Office of National Marine Sanctuaries
National Oceanic and Atmospheric Administration

Time and Tide

A History of the National Marine Sanctuary System

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National Oceanic and Atmospheric Administration
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1st Edition, 2022

Cover Image: The shoreline of Greater Farallones National Marine Sanctuary. Image: Jennifer Stock/NOAA.

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Dedication

The National Marine Sanctuary System is the result of the dedication, passion, and effort of hundreds of staff, thousands of partners and volunteers, and millions of supporters. This book is dedicated, with gratitude, to all of them, but especially to the NOAA friends, colleagues, and champions we lost far too early:

Ted Beuttler	Helen Golde	Amy B. Massey
Stephanie Campbell	Hoku Johnson	Greg McFall
Douglas R. Cooper	Lindy Johnson	Paul D. Moen
Alex Creedon	Noel Kartman	Luke Nachbar
Thor Dunmire	Brian Keller	Mike Overfield
Nancy Foster	Rusty Mason	Liz Love Reisenbichler

Out of the rolling ocean, the crowd, came a drop gently to me,
Whispering, I love you, before long I die,
I have travel'd a long way, merely to look on you, to touch you,
For I could not die till I once look'd on you,
For I fear'd I might afterward lose you.

Out of the Rolling Ocean, the Crowd
Walt Whitman, 1865

Introduction:
Our Best Ocean Idea

The beginnings of the National Marine Sanctuary System were distinctly without fanfare. About 50 years ago, approximately nine months before the Watergate scandal dominated the news, President Richard Nixon spent part of an October week signing 38 bills passed by Congress. The Marine Protection, Research, and Sanctuaries Act (MPRSA) was among them, signed on October 23, 1972. There are no known photos of the president signing it and his signing remarks called out the ocean dumping portion of the MPRSA, but made no mention of Title III, which authorized the creation of a marine sanctuary program. Title III itself was a bitterly debated, last minute addition in committee conferences between the House and Senate as they hashed out differences in competing bills. But the act was quietly revelatory. It was, and remains, the only authority to address marine conservation in U.S. waters from a holistic, ecosystem perspective.

> *In formulating the marine sanctuary provision, the Congress provided a powerful tool for conservation and protection of some of the Nation's more valuabl marine areas. This legislation offers potential for development of a landmark program, analogous to well-established Federal programs that are already providing protection to some of our outstanding terrestrial areas such as national parks, national seashores, national wildlife refuges, wild and scenic rivers, and wilderness areas...*
>
> Commerce Secretary John K. Tabor in a 1974 letter to Speaker of the House Carl Albert

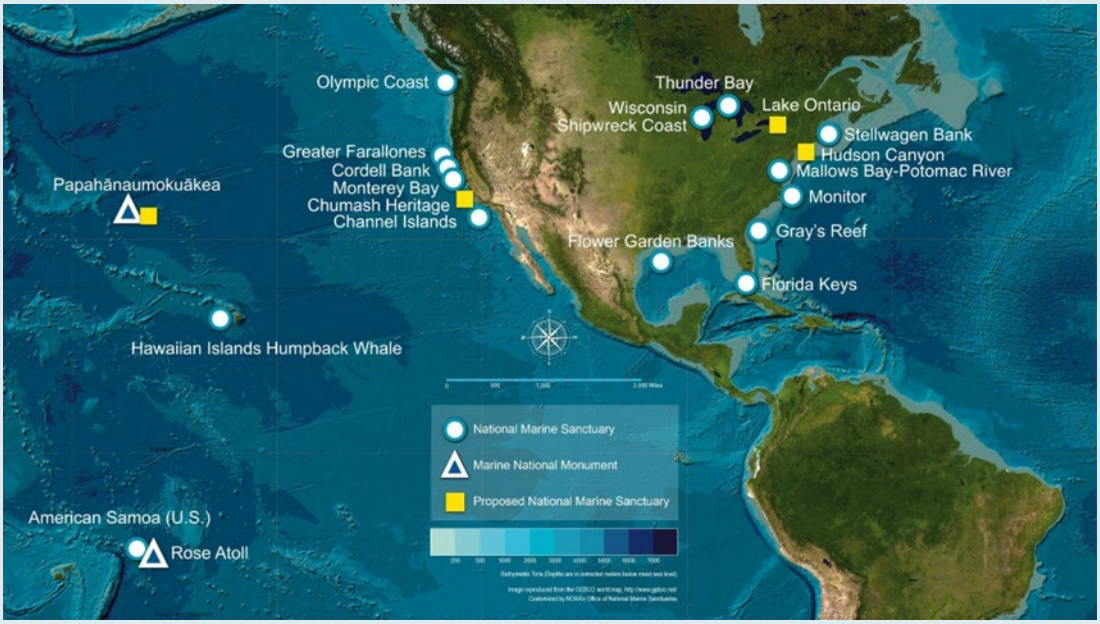
The arrival of national marine sanctuaries in the arena of American conservation was the culmination of not just decades, but centuries of social, cultural, scientific, and democratic developments and changes. These underwater parks were the result of hard-fought struggles among lawmakers and activists, constituents and conservationists, and scientists and scholars, all of whom felt strongly about their views.

This book depicts how the National Marine Sanctuary System and each of its component sites developed, what successes are celebrated, and what challenges lie ahead. The chapters do not tell the full story (each site's story could be a book by itself), but they relay the essential history.

More than half of America's borders are water, stretching over 12,000 miles of coastline. But a country doesn't end at the shore. It extends far into the ocean, lakes and into the deep. Within these waters are found some of America's most important natural resources, places of incomparable beauty, and irreplaceable artifacts of history—all underwater treasures that, on the whole for the American people, are unknown, unseen, and sometimes at risk.

Explorer and Author Jean-Michel Cousteau, 2012

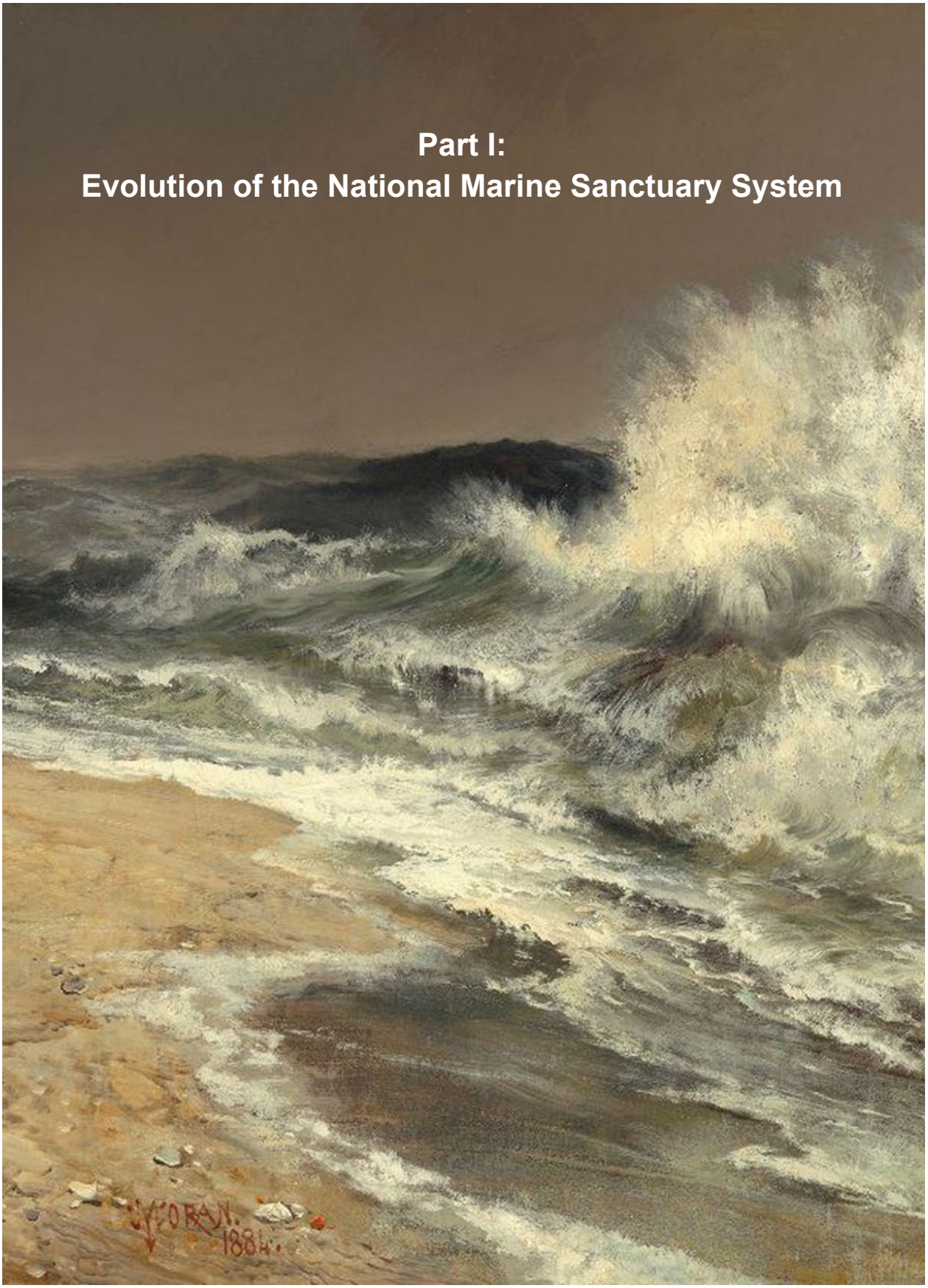
Join us for a voyage of time and tide, and explore the story of your national marine sanctuary system.



Sanctuary System Directors

- Robert Kifer (Coordinator), 1975–1977
- Phillip (Johnson) Tuwaletstiwa, 1977–1979
- JoAnn Chandler, 1979–1981
- Dallas Miner, 1981–1983
- Nancy Foster, 1983–1986
- Herbert Kaufman, 1986
- Vicki Allen, 1986–1987
- Joseph Uravitch, 1987–1991
- Bill Harrigan, 1992–1993
- Francesca Cava, 1993–1994
- Jim Lawless, 1994–1995
- Stephanie Thornton, 1995–1999
- Daniel J. Basta, 1999–2015
- John Armor, 2015–present

Part I:
Evolution of the National Marine Sanctuary System



Chapter 1
Historical Context

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Historical Context

On a list of the inventions of human civilization, things like writing, law, cities, drama, and art usually appear. Rarely do we see the concept of parks, or protected areas, on that list. Yet setting aside areas for conservation, recreation, and renewal is one of our best ideas. These are places that we consider special for some reason and want to keep that way, or restore to a more pristine condition.

Parks were born in and congruent with the development of a conservation ethic through our civilizations. One of humanity's most ancient religious traditions, animism, granted souls and thus a kind of sacred personhood to the natural world, including animals, plants, trees, water features like streams and pools, mountains, seas, and skies. Care of nature and the role of humanity as a steward for creation are emphasized in many faiths including Buddhism, Christianity, Hinduism, Islam, Jainism, Judaism, and Shintoism. Civic society and governments too were concerned about the use and sustainability of wildlife, water, and other natural resources, and informal agreements likely developed among neighboring communities and nations for centuries about fishing rights, harvest of other animals, boundary issues, and use of water. A 1489 treaty between Britain and Denmark on fishing rights around Iceland, for example, traced its origins to sixth-century Roman law.

The first formal international environmental treaties and compacts arrived on the scene in the early 20th century; the 1911 Fur Seal Treaty signed by the United States, the United Kingdom, Japan, and Russia is one of the first modern compacts to protect wildlife. In 1909, President Theodore Roosevelt wanted to invite world powers to a global conservation meeting. The gathering never came to fruition, but Roosevelt's vision foreshadowed many contemporary international conferences including the International Marine Protected Area Congress and World Conservation Congress, both held every four years, and the World Parks Congress held every decade.

Fur seals in a rookery in the Pribilof Islands in the 1950s. Image: NOAA.

President Roosevelt was a pioneer of American conservation. The natural beauty of American lands, seas, and wildlife inspired the words of Henry David Thoreau, Walt Whitman, and Florence Merriam Bailey, and the images of Hudson River School artists like Thomas Moran and Albert Bierstadt. Their efforts prompted calls to protect and preserve wild places and wild animals. Although initiated by mostly economic motives, the passage of the Lacey Act (1900), the Antiquities Act (1906), and the Migratory Bird Treaty Act (1916), and the founding of the U.S Commission of Fish and Fisheries (1871), the Office of Economic Ornithology and Mammalogy (1886), and National Park Service (1916), among others, all had preservation mandates and were forerunners to numerous agencies today. America introduced the concept of a modern national park to the world with the establishment of Yellowstone National Park in 1872.

Parks though are an ancient concept from many cultures. The word park is derived from an old Germanic root word parricus, meaning a confined place to keep animals. Early parks were likely hunting reserves set aside for nobility and royalty to use. In their 2005 book, “Invention of the Park,” Karen R. Jones and John Wills cited one of the earliest known examples of a park from the 4,000-year-old Mesopotamian story, “The Epic of Gilgamesh.” The ancient tale included a majestic forest of cedars protected by its own gate. Other ancient versions of parks were the

sacred gardens of Persia, Buddhist-inspired landscapes of China, sacred groves of Greece, and the equally sacred Polynesian tabu or tapu areas of no, or limited, harvests. The park idea spread and became more secular and civic in nature as civilizations grew and became more complex. This eventually led to the modern incarnations we know today: large city parks, public squares and gardens, and national and state parks.

> *It is a curious situation that the sea, from which life first arose, should now be threatened by the activities of one form of that life. But the sea, though changed in a sinister way, will continue to exist; the threat is rather to life itself.*
>
> Rachel Carson, "The Sea Around Us," Revised Edition, 1960

Underwater parks had equally ancient roots and underwent a similar, if somewhat slower, evolution process than their counterparts on land. The ocean and its resources were integral to the very survival of ancient humans. They were sophisticated in the technology, approaches, and rituals they developed to harvest marine creatures. Oceanic peoples in the Pacific, including both Hawaiians and Samoans, closed reef and lagoon areas to harvest for certain periods of time to allow stocks to rebuild. Many Native American tribes held—and continue to hold—rivers and other bodies of waters sacred. For these Indigenous people, the first stewards of the nation's resources, nature and culture were, and are, united in a profound "sense of place," the meaning or feeling that a group of people ascribes to a geographic location. The ocean provided sustenance in the form of fish, shellfish, waterfowl, and other animals; a mode of transportation for kayaks, canoes, and rafts; and a source of the sacred in oceanic gods and heroes, a location of the afterlife, and ocean wildlife as companions and kin of humans.

A 1937 aerial shot showed Hanauma Bay, Hawai‘i, which was declared a Marine Life Conservation District by the state in 1967. Image: U.S. Air Force, courtesy of the National Archives.

The first aquatic parks in the Americas, after European colonization began, included the great ponds, bays, coves, and rivers of the Massachusetts Bay Colony under the 1641 legal code, the Body of Liberties.

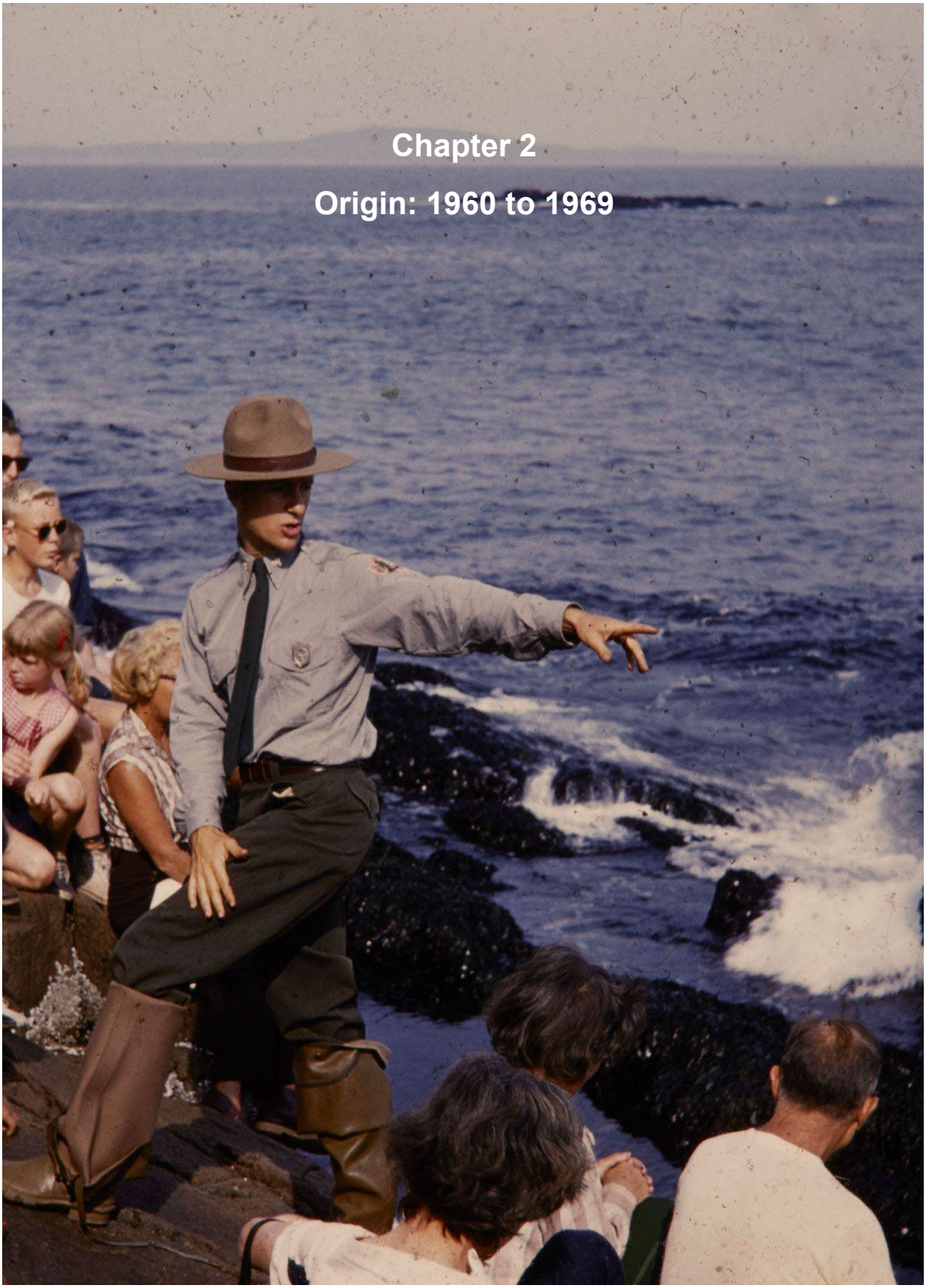
The first modern designated ocean park, both in America and the world, appears to have been a special government reservation created on, and in, the waters around the islands of St. Paul and St. George in Alaska's Pribilofs to protect fur seals in 1869. The pattern held until the early 20th century: underwater parks in the U.S. were seaward extensions of terrestrial protected areas, including state parks, national wildlife refuges and national parks and monuments. Pelican Island Federal Bird Reservation (now National Wildlife Refuge), Katmai National Monument (now National Park) and Acadia National Park were the first, in 1903, 1918, and 1919 respectively. Other early examples included Fort Jefferson National Monument in 1935 (today Dry Tortugas National Park) and Channel Islands National Monument (now National Park) in 1938. Two marine life refuges—San Diego, declared in 1929 and Hopkins in Monterey Bay, declared in 1931—in California might be the earliest ocean parks in the U.S. established independent of a land-based component. They were followed in 1960, when California established the Point Lobos Marine Reserve and Florida designated John Pennekamp Coral Reef State Park. In 1967, Hawai‘i created the Hanauma Bay Marine Life Conservation District.

But underwater parks truly came of age, in America and the rest of the world, starting in the 1960s.

A confrontation at a segregated beach in St. Augustine, Fla. in 1964. Image courtesy of the Library of Congress.

Racism in Early American Conservation

While we credit the early conservation movement in the U.S. with many achievements, including the establishment of Yellowstone National Park, it also bears a legacy of racial injustice that we have only begun to reckon with. Native Americans were removed from their ancestral lands to make way for iconic national parks. John J. Audubon owned enslaved human beings. John Muir, founder of the Sierra Club, made derogatory comments about Native Americans and African Americans. Some of the early members of the Sierra Club and proponents of national institutions like the U.S. National Park Service, the U.S. Forest Service, the New York Zoological Society, and our oldest museums were open advocates of white supremacy and the eugenics movement. From Reconstruction to the civil rights movement in the 1960s, parks, beaches, and recreational facilities were segregated. Those for minorities, if they existed at all, were typically of inferior quality. Even today, low income and minority-dominated communities have fewer and less accessible parks than more wealthy or white-dominated towns and cities. Major conservation agencies and organizations lack diverse leadership and members.



Chapter 2

Origin: 1960 to 1969

Chapter 2
Origin: 1960 to 1969

The restless generation that came of age before and during the Vietnam War, suddenly aware of environmental abuses (and broader societal ones) carried live into their homes on the new media of television, began to advocate for more meaningful and extensive protection of the natural world. The modern grassroots environmental movement arose out of awareness and concern associated with events like the 1969 oil spill off the coast of Santa Barbara, California; the burning of the Cuyahoga River; ocean dumping along American coastlines; and the use of pesticides such as DDT that was the subject of Rachel Carson's influential book "Silent Spring," published in 1962.

Rachel Carson and colleague Bob Hines conducted research in the Florida Keys c.1955. Image: U.S. Fish and Wildlife Service.

By the late 1960s and 1970s, the environmental movement resulted in treaties addressing the protection of natural and cultural heritage, tackling threats from pollution, and setting aside special areas to protect for present and future generations.

In the U.S., legislation such as the Endangered Species Act, the Marine Mammal Protection Act, the Clean Water Act, the Clean Air Act, and the Coastal Zone Management Act laid the foundation for our modern conservation infrastructure today. The creation of key agencies (such

as the Environmental Protection Agency (EPA) and the National Oceanic and Atmospheric Administration (NOAA), both in 1970) focused and institutionalized those acts and the programs, policies, and regulations that grew up around them. State and local governments followed suit, creating additional protections in their jurisdictions.

The university sector created degrees and training programs to help professionalize natural resource management. New fields of study emerged, like natural resource economics and specialized subdisciplines of oceanography and geography. Our knowledge expanded about the still largely unknown and unquantified marine world. Movies like 1961's "Voyage to the Bottom of the Sea" and "must-see" TV like 1966's debut of "The Undersea World of Jacques Cousteau" helped move the ocean into the view of many Americans for the first time.

Point Reyes National Seashore was featured in a National Park Service Mission 66 photo. Image: National Park Service.

Parks were integral in the creation of the U.S.'s modern stewardship institutions. Although it had been around since 1916, the National Park Service evolved into the icon that we know today due to its ambitious Mission 66 agenda, which added substantially to the number of parks, developed visitation infrastructure, and professionalized the education and outreach functions of the service. The National Wildlife Refuge System Administration Act was passed in 1966, creating a parent organization for the national wildlife refuges that existed since President Roosevelt approved the first, Pelican Island Federal Bird Reservation, in Florida in 1903.

A National Park Service Mission 66 publicity photo invited visitors to come explore Cape Cod National Seashore. Image: National Park Service.

Scholars and practitioners began to seriously explore the need for and nature of managing underwater parks in the late 1950s. “The Underwater Guide to Marine Life” written by Carleton

Ray and Elgin Ciampi in 1956, called for underwater parks (“Some of the richest areas should be set aside and protected as are ‘wilderness’ areas on land.”) and described the various benefits of them as areas of replenishment, sanctuary areas for endangered species, beautiful places for divers to enjoy, and natural outdoor laboratories and classrooms. Aquatic specialists in the National Park Service prepared guidance and advised their leaders about the difference in managing lakeshores, seashores, and marine habitats from managing the deserts, forests, mountains, and fields of terrestrial parks. Virgin Islands National Park in 1958 developed an underwater guided trail, believed to be the first of its kind in the world, and the possibilities of new technologies like scuba diving, submersibles, and underwater communication devices generated excitement among park staff about sharing the wonders under the sea with those who lived above it.

The First World Conference on National Parks was conceived and hosted by the U.S. in 1962. It recommended governments to examine the possibility of creating marine parks and reserves. There have now been seven World Parks Congresses.

In 1966, a Special Symposium on Marine Parks was held as part of the Eleventh Pacific Science Conference in Tokyo, Japan. The convener of the event, Dr. Tuyosi Tamura, states in his introduction to the proceedings: "[I]t did not occur even to us landscape architects that the

unearthly beauty and mystery of the marine world could be scientifically studied and enjoyed and therefore should be preserved from destruction."

> Recent progress in the development of marine parks is encouraging, but it is only a beginning. *Hopefully, the trend will continue so that the most outstanding marine gardens and reefs of the world will have the protection they deserve.*
>
> Professor John E. Randall, 1968

In 1966, President Lyndon Johnson's Science Advisory Committee called for a system of marine wilderness preserves in the report “Effective Use of the Sea” in order to “secure for the American people of present and future generations the benefits of an enduring resource of wilderness.” By 1968, the first of 11 different bills concerned with creating individual marine sanctuaries (in California, Massachusetts, or New Hampshire) or a system of marine sanctuaries, and ranging from complete wilderness to research laboratories to recreational areas, was introduced in Congress. The 1969 report of the Stratton Commission “Our Nation and the Sea,” which resulted in more than 60 bills in Congress, recommended that special attention and provision be made for public access to beaches and water recreation in the face of increasing shoreline development.

Most of the bills were opposed by various agencies of the federal government and by powerful outside interests, including the oil and gas industry. The path to any kind of a national system of underwater parks seemed to be slow, bureaucratic, and uphill. Then, on the morning of January 28, 1969, tragedy struck in Santa Barbara, California.

Chapter 3

Foundation: 1970 to 1979

Chapter 3
Foundation: 1970 to 1979

On the morning of January 28, 1969, an uncontrolled release of oil from the failure of well design and pressure control systems occurred on Union Oil's Platform A. Approximately three million gallons of crude oil spilled into the Santa Barbara Channel, blackening popular beaches and killing thousands of seabirds and countless fish and marine mammals. It was the worst oil spill to date and the first beamed into the living rooms of millions of Americans on the increasingly popular medium of television. In the public outrage that followed, the nation's leaders had new incentive to move forward on the marine sanctuary bills, and on other legislation that today forms the foundation of our marine stewardship.

President Nixon toured an oiled beach in Santa Barbara in 1969. Image courtesy of the National Archives.

1972 was a landmark year in modern conservation. On the international front, the Second World Parks Congress was held, urging "all governments concerned to set aside appropriate marine areas as national parks and reserves and to take action to extend the boundaries of existing terrestrial national parks and reserves to include representative marine ecosystems." The historic Convention for the Protection of World Cultural and Natural Heritage and the London Convention for the Prevention of Marine Pollution by Dumping of Wastes and Other Matter both were finalized. On the domestic front, President Nixon signed the Coastal Zone

Management Act, the Marine Mammal Protection Act, the Clean Water Act, and the Clean Air Act. He also signed the MPRSA); Title III, which had been added during conference on the legislation over the president's objections, created the National Marine Sanctuary Program.

> *Past conservation action has stopped, to a great extent, at the edge of the sea; resources beyond were 'out of site and out of mind…' The vastness of the seas and their resources were impressive and appeared to be without limit. To the contrary, we now realize that there is a limit to the resources of the oceans and that Man's actions can damage underwater environments and can deplete marine life.*
>
> Orthello L. Wallis, National Park Service, 1971

Like many other important conservation laws, the passage of the MPRSA involved years of debate and legislative evolution. In 1971 and 1972, after important Merchant Marine and Fisheries Committee hearings on ocean dumping, more bills in both the Senate and House wended their way to conference in 1972, where a compromise restored the marine sanctuary provision deleted from the Senate bill because of concerns about the U.S. declaring sanctuaries in what was then considered the high seas (and is now included in the U.S.'s exclusive economic zone). An early NOAA employee working on the program in 1975 noted that a subtle but important philosophical change happened between when the first of the bills was introduced in 1968 to the almost-final bills in 1972, that being a change from preventing something, such as oil drilling, to proactive protection of important areas.

Title III was only a few pages long, containing the authority for the Secretary of Commerce to assess, designate, and manage national marine sanctuaries, with requirements to consult with other federal and state officials, conduct public reviews, and issue regulations for each sanctuary. The National Marine Sanctuary Program was given to the newly created National Oceanic and Atmospheric Administration to manage. While struggling to build a new agency composed of both old parts (for example, the Coast Survey dated from 1807), and brand new programs, NOAA had now been tasked with creating two new programs from whole cloth, the nation's Coastal Zone Management Program (including what would become the National Estuarine Research Reserve System) and the National Marine Sanctuary Program. For more than a year, the sanctuary program existed only on paper.

Robert Knecht, being sworn in 1973, was the first director of the Office of Coastal Zone Management at NOAA. Image: NOAA News, October 1973.

In November 1973, NOAA hosted a three-day workshop of multidisciplinary experts to help jumpstart the development of the program's infrastructure. A senior official summed up in the foreword to the workshop report: "When we in NOAA began to look at the implementation…we found that we were really breaking new ground. There had been considerable work on marine preserves and sanctuaries…but we found we had very little clear, definitive guidance as to how we might go about implementing these programs." The workshop examined the existing federal and numerous state park systems; heard from scientists, government officials, user groups, and marine industries; and held discussions among the participants. By 1974, though separate funding appropriations still had not been established, NOAA had built on the results of the workshop and issued the first regulations for the program, laying the foundation for the fifty years that would follow.

In 1975, the International Conference on Marine Parks and Reserves was held in Tokyo, Japan, convened by the International Union for the Conservation of Nature, the world's oldest and largest environmental organization. The recommendations that arose from the conference included that: IUCN establish methodology and expertise to establish, assess, and manage marine parks; nations establish marine parks and reserve networks; nations with marine park experience help train those with less experience; and nations and NGOs cooperate with each other in raising awareness of marine parks. IUCN's marine program was founded shortly thereafter, in 1976. The Great Barrier Reef Marine Park was created in Australia, now one of the world's most iconic and unfortunately threatened ocean parks.

The first national marine sanctuary was designated in 1975, a circle of about a square mile in area to protect the remains of the iconic Civil War ironclad USS *Monitor*, which was more by circumstance than design, as no other legislation could be found to protect the newly discovered shipwreck. It was followed later that year by the designation of Key Largo National Marine Sanctuary, protecting 103 square nautical miles of coral reef habitats off Pennekamp State Park, from Carysfort Reef Light to Molasses Reef. NOAA's first marine sanctuaries coordinator described in an issue of Coastal Management how the MPRSA would be implemented,

summarizing: “One may view this authority as the ocean water counterpart to our National Parks and Seashores.”

Dignitaries attended the 1975 dedication ceremony for Monitor National Marine Sanctuary. Image: NOAA News, April 1975.

Despite the new activity in the sanctuary program in 1975, it still seemed under the radar within NOAA. In addition to the continuing failure to request funds for the program, in a report from NOAA on marine recreation, national marine sanctuaries were not mentioned by any NOAA representative, only by a single outside participant from the University of Waterloo, who used the term “marine sanctuaries” in a generic sense. This lack of reference came even as the report discussed the need to protect access to the ocean for recreational users and proposed extending zoning into the sea to help protect and manage various forms of recreation.

> *Marine Sanctuaries represent a pledge by the Congress of the United States to study, plan, and manage valuable marine environments…it is my sincere hope that the program succeeds.*
>
> Professor Robert Graham, 1975

Over the next several years, NOAA conducted a process to allow nominations of areas to be included on a List of Recommended Areas (LRA) to serve as the pool of potential sites to undergo a designation process to become sanctuaries. Sites had to be justified by their ability to

function as at least one of five types of areas: habitat preserves, species preserves, natural areas (to be left in a natural state for comparison to impacted areas), field laboratories (to be manipulated by scientists), and recreational/esthetic areas. Designation required a detailed description of the site, public hearings, and consultations with state and federal agencies, all of which remain integral parts of our designation process today. At publication on March 19, 1979, the LRA had 68 sites (out of the 169 nominated), along with seven active candidates in designation processes.

Perhaps to quell lingering questions about the need for the program, a study was conducted in 1977 by the Center for Natural Areas, a non-governmental environmental organization. They concluded: "The Marine Sanctuaries Program, with its broad mandate to protect and restore marine resources and values, its broad jurisdiction over marine areas, and its flexibility both in terms of designating sanctuaries and in tailoring regulations to the specific protection needed for individual sanctuaries, offers a unique, positive, and comprehensive program to protect highly valuable marine resources."

