Refuge and the largest spawning populations of indigenous Lake Trout occur in this area. Federal and state agencies recognize that the Mid-Lake Plateau provides one of the most significant opportunities in Lake Michigan for sustaining natural reproduction of Lake Trout.

4.3.5.2 Climate

Climate change is a concern in the Great Lakes and much research is currently being done on the topic. According to the U.S. Environmental Protection Agency:

Water level and water temperature are two important and interrelated indicators of weather and climate change in the Great Lakes. Water level (the height of the lake surface above sea level) is influenced by many factors, including precipitation, snowmelt runoff, drought, evaporation rates, and people withdrawing water for multiple uses. Water temperature is influenced by many factors, too, but most directly by air temperature.

In recent years, warmer surface water temperatures in the Great Lakes have contributed to lower water levels by increasing rates of evaporation and causing lake ice to form later than usual, which extends the season for evaporation.¹⁵ Lower water levels in the Great Lakes forced ships to reduce their cargo tonnage by 5 to 8 percent between 1997 and 2000, which increased shipping costs. Lower water levels can also affect water supplies, the usability of infrastructure such as docks and piers, and shoreline ecosystems. These types of disruptions from low water levels are expected to continue as the climate changes.¹⁶

Another possible effect of warmer water, reduced ice cover, and increased evaporation is a corresponding increase in precipitation over nearby land, especially “lake effect” snow.¹⁷ Rising water temperatures are also expected to expand the ranges of, and give new advantages to, some

¹⁵ Gronewold, A.D., V. Fortin, B. Lofgren, A. Clites, C.A. Stow, and F. Quinn. 2013. Coasts, water levels, and climate change: A Great Lakes perspective. *Climatic Change* 120:697–711.

¹⁶ Posey, J. 2012. Climate change impacts on transportation in the Midwest. U.S. National Climate Assessment, Midwest Technical Input Report.

¹⁷ Burnett, A.W., M.E. Kirby, H.T. Mullins, and W.P. Patterson. 2003. Increasing Great Lake-effect snowfall during the twentieth century: A regional response to global warming? *J. Climate* 16:3535–3542.

invasive species such as the zebra mussel, and to encourage the growth of certain waterborne bacteria that can make people ill.^{18,19}

4.3.5.3 Water Quality

The Wisconsin Department of Natural Resources (WDNR), University of Wisconsin Sea Grant, U.S. Geological Survey (USGS), and U.S. Environmental Protection Agency, are among the organizations that monitor water quality in Lake Michigan, including the study area. As the proposed action does not anticipate a negative impact on water quality, this section is not intended to be a comprehensive summary. Notably, water quality issues in the study area have the potential to curtail public access (via beach closures) in some discrete areas, and therefore could have an impact on public enjoyment of sanctuary resources. Concentrations of blue / green algae (more information here: dnr.wi.gov/lakes/bluegreenalgae), cladophora (more information here: dnr.wi.gov/topic/GreatLakes/cladophora), and *Escherichia coli* (more information here: dnr.wi.gov/topic/SurfaceWater/recreation) can create harmful water quality conditions for humans. See the WDNR's 2014 Beach Season Summary:

dnr.wi.gov/topic/Beaches/documents/BeachReport2014.pdf

More detailed water quality data can be found here:

USGS Water Quality Data: waterdata.usgs.gov/wi/nwis/qw

WDNR Water Quality Monitoring: dnr.wi.gov/topic/SurfaceWater/monitoring and dnr.wi.gov/topic/beaches/monitoring

4.3.6 Biological Environment

The natural resources and ecological qualities found within Wisconsin's central Lake Michigan coastline contribute significantly to the ecological system of Lake Michigan and its terrestrial interface. The area's natural resources play a significant role in Lake Michigan's ecological health and diversity, economic vitality, and recreational opportunity.

The Lake Michigan coastline is a critical migratory flyway for birds. Millions of birds participate in the seasonal migration from northern climes southeast through the Great Lakes region. Even though the Great Lakes act as a barrier to migrating birds, the coastlines become migratory corridors or highways that are heavily used. Wisconsin's central Lake Michigan coastline, part of the Lake Michigan Flyway, contains important stopover sites for migratory birds, helping to link Canada to Central and South America.

On the landward side, there has been significant federal, state, and local investment into Wisconsin's central Lake Michigan coastline in an effort to build local and state capacity to plan, restore, and manage the area's natural resources. Agencies like the Wisconsin Coastal Management Program and Wisconsin

¹⁸ Rahel, F.J., and J.D. Olden. 2008. Assessing the effects of climate change on aquatic invasive species. *Conserv. Biol.* 22(3):521–533.

¹⁹ Kanoshima, I., L. Urmas, and J.-M. Leppanen. 2003. The influence of weather conditions (temperature and wind) on cyanobacterial bloom development in the Gulf of Finland (Baltic Sea). *Harmful Algae* 2:29–41.

Department of Natural Resources, along with federal and local partners, have targeted resources to develop fish and wildlife habitat protection plans, restore stream and tributary connectivity, conduct wetland and habitat assessments, develop watershed plans, enhance coastal beach health, restore native landscapes, implement integrated bluff management, and control invasive species.

4.3.6.1 Invasive species

Invasive species are a serious problem in the Great Lakes. The Great Lakes ecosystem has been severely damaged by more than 180 invasive and non-native species. Species such as the zebra mussel, quagga mussel, Round Goby, Sea Lamprey, and Alewife reproduce and spread, ultimately degrading habitat, out-competing native species, and short-circuiting food webs. Invasive zebra and quagga mussels have had an exceptionally significant impact on shipwrecks and maritime heritage resources, as they have an affinity for hard substrates and are commonly found attached to these sites. When first introduced into the Great Lakes in the 1980s, via ballast water discharge from transoceanic ships, zebra and quagga mussels first colonized shallow, well-lit shipwreck sites. Today, however, sanctuary archaeologists have observed significant zebra and quagga mussel infestation on shipwrecks sites as deep as 300 feet.

Although invasive mussels settle on all hard substrates, it has been documented that they appear to prefer wrought iron and steel surfaces (Watzin et al. 2001). As a result, there is concern over the effects of the spread of their colonization on shipwrecks. The latest lake-wide survey of quagga mussels, which included sites within the sanctuary, showed that mussel abundances increased twofold between 2003 and 2007 at depths greater than 50 meters, and about fourfold at depths between 51-90 meters (T. Nalepa, NOAA GLERL, unpubl. data).

The initial impact of mussel attachment is the loss of “archaeological visibility” – the surfaces of a historic shipwreck can literally disappear under layers of mussels (Kraft 1996, Watzin et al. 2001). While the shape of the shipwreck is still recognizable, the details of its surface and construction are obscured, thus severely impacting the ability to study these resources. Infestation of zebra and quagga mussels could also diminish the interest in diving on these wrecks, resulting in an adverse economic impact in the area through loss of tourism (Black et al. 2000). The weight of these mussels can also affect the structural integrity of the wrecks causing portions to break off or collapse. Also, removing mussels from the surfaces of these resources could result in further damage and loss (Watzin et al. 2001). Finally, when mussels colonize steel structures such as walls, pipes, and iron fasteners and fittings on shipwrecks, the iron and steel corrodes at a significantly accelerated rate as compared to ferrous material not encrusted with mussels (Watzin et al. 2001). Since many of the wooden ships in the proposed sanctuary are primarily iron and steel fastened, the structural integrity of these resources could potentially be compromised (Watzin et al. 2001).

The United States regulates ballast water management domestically through the Coast Guard (USCG) under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996 (NISA) (16 U.S.C. §4711) and through the Environmental Protection Agency’s (EPA) Vessel General Permit program, issued under the Federal Water Pollution Control Act (33 U.S.C. §1342). For more information on federal regulation of ballast discharges, see http://www.gc.noaa.gov/gcil_ballast_federal.html

In response to growing concerns and damage to the environment caused by aquatic invasive species, the State of Wisconsin issued a state general permit, WI-0063835-2, under independent state authority to regulate discharges of pollutants to waters of the state pursuant to Wis. Stat. § 283.35 (1m). The permit includes new effluent discharge limits for Great Lake vessels, consistent with Minnesota's requirement for Great Lake Vessels to comply with the International Maritime Organization (IMO) ballast water standards. Both Michigan and Minnesota have issued state permits regulating ballast water discharges under their independent state authorities. For more information on the Wisconsin's general permit and regulation of ballast water, see <http://dnr.wi.gov/topic/wastewater/generalpermits.html>.

4.3.6.2 Protected Resources

The study area of the proposed action does not contain listed or proposed threatened or endangered species or designated or proposed critical habitat under the Federal Endangered Species Act. Magnuson Stevens Act authority over Essential Fish Habitat does not apply to the Great Lakes.

Chapter 5

ANALYSIS OF ENVIRONMENTAL CONSEQUENCES OF ALTERNATIVES

5.1 Introduction

This chapter evaluates the anticipated environmental impacts resulting from the implementation of each of the alternatives presented in Chapter 3. The potential impacts would be applicable to the affected environment described in Chapter 4. Also discussed are potential cumulative impacts, unavoidable adverse impacts, and other anticipated impacts.

Under NEPA (42 U.S.C. 4321 et seq.), an environmental assessment would have sufficed to analyze the impacts of this action since NOAA has determined that no significant impacts are likely under any of the alternatives. However, the NMSA requires NOAA to publish a DEIS regardless of the intensity of the impacts of the proposed action if NOAA is considering changing the terms of designation of a sanctuary (16 U.S.C. 1434).

5.2 Affected Resources and Potential Impacts

As described in Chapter 3, the alternatives address both the boundary and regulatory alternatives. Evaluations are provided for each environment type that may be impacted by the alternatives, as follows:

Underwater Cultural Resources

- Known Shipwrecks
- National Register of Historic Places (subset of known shipwrecks)
- Additional Maritime Heritage Sites and the Maritime Cultural Landscape

Human Uses

- Tourism and Recreation
 - Tourism
 - Recreational Fishing
 - Boating
 - Scuba Diving and Snorkeling
- Commercial Activities
 - Commercial Fishing
 - Shipping
 - Other commercial activities
- Socioeconomics
 - Population Density
 - Income and Employment

- Economic Value and Use
- Military Exercise Area

Physical and Biological Environment

- Physical
 - Geology
 - Climate
 - Water quality
- Biological
 - Invasive species
 - Protected resources

5.2.1 Types of Potential Impacts

Direct, indirect and cumulative impacts are defined at 40 CFR 1508.7 and 1508.8, and these definitions are presented below. These categories are used to describe the timing and proximity of potential impacts on the affected area only. They have no bearing on the significance of the potential impacts, and are used only to describe or characterize the nature of the potential impacts. Cumulative impacts as defined below are discussed in Section 5.4

- **Direct Impact:** A known or potential impact caused by the proposed action or project that occurs at the time and place of the action.
- **Indirect Impact:** A known or potential impact caused or induced by the proposed action or project that occurs later than the action or is removed in distance from it, but is still reasonably expected to occur.
- **Cumulative Impact:** A known or potential impact resulting from the incremental effect of the proposed action added to other past, present or reasonably foreseeable future actions.

5.2.2 Duration of Potential Impacts

The duration of the potential impact can be defined as either short-term or long-term and indicates the period of time during which the environmental resource would be impacted. Duration takes into account the permanence of an impact or the potential for natural attenuation of an impact. In general, the impacts of all of the proposed alternatives would be long-term or permanent. The duration of each potential impact is defined as follows:

- **Short-Term Impact:** A known or potential impact of limited duration, relative to the proposed action and the target resource. For the purposes of this analysis, these impacts may be instantaneous or may last minutes, hours, days, or up to five years.
- **Long-Term Impact:** A known or potential impact of extended duration, relative to the proposed action and the environmental resource. For the purposes of this analysis, these impacts would last longer than 5 years.

- **Permanent Impact:** A known or potential impact that is likely to remain unchanged indefinitely.

5.2.3 Geographic Extent

National marine sanctuary designation can cause impacts at a variety of geographic scales. For the purposes of this analysis, impacts are assessed in two ways:

- **Localized:** Site-specific and generally limited to the area within and the immediate surroundings of the proposed boundaries.
- **Beyond Proposed Boundaries:** Unconfined or unrestricted to the proposed boundaries. These impacts may extend only in the immediate vicinity of a proposed boundary or a larger area of Lake Michigan.

The area under consideration as a national marine sanctuary in Wisconsin contains an extraordinary collection of underwater cultural resources demonstrated by the listing of 19 shipwrecks on the National Register of Historic Places. This description applies to resources in the largest area being considered (Alternative B), which is defined as the waters off the following counties: Ozaukee, Sheboygan, Manitowoc, and Kewaunee. For purposes of this section, this area is referred to as the “study area.”