During committee hearings in 1978 for a reauthorization of the MPRSA, one critic was frank in his assessment of NOAA's progress in building up a network of marine sanctuaries. Kenneth S. Kamlet, of the National Wildlife Federation, read from his testimony: "…it is a source of deep disappointment to conservationists and other concerned Americans that the record of the marine sanctuaries program can be summarized as follows: (1) no funding sought or obtained through FY78; (2) a grand total of two sanctuaries designated in five years; (3) a paltry half-million dollars in funding requested for FY79; and (4) although over 170 recommendations and nominations for marine sanctuary site designations have been received by NOAA since last summer, it is proposed to designate such sites over the next 5 years at a rate no greater than 5 to 7 per year. We believe the pace and vigor of the marine sanctuaries program must be greatly stepped up if marine sanctuaries are to respond to the growing challenges of the balance of this century." Even as he was speaking to the committee, NOAA had more sanctuaries in the works. Some would be more successful than others.

NOAA research vessel *Delaware II* braved a storm in the late 1970s as it conducted research on Georges Bank. Image: NOAA.

On August 10, 1979, Georges Bank, along with Flower Garden Banks, and Gray's Reef, were identified as active candidates for designation as sanctuaries. The nomination of Georges Bank off New England had been made only a few months before, in May 1979 by the Gloucester Fishermen's Wives Association, the Boat Owners United, Seafood Producers Association, the New Bedford Fishermen's Union, the Chatham Seafood Cooperative, the Old Harbor Fish Company, the National Coalition for Marine Conservation, and the Conservation Law Foundation of New England. But after three public hearings, Georges Bank was withdrawn as an active candidate because, as NOAA noted in its notice, it was "determined that existing management programs are adequately protecting the area's resources." The site had been controversial inside and outside the government, which also had a role in its removal from consideration.

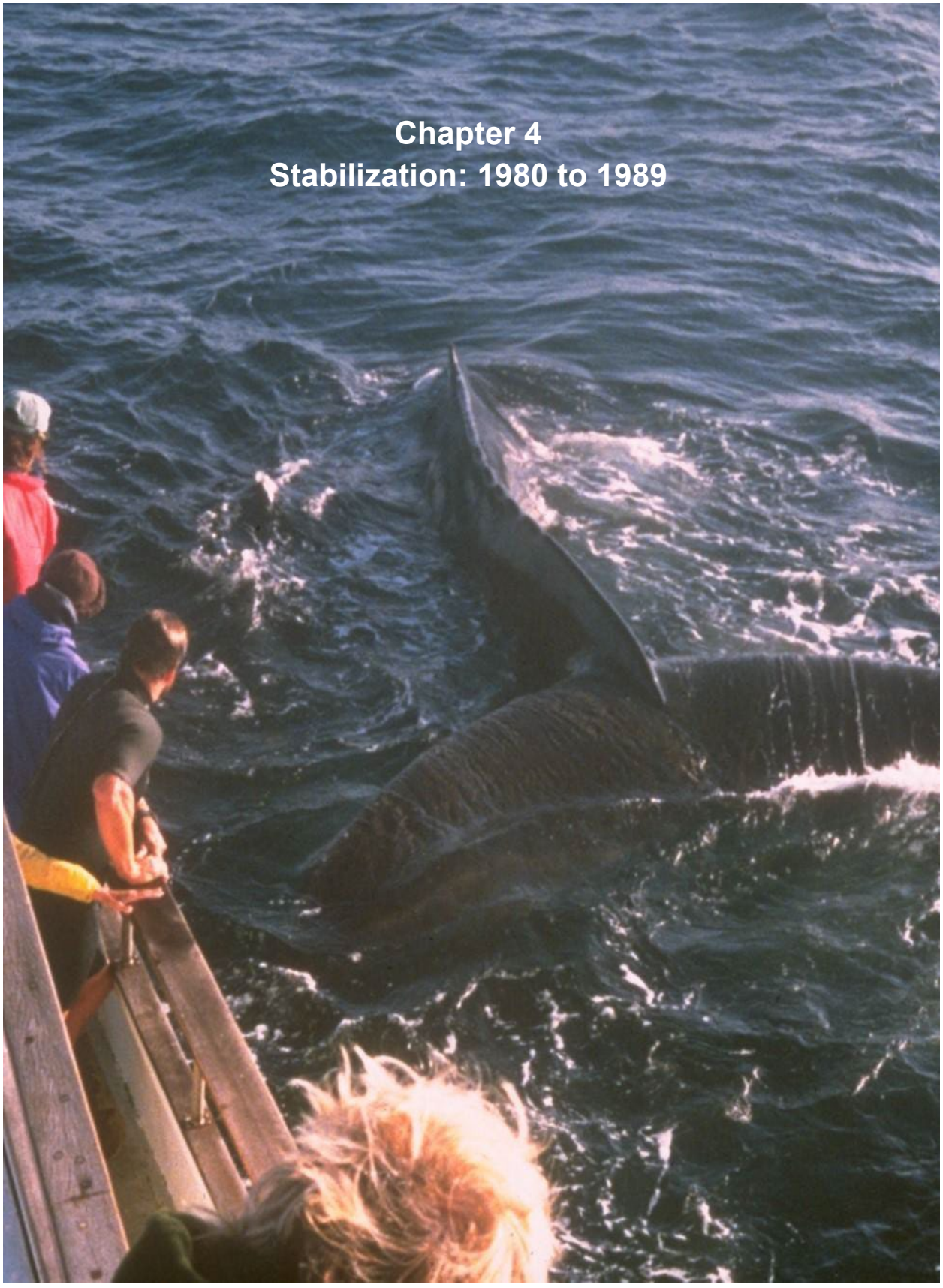
There was more than enough to do even without Georges Bank. As the 1970s closed out, NOAA's resolve to lay a foundation for the sanctuary program had been completed, in program regulations, permanent staff, a first-time direct appropriation (in 1979), two designated sanctuaries, and a geographically- and resource-diverse pool from which to select future sanctuaries. NOAA had also laid out an ambitious agenda for itself to consider seven different areas for designation: Flower Garden Banks, Gray's Reef, Channel Islands, Monterey Bay, Point Reyes/Farallon Islands, Looe Key, and St. Thomas, USVI. But both big attention and big trouble were coming for this little program.

History of Legislation Associated with the NMSP

- 1972: MPRSA passed
- 1975: MPRSA amended by raising authorized appropriation ceilings
- 1976: MPRSA amended by raising authorized appropriation ceilings
- 1977: MPRSA amended by raising authorized appropriation ceilings
- 1980: MPRSA reauthorized with substantive amendments
- 1981: Legislation introduced by Representative Breaux to repeal Title III but stalled in committee
- 1981: MPRSA amended by raising authorized appropriation ceilings
- 1984: MPRSA reauthorized with substantive amendments
- 1988: MPRSA reauthorized with substantive amendments
- 1990: Florida Keys National Marine Sanctuary and Protection Act passed
- 1990: Appropriation legislation contains language ordering NOAA to assess the potential of Kahoʻolawe in Hawaiʻi for sanctuary status
- 1992: Title III separated and authorized alone as National Marine Sanctuaries Act, among other substantive amendments
- 1992: Hawaiian Islands National Marine Sanctuary and Protection Act passed
- 1992: Oceans Act of 1992 designated Stellwagen Bank National Marine Sanctuary
- 1996: NMSA reauthorized with substantive amendments
- 2000: NMSA reauthorized with substantive amendments
- 2008: NMSA reauthorization bill is introduced but stalled in committee

History of Formal Assessments and Reviews Conducted of the NMSP

- 1977: Assessment of the Need for a National Marine Sanctuaries Program by the Center for Natural Areas (nonprofit organization)
- 1979/1980: Whether the Marine Sanctuaries Provisions of the MPRSA Confer Environmental Protection Authority Beyond That Contained in Other Federal Statutes (Part 1, December 1979) and Marine Sanctuaries (Part 2, January 1980) by the Congressional Research Service as requested by Representative Breaux
- 1981: Marine Sanctuaries Program Offers Environmental Protection And Benefits Other Laws Do Not by the Comptroller General of the U.S.
- 1991: *A Future for Marine Sanctuaries* by contracted consultant
- 1993: *External Review Team Report* (The Potter Report) by contracted consultant
- 2000: *Protecting Our National Marine Sanctuaries* by the National Academy of Public Administration
- 2005: *Program Assessment Rating Tool (PART) Report* by the Office of Management and Budget
- 2006: *Ready to Perform?* by the National Academy of Public Administration
- 2008: National Marine Sanctuary Program Protects Certain Resources, But Further Actions Could Increase Protection by the Department of Commerce Office of the Inspector General
- 2021: An External Review of the National Marine Sanctuary System by the National Academy of Public Administration



Chapter 4
Stabilization: 1980 to 1989

Chapter 4
Stabilization: 1980 to 1989

"[A] nearly forgotten federal program is rising like a phoenix from the ashes of bureaucratic obscurity to play a potentially prominent role in assuring that the nation's approach to its marine resources is both comprehensive and balanced." So begins an article in 1978 by two attorneys about the National Marine Sanctuary Program. On the surface it appeared true. NOAA had ambitious plans to build on an established foundation. President Jimmy Carter, in his Environmental Message to Congress in 1977, had included marine sanctuaries in his address: "Existing legislation allows the Secretary of Commerce to protect certain estuarine and ocean resources from the ill-effects of development by designating marine sanctuaries. Yet only two sanctuaries have been established since 1972, when the program began. I am, therefore, instructing the Secretary of Commerce to identify possible sanctuaries in areas where development appears imminent, and to begin collecting the data necessary to designate them as such under the law."

Jane Yarn of the Council for Environmental Quality met with President Jimmy Carter in c.1979. Yarn was instrumental in getting Gray's Reef and other areas approved as national marine sanctuaries before Carter left office. Image courtesy of the Carter library and Cosmos Mariner Productions.

In late 1979, in response to the President's directive, NOAA announced the List of Recommended Areas, a pool of 68 sites for future consideration as sanctuaries. But the controversies surrounding the LRA were numerous. The ability of anyone—individual, organization, or agency—to nominate an area was seen as letting unqualified people be involved as opposed to being an opportunity for maximum public participation. One legal commenter went so far as to accuse: "...while it may seem at first to be a process which encourages broad public participation, really allows the agency to assume a reactive stance and make opportunistic decisions whether and how to proceed on a given recommendation." Worst, and untrue, was the accusation that NOAA was going to enter into rushed and secretive processes to designate all of the sites on the list. But criticisms that the sites included on the LRA were not well-documented or reviewed were based in fact; requirements existed as to what kind of information was necessary to support a nomination, and state and federal agencies had to be consulted for each nomination. But detailed quality control and procedures were both lacking. As the program itself said, "[The LRA] resulted in much unnecessary and certainly premature controversy over the Program as a whole."

Simultaneously, the program became, in the words of environmental planner B.J. O'Sullivan in an article in 1980, "deeply embroiled in the country's more recent energy vs. environment controversy, particularly in relation to Offshore Continental Shelf (OCS) oil and gas development activities." This entanglement was embodied in the uproar surrounding the recently released draft environmental impact statement for Flower Garden Banks and its proposal to ban new oil and gas development in and around the banks for five years. The shortcomings of the LRA, combined with the Flower Garden Banks controversy and continuing opposition by the oil and gas industry, led to the most serious attempt in the program's history to repeal the program.

In 1979, Representative John Breaux from Louisiana requested an assessment from the Congressional Research Service on the redundancy of Title III of the Marine Protection, Research, and Sanctuaries Act (that authorized the National Marine Sanctuary Program) with other laws protecting the marine environment. The CRS returned a report in 1980 finding that Title III was unique among marine laws because of its "significant distinguishing feature…its comprehensive approach to area management" and its unusual provision that "sanctuaries can be designated in anticipation of possible conflicts between anticipated uses and special site values." Representative Breaux objected to the findings of the report, stating that he found the study "quite simply wrong" in his response letter and highlighting numerous weaknesses he felt were present in the analysis. The director of the CRS stood by the conclusions of the report.

Representative Breaux introduced legislation to repeal Title III later in 1980. In his statement in the House, he states with his opposition to the marine sanctuary program, starting: "I am introducing a bill today to repeal the marine sanctuaries title (title III), of the Marine Protection, Research, and Sanctuaries Act of 1972. I have come to the conclusion that this Nation does not need, nor can it afford, a marine sanctuaries program." and concluding: "I think that it is time that this program be repealed. Clearly, it is unnecessary to protect the marine environment, is a source of additional Government red tape and expense, and is run with little regard to either congressional or Presidential opinion on energy development and Government efficiency."

In response to the bill, the Marine Wilderness Society, in an article in the July 1980 issue of *Skin Diver*, rallied divers to contact and tell their congressional representatives to vote against the bill, stating: "The sanctuaries attack is a test case intended to force politicians and the public to choose between energy production, and environmental controls designed to protect natural resources from degradation by this production…If the Marine Sanctuaries Act is repealed, the repercussions will spread to all other areas of government and drastically weaken the efforts of Federal agencies to protect the ocean." The bill gained numerous other sponsors and was referred to the committee but made no further progress.

The controversy prompted another review of the program, this one in 1981 by the U.S. Government Accountability Office (or GAO), whose job is to provide Congress, federal agencies, and the public with factual, non-partisan information. The GAO's report found that although "the program overlaps with other Federal laws that protect the marine environment, it complements their authority by offering benefits other laws do not. It provides comprehensive regulation, planning, and management (within the limits of international law) to assure long-term preservation of all the resources that require protection; offers environmental protection where gaps exist in the coverage other laws provide; and encourages and supports research and assessment of the condition of sanctuary resources and promotes public appreciation of their

value and wise use. These benefits make the program useful in protecting designated sanctuaries."

Despite the positive findings of the GAO report, NOAA quickly realized that the controversy was not going to be resolved with anything short of getting rid of the LRA and by 1981, had gone back to the drawing board. In 1982, the program issued its Program Development Plan, or PDP, to address the shortcomings of the LRA and the issues that prompted the controversy. The PDP laid out the program's mission (establish a system of sanctuaries) and goals (resource protection, research, public awareness, and compatible uses), stated the intent to create a new, scientifically-based pool of sites for future consideration (the Site Evaluation List, or SEL), and outlined processes to designate sanctuaries and to prepare management plans. Efforts to support the creation of the SEL were also ramped up, with the creation of eight regional science teams to assess and nominate sites to the SEL. Congressional objections prevented the Alaska team from completing its work but the other seven teams did, and in 1983, the SEL was published with 29 scientifically reviewed areas. Furthering its stabilization efforts, a new organizational identity was created, as the Sanctuary Program Division within NOAA's Office of Ocean and Coastal Resource Management. By early 1981, four new sites had been designated: Looe Key, Point Reyes-Farallon Islands, Channel Islands, and Gray's Reef national marine sanctuaries. But designation processes in other parts of the country were not going quite as smoothly.

A 1998 research expedition into Channel Islands National Marine Sanctuary included trawl and sediment sampling. Image: NOAA.

In 1980, three areas of Puerto Rico—La Parguera; Mona and Monita Islands; and Culebra and Culebrita Islands/Cordillera Reef—were made active candidates for sanctuary designation, all of which were considered promising for protection as national marine sanctuaries. Discussions

with the Puerto Rico Department of Natural Resources proved fruitful, and NOAA gained the approval and cooperation of the department in moving forward. An issue paper examining resources of each area and how a national marine sanctuary might protect them was prepared by NOAA and the DNR, and released for public review in April 1981, along with the dates for three public workshops. By July 1981, the Culebra and Culebrita Islands/Cordillera Reef site was removed from consideration, due to local opposition and the inability of NOAA to manage so many simultaneous designations. But notice was given at the same time of the intent to begin the designation process for the other two Puerto Rican sites.

By March 1983, NOAA had released the draft regulations and draft management plan, in both Spanish and English, for La Parguera for public review. However, a different political party had come into office and the Department of Natural Resources had withdrawn its support. A new governor, fearing loss of authority to the federal government, had promised to veto any territorial waters in the proposed sanctuary. Well-orchestrated anti-sanctuary campaigns arose, fueled in part by false information by those with personal motives (including the owners of illegal casetas (vacation homes) in the mangroves (and including rumors that the U.S. government wanted the sanctuary to house missiles pointed at Central America). Vehicles showed up at public meetings bearing “Sanctuario no” written on them, and the meetings themselves were rowdy and contentious, populated by fishermen and women who had been told the federal government was going to shut down all fishing activity if the proposed area became a sanctuary. With the governor’s veto threat looming, NOAA made the decision to withdraw the proposed sanctuary in 1984 and suspend the effort to designate the Mona and Monita Islands site as well, effectively halting any sanctuary activity in Puerto Rico that continues to the present day.

Simultaneous to the ongoing work in Puerto Rico, NOAA was working on the designation of St. Thomas, home to the last sizable intact mangrove forest, extensive coral reefs, and several shipwrecks, in the U.S. Virgin Islands. An issue paper had been prepared and a public workshop held in 1979, and in June 1980, NOAA issued the draft regulations and draft management plan for the site. But because the site was entirely within territorial waters, NOAA had taken a different approach to this site than for La Parguera, proposing to allow the territory to establish the primary regulations, which NOAA would then adopt. But by March 1982, nearly two years later, NOAA suspended the designation process when the USVI legislature failed to enact the proposed territorial regulations. To date, it was the last sanctuary designation activity in the USVI.

In 1985, NOAA announced its intent to consider designating Norfolk Canyon, Virginia (highlighting its deep sea coral and invertebrate-festooned canyons) and Ten Fathom Ledge/Big Rock, North Carolina (a unique mix of benthic communities) as active candidates for designation. Interest in Norfolk Canyon had pre-dated the SEL process; the North Carolina site was the first one activated from the SEL. By February 1986, NOAA decided, based in part on the positive public comments, to move forward with the designation process for Norfolk Canyon. Despite the mostly positive public comments supporting the North Carolina site and faced with the competing demands of the ongoing designations of Cordell Bank and Flower Garden Banks, NOAA opted to suspend Ten Fathom Ledge/Big Rock from further consideration. Scoping meetings were held in summer 1985 for Norfolk Canyon, and a draft EIS was prepared by 1992. But without any apparent threats to the site, NOAA didn’t make any significant progress. Belatedly, in 1997 NOAA also discontinued the site from consideration. Processes for Fagatele Bay and Cordell Bank were more successful, resulting in designations in 1986 and 1989

respectively. Three new areas (Monterey Bay, Stellwagen Bank, and Northwest Straits, Washington) were made active candidates for designation and four more areas (Santa Monica Bay in California, and Alligator Reef, Sombrero Reef, and American Shoal in the Florida Keys) were named as study areas to determine their feasibility to become active candidates.

> *The protection afforded to highly visible terrestrial resources has not been given to the aquatic resources, even in the same park.*
>
> Gary E. Davis, NPS scientist, 1980

As well-established as the sanctuary program was becoming, it faced two significant legal challenges to its existence for the first time. The first came from the oil and gas interests that had long opposed the program; one petroleum company executive in 1980, for example, wrote: "The marine sanctuaries program has had a chequered history since passage of the Marine Protection, Research and Sanctuaries Act in 1972." Interested parties, and the public, have been presented with a series of elastic policy proclamations, alternatively expanding and shrinking lists of proposed sanctuaries, and a number of controversial white papers, issue papers, and draft environmental impact statements." The first challenge went to the very heart of Title III of the MPRSA by disputing the authority of the government to designate sanctuaries and manage uses within them. The Western Oil and Gas Association sued the government, alleging the designation of Channel Islands National Marine Sanctuary was invalid in that it had hurt a number of the association's members by prohibiting oil and gas exploration and production in the sanctuary. But in 1985, the U.S. District Court for the Central District of California ruled against the association, saying that it had failed to show that the government's actions had been arbitrary, capricious, or an abuse of discretion. The ruling affirmed the right of the federal government to designate sanctuaries and promulgate regulations within them.

A diver examined the wreck of *Monitor* in 2016. Because the wreck is so deep, divers require special technical diving skills. Image: NOAA.

NOAA lost a second lawsuit in 1989 when an individual was denied a permit to dive on the wreck of the *Monitor* due to safety reasons; the decision established that NOAA didn't regulate public diving safety. The judge concluded: "The [diving] standards adopted for Agency use by NOAA and or the United States Navy may not be imposed upon the public sector merely because the proposed activity is to be carried out within a Marine Sanctuary." However, subsequent legal actions involving the same individual, who proposed photographing the wreck as a research project, reaffirmed NOAA's right to deny research permits for proposed projects that do not meet legitimate science standards.

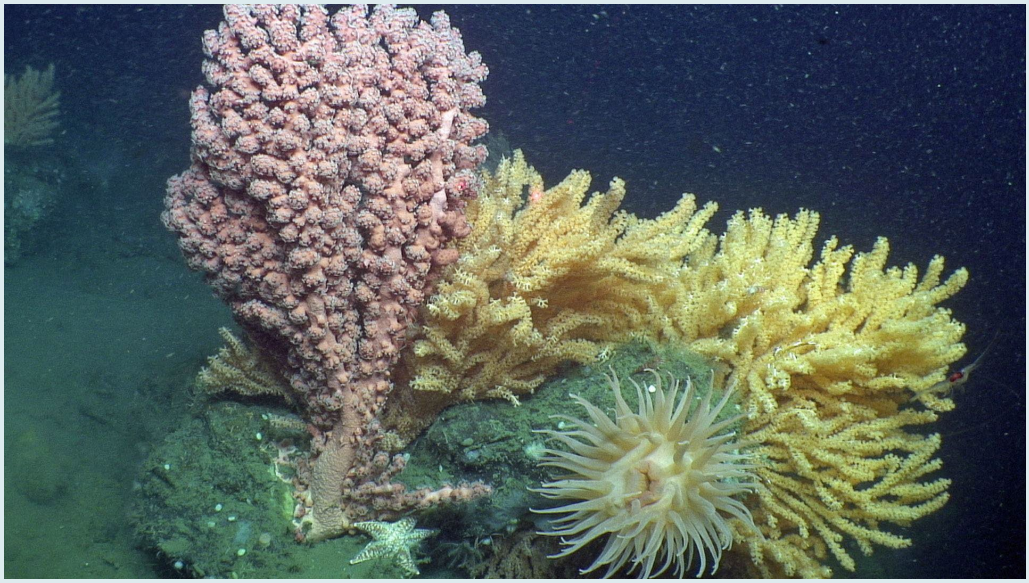
> *Although our National Park Service is probably the world's finest, we have not translated the need for special area management into our ocean ecosystems, but still cling to the belief that protection of individual species will suffice.*
>
> John V. Byrne, NOAA Administrator, 1984

Two reauthorizations in this decade also helped stabilize the program. The 1984 reauthorization of the MPRSA set the stage for its maturation, including clarifications to the designation

process, the requirement for an assessment of the present and potential uses of an area; and a requirement for research and education programs in sanctuaries. Another major reauthorization in 1988 allowed the program to establish a special use permit program and collect fees for commercial operations in sanctuaries, and provided authority to collect response and clean-up costs, as well as damages for any sanctuary resources destroyed, from responsible parties in events like oil spills and vessel groundings.

In 1986, the sanctuary program eased into a role it would expand and maintain in ensuing decades, that of an international leader, by hosting the first international meeting of marine protected area managers in the world (earlier meetings, like 1975's first International Conference on Marine Parks and Reserves held in Tokyo, Japan, focused on policy experts, not managers) in the sanctuaries in Florida and California. Thirty invited participants from 22 counties attended, learning from each other through both seminars and field experiences.

By the end of the 1980s, the program had put the LRA controversy behind it, and had a stable appropriation and a new organizational structure when the Sanctuaries Program Division merged with the division overseeing the National Estuarine Research Reserve System (created by the Coastal Zone Management Act) to become the Marine and Estuarine Management Division. Program philosophy, steadily evolving since and through reauthorizations, had moved the program from one of regulating and prohibiting to one of management and planning, with greater emphasis on research, education, and partnerships. Circumstances were ripe for the next stage in the program's evolution but serial crises in the Florida Keys, whether the program was ready or not, were about to push it along.



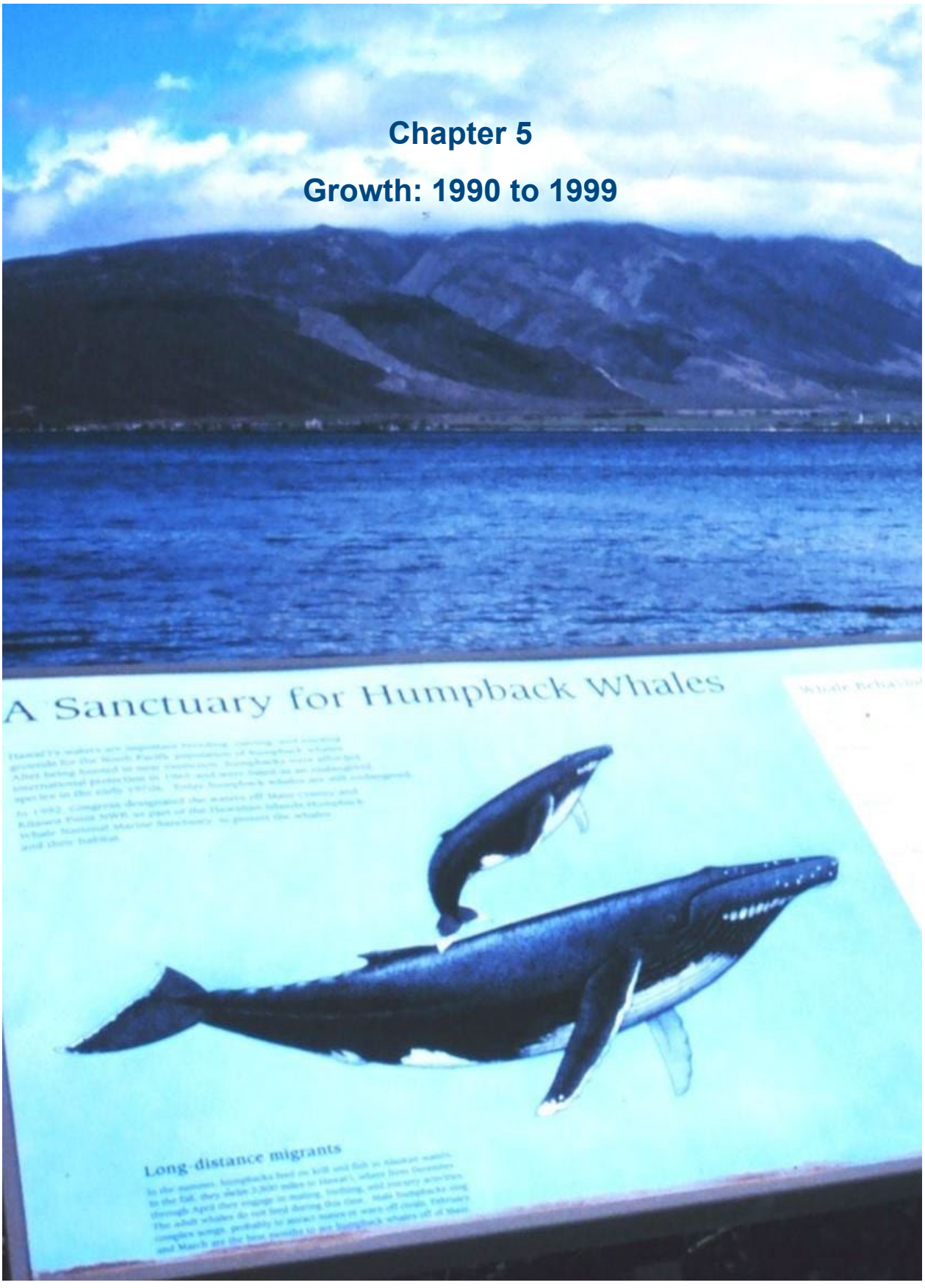
Coral colonies in Norfolk Canyon off the coast of Virginia were explored during a NOAA research expedition in 2013. Image: Deepwater Canyons 2013, Pathways to the Abyss, NOAA-OER/BOEM/USGS.

Areas That Started But Never Finished a Sanctuary Designation Process

- Georges Bank, New England
- St. Thomas, USVI
- La Parguera, Puerto Rico
- Mona and Monita Islands, Puerto Rico
- Culebra and Culebrita Islands/Cordillera Reef, Puerto Rico
- Norfolk Canyon, Virginia
- Ten Fathom Ledge/Big Rock, North Carolina
- Puget Sound, Washington

Chapter 5

Growth: 1990 to 1999



Chapter 5
Growth: 1990 to 1999

In late 1989, in just over a two-week period, the vessels *Elpis*, *Alec Owen Maitland,* and *Mavro Vetranic* ran aground in the Florida Keys. Together, the three groundings destroyed hundreds of acres of coral. Prompted by the widespread destruction and public outcry, by the end of 1990, the Florida Keys National Marine Sanctuary and Protection Act had designated Florida Keys National Marine Sanctuary, subsuming the older and smaller Key Largo and Looe Key national marine sanctuaries. The act also banned oil and gas exploration and production; prohibited the operation of large vessels near the reefs; and directed NOAA to prepare a management plan (a contentious process that would take seven more years - see Chapter 14), establish a sanctuary advisory council (the first in the program), and launch a Water Quality Protection Program (also a first for the program). In short order, the sanctuary had also been named by the International Maritime Organization, the international agency charged with managing vessel traffic around the world, as a Particularly Sensitive Sea Area, meaning all large vessels had to stay far away from the reef tracts.

Wellwood ran aground Molasses Reef in Florida Keys National Marine Sanctuary in 1984, five years before a trio of groundings led to the creation of the sanctuary. Image: NOAA.

While the act took care of designating that sanctuary, the system was grappling with some of the most complex and controversial designation processes it had ever faced, which when completed, would represent the greatest surge of growth yet seen in the program. Stellwagen Bank, Flower Garden Banks, Monterey Bay, and Hawaiian Islands Humpback Whale all were finally established in 1992, followed by Olympic Coast in 1994. Nearly all of these were large coastal areas and/or saw intense use and economic development potential. All faced opposition from varying user groups and corporate interests (see individual chapters for further discussion).

The program was also intermittently directed to or administratively decided to start designation processes that were halted. Ordered by Congress to assess the sanctuary potential of Kahoʻolawe in Hawaiʻi and Santa Monica Bay in California, NOAA found that the first had some potential but needed further study and the second did not meet a threshold for national significance based solely on its recreational value. Norfolk Canyon, which had been an active candidate since the 1980s, was renamed as such in 1993, but by 1997 was removed from further consideration, based on resource limitations and no clearly identified threat to the site.

More effort was invested in the Northwest Straits site, centered around the Puget Sound area and wholly within Washington state waters. The Regional Evaluation Team that had recommended the site to NOAA for inclusion on the SEL in 1982 had noted that although it was their top recommendation among their five, they were concerned about state opposition to it. NOAA added it to the SEL but, as the team had warned, the site faced considerable resistance from the start. In the 1988 reauthorization of the MPRSA, Congress ordered NOAA to make the site an active candidate. NOAA did so, posting a notice of intent to begin the designation process in October 1989. By 1993, NOAA had prepared and shared a Discussion Paper describing the rationale for creating a federally managed sanctuary in an area composed entirely of state waters. An extensive public engagement process followed: 24 focus group meetings throughout the study area in March 1995; three public focus group meetings in May 1995; two workshops in summer 1995 dedicated to education and research; and ongoing work throughout 1995 with the state to synthesize information in anticipation of releasing a draft management plan.

Despite all of this investment of time and effort, the site remained controversial, and the state of Washington and commercial shipping and fishing interests remained opposed to its designation as a sanctuary. By 1996 things came to a head. That year's reauthorization of the NMSA ordered NOAA to cease the designation process and instead assist the state in forming and acting as technical advisors to an independent Citizen's Advisory Commission of 15 members representing local governments, tribes, users, ports, and environmentalists. The Commission initiated meetings in May 1997 and completed a final report in August 1998. While the Commission did recommend the creation of a federally funded, regional voluntary program for the seven counties adjacent to the waters of the Northwest Straits, it did not recommend that a national marine sanctuary be established. This effectively ceased work by the sanctuary system in the Puget Sound area. The site was withdrawn from sanctuary consideration in September 1999.

> *The NMSP has tremendous potential to conserve America's most outstanding marine resources and has achieved considerable success despite limited resources and variable support from successive Administrations. Strong public support, new high-profile sites, and improved reauthorization legislation…provide an opportunity to take the program to new heights.*
>
> External Review Team, 1993

Throughout the decade, the sanctuary program focused much energy on completing designations. But considerable developments were rapidly evolving the program in other ways and putting in place mechanisms now considered bedrock components of sanctuary culture. The 1992 reauthorization of the Marine Protection, Research, and Sanctuaries Act was a significant overhaul of the act, including creating the stand-alone National Marine Sanctuaries Act.

Cultural resources were included among the factors that gave an area special national significance, in addition to natural resources like wildlife and habitats. Additions to the act created a mandate to support long-term monitoring and research, and to conduct education programs. The program was also ordered to create models of, and incentives for, conservation of marine resources, and was also encouraged to undertake better international cooperation. A new interagency consultation requirement was added for federal actions likely to harm sanctuary resources. The reauthorization also notably gave the program independent authority to establish advisory councils, after trouble with the requirements of the Federal Advisory Committee Act delayed the formation of an advisory council for Florida Keys National Marine Sanctuary.

The 1996 reauthorization was a more incremental reauthorization than 1992's major overhaul but added some significant and unique authorities to the NMSA in the form of an innovative public-private partnership between the sanctuary program and private enterprise. Facets of that collaboration included the adoption of and ability to license a symbol for the program; ability to designate an "official sponsor" of the sanctuary program; and authority for the creation, marketing, and selling of products, among others. The inclusion of such unique provisions in federal legislation could be traced in part to a review of the sanctuary program conducted in 1993 by the Center for Marine Conservation, which advocated for the program to explore innovative funding techniques including foundations, user fees, and grants and matching funds programs. These were the roots of a nascent business planning function for the program, which would eventually result in master planning documents for vessels and facilities, and a revenue enhancement plan in 1997, in concert with the trademarking in 1995 of the program's distinctive whale tail logo.

The reauthorizations and program reviews also encouraged the program to raise its public profile. The program responded in a robust manner, launching three major outreach efforts in the late 1990s. In 1998, a partnership with National Public Radio took one and a half million listeners on a radio expedition to sanctuaries, and a story in National Geographic Magazine brought sanctuaries to nearly ten million readers. In 1999, the system and National Geographic also partnered to launch Sustainable Seas Expeditions, a five-year, multi-million-dollar exploration and outreach effort. The public followed along as scientists explored sanctuaries in *DeepWorker* submersibles, including many classrooms that used associated lesson plans.

The mini-sub *DeepWorker* awaited deployment from NOAA ship *McArthur* during the 2001 Sustainable Seas expeditions. Image: Albert E. Theberge/NOAA.

Organizationally, the decade saw many changes for the sanctuary system. In 1990, the sanctuary program was managed from the Sanctuaries and Reserves Division (from its earlier incarnation as the Marine and Estuarine Management Division) which handled the responsibilities for both the National Marine Sanctuary Program and the National Estuarine Research Reserve System, but ended the decade as the Marine Sanctuaries Division, when the reserves were split off into their own management body. Appropriations for the program grew from just over $3 million in 1990 to $14 million in 1999.

During this era, the program also began to refine and strengthen its conservation focus. The regulations of sites reflected a conscious effort to focus on priority resource management concerns from a variety of sources (for example, seabed disturbance, non-point pollution, and harassment of wildlife). Some of the regulations targeted activities from outside the sanctuary that could enter and injure resources. The program launched its long-running National Marine Sanctuary Conservation Series, a series of high-quality publications featuring research in and about sanctuaries.

The first comprehensive zoning scheme for the system was approved with the completion of the management plan for Florida Keys National Marine Sanctuary in 1997. In addition, the program began to evolve its trustee responsibilities concerning damage assessment and restoration. The program ventured more extensively into the complex arena of water quality, as both Florida Keys and Monterey Bay national marine sanctuaries established water quality protection programs. The first full-time NOAA enforcement agent assigned to a sanctuary began working in the Florida Keys in 1994.

Three court cases, two in 1992 and one in 1995, set important precedents for the sanctuary system. Both cases in 1992 strengthened NOAA's role as a steward of historical and cultural resources. Divers taking artifacts from shipwrecks in and damaging the seabed of Channel Islands National Marine Sanctuary were found guilty of violating sanctuary regulations, a verdict which was upheld on appeal. NOAA filed suit against a treasure salvor to cease salvage operations in Florida Keys National Marine Sanctuary and fund restoration of coral damage due to "mailboxing," which is the directing of a boat's propulsion at the seabed to dig holes in it. NOAA was successful through an appeals process.

The case in 1995 reinforced NOAA's role in protecting sanctuary resources as well. The Personal Watercraft Industry Association challenged the regulation of Monterey Bay National Marine Sanctuary prohibiting operation of jet skis in the sanctuary except in four zones. The federal district appeals court of Washington D.C. ruled in favor of NOAA, finding that the regulation was not arbitrary or capricious, and affirming that NOAA did not need to enact regulations for any potentially harmful activities all at once.

The sanctuary program leadership met with Commerce Secretary Daley in 1999 as part of the program's higher profile in the 1990s. Image: NOAA.

A new strategic plan in 1994 articulated a new mission for the program: “to identify, manage and protect marine and Great Lakes areas of special national significance to ensure their continued cultural and ecological integrity for future generations in the context of larger marine ecosystems.” The plan further articulated three overarching goals for the program of stewardship, partnership; and information, research, and education, and committed to using ecologically sound principles of resource protection and conservation to achieve them.

olstered by the two reauthorizations in 1992 and 1996, external reviews in 1991 and 1993, and the new strategic plan in 1994, the program had developed its core education and outreach, research and monitoring, resource protection and public participation, and business planning programs. Every new site had an advisory council, and steady progress was being made in setting up councils for older sites. Six new sites had nearly doubled the number of sanctuaries in the system and vastly increased its area. Many academic discussions of the history of the sanctuary program point toward the decade of the 1990s as its most active since the passage of the MPRSA in 1972. The program certainly matured in its operations, in its sense of itself as an institution, and in its confidence as a force for marine conservation. But its rapid growth and higher profile were about to have consequences.

International Protections and Designations at Work in Sanctuaries

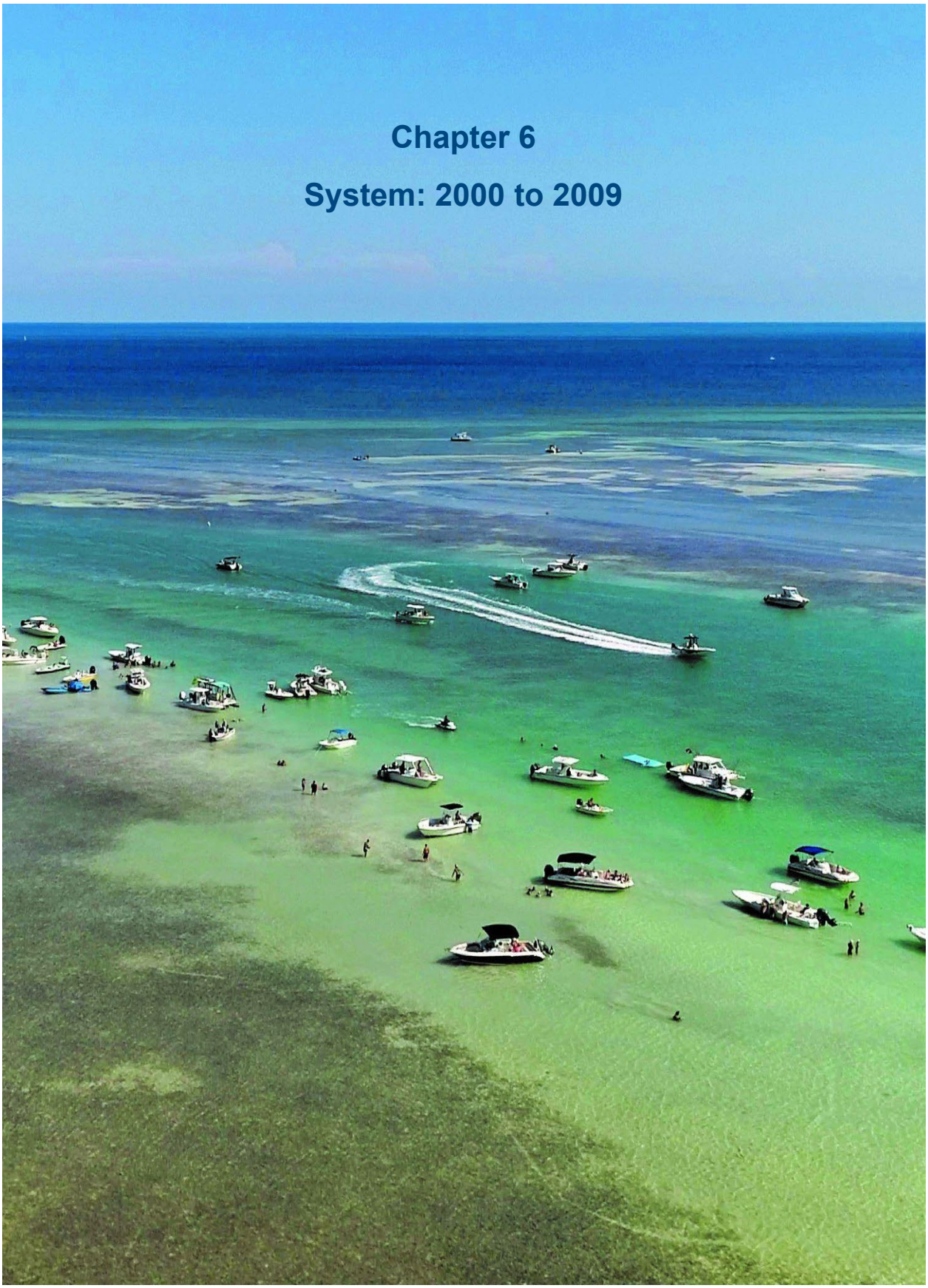
- SBNMS: Vessel routing measures approved by IMO guide ships away from areas frequented by whales
- GRNMS: Was included as part of the Carolinian-South Atlantic Man and the Biosphere complex until the U.S. withdrew the site in 2017
- FKNMS: IMO Particularly Sensitive Sea Area and Area to Be Avoided keep large vessels away from reef tracts; IMO no-anchoring regulations protect corals from anchor damage; listed under the Specially Protected Areas and Wildlife Protocol of the Caribbean Environment Programme
- FGBNMS: IMO no-anchoring regulations protect corals from anchor damage; listed under the Specially Protected Areas and Wildlife Protocol of the Caribbean Environment Programme
- CINMS: IMO Area to be Avoided keeps large ships carrying hazardous cargo away from the islands; included as part of the Channel Islands Biosphere Region recognized by UNESCO; in the U.S. Tentative List for future consideration as a World Heritage Site (California Current)
- MBNMS: Vessel routing measures approved by IMO guide ships away from sensitive areas; on U.S. Tentative List for future consideration as a World Heritage Site (California Current)
- GFNMS: Tomales Bay covered by RAMSAR Wetlands Convention; included as part of the Golden Gate Biosphere Region recognized by UNESCO; on U.S. Tentative List for future consideration as a World Heritage Site (California Current)
- CBNMS: on U.S. Tentative List for future consideration as a World Heritage Site (California Current)
- OCNMS: Voluntary IMO Area To Be Avoided in place
- PMNM: IMO Particularly Sensitive Sea Area and Area to Be Avoided keep large vessels away from reef tracts; IMO vessel routing measures guide ships away from sensitive areas; World Heritage Site
- NMSAS: On U.S. Tentative List for future consideration as a World Heritage Site

Timeline of Sanctuary Advisory Councils and Volunteer Programs

- 1991: FKNMS Sanctuary Advisory Council
- 1993: GFNMS Beach Watch
- 1994: MBNMS Sanctuary Advisory Council
- 1995: CINMS Whale Corps, OCNMS Sanctuary Advisory Council, HIHWNMS Ocean Count
- 1996: HIHWNMS Sanctuary Advisory Council, SBNMS Sanctuary Advisory Council, GFNMS SEALS
- 1997: TBNMS Sanctuary Advisory Council, MBNMS Beach COMBERS
- 1998: CINMS Sanctuary Advisory Council, HIHWNMS Na Pali O Ke Kai Volunteer Coastal Monitoring project, MBNMS Bay Net
- 1999: GRNMS Sanctuary Advisory Council, GFNMS LiMPETS
- 2000: MBNMS Team OCEAN, MBNMS Snapshot Day, FGBNMS Naturalist Onboard Program
- 2001: NWHICRER Reserve Advisory Council
- 2002: GFNMS Sanctuary Advisory Council, CBNMS Sanctuary Advisory Council, CINMS Naturalist Corps (with Channel Islands National Park), OCNMS Beach Monitoring (with University of Washington and REEF)
- 2003: National MPA Center Federal Advisory Committee
- 2005: FBNMS Sanctuary Advisory Council (now the NMSAS Sanctuary Advisory Council), FGBNMS Sanctuary Advisory Council, MNMS Sanctuary Advisory Council, FKNMS BleachWatch Program (with Mote Marine Laboratory)
- 2010: SBNMS Stellwagen Sanctuary Seabird Steward
- 2013: Sanctuary System Business Advisory Council
- 2016: HIHWNMS Team OCEAN
- 2018: HIHWNMS Sanctuary Beach Naturalist Program
- 2019: Lake Ontario National Marine Sanctuary (proposed) Sanctuary Advisory Council
- 2020: MPNMS Sanctuary Advisory Council

Chapter 6

System: 2000 to 2009



Chapter 6
System: 2000 to 2009

In early 2000, in the first issue of *Sanctuary Watch*, the system's newly fledged bimonthly newsletter, the program's director wrote: "The year 2000 promises to be an exciting one for NOAA's National Marine Sanctuaries Program." She was right. In some ways, after 1972 and 1992, 2000 has been the most important year in the history of the sanctuary system to date.

The new millennium dawned with a sanctuary system exhausted from the rapid expansion of the 1990s. Emerging opinions from different quarters that such growth might have outstripped the ability of the program to optimally manage sanctuaries led to calls to limit new sanctuary designations. By doing so in the 2000 reauthorization, Congress required the program to focus inward to proactively manage and provide for its existing sites. The only new sites added to the system during this decade were Thunder Bay National Marine Sanctuary, Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve (which would eventually become Papahānaumokuākea Marine National Monument) by Presidential Proclamation in 2006, and Rose Atoll Marine National Monument in American Samoa established by Presidential Proclamation in 2009 (and which would be encompassed by an expanded sanctuary in American Samoa in 2012).

System growth also came in a number of large expansions during this decade. Florida Keys National Marine Sanctuary had a large expansion in 2001when it created the Tortugas Ecological Reserve (127 square miles), and Monterey Bay National Marine Sanctuary grew even larger (by 766 square miles) when it expanded in 2009 to include Davidson Seamount. Channel Islands National Marine Sanctuary grew by a smaller amount—20 square miles—when it was expanded in 2007 as part of the creation of a network of conservation areas within the sanctuary. These actions kicked off other expansions in the next decade at National Marine Sanctuary of American Samoa and Thunder Bay, Greater Farallones, and Cordell Bank national marine sanctuaries.

A provision of the 2000 reauthorization, which represented the first major overhaul of the NMSA in eight years, gave voice to the identity that the program had been feeling out internally for some time, that of a system. As the number of sites and managed area grew, as the culture of the program developed, the program knew it could not simply function as a collection of sites. The reauthorization's directive to formally establish a system to encompass all sanctuaries was both welcome and a confirmation of the program's own thinking. But what exactly did that mean?

> *An important consideration is the nature of the 'program' itself. A 'program' implies focus on a mission, as well as a future vision. Moreover, it implies a 'system' with connectivity and networking among the elements involved.*
>
> Professor Carleton Ray, 1991.

Becoming a system required that the agency take a more strategic approach to plan for its future needs and growth and undergo a deliberate effort to develop its system identity. The program looked at how its organization had to change to meet the needs of becoming a system. In the 1980s and early 1990s the size of the program and the lack of funding did not require a regional

presence in the field, though there was a regional organization at the headquarters. A mid-1990s reorganization created functional branches at the headquarters for science, education, policy, and operations. While this flattened structure met the program's needs earlier in the decade, it was not an adequate structure for the program's recent growth. Along with the process of regionalization, a package was sent to Congress in 2001 to elevate the program from a division to an office within NOAA. Approved in 2006, the elevation created a new Office of National Marine Sanctuaries.

Reflecting Congress's interests in the sanctuary system, the bipartisan, bi-coastal National Marine Sanctuary Caucus was formed in 2006 by then-Representatives Lois Capps of California and Ileana Ros-Lehtinen of Florida. The purpose of the caucus is to raise awareness of the sanctuary system in Congress and to ensure adequate resources were devoted to it. The caucus currently has 23 members from across the country.

To help bolster its new identity, the non-profit National Marine Sanctuary Foundation was created in 2000 to promote citizen science, research, conservation, education, and community engagement to protect coral reefs and marine habitats, preserve places of cultural significance, and conserve our maritime history and heritage. The first year a small grant to the foundation allowed them to hire a director and convene a board. Its original board members included marine explorer Jean-Michel Cousteau, Director of the Institute for Exploration Dr. Robert Ballard and ocean explorer Dr. Sylvia Earle. Today the foundation is the primary national non-profit partner for the sanctuary system and a national figure in ocean conservation.

As one of its first projects, the foundation organized the first ocean day on Capitol Hill in 2001, which has now grown into the expansive Capitol Hill Ocean Week held every June. The nation's premier annual ocean event each year brings together over 700 global influencers and newsmakers to examine contemporary marine issues and trends. The foundation organizes and hosts the conference and shares it with the world through free live streaming.

With elevation to an office, other parts of the program's infrastructure also received attention. Assessments for small boats and facilities were conducted, resulting in system-wide statements of needs and priorities. The Maritime Heritage Program was established. The system's new strategic plan completed in 2005 outlined seven goals that mirrored the nine purposes and policies contained in the 2000 NMSA: identify, manage, and designate sanctuaries; build and strengthen network identity; enhance public awareness; build scientific understanding; facilitate human use; work with the international community; and build operational capacity and infrastructure.

The decade saw the growth of cross-cutting plans and teams across the system, with the creation of national plans and cross cutting teams for science, education, and international activities. An evaluation of program regulations to make them more internally consistent was conducted (such as ensuring definitions of terms were the same for all sanctuaries), and a process to review and update decades-old management plans was created and implemented. The system debuted its new brand identity when it unveiled its first website and launched the newsletter *Sanctuary Watch*. National tools and products launched this decade included 2005's online Encyclopedia of the Sanctuaries which provided critical information on the diverse life found in sanctuaries and 2007's first-ever sanctuary atlas, featuring large scale full color maps of the sanctuaries.

Two young participants in the Ocean Guardian School program took part in a beach monitoring program. Image: Nick Zachar/NOAA.

Formal education programs too got a boost across the system. The Bay Watershed Education and Training program (B-WET) was established in 2002 as a NOAA education effort for the Chesapeake Bay region. B-WET provides competitive grant funding to support meaningful watershed educational experiences for K-12 students to better connect them to the ocean and Great Lakes. Since its inception, the program has expanded to cover seven regions, including four in which the sanctuary system is the manager or co-manager (California, Great Lakes, Hawaii, and the Pacific Northwest). Today, B-WET is one of the system's primary ways of supporting environmental education for underserved and marginalized communities. The Ocean Guardian School Program, patterned after the Reef Guardian School Program of Great Barrier Reef Marine Park, followed in 2008. Enrolled schools make commitments to the protection and conservation of their local watersheds and underwater parks, and the world's ocean. Students in the schools meet this commitment by undertaking a school- or community-based conservation project and participating in other projects like Zero-Waste Week.

The headquarters staff of the sanctuary system gathered in 2008, along with the mascot, Sanctuary Sam. Image: NOAA.

Another education program that launched in 2009 had its roots in the tragedy of 9/11. Eight people aboard Flight 77—DC sixth-graders Bernard Brown II, Asia Cottom, and Rodney Dickens; their teachers Hilda Taylor, Sarah Clark, and James D. Debeuneure respectively; and National Geographic employees Joe Ferguson and Ann Judge—were headed to Santa Barbara, California, to join a National Geographic Photo Camp alongside the Sustainable Seas Expeditions, a five-year effort by the National Marine Sanctuary System and National Geographic to explore sanctuaries in the minisub *DeepWorker*. After Flight 77 crashed into the Pentagon, killing all those aboard, the sanctuary system created the Ocean for Life program as a tribute.

Ocean for Life was designed as an ocean science and cultural exchange program for high school students from Western and Middle Eastern countries. Using national marine sanctuaries as field laboratories—including Florida Keys, Gray's Reef, Greater Farallones, Cordell Bank, Monterey Bay, and Channel Islands national marine sanctuaries—students came together in Ocean for Life sessions in 2009, 2011, and 2013. Together, they explored, filmed, photographed, and shared what they had learned, and built bonds with each other and with the ocean. By the time the program ended in 2013, 115 students from 17 countries and all over the U.S. had participated.

> *The National Marine Sanctuary Program is fundamentally well conceived and is beginning to demonstrate notable successes in protecting valuable*

> *parts of the ocean. However, many close observers of, and some participants in, the program feel that it is uncertain, ineffective, and pitifully small. This judgment overlooks what the program has accomplished…*
>
> National Academy of Public Administration, 2000

External review by experts indicated that all of these efforts were leading the system in the right direction. An assessment in 2000, the first of three over the years by the National Academy of Public Administration (NAPA), indicated that the program was on the right path and called for greater public participation, establishment of marine reserves (where appropriate), strengthened education and research, acquisition of more resources to implement programs, and a more systematic approach to managing the system for results. A 2006 review by NAPA also affirmed the direction of the system and urged it to put more emphasis on performance-based management; take more chances in experimenting with new conservation approaches; and expand its partnerships even more. The third NAPA review, completed early in 2021, is covered in the next chapter. A Department of Commerce Office of the Inspector General examination of the program in 2008 found that it was making progress towards long-term protection of marine ecosystems and cultural resources, but that enforcement needs should be strengthened and stronger coordination with partners was needed.

Having completed the development of an advisory council at every site and with several national meetings of advisory council chairs and coordinators under its belt, the system considered the possibility of a national advisory council. A number of options were considered, including forming a permanent national advisory council; creating time-limited temporary councils for specific purposes; creating a Council of Chairs composed of site advisory council chairs; making use of the MPA Center's Federal Advisory Committee; and using informal constituent roundtables. The system decided to use a yearly Council of Chairs approach to obtain input on national issues. The Council of Chairs proved a useful sounding board for various issues through the decade.

> *The National Marine Sanctuary Program is a key part of my Administration's ocean policy. In particular, this long-standing program will be an integral part of the national system of marine protected areas, which I recently directed Federal agencies to establish.*
>
> President Clinton, NMSA Signing Statement by the President, 2000

While the sanctuary program was exploring its identity as a system, the nation's leaders were also focusing on the array of marine protected areas around the country. They were trying to figure out how such a disparate set of underwater parks of various sizes, shapes, purposes, and authorities at all levels of government could be better harnessed to help achieve the conservation mandates that experts believed were necessary to conserve American waters. In 2000, President Clinton signed Executive Order 13158 creating the National Marine Protected Area Center as a cooperative endeavor between the Department of Commerce, through NOAA, and the Department of the Interior, through various bureaus. The EO ordered the MPA Center to "develop a framework for a national system of MPAs, and to provide Federal, State, territorial, tribal, and local governments with the information, technologies, and strategies to

support the system" and to also create a Marine Protected Area Federal Advisory Committee to provide the Center with expert input and advice.

Cartoonist Jim Toomey, creator of the Sherman's Lagoon comic strip, and NOAA Administrator Jane Lubchenco unveiled the poster he designed for the MPA Center in 2009. Image: Kara Schwenke/NOAA.

By 2003, the MPA Center was created, housed, and staffed at NOAA, and formally defined "marine protected area," described the mission and goals of the national system, and established its advisory committee. More progress followed rapidly as the Center created a virtual library on its website; launched a newsletter; began building an inventory of the nation's underwater parks; and completed technology needs assessments and social and natural science strategies for the nation's underwater parks. By the end of the decade, the Center had initiated an MPA tool kit including a pilot human use mapping project and best practices for boundary making; assessed the status of "de facto" underwater parks (for example, areas of water closed to public use near military facilities); and made significant headway in developing the framework for the national system.

The reauthorization of the National Marine Sanctuaries Act in 2000 had curbed new designations from being initiated by NOAA but by the end of the decade, a solid system identity established, the system was ready to return to one of its fundamental purposes: identifying and designating new sanctuaries.

Mallows Bay-Potomac River National Marine Sanctuary, shown above, was the first site approved for the new inventory in 2014. The site was designated in 2019. Image: Kate Thompson/NOAA.

Approaches to Developing Pools of Potential Sanctuaries

- 1972 - The MPRSA is silent on how future sanctuaries should be chosen.
- 1977 to 1982 - List of Recommended Areas: The LRA was NOAA's first mechanism for screening and pooling areas for future consideration as a sanctuary. Nominations were accepted from any member of the public, agency, or organization, and reviewed by NOAA. Of 169 nominations made to NOAA, 68 were eventually accepted and published in 1979. Flower Garden Banks, Gray's Reef, Channel Islands, Gulf of the Farallones, St Thomas (USVI), and George's Bank were all made active candidates from the LRA, and the first four eventually became sanctuaries.
- 1983 to 1995 - Site Evaluation List: In 1983, after being criticized for how the LRA accepted sites, NOAA replaced it with the SEL. The SEL was a list of areas selected for further evaluation for possible designation as national marine sanctuaries, based on their natural resources. The SEL included detailed criteria, relied on regional science review panels, and was intended to be reviewed and updated every five years. The SEL included 29 sites, four of which were subsequently designated as sanctuaries: Flower Garden Banks, Stellwagen Bank, Western Washington Outer Coast (renamed Olympic Coast), and Thunder Bay. An evaluation team was convened to consider adding areas with nationally significant maritime heritage resources but never completed its work.
- 2000 to 2014: The system was prevented from considering new sites by the 2000 reauthorization of the NMSA until such a time as the program could document that the addition of new sites would not impact the existing sanctuaries.

- 2014 and ongoing - Sanctuary Nomination Process: The system established a process to give communities an opportunity to identify special marine and Great Lakes areas they believe would benefit from designation as a national marine sanctuary. As opposed to the open nomination process of the LRA and the exclusive science teams of the SEL, nominations are accepted from communities (defined as a collection of interested individuals or groups; local, tribal, state, or national agencies; elected officials; or topic-based stakeholder groups, at the local, regional or national level (e.g., a local chapter of an environmental organization, a regionally-based fishing group, a national-level recreation or tourism organization, academia or science-based group, or an industry association)) and should demonstrate broad support from a variety of stakeholders and interested parties. Sites are reviewed by NOAA and if NOAA determines a nomination adequately meets the final criteria and considerations, it may place that nomination into an inventory of areas to consider for designation as a national marine sanctuary.

Chapter 7

Community: 2010 to 2020

Chapter 7
Community: 2010 to 2020

As the 2000s closed and its 40th anniversary approached, the sanctuary system had accepted and invested in its identity as a coordinated system of underwater parks. With the intent to start resuming new designations and with the addition of new communities through expansions in American Samoa (2012), Thunder Bay (2014), Greater Farallones (2015), and Cordell Bank (2015) national marine sanctuaries, the system also assumed what may be its most important role yet, as a member of local, national, and international communities.

> *Everywhere you look you can find ordinary people doing extraordinary work, providing scientists with aggregated benchmarking data on our ocean resources. By understanding what conditions are like now, scientists will have something to compare it with later—often during critical times, like after a catastrophic oil spill, as we saw in the Gulf of Mexico. With the help of people just like you and me, collectively we will know a whole lot more about the numbers and types of sea life in our waters, how best to respond to a major disturbance, and how much success we're having in protecting vulnerable habitats.*
>
> Francesca Koe, GFNMS Volunteer and SAC Member, 2012

Sanctuaries had always been part of their local communities, with staff, offices, vessels, and other facilities based in coastal towns and cities, and programs that engaged local residents of all ages. But the maturing view of sanctuaries as members of their gateway communities and as part of a solution to local issues and needs led to increasing investments in programs and partnerships at the local level. One example is the growth of both volunteer opportunities and volunteer contributions. Coming from its roots in the first volunteer program in the system, Beach Watch, founded in 1993 by Greater Farallones National Marine Sanctuary, the system worked to create volunteer opportunities at every site. Volunteer programs grew steadily, from about 4,000 volunteers in 2012 to nearly 12,000 by the end of the decade; by 2012, over a million volunteer hours had been generously served on behalf of the system. In this decade, a volunteer handbook was prepared (2016) and new programs were added, including the Stellwagen Sanctuary Seabird Stewards at Stellwagen Bank National Marine Sanctuary (2010) and Hawaiian Islands Humpback Whale National Marine Sanctuary's Beach Naturalist Program (2018).

Another group of specialized volunteers, members of advisory councils, deepened in importance in the new decade. The Federal Advisory Committee of the National MPA Center and the entirety of the Sanctuary Advisory Councils together, for the first time, issued a "Call to Action" in 2015 in recreation and tourism use of underwater parks, including inviting people to play in parks, embracing the human dimension of ocean places, sustaining ecosystems and values, and engaging recreational users as ocean stewards. The MPA Center's advisory committee issued two key reports in 2017, one on developing ecological connectivity among underwater park networks and another on developing external financing for underwater park programs. In 2013, the sanctuary system invoked its authority under the NMSA for the first time to form a national level advisory council, the Sanctuary System Business Advisory Council, to provide advice and

recommendations on the relationship of ONMS with the ocean business community. Representatives from travel and tourism, recreation, fishing, transportation, energy, and technology sectors, corporate foundations, and other businesses have sat on the council since then.

This new community role included a need to be better about reaching diverse audiences. Building on earlier efforts like Los Marineros and MERITO (see discussion in Chapter 9 on Channel Islands National Marine Sanctuary), the system launched Voyage to Discovery in 2011. This project to explore and share the untold stories of African Americans and the sea played out through partnerships with such groups as the National Association of Black Scuba Divers (NABS) and projects such as essay contests, shipwreck research and mapping, and hosting NABS Youth Environmental Summits. The sanctuary system built on these diversity efforts by launching in 2017 the Heritage of the Blue program, featuring articles, story maps, and photo essays focused on the seven official heritage months of the year. That same year, the sanctuaries homepage and key documents were also translated into Spanish for the first time to make them more accessible.

Members of the National Association of Black Scuba Divers assessed a wreck in Florida Keys National Marine Sanctuary. Image: Tane Casserley/NOAA.

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Samoan singers practiced for a competition held each Flag Day in American Samoa. Image: Matt McIntosh/NOAA.