5.2.4 Magnitude of Potential Impacts

To determine the proposed action’s magnitude or intensity, NOAA qualitatively assessed the degree to which the alternatives would impact a particular resource. The magnitude or intensity of a known or potential impact is defined on a spectrum ranging from no impacts to major impacts. The potential impacts could be either beneficial or adverse for a particular resource. This DEIS considers the relative magnitude or intensity of both adverse and beneficial impacts.

The intent of NOAA’s proposed action is to provide beneficial impacts to underwater cultural resources (sanctuary resources). The qualitative assessment is based on a review of the available and relevant reference material, and is based on professional judgment using standards that include consideration of the permanence of an impact or the potential for natural attenuation of an impact; the uniqueness or irreplaceability of the resource; the abundance or scarcity of the resource; the current condition of the resource; the geographic, ecological, or other context of the impact; and the potential that mitigation measures can offset the anticipated impact. Impact magnitude descriptions are defined as follows.

- **Minor impacts** to the structure or function of a resource might be perceptible but are typically not amenable to measurement. This term is closely linked to “negligible” which refers to a level that is below significant to the point of being hardly detectable. These are typically localized but may in certain circumstances extend beyond a proposed boundary. Generally, minor impacts are those that, in their context and due to their low level of severity, do not have the potential to meet the considerations of ‘significance’ set forth in CEQ regulations (40 CFR 1508.27).
- **Moderate impacts** to the structure or function of these resources are more perceptible and, typically, more amenable to quantification or measurement. These can be both localized, or may

extend beyond a proposed boundary. Generally, moderate impacts are those that, in their context and due to their low level of severity, do not have the potential to meet the considerations of ‘significance’ set forth in CEQ regulations (40 CFR 1508.27).

- **Major impacts** to these resources are typically obvious, amenable to quantification or measurement, and result in substantial structural or functional changes to the resource. These can be localized, or may extend beyond a proposed boundary. Generally, major impacts are those that in their context and due to their severity, have the potential to meet the considerations of ‘significance’ set forth in CEQ regulations (40 CFR 1508.27).

Table 10. Summary of terms used to describe potential environmental impacts

Type of Impact	Duration of Impact	Geographic Extent	Magnitude/ Intensity	Qualifier	Significance
No Effect					Negligible
Direct	Short-term	Localized	Minor	Adverse	Less than significant
Indirect	Long-term	Beyond proposed boundaries	Moderate	Beneficial	Significant
Cumulative	Permanent		Major		

5.3 Analysis of Environmental Consequences of Alternatives

This section describes the anticipated environmental consequences of the preferred alternative on the maritime heritage, physical and biological resources, and socioeconomic resources of the Proposed Wisconsin – Lake Michigan NMS as described in the Affected Environment (Chapter 4). The impacts are identified generally as either beneficial or adverse effects. None of the alternatives are anticipated to have any adverse significant impacts to any of the resource elements analyzed.

The regulatory options and boundary options are not mutually exclusive and therefore can be combined in various ways. That said, for most resource elements, the combination of Boundary and Regulatory Alternative variations is expected to have negligible differences in environmental impacts conclusions. Further discussion is provided for those resource elements where the differences in environmental impacts would be noticeable. NOAA is proposing two boundary alternatives and two regulatory alternatives. For purposes of analysis, they are presented as follows:

5.3.1 Boundary Alternatives

Boundary Alternative A is 1,075 square miles, with 37 known shipwrecks and 80 probable/suspected shipwrecks. This boundary includes the waters off the following three counties: Ozaukee, Sheboygan, and Manitowoc.

Boundary Alternative B is 1,260 square miles, with 38 known shipwrecks and 95 probable/suspected shipwrecks. This boundary includes the waters off the same three counties in Alternative A, with the addition of Kewaunee County.

Generally, the benefits of the two boundary alternatives relate proportionally to the number of shipwrecks in each alternative and the opportunity for additional coastal communities to benefit from a sanctuary designation in adjacent waters.

5.3.2 Regulatory Alternatives

Regulatory Alternative A consists of the following prohibitions:

- Moving, removing, recovering, altering, destroying, possessing, or otherwise injuring, or attempting to move, remove, recover, alter, destroy, possess or otherwise injure a sanctuary resource.
- Grappling into or anchoring on shipwrecks sites that are marked with a mooring buoy.
- Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the Act or any regulation or any permit issued under the Act.

Regulatory Alternative B consists of the following prohibitions:

- Moving, removing, recovering, altering, destroying, possessing, or otherwise injuring, or attempting to move, remove, recover, alter, destroy, possess or otherwise injure a sanctuary resource.
- Grappling into or anchoring on shipwreck sites.
- Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the Act or any regulation or any permit issued under the Act.

Regulatory Alternative B is different than A in that it prohibits anchoring or grappling into all shipwreck sites in the proposed sanctuary, not just those that have mooring buoys.

Because many consequences are common to all of the analyzed alternatives, they are presented once (see below), followed by a discussion of the unique consequences that would occur in each alternative. The unique consequences of each alternative are related to the number of sites within a particular boundary alternative, the historical, archaeological and recreational significance of these sites, and the number of coastal communities adjacent to the proposed sanctuary.

Although the application of sanctuary regulations and resource protection programs to 37 shipwreck sites is the chief and most direct benefit of the preferred action, there are several anticipated economic (e.g., increased tourism) and environmental (e.g., increased multidisciplinary research) benefits as well. These consequences are common (though proportional) to each alternative and are discussed in the following section. Similarly, the consequences relative to the physical and biological environment are also common to each alternative, and summarized below.

5.3.3 No Action Alternative

Taking no action would mean that NOAA would not designate a national marine sanctuary in Wisconsin's Lake Michigan waters. Implementation of the No Action alternative would result in no changes to existing management of the resources in this area described above in Chapter 4, Affected Environment. The No Action alternative provides a baseline to which environmental consequences of the national marine sanctuary designation alternatives can be compared. No direct changes to the environment and resources are expected to result from the No Action alternative.

5.4 Consequences of No Action Alternative

5.4.1 Underwater Cultural Resources

By not implementing components of the Management Plan that address the protection of underwater cultural resources, there would be direct, adverse impacts to these resources. As described in Chapter 2, these impacts include: anchor damage from visiting dive boats, damage due to unpermitted and poorly attached mooring lines, artifacts being looted, artifacts being moved within a shipwreck site, a remotely-operated vehicle tether entangled within a shipwreck, fishing gear entangled within a shipwreck, and the disturbance of newly discovered shipwrecks. These impacts threaten the long term sustainability of historic shipwrecks and other underwater cultural resources, and negatively impact their recreational and archaeological value.

Without a sanctuary designation, federal resources would not be available for enhanced protection of underwater cultural resources, as well as education, research, and community engagement that foster awareness and protection of these resources. As explained in Chapter 3.4, the State of Wisconsin laws and other Federal laws like the ARPA and NHPA would apply to abandoned shipwrecks, but the additional authority to provide uniform protection over the entire collection of nationally significant historic shipwrecks under NOAA's proposed regulations would not exist. Without the additional protections provided by the proposed action, continued degradation from these threats could occur, and over time may result in significant effects.

5.4.2 Tourism and Recreation

5.4.2.1 Tourism

From a tourism perspective, the coastal communities in the proposed sanctuary have been extremely active in promoting the proposed sanctuary; they have high expectations for the beneficial impact it would have on their communities. Potential partners as identified in the State of Wisconsin's nomination to NOAA have factored the sanctuary designation into their local city planning and marketing initiatives. If a sanctuary is not designated, there will be an indirect and adverse impact from not having a national designation that attracts tourists and enhances recreational opportunities. The coastal communities are still promoting tourism in their operational and strategic plans. Given the general interest in visiting the Great Lakes, it is likely the efforts to attract tourists would yield more visitors. While they are not depending on

a sanctuary designation for tourism, it is apparent that a national designation would enhance such efforts. As such, NOAA anticipates less than significant impacts from this alternative.

5.4.2.2 Recreational fishing

There is no anticipated impact to the recreational fishing community because the sanctuary programs and regulations do not regulate recreational fishing activities.

5.4.2.3 Boating

There are numerous opportunities for boating in the proposed sanctuary, including pleasure boating, sailing, windsurfing, surfing, and parasailing. The No Action Alternative is not expected to have any effect on current use of the area by boaters.

5.4.2.4 Scuba Diving and Snorkeling

It is anticipated there would be an indirect, adverse impact on divers under the No Action Alternative because NOAA would not provide funds for a more extensive mooring buoy system and for better documentation and interpretation of shipwrecks to enhance the diving experience and related marketing. There are already state prohibitions on removing artifacts. However, divers would not be subject to additional sanctuary regulations on anchoring; divers might perceive the lack of anchoring regulations as beneficial, as it might be less complicated for them to dive at a shipwreck site. Overall, NOAA anticipates impacts under the No Action Alternative to be less than significant.

5.4.3 Commercial Activities

5.4.3.1 Commercial fishing

Given that there are two known commercial fishing operations in the area who are aware of known shipwreck locations, they are known to avoid these areas. Thus NOAA anticipates no impacts under the No Action Alternative.

5.4.3.2 Shipping

There would be no impact on shipping activities. Commercial shipping vessels transiting the proposed sanctuary would continue their typical operations. As described in Section 3.5.3, ports and harbors are proposed to be excluded from the sanctuary boundary. In addition, the Howard Coble Coast Guard and Maritime Transportation Act of 2015 includes a provision (section 602) that allows ballast water exchange in Great Lakes national marine sanctuaries that protect underwater cultural resources.

5.4.3.3 Other commercial activities

There would be no impact on commercial activities, such as the potential for offshore wind energy activities if NOAA does not designate a national marine sanctuary. Any such commercial activities would need to comply with existing state and federal permits.

5.4.4 Socioeconomics

5.4.4.1 Population density

There is no anticipated impact to population density if no sanctuary is designated.

5.4.4.2 Income and employment

There is no anticipated impact to income and employment if no sanctuary is designated. However not designating means the area would lose out on the potential positive effects to income and employment if a sanctuary was designated

5.4.5 Military Exercise Area

There would be no impact on the use of the military exercise area (Overwater Range R-6903) used by the Air National Guard and administered by the Combat Readiness Training Center at Volk Field, Wisconsin. The Air National Guard would continue its use of this area, which tends to focus on air-to-air exercises.

5.4.6 Physical and Biological Environment

There would be no impact on the additional physical and biological resources in the area since the No Action alternative would leave the environment as is, without adding additional indirect beneficial or adverse impacts that would result from a sanctuary designation and the associated activities in the area.

5.4.6.1 Physical

Geology: There would be no impact on the geology of the proposed sanctuary.

Climate: There would be no impact on climate.

Water quality: There would be no impact on water quality.

5.4.6.2 Biological

Invasive species: There would be no impact on invasive species.

Protected resources: There are no “protected resources” in the proposed sanctuary. There are no federally listed or proposed to be listed threatened or endangered species in the proposed sanctuary.

Table 11: Summary of consequences for the “No Action” Alternative

Resource	Type of Impact	Duration of Impact	Geographic Extent	Magnitude/ Intensity	Quality	Significance
Underwater Cultural Resources						
<i>Underwater cultural resources</i>	Direct	Long Term	Localized	Moderate	Adverse	Less than significant
Tourism and Recreation						
<i>Tourism</i>	Indirect	Long Term	Localized	Minor	Adverse	Less than significant
<i>Recreational fishing</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Boating</i>	No Impact	Long Term	Localized	N/A	N/A	No effect
<i>Scuba diving and snorkeling</i>	Indirect	Long Term	Localized	Moderate	Adverse	Less than significant
Commercial activities						
<i>Commercial fishing</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Shipping</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Other commercial activities</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
Socioeconomics						
<i>Population density</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Income and employment</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
Military exercise area	No Impact	Long Term	Localized	N/A	N/A	No Effect
Physical and biological environment						
<i>Geology</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Climate</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Water quality</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Invasive species</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect
<i>Protected resources</i>	No Impact	Long Term	Localized	N/A	N/A	No Effect

5.5 Consequences Common to Boundary Alternatives A and B, and Regulatory Alternatives A and B

This section analyzes the consequences that are common to Boundary Alternatives A and B when combined with Regulatory Alternatives A and B²⁰. These consequences are common to any combination of boundary alternative and regulatory alternatives that could be selected for designation. It is worth noting that Thunder Bay NMS provides a useful example of how these consequences play out at an underwater cultural resource-focused national marine sanctuary. For more information, see the Thunder Bay NMS 2009 Final Management Plan and 2013 Condition Report.

Table 12. Summary of boundary alternatives

Alternative	Boundary	Known shipwrecks	Potential shipwrecks
Boundary A (NOAA's preferred alternative)	1,075 square miles	37	80
Boundary B	1,260 square miles	38	95

Table 13. Summary of regulatory alternatives

Alternative	Regulations
Regulatory A	NOAA would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, including a regulation that prohibits grappling and anchoring into shipwreck sites that are marked with a mooring buoy.
Regulatory B (NOAA's preferred alternative)	NOAA would adopt regulations similar to those used in other sanctuaries to protect underwater cultural resources, with an additional regulation that prohibits grappling and anchoring into all shipwreck sites.