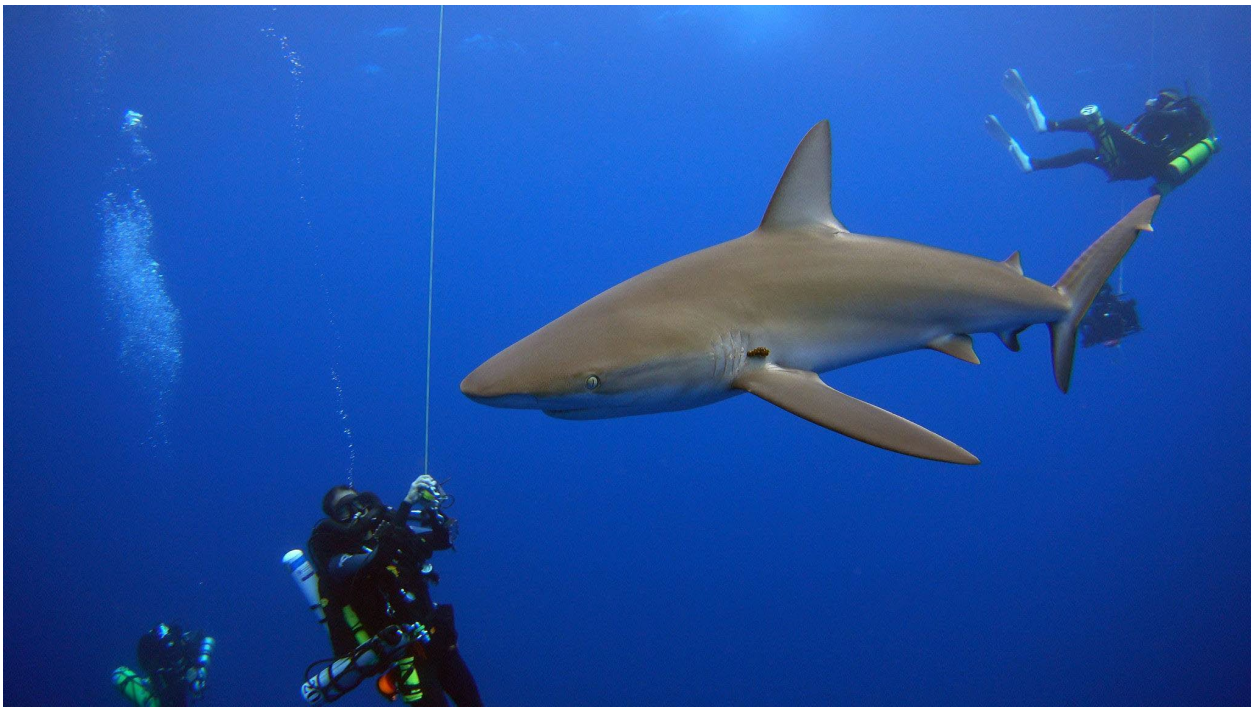
Renewed emphasis was also placed on working with the Indigenous communities in the sanctuary system, including Native Hawaiians, Samoans, and Native American tribes. In 2011, the National MPA Center's Federal Advisory Committee established a Cultural Heritage Resources Working Group which led in 2014 to the launch of an online cultural resources toolkit for underwater park managers which, among other things, defines a cultural landscape approach and provides guidelines on working with Indigenous people, integrating cultural resources into underwater park management, and guarding sensitive cultural information. In 2012, the sanctuary system co-hosted the First Nations Climate Summit at the Smithsonian's National Museum of the American Indian with the Hoh, Makah, and Quileute Tribes and the Quinault Indian Nation. The symposium brought together four regional panels; one each for the

West Coast states; Alaska; the U.S. Pacific states and territories; and the Great Lakes, East Coast, and Gulf of Mexico states. Each day included cultural ceremonies and regional panel discussions. A resolution was drafted and sent to Congress and President Obama requesting formal recognition of the coastal indigenous people and their expertise in understanding and adapting to changes in their natural systems.

While individual sanctuaries built and enhanced their local communities, the system was also renewing its efforts at the national level, helped in 2013 when the office expanded to include the National MPA Center, deepening and enhancing the mission of both. The MPA Center helped connect the system of sanctuaries with the larger network of underwater parks in the nation, as well as took over coordination functions for the system's international and climate programs. The system provided the MPA Center with additional infrastructure and expanded reach to external audiences. The inventory of parks maintained by the MPA Center allows policy and scholarly analysis of the effectiveness and level of protection the nation's underwater parks provide, including in support of domestic and international priorities such as global marine conservation targets and integration of marine conservation and climate resilience agendas.

With so much experience behind it, the system displayed a new confidence in its own leadership role as a protected area manager among other federal agencies and institutions and forged out onto new paths toward ever increasing audience reach. In 2013, the system introduced the world to Sanctuary Sam, the spokes-sea lion and in 2014, launched Get Into Your Sanctuary Day, an annual event designed to increase awareness, engagement, and enjoyment of sanctuaries by their communities. That same year, the Earth is Blue social media campaign debuted. The sleek monthly *Earth is Blue* magazine followed in 2016, the first newsletter from the system since the last issue of *Sanctuary Watch* in Winter 2010. Created in partnership with the National Marine Sanctuary Foundation, the annual 80-page magazine uses vivid imagery and engaging articles to highlight the diversity of marine life within national marine sanctuaries and marine national monuments and to tell stories about the people who depend on them. The system entered the bold new world of virtual reality in 2017 with the launch of its online virtual dive tours, featuring high resolution 360° footage filmed in partnership with Catlin Seaview.

The science side of the sanctuary system was building as much as the outreach and education functions of the system. The first ever sanctuary system condition report, built on the condition reports for each individual site, was completed in 2013, outlining the status and trends of resource conditions across the system. The report also provided a synthesis of information to support sanctuary-level conservation science programming, investment, and decision making. The report also discussed the need for more monitoring and research, the critical role of dedicated citizens who volunteer their time and talents, and the role of partnerships in protecting special marine places. The Condition Report Handbook, summarizing the lessons learned and best practices in over a decade of preparing these report cards, was finished in 2015, just in time to initiate the second system round of condition reports. First up was Channel Islands National Marine Sanctuary, volunteering to test the new procedures, including the addition of ecosystem services to the resources covered by the report. The Chumash Tribe also provided their perspective on ecosystem services as part of the condition report, another first.



A Galapagos shark swam past diving scientists in Papahānaumokuākea Marine National Monument. Image: NOAA and Richard Pyle/Bishop Museum.

Sanctuary scientists were innovating in other ways. In 2010, the Aquarius 2020: If Reefs Could Speak mission featured NOAA aquanauts conducting research on coral reefs in Florida Keys National Marine Sanctuary out of the submerged lab Aquarius. The aquanauts conducted live-broadcast educational programming to thousands each day. Eight years later, the sanctuary system and its partners, including the U.S. Navy, initiated the SanctSound project, designed to characterize and better understand the soundscapes of eight sites and how underwater noise impacts the habitats and animals of sanctuaries. Expected to run through 2022, the project will help managers make more informed decisions.

Important advances in determining visitation to sanctuaries were also made. Because sanctuaries are wide open waters with no single access point, understanding how many people visit and use sanctuaries has been a long-term challenge. With new advances in technology (such as aerial, surface and subsurface uncrewed systems) and machine learning, sanctuary economists and other experts are now making impressive strides in better characterizing, understanding, and monitoring visitation patterns. In tandem with this work, the science team launched, in 2020, its Sanctuary Use Characterization, Assessment and Research (SUCAR) program. SUCAR will update older valuation studies, and undertake new ones, including building better understanding of the profiles of sanctuary communities.

> *Federal resource managers can best meet their public trust responsibilities when marine resource management plans fully integrate sustainable use with robust conservation strategies. The National Marine Sanctuaries Act and Antiquities Act are among the best tools for implementing and integrating those conservation strategies.*
>
> Professor John F. Bruno and other academic experts, 2018

More than at any time in its history, the sanctuary system also reached out confidently to business and corporate partners. The Sanctuary Classic, launched in 2012, was a cooperative effort with recreational fishing organizations and businesses, which helped lead to a groundbreaking agreement signed in 2018 with the National Marine Manufacturers Association, and the American Sportfishing Association, among others. The Business Advisory Council formed in 2013 was the first formal mechanism used by the system to enlist the corporate sector and led to cooperative efforts with numerous companies. Vessel speed reduction trial programs set up by Channel Islands National Marine Sanctuary and its partners in 2014 proved so successful they were expanded to Greater Farallones and Cordell Bank national marine sanctuaries in 2017. Business recognition programs reached a new level of maturity, with the launch of Florida Keys National Marine Sanctuary's Blue Star Diver program in 2009 and Blue Star Fishing Guides in 2018, and the beginning stages of a national recognition framework in 2020.

Partners in the nomination of Papahānaumokuākea Marine National Monument celebrated its inscription as a World Heritage Site in 2010. Image: NOAA.

The sanctuary system was assured in its role as an international leader, helping organize the third International Marine Protected Area Congress in 2012; co-leading the Marine Theme of the 2014 World Parks Congress, the largest gathering of park professionals on the planet; and playing a large role at the 2016 World Conservation Congress in Hawaii. The sanctuary system was a founder or co-founder of numerous underwater organizations during this decade including Big Ocean (2010), a network of managers of marine parks over 100,000 square miles; the MPA Agency Partnership (2012), formed of government agencies around the world charged with MPA management; and the IUCN Task Force on Marine Mammal Protected Areas (2013), consisting of MPA practitioners focused on marine mammal conservation. Papahānaumokuākea Marine National Monument led the effort to designate the site as a World Heritage Site in 2010, and also co-hosted the first meeting of marine World Heritage Site managers in the same year. Additionally, the National MPA Center was a leader in MPA training as they took over the International MPA Management Capacity Building Program founded by the sanctuary system in 2005 to help share best practices, expertise, and experience among marine protected areas managers around the world. During this decade, the system saw significant growth in its sister sanctuary relationships, including by Stellwagen Bank National Marine Sanctuary who with its partners formed the first ever sister sanctuary network with underwater parks in the Dominican Republic, Bermuda, and the French Antilles protecting humpback whales at both ends of their Atlantic/Caribbean migration path.

Community was also the driver for the most significant cultural shift of this decade, the development and implementation of a new process, the Sanctuary Nomination Process in 2014, to allow for new designations. With the injunction on new designations in 2000, the system's Site Evaluation List had gone dormant, and a new mechanism was needed to help build a pool of new sites for future consideration as sanctuaries. Rather than rely on the scientific review teams of the SEL process, the system instead chose to use a community-driven process, where communities (loosely defined as defined as a collection of interested individuals or groups; local, tribal, state, or national agencies; elected officials; or topic-based stakeholder groups, at the local, regional or national level) submitted nominations and NOAA reviewed the submission for adherence to criteria for national significance and other selection factors.

Soon after launching the Sanctuary Nomination Process in 2014, submissions came from communities around the country. After going through the review process, a number were accepted into the inventory. One of them, Mallows Bay-Potomac River, began a designation process in 2015, followed by Wisconsin-Lake Michigan in 2016. Lake Ontario began the designation process in 2019, Chumash Heritage in 2021, and Hudson Canyon in 2022, and three other sites remain in the inventory: Lake Erie Quadrangle, Pennsylvania; St. George Unangan Heritage, Alaska; and Mariana Trench, Commonwealth of Northern Mariana Islands. In 2019, Mallows Bay-Potomac River National Marine Sanctuary and in 2021 Wisconsin Shipwreck Coast National Marine Sanctuary became the nation's fourteenth and fifteenth national marine sanctuaries. They were also the first national marine sanctuaries designated in nearly two decades, the longest stretch without any new marine sanctuary in the system's history.

In his *Metaphysics*, ancient Greek philosopher Aristotle gave us the origin of the phrase: *The whole is greater than the sum of its parts*. In these first chapters, we discussed the whole sanctuary system, how it began and how it evolved from *program* to *system*. Let's turn our attention to the parts of the whole, the sites of the system and their stories.

Christmas tree worms sit atop a coral head in Flower Garden Banks National Marine Sanctuary, the most recent one to expand its boundaries. Image: G.P. Schmahl/NOAA.

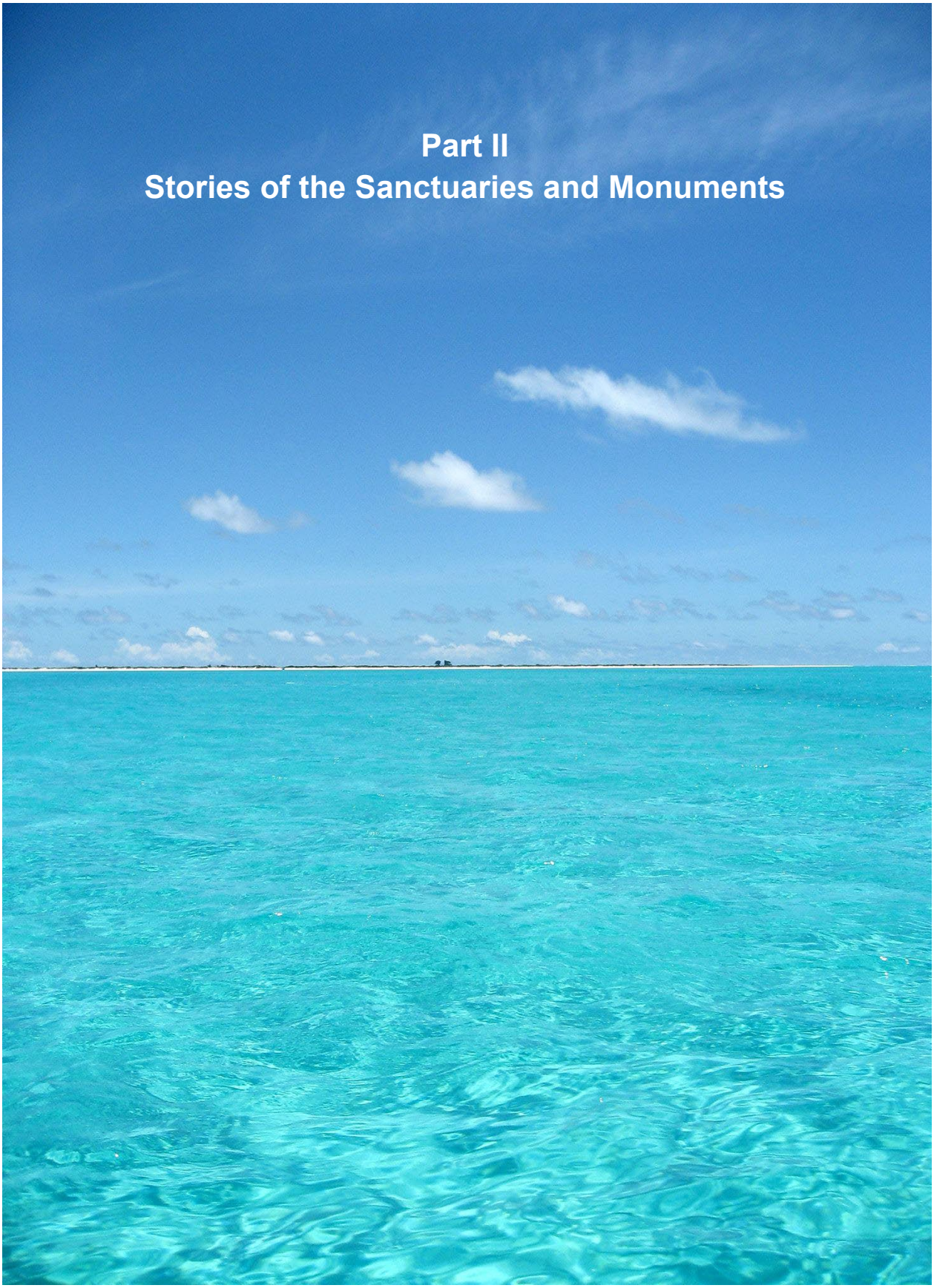
Sanctuaries That Have Expanded Since Original Designation

- 1990: FKNMS: designation of the larger sanctuary subsumed the older and smaller Key Largo and Looe Key national marine sanctuaries for a total area of 3,707 square miles.
- 2000: FGBNMS: expanded to include Stetson Bank, which added 33 square miles to the sanctuary.
- 2001: FKNMS: expanded to include the Tortugas Ecological Reserve, which added 127 square miles.
- 2007: CINMS: expanded by 20 square miles as part of the establishment of a network of marine reserves and conservation areas in the sanctuary.
- 2008: MBNMS: expanded to include Davidson Seamount, which added 766 square miles to the sanctuary.
- 2012: NMSAS: expanded to 13,581 square miles from the older Fagatele Bay National Marine Sanctuary which was less than 1 square mile in area.
- 2014: TBNMS: expanded by 3,852 square miles.
- 2015: GFNMS: expanded by 2,013 square miles.
- 2015: CBNMS: expanded by 757 square miles.
- 2016: PMNM: expanded by 442,785 square miles.
- 2021: FGBNMS: expanded by 104 square miles.

Businesses recognized by the Blue Star Fishing program in Florida Keys National Marine Sanctuary proudly display their plaques. Image: NOAA.

Timeline of Business Recognition and Cooperation Programs

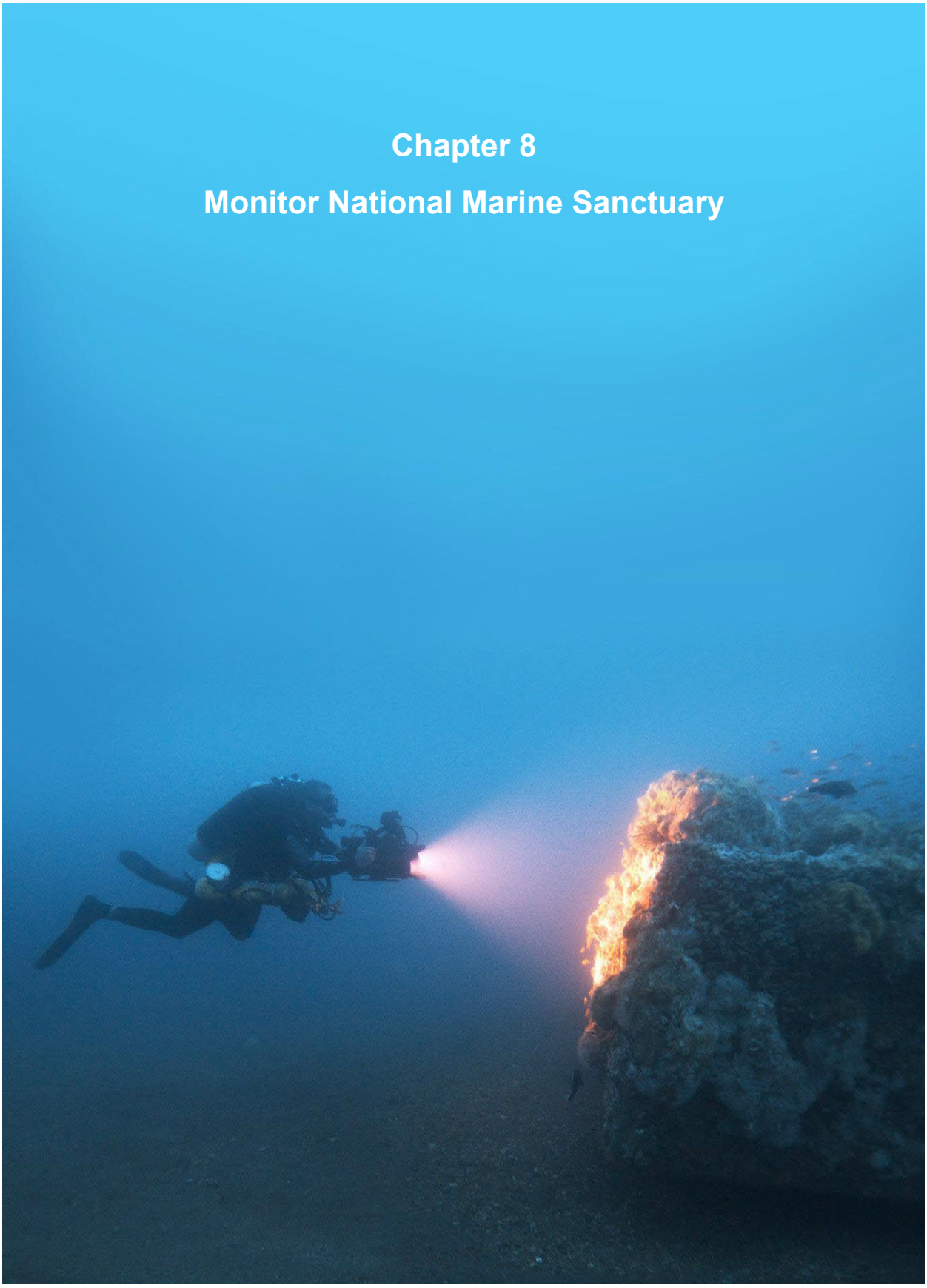
- 2007: FKNMS Dolphin SMART
- 2009: FKNMS Blue Star Divers
- 2009: SBNMS Corporate Responsibility Program (with IFAW)
- 2015: MNMS ANCHOR
- 2014: CINMS Vessel Speed Reduction Program
- 2017: GFNMS/CBNMS Vessel Speed Reduction Program (expansion from CINMS)
- 2019: FKNMS Blue Star Fishing Guides



Part II
Stories of the Sanctuaries and Monuments

Chapter 8

Monitor National Marine Sanctuary



Chapter 8
Monitor National Marine Sanctuary

A Ship Suspended in Time

In 1973, the wreck of USS *Monitor*, a Civil War ironclad that lay deep beneath the ocean surface where it had sunk over a century before, was discovered off Cape Hatteras, North Carolina. Seeking a way to protect the newly discovered wreck from salvage and other potential impacts, Representative Walter Jones, Sr., Governor James Holshouser, and other proponents suggested using a new protection mechanism called national marine sanctuaries. On January 30, 1975, Monitor National Marine Sanctuary became the nation's first underwater park designated under the Marine Protection, Research, and Sanctuaries Act, a circle of about one nautical mile in area around the site of the wreck. For the last 45 years, through a combination of education, archaeology, marine science, and regulatory programs, sanctuary staff have celebrated *Monitor*'s history, preserved its legacy, and honored North Carolina's rich maritime heritage. Dive in to learn more about this iconic wreck, and the nation's first national marine sanctuary.

Discovery (1862 to 1975)

Designed by Swedish-American engineer John Ericsson and built at the Continental Iron Works in Greenpoint, New York, *Monitor* was launched on January 30, 1862. A radical departure from traditional warship design, the vessel was fully steam-powered and completely armored, with engineering spaces, crew and officer spaces, and the galley all below the water line. The first of its kind 21.5-foot diameter, 9-foot-high revolving turret, located at midships, housed two powerful, 11-inch cannons.

> *There is now building at the Continental Iron Works, Green Point, a formidable iron battery, which will probably prove a novel and efficacious implement of war…Captain Ericsson submitted to the commissioners who were appointed to examine the proposals a plan for an impregnable iron battery, which should be novel, yet simple in its construction.*
>
> "The Daily Press", Cincinnati, Ohio, December 24, 1861

Due to the threat that CSS *Virginia* (a Confederate ironclad built from the burned hull of USS *Merrimack*) posed to the federal fleet at Hampton Roads, Virginia, *Monitor* was ordered to Hampton Roads to stop the Confederate ironclad. When *Monitor* arrived on the night of March 8, 1862, it encountered a scene of carnage and despair for the Union Navy. Earlier that day, *Virginia* had attacked the entire Union fleet in Hampton Roads sinking four vessels, capturing a transport, and damaging four other warships. The destruction left behind included 241 Union sailors killed and more than 100 wounded. It was the worst U.S. Navy defeat until Pearl Harbor. In contrast, the crew of *Virginia* suffered only two casualties and a dozen wounded.

The crew of *Monitor* in a photo taken in 1862. Image courtesy of the National Archives.

The Union vessels fought bravely; however, their guns were unable to penetrate *Virginia*'s armored hull. That evening as the burning USS *Congress* illuminated the night sky, USS *Monitor* took up a protective position next to the grounded USS *Minnesota*. Eager to return to the battlefield the next morning, *Virginia* fired the opening salvo from a thousand yards out against USS *Minnesota*, hitting the ship and causing an explosion. USS *Monito*r moved to intercept the *Virginia* and for the next four hours, the two ironclads circled one another, trading shot and shell at point-blank range but doing no significant damage. Through it all, *Monitor* protected *Minnesota*, and it remained afloat. The battle that day left neither vessel seriously damaged, and both sides claimed victory. Historians have called the battle a draw. However, there was one clear winner: ironclad technology. The age of wooden warships was over. But *Monitor's* naval career was short-lived. Shortly after midnight on December 31, 1862, while under tow by *Rhode Island* to Beaufort, North Carolina, the vessel sank in a gale off Cape Hatteras, North Carolina, taking sixteen crew members with it.

> *Our little vessel was lost, and we, in months gone by, had learned to love her, felt a strange pang go through us as we remembered that never more might we tread her deck, or gather in her little cabin at evening. The little*

> *'cheesebox on a raft' has made herself a name which will not soon be forgotten by the American people.*
>
> Grenville Weeks, Surgeon of USS *Monitor*, 1863

The location of the wreck of the *Monitor* remained a mystery for over a hundred years after its sinking. In 1945, a naval vessel testing a new sonar technology called the Underwater Object Locator discovered a submerged object about 140 feet long, the size of the ironclad, and speculation began that it was perhaps the long-lost vessel. But it was nearly thirty years later, when an expedition with the dual purpose of studying the continental shelf and locating the wreck finally confirmed what had been suspected in 1945. In August 1973, scientists aboard Duke University's research vessel *Eastward* located *Monitor* using side scan sonar, which was confirmed by additional expeditions in 1974.

Discussions on how to protect the newly discovered wreck began soon after its discovery. No comprehensive law existed to protect shipwrecks in U.S. waters (the Abandoned Shipwreck Act protecting historic wrecks wasn't passed until 1987) and proponents soon looked toward the new but as yet unused sanctuary authority under the MPRSA. The Governor of North Carolina nominated the wreck to NOAA in 1974 and NOAA completed its environmental impact assessment in 1975, assessing four options for the wreck: salvaging the wreck; adding the wreck to the National Register of Historic Places; precluding all access to the wreck; and taking no action. A national marine sanctuary with regulations that managed but not prohibited access and established other protection measures was deemed the best option, supported by 22 public comments of support from a variety of states, agencies, organizations, and individuals (and one comment against). In October 1974, the wreck was added to the National Register and in January 1975, the wreck site became the nation's first national marine sanctuary. Its regulations included prohibitions on anchoring, salvaging, seabed drilling, and trawling, among others.

Exploration (1976 to 1998)

The sanctuary's first management plan was not completed until January 1982, in part because sanctuary managers needed a better sense of the wreck's condition before they could decide the appropriate course of action and partially because they had a unique task in front of them: Monitor National Marine Sanctuary was one of only a few underwater parks focused on shipwrecks around the world and they were charting new territory. The management plan assessed a number of options: non-interference in the wreck, including most onsite research activities; limited onsite investigation and public access; partial or selective recovery; or attempted full recovery of the wreck. A technical advisory committee (composed of maritime experts from universities, museums, other federal agencies, and the U.S. Navy) supported, and NOAA adopted, the last option. The management plan had three objectives: protect and preserve the wreck and associated documents and artifacts; disseminate information about the wreck; and enhance public awareness of the wreck. Toward those ends, the wreck was made a National Historic Landmark in 1988, the first underwater resource to earn the designation. In 1987, The Mariners' Museum was selected as the principal repository to receive, conserve, and display artifacts from the wreck.

In 1977, NOAA conducted its first research visit to the site, followed in 1979 by an intensive, month-long expedition. This second visit utilized the most sophisticated underwater technology of its time—mixed gas diving that allows divers to reach deeper depths and crewed submersibles—to excavate the captain's cabin and recover artifacts. Numerous research and recovery expeditions coordinated between NOAA and the U.S. Navy occurred from the late 1970s into the early 1990s. Major dives in 1979 recovered numerous small artifacts. The *Monitor*'s unique four-fluked anchor was recovered in 1983. The ground-breaking three-week long expedition in 1987 (using an ROV called "Deep Drone" to carry out corrosion and structural surveys and sonar-mapping of the wreck) generated press coverage by media as varied as the *New York Times*, CNN, *Time*, and *Parade*. The following year, an expedition to continue corrosion surveys and take photos of the wreck to construct a photo mosaic generated additional national and international press coverage, including another article in *Parade*. The *Monitor* was also featured in the BBC/PBS series *Discoveries Underwater* and was the subject of an exhibition at the Philadelphia Maritime Museum. Outreach efforts conducted by the sanctuary itself included the 1992 launch of the newsletter *Cheesebox*, the Civil War-era nickname for the vessel, and in 1995 the launch of an education kit including brochures, posters, and reproductions of artifacts and crew letters.

But the advent of the 1990s also brought an alarming pattern of accelerated deterioration in several areas of the wreck. In 1996, NOAA's new management plan for the sanctuary included among its primary goals: continue the current program of monitoring studies to document and analyze changes to the *Monitor* and its immediate environment; evaluate technologies and resources for stabilization of the *Monitor*; and map and recover *Monitor* artifacts which are in danger of being damaged or destroyed. That same year, NOAA was also given a mandate by Congress to develop a plan to preserve what was left of the *Monitor*. In 1998, the long range plan—*Charting a New Course for the* Monitor—was released, outlining a six-step project for stabilizing portions of *Monitor*'s hull and recovering the vessel's steam engine and rotating gun turret.

The wreck of the *Monitor* lies in over 230 feet of water far off the coast of Cape Hatteras, an area infamous for its bad weather and rough sea conditions. Diving at this depth is physically exhausting and dangerous and requires technical training and sophisticated technology. Any recovery operations for the wreck were certain to be arduous and risky, fraught with technical difficulties even under the best circumstances in the cold deep waters of the Atlantic. But the plan set the stage for over fifteen years of success that would begin with recovering some of the key structural elements of *Monitor* and end with a belated heroes' burial in Arlington National Cemetery.

The turret of *Monitor* was loaded onto a barge during the recovery expedition in 2002. Image: U.S. Navy, courtesy of the National Archives.

Recovery (1998 to 2012)

When the *Monitor*'s 9-foot cast iron propeller and 11 feet of propeller shaft were recovered in 1998 with the help of the U.S. Navy, they represented the largest artifacts recovered from the wreck. But, NOAA and the Navy began planning larger recovery expeditions in 1999 and conducted a 2000 expedition to assess the wreck for recovery operations, which was featured on *Wreckfinder* on Discovery Channel, *NOVA* on PBS, and a special on the History Channel. The stabilization portion of the long range plan was implemented in 2000 and 2001. The *Monitor*'s vibrating lever steam engine was successfully recovered in 2001.The Batten Conservation Complex also opened at The Mariners' Museum in 2001, specifically to conserve *Monitor* artifacts recovered in prior and ongoing expeditions. But the largest recovery effort came in 2002, when a 41-day expedition raised the rotating gun turret and two 11-inch cannons from the ocean floor. In March 2007, The Mariners' Museum and NOAA officially opened the USS *Monitor* Center, a 64,000 square foot addition to the museum's existing building dedicated to telling all facets of the USS *Monitor* story, including designer John Ericsson, CSS *Virginia*, and Monitor National Marine Sanctuary, as well as the ongoing artifact conservation including the engine and gun turret.

> *After 140 years on the ocean floor, NOAA and the U.S. Navy raised the turret of the USS Monitor yesterday. The turret broke the ocean's surface at 5:47 pm and landed safely on the deck of the derrick barge Wotan at 5:59 pm.*
>
> Press Statement by NOAA, August 6, 2002

The recovery of the turret marked the end of the major recovery work for the wreck, but not efforts to study and share the *Monitor*. In 2005, the sanctuary established its advisory council to bring in the voices of experts to help shape the future of the sanctuary. It was the first such advisory group for the sanctuary but the last one created for an existing site; the system now has 16 site-based councils. Like its counterparts at other sites the sanctuary's council was, and remains, composed of a range of members representing community interests, maritime heritage experts, and governmental partners.

In 2008, the site released its first condition report, which summed up what experts had already been seeing for decades. Much of the wreck's lower hull plating had already collapsed before the wreck was even discovered, and more was removed to gain access to recover the steam engine. Years of impacts from storms and natural corrosive processes had done their work in breaking down the wreck, a deterioration that continues today. Major recovery efforts were successfully completed; conservation efforts were underway; interpretation and education programs were ongoing. But one major task remained elusive: who were the sailors whose remains had been found in and around the turret in 2002?

Finding human remains on the wreck wasn't unexpected; sixteen members of the crew had been lost with the vessel on the fateful night in 1862. But, to find nearly complete skeletons concentrated inside the turret during the 2002 expedition was surprising. No one ever expected to be able to positively identify a specific member of the crew, which is what the sanctuary set out to do next.

The remains were taken to what is now the Defense POW/MIA Accounting Agency, as records were examined to see if they could help identify which members of the crew might have been in the turret as the vessel was going down. Extensive genealogical research was conducted and DNA from the bones was tested against that volunteered by known descendants of *Monitor*'s crew to help determine their identity. Forensic facial construction was even completed by experts in Louisiana State University's Forensic Anthropology and Computer Enhancement Services Laboratory using a combination of 3-D clay facial reconstruction, computer-generated modeling, and computer-enhanced imaging techniques. The faces of the two men, both white, dark haired, and dark-eyed, one in his late teens or early 20s, the other older, perhaps up to 40 years old, were revealed to the public in 2012, hoping someone might recognize them from old photos or records.

The two *Monitor* sailors were laid to rest in Arlington National Cemetery in 2013. Image: NOAA.

But no definitive identity was able to be given to either man. After resting on the seabed for over 140 years and after exhausting all their avenues for identification over a decade, NOAA and the Navy decided the time had come to bury the remains. In 2013, the two sailors were laid to rest, with full military honors, in Arlington National Cemetery, and a monument was dedicated to them and the fourteen others who were lost with the *Monitor*.