5.5.1 Tourism and Recreation

5.5.1.1 Tourism

In each of the alternatives, there is anticipated to be direct, significant, and beneficial consequences to tourism. It is expected that the proposed sanctuary would draw more tourists to the area due to the national designation, enhanced education and outreach programs, and improved public access. The State's nomination to NOAA highlighted the opportunity to promote recreation and tourism. It is possible that tourism-related businesses that relate to the proposed sanctuary could be established or enhanced. For example, a dive shop recently opened in Port Washington, in part due to the proposed national marine sanctuary. It is possible that tour boat charter businesses could be established, as in the case of the Skyline

²⁰ Possible combinations: 1) Boundary Alternative A with Regulatory Alternative A, 2) Boundary Alternative A with Regulatory Alternative B, 3) Boundary Alternative B with Regulatory Alternative A, and 4) Boundary Alternative B with Regulatory Alternative B

Princess tour boat company in Manitowoc that operated for several months during the summer of 2016. These benefits would be slightly more with Boundary Alternative B, with the addition of Kewaunee County (adding the coastal communities of Kewaunee and Algoma).

A sanctuary designation would also enhance the State of Wisconsin's Maritime Trails initiative. Additionally, NOAA would establish some type of "presence" in the coastal communities by working with state and local partners to create exhibits and programming. While the specifics will be determined after designation, it is a priority of NOAA to have places where people can learn about the Wisconsin – Lake Michigan National Marine Sanctuary. It is likely that NOAA will partner with existing institutions, such as the Wisconsin Maritime Museum, Spaceport Sheboygan, and Port Exploreum. NOAA anticipates that visitation would increase at locations with NOAA involvement.

It is possible that an increase in visitors will result in more vehicular traffic and more boats on the water, but, based on the increases in tourism in Thunder Bay NMS and other sanctuary sites, the increase in visitors is not expected to be on the scale that existing facilities and roadways would be unable to accommodate visitors, and vessel traffic is not expected to rise to the level where conflicts of users or safety issues would arise. Therefore, the impacts would be negligible.

5.5.1.2 Recreational fishing

Recreational fishing is a popular activity in Lake Michigan and in the proposed sanctuary. In each of the boundary and regulatory alternatives, there is no anticipated impact to recreational fishing. Fishermen will continue to be able to fish anywhere in the proposed sanctuary, and the proposed sanctuary regulations should not negatively impact their ability to fish as they do now. The majority of the sport and charter fishers are currently trolling or are using large boats and do not anchor.

5.5.1.3 Boating

It is expected that the proposed sanctuary would promote recreational activities to the area. The State's nomination to NOAA highlighted the opportunity to promote recreation, including sailing, kayaking, boating, and paddle-boarding. While an increase in these activities is likely, it is not expected to adversely impact sanctuary resources or cause other adverse impacts to Lake Michigan. This anticipated increase is not expected to interfere with commercial fishing, recreational fishing, shipping, or other uses of the water, and therefore NOAA anticipates no impacts.

5.5.2. Commercial Activities

5.5.2.1 Commercial fishing

The proposed action is not introducing regulations specific to commercial fishing. Commercial fishermen use trap nets or gill nets which are anchored down, but it is unlikely that fishermen would anchor their nets near known shipwrecks due to snagging and the potential to have their gear damaged. The expected impact to commercial fishermen is negligible because the local fishing operations know where the

shipwrecks are and have been avoiding them. It will be important to work with commercial fishermen and researchers who are trawling to ensure they do not adversely impact shipwreck sites. Notably, lake bottom mapping and characterization that may occur due to sanctuary designation would benefit commercial fishermen, in both gaining a better understanding of habitat and avoiding shipwrecks sites and other cultural features. In addition, better documentation of cultural resources and increased communication between fisherman and resource managers would be beneficial.

5.5.2.2 Shipping

As indicated in Chapter 4, *Affected Environment*, commercial shipping on the Great Lakes is an important activity that supports the nation's economy. The proposed sanctuary is not expected to have adverse impacts to commercial shipping. NOAA intends to work with potentially affected stakeholders and relevant federal agencies to ensure that commercial shipping practices remain unhindered in the proposed sanctuary. This will be accomplished in part by not including the commercial ports and marinas of Two Rivers, Manitowoc, Sheboygan, and Port Washington in the sanctuary boundary. In addition, with the passage of the Coast Guard Authorization Bill of 2015, the Coast Guard and U.S. Environmental Protection Agency regulations prohibiting ballast water exchange in national marine sanctuaries would not apply to this proposed sanctuary. A potential increase in the number of divers (as an indirect effect of the proposed action) may have a negligible impact on shipping operations, but education and outreach is expected to help avoid user conflicts.

Because the State of Wisconsin has determined that dry cargo residue (DCR) sweeping is illegal in state waters, none of the alternatives would have an impact on this activity. Because the sanctuary would be jointly managed by NOAA and the State of Wisconsin, and because all bottom lands within the sanctuary are state owned, a sanctuary designation would not alter this situation.

5.5.2.3 Other commercial activities

There is no anticipated effect on commercial activities in the proposed sanctuary. Activities such as offshore wind development would not be impacted by a sanctuary designation because such a development would have to meet existing state and federal regulations. The proposed sanctuary regulations that are different from state and federal regulations are limited to protecting shipwrecks through restrictions on anchoring, which would be unlikely to impact commercial activities.

5.5.3 Socioeconomics

5.5.3.1 Population density

The population density is not expected to change as a result of the proposed national marine sanctuary. However, current trends in the area, as cited in Leeworthy et al., 2016, show anticipated population growth in the study area to be minimal through 2040.

5.5.3.2 Income and employment

There is currently no research on the expected impacts of the proposed WLNMS on jobs and unemployment. However, using other sanctuary experiences as an example, it is possible that a new national marine sanctuary in Wisconsin could support additional employment and income. For example, successful education or marketing campaigns that inform people of the recreational and historical opportunities at the site could induce additional visitors and spending to the area. This amount cannot be quantified at this time, but currently there are research efforts underway to quantify the economic landscape of the proposed sanctuary study areas, including use and expenditures in the area. NOAA anticipates that impacts in implementing any combination of the proposed action alternatives would be negligible. There may be a slightly higher benefit for combinations with Alternative Boundary B because it encompasses a larger area, more access points and potentially more employment opportunities.

5.5.4 Military Exercise Area

There is no anticipated impact on the military exercise area because this area is little used by the Wisconsin Air National Guard. Current activities are not of the nature that they would have an impact on sanctuary resources. If activities increase or the nature of activities changes, NOAA will consult with the Wisconsin Air National Guard.

5.5.5 Physical and Biological Environment

There is no anticipated impact on the physical and biological environment. There are no threatened or endangered species.

Table 14: Summary of consequences common to the four Boundary Alternatives A and B and Regulatory Alternatives A and B combinations

Resource	Type of Impact	Duration of Impact	Geographic Extent	Magnitude/Intensity	Quality	Significance
Tourism and Recreation						
<i>Tourism</i>	Direct	Permanent	Localized	Minor	Beneficial	Significant
<i>Recreational fishing</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
<i>Boating</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
Commercial activities						
<i>Commercial fishing</i>	No Impact	Permanent	Localized	N/A	N/A	Negligible
<i>Shipping</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
<i>Other commercial activities</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
Socioeconomics						
<i>Population density</i>	No Impact	Permanent	N/A	N/A	N/A	No Effect
<i>Income and employment</i>	Direct	Permanent	Localized	Minor	Beneficial	Negligible
<i>Military exercise area</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
Physical and biological environment						
<i>Geology</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
<i>Climate</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
<i>Water quality</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
<i>Invasive species</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect
<i>Protected resources</i>	No Impact	Permanent	Localized	N/A	N/A	No Effect

5.6 Consequences Unique to Each Alternative

The unique consequences relative to each boundary alternative are related to the associated amount of lake area and therefore the number of shipwreck sites within each alternative. The unique consequences relative to each regulatory alternative are also related to the number of shipwreck sites since the difference in regulations would apply to those shipwreck sites. For all the boundary and regulatory alternatives the aspects of the affected environment with unique consequences are the underwater cultural resources and the human use categories of tourism and scuba diving and snorkeling. The sections below describe the unique consequences for each alternative for these resources under the boundary and regulatory alternatives.

5.6.1 Underwater Cultural Resources

Under all the action alternatives in which NOAA would designate the Wisconsin - Lake Michigan NMS, there would be direct and beneficial effects for underwater cultural resources. The Management Plan consisting of resource protection, education, and research elements would be applied in all alternatives. As part of the Management Plan, NOAA would install mooring buoys at many shipwreck sites. The locations of the buoyed sites would be published by NOAA. Moorings are a key resource protection strategy in that they: (1) eliminate the need for a dive boat to use its anchor to locate and secure itself to a fragile shipwreck site; (2) eliminate the need for non-permitted moorings at shipwreck sites, which can become derelict over time, posing a risk to divers and potentially damaging the site; (3) make for safer diving by providing a sturdy means of descent and ascent for divers, and an easy-to-find surface marker for kayakers; and (4) encourage public accessibility.

Under Boundary Alternative A, approximately 1,075 square miles would become sanctuary waters with 37 known shipwrecks, including 18 on the National Register of Historic Places (NRHP), and with 80 potential shipwrecks based on historical records. Waters off Kewaunee County would be not included, which means those shipwrecks would remain protected under State of Wisconsin law, the ARPA and the NHPA, but would not be protected by the sanctuary. If Regulatory Alternative A was selected, these shipwrecks would be covered by a prohibition on damaging underwater cultural resources and a prohibition on the use of grappling hooks and other anchoring devices on shipwreck sites when there is a mooring buoy present. Divers and other visitors to the shipwreck sites would not be prohibited from using grappling hooks or other anchoring devices at shipwreck sites that are not buoyed, but would still be subject to the prohibition on damaging a shipwreck. While it would be a priority for NOAA to install buoys at shipwrecks sites, if NOAA is not able to, there is a greater possibility of damage to these sanctuary resources. The result of applying these prohibitions on this area is a positive significant effects on the underwater cultural resources, compared to the No Action Alternative.

Under Regulatory Alternative B, those same shipwrecks found in Boundary Alternative A would be protected by the same prohibition on damaging underwater cultural resources, and an additional prohibition on anchoring into any shipwreck site. NOAA anticipates that this additional protection for the shipwreck sites would result in positive significant effects on the underwater cultural resources, compared

to the No Action Alternative. The positive effects would have a greater magnitude compared to Regulatory Alternative A.

Under Boundary Alternative B, approximately 1,260 square miles would become sanctuary waters with 38 known shipwrecks, including 19 on the National Register of Historic Places, and with 95 potential shipwrecks in this area based on historical records. The addition of the waters off Kewaunee County results in adding an area of 185 square miles, and includes one known shipwreck and 15 potential shipwrecks. Boundary Alternative B would have a slightly larger benefit with the addition of the *America* shipwreck, than Boundary Alternative A. If Regulatory Alternative A was selected then it would result in positive significant effects for a larger number of shipwrecks that would be protected under the damaging and anchoring on sites with mooring buoy prohibitions, compared to Boundary Alternative A with these regulations, and compared to the No Action Alternative.

Under Regulatory Alternative B, those same larger number of shipwrecks found in Boundary Alternative B would be protected by the same prohibition on damaging underwater cultural resources, and the additional prohibition on anchoring into any shipwreck site. Therefore, the combination of boundary Alternative B with Regulatory Alternative B would have a slightly higher beneficial impact when compared to the other alternatives.

Any of the four combinations of the proposed action would have a significant beneficial effect on cultural resources compared to the No Action Alternative. Specifically, the anticipated benefits range from additional legal authority to protect underwater cultural resources, to enhancing education and research programs, to enhanced law enforcement.

5.6.2 Human Uses

5.6.2.1 Tourism

In each of the alternatives, there is anticipated to be direct, significant, and beneficial consequences to tourism. It is expected that the proposed sanctuary would draw more tourists to the area due to the national designation, enhanced education and outreach programs, and improved public access. As part of the Management Plan, NOAA would promote the sanctuary as a national destination by offering opportunities for tourists to learn about and appreciate the nationally significant collection of shipwrecks.

Any of the four combinations of the proposed action alternatives would have a significant beneficial effect on tourism compared to the No Action Alternative. Specifically, the anticipated benefits range from benefits to communities from being adjacent to the sanctuary boundary, to additional legal authority to protect underwater cultural resources with the result of promoting better-protected shipwrecks, to enhancing education and research programs.