Expansion (2013 and ongoing)

USS *Monitor* was hardly the only ship claimed by the dangerous shoals and unpredictable weather off Cape Hatteras. The waters surrounding Monitor National Marine Sanctuary have been associated with nearly 500 years of western maritime history, including colonial exploration, commerce, the American Civil War, U.S. naval aviation, World War I, and, most predominantly, World War II's Battle of the Atlantic. In its entirety, this oceanic World War II battlefield spanned the Atlantic Ocean and Gulf of Mexico, but nowhere did the war come to America's doorstep as it did off North Carolina's coast. Cape Hatteras, North Carolina, emerged as a strategic destination for German U-boats targeting Allied convoys that were carrying critical supplies to the war effort in Europe and Africa. The combination of the geography of the Outer Banks, proximity of the continental shelf, and well known shipping lanes provided German U-boats an ideal hunting ground where they could easily attack merchant ships and then retreat to deeper waters. In just three years, from 1942 to 1945, Germany's devastating U-boat campaign

against merchant shipping caused the loss of 90 ships and nearly 1,700 souls off North Carolina alone. These factors resulted in the highest concentration of World War II shipwrecks near the continental U.S., as well as the largest collection of World War II shipwrecks anywhere in the United States.

Recognizing these shipwrecks were as much of historical interest as *Monitor* (and had important stories to tell about service and sacrifice on behalf of the nation), the sanctuary began in 2008 to conduct expeditions to identify, document, and study its shipwrecks. A five-year expedition was kicked off in 2008 and by the time it wrapped in 2012, it had identified the wreck of the patrol boat USS YP-*389*, among others. Other research expeditions in ensuing years would also find, confirm, and/or survey additional wrecks. Work with federal and academic partners in 2014 identified two additional wrecks from the Battle of the Atlantic, the German U-boat U-*576* and freighter *Bluefields*. A formal five-year Battle of the Atlantic shipwreck study was launched in 2015. 2015 also saw the U-*576* work featured in *Alert Diver* magazine.

The more the sanctuary explored and learned about the Battle of the Atlantic, and the maritime heritage off the coast of North Carolina, the more it was convinced that the area deserved the protection of sanctuary status. When the sanctuary's most recent management plan was released in 2013, it included among its eight action plans one to expand the sanctuary to include these other shipwrecks; the other seven focused on resource protection, education and outreach, archaeological research, resource monitoring, *Monitor* sailors, artifact conservation, and operations and administration. The sanctuary announced its formal expansion proposal in 2016, with a formal public review period and five public hearings in North Carolina and Washington, D.C.

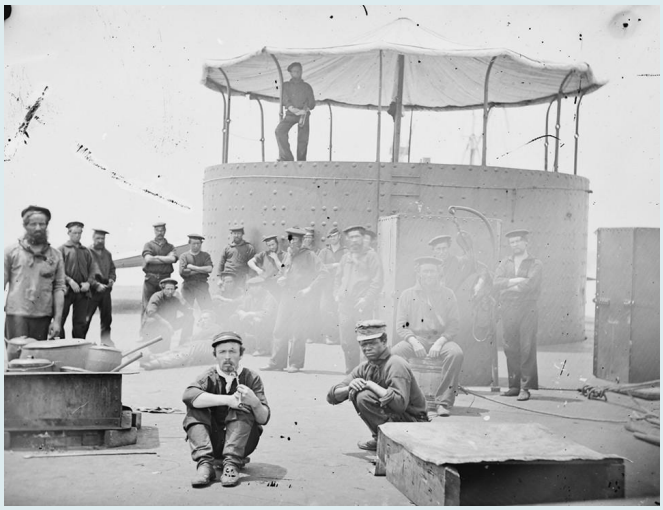
Divers investigated the wreckage of U-701, which was sunk off Cape Hatteras in 1942. Image: Stephen Sellers/NOAA.

The sanctuary initiated two new stewardship programs benefiting the expansion effort. Partnering with the Nautical Archaeology Society in 2013, the sanctuary began teaching a maritime archaeology course to qualified divers to prepare them for citizen science projects helping to survey Battle of the Atlantic shipwrecks off North Carolina; its first graduating group of twenty volunteers helped complete a survey of the Soviet tanker *Ashkhabad*. In 2015, the sanctuary launched its ANCHOR program: Appreciating the Nation's Cultural Heritage and Ocean Resources. ANCHOR helps educate local dive shops and divers about protecting shipwrecks and how to dive on them responsibly.

The sanctuary also continued its *Monitor*-focused work. 2016's *The USS* Monitor *and NOAA: A Look Through Time* video tells the story of the ironclad from the Civil War until today, and the *Maritime Archaeology: Discovering and Exploring Shipwrecks* curriculum teaches students about why shipwrecks are important and the tools and science used to discover and study them. In 2017, the sanctuary unveiled 3-D photogrammetric models of *Monitor*, and seven other Battle of the Atlantic shipwrecks. In 2018, the unique art installation *Monitorium* by renowned artist Wayne White at the Virginia Museum of Contemporary Art used monumental-sized puppets, props, and sound to present White's unique perspective on the USS *Monitor*, the Battle of Hampton Roads, and the people associated with the ship.

Whether through news story, lesson plan, or modern art installation, by celebrating the iconic USS *Monitor*, by preserving and remembering the events of World War II off our shores, we tell

the stories of the men and women who made such sacrifices for this country. And we honor that sacrifice and hope that no other lives must be offered up in war. For, as philosopher George Santayana wrote in his 1906 *The Life of Reason*: "Those who cannot remember the past are condemned to repeat it."



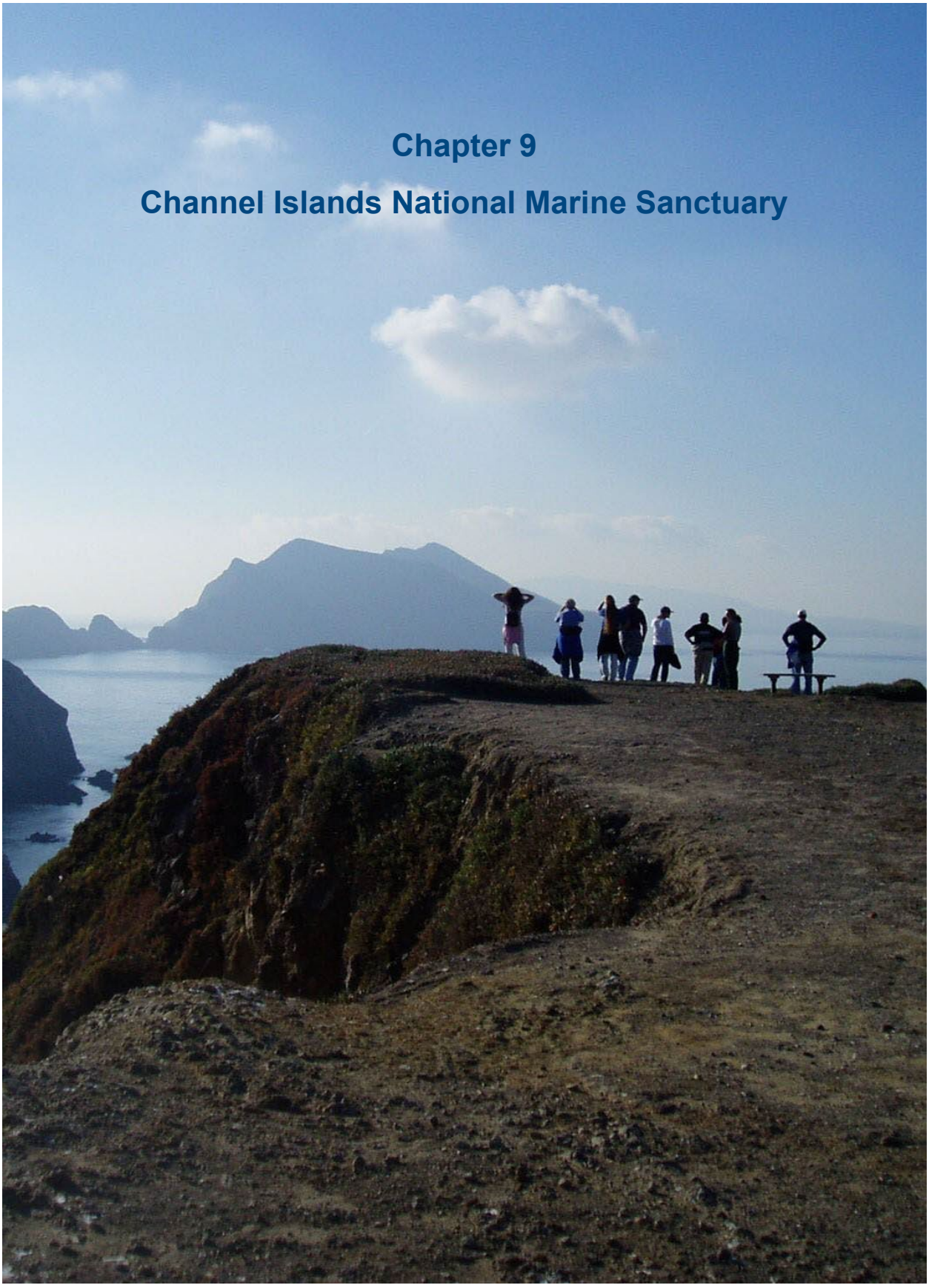
Members of the crew of *Monitor* in July 1862. Image courtesy of the Library of Congress.

Origins of the Sanctuary's Name

The name *Monitor*, meaning someone or something that watches and warns, was suggested for the vessel by its designer John Ericsson. The name was borne by the original ironclad, as well as being the name for the general class of its type and was also the name of a World War II landing ship. Just for fun, the Star Trek media franchise has also used the name for several different classes of starships in its fictional universe.

Sanctuary Superintendents

- Floyd Childress and Ted Lillestolen (both NOAA Corps), ran from HQ, 1975 to 1983
- Edward Miller, ran from HQ, 1983 to 1989
- Ileen Byron, ran from HQ, 1989 to 1991
- Dina Hill (acting), 1991 to 1992
- John Broadwater, 1992 to 2006
- Dave Alberg, 2006 to 2021
- Paul Orlando, 2021 and ongoing



Chapter 9

Channel Islands National Marine Sanctuary

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The Galapagos of North America

Averaging over twenty miles offshore of mainland California, in the Santa Barbara Channel, lie eight islands that are home to so many unique species and productive habitats, they have been nicknamed the Galapagos of North America. These waters combine warm and cool currents to create an exceptional breeding ground for many species of plants and animals. Forests of giant kelp are home to numerous populations of fish and invertebrates. Every year, over 27 species of whales and dolphins visit or inhabit the sanctuary including the rare blue, humpback, and sei whales. Seabird colonies and sea lion rookeries flourish on and around the islands.

Five of those islands, those that lie in the north (Santa Cruz, Santa Rosa, San Miguel, Santa Barbara, and Anacapa) have been deemed so valuable, they have been protected through numerous special designations, both on land and at sea, including Channel Islands National Monument (1938), Nature Conservancy Santa Cruz Island Preserve (1978), Channel Islands National Park (1980), Channel Islands National Marine Sanctuary (1980), and a network of state and federal marine reserves and conservation areas (2004 and 2007). Learn more about the story of how Channel Islands National Marine Sanctuary came to be.

A Conservation Foundation (to 1980)

The Channel Islands as we know them today arose about 18,000 years ago, when rising seas engulfed the one large island that geologists named Santarosae. When humans came to live in the islands is uncertain, but Daisy Cave on San Miguel Island holds the earliest known coastal shell midden on the continent, and the bones of a woman recovered from Santa Rosa Island in 1959 are about 13,000 years old, making these the oldest known human remains in North America.

Paleo-Indians who lived in the islands, the ancestors of the Chumash people, used boats for hunting marine mammals and for trading with the mainland people, practices which held up for centuries before European explorers arrived. Because each island had different resources, the people developed an organized, watercraft-based inter-island trade network that helped evolve a single unique culture. The islands are by Chumash traditional beliefs the center of creation. Legend holds that humans crossed from over the rainbow bridge to the mainland, when the Creator became concerned about overcrowding on the islands. Though warned not to look down as they crossed over, some people did and fell into the sea and became dolphins who ever after have been considered the relatives of the Chumash people. Chumash tradition holds that the ‘Elye‘wun, swordfish, are also relatives who live under the sea and occasionally provide whales for sustenance and support by tossing them ashore.

> *The people venerated the swordfish because they sometimes chased whale ashore and thus the people had a lot of meat…When they threw a whale out*

on the shore the people were glad for there was lots to eat. The whale belonged to the people who owned the shore just where it washed up.

Chumash oral narrative collected by J.P. Harrington in "December's Child: A Book of Chumash Oral Narratives", edited by Thomas C. Blackburn, 1975

The settlement of the islands and trade within them was facilitated by a use of a unique planked boat called the tomol. The tomol is the only known Native American boat made from planks, substantially different from the reed, dugout, or skin boats made and used by other tribes. The tomols represented a significant engineering accomplishment, made with whalebone wedges and stone drills which European and Asian cultures were only able to achieve after the development of iron tools. Drift redwood was split into planks and sewn together using red milkweed, and the vessel was sealed with local naturally occurring asphalt. Coyote, a mischievous figure who figures prominently in many stories, provided the Chumash with their tomols and taught them how to fish.

Chumash "pullers" propelled their tomol on its annual crossing from Channel Islands Harbor to Limuw (Santa Cruz Island) in 2015. Image: Robert Schwemmer/NOAA.

Spanish explorers arrived in California in the 1540s and serious colonization efforts began in the 1760s as military, missionary, and economic interests combined to bring more and more Spanish to the area. The Chumash culture, which flourished for centuries, was almost

completely eradicated after a few short decades of contact, including the Island people who had been moved to the mainland under the mission system.

In ensuing years, California transitioned from Spanish possession to being part of Mexico and eventually entered the U.S. union with statehood in 1850. The Channel Islands were seasonally inhabited by Alaskan Aleuts hired by Russian and American fur companies to hunt seals and otters, a particularly lucrative trade that eventually decimated the marine mammal population by the 1820s. They camped on the islands for months at a time and hunted the animals from their native *baidarka* watercraft, stitched skins stretched over frames of wood or bone. Yankee whalers first visited the Channel Islands in the early 1800s. While the industry was less prominent along the California coast than the Pacific Northwest whaling grounds, it was still a strong industry around the islands. Whale populations, too, were indiscriminately over-hunted to near extinction. Whalers soon moved on to more productive regions in the Arctic and off the coast of Japan.

The gold rush that started in California in the 1850s led to booming sea traffic and ports, including in the Santa Barbara region. Increased shipping traffic meant a corresponding increase in shipwrecks, especially at the rocky islands and mainland points. One notorious shipwreck was that of the SS *Winfield Scott*, a steam ship carrying gold, mail, and more than 450 crew and passengers, which in December 1853 wrecked at Anacapa Island while traveling from San Francisco to Panama.

Different eras brought new waves of fortune, and misfortune, to the islands. Ranching, which introduced cattle, sheep, horses, and pigs to the islands, began in the 1830s and continued into the 1990s. Convicts were sequestered on Santa Cruz Islands in the 1830s. Military use of the islands began in the 1930s and continued through World War II and into the 1950s. Eventually much of the land transferred from private, NGO, and military hands into the ownership of the National Park Service.

The waters around the islands were no different, seeing vast changes in the last two centuries. Commercial fishing increased exponentially and brought new immigrants to the state, from the Chinese in the 1850s, to Japanese in the late 1800s to Italians soon after, each bringing their distinct types of fishing boats with them. Prohibition in the 1920s saw the Channel Islands and surrounding waters as the site of considerable rum running and smuggling. Canadian and Scottish liquors were offloaded at the islands and then transported into Santa Barbara and Ventura on moonless nights in fast powerboats. Abalone, whose abundance soared with the removal of otters and relocation of Chumash, were harvested to dangerously low levels and severely impacted by withering foot disease, with white abalone eventually being placed on the Endangered Species List in 2002, the first marine invertebrate to be so listed. Black abalone were listed as endangered in 2008 but have recently seen a significant uptick in their abundance.

A 1910 postcard showed a view of Santa Cruz in Channel Islands National Marine Sanctuary. Image: Detroit Publishing Company, courtesy of the Library of Congress.

Modern conservation in the Channel Islands region could perhaps be dated to 1938 when President Franklin D. Roosevelt declared Channel Islands National Monument. Though the original declaration focused on the islands of Anacapa and Santa Barbara, even then scientists were impressed with the marine life around them and by 1949, they had prevailed upon President Truman to add the waters within one nautical mile of shore to the monument. As the ownership of the land on the other three northern Channel Islands gradually moved away from private and military holders, interest grew in protecting those islands as well, until the late 1970s when legislation was introduced numerous times to create a national park. These efforts came to fruition on March 5, 1980, when President Carter signed on and the national monument became Channel Islands National Park.

> *Channel Islands: The Channel Islands Are of the Sea. Sandy Beaches, Craggy Headlands, Quiet Coves…*
>
> National Park Service Interpretive Brochure, 1963

Congruent with interest in expanding protection on land, there was also strong interest in increasing conservation efforts in the marine environment. The state of California, through the California Resources Agency, nominated the site in 1977 to NOAA's List of Recommended Areas, along with the areas that would later become Greater Farallones and Monterey Bay national marine sanctuaries. A public workshop was held in April 1978 and an issue paper was circulated

for review and discussion among state and federal agencies in December that year. In 1979, the site was made an active candidate, meaning the site was going through a designation process to become a sanctuary; proposed regulations and a draft environmental impact statement were issued in November 1979. It was one of seven sites that were the first ever such active candidates for the program; five of those seven would eventually become sanctuaries.

As part of the public review process, public hearings were held in January 1980 in both Santa Barbara and Ventura. The sanctuary proposal elicited comments from both proponents and opponents. Some advocated extending the boundaries to include the entire Santa Barbara Channel while others felt the islands were already adequately protected by existing authorities. A number of groups questioned both the exclusion or inclusion of certain uses in the regulations or made specific requests about how such regulations should be shaped. As the sanctuary was the first large, truly ecosystem-based sanctuary to go through a designation process (earlier sites were either single resource and/or very small), these comments and NOAA's response to them set a precedent for the sites that would follow.

In September 1980, seven months after the national park was created, Channel Islands National Marine Sanctuary was designated. In his signing statement for the 1980 designation of the sanctuary, President Carter said: "The Channel Islands Sanctuary demonstrates how we can work together to manage our environment prudently without major economic sacrifices. It will be a model for other sanctuaries to follow." And indeed, it has been.

A Conservation Generation (1981-2013)

The sanctuary had become a reality, with delineated boundaries and enforceable regulations. But this was, for now, simply a paper park, a term in the conservation community meaning a protected area having no real impact. The sanctuary, and the program that ran it, had to start earning its conservation credibility in the southern California region. The first step was creating a management plan, which was released in 1983. The actions and programs contained in the management plan were a hybrid of concern-driven and functional areas, laid out according to management actions, research, and interpretation. The primary management concerns at the time were focused on logistics related to the remote location of the sanctuary, coordination of enforcement activities, development of basic research and interpretive programs, and development of a contingency plan for emergencies. Research programs were focused on the baseline characterization of sanctuary resources and development of groundwork for future monitoring programs. Interpretive programs were focused on building public awareness of the sanctuary.

The 1983 management plan provided the foundation for an ever-increasing suite of conservation measures and programs for the ensuing thirty years. In 1991, an Area to be Avoided designation, a measure conferred by the International Maritime Organization, was created around the islands. The sanctuary began operations of the R/V *Ballena* in 1996, and in 1997, expanded their research area to the skies with the use of aerial surveys to monitor human and wildlife activities in and around the islands under the Sanctuary Aerial Monitoring and Analysis Program. In 2000, the vessel traffic lanes transiting through the sanctuary, along with those transiting Monterey Bay and Greater Farallones national marine sanctuaries further north, were shifted, also by the International Maritime Organization, to move large cargo and other ships away from the sensitive areas of the three sanctuaries.

The turning of the millennium brought new tools and partners to help protect the resources of the sanctuary. In 1998, the sanctuary seated its first advisory council, the seventh in the system to do so. The advisory council, today 21 members strong, remains an important component of how the sanctuary does business. Members represent the general public, tourism, business, recreational fishing, commercial fishing, non-consumptive recreation, education, research, conservation and Chumash community interests, as well as local, state and federal government agencies. Five working groups—Conservation Working Group, Sanctuary Education Team, Commercial Fishing Working Group, Recreational Fishing Working Group and Research Activities Panel—operate under the purview of the council and help to bring additional community members and experts together to focus on specific issues.

In the early years of the 2000s, the state of California began laying the groundwork for an eventual network of marine protected areas in its state waters. After a long, involved public process, in 2003 California established the first set of marine reserves in the state waters of the sanctuary, which included ten marine reserves (which do not allow harvest of any kind) and two marine conservation areas (which allow limited types of harvest). In 2007, NOAA completed action to extend the marine protected areas into the deeper federal waters of the sanctuary. The network is designed to protect and restore habitats; provide a refuge for all sea life; provide reference areas for research and educational opportunities; and protect marine natural heritage for future generations. Regular biological and socioeconomic monitoring have shown that not only has the network been successful in meeting its objectives, it has done so without any serious detriment to the uses and economic value of the region.

> *The South Central Coast prides itself on its conservation ethic, as embodied in Channel Islands National Park and Los Padres National Forest. The sanctuary extends this ethic into the sea, ensuring a healthy ocean environment for future generations of swimmers and surfers, fishermen and boaters, teachers and students.*
>
> Representative Lois Capps, on the 25th anniversary of the sanctuary, 2005

Once the marine protected area network was complete, the sanctuary turned its attention to preparing its first new management plan in a generation. In 2009, as part of a system-wide project to update the guiding documents for all sites, the sanctuary released a new management plan. This one, far more detailed than its 1983 predecessor, was built around a series of action plans for public awareness, conservation science, water quality, emergency response and enforcement, maritime heritage, resource protection, operations, and performance evaluation.

Later that year, the sanctuary's first condition report was also released. It found, in general, that water quality in the sanctuary was in fair to good condition but the abundance and distribution of major habitats and key species, the integrity of maritime archaeological resources, and impacts from human use were of concern.

A diver inspected the remains of *Winfield Scott*, discovered in 1981 in the sanctuary. Image: Robert Schwemmer/NOAA.

The maritime history resources of the sanctuary were not neglected during this period. As early as 1981, with the discovery of the wreck of the *Winfield Scott*, the sanctuary took its maritime heritage responsibility seriously. An inventory of shipwrecks in the sanctuary was completed in 1985. In 1987, in the first prosecution of its kind, twenty individuals were charged with, and found guilty of, violating sanctuary regulations when they ransacked and removed artifacts from three shipwrecks in the sanctuary. The case set a precedent in the protection of shipwrecks that still stands today. In 1996, the sanctuary completed a more comprehensive submerged cultural resource assessment of the sanctuary, in cooperation with Channel Islands National Park. The wreck of the *Winfield Scott* was featured by the History Channel in 2002.

The sanctuary's efforts during this three-decade period were also directed at engaging Santa Barbara-region communities. New sanctuary exhibits appeared at the Channel Islands National Park Visitor Center, the Anacapa Island Museum, and the landing docks at Anacapa and Santa Barbara islands in 1986; the exhibit at the visitor center was joined by sculptures of a dolphin and California sea lion by artist Bud Bottoms. The sanctuary's newsletter *Alolkoy*, the Chumash word for dolphin, debuted in 1988 and the following year, the sanctuary and its partners published the *Directory of Marine and Coastal Education Resources for Santa Barbara, Ventura, and San Luis Obispo Counties*. The sanctuary partnered with the Santa Barbara Museum of Natural History to open the Sea Center on Stearns Wharf and worked with the local school district to build Los Marineros, a multidisciplinary marine education program for 5th graders. In a first for the system, the sanctuary launched its website in 1995. 1996 saw the

creation of the Marine Educator's Regional Alliance (MERA) with 28 member organizations, to help coordinate among the many conservation education efforts in the area.

The Waves on Wheels Program—delivering marine science lessons in a van to elementary schools in the region—debuted in 2002. The From Sea to Shore Lecture Series, co-sponsored by Channel Islands National Park, began offering talks to the local community about ongoing research programs in 2004. A brochure on safe boating and responsible wildlife reviewing was sent to nearly 28,000 registered boaters in Ventura County, an effort that involved also working with the national park, and state and local partners. This same pioneering spirit led to the 2009 installation of four interactive kiosks in locations near the sanctuary (the first in the sanctuary system) and the 2012 release of the Tidepool app, one of the first released by the sanctuary system and still a favorite of those exploring the sanctuary's intertidal zones.

In 1987, the sanctuary assisted the Chumash community in the construction of a tomol and in 2001, supported the first modern crossing of a tomol from the mainland to Santa Cruz Island (Limuw). *'Elye'wun* arrived after a day-long journey to be greeted by Chumash families. A research voyage the year prior did not end so fortunately. In November 2000, while conducting research with scientists from the U.S. Geological Survey near Point Conception, R/V *Ballena* capsized. The vessel, a complete loss, was replaced in 2003 by the state-of-the-art R/V *Shearwater*, which today continues to serve as the sanctuary's primary research platform.

Representative Lois Capps christened R/V *Shearwater* in 2002. Image: Sarah Marquis/NOAA News, June 2002.

In 2002, the sanctuary deepened its already strong relationship with the national park when they partnered to create the Channel Islands Naturalist Corps, a group of specially trained volunteers dedicated to educating passengers onboard whale watch vessels visiting Channel Islands National Marine Sanctuary and Channel Islands National Park. Volunteers are also

trained to lead island hikes within the national park, participate in numerous local outreach events, and to conduct citizen science, including the collection of valuable research on marine mammals and other important sanctuary and park resources.

A Conservation Future (2013 and ongoing)

A generation has grown up on the shores of Santa Barbara since the sanctuary was designated. Children who once kayaked around the islands and hiked their heights now take their own children to do the same. The sanctuary has fulfilled the promise it made on September 22, 1980 and become a respected conservation institution. But in some ways its job is just beginning, and the sanctuary is still innovating to protect its resources, engage its constituents, and test new conservation mechanisms.

In 2013, the sanctuary moved into new offices adjacent to the Maine Science Institute on the campus of the University of California, Santa Barbara, bolstering their productive university partnership in support of research and education. Also in 2013, the sanctuary assisted in the opening of the Channel Islands Boating Center at Channel Islands Harbor in Ventura, California. The new center was created to provide educational and recreational opportunities for residents and visitors, teaching boating skills and safe boating practices, and providing educational resources about the local marine environment and the sanctuary. The center features sanctuary system exhibits, touch screen kiosks, a spherical display, the interactive *Shipwrecked* game, and classroom space.

After a number of ships struck and killed whales, the sanctuary looked at options to address the issue. Work with the International Maritime Organization and other partners led to a shift in shipping lanes through the sanctuary in 2013 to move vessels away from known hotspot whale feeding areas. In 2014, the sanctuary, in partnership with local Air Pollution Control Districts and the National Marine Sanctuary Foundation, began a trial program called Blue Skies and Blue Whales to see if an incentive-driven approach could slow large vessels in the channel to help prevent ship strikes on whales and reduce air pollution. Seven global shipping companies participated by slowing ship speeds, achieving a significant reduction of greenhouse gas emissions. The speed reduction also greatly reduced the chance of fatal ship strikes on whale populations. The trial was such a success a second program, the 2016 Vessel Speed Reduction incentive program, was launched from July through November 2016. In 2017, the program was made permanent and geographically expanded to include speed reduction zones in the San Francisco Bay Area which added Monterey Bay, Greater Farallones, and Cordell Bank national marine sanctuaries.

An aerial view of Anacapa. Image: Robert Schwemmer/NOAA.

In 2016, the sanctuary, with its partners in NOAA Office of Exploration and Research and the National Centers for Coastal Ocean Science hosted telepresence broadcasts from the Ocean Exploration Trust's exploration vessel *Nautilus* expedition that reached students all over the country, more than 525 per day. Scientists from around the world were also able to participate and contribute to the mission in real time. 2018 featured other technological innovations as the sanctuary participated in testing a shore-based radar system designed by engineering students at the University of California, Santa Barbara to track local vessel movements and in also working with California Department of Fish and Wildlife to test eFINS, a new mobile app assisting law enforcement officials in the field to electronically record and reference enforcement encounters, even in remote offline environments.

In 2018, the sanctuary system initiated the second round of its condition reports, refining the approach pioneered in the first round (completed in 2013) and adding in an assessment of the ecosystem services of each site. The sanctuary volunteered to be the first site to undergo the revised assessment. The report, released in two parts in 2018 and 2019, described the current status of sanctuary resources, finding that while water quality remains in fair to good condition, abundance and distribution of major habitats and key species are only in fair condition, with fears that conditions are on a downward trend. The integrity of maritime archaeological resources remains in fair condition. The Chumash community representatives on the sanctuary advisory council were invited to independently author a chapter within the condition report that provides their own assessment and powerful cultural perspective on the sanctuary's ecosystem services, a first for the sanctuary system.

> *They are there in the ecosystems shaped by untold generations of Chumash traditional tending. They are there as protectors of the buried ancestors and villages. And they are there through the prayers of people longing for reconnection with their home. Their relatives exist there too – dolphins, foxes, oaks, olivellas, abalone. The Chumash are the islands and the waters.*
>
> The Chumash Ecosystem Services Assessment, 2019, part of the CINMS Condition Report

The condition report set the stage for a new management plan review that was initiated in October 2019. A draft management plan with ten action plans for climate change, marine debris, vessel traffic, introduced species, zone management, education and outreach, research and monitoring, resource protection, cultural resources and maritime heritage, and operations and administration was released for public review from December 2021 to February 2022. The comments received in writing and at virtual public hearings are now under review and will be used to inform the preparation of the final management plan that will guide the sanctuary in coming years.

The findings of the condition report demonstrate a hard truth: despite all the protection invested in the Channel Islands, much work still remains. The new condition report found that climate change is a major threat to the sanctuary ecosystem and the ecosystem services it provides. Our job in protecting the Channel Islands, all of the ocean parks in the nation, and indeed the entire ocean, remains crucial.

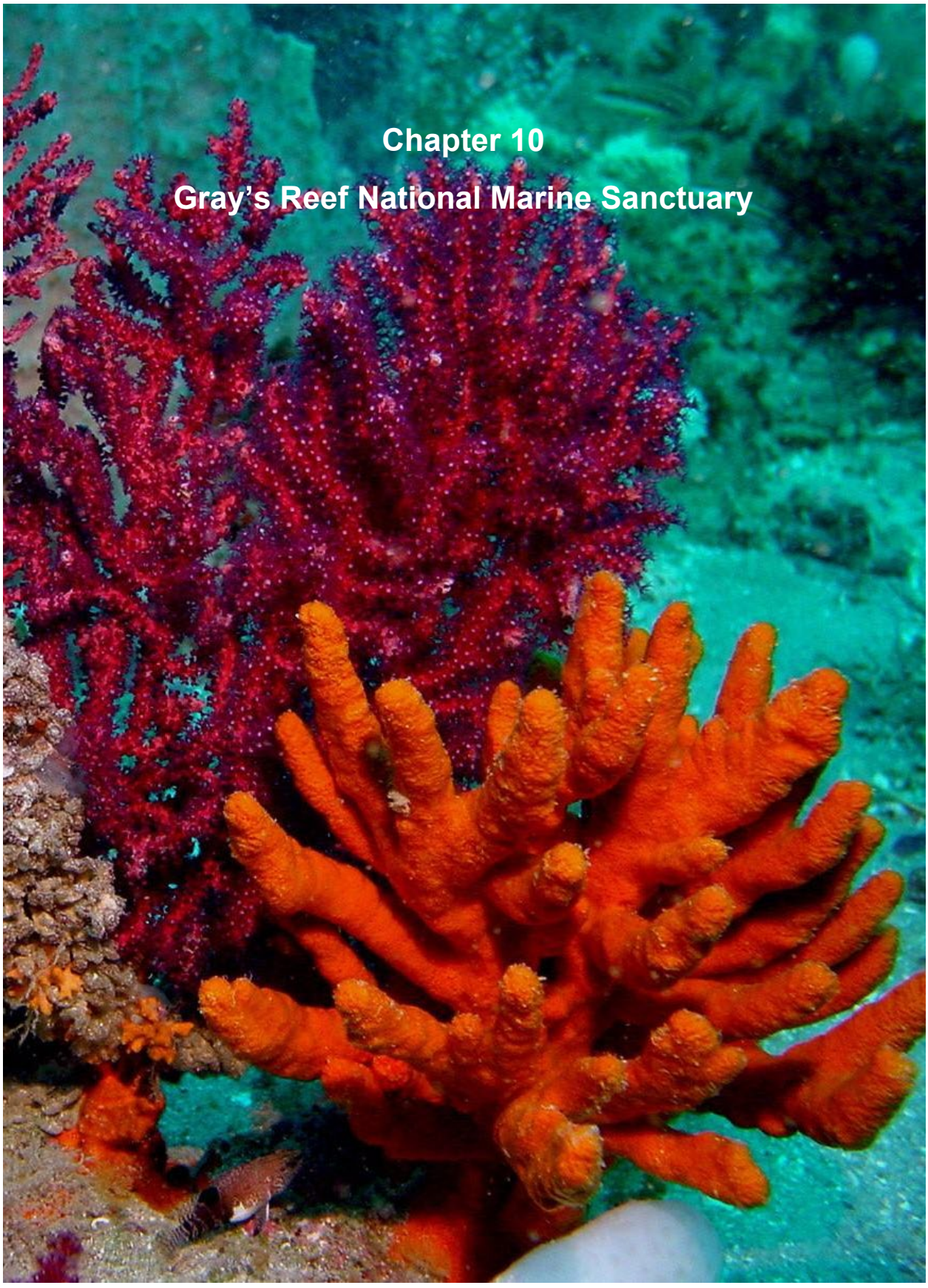
A northern elephant seal took a snooze on the shore of the sanctuary. Image: Robert Schwemmer/NOAA.