Under Boundary Alternative A (1,075 square miles), waters off Kewaunee County would not be in the sanctuary boundary, which means that the communities of Kewaunee and Algoma would not be immediately adjacent to the sanctuary. However, as in existing national marine sanctuaries, tourism benefits can still be accrued by surrounding communities. NOAA would still engage these communities in education and outreach programs, which may encourage more visitors to the sanctuary. Kewaunee

County would still benefit from many aspects of the proposed sanctuary while not being adjacent to sanctuary waters.

Under Boundary Alternative B (1,260 square miles), the addition of the waters off Kewaunee County results in adding an area of 185 square miles, and includes one known shipwreck and 15 potential shipwrecks. The communities of Kewaunee and Algoma would be immediately adjacent to the sanctuary. The tourism benefits described in the *Consequences Common to all Alternatives* section would be applied here.

There are direct and beneficial impacts to tourism under both Regulatory Alternatives A and B. As shipwrecks are better protected, tourists are expected to value this resource and come to the sanctuary as a destination. The differences between Regulatory Alternatives A and B are minor when it comes to tourists appreciating the shipwrecks, although Regulatory Alternative B has a higher level of protection than Regulatory Alternative A. NOAA anticipates that this additional protection for the shipwreck sites under both regulatory alternatives would result in positive significant effects on tourism, as compared to the No Action Alternative.

5.6.2.1 Scuba Diving and Snorkeling

Scuba diving and snorkeling activities would be expected to increase under all the action alternatives. Under Boundary Alternative A, as the proposed sanctuary is focused on underwater cultural resources (primarily shipwrecks), it is expected that diving and snorkeling activities would increase, but the effects would be less than significant. As there is only one additional shipwreck in Boundary Alternative B, the difference across action alternatives is negligible.

The proposed sanctuary regulations would be more restrictive than State of Wisconsin law, providing a higher level of protection. The proposed sanctuary regulations under Regulatory Alternative A would result in minor impacts to diving activities, as dive boats would be prohibited from anchoring at shipwreck sites that do not have mooring buoys. Divers would need to learn about and use alternative techniques for securing boats at a dive site if there is not a mooring buoy on which to tie the boat. NOAA intends to build on and improve the State's mooring buoy program, as this is an important way to protect shipwrecks. Once the mooring buoy system is well-established, the impact to divers from the change in mooring requirements will be minimal. The sanctuary would make publically available a map that identifies all known shipwrecks, both ones that are buoyed and non-buoyed.

Under Regulatory Alternative B, the proposed sanctuary regulations would result in minor adverse impacts to diving activities, as dive boats would be prohibited from anchoring at all shipwreck sites. Divers would need to learn about and use alternative techniques for securing boats at a dive site if there is not a mooring buoy on which to tie the boat. NOAA intends to build on and improve the State's mooring buoy program, as this is an important way to protect shipwrecks. Once the mooring buoy system is well-established, the negative impact to divers from not being able to anchor will be minimal. The ultimate result of a no anchoring prohibition at shipwreck sites is to maintain the highly preserved quality of sanctuary shipwrecks, thereby ensuring a better long term experience for divers.

NOAA will build on the State of Wisconsin's map of shipwrecks in the proposed sanctuary. As appropriate and in consideration of resource management conflicts, NOAA would update the maps as new shipwreck sites are found by the sanctuary, the Wisconsin Historical Society, or other public or private groups and individuals. This will have a less than significant positive effect on the snorkeling and diving community because it will make it easier for them to locate and access choice sites, enhancing their recreational experience.

5.7 Cumulative Impacts

The CEQ regulations (40 CFR 1500) for implementing the provisions of NEPA define cumulative impacts as “the impact on the environment which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (CEQ 1997a). The regulations further define cumulative impacts as those that can result from individually minor but collectively significant actions that take place over a period of time. The CEQ guidance for considering cumulative effects states that NEPA documents “should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant” (CEQ 1997).

Cumulative Impact Assessment Methods

CEQ's cumulative effects guidance sets out several different methods for assessment such as checklists, modeling, forecasting and economic impact assessment, where changes in employment, income and population are evaluated (CEQ 1997). This DEIS uses a variety of methods, depending on the resource area, to determine cumulative effects. In general, past, present and reasonably foreseeable future projects are assessed by topic area (see above). Cumulative effects may arise from single or multiple actions and may result in additive or interactive effects. Interactive effects may be countervailing, where the adverse cumulative effect is less than the sum of the individual effects, or synergistic, where the net adverse effect is greater than the sum of the individual effects (CEQ 1997).

Activities to manage the proposed sanctuary, as described in the Management Plan, should result in beneficial effects to the maritime heritage resources and cultural landscape environment. Considering existing federal and state regulations that provide some protection to our nation's cultural resources, the proposed action is expected to yield incremental positive effects through additional resource protection to known and potential shipwrecks. In this section on cumulative impacts, NOAA addresses non-NOAA actions that could interact with the effects of designation described in all the alternatives except the “No Action” alternative.

No cumulative adverse effects from NOAA's proposed action alternatives are anticipated. The past, present, and reasonably foreseeable actions that were considered as threats to sanctuary resources and other environmental elements in conjunction with the proposed sanctuary include:

Direct Threats from Human Activities

Human threats include looting sanctuary shipwreck sites, disturbing artifacts or the wreck itself, and damaging sites by anchoring. It is possible that recreational boating and diving could increase over time, therefore increasing these types of human threats. However, the proposed sanctuary would have a less than significant, but beneficial effects on the resources by reducing the occurrence of these human threats through regulatory prohibitions and public outreach, which would lower the risk of damage to the sanctuary's shipwrecks.

Threats from Natural Processes

Natural processes include the impacts of wind, waves, storms and ice. There is no definitive indication that these natural processes will change in frequency or intensity in the foreseeable future. The impacts are analyzed earlier in Chapter 5.

Overall, the outcome of these external stressors is not expected to be significantly altered by the implementation of the proposed action, although sanctuary protection over the shipwrecks could slightly decrease the negative effects of these stressors. No single activity, however, when taken in consideration with others, would have significant beneficial or negative impacts on any individual or combined resource. Therefore, cumulative impacts of this action are not considered significant under NEPA. Based on this analysis, the proposed action, reviewed in conjunction with other actions taking place in the proposed sanctuary, is not expected to result in significant cumulative impacts on sanctuary resources or the environment.

State of Wisconsin Laws Relating to Maritime Heritage Resources

These laws impact maritime heritage resources by prohibiting resource disturbance or artifact recovery without a permit. The cumulative effects of these laws, when considered with the proposed action, are to protect maritime heritage resources from disturbance and destruction. Public awareness about state laws related to maritime heritage resources is also expected to increase as a result of the proposed action, further reinforcing this effect. There will be a positive, less than significant, benefit to public awareness regarding state laws related to maritime heritage resources as a result of the proposed action, further reinforcing this benefit for the maritime heritage resources.

Invasive Species

As discussed earlier in this chapter, invasive species are a threat to the Great Lakes and to the underwater cultural resources. One known source of invasive species is ballast water. Various large scale regional efforts are underway to reduce or reverse the spread of invasive species in the Great Lakes. Should these efforts be successful, they could result in slower degradation of shipwrecks in the proposed sanctuary. Given that the proposed action does not regulate activities that could be a source of invasive species, NOAA does not anticipate incremental changes as a result of the proposed action. Therefore, NOAA does not anticipate significant cumulative effects of our proposed action in conjunction with threats from invasive species.

Chapter 6

ADDITIONAL CONSIDERATIONS

6.1 Consultation and Environmental Compliance

The following is a list of federal consultation and environmental regulations that apply to the proposed action, as well as a description of compliance by NOAA with applicable requirements.

Consultations under the NMSA

Under section 303(b)(2) of the NMSA, NOAA is required to conduct a series of consultations with Congress, federal and state agencies, and other interested parties. Per this requirement, consultation letters will be sent to coincide with the publication of this document and the proposed rulemaking to the following:

- U.S. House of Representatives Natural Resources Committee
- U.S. Senate Committee on Commerce, Science, and Transportation
- Department of Defense
- Department of State
- Department of Transportation
- Department of the Interior
- U.S. Environmental Protection Agency
- U.S. Army Corps of Engineers
- U.S. Fish & Wildlife Service
- U.S. Coast Guard

Relation to Existing Laws and Executive Orders

NEPA requires that a discussion of the relation of the action to other existing laws and executive orders be included. The relation of this action to other legal requirements is discussed as follows:

Coastal Zone Management Act (CZMA)

The CZMA creates a partnership between the Federal and State governments that allows States to develop coastal zone management programs within a set of Federal guidelines but tailored to their individual needs. The Act also requires that each Federal agency's activities within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner that is, to the maximum extent practicable, consistent with the enforceable policies of the Federally-approved state coastal zone management program. NOAA has worked with the State of Wisconsin on drafting the

proposed action since it takes place wholly within Wisconsin state waters. NOAA will formally consult with the State of Wisconsin on the federal consistency of this action. Although the proposed action would occur outside of the coastal zone of the states bordering Lake Michigan and neighboring Wisconsin, NOAA will provide the State of Illinois and the State of Michigan with an opportunity to review the proposed action for federal consistency.

Endangered Species Act (ESA)

The ESA requires all federal agencies, in consultation with the Departments of the Interior (USFWS) and Commerce (NMFS), to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species, or result in the destruction or adverse modification of the critical habitat of such species. For any action with a potential for impacts to federally protected species, NOAA's Office of National Marine Sanctuaries evaluates the potential impacts and, if needed, prepares a biological assessment to inform the biological opinion produced by NOAA's National Marine Fisheries Service (NMFS). This consultation informs the analysis of impacts on federally listed species to determine their significance. As explained in Section 4.3.6.2, NOAA does not anticipate that there are any listed or proposed threatened or endangered species or designated or proposed critical habitat in the study area.

National Historic Preservation Act of 1966

The National Historic Preservation Act (NHPA), amended in 1992, requires that responsible agencies taking action that potentially affects any property with historic, architectural, archeological or cultural value that is listed on, or eligible for listing on, the National Register of Historic Places comply with the procedures for consultation and comment issued by the Advisory Council on Historic Preservation (ACHP). The responsible agency also must identify properties affected by the action that are listed on or potentially eligible for listing on the National Register of Historic Places, usually through consultation with the State Historic Preservation Officer. Section 106 of the NHPA defines requirements and policy for the preservation, restoration and maintenance of the historic and cultural environment of the United States. NOAA is coordinating its responsibilities under Section 106 with its ongoing NEPA process, pursuant to 36 CFR 800.8, including the use of NEPA documents and public and stakeholder meetings to also meet the requirements of Section 106. No adverse impacts to historic or cultural resources are anticipated as a result of any of the action alternatives presented in this DEIS.

Regulatory Flexibility Act (RFA)

The RFA, as amended and codified at 5 U.S.C. 601 et seq., requires an agency to prepare a regulatory flexibility analysis of any rule subject to the notice and comment rulemaking requirements under the Administrative Procedure Act (5 U.S.C. 553) or any other statute, unless the agency certifies that the rule will not have a significant economic impact on a substantial number of small entities. Under section 605(b) of the RFA, however, if the head of an agency (or his or her designee) certifies that a rule will not have a significant impact on a substantial number of small entities, the statute does not require the agency

to prepare a regulatory flexibility analysis. Pursuant to section 605(b), the Chief Counsel for Regulation, Department of Commerce, submitted a memorandum to the Chief Counsel for Advocacy, Small Business Administration, certifying that the original proposed rule would not have a significant impact on a substantial number of small entities. The rationale for that certification was set forth in the notice of proposed rulemaking.

Rivers and Harbors Act of 1899

The Rivers and Harbors Act of 1899 regulates the following: (1) construction of bridges, causeways, dams or dikes; (2) obstruction of excavations and filling of navigable waters; (3) establishment of harbor lines and conditions related to grants for the extension of piers; and (4) penalties related to the regulated actions, and to the removal of existing structures. No activities regulated under the Rivers and Harbors Act of 1899 are part of the proposed action or any of the alternatives.

Executive Order 12866 Cost-Benefit Analysis

Under Executive Order 12866, if a rule is determined to be significant, then a socioeconomic impact study (i.e., assessment of the costs and benefits of the regulatory action) must be conducted. Under 12866 a regulatory action is significant if the rule may:

- have an annual effect on the economy of \$100 million or more or adversely affecting in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety, or State, local, or tribal governments or communities;
- create a serious inconsistency or otherwise interfere with an action taken or planned by another agency;
- materially alter the budgetary impacts of entitlements, grants, user fees, or loan programs, or the rights and obligations of recipients thereof; or
- raises novel legal or policy issues arising out of legal mandates, the President's priorities, or the principles set forth in this Executive Order.

NOAA has concluded that the proposed rule analyzed in this DEIS is not significant under E.O. 12866.

Executive Order 13132 Federalism

Under Executive Order 13132, each agency must consult, to the extent practicable and permitted by law, with State and local officials early in the process of developing regulations. These consultations should seek comment on the compliance costs or preemption, as appropriate to the nature of the rulemaking under development. NOAA has concluded that this regulatory action does not have federalism implications sufficient to warrant preparation of a federalism assessment under Executive Order 13132 because NOAA supplements and complements state and local laws under the NMSA.

Executive Order 13175 Consultation and Coordination with Indian Tribal Governments

There are no federally recognized tribes in the immediate area of this proposed action for consultation under E.O. 13175. However, NOAA is inviting state recognized tribes to be consulting parties under Section 106 of the National Historic Preservation Act (54 U.S.C. 306108), pursuant to 36 CFR 800.2.

6.2 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs that the programs of federal agencies identify and avoid disproportionately high and adverse effects on human health and the environment of minority or low-income populations. The designation of national marine sanctuaries by NOAA helps to ensure the enhancement of environmental quality for all populations in the United States. None of the alternatives described in this document or the cumulative actions would result in any disproportionate negative impacts on any minority or low-income population, and would result in long-term or permanent beneficial impacts by protecting maritime cultural heritage resources, which may provide employment opportunities and result in improved ecosystem services to nearby inhabitants through the protection of the habitat provided by the resource. Minority and low-income populations may benefit from planning efforts that seek to integrate communities into sanctuary management planning.

6.3 Relationship of Short-term and Long-term Productivity

NEPA requires consideration of the relationship between local short-term uses of the environment and the maintenance and enhancement of long-term productivity. The short-term uses of the environment relating to each of the action alternatives may increase the number of visitors to the area, while at the same time improve the health and quality of the environment by protecting the maritime cultural heritage resources that provide habitat for living resources through: (1) regulations prohibiting damaging the underwater cultural resources; (2) providing a mechanism through the NMSA to respond to hazardous spills that damage the underwater cultural resources; and (3) monitoring human activities through regulations and non-regulatory programs that incorporate community involvement in the stewardship of sanctuary underwater cultural resources. Long-term productivity derived from the action alternatives is based on the goals of the sanctuary and the proposed management actions to achieve the goal of long-term protection of the underwater cultural resources that would preserve the living resource habitat. These proposed actions include action plans related to resource protection, recreation and tourism, education, science and research, infrastructure and operations. Benefits to both short-term uses and long-term productivity based on implementation of sanctuary designation and management actions are proportional to the number of underwater cultural resources that provide habitat encompassed within the area of each alternative. NOAA anticipates any growth inducing impacts from the proposed action to be less than significant.

6.4 Irreversible and Irretrievable Commitment of Resources

Section 1502.16 of the NEPA regulations require that EIS discuss any irretrievable or irrevocable commitments of resources which would be involved in the proposed action, should it be implemented. Given that the proposed action involves designation of a national marine sanctuary that does not require any construction or permanent changes to physical, biological, or cultural resources, there are no irretrievable or irrevocable commitments of resources.

Index

Fishing 24, 46, 48, 57, 58, 61, 62, 63, 65, 66, 67, 72, 78, 83, 84, 87, 88

Human Environment 2, 15

Management Plan 17, 22, 25, 26, 28, 29, 30, 39, 83, 87, 92, 93, 95, 100

Maritime Cultural Landscape 55, 57, 58, 78

National Marine Sanctuaries Act 12, 16, 26, 41

Physical and Biological Environment 44, 79, 82, 85, 86, 90, 91

Public Scoping 5, 19, 29, 32

Shipping 24, 41, 73, 74, 81, 85, 92, 94, 96, 97, 99

State of Wisconsin 14, 22, 23, 24, 26, 28, 29, 30, 34, 35, 37, 38, 41, 43, 47, 50, 52, 72, 77, 88, 95, 100

Tourism 14, 23, 24, 31, 68, 85, 90, 91, 94, 95, 96, 99, 100, 101, 102

United States Coast Guard (USCG) 41, 55, 64, 84, 92, 97

Wisconsin Historical Society 13, 21, 22, 33, 34, 40, 41, 42, 50, 53, 54, 56, 59, 65, 103

Appendix A

Wisconsin-Lake Michigan National Marine Sanctuary Draft Management Plan

December 2016

Executive Summary

The proposed 1,075-square-mile Wisconsin – Lake Michigan National Marine Sanctuary (WLMNMS) encompasses the waters and bottomlands of Lake Michigan adjacent to Manitowoc, Sheboygan, and Ozaukee Counties. The boundary includes 80 miles of shoreline and extends 7 to 16 miles from the shoreline. The proposed sanctuary would protect and interpret a nationally significant collection of underwater cultural resources, including 38 known shipwrecks and numerous other historic maritime-related features; according to archival documents over 80 shipwrecks are yet to be discovered. The sanctuary would also enhance and facilitate broader lake conservation efforts as well as heritage tourism within the many communities that have embraced their centuries-long maritime relationship with Lake Michigan, the Great Lakes region, and the nation. The sanctuary includes the principal cities, Port Washington, Sheboygan, Manitowoc, and Two Rivers, all core supporters and contributors to the nomination and designation efforts. The sanctuary will be co-managed by the State of Wisconsin and NOAA.

The historic shipwrecks in the proposed sanctuary are representative of vessels that sailed and steamed this corridor, carrying grain and raw materials east as other vessels came west loaded with coal, manufactured good, and immigrants. Nineteen of the 38 sites are listed on the National Register of Historic Places. Many of the shipwrecks in the proposed sanctuary retain an unusual degree of architectural integrity, with 14 vessels virtually intact. Well preserved by Lake Michigan's cold, fresh water, the shipwrecks and related underwater cultural sites in and around the proposed WLMNMS possess exceptional historical, archaeological, and recreational value. The proposed WLMNMS would protect and manage these underwater cultural resources as sanctuary resources. The sanctuary resources would not include the biological and ecological resources of the area already managed by the state of Wisconsin.

Establishing a national marine sanctuary in Wisconsin waters would complement and expand existing state-led preservation efforts, research programs, and public outreach initiatives. Since 1988 the Wisconsin Historical Society has actively inventoried, documented, and interpreted the state's underwater cultural heritage, evolving into one of the nation's most respected state underwater archaeology programs. A sanctuary designation would enhance these efforts and add additional protections due to its comprehensive research, resource protection, and education programs. The presence of a sanctuary would provide access to NOAA's extended network of scientific expertise, partners, and technological resources, enhance ongoing research, and provide an umbrella for the coordination of these activities. A sanctuary would support and build on the educational initiatives in place and provide programming and technology that could reach K-12, post-graduate, and the general public across the state. A sanctuary designation, the local commitment to the sanctuary, the existing state agency interest, and NOAA's

existing network of affiliated programs has the potential to create synergies that reach far beyond the proposed sanctuary boundaries.

About this Management Plan

Management plans are sanctuary-specific planning and management documents used by all national marine sanctuaries. They identify immediate, mid-range, and long-term challenges and opportunities, and develop a course for the future. A management plan describes resource protection, research, and education and outreach programs that guide sanctuary operations, specifies how a sanctuary should best protect its resources, and describes sanctuary regulations if appropriate. The Draft Management Plan (DMP) for the proposed WLMNMS outlines the administrative framework, goals, and possible activities necessary to achieve the vision of a WLMNMS.

The first management plan for the proposed sanctuary is relatively general, consisting of broad goals and strategies. This level of detail is intentional, as it takes several years to explore how to best integrate the sanctuary into communities, explore opportunities for partnerships, and determine more specific priorities. The Office of National Marine Sanctuaries considers this evolution as a sanctuary's "life cycle." Management plans are created with input from the sanctuary advisory council, general public, local governments, state and federal agencies, and other stakeholders. The WLMNMS DMP is comprised of four action plans: Resource Protection; Education and Outreach; Research; and Sanctuary Operations.

While the proposed WLMNMS would be co-managed by NOAA and the State of Wisconsin, the sanctuary would rely heavily on a range of partners to help carry out its mission. NOAA will continue to work in full cooperation with the Wisconsin Historical Society, Wisconsin Department of Natural Resources, and the Wisconsin Coastal Management Program. In addition, partnerships with local communities, private businesses, non-governmental organizations, educational and cultural institutions, and other local, state, and federal agencies provide the synergies needed to establish and accelerate sanctuary research, site monitoring, education and outreach, and enforcement, among other areas. The many partnerships developed over the course of the nomination and designation process have been, and will continue to be, critical to the success of the sanctuary.

This DMP is specific to NOAA's actions, but will also link to the actions and responsibilities of partner management agencies, all of which will be integral to WLMNMS success. Public involvement has been valuable throughout the nomination and designation processes, and will continue to be valuable, through opportunities to volunteer and to participate on the Sanctuary Advisory Council.

NOAA's Office of National Marine Sanctuaries

NOAA's Office of National Marine Sanctuaries (ONMS) is the federal program within the National Oceanic and Atmospheric Administration (NOAA), National Ocean Service (NOS) charged with managing national marine sanctuaries. ONMS serves as the trustee for a network of underwater parks encompassing more than 600,000 square miles of marine and Great Lakes waters. The network includes a system of 13 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments. Few places on the planet can compete with the diversity of the National Marine Sanctuary

System, which protects America's most iconic natural and cultural marine resources. The system works with diverse partners and stakeholders to promote responsible, sustainable ocean and Great Lakes uses that ensure the health of our most valued underwater places. The Office of National Marine Sanctuaries also leads the National Marine Protected Areas Center, the nation's hub for building innovative partnerships and tools to protect our special ocean. Within sanctuary waters, giant whales feed, breed and nurse their young, coral colonies flourish, and shipwrecks tell stories of our maritime history. Sanctuary habitats include beautiful rocky reefs, lush kelp forests, whale migration corridors and destinations, spectacular deep-sea canyons, and underwater archaeological sites.

ONMS raises public awareness of sanctuary resources and conservation issues through programs of scientific research, monitoring, exploration, education and outreach. ONMS provides oversight and coordination of the sanctuary system by setting priorities for addressing resource management issues and directing program and policy development. To protect the living marine and non-living resources of sanctuaries, ONMS works cooperatively with the public in developing sanctuary management plans and regulations consistent with the National Marine Sanctuaries Act (NMSA).

Wisconsin Historical Society

The sanctuary would be co-managed by NOAA and the State of Wisconsin. The Wisconsin Historical Society (WHS) is the State of Wisconsin's principal historic preservation agency and charged under state statutes (44.02 and 44.30-44.31) with the research, protection, restoration, and rehabilitation of historic properties within Wisconsin. Under Wisconsin statute 44.47, the Society is also charged with the identification, evaluation, and preservation of Wisconsin's underwater archaeological resources, including submerged prehistoric sites, historic shipwrecks, and aircraft on state-owned bottomlands. The State Historic Preservation Office within the WHS reviews federal, state and local projects for their effect on historic and archaeological properties.

Created in 1988, the State Maritime Preservation and Archaeology Program works to survey, inventory, and evaluate Wisconsin's underwater archaeological resources, develop preservation strategies, administer field management practices, and enhance public appreciation and stewardship for Wisconsin's precious and fragile underwater cultural resources. The Maritime Preservation and Archaeology Program is within the Society's Division of Historic Preservation – Public History.

Comprehensive Management

The NMSA includes a finding by Congress that ONMS will “improve the conservation, understanding, management and wise and sustainable use of marine resources” (16 U.S.C. 1431(a)(4)(A), §301(a)(4)(A)). The NMSA further recognizes that “while the need to control the effects of particular activities has led to enactment of resource-specific legislation, these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of the marine environment” (16 U.S.C. 1431(a)(3), §301(a)(3)). Accordingly, ONMS subscribes to a broad and comprehensive management approach to meet the NMSA's primary objective of resource protection.

Comprehensive sanctuary management serves as a framework for addressing long-term protection of a wide range of living, nonliving, and marine heritage resources, while allowing multiple uses of the sanctuary to the extent that they are compatible with the primary goal of resource protection. The resources managed by the ONMS span diverse geographic, administrative, political and economic boundaries. Strong partnerships among resource management agencies, the scientific community, stakeholders, and the public at-large are needed to realize the coordination and program integration that the NMSA calls for in order to comprehensively manage national marine sanctuaries.

Charting the First Management Plan

On December 2, 2014, pursuant to Section 304 of the National Marine Sanctuaries Act and Sanctuary Nomination Process (79 FR 33851), the State of Wisconsin submitted a nomination asking NOAA to accept this area onto the inventory of places that NOAA would consider as a national marine sanctuary. The nomination cited conservation goals to protect and conserve the nation's cultural heritage as well as opportunities to expand public access, recreation, tourism, research, and education.