Origins of the Sanctuary's Name

The original Chumash names of the islands are Tuqan (San Miguel), Wi'ma (Santa Rosa), Limuw (Santa Cruz), and 'Anyapax (Anacapa). Santa Barbara Island was called siwot^{h} by the Tongva people, who may have accessed it seasonally, along with visits from Chumash people. The sanctuary is named for the islands, which in turn derived their group name from the Santa Barbara Channel. The oldest chart held by NOAA of the area—a 1791 nautical chart drawn by British officer George Vancouver—bears the moniker *Canal de Santa Barbara* and the modern names of Santa Cruz, San Miguel, Santa Rosa, and Santa Barbara (though Anacapa is missing), which were given to the islands by Spanish explorer Sebastián Vizcaíno in the early 1600s.

Sanctuary Superintendents

- Carol Pillsbury, in coordination with the National Park Service, 1980 - 1987
- Francesca Cava, 1987 to 1990 (NOAA Corps Officer)
- Steve Jamison, 1990 to 1992 (NOAA Corps Officer)
- John Miller, 1993 to 1996 (NOAA Corps Officer)
- Ed Cassano, 1996 to 1999 (NOAA Corps Officer)
- Matt Pickett, 1999 to 2002 (NOAA Corps Officer)
- Chris Mobley, 2002 to present



Chapter 10
Gray's Reef National Marine Sanctuary

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Gray's Reef National Marine Sanctuary

An Unexpected Treasure

The ocean remains largely unknown, most of its depths and seabed still awaiting exploration. The farther away from land and from human use, the harder it is for us to know what lies beneath water that spreads as far as the eye can see. Gray's Reef, nineteen miles offshore of Sapelo Island in Georgia, was a discovery we can attribute to Milton "Sam" Gray, the dedicated scientist who first studied the many invertebrates found on these rocky outcrops, and the subsequent fish and sea turtle experts who happily followed his lead. Today we know that Gray's Reef comprises one of the largest near-shore reefs in the southeastern United States and is representative of important live-bottom habitats that stretch from Cape Hatteras, North Carolina to Cape Canaveral, Florida. The rocky ledges, some sixty to seventy feet below the Atlantic Ocean's surface, are wreathed in a carpet of attached organisms garnering the name "live-bottom habitat." Grouper, black sea bass, mackerel, angelfish, and a host of other fish find refuge and food at the reef. Read on to find out why Sam Gray was so impressed with this live bottom habitat, and why sport fishing and diving enthusiasts have made the sanctuary such a popular recreation area along the Georgia coast.

Protecting Gray's Legacy (to 1999)

Like other coastal areas of the country, Georgia's shores have been inhabited for more than 12,000 years. Some of the original inhabitants were ancestors of the Guale Tribe, who lived on the mainland and on the Sea Islands and took fish and shellfish in addition to being farmers and hunters. Contact with French, Spanish, and English explorers and missionaries led to loss of the Guale cultures, with some people forced out of the area and others merging with tribes who moved into their lands, such as the Yamassee and Creek tribes. Both the Yamassee and Creek tribes were eventually forced out of Georgia.

Centuries of war were fought among the European powers for control of Georgia and other parts of the southeastern region, wanting exclusive control over its deepwater port in Savannah, interior pine forests, and rich lands for crops like rice and indigo. The colony of Georgia was established at what would become Savannah by English colonists led by General James Oglethorpe. Savannah and its port were not only strategic but also the main colonial port for coastal Georgia during the 18th and 19th centuries.

After the American Revolution, Georgia's coastal settlement grew as tobacco, cotton, lumber, and other inland products were shipped downriver to Savannah and out to other American and Caribbean ports. Most coastal vessels carrying such products in and out of Savannah and other Georgian ports passed through or near the Gray's Reef area. Much of Georgia's maritime commerce was sustained by African American labor. Many enslaved and some free African American sailors worked on inland vessels and aboard coastal schooners and fishing boats. Following the Civil War, African American fishermen comprised much of coastal Georgia's regional commercial fishery.

Advancing technology brought growth to both the fishing and shipbuilding industries. Until the late-19th century, fish were usually caught on hand lines and were kept in live wells built into the boat's deck; this changed as seine nets were introduced in the 20th century. By the early 1800s Savannah was a regional shipbuilding center constructing numerous masted schooners, brigs, and ships for local use. In 1819, SS *Savannah* became the first steamship to cross the Atlantic Ocean, from Savannah to Liverpool, England. Locally built vessels were used in 19th-century coastal trade between Charleston, Savannah, and smaller coastal towns such as Darien, Brunswick, and Fernandina in Florida. Many small inland steamers were also used at Savannah to navigate the numerous rivers and sounds. Larger coastal steamboats were used to carry passenger traffic between Savannah and other southern coastal cities. While steamboats moved much southern passenger traffic, sailing vessels tended to carry bulk goods but both passenger and cargo trades were significantly lessened with the introduction of the railroad in the mid-1800s.

Savannah was an important southern port during the Civil War and was blockaded by the Union Navy early in the conflict. While the Confederate Navy maintained a strong squadron at the city, they never confronted the Union blockaders at the river's mouth or offshore. Three gunboats—*Atlanta*, *Georgia*, and *Savannah*—were ironclads like CSS *Virginia*, which fought to a draw against USS *Monitor* at Hampton Roads, Virginia, in 1862. However, Union patrol vessels prevented blockade runners from entering the river to re-supply the Confederates. In December 1864, Union General William T. Sherman captured Savannah during his March to the Sea after burning Atlanta and gave it to President Lincoln. In his letter to the President, Sherman wrote: "His Excellency President Lincoln: …I beg to present you, as a Christmas gift, the city of Savannah, with 150 heavy guns and plenty of ammunition, and also about 25,000 bales of cotton."

A historic postcard showed a view of the Savannah River in c.1900. Image: Detroit Publishing Company, courtesy of the Library of Congress.

During the second World War, southeastern U.S. coastal waters were part of the battleground for the Battle of the Atlantic. In 1941 and 1942 several German U-boats sank Allied merchant vessels near the present sanctuary's boundaries. In April 1942, German submarine U-*123* sank three merchant vessels in about 24 hours. The oil tankers *Oklahoma* and *Esso Baton Rouge* and the steamship SS *Esparta* were sunk in waters adjacent to Gray's Reef, immediately off St. Simons Island, near Brunswick. Twenty-three crewmen died. Georgians panicked, fearing the Germans were about to land on the coast. That same year, Savannah and Brunswick became important contributors to the Liberty ships, mass-produced cargo vessels that carried food, tanks, heavy equipment, and other critical materiel across the ocean to America's allies and troops. Savannah launched Georgia's first Liberty ship, SS *James Oglethorpe*, in November 1942. A few months later, Brunswick's shipyard joined the effort with enthusiasm, even building seven ships in only one month. By the end of the war, Savannah had built 88 Liberty ships and Brunswick had built 85, together employing more than 30,000 laborers at peak production. In total, American workers built 2,710 Liberty ships during World War II.

> *The writer proposes the name "Gray's Reef" to specifically designate the study area in the honor of the late Milton B. Gray of the University of Georgia Marine Institute.*
>
> Jesse L. Hunt, Jr., 1974 thesis

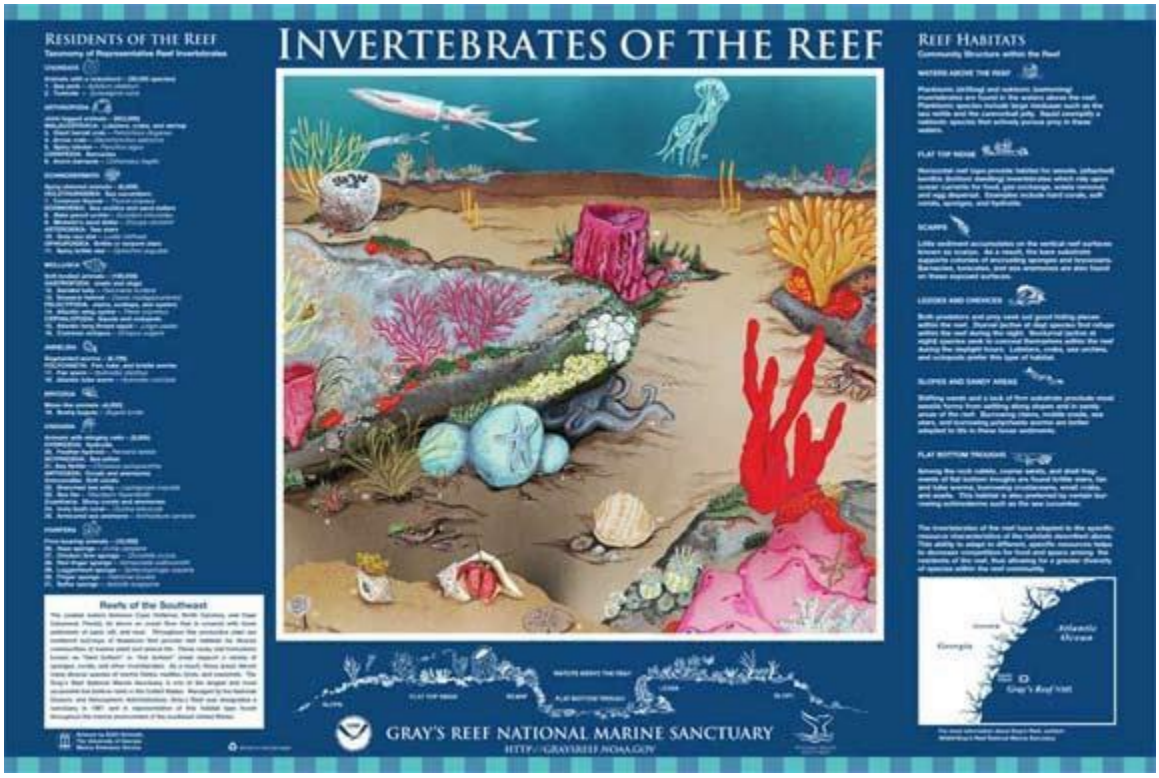
Modern conservation in coastal Georgia may be dated to the establishment of Cumberland Island National Seashore in 1972. But the offshore waters were not forgotten. Sam Gray, the biological collector who discovered the live bottom, died in 1967, but the richness of Gray's Reef stayed on the mind of those minding the Georgia coast. In 1978, the Georgia Department of Natural Resources nominated the area to NOAA for consideration as a sanctuary, and things proceeded apace after that. The area was made an active candidate in 1979, after a mostly favorable informal review by state and federal agencies, environmental groups, and other interested organizations. Kicking off the designation process in 1980, NOAA prepared an issue paper, held a scoping meeting, and conducted formal consultations with state and federal agencies. In June 1980, Gray's Reef National Marine Sanctuary was proposed with an area of about 22 square miles and draft regulations that prohibited alteration of the seabed, discharges, certain types of fishing, marine specimen collection, and removing/damaging historic or cultural resources. After a round of public hearings and other opportunities for providing input on the proposal, the final designation came in January 1981 with final boundaries and regulations substantially identical to those proposed. Jane Yarn (1924 to 1995), a Georgia conservationist who served on the Council on Environmental Quality under President Carter, was instrumental in getting the sanctuary (along with Greater Farallones and Looe Key national marine sanctuaries) approved by the President in the last days of his administration. NOAA entered into a cooperative agreement with the Georgia Department of Natural Resources for onsite management of the sanctuary.

> *Early in 1978 we thought, 'you know, there is this national marine sanctuary program and Gray's Reef would be a really interesting area to become a national marine sanctuary,' because it was one of few natural live bottom areas that we knew about in the South Atlantic at the time. So we sat back and decided that we would nominate it and I wrote the nomination for Gray's Reef to become a national marine sanctuary. We submitted it to the Secretary of Commerce and thanks to Jane Yarn and her work, since she was a personal friend of Jimmy Carter, she was able to shepherd that legislation through President Carter to sign it into law.*
>
> Duane Harris, first director of the Georgia Natural Resources Coastal Resources Division, 2020

The first management plan for the sanctuary was written by the Georgia Department of Natural Resources and appeared in 1983, a compact set of programs and projects laid out to achieve four goals: protect the sanctuary; coordinate research; enhance public awareness; and provide for multiple compatible use. The document consisted of a set of action plans, including ones for resource protection (emphasizing enforcement of regulations and coordination among relevant authorities); resource studies (designed to build baseline knowledge about the area); interpretation and recreation (emphasizing products and messaging for sanctuary visitors); and administration (outlining roles and responsibilities).

By 1986, when the sanctuary was added to the Carolinian-South Atlantic Man and the Biosphere complex, its value was well-documented. The buildup of infrastructure to protect it, however, would come more gradually over the next decade. In 1990, the first NOAA superintendent assumed management of the sanctuary from the Georgia Department of Natural Resources, initiating a new era in management. In 1990, the sanctuary partnered with the City of Tybee

Island and the University of Georgia to sponsor the Tybee Island Marine Science Center. Four years later, in 1996, the sanctuary began operations of its first research vessel, R/V *Benthos*.



An early sanctuary poster introduced viewers to the invertebrates of Gray's Reef. Image: NOAA.

The sanctuary's educational offerings during those years were aimed at building basic awareness of the sanctuary—always a hard job since out of sight is out of mind—and included posters depicting fish and invertebrates of the sanctuary, middle and elementary marine science workbooks, and field guides to fish and seaweeds of the sanctuary. In 1997, the sanctuary teamed up with Stellwagen Bank National Marine Sanctuary to produce the video, *The Northern Right Whale: From Whaling to Watching*, which highlights the transition from harvesting whales to enjoying them through whale watching. The video also highlights the plight of the North Atlantic right whale, one of the most endangered marine mammals in the world.

The end of the 1990s came on a wave of achievements for the sanctuary. In 1999 alone, the sanctuary seated an advisory council, established a Student Ocean Council, and mounted the Savannah-based Ocean Fest. The sanctuary advisory council has two seats each for research, education, conservation, and citizen-at-large, and one each for sport fishing and sport diving, as well as governmental representatives from seven state and federal agency partners. They meet four times a year to discuss management, research, education, and other projects and provide their advice to the sanctuary superintendent.

Extending Gray's Legacy (2000 to 2010)

The sanctuary launched itself into the new millennium with enthusiasm. Two new boats arrived to replace the aging *Benthos*: R/V *Joe Ferguson* in 2002 and R/V *Sam Gray* in 2005. By 2003, the sanctuary was fully mapped, providing a more complete picture of the benthic habitats and filling in gaps in information needed to knowledgeably manage the sanctuary. That new information was put to work in 2006, when twenty-three years after its first management plan, the sanctuary brought out their second plan. They were the first site to do so in a system-wide effort to update all sanctuary management documents. This plan was the result of a new approach that built on past history but added new innovations: the extensive involvement of sanctuary advisory councils and their working groups, the focus on action plans designed to address specific issues, and an expanded knowledge base that simply didn't exist when most sanctuaries were created. Six action plans were prepared for marine resource protection, research and monitoring, education and outreach, exploration, administration, and performance evaluation.

The sanctuary's research vessel *Joe Ferguson* was named for and dedicated to a National Geographic colleague who died in the September 11 terrorist attack on the Pentagon. Image: Greg McFall/ NOAA.

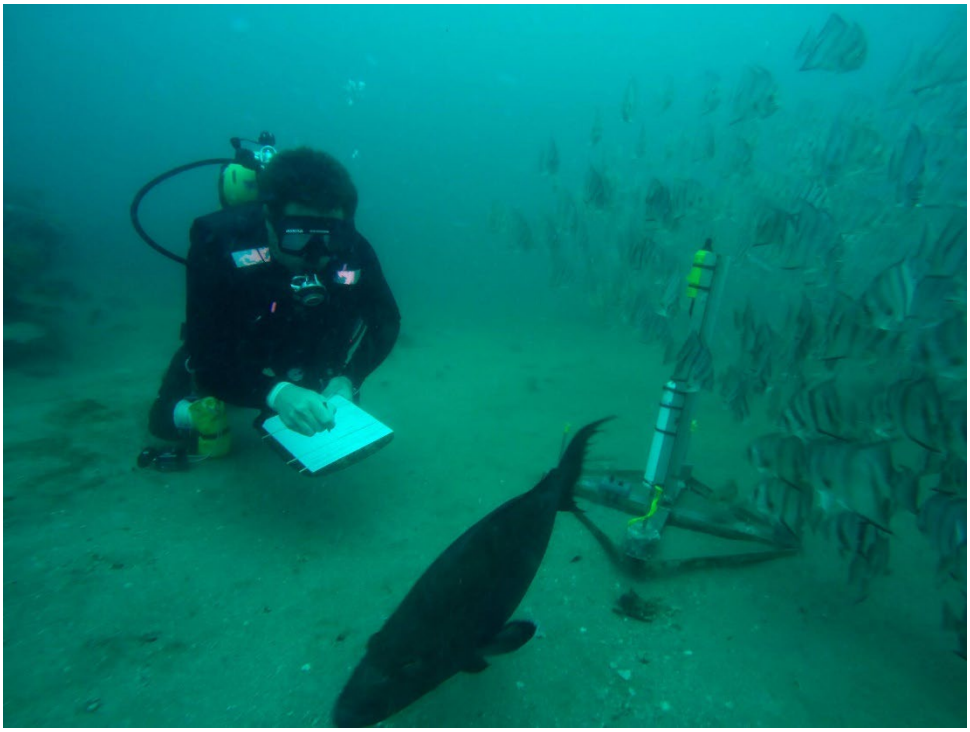
The sanctuary's almost 30 years of research findings, including a long-term partnership with NOAA's Office of Marine and Aviation Operations that brings NOAA Ship *Nancy Foster* to the sanctuary each year for intensive science expeditions, were put to work to help prepare the site's first condition report. The condition report, completed in 2008, found that human activities were not significantly impacting either water quality or habitat, though concerns were expressed about the impacts of fishing on the sanctuary. It also noted that, as much information as had

been gathered over decades of research, much more was needed to accurately assess resource conditions.

Offshore sites such as Gray's Reef are harder to share with the public, since most people will never visit the sanctuary. Interpretive efforts did and do focus on engaging the community in other ways. The new millennium saw a renewed emphasis on "bringing the sanctuary to the shore." In 2003, the sanctuary broadcasted live interviews with divers from the sanctuary and 2004 launched the first Ocean Film Festival in the system, which helped spawn Monterey Bay's Blue Ocean Film Festival in 2010. Gray's Reef launched the immersive "bootcamp" teachers training workshop, *Rivers to Reef,* in 2005 to the delight of educators across Georgia.

The sanctuary also began a long tradition that continues today in partnership with the National Marine Sanctuary Foundation, when in 2006 it hosted the first annual Marine Advanced Technology (MATE) ROV Southeast Regional Competition for students, which saw teams of high school students building remotely operated vehicles (ROVs) out of PVC pipe and small motors and flying them in a swimming pool. In 2007 an exhibit featuring the sanctuary debuted in the Georgia Aquarium in Atlanta. Two years later, the sanctuary hosted the Youth Education Summit of the National Association of Black Scuba Divers. In 2010, the sanctuary won a NOAA Preserve America grant to begin collecting the oral history and stories of Georgia's coastal anglers.

In 2010, the sanctuary also finalized a sanctuary regulation banning spearfishing to help prevent selective removal of large fish from the population and to improve the ability of enforcement of a ban on powerheads, a type of firearm used underwater. The spearfishing ban was discussed numerous times in the sanctuary's history, in the original designation process in 1981 and again during a management plan review in the mid-2000s. While the sanctuary chose not to ban spearfishing at the time of new regulations in 2006, the new management plan included a commitment to gather information on visitation levels of the sanctuary as well as the potential socioeconomic impacts of such a ban. By 2007, the information had been gathered and considered, and the sanctuary decided to move forward with the ban, publishing a proposed rule in March 2009 and the final regulation in February 2010.



A diver deployed a hydrophone in the sanctuary, an instrument that lets scientists better understand the underwater soundscape and help managers make more informed decisions about protecting sanctuary resources. Image: NOAA.

Ensuring Gray's Legacy (2011 and ongoing)

The sanctuary closed out its thirtieth year with the establishment of the Research-Only Area in 2011, situated in the southern third of the sanctuary and about eight square miles in area. Over seven years in the making, from when the idea was first raised during the first management plan review in 2004, the establishment of a research-only area began with the creation of a Research Area Working Group of the sanctuary advisory council that eventually decided that, to answer significant research questions, a research area should be established that was closed to fishing and other human activities. The research area would also allow researchers to more accurately determine the effects of natural events and to study impacts of climate change, both of which may be masked by the overwhelming effect of fishing.

Once the working group concluded its work, the full advisory council endorsed its recommendation and advised the sanctuary to explore the idea in a public process. The sanctuary agreed and began a multi-year public process that examined six different boundary and regulatory combinations, eventually proposing its favored option in 2010. After a formal public review process, the Research Area was finalized in 2011. While transit of vessels is allowed, recreational fishing and diving activities are prohibited, allowing scientists to conduct habitat studies where critical variables can be controlled and compared to other areas inside and outside the Research Area.

Once the effort to establish the Research Area was achieved, the sanctuary turned its attention to updating its management plan. Its first step, in 2012, was to update its 2008 condition report

using new research findings and the knowledge of external experts. The findings provided a better sense of the status of water quality, habitats, and key species, finding them to be in fair to good impact, with localized impacts from heavier human use, mainly fishing.

In 2014, the sanctuary published a revised management plan, which contained action plans to achieve three objectives: maintain or improve the condition of all sanctuary resources; increase awareness of and support for the sanctuary; and advance collaborative and coordinated management of the sanctuary. In the years since then, the sanctuary has focused on implementing the actions outlined in the action plans, including improving understanding of the ecological connectivity of live-bottom habitats and evaluating areas outside of the current sanctuary boundaries that may require additional conservation and protection. A rapid assessment of the 2014 plan in 2019 concluded that the management programs and regulations were still relevant and that no revisions to either was warranted.

While the MATE ROV competitions have continued through a partnership with the Gray's Reef Chapter of the National Marine Sanctuary Foundation, the last several years have also seen new outreach projects. In 2016, twenty new signs about the sanctuary were installed at various boat ramps and marinas in Georgia, targeting locations where sanctuary visitors were likely to see it and featuring marine life in the sanctuary, user information and regulations, and activities such as fishing and diving. Gray's Reef had its first livestream event in 2017, the "Live Exploration of Gray's Reef," in partnership with Georgia Public Broadcasting. The program reached an unprecedented 47,000 viewers, mostly students in science classes. In 2018, *The Excursion*, a television show dedicated to promoting tourism in Georgia, aired nationwide and featured recreational fishing in the sanctuary.

In 2019, Associated Press reporter Patrick Whittle said: "Gray's Reef has served as a global inspiration. Following the lead of the U.S., other nations have designated similar sanctuaries and protected areas, which now cover about 6% of the world's oceans — a bonanza for researchers but, more importantly, an important tool for safeguarding the seas." We couldn't agree more! New technologies, expanded opportunities for public engagement, a broad scope of research, and continued collaboration with stakeholders shine a bright light on the future of Gray's Reef National Marine Sanctuary.

A sea star resting on coral in the sanctuary. Image: Greg McFall/NOAA.

Origins of the Sanctuary's Name

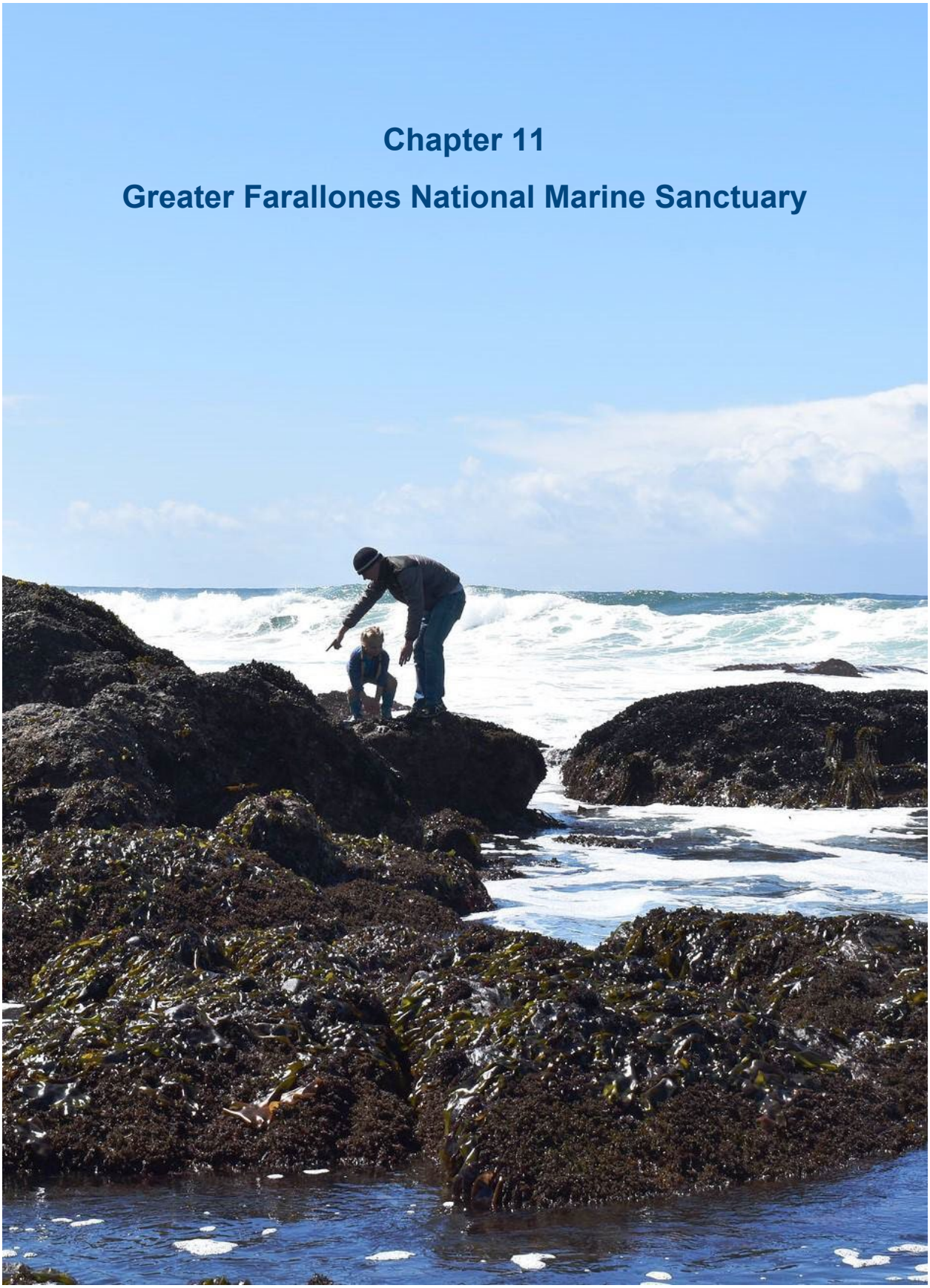
The sanctuary is named in honor of Milton B. "Sam" Gray, a biological collector, taxonomist, and curator at the University of Georgia Marine Institute, who conducted the first known survey of the reef in 1961. The name was first proposed in a thesis by graduate student Jesse Hunt that resulted from his first intensive study of the reef in 1974. The Georgia Department of Natural Resources adopted the name when they nominated the reef for sanctuary consideration in 1978.

Sanctuary Superintendents

- Cooperative Agreement with Georgia DNR to serve as onsite manager, 1981 to1990
- Reed Bohne, 1990 to 2006
- Cathy J. Sakas and Greg McFall, Acting Superintendents, 2006 to 2007
- George Sedberry, 2007 to 2013
- Greg McFall, 2013
- Sarah Fangman, 2014 to 2017
- Numerous acting superintendents, 2017-2019
- Stan Rogers, 2019 to present

Chapter 11

Greater Farallones National Marine Sanctuary



Chapter 11
Greater Farallones National Marine Sanctuary

An Embarrassment of Riches

Greater Farallones National Marine Sanctuary is an extraordinarily diverse marine ecosystem that supports abundant wildlife and valuable fisheries. The Farallon Islands, located in the south-central part of the sanctuary, are a national wildlife refuge, offering resting and breeding sites for marine mammals and seabirds. The sanctuary is located within the California Current ecosystem, stretching along the western coast of North America from southern Canada to northern Mexico. Wind-driven upwelling provides a ready supply of nutrients to surface waters making this ecosystem one of the most biologically productive regions in the world. The sanctuary provides breeding and feeding grounds for at least 26 endangered or threatened species; 37 marine mammal species, including blue, gray, and humpback whales, harbor seals, elephant seals, Pacific white-sided dolphins, and one of the southernmost U.S. breeding colonies of the once threatened Steller sea lions; over a quarter-million breeding seabirds; and one of the most significant white shark populations on the planet. Sail on to learn more about how these treasures came to be protected.

A Transitional Century (to 1992)

About 11,000 years ago Paleo-Indian people, making their way down the coast over generations, lived in the area we now call San Francisco. The people harvested a diversity of resources, hunting birds, taking land and marine mammals, and gathering fish and shellfish. Within a few thousand years, the people became more settled, establishing villages and developing cultures that would give rise to the tribal ones we know from the region today, the Inland and Coastal Miwok and other tribes. The Miwok living near the coast and along lagoons used, like their Ohlone neighbors to the south in the Monterey Bay region, canoes made of bound tule rushes. These boats were gathered into cigar-shaped bundles and made into rafts and canoes. The natives used the craft for transportation and fishing in sloughs and bays.

As the Europeans encroached into the area in the 1700s, they, as they had all over the New World, radically impacted the culture of the Indigenous people they encountered. Disease, enslavement, and missionary efforts would take their toll, significantly reducing the population of the Indigenous peoples and displacing them from ancestral lands they held for thousands of years. Missions and presidios came first, as the Spanish developed their settlements along the coast north from Mexico. The Russians, following sea otter populations south down the coast from Alaska, came next. English and Americans joined the sea otter and seal slaughters, and by the 1830s, the market collapsed as the marine mammal populations reached near-extinction.

Yerba Buena, a port town established in 1835 near the large natural bay, was a natural melting pot of cultures, a combined mixture of Old World practices and New World influences to form their own unique culture. As the fur trade was waning in the 1820s, other industries were taking its place: the hide and tallow trade, the whaling industry, and others. Seen as important to trade in the Pacific, American interest in the region and its ports increased, and even before the

Mexican-American War, Americans were moving into the area. California became independent of Mexico in 1846 and joined the union in 1850 as the 31st state. In between, the discovery of gold at Sutter's Mill on the American River in 1848 created a boom that quickly grew remote little Yerba Buena into the multi-cultured, cosmopolitan San Francisco.

After the 1848 gold strike, hundreds of vessels sailed or steamed into San Francisco Bay, carrying goldseekers, and those seeking to make their own fortunes off of supporting the goldseekers. Fishermen arrived from a variety of nations, China and Italy among them, bringing their own unique vessels and fishing methods. The Chinese were the first people to become involved in an intensive fishing industry. Targeting mainly shrimp, Chinese fishing villages and camps grew at Point San Pedro and Tomales Bay. Their fishing junks were common offshore sights in the 1850s and 1860s. By the end of the 19th century, Genovese fishermen joined them in fishing the region, though they sought herring, bass, cod, tuna, and other species. Other immigrant fishermen who fished out of the San Francisco region included Italians, Greeks, and Yugoslavians.