On October 7, 2015 President Obama announced that NOAA would initiate the sanctuary designation process for Wisconsin-Lake Michigan (80 FR 60631). That announcement initiated a 90-day public comment period during which NOAA solicited additional input related to the scale and scope of the proposed sanctuary, including ideas presented in the community nomination. NOAA hosted three public meetings in November 2015 and provided additional opportunity for comments through the web and traditional mail. All comments received were made available to the public through the Regulations.Gov web portal.

During this period, approximately 135 individuals provided input. Comments were overwhelmingly supportive of the goals of sanctuary designation, including the rationale for conservation of nationally-significant resources, considerations that enhance public use and recreation, considerations that enhance tourism and the local economy, and as a venue for education, science, and interpretation as described in the community nomination. The comments underscored the need for conservation and interpretation, particularly the importance of educating the public about the significance of the Great Lakes and the role that shipbuilding and shipping commerce has played, and continues to play, in the history of the region and our nation. There was strong support from local communities, governments, and organizations supporting sanctuary designation and offering opportunities to partner for education, research, outreach, and other activities.

Input gathered from resource users, stakeholders, interest groups, government agencies, and other members of the public during the scoping process was considered in developing the management plan, including comments regarding boundaries, education and outreach, recreation and tourism, research, and sanctuary operations. NOAA worked closely with local and state governmental partners, including a State Agency Working Group, consisting of the Wisconsin Historical Society, Wisconsin Department of Natural Resources, Wisconsin Coastal Management Program, Wisconsin Department of Transportation, Wisconsin Department of Tourism, Wisconsin Public Service Commission, and the Wisconsin Public Lands Commission.

The WLMNMS DMP four action plans each include background information on resource management issues and an overview of the direction the sanctuary will take to address management needs. The goals for each action plan are summarized and the strategies describe how the goals will be accomplished for a particular issue or program area.

Resource Protection Action Plan

Description

The purpose of this action plan is to strengthen resource protection by conducting on-water resource protection activities, promoting responsible use of sanctuary resources, developing education initiatives, and enhancing enforcement efforts.

Background

Sanctuary resources include all archaeological, historical, cultural, and geographical materials and locations, that are located within the sanctuary boundaries, and are associated with or representative of earlier people, cultures, and human activities. This includes, but is not limited to, all shipwrecks and related components, aircraft, prehistoric sites, and isolated archaeological material and sites.

Natural and human processes can threaten the long-term sustainability of Wisconsin's shipwrecks and other underwater cultural resources. While the effects of natural processes such as ice or invasive mussel damage on shipwrecks will be studied using strategies found in the Research Action Plan, the Resource Protection Action Plan is designed to assess and reduce human impacts on sanctuary resources. In practice, the two plans will be highly integrated. Human activities have the greatest potential for harming shipwrecks and other underwater cultural resources. These activities include anchoring, inadvertent and intentional diving practices that damage resources, and looting. The sanctuary encourages public access to its resources and strives to balance increased visitation with resource management and preservation.

Adopting sanctuary regulations that complement and enhance current State of Wisconsin underwater cultural resource regulations is a fundamental resource protection activity. During the multi-year designation process, NOAA and its state partners developed underwater cultural-specific regulations to ensure protection of nationally significant resources in the Proposed WLMNMS. These regulations are referenced throughout the Draft Management Plan. The full text of NOAA's proposed regulations can be found in this document's appendix.

Goal

Strengthen resource protection in the Proposed WLMNMS through resource-specific initiatives and compliance with sanctuary regulations, while increasing public access.

Objectives

- Better understand recreational use patterns and the effects of users on the resources.
- Increase public access and awareness while promoting and facilitating responsible use of sanctuary resources.
- Establish interagency collaboration for enforcement, including on-water and interpretive enforcement, as a resource protection tool.

Strategies

STRATEGY RP-1: Produce baseline assessment of recreational use of sanctuary resources.

Activity 1.1: Work with partners such as the NOAA National Centers for Coastal Ocean Science (NCCOS) to establish current recreational activities and use patterns in the sanctuary.

- A. Complete NCCOS-funded socioeconomic baseline study.
- B. Work with dive charters, similar businesses, and state partners to document recreational use of sanctuary resources.
- C. Collaborate with enforcement partners to document recreational use of sanctuary resources.

STRATEGY RP-2: Develop and begin implementation of a systematic monitoring program for shipwrecks and other underwater cultural resources.

Activity 2.1: In collaboration with state and public partners, develop a five year plan for monitoring sanctuary shipwrecks to address human and natural impacts.

- A. Assess and collate available baseline data on sanctuary shipwrecks.
- B. Establish monitoring criteria.
- C. Develop a phased, five year monitoring plan.

STRATEGY RP-3: Develop a shipwreck mooring program to protect sites from anchor damage and facilitate public access.

Activity 3.1: Enhance and expand state-maintained shipwreck moorings.

- A. Building on WHS mooring program, develop and begin implementation of a five-year plan for design, installation and maintenance of mooring buoy system, including priorities for which shipwrecks to buoy.
- B. Develop and implement an operational plan for annual redeployment and maintenance of existing buoys.
- C. Work with local dive charters to monitor moorings throughout the dive season.

STRATEGY RP-4: Increase and encourage access and responsible use of sanctuary resources by fostering greater awareness among recreational users.

Activity 4.1: Provide practical information for users such as shipwreck locations and information, access points, regulations, and contact information.

- A. Develop outreach materials, web, and mobile device-based information for recreational users of sanctuary resources.
- B. Provide information about shipwrecks, sanctuary regulations, and enforcement contact information at marinas, boat ramps, and other access points.
- C. Explore ways to improve public access to sanctuary resources for kayakers and snorkelers.

STRATEGY RP-5: Develop a plan to increase awareness of sanctuary regulations and state law, and to enhance law enforcement efforts.

Activity 5.1: Create an outreach campaign aimed at creating public awareness of sanctuary regulations.

- A. Develop user-friendly web pages that foster awareness, appreciation, and value of sanctuary resource protection regulations.
- B. Develop digital and hardcopy materials to support public outreach.
- C. In collaboration with state and local stakeholders, develop innovative, low cost methods of broadening public awareness and appreciation of sanctuary regulations (i.e. public presentations, shared media opportunities, etc.).
- D. Develop and implement a strategy to work directly with business owners (dive charters, dive shops, outfitters, etc.) that interact directly with sanctuary resources.
- E. Make presentations on the sanctuary's management at diving industry trade shows and other relevant events that have concentrations of core sanctuary users.

Activity 5.2: Ensure sufficient patrol presence in the sanctuary through partnerships and interagency coordination.

- A. Develop agreements with the U.S. Coast Guard, NOAA Office of Law Enforcement, and state agencies for enforcement of sanctuary regulations.
- B. Provide information to law enforcement personnel on interpretive enforcement.
- C. Develop outreach materials for enforcement officers to distribute while patrolling the sanctuary.
- D. Develop an interagency communication and response plan.

Requirements

The sanctuary's ability to fully implement the management plan will be dependent on the realities of funding and other resources over the initial five-year period. Full implementation of these action plans is dependent on continued support from state and federal funding, grants, donations, staffing, and contributions from partners.

Education and Outreach Action Plan

Description

The purpose of this action plan is to enhance public awareness, understanding, and stewardship of the sanctuary, the Great Lakes, and the oceans.

Background

Sanctuary education and outreach programs are designed to raise public awareness about the sanctuary and its resources, encourage public involvement in resource protection, increase knowledge about Great Lakes maritime heritage, and expand ocean, climate and Great Lakes literacy. Education and outreach includes both formal and informal programs for learners of all ages including students, teachers, sanctuary visitors, and constituents, including user groups impacting sanctuary resources.

The sanctuary will use education and outreach as a tool to address specific priority issues identified in the management plan. Education is essential to achieving many of the sanctuary's management objectives and will be used to both complement and promote resource protection and research programs.

Goal

Provide educational opportunities that promote understanding, appreciation, and involvement in the protection and stewardship of sanctuary resources, the Great Lakes, and the oceans.

Objectives

- Provide leadership in assessing educational needs and interests of residents, local, regional and statewide schools, and visitors to the proposed sanctuary.
- Develop or adopt existing sanctuary education and outreach programs and begin initial implementation of programs that complement and promote sanctuary resource protection and stewardship including expanding existing sanctuary programs from other sites.
- In collaboration with WHS, develop and begin initial implementation of education programs that promote awareness and understanding of sanctuary resources and Wisconsin's maritime heritage.
- Develop and begin initial implementation of education programs and partnerships that promote awareness and interaction with the National Marine Sanctuary System and NOAA.
- Encourage the involvement of volunteers to help foster understanding and participation in the protection and stewardship of sanctuary resources.

Strategies

STRATEGY ED-1: Increase awareness and knowledge of the sanctuary through education and outreach programs.

Activity 1.1: Develop a plan to begin offering sanctuary content to elementary, secondary, and higher education teachers and students.

- A. Working with educational partners and WHS, develop a five-year plan that identifies areas for integrating NOAA and sanctuary content into school curricula.
- B. Promote and coordinate consistency of sanctuary education materials with state of Wisconsin Academic Standards.
- C. Facilitate trainings and workshops for educators, leveraging NOAA resources as possible.
- D. Conduct sanctuary-related educational programs for regional schools.

Activity 1.2: Develop or adopt existing sanctuary maritime heritage education programs, outreach and exhibits for use in museums, visitor centers, and outdoor venues.

- A. Working with educators and community and state partners, develop a five-year plan that identifies initial areas of NOAA collaboration at museums and visitor center locations in sanctuary communities.
- B. Identify grant and other funding opportunities that will help establish a sanctuary interpretive presence in local partner venues.
- C. Leverage existing partnerships to facilitate use of tallship *Denis Sullivan* throughout sanctuary as a mobile, on-water classroom and sanctuary flagship.
- D. Develop shipboard education programs and seek new shipboard education partners and opportunities.
- E. Conduct sanctuary-related presentations at museums, visitor centers, and other relevant locations within sanctuary communities.

Activity 1.3: Facilitate distance learning with Wisconsin museums and other locations state-wide.

- A. Work in conjunction with ONMS distance learning program or social media campaign, such as Earth Is Blue to create, showcase, and distribute curriculum and multimedia content from around NOAA and the sanctuary system.
- B. Collaborate with Thunder Bay NMS, WHS, and other partners on joint distance learning projects.

Activity 1.4: Promote marine technology as a way to enhance STEM education

- A. Leveraging experience and assistance from Thunder Bay NMS and other marine sanctuaries, foster awareness and participation in the Marine Advanced Technology Education Center's (MATE) remotely operated vehicle competition.
- B. In cooperation with local educators develop a strategy for engaging mentors and students in MATE competition.
- C. Host relevant workshops for educators and mentors.

STRATEGY ED-2: Enhance sanctuary communications to create greater awareness.

Activity 2.1: Develop a communications plan.

Activity 2.2: Create and leverage local, regional, and national media contacts.

Activity 2.3: - Develop content for proposed sanctuary's website and social media to provide quality, up-to-date information about the sanctuary.

Activity 2.4: Sponsor, organize, and participate in outreach opportunities that promote the sanctuary's mission and that allow for dissemination of sanctuary information.

Requirements

The sanctuary's ability to fully implement the management plan will be dependent on the realities of funding and other resources over the initial five-year period. Full implementation of these action plans is dependent on continued support from state and federal funding, grants, donations, staffing, and contributions from partners.

Research Action Plan

Description

The purpose of this action plan is to outline the sanctuary's research objectives and priorities. Sanctuary research is conducted in support of resource protection, resource management, and education initiatives. The action plan is intended to guide the proposed sanctuary as well as working with potential sanctuary partners.

Background

Developing knowledge of the sanctuary's underwater cultural resources through research will be a primary function of proposed sanctuary, and will build off decades of research by the WHS, avocational groups, and private individuals. Since 1988 the WHS has actively inventoried and documented the state's underwater cultural heritage, evolving to one of the nation's most respected state underwater archaeology programs.

Sanctuary resources include all archaeological, historical, cultural, and geographical materials and locations, that are located within the sanctuary boundaries, and are associated with or representative of earlier people, cultures, and human activities. This includes, but is not limited to, all shipwrecks and related components, aircraft, prehistoric sites, and isolated archaeological material and sites. It is anticipated that staff will conduct, support, promote, and coordinate all research with an aim toward sanctuary characterization. Characterization is the process through which sanctuary resources are inventoried, located, documented, and ultimately analyzed within a broader historical and archaeological context. Knowledge acquired through research is used to evaluate existing management practices,

enhance future management decisions, and educate the public about the importance of the Great Lakes and their history.

Characterization of the sanctuary begins with a historical inventory of potential underwater cultural located in and around the sanctuary. Physically locating underwater cultural resource sites is the next step in sanctuary characterization. Finally, documentation is perhaps the most intense and important aspect of the sanctuary's characterization efforts. Archaeological documentation provides baseline data to evaluate the current state of preservation, and can identify threats to sites, such as invasive mussels, ice and anchor damage, looting, and other intentional and unintentional human impacts.