Italian fishers repaired their nets on a wharf in San Francisco Harbor in 1891. Image courtesy of the National Archives.

As initial turmoil of the Gold Rush waned, San Francisco became an active homeport for whalers. During the 1870s, whaling steamers operated out of the city, making San Francisco Bay the world's principal whaling center. By the 1930s, the whaling industry entered a decline and entrepreneurs turned to more lucrative industries like petroleum. The discovery of fossil fuels led to commercial exploitation of oil in California in 1865. By 1901, Standard Oil of New Jersey

had developed a large oil refinery on the shores of San Francisco Bay. The company brought scores of new vessels carrying crude oil along the coast to San Francisco. During the 1920s, numerous oil, gasoline, and kerosene tankers navigated along the Pacific Coast. As it had in other sanctuaries, rum running became a lucrative if illegal venture during Prohibition, mainly at Point Reyes. Ships carrying contraband liquor from other countries remained offshore while the cargo was shuttled to the beach. Waiting trucks or small sailboats transported the liquor from the point to Tomales Bay to the north.

As San Francisco grew, so did its need for natural resources, especially timber. This demand gave birth to a lumber industry along the Sonoma and Mendocino County coasts from the mid-19th century into the 20th century. The rugged coast had few roads and no long distance railroads, so the most cost effective way to move the lumber was by sea. Lumbering operations established sawmills along the shoreline at the few places where it was possible to temporarily anchor a vessel. These "doghole ports," so named because they were so small and exposed that mariners joked they were barely large enough for a dog to turn around, became centers of economic activity. Enterprising lumbermen rigged a network of chutes and cables extending from the bluffs down into small coves allowing lumber to be transferred from shore to waiting ships. A fleet of small, maneuverable schooners, steam schooners and eventually steamers carried the timber to markets as close as San Francisco, and as distant as the Eastern Seaboard, Australia and Asia. The trade left not only place names, but the archaeological remains of the infrastructure and in some cases those vessels unlucky enough to be lost on these shores. Lasting communities sprang up at some of these locations: Bodega Bay, Gualala, Point Arena, Mendocino and Caspar to name a few.

An 1860 sketch showed the seals and seas of the Farallon Islands. Image from "Scenes of Wonder and Curiosity in California" by Thomas Armstrong, courtesy of the Library of Congress.

The Farallon Islands had their own tumultuous history as the mainland. Though, according to some sources, the Native American inhabitants of the region regarded the Farallon Islands as

the island of the dead, the islands have for centuries been anything but. The rocky islands, though treacherous to human mariners, were havens for robust wildlife populations on the land and in and on the waters around them: nesting seabirds in numbers that stagger the imagination, intertidal zones teeming with abalone species now absent from much of the coast, shorelines thick with seals and sea lions, offshore waters patrolled by white sharks in search of unwary pinnipeds for a meal. The first Europeans known to set foot there—Englishman Francis Drake and his crew—did so to take bird eggs and kill seals. The islands were subsequently inhabited in turn by Aleut fur hunters (brought there by Russians); whalers and smugglers stopping off for water, food, and wood in the nineteenth century; and American entrepreneurs, sometimes violently competing with each other, intent on profiting from the guano, seabird eggs, and feathers. These exploitation efforts led to a decimation of wild populations that are still recovering.

> *After becoming a National Wildlife Refuge, the islands were left to the animals and biologists…The US Fish and Wildlife Service and PRBO were faced with the task of repairing 150 years' worth of damage to the natural resources of the Farallon Islands. Great progress has been made by the US Fish and Wildlife Service and PRBO Conservation Science and in 1981 the National Oceanic and Atmospheric Administration joined the effort when the waters around the island were protected with the creation of the Gulf of the Farallones Marine Sanctuary.*
>
> History of the Farallon Islands, Farallon Islands National Wildlife Refuge Website

The legacy of conservation over carnage began in 1909 when President Theodore Roosevelt declared a refuge for three of the islands (Noonday Rock, North Farallon and Middle Farallon), just six years after he had created the first wildlife refuge, Florida's Pelican Island. The last island in the chain, Southeast Farallon was added to the refuge in 1969, and the islands are now managed by the U.S. Fish and Wildlife Service as Farallon Islands National Wildlife Refuge.

But the refuge never included the waters around the islands and when NOAA asked states for recommendations for future national marine sanctuaries, the California Resources Agency responded in 1977 by nominating the waters around the islands and along the coast (along with Channel Islands and Monterey Bay). A public workshop was held in April 1978 and after preparing an issue paper and consulting with local, state, and federal agencies, interest groups, and others, NOAA decided to move forward. By 1979, the site had become an active candidate and began the designation process in March 1980, when NOAA proposed a boundary containing about 1,000 square miles and regulations prohibiting hydrocarbon operations, discharges, seabed alterations, operating of commercial vessels in certain areas, marine mammal and bird disturbances, and historical resource removal. After conducting a public review and comment period, including public meetings in May 1980, Point Reyes-Farallon Islands National Marine Sanctuary was designated in January 1981, with an area of 1,255 square miles and substantially the same regulations that had been proposed the prior year. In response to a number of commenters speaking against the designation, NOAA asserted: "No mechanism currently exists to provide comprehensive management, research, coordination, and assessment for the extraordinary diversity of natural resources concentrated in the waters around Point Reyes and the Farallon Islands."

Just over a month later, however, the regulations preventing hydrocarbon operations were suspended, along with those of the newly designated Channel Islands National Marine Sanctuary, when incoming President Reagan issued Executive Order (EO) 12291. The EO required that NOAA conduct an analysis of the regulations of the costs and benefits to the nation that would result from imposing prohibitions on hydrocarbon activities. NOAA prepared a regulatory impact analysis, and after considering comments on it, found, according to the record, "no compelling reasons to further suspend or alter the regulations." In March 1982, more than a year after they were suspended, the hydrocarbon prohibitions of both sanctuaries came into force.

The sanctuary had a small research vessel in the early 1980s. Image: NOAA.

In 1984, the sanctuary faced what would be the first of a number of challenging oil spill incidents. On October 31, the tanker *Puerto Rican* departed for sea from the bay but in just over three hours, an explosion tore open the tanker and left her burning. Towed to sea, the tanker spilled over a million gallons of oil including around the islands and onshore at Bodega Bay and Bodega Harbor. Total bird mortalities from the spill may have been as high as 5,000. The settlement funds that resulted from the accident have been used to remove grounded and abandoned vessels from sensitive sanctuary habitats, restore eelgrass, and to develop and initiate an education and community-science program for high school students, called LiMPETS. A second spill in 1986 from a lost hatch cover on the tanker barge *Apex Houston* spilled less oil, about 26,000 gallons, but the bird mortality was even higher, close to 9,000. The

settlement of $5.9 million was used to help recolonize common murres and acquire habitat for marbled murrelets.

In better news in 1986, the sanctuary launched what was then the first large-scale whale study in the sanctuary system, which would be followed by the WHAPS project in Channel Islands National Marine Sanctuary in 1998 and the even larger SPLASH in 2004 by Hawaiian Islands Humpback Whale National Marine Sanctuary. That launch was followed in 1987 by the release of the first management plan for the sanctuary and a change of name to Gulf of the Farallones National Marine Sanctuary (although not officially changed until 1997, with the issuance of a Federal Register notice to that effect). It was the first time a sanctuary had ever changed its name and would be the first of two name changes for this site. The management plan included actions for resource protection, research, and interpretation and education, as well as an administrative framework that relied on Point Reyes National Seashore and Golden Gate National Recreation Area for logistical and interpretive support. The sanctuary's first research plan was developed in 1992, with an emphasis on determining the status and trends of seabirds and marine mammals, identifying emerging issues, and detecting, responding and restoring species and habitats impacted by oil pollution. The plan provided the framework for the implementation of periodic research symposia and coordination of seabird and marine mammal research throughout California.

In 1988, the sanctuary moved closer to its National Park Service neighbors both symbolically and practically. It already worked extensively with Point Reyes National Seashore (including one submerged cultural resources survey in 1982 and another in 1989) but the relationship was enhanced when the site was added to a Man and the Biosphere site, the Golden Gate complex which also included Golden Gate National Recreation Area and Point Reyes National Seashore. Additionally, two wetland areas (Bolinas Lagoon in 1998 and Tomales Bay in 2002) were recognized under the Ramsar Convention as Wetlands of International Importance.

Seagulls roosted on rocks during a foggy day in the Farallones in 1989. Image courtesy of the NOAA Photo Library.

The sanctuary also moved to the quarters of Golden Gate National Recreation Area in the same year, co-locating with park service staff, and then moving again three years later in 1991 to its current location at the old Coast Guard Station on The Presidio. That same year, the sanctuary assumed management for Cordell Bank National Marine Sanctuary, which had been designated in 1989. The sanctuary worked with the state wildlife protection and enforcement agency, providing an enforcement vessel, *Phocoena*.

By 1992, almost a century after formal stewardship began in the Farallon Islands, the sanctuary was settled into permanent quarters, had weathered two oil spills, and was an active member of the San Francisco community, providing Project Ocean curricula, loaner slide shows, and posters for local schools and exploring the idea of a local adopt-a-beach program that would become one of the most well-known and esteemed programs of the entire sanctuary system. The next two decades would be all about conservation innovations.

Decades of Innovation (1993 to 2015)

Sanctuary culture has always fostered innovation, and each sanctuary has developed new and novel ways to approach the problems they faced in their areas. Greater Farallones National Marine Sanctuary is no different. But their innovations resulted in a number of “firsts” for the system and helped pave the way for other sanctuaries to undertake similar projects.

One of these most important new efforts was the 1993 launch of the volunteer stewardship and community science program Beach Watch, a program that trains volunteers to survey and document the shores of the sanctuary. Not only was Beach Watch the first volunteer program for

the sanctuary system, it was one of the first modern ones for NOAA (after such long-term programs as the National Weather Service's Cooperative Observer program that has existed since 1890). Opportunities for volunteers were expanded in 1996 with the establishment of the SEALS citizen science programs to protect pupping seals in Tomales Bay and Bolinas Lagoon. In 2003, the SEALS program was credited with helping stabilize pupping rates in the sanctuary for the first time in well over a century.

The first Beach Watch volunteers were trained in 1993. Image: Jan Roletto/NOAA.

LiMPETS, the Long-Term Monitoring Program and Experiential Training for Students program, followed in 1999, connecting with over 5,000 students each year to involve them in hands-on scientific endeavors. The Seabird Protection Network, set up in 2005, is the sanctuary's newest volunteer endeavor. Data generated from all of these volunteer programs has been used to help natural resources managers make decisions, support peer-reviewed scientific publications, and help recover damages from responsible parties in oil spills and other events.

In 1995, the site pioneered another "first" when community members founded the Farallones Marine Sanctuary Association, today the Greater Farallones Association, the first formal friends' group of a sanctuary and one that predated the National Marine Sanctuary Foundation by five years. Today, the Association undertakes programs such as LiMPETS, kelp recovery plans, Bolinas Lagoon restoration efforts, control of invasive green crabs in lagoons adjacent to the sanctuary, youth camps, family workshops, and Sanctuary Exploration trips.

The first sanctuary visitor center in the system opened on San Francisco's famed Presidio in 1999, blazing a trail for the ten more that followed in the ensuing decades. Today the Greater Farallones Visitor Center provides exhibits and programs to visitors to inform them about the habitats and wildlife of the Farallones region. Companion exhibits can be found at the Aquarium of the Bay, the California Academy of Sciences, Pigeon Point Light Station, San Francisco Zoo, and the Bear Valley Visitor Center of Point Reyes National Seashore. The opening of the visitor center kicked off a series of innovative in-school education programs that now include Fisherman in the Classroom, Deep-Sea Corals, Sharkmobile, Crab Cab, and Seabird Shuttle.

Public programs include speaker series, family workshops, and every year's eagerly anticipated Sharktoberfest in October.

In the late 1990s, the sanctuary also undertook a regulatory action to ban the operation of motorized personal watercraft in the nearshore waters of the sanctuary. In April 1996, NOAA received a petition for rulemaking from the Environmental Action Committee of West Marin (EAC), asking the sanctuary to ban motorized personal watercraft as incompatible with the purposes of the sanctuary by posing a threat to the wildlife, creating air and water pollution, and threatening other uses of the sanctuary. In August 1997, NOAA published a notice seeking information and comments from the public on the petition; 160 public comments, nearly all of which supported the idea of a ban, were received. NOAA proposed a ban of such watercraft in the nearshore waters of the sanctuary along the mainland and around the Farallones in April 1999, but after reviewing updated information on impacts from motorized personal watercraft and receiving many comments supporting a total ban in the sanctuary, the proposed regulation was amended in May 2000. In September 2001, a total ban was enacted in the sanctuary, south of Bodega Head.

A sanctuary educator led visitors on a nature walk in c.2000. Image: Maria Brown/NOAA.

In the 2000s, the sanctuary invested significantly in its management infrastructure. The sanctuary advisory council was seated in 2002, providing valuable citizen voices in the operation of the sanctuary. The council played a major role, along with those for Monterey Bay and Cordell Bank national marine sanctuaries in a complex, comprehensive management plan review process for all three sanctuaries from 2005 to 2008. Today the advisory council has representatives for research, education, commercial and recreational maritime activities, fishing, conservation (two), youth, and one at-large representative each from the Marin, San Francisco-San Mateo, and Mendocino-Sonoma communities, who work with government

representatives from five federal and state agency partners to advise the sanctuary superintendent.

In 2006, the sanctuary, along with its neighbors Cordell Band and Monterey Bay national marine sanctuaries, funded a research vessel, R/V *Fulmar*. Fulmar is a 67-foot vessel which can carry up to a dozen scientists out to the offshore waters of the sanctuaries. *Fulmar* is still in operation, supporting research, characterization, and educational opportunities of pelagic and deep-species and habitats.

New management plans and regulations for all three sanctuaries were delivered in 2008. The sanctuary's first condition report followed in 2010, delivering a comprehensive assessment of the resources of the sanctuary. Overall, the resources of the sanctuary's outer coastal and offshore areas appear to be in relatively good condition, with most concern expressed about water quality (due to impacts of outflow from the City of San Francisco, San Francisco Bay and agricultural runoff), invasive species within the sanctuary's estuarine habitats, impacts from human-use in intertidal areas, and bottom trawling. But the sanctuary also notes that increased management actions were having a positive impact. The sanctuary is one of the few places in the world where endangered blue and humpback whale populations are increasing. As of 2021, there are growing management concerns for endangered and threatened whales from vessel collisions and entanglement.

In 2004 the pelagic monitoring project, Applied California Current Ecosystem Studies (ACCESS), evolved from an intermittent, ship-based project quantifying the abundance and distribution of birds and mammals throughout the sanctuary to a highly collaborative, ecosystem-based monitoring project. ACCESS is now a long-term monitoring project, touted as one of the premier monitoring projects along the West Coast, sampling not only for birds and mammals, but their prey, ocean acidification, acoustic sampling, environmental DNA, all indicators to the health of three sanctuaries.

In 2007, the state of California established a series of marine reserves and marine conservation areas in the state waters of the sanctuary under the state's Marine Life Protection Act of 1999. The North-Central Coast set, extending from Pigeon Point north to Point Arena, was created in 2009, with 21 MPAs covering 153 square miles, with about 11% in a no-take status and 6 special closures to protect sensitive seabird breeding and marine mammal haul-out sites.

In 2008 the sanctuary hosted its inaugural Biennial Ocean Climate Summit focusing on addressing potential climate change impacts along the San Francisco Bay Area's outer coast. Followed in 2010 with the launch of the Center for Collaboration on Ocean Climate Change. The Center for Collaboration continues to take the lead within the sanctuary system to demonstrate the role that marine protected areas play in climate change adaptation and mitigation focusing on 1) communicating the importance of marine protected areas; 2) bringing together partners to develop case studies and models; and 3) training marine protected area managers on the importance of addressing climate change.

The last major conservation action taken by the sanctuary before its expansion was a shift of vessel traffic lanes in 2013. Working with the U.S. Coast Guard and the International Maritime Organization, NOAA helped revise the vessel traffic lanes leading to San Francisco Bay, extending and narrowing the approach to help protect slow-moving whales from being struck by cargo vessels and to avoid interaction between fishing vessels and large commercial ships.

The conservation programs built by the sanctuary over nearly three decades saw notable successes. Northern fur seals returned in force to the islands in 2006, the first major concentration there since a slaughter of 200,000 seals in the 1830s. Declines in the birth survival rates of harbor seals in Tomales Bay and Bolinas Lagoon were reversed. The numbers of blue whales along the West Coast have steadily increased. It was time to set the stage for further conservation successes.

Elephant seals raised a ruckus at Ano Nuevo State Park. Image: Sara Heintzelman/NOAA.

Threshold to Future Protection (2015 and ongoing)

In 2015, after over a decade of hard work with partners, advisory council members, and constituents, the sanctuary and Cordell Bank National Marine Sanctuary both enacted substantial expansions to their size. The sanctuary, now 3,295 square miles in size, extends northward of Point Arena to encompass an area of upwelling south of the point, which drives the extraordinary productivity of the sanctuary and surrounding waters. To better reflect its new size and at the behest of community members, the sanctuary changed its name again to become Greater Farallones National Marine Sanctuary.

Fresh off its expansion, the sanctuary in 2016 announced the resolution to a long standing maritime mystery when it announced the discovery of USS *Conestoga*, a naval vessel missing for 95 years. The vessel sailed from San Francisco in 1921 with a crew of 56 on orders to proceed to American Samoa to take up duties at Tutuila. *Conestoga* never arrived and was declared missing with all hands lost in June 1921. The vessel was rediscovered by a maritime heritage research cruise in 2014 and subsequently confirmed by a remotely operated vehicle survey in 2015.

Today, the sanctuary continues to innovate. In 2016 the sanctuary and the Greater Farallones Association piloted the Sanctuary Exploration Series, a fee-based monthly field trip organized by the Association and benefiting the sanctuary. Participants have enjoyed such adventures as whale watching, kayaking, and stand up paddleboarding. In 2017, a long-sought conservation objective was realized when remaining illegal moorings and vessels—potential sources of pollution and damage to eelgrass beds—were removed from the sensitive waters of Tomales Bay. 2019 saw the launch of a new Sanctuary Naturalist Training Course (covering the ecosystem and wildlife of the sanctuary) to increase ocean and climate literacy and develop the sanctuary's community volunteer force. Those who completed the training and volunteered for at least 15 hours for the sanctuary were awarded Sanctuary Naturalist Course certificates.

Narrator Dr. Sylvia Earle noted in a 2018 short film celebrating the 25th anniversary of Beach Watch: "These volunteers are forces for change and models of ocean stewardship. They are ordinary people accomplishing extraordinary things. No, they are extraordinary people accomplishing extraordinary things." The same can be said of Greater Farallones National Marine Sanctuary as it enters its fourth decade.

Fog enshrouded the rocky islands of the Farallones. Image: Matt McIntosh/NOAA.

Origins of the Sanctuary's Name

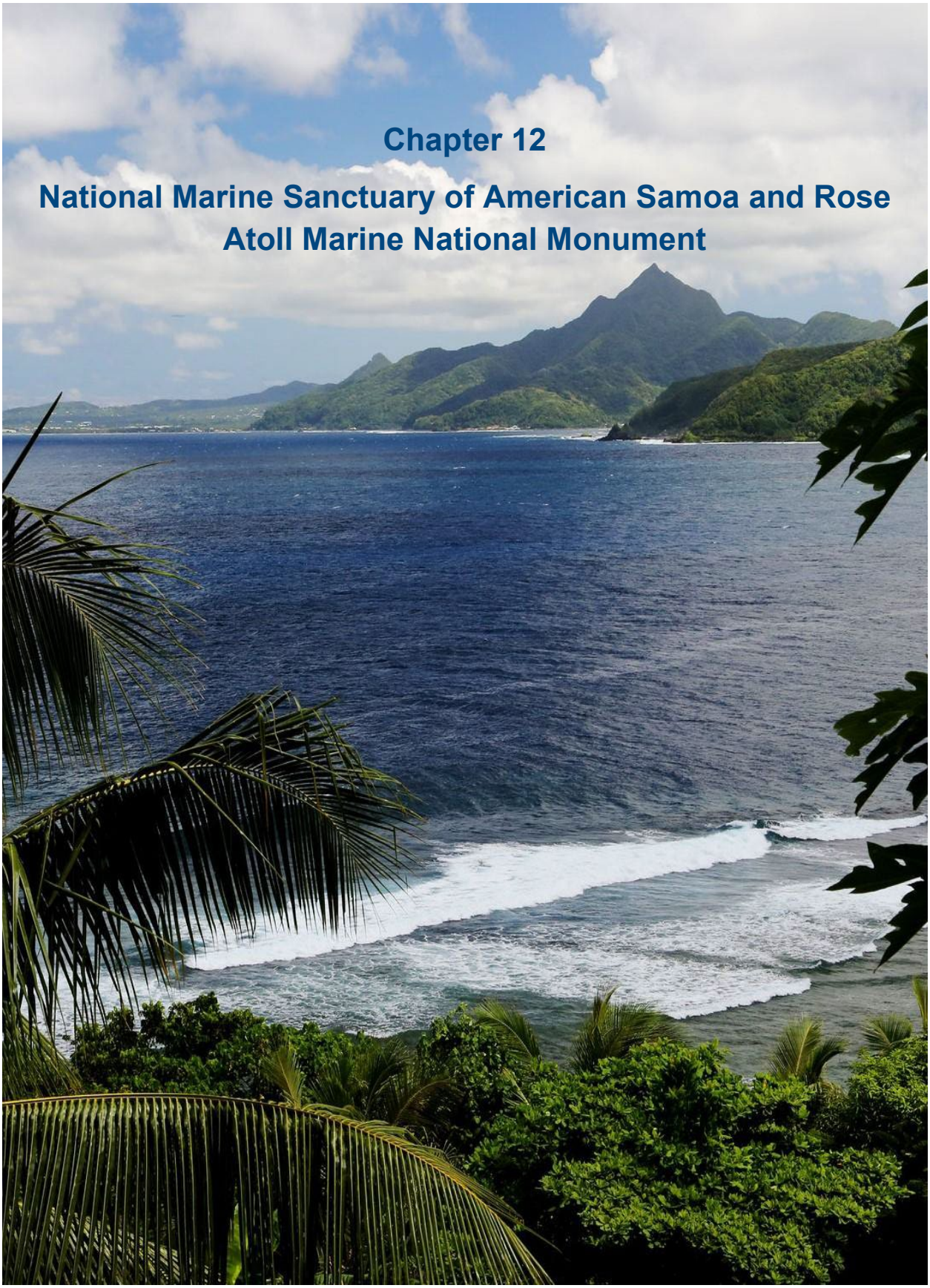
The Farallon Islands were at first named the Islands of Saint James by Francis Drake. Now one of the northern Farallon Islands is named the Isle of Saint James and collectively, 11 islands and rocks are collectively called the Farallon Islands. The sanctuary is named for the Farallones, which comes from the Spanish word *farallon*, meaning a rocky island or outcrop. An 1850 nautical chart, one of the earliest naming the island group, lists the full name as *Farallones de los Frayles*: the rocky islets of the brothers. Friar Antonio de la Ascensión, along the Spanish explorer Sebastián Vizcaíno's 1603 expedition, is credited with bestowing the name. The sanctuary has borne three names since it was designated: Point Reyes-Farallon Islands, Gulf of the Farallones, and finally Greater Farallones National Marine Sanctuary.

Sanctuary Superintendents

- Managed by Point Reyes National Seashore 1981 to 1987
- Miles Croom, 1987 to 1989
- Ed Ueber, 1989 to 2003
- Maria Brown, 2004 to present

Chapter 12

National Marine Sanctuary of American Samoa and Rose Atoll Marine National Monument



Chapter 12
National Marine Sanctuary of American Samoa and Rose Atoll Marine National Monument

A Distant Wonder

National Marine Sanctuary of American Samoa encompasses 13,581 square miles around the culture-rich islands of American Samoa and supports one of the most diverse ecosystems in the National Marine Sanctuary System. Some of the marine life that finds a home in the sanctuary includes invertebrates, fishes, turtles, marine mammals and marine plants. The sanctuary protects extensive coral reefs, including some of the oldest and largest Porites coral heads in the world, along with deep water reefs, hydrothermal vent communities, and rare marine archaeological resources. Visitors to the sanctuary can enjoy recreational activities such as diving, snorkeling, and fishing as well as experience the cultural heritage of the islands. Read on to learn how this once tiny site became so large in size—and was always large at heart!

A Tiny Seed (to 1986)

God Tagaloa, begins an ancient Samoan tale recorded by Brother Herman, a Marist friar, in 1955, lived in the wide open spaces, as the heavens used to be called. He thought of making on the earth a place to stand on. Our globe in those days consisted only of water. So he made a resting place by creating a rock and stood on it. This rock he called Manu'atele. Tagaloa was pleased with his work. Tagaloa goes on to create other islands across the wide Pacific, returning only at the end of his exertions to create Tutuila, where we are told, the god intended the chiefs of humanity to find rest. Perhaps Tagaloa rested himself there too.

The islands of American Samoa are a handful of scant land in a world that might well be made of only ocean if the view from the islands is any measure. Archeological evidence suggests the islands have been inhabited for at least 3,000 years when a wave of human migration from southeast Asia may have paused for an extended period before subsequent voyages of colonization continued to the Marquesas, Tahiti, and the distant islands of Polynesia (including Hawai'i). As a result, many elements of Polynesian culture are considered to have their roots in the Samoan area of the Pacific.

> *In the village of Uafato in Fagaloa Bay, Upolu, Lu had a 'sa-moa' - a preserve of hens, which he* laid under a taboo...Lu married Lagituaiva. They had a son whom they named Samoa in memory of Lu's preserve of fowls sa-moa, 'the Tabooed Hens.' This Samoa was the *progenitor of the Moa clan, who in time became the kings of Manu'a and of the whole group.*
>
> Brother Marist, "Tales of Ancient Samoa", 1955

Many aspects of Samoan culture have also remained intact through waves of European and American exploration and occupancy. Fa'a Samoa means the Samoan Way and includes the

traditional structure of Samoan society. Samoan society is based on a system of matais, or chiefs, with varying levels of rank and formed around extended families, or aiga, with a common allegiance to a high-ranking village matai. Fa'a Samoa is also composed of values like aiga (family), tautala Samoa (language), gafa (genealogy), lotu (church), and Fa'alavelave (ceremonial and other family obligations).

Dutch explorer Jacob Roggeveen was the first European to find the islands, in 1722; increasing contact with Western vessels came in the form of explorers, whaling vessels, merchant ships, and missionary efforts in the Pacific. Samoa was quickly recognized as a strategic midpoint on early sailing and steamer routes and in the late 19th century, British, German, and American governments all sought a foothold there. In December 1899, under the Tripartite Treaty, Western Samoa passed into German control, while the United States gained what is now known as American Samoa.

A sketch of Pago Pago in c.1840. Image: Alfred T Agate, courtesy of the U.S. Naval History and Heritage Command.

Tutuila became a territory of the United States in 1900 followed by the islands of Manu'a in 1904. With its strategic location, naval presence in American Samoa—there was a US naval base in Pago Pago Harbor—provided logistical support to pre-World War II and wartime American operations against forces of the Imperial Japanese Navy. In 1940, Pago Pago on Tutuila became

a training and staging area for the U.S. Marine Corps engaged in amphibious operations. During this intensive period, the United States built roads, airstrips, docks, and medical facilities, introducing change into numerous areas of island life. Many American Samoans enlisted in the U.S. Marines, and a home guard unit was established. In 1945, after the war was over, the Marines left the island territory and in 1951, the naval administration was changed to a civil form of government.

Tutuila, the largest island, forms the southwestern end of the territory, curving like the merging of two crescent moons around the large central lagoon of Pago Pago Harbor. Another embayment at the island's southwestern end is Fagatele Bay, which is where the national marine sanctuary story of American Samoa begins.

The red crown-of-thorns starfish shown here is an invasive predator that damages reefs in American Samoa. Image: Greg McFall/NOAA.

In March 1982, territorial Governor Peter T. Coleman nominated Fagatele Bay to NOAA, citing its ongoing recovery from a 1978 crown-of-thorns starfish invasion and building on the government's earlier designation as a special area under the territory's coastal management program. NOAA found that the nominated area met the requirements for inclusion on its List of Recommended Areas, including that it was important to endangered species, was an ecosystem of exceptional productivity, and contained distinctive features with strong research value. Fagatele Bay was added to the LRA in April 1982. In May of that year, a public workshop was

held in the territory, and consultations were conducted with federal and territorial officials, all of whom urged NOAA to move ahead with a designation process.

In December 1984, NOAA issued proposed regulations (prohibitions on taking natural and cultural resources, using certain types of fishing gear, operating vessels, discharging material, and disturbing the seabed) and a draft management plan for public review. Exactly one reviewer offered comments on the draft proposal, and that was to include more definitions in the regulations to ensure clarity. In April 1986, Fagatele Bay National Marine Sanctuary was designated, the seventh in the system and though it was tiny at about a quarter square mile, it already had a number of firsts: the first sanctuary designated outside the continental United States, and the first, and still only, sanctuary south of the equator.

Careful Tending (1987 to 2012)

If one were to use only the *Federal Register* (the federal government's official journal and place to publish public notices for things like regulations and meetings) as a gauge, the new sanctuary goes quiet for over two decades, when a notice appears to let the public know that NOAA is about to undertake an expansion that will change the very nature of this sanctuary. But more on that later. And that appearance would be simply an illusion.

In the ensuing twenty-three years, the site serves as proof that a sanctuary is more than the sum of its parts. The tiny sanctuary slowly grew to have an outsized conservation influence in the territory. Its beginnings at management are humble and in line with the earliest management plans in the system. Its 1986 management plan contained four objectives: coordinating and refining the protection authorities of the sanctuary, building a public awareness program, coordinating research in the sanctuary, and promoting other uses as compatible with the first three objectives. Although there was some discussion of the local needs of American Samoans, the attention given to cultural issues was cursory and not reflective of reality. From the start, the sanctuary intended to put Fa'a Samoa at the center of its management and maximize the benefits it could bring to American Samoa.

Students enjoyed the first EnvironDiscoveries Summer Camp in Futiga. Image: Nancy Daschbach/NOAA.

In 1991, the sanctuary initiated its popular summer science camp for students, a practice that has continued in various incarnations to the present. The camp introduced students to a curriculum that integrated both marine science and traditional Samoan stewardship concepts. A similar approach undergirded Le Tausagi, launched in 1998, in which a network of government ocean/coastal education coordinators came together to host "Enviro-Discoveries" Summer Camps each year. 2003 added the first ever ocean festival to the sanctuary's credit and when the sanctuary advisory council was seated in 2005, it included voices from the villages near the sanctuary. Today the council has seats for each of its federal and territorial government partners and 17 from the community including a youth seat and five community representatives from the east and west sides of Tutuila, Ta'u of the Manu'a islands, Swains Island, and Aunu'u Island. Later "firsts" included 2010's first ever *Dive Into Education* Workshops and the 2011 installation of two interactive kiosks, one at the airport and one at the hospital, both in Pago Pago.

The sanctuary wasn't neglecting its research role in these years. In 2002, a first ever Geographic Information System capacity building workshop was held in the territory, followed by its first whale survey in 2003 and its first submersible dive in 2005. In 2007, the first condition report for the sanctuary was completed, finding that although the bay had faced an astonishing array of disruptions, from such things as cyclones, crown-of-thorns starfish outbreaks, and coral bleaching and diseases, recovery has been remarkably swift in comparison to other coral reef ecosystems. The bay's relative isolation also provides a measure of protection. The most significant threats to the reef were noted to be from human activities including over-fishing, poaching (especially by blast-fishing and spearfishing at night), and land clearing for agricultural development. R/V *Manuma* began research operations in 2009.

The bay's remarkable resources, as they had been recognized in the early 1980s, continued to gain protection recognition in the late 2000s. In 2008, the sanctuary was an unexpected addition to the U.S. Tentative List, a pool of sites that have met a basic threshold to be considered for future nomination by the U.S. as World Heritage Sites. NOAA nominators had been told the area was too small for consideration, but officials at the Department of the

Interior, who maintain the Tentative List, had different thoughts when they flew over the area and decided to include the sanctuary on the list.