Goal

Protect the proposed sanctuary's resources and maritime landscape by inventorying, locating, documenting, assessing, managing, and interpreting the sanctuary's archaeological, historical, and environmental resources.

Objectives

- Characterize the sanctuary's underwater cultural resources.
- Develop and encourage collaborative research programs to meet the sanctuary's on-going management needs.

Strategies

STRATEGY R-1: Characterize the sanctuary's underwater cultural resources and landscape features.

Activity 1.1: Conduct historical and archival research on underwater cultural resources and landscape features in and around the sanctuary.

- A. Research and compile historical documentation relevant to sanctuary resources, including vessel enrollment and registration documents, court records, insurance files, and regional newspapers.
- B. Maintain files and databases on potential shipwrecks and other underwater cultural resources within the sanctuary.
- C. Coordinate archival research and databases with Wisconsin Historical Society.
- D. Collaborate with State of Wisconsin to write National Register of Historic Places nominations; explore a NRHP district nomination for the sanctuary.

Activity 1.2: Conduct systematic remote sensing and visual surveys to locate and identify underwater cultural resources and landscape features in the sanctuary.

- A. Define survey requirements for characterization.
- B. Disseminate research results to professional and public audiences.

- C. Complete National Centers for Coastal Ocean Science led environmental assessment and mapping project; leverage project to increase longer-term remote sensing capacity.

Activity 1.3: Prioritize archaeological documentation of identified underwater cultural resources to establish baseline data for long-term monitoring.

- A. In collaboration with State of Wisconsin, determine priorities for shipwreck and archaeological site research and documentation.
- B. Complete baseline documentation of prioritized shipwrecks and archaeological sites including site plans, underwater video, still imagery, and photo-mosaics.
- C. Disseminate research results to professional and public audiences in a timely manner.

Activity 1.4: Build on the State and Wisconsin Sea Grant's Geographical Information System (GIS) for archaeological, historical, and geographical data management and dissemination.

STRATEGY R-2: Develop partnerships with local, state, national, and international researchers and organizations to enhance research programs.

Activity 3.1: Develop partnerships that accelerate characterization of the sanctuary's underwater cultural resources.

Activity 3.2: Develop partnerships with multi-disciplinary researchers and organizations to facilitate characterization of the sanctuary's natural environment.

Activity 3.3: In support of sanctuary condition report and ONMS Sentinel Site initiative, facilitate the study of Great Lakes ecology including the study of climate change, invasive species, lake biology, geology, and water quality.

Requirements

The sanctuary's ability to fully implement the management plan will be dependent on the realities of funding and other resources over the initial five-year period. Full implementation of these action plans is dependent on continued support from state and federal funding, grants, donations, staffing, and contributions from partners.

Sanctuary Operations and Administration Action Plan

Description

The purpose of this action plan is to create sanctuary infrastructure, staffing and program support to ensure effective implementation of the Management Plan.

Background

The WLMNMS will be established to preserve and protect the region's unique and irreplaceable underwater cultural resources. Protecting these resources will require appropriate facilities and vessels, trained personnel and volunteers, funding and partnerships, and an extensive array of specialized equipment. Developing an effective and sustainable infrastructure will be a major focus of the sanctuary.

The Office of National Marine Sanctuaries, the State of Wisconsin, and local communities will work together to support the functions of the proposed sanctuary. The roles and responsibilities that NOAA and the state will have in sanctuary management will be identified in a Memorandum of Understanding (MOU). The overarching purpose of the MOU is to provide the mechanism for coordination of the efforts of NOAA and the state to meet the common commitment to protect and manage sanctuary resources. Additionally, the Programmatic Agreement will describe the roles and responsibilities of the federal and state government in the permit review process. The documents are included in the Appendix.

Establishing a Sanctuary Advisory Council will be an essential component of the management plan. Advisory council members will represent the community's different interests, including local government, education, maritime history and interpretation, fishing, diving, tourism, economic development, industry, and the community-at-large. Advisory council members serve as liaisons between their constituents and the sanctuary, keeping sanctuary staff informed of issues and concerns and performing outreach to their respective constituents on the sanctuary's behalf.

Finally, the sanctuary will benefit immensely from partnerships within NOAA and non-governmental organizations, private businesses, education and cultural institutions, community groups, private citizens, and local, state, and federal agencies. The sanctuary will develop these partnerships to create or improve a number of essential capacities, including research vessels and equipment, administrative space, law enforcement, and education and outreach.

Goal

Ensure sanctuary operations and administrative capabilities are sufficient to effectively and safely implement the sanctuary's mission.

Objectives

- Ensure necessary sanctuary infrastructure.
- Create a "NOAA presence" within sanctuary communities
- Secure funding to support sanctuary operations and programs.
- Build staffing and enhance program support through partnerships and volunteers.

Strategies

STRATEGY SO-1: Develop a “NOAA presence” within sanctuary communities that supports the sanctuary’s mission and infrastructure needs, and that recognizes, leverages, and complements individual assets in sanctuary communities.

Activity 1.1: Conduct an infrastructure and operations requirements evaluation.

- A. In cooperation with sanctuary communities, develop a strategic plan for creating a “NOAA presence” in each community, to include infrastructure, research, education, and outreach considerations.

STRATEGY SO-2: Develop infrastructure for research vessels, equipment and field operations.

Activity 2.1: Work with NOAA’s Great Lakes Environmental Research Laboratory to safely and efficiently meet the sanctuary’s research vessel and research equipment needs.

- A. Conduct a needs assessment for the WLMNMS vessel operations requirements, including research vessels, research equipment, staffing, and maintenance requirements.

STRATEGY SO-3: Hire staff to support sanctuary operations, resource protection, education and outreach, and research programs.

Activity 3.1: Identify initial sanctuary staffing needs and hire appropriate staff.

- A. Hire a full-time education and outreach specialist.
- B. Hire a full-time research, programs, and operations coordinator.
- C. Seek ways to share staff time, particularly agency-wide administrative duties, with Thunder Bay NMS and ONMS Northeast and Great Lakes Region.
- D. Leverage internships where possible.

Activity 3.5: Provide staff with opportunities and resources for professional development training.

STRATEGY SO-4: Establish a Sanctuary Advisory Council.

Activity 5.1: Acknowledging the geographical expanse and diverse communities of the sanctuary, develop an appropriate sanctuary advisory council structure.

- A. Create a Sanctuary Advisory Council charter.
- B. Provide support, training, resources, and guidance to help the advisory council engage and educate the public about sanctuary management issues.
- C. Strengthen the structure of the advisory council by evaluating and amending the advisory council’s charter when needed and developing strategies to enhance the council’s participation and effectiveness.

STRATEGY SO-5: Establish a sanctuary volunteer program.

- A. Attract, train, utilize, recognize, and retain volunteers to support and enhance sanctuary programs.
- B. Develop volunteer handbook with policies and opportunities for volunteers.

Requirements

The sanctuary's ability to fully implement the management plan will be dependent on the realities of funding and other resources over the initial five-year period. Full implementation of these action plans is dependent on continued support from state and federal funding, grants, donations, staffing, and contributions from partners.

DMP Appendices

DMP Appendix 1: Proposed WLMNMS Regulations

DMP Appendix 2: Potential sanctuary operating budgets and partner contributions.

DMP Appendix 1: Proposed WLMNMS Regulations

SUBPART T – WISCONSIN - LAKE MICHIGAN NATIONAL MARINE SANCTUARY

§ 922.210 Boundary.

The Wisconsin – Lake Michigan National Marine Sanctuary consists of an area of approximately 812 square nautical miles (nmi²) (1,075 sq. mi) of Lake Michigan waters within the state of Wisconsin and the submerged lands thereunder, over, around, and under the submerged underwater cultural resources in Lake Michigan. The precise boundary coordinates are listed in appendix A to this subpart. The eastern boundary of the sanctuary begins approximately 9.5 miles east of the Wisconsin shoreline in Lake Michigan at Point 1 roughly on the border between Manitowoc and Kewaunee County. From this point the boundary continues SSW in a straight line to Point 2 and then SW to Point 3 at roughly the border between Ozaukee and Milwaukee County. From this point the boundary continues west towards Point 4 until it intersects the shoreline at the ordinary high water mark near Mequon, WI. From this intersection the boundary continues north following the shoreline cutting across the mouths of creeks and streams until it intersects the line segment formed between Point 5 and Point 6 at the end of the southern breakwater at the mouth of Sauk Creek at Port Washington. From this intersection the boundary continues across the river mouth towards Point 6 until it intersects the shoreline at the ordinary high water mark at the end of the northern breakwater. From this intersection the boundary continues north following the shoreline until it intersects the line segment formed between Point 7 and Point 8 at the end of the southern breakwater at the mouth of the Sheboygan River. From this intersection the boundary continues across the river mouth towards Point 8 until it intersects the shoreline at the ordinary high water mark at the end of the northern breakwater. From this intersection the boundary continues north along the shoreline until it intersects the line segment formed between Point 9 and Point 10 at the end of the southern breakwater at the mouth of Manitowoc Harbor. From this intersection the boundary continues across the harbor mouth towards Point 10 until it intersects the shoreline at the ordinary high water mark at the end of the northern breakwater. From this intersection the boundary continues north following the shoreline until it intersects the line segment formed between Point 11 and Point 12 at the end of the western breakwater at the mouth of East Twin River. From this intersection the boundary continues across the river mouth towards Point 12 until it intersects the shoreline at the ordinary high water mark at the end of the eastern breakwater. From this intersection the boundary follows the shoreline NE around Rawley Point and then NNW until it intersects the line segment formed between Point 13 and Point 14 along the shoreline at approximately the border between Manitowoc and Kewaunee County near Twin Creeks, WI. Finally, from this intersection the boundary moves east across Lake Michigan to Point 14.

§ 922.211 Definitions.

- (a) The following terms are defined for purposes of Subpart T:
- Sanctuary resource means all prehistoric, historic, archaeological, and cultural sites and artifacts within the sanctuary boundary, including but not limited to, all shipwrecks and related components.
 - Shipwreck site means any sunken watercraft, its components, cargo, contents, and associated debris field.

(b) All other terms appearing in the regulations in this subpart are defined at 15 CFR 922.3, and/or in the Marine Protection, Research, and Sanctuaries Act, as amended, 33 U.S.C. 1401 et seq., and 16 U.S.C. 1431 et seq.

§ 922.212 Co-Management.

NOAA has primary responsibility for the management of the Sanctuary pursuant to the Act. However, as the Sanctuary is in state waters, NOAA will co-manage the Sanctuary in collaboration with the State of Wisconsin. The Director may enter into a Memorandum of Understanding regarding this collaboration that may address, but not be limited to, such aspects as areas of mutual concern, including Sanctuary resource protection, programs, permitting, activities, development, and threats to Sanctuary resources.

§ 922.213 Prohibited or otherwise regulated activities.

(a) Except as specified in paragraph (b) of this section, the following activities are prohibited and thus are unlawful for any person to conduct or to cause to be conducted:

(1) Moving, removing, recovering, altering, destroying, possessing, or otherwise injuring, or attempting to move, remove, recover, alter, destroy, possess or otherwise injure a sanctuary resource.

(2) Grappling into or anchoring on shipwreck sites.

(3) Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the Act or any regulation or any permit issued under the Act.

(b) The prohibitions in paragraphs (a) (1) through (3) of this section do not apply to any activity necessary to respond to an emergency threatening life, property or the environment; or to activities necessary for valid law enforcement purposes.

§ 922.214 Emergency regulations.

(a) Where necessary to prevent or minimize the destruction of, loss of, or injury to a Sanctuary resource, or to minimize the imminent risk of such destruction, loss, or injury, any and all activities are subject to immediate temporary regulation, including prohibition. An emergency regulation shall not take effect without the approval of the Governor of Wisconsin or her/his designee or designated agency.

(b) Emergency regulations remain in effect until a date fixed in the rule or six months after the effective date, whichever is earlier. The rule may be extended once for not more than six months.

§ 922.215 Permit procedures and review criteria.

(a) Authority to issue general permits. The Director may allow a person to conduct an activity that would otherwise be prohibited by this subpart, through issuance of a general permit, provided the applicant complies with:

(1) The provisions of subpart E; and

(2) The relevant site specific regulations appearing in this subpart.

(b) Sanctuary general permit categories. The Director may issue a sanctuary general permit under this subpart, subject to such terms and conditions as he or she deems appropriate, if the Director finds that the proposed activity falls within one of the following categories:

- (1) Research - activities that constitute scientific research on or scientific monitoring of national marine sanctuary resources or qualities;
 - (2) Education - activities that enhance public awareness, understanding, or appreciation of a national marine sanctuary or national marine sanctuary resources or qualities;
 - (3) Management - activities that assist in managing a national marine sanctuary.
- (c) Review criteria. The Director shall not issue a permit under this subpart, unless he or she also finds that:
- (1) The proposed activity will be conducted in a manner compatible with the primary objective of protection of national marine sanctuary resources and qualities, taking into account the following factors:
 - (i) the extent to which the conduct of the activity may diminish or enhance national marine sanctuary resources and qualities; and
 - (ii) any indirect, secondary or cumulative effects of the activity.
 - (2) It is necessary to conduct the proposed activity within the national marine sanctuary to achieve its stated purpose;
 - (3) The methods and procedures proposed by the applicant are appropriate to achieve the proposed activity's stated purpose and eliminate, minimize, or mitigate adverse effects on sanctuary resources and qualities as much as possible;
 - (4) The duration of the proposed activity and its effects are no longer than necessary to achieve the activity's stated purpose;
 - (5) The expected end value of the activity to the furtherance of national marine sanctuary goals and purposes outweighs any potential adverse impacts on sanctuary resources and qualities from the conduct of the activity;
 - (6) The applicant is professionally qualified to conduct and complete the proposed activity;
 - (7) The applicant has adequate financial resources available to conduct and complete the proposed activity and terms and conditions of the permit;
 - (8) There are no other factors that would make the issuance of a permit for the activity inappropriate.

§ 922.216 Certification of preexisting leases, licenses, permits, approvals, other authorizations, or rights to conduct a prohibited activity.

- (a) A person may conduct an activity prohibited by § 922.213(a)(1) through (3) if such activity is specifically authorized by a valid Federal, state, or local lease, permit, license, approval, or other authorization, or tribal right of subsistence use or access in existence prior to the effective date of sanctuary designation and within the sanctuary designated area and complies with § 922.49 and provided that the holder of the lease, permit, license, approval, or other authorization complies with the requirements of paragraph (e) of this section.
- (b) In considering whether to make the certifications called for in this section, the Director may seek and consider the views of any other person or entity, within or outside the Federal government, and may hold a public hearing as deemed appropriate.
- (c) The Director may amend, suspend, or revoke any certification made under this section whenever continued operation would otherwise be inconsistent with any terms or conditions of the certification.

Any such action shall be forwarded in writing to both the holder of the certified permit, license, or other authorization and the issuing agency and shall set forth reason(s) for the action taken.

(d) Requests for findings or certifications should be addressed to the Director, Office of National Marine Sanctuaries; ATTN: Sanctuary Superintendent, Wisconsin - Lake Michigan National Marine Sanctuary, 1305 East West Hwy, 11th Floor, Silver Spring, MD 20910. A copy of the lease, permit, license, approval, or other authorization must accompany the request.

(e) For an activity described in paragraph (a) of this section, the holder of the authorization or right may conduct the activity prohibited by § 922.213 (a)(1) through (3) provided that:

(1) The holder of such authorization or right notifies the Director, in writing, within 180 days of the effective date of Sanctuary designation, of the existence of such authorization or right and requests certification of such authorization or right;

(2) The holder complies with the other provisions of this section; and

(3) The holder complies with any terms and conditions on the exercise of such authorization or right imposed as a condition of certification, by the Director, to achieve the purposes for which the Sanctuary was designated.

(f) The holder of an authorization or right described in paragraph (a) of this section authorizing an activity prohibited by § 922.213 may conduct the activity without being in violation of applicable provisions of § 922.213, pending final agency action on his or her certification request, provided the holder is otherwise in compliance with this section.

(g) The Director may request additional information from the certification requester as he or she deems reasonably necessary to condition appropriately the exercise of the certified authorization or right to achieve the purposes for which the Sanctuary was designated. The Director must receive the information requested within 45 days of the postmark date of the request. The Director may seek the views of any persons on the certification request.

(h) The Director may amend any certification made under this section whenever additional information becomes available that he/she determines justifies such an amendment.

(i) Upon completion of review of the authorization or right and information received with respect thereto, the Director shall communicate, in writing, any decision on a certification request or any action taken with respect to any certification made under this section, in writing, to both the holder of the certified lease, permit, license, approval, other authorization, or right, and the issuing agency, and shall set forth the reason(s) for the decision or action taken.

(j) The holder may appeal any action conditioning, amending, suspending, or revoking any certification in accordance with the procedures set forth in § 922.50.

(k) Any time limit prescribed in or established under this section may be extended by the Director for good cause.

DMP Appendix 2: Potential sanctuary operating budgets and partner contributions.

The potential operating budget below is an estimate to show options for activities that can be funded at varying levels. The base level of operations characterized below can be executed within existing funds without any negative impact on the National Marine Sanctuary System as a whole. In this table each column's list of activities for a given funding level also includes all activities from preceding columns. The operating budget each year for the proposed sanctuary would be contingent on several factors including the overall operation budget for ONMS and spending priorities determined by ONMS and NOAA. In addition, the budget may also include "construction" funds to support infrastructure capital and maintenance. These would be contingent on factors similar to the operational funds.

\$250,000	\$500,000	\$600,000	\$750,000	\$900,000
Sanctuary designation	Hire Program and Operations Coordinator	Hire Education Coordinator, Research Coordinator, or Resource Protection Coordinator	Hire Education Coordinator, Research Coordinator, or Resource Protection Coordinator	Hire Education Coordinator, Research Coordinator, or Resource Protection Coordinator
Establish Sanctuary Advisory Council (SAC)	Hire Education Coordinator, Research Coordinator, or Resource Protection Coordinator	Continue to implement management plan priorities	Implement prioritized aspects "NOAA Presence" plan and related infrastructure	Full implementation of "NOAA Presence" plan
Establish administrative office(s) (could be temporary)	Fully operational SAC	Continue interpretive/recreation/tourism/ co-branding opportunities via "NOAA Presence" plan	Continue to implement management plan priorities	Full implementation of Management Plan
Hire Sanctuary Superintendent	Continue to implement management plan priorities	Continue fundraising for interpretive projects	Expand resource protection, education, and research programs	Initiate review of management plan with partners, community and SAC
With partners, develop a strategic plan for creating a "NOAA presence" in each community, to include infrastructure, research, education, and outreach considerations	Begin interpretive/recreation/tourism/ co-branding opportunities via "NOAA Presence" plan	Expand education program: STEM and MATE ROV initiatives	Begin Sanctuary Condition Report	Finalize Sanctuary Condition Report
	Establish volunteer program			

\$250,000	\$500,000	\$600,000	\$750,000	\$900,000
Establish resource protection program, focus on mooring buoy initiative; initiate Law Enforcement collaborations	Establish local sanctuary foundation Expand resource protection: additional moorings	Expand resource protection: additional moorings, establish monitoring		
Establish education program/partners hips, evaluate opportunities	Expand education program: create programming for partner venues	Expand research program: continue mapping, accelerate characterization		
Establish research program/partners hips, begin sanctuary characterization	Expand research program: mapping, accelerate characterization, GIS			
Develop/expand programs to enhance awareness and interpretation of Sanctuary and resources	In partnership with GLERL, acquire trailerable research vessel, conduct broader vessel/research needs assessment			

Partner Contributions

As indicated in the sanctuary nomination package, the State of Wisconsin, through the Wisconsin Historical Society, Wisconsin Coastal Management Program, Wisconsin Department of Natural Resources, Wisconsin Department of Tourism, and other state agencies, are committed partners in ensuring that the proposed Wisconsin-Lake Michigan National Marine Sanctuary reaches its full potential. Areas of collaboration that will supplement and complement federal funding include research, resource protection, law enforcement, co-writing and obtaining grant funding, marketing, and tourism.

Additionally, the communities of Two Rivers, Manitowoc, Sheboygan, Port Washington, and Mequon, are firmly committed to the sanctuary's success. Each community offers unique local

maritime infrastructure components that would significantly complement sanctuary management, public outreach, education, and tourism efforts. This includes harbors and dock space, developable lake and riverside land, and available water side office space. These coastal communities share a common interest in protecting Lake Michigan, are committed to linking their downtowns to Lake Michigan and the sanctuary, and continue to invest in Lake Michigan for tourism and recreation. Located along the highly-traveled I-43 corridor, these communities have experienced tourism organizations that will benefit the sanctuary, while their educational and cultural institutions can help with programming. Key institutions identified in the nomination include the Wisconsin Maritime Museum, Port Exploreum, Spaceport Sheboygan, and the Rogers Street Fishing Village.

Federal partners, such as the Office of Coast Survey and the National Centers for Coastal Ocean Science, will be important partners in ensuring full implementation of the sanctuary's management plan, and, in fact, are supporting the designation. Similarly, regional and nationwide university partners will help the sanctuary meet research and resource protection goals, contribute to securing grant funding, and possibly support sanctuary infrastructure. Notably, the University of Wisconsin Sheboygan and Manitowoc campuses have already contributed office and administrative support to the designation effort.

APPENDIX B

References

- Black, M.G., D.F. Reid, S.J. Nichols, S. Hautau, G.W. Kennedy. 2000. Impacts of zebra mussel infestations on the shipwrecks of Thunder Bay, Lake Huron. *Diving for Science in the 21st Century*. 16pp.
- Burnett, A.W., M.E. Kirby, H.T. Mullins, and W.P. Patterson. 2003. Increasing Great Lake-effect snowfall during the twentieth century: A regional response to global warming? *J. Climate* 16:3535–3542.
- Cooper, David J. and Paul Kriesa. 1990. Great Lakes Shipwrecks of Wisconsin: The Early Industries: Fishing, Lumber, Mining, and Agricultural, 1800-1930; Settlement, 1800-1930; and Package Freight, 1830-1940, Multiple Property Documentation for Wisconsin's submerged shipwrecks.
- General Accounting Office. 1992. Military Training: Unexploded Ordnance Found in Lake Michigan, Defense Technical Information Center, 1992. Report to the Honorable F. James Sensenbrenner, House of Representatives, General Accounting Office.
- Gronewold, A.D., V. Fortin, B. Lofgren, A. Clites, C.A. Stow, and F. Quinn. 2013. Coasts, Water Levels, and Climate Change: A Great Lakes Perspective. *Climatic Change* 120:697–711.
- Jensen, John O. and Philip Hartmeyer. 2014. A Cultural Landscape Approach Overview and Sourcebook for Wisconsin's Mid-Lake Michigan Maritime Heritage Trail Region, 2014.
- Kanoshima, I., L. Urmas, and J.-M. Leppanen. 2003. The Influence of Weather Conditions (temperature and wind) on Cyanobacterial Bloom Development in the Gulf of Finland (Baltic Sea). *Harmful Algae* 2:29–41.
- Meverden, Keith N. and Tamara Thomsen. 2008. Wisconsin's Historic Shipwrecks: An Overview and Analysis of Locations for a State/Federal Partnership with the National Marine Sanctuary Program.
- Rahel, F.J., and J.D. Olden. 2008. Assessing the effects of climate change on aquatic invasive species. *Conserv. Biol.* 22(3):521–533.
- The Nature Conservancy. 2012. Lake Michigan Biodiversity Conservation Strategy.
- U.S. Department of Commerce, Bureau of the Census. <http://www.census.gov>

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Information System. [Http://www.bea.gov/regional/downloadzip.cfm](http://www.bea.gov/regional/downloadzip.cfm)

U.S. Department of Labor, Bureau of Labor Statistics, Consumer Price Index. <http://data.bls.gov/cgi-bin/surveymost>

U.S. Department of Labor, Unemployment. <http://www.bls.gov/data/#unemployment>

Watzin, M.C., A.B. Cohn, B.P. Emerson. 2001. Zebra mussels, shipwrecks, and the environment, final report. University of Vermont, School of Natural Resources. 55pp. Electronic document available from: www.history.navy.mil/branches/UA_ZebraMussels.pdf

Wisconsin Department of Natural Resources. 2015. The Ecological Landscapes of Wisconsin: an Assessment of Ecological Resources and a Guide to Planning Sustainable Management. Wisconsin Department of Natural Resources, PUB-SS-1131 2015, Madison.

Wisconsin Department of Natural Resources. 2015. Lake Michigan Integrated Fisheries Management Plan, 2015-2024, Public Discussion Draft.

Wisconsin Department of Natural Resources. Wisconsin's Great Lakes Beach Monitoring & Notification Program. <http://dnr.wi.gov/topic/beaches/>

Woods and Poole Economics Inc., 2016. <https://www.woodsandpoole.com/>

Wisconsin Shipwrecks. <http://www.wisconsinshipwrecks.org/attraction/MidLakeMichigan>

Wisconsin Statewide Comprehensive Outdoor Recreation Plan. <http://dnr.wi.gov/topic/parks/planning/scorp/>



NATIONAL MARINE
SANCTUARIES

AMERICA'S UNDERWATER TREASURES