> *The atoll is known to Samoans, who have periodically visited over the past millennium, as "Nu'u O Manu" ("Village of seabirds"). It is believed that Polynesians have harvested at Rose Atoll for millennia and several species, such as the giant clam, were used for cultural celebrations and events. Few relatively undisturbed islands remain in the world and Rose Atoll is one of the last remaining refuges for the seabird and turtle species of the Central Pacific.*
>
> Proclamation 8337, Establishment of the Rose Atoll Marine National Monument, 2009

Fagatele Bay wasn't the only area of important natural and cultural resources in American Samoa. In 2009, over 13,400 square miles of waters—called some of the most pristine waters left in the world—around Rose Atoll (also known by its Samoan names: Muliāva ("end of the south equatorial current") and Motu o Manu ("island of seabirds")), an islet in the far east of territorial waters, were declared as a marine national monument. In his signing statement, President Bush acknowledged its value: "The third new monument will be the Rose Atoll Marine National Monument. Rose is a diamond-shaped island to the east of American Samoa, our Nation's southernmost territory. It includes rare species of nesting petrels, shearwaters, and terns, which account for its native name, 'Island of Seabirds.' The waters surrounding the atoll are the home of many rare species, including giant clams and reef sharks, as well as an unusual abundance of rose-colored corals. This area has long been renowned as a place of natural beauty. And now that it's protected by law, it will also be a place of learning for generations to come." But as large as the new monument was, it was soon to be encompassed by something even larger: National Marine Sanctuary of American Samoa.

A Great Harvest (2012 and ongoing)

In 2009, President Bush ordered NOAA to begin a process to add the monument to the sanctuary. In reality, discussions about expanding Fagatele Bay National Marine Sanctuary had held off and on since its designation. But the order set off a process that began formally with a scoping process in 2009 to assess the public's views on sanctuary expansion. An extensive and interactive discussion with residents and communities near potential expansion areas, and with the American Samoa government, helped address concerns about the potential expansion. The sanctuary advisory council also created a working group to ensure that all interests were addressed. In 2011, NOAA formally proposed an expansion of six components, including the original Fagatele Bay, Fagalua and Fogamaʻa (the next bay east of Fagatele) on Tutuila Island, as well as areas around the islands of Aunuʻu, Taʻu, Rose Atoll Marine National Monument, and Swains Island. In 2012, the expanded sanctuary was finalized, under the new name National Marine Sanctuary of American Samoa, with a total area of 13,581 square miles.

Students attended a class at the Ocean Center featuring NOAA's Science on a Sphere. Image: Apulu Veronika Molio'o Mata'utia Mortenson/NOAA.

The expansion did not slow down the sanctuary. In 2012, congruent with the expansion, the Tauese P.F. Sunia Ocean Center was opened in Pago Pago, a learning, training, and discovery center celebrating American Samoa's ocean riches. Exhibits highlight coral reefs, ocean ecosystems, Samoan cultural ties to coral reefs, and natural and human threats to the reefs, and the Science On a Sphere offers planetary data projected onto a six-foot diameter sphere. The Ocean Swimming/Ocean Science program launched in 2012 taught students about ocean safety, swimming, marine science, and how to be effective ocean stewards, and helps address the danger of drowning. A partnership with Papahānaumokuākea Marine National Monument, Google Street View, and Catlin Seaview Survey in 2014 yielded 360° panoramic photos and videos, which supported the preparation of Virtual Dive Expedition Kits shared with students and communities in 2018. The kits have been popular with the community ever since.

The sanctuary also facilitated connecting people and place through various projects. In 2016, the sanctuary implemented the Festival of Sites Village to Visitor program to engage cruise ship passengers and help them understand the broad cultural heritage of American Samoan traditions and lifestyles. The same year, the sanctuary worked with partners to support the Fagota Mo Taeao Open Fishing Tournament highlighting traditional fishing practices and responsible recreation, an effort that continues today. American Samoa's first ever Conservation Research Science Roundtable was held for scientists, educators, and decision makers in 2018, to identify research needs for the sanctuary and steps to address them. In 2019, less than a year after the introduction of ROVs to American Samoan classrooms, the first underwater ROV competition in the territory was held by the sanctuary and its partners, including the Department of Education and MATE. Teams from 11 high schools were challenged to design and build their ROV and test its capabilities through mission tasks modeled after real case scenarios.

A number of important research expeditions explored the sanctuary in the late 2010s, highlighting numerous discoveries. Diving expeditions and fish and coral surveys in 2017 in partnership with the Bishop Museum of Hawai‘i and NOAA’s National Centers for Coastal Ocean Science garnered new knowledge about mesophotic reef ecosystems in the sanctuary. Also called the twilight reefs, these ecosystems form in the lowest depth that sunlight can penetrate and have different species of fish and coral than in more shallow coral reefs.

Also in 2017, an expedition of NOAA research vessel *Okeanos Explorer* found, through the use of a remotely operated vehicle, a number of new seamounts and deep-sea ridges, home to several newly discovered species. A 2019 expedition of the Ocean Exploration Trust’s research vessel *Nautilus* continued the exploration of the seamounts and mapped deep sea habitats in the sanctuary. The expedition also uncovered a new hydrothermal vent on Vailulu’u Seamount, indicating this volcanic hotspot is still active.

A fautasi crew practiced for races held every Flag Day in American Samoa. Image: Apulu Veronika Molio’o Mata’utia Mortenson/NOAA.

Fautasi, the long wooden canoes once used to transport people and goods among the islands in Samoa, are now primarily used in races on April’s Flag Day for pride of community and culture. In 2019 the sanctuary hosted the first Fautasi Heritage Symposium, a three-day festival featuring presentations, exhibits, and conversations with fautasi crews and captains. One of those captains, Fu’ega Sa’ite Moliga, interviewed in 2017 for a Stories from the Blue feature, shares: “You know, everything goes hand-in-hand. That's what we like to pass on to our kids in the younger generations.To maintain our identity, that's the most important thing to us.” The sanctuary is proud to have a role in protecting the territory’s natural and cultural riches for future generations of American Samoans.

Pink coralline algae like this gives Rose Atoll its English name. Image: Mark Manuel/NOAA.

Origins of the Sanctuary's Name

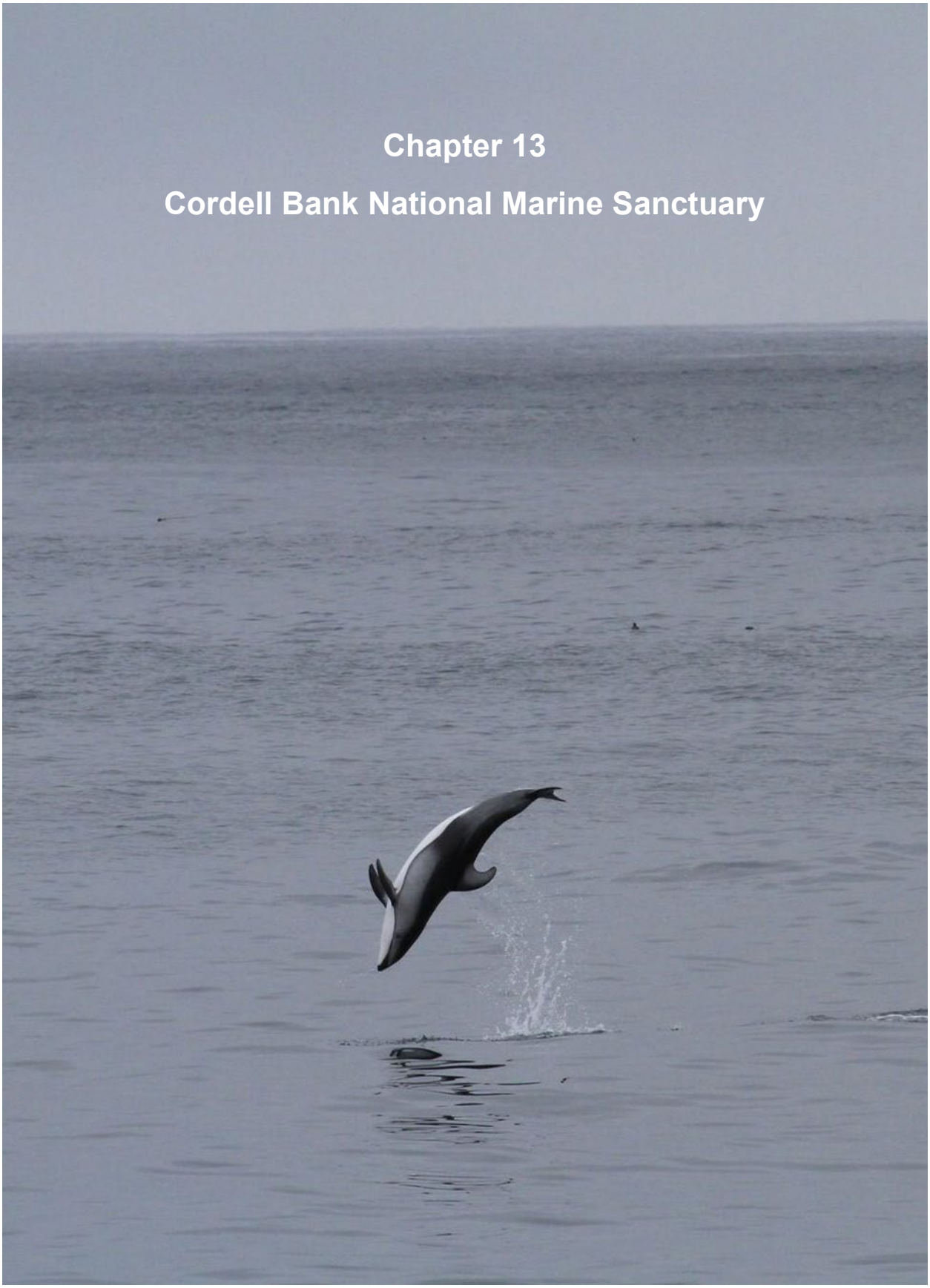
The sanctuary is named after the Territory of American Samoa, which itself derives from a Samoan word that might mean "place of the moa," a now-extinct large flightless bird. The present sanctuary resulted from an expansion of a much smaller site, Fagatele Bay National Marine Sanctuary, named after the bay which it encompassed and a nearby now-uninhabited village. Fagatele may come from Samoan words meaning "great bay."

Sanctuary Coordinators/Superintendents

- Reed Bohne (from HQ), 1986 to 1988
- Nancy Daschbach, 1988 to 2006
- William Keine, 2006 to 2007
- Gene Brighouse, 2008 to 2018
- Atuatasi-Lelei Peau, 2018 to present

Chapter 13

Cordell Bank National Marine Sanctuary



Chapter 13
Cordell Bank National Marine Sanctuary

A Revelation of Wonder

Cordell Bank National Marine Sanctuary is a lush feeding ground for many marine mammals and seabirds. During the spring and early summer, a process called upwelling brings cold, nutrient-rich water towards the surface, causing an explosion of biological activity. Algae and invertebrates thrive in the nutrient-rich water, which attracts a vast array of fish and marine mammals for feeding. Humpback whales, Pacific white-sided dolphins, Dall's porpoises and California sea lions can be seen throughout the summer and fall. However, few people have seen this special area off the California coast due to its depth, currents and distance from the mainland. Read on to learn more about this mysterious wonder.

Discoveries (to 2003)

Offshore where seabirds or marine mammals feed is usually an indicator of good fishing: it was an informal rule that early anglers knew well. It was also a lesson for the nation's Coast Survey which was charged with exploring and charting areas of high use to help improve the safety of vessels. One of those areas off the coast of California was surveyed in 1853 by George Davidson during a mapping expedition on California's north coast. Edward Cordell, a German immigrant to the U.S. and a man admired both for his character and his technical abilities as evidenced by many accolades in Coast Survey reports, was sent to do a more thorough survey in 1869. He used the accepted technology of his time; a lead weight was sent over the edge of the ship until it hit the bottom and then measured the line on its return to the surface. While Cordell knew there was a significant bank feature in the area, and that it was a productive area, he had no way of knowing what wonders lay under the surface. It would be more than a hundred years later for that story to be told.

> *A shoal known to exist some miles to the westward of Point Reyes, and of which mention was made in the first Directory for the Pacific Coast, published in 1858, has been developed by Assistant Cordell...In the formal search attention was first drawn to the special site of the shoal by numbers of seal, sea-lions, and marine birds, which resort there. In describing the result of his soundings, Mr. Cordell says: 'The least water found was twenty-five fathoms...'*
>
> Report of the Superintendent of the United States Coast Survey for 1869

The divers of Cordell Expeditions, a nonprofit research association founded by Dr. Robert Schmieder, first explored the bank underwater in 1977 and continued studying and documenting its diversity for a decade. It was only then the full riches of the bank first came into view. Dr. Schmieder remembered his first look during an interview for an oral history of the sanctuary: "So we continued down and as I went down, this gray green blanket started getting

texture and a mottled appearance, and then I realized it was shimmering. And then, only then, did I realize I was looking at fish…And if you can imagine having an opaque curtain in front of you and then a small hole opens and it widens like an iris, and as that iris opened I saw below me this extraordinarily colorful, exquisitely beautiful, astonishingly bright landscape below me with these colors pink, especially, white, especially, but maybe some other purplish colors."

> *But once I heard it became a sanctuary, said, 'Hey, I contributed something.' And like John said, it's a pat-yourself-on-the-back kind of moment. But I never dreamed it was as big as when we came back in October for the get-together, and just the reception we got. I said, 'Holy cow. I can't believe this.' But yeah, it's something I'll never forget.*
>
> Jerry Seawell, one of the Cordell Expedition Divers in an oral history taken in 2010

In July 1981, about four years after the first dives, Cordell Expeditions contacted NOAA about adding the bank to the List of Recommended Areas, at the time the pool of sites from which future sanctuaries were chosen. NOAA agreed and added the site to the LRA; in June 1983, the site was made an active candidate for designation. Though a scoping meeting was held in April 1984, the site didn't begin the designation process until 1987, when a preferred boundary encompassing about 100 square miles and two regulations prohibiting discharges and removal of benthic organisms was proposed.

A diver checked out coral formations on Cordell Bank in the 1970s. Image: Cordell Bank Expeditions.

During the public review of the proposal that followed—which included two public meetings in Bodega and San Francisco in September 1987—nearly all of the public comments, barring those related to regulating fishing, were supportive of increasing the protective measures for the sanctuary, including banning oil and gas activities, prohibiting anchoring, and extending protection to historical resources. NOAA agreed and included these three new provisions in its final rule. Cordell Bank National Marine Sanctuary was designated in 1989.

After designation, little progress was made in building out the protection, research, and education programs of the sanctuary. In 1991, the sanctuary was delegated to Gulf of the Farallones (later Greater Farallones) National Marine Sanctuary to manage and was also, in 1993, added to the Golden Gate Man and the Biosphere Reserve complex. Stretching the resources of one already busy site was difficult but the sanctuary was able to initiate at least some outreach efforts. In 1997 a field guide to the seabirds of the sanctuary was published and a number of wayside exhibits were added to coastal overlooks in three locations along the California coast.

Evolutions (2003 to 2014)

The new millennium opened another chapter in the sanctuary's legacy of discovery when in 2001, the first surveys of the bank by a remotely operated vehicle (ROV) were conducted, allowing the public for the first time to see for themselves what has so dazzled the divers of Cordell Expeditions.

The sanctuary also discovered what it meant to be on its own from the over a decade of management by Greater Farallones National Marine Sanctuary. A new independent superintendent had been hired, and in 2002 the sanctuary moved into shared space with Point Reyes National Seashore. The same year, they seated their sanctuary advisory council, which today consists of 14 seats: four community-at-large, and two each of conservation, education, research, fishing, and maritime activities. The council meets four times a year to provide input and advice to the sanctuary. In 2008, local community leaders established the Cordell Marine Sanctuary Foundation, to support the goals of the sanctuary and help increase awareness and resources to support it.

In order to protect the benthic communities of the sanctuary, and the rockfish and other species that depend on them, in 2006, areas within the sanctuary were declared as Essential Fish Habitat (EFH), a designation that requires fishery management councils—the regional bodies used by the National Marine Fisheries Service to manage fisheries—to assess the detrimental impact fishing can have on a specific area and take steps to address it. The sanctuary followed this declaration in 2008 by releasing a new management plan, the result of the complex process that also revised the management plans for Greater Farallones and Monterey Bay national marine sanctuaries. The sanctuary's first condition report followed in 2009, finding that although water quality was in good condition, the sanctuary was found only fair in habitat and living resources, mainly due to centuries of fishing impacts. However, the sanctuary noted that the EFH provisions—fishing regulations and seabed disturbance prohibitions enacted by the Pacific Fishery Management Council—appeared to be having a beneficial effect.

In 2013, in concert with Greater Farallones National Marine Sanctuary, the sanctuary worked with the State and Coast Guard to shift shipping lanes approaching San Francisco Bay to increase safety for mariners and protect whales. Extending the three lanes in the approach to San Francisco Bay reduced the co-occurrence of ships and whales within the national marine sanctuaries.

A research diver swam past a colony of strawberry anemones and orange hydroids in the sanctuary. Image: Joe Hoyt/NOAA.

In 2015 Cordell Bank and Greater Farallones national marine sanctuaries established a voluntary speed reduction program to protect whales. Ship strikes are a major threat to recovering endangered and threatened whale populations, including blue, humpback, and fin whales. In response, Cordell Bank, Greater Farallones, and Monterey Bay national marine sanctuaries established a voluntary Vessel Speed Reduction zone for commercial ships that pass through traffic lanes in the sanctuaries. Ships slow to speeds of 10 knots while traveling through vessel traffic lanes outside the Golden Gate Bridge from May through mid-November, the period of peak whale abundance. The voluntary slowdown program is a collaboration between the sanctuary system, shipping firms, Coast Guard, Bay Area Air Quality Control District, and local organizations.

The sanctuary found new audiences by partnering with well-trafficked institutions to host exhibits about the remote and hard to visit sanctuary. Exhibits were created at Point Reyes National Seashore (2004, 2015), Bodega Marine Lab (2006) and the Oakland Museum of California (2013). Exhibits seek to immerse people in the diversity and abundance of life on the seafloor, mid, and surface waters and highlight how humans are related to its health. The Ocean Exploration Center at Point Reyes National Seashore's Lighthouse Visitor Center features 3-D models of ocean wildlife, wall murals depicting life below the surface, and interpretive panels describing ocean wildlife and habitats off the coast. The Oakland Museum of California hosts a 2000-square-foot gallery focused on Cordell Bank National Marine Sanctuary as part of its Natural Sciences Gallery which tells the stories of eight incredible locations in California. The

gallery has immersive videos and interactive activities and displays and is a focus for a museum-led education program called Under the Sea Exploring Cordell Bank National Marine Sanctuary.

The sanctuary has also pioneered unique ways of engaging the local coastal communities. In 2006, the system's only radio show debuted when sanctuary staff launched Ocean Currents, which had broadcast continuously since then and was recognized as one of the top ocean podcasts by Oceana. Sanctuary staff also worked with South Florida PBS as part of the Changing Seas series and supported the creation of *The Cordell Bank: A National Treasure*, which was screened at film festivals in the United States, through PBS broadcast stations nationwide, online, and at the sanctuary's 30th anniversary celebration. The sanctuary also worked with collaborators to create education materials for teachers to use including Winged Ambassadors connecting ocean literacy with sanctuary science focusing on the incredible migrations and conservation concerns about albatrosses. They also contributed content to the Deep Sea Coral Community Curriculum highlighting how sanctuaries conduct deep sea research, as well as a Dungeness crab toolkit which brings together various teaching tools to highlight the fragility of economically valuable species like Dungeness crab in the face of a high carbon world and ocean acidification. Sanctuary staff have participated and led numerous trainings for teachers helping to further their ability to teach about the ocean through the lens of the sanctuary.

A school class spotted a gray whale during a field trip for 2016's Every Kid in a Park program. Image: Jennifer Stock/NOAA.

But this sanctuary, even as it looked forward, never forgot the unique history that had led to its creation. In 2009, an extensive effort was undertaken to record the oral histories of the divers that took part in the early Cordell Expeditions. As part of the oral history efforts, the sanctuary hosted a public event for its 20th anniversary bringing the original dive team members of Cordell Expeditions together to share with the public their experiences on an oral history panel discussion *Re-Discovering Cordell Bank: Dive Expedition 30 Years Later*. It was a fitting close to one chapter and the opening of a new one: the sanctuary was about to undertake public processes to consider expansion of the sanctuary to more than double in size.

Expansions (2015 and ongoing)

Since 2001, when public comments during the joint management plan review with Greater Farallones and Monterey Bay national marine sanctuaries raised the idea, Cordell Bank had been considering the need for boundary expansion to protect significant marine resources and habitats and the source of nutrient-rich upwelled waters to the north and west of the sanctuary. The 2008 management plan included strategies to facilitate a public process within five years to evaluate boundary alternatives that ensured maintenance of the area's natural ecosystem, including its contribution to biological productivity. In December 2012, NOAA initiated the public process to evaluate and assess a proposed expansion of the three sanctuaries and concluded the process in June 2015. Expansion more than doubled the sanctuary's size from 529 square miles to 1,286 square miles.

With the completion of the expansion, the sanctuary turned its attention to studying this new area. An acoustic monitoring buoy was deployed in the sanctuary in 2015, to characterize the soundscape and better understand noise impacts on whales and other species. The acoustic buoys were an addition to the hypoxia sensor buoys set up in the sanctuary in 2013 that monitor low oxygen water conditions in the sanctuary. In 2016, the sanctuary undertook the development of a 20-year monitoring plan for benthic habitat, which has been surveyed using various technologies and approaches.

In 2018 a new coral was discovered in the sanctuary. The specimen was collected by sanctuary scientists during a 2018 research expedition; however, reviews of imagery from past surveys indicate the coral has been on Cordell Bank since at least 2004 but had never previously been noted. The small, yellow soft coral was named for its discovery on Cordell Bank, *Chromoplexaura cordellbankensis*. Dozens of deep sea corals thrive off the California coast, but many are still unknown to science, and these surveys are critical to inventory the species in the sanctuary.

With the advent of 2020, resource protection in the sanctuary continued to evolve with alterations to the 2006 Essential Fish Habitat restrictions in and around the sanctuary. The amendment changed bottom trawl fishing closures to minimize adverse effects of fishing, re-opened historically important fishing grounds to groundfish bottom trawling, and prohibited fishing with bottom-contacting gear in deep waters off California to protect deep-water ecosystems, including deep-sea corals.

In 2009, as the sanctuary was collecting the oral histories of Cordell Expedition divers, its founder, Dr. Robert Schmieder, was asked: "What do you tell your friends or family or colleagues about Cordell Bank today? For instance, how would you describe it to somebody?" Dr. Schmieder answered: "I tell them that I am absolutely astonished and thrilled that there is a national marine sanctuary in really good hands…" NOAA is proud to be those good hands for the future of Cordell Bank.

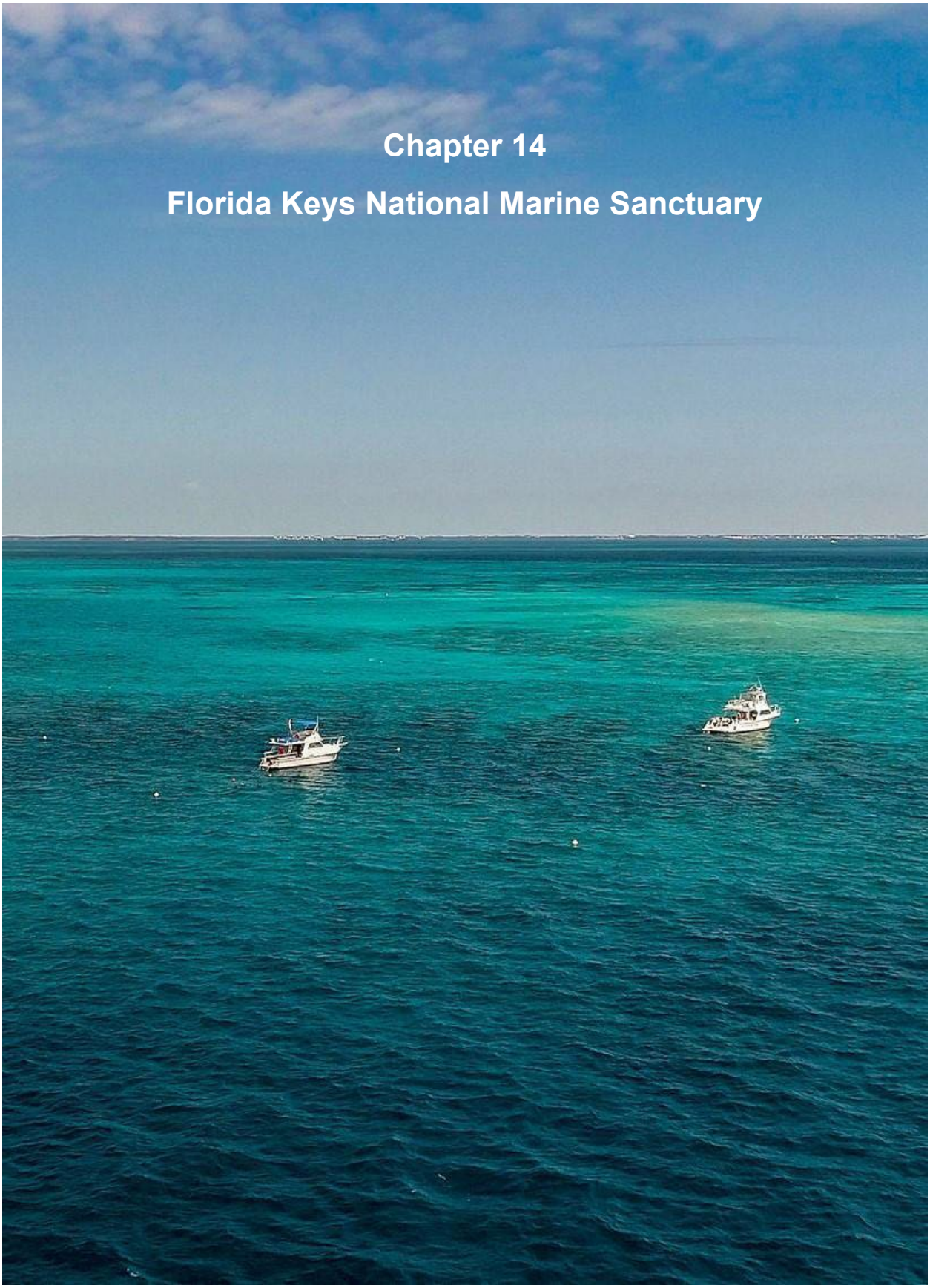
A tufted puffin in the sanctuary. Image: Sophie Webb/NOAA.

Origins of the Sanctuary's Name

The sanctuary takes its name from the rise that forms its centerpiece, Cordell Bank. Although the bank was originally discovered by George Davidson of the U.S. Coast Survey in 1853 and should have by tradition been named for him, it was fellow surveyor Edward Cordell who was given that honor. Cordell carried out a more thorough survey of the bank in 1869. After he died unexpectedly of a seizure in San Francisco the following year, the bank was named after him. Davidson had to settle for being the namesake of Davidson Seamount, now part of Monterey Bay National Marine Sanctuary. As an interesting trivia note, Cordell, as a new hydrographer with the Coast Survey, accompanied naval officer Henry Stellwagen as he surveyed a bank off the coast of Massachusetts that was later named for him (as would one day the sanctuary that protects it.)

Sanctuary Superintendents

- Managed by Greater Farallones National Marine Sanctuary 1989 to 1989
- Ed Ueber, 1989 to 2003
- Dan Howard, 2003 to 2021
- Maria Brown, 2021 to present



Chapter 14

Florida Keys National Marine Sanctuary

Chapter 14
Florida Keys National Marine Sanctuary

A Tropical Treasure

National marine sanctuaries are generally designated by an administrative process overseen by NOAA. However, Congress, recognizing the importance of the Florida Keys ecosystem and the degradation of the ecosystem due to direct and indirect physical impacts, passed the Florida Keys National Marine Sanctuary and Protection Act in 1990. The sanctuary protects 2,900 square nautical miles of waters surrounding the Florida Keys, from south of Miami westward to encompass the Dry Tortugas, excluding Dry Tortugas National Park. The shoreward boundary of the sanctuary is the mean high-water mark, meaning that once you set foot in Keys waters, you have entered the sanctuary. Within the boundaries of the sanctuary lie spectacular, unique, and nationally significant marine resources including North America's only coral barrier reef, extensive seagrass beds, mangrove-fringed islands, and more than 6,000 species of marine life. The sanctuary also protects our nation’s maritime heritage including remains of past cultures, navigation, or human interaction with the sea, shipwrecks and other archeological sites of significance. Sail on to learn why and how this sanctuary became the first one legislatively designated.

Plundered (to 1974)

The size of Florida has changed many times due to varying sea levels. At the time of the last ice age (100,000 years ago) sea levels dropped completely exposing Florida's coral reefs. The landmass of Florida was much greater and extended many miles into the Gulf of Mexico. Over time the coral reefs were fossilized, creating today’s Florida Keys. When the polar ice caps began to melt 15,000 years ago, the water levels rose and over many thousands of years new coral reefs formed into the underwater environment we know today.

The earliest Paleo-Indian people are thought to have arrived in South Florida around 12,000 years ago. With most of the area their habitation now underwater not much is known about their material culture. We know that Indigenous people living in the Florida Keys were skilled seafarers. They stewarded the islands hunting sea turtles and marine mammals and harvesting fish and shellfish. For example, the Calusa, a socially and religiously complex culture, inhabited the southwestern part of peninsular Florida for centuries before European explorers arrived. Unlike many other Indigenous people, they did not farm, relying instead on hunting, fishing, and shellfishing in the estuarine and marine environments. They were a sea-going people as well, using large dugout canoes to cover great distances in Florida and Caribbean waters and trading with native groups in the Antilles and Cuba.

They were among the first to take advantage of a natural bounty of land and sea that later European explorers would describe in glowing terms. “They are called the Islands of the Tortugas; for turtle are there, and many which come at night to lay their eggs in the sand,” recorded Hernando Fontaneda in 1575, in his memoir from his days as a captive among the Calusa. “The Tortugas abound with a variety of sea birds, turtle and excellent fish,” wrote George

Gauld in 1790, part of the surveying and charting work the Scotsman was doing on behalf of Great Britain. This natural abundance, combined with legends of gold and silver, drew Europeans to the state.

> *There are yet other islands, nearer to the mainland, stretching between the west and east, called the Martires; for the reason that many men have suffered on them, and also because certain rocks rise there from beneath the sea, which, at a distance, look like men in distress.*
>
> Hernando D'Escalante Fontaneda, "Fontaneda's Memoir", 1575

Spanish explorer Ponce de Leon first noted the Florida Keys in 1513 as Los Martires. In his exploration of the Gulf of Mexico the rocky Keys islands appeared from a distance as suffering martyrs. This would become all too true a notion for the Keys as the shallow reefs, shoals and routine hurricanes caused many vessels to go aground, wreck, or be claimed by the sea. The 1500s and 1600s saw the Spanish make further inroads into Florida, establishing settlements and missions, including St. Augustine, considered the oldest continually habited city in the U.S. Originally settled and claimed by Spain, Britain gained control of Florida in 1763, control was later returned to Spain. Spain formally ceded Florida to the United States in 1821, according to the terms of the Adams-Onis Treaty.

Contact with Europeans (mainly Spanish) in the 16th and 17th centuries devastated the Calusa and other tribes in Florida, who eventually died from disease, warfare, and slave raids. Other tribes, including the Seminoles, migrated south into the region in the 19th century and were in turn forced further and further southward by American settlement. The Seminoles attacked white coastal settlements in the 1830s, until 1834 when the second Seminole Wars was waged to open the Florida coast to American settlement. When it ended over ten years later, more than 1,500 were dead.

Key West, originally called Cayo Hueso, was a small fishing village and watering stop for ships making long voyages across the Gulf of Mexico and Atlantic. Until after the war of 1812, Key West and the rest of the Keys were a frontier, homes to people who didn't have or couldn't find a home elsewhere. Displaced Native Americans, pirates, shipwreck salvors, spongers, and renegades settled in small communities along the Keys.

> *The unexperienced navigator too is sometimes by light winds and unknown sets of the gulf accidentally carried within side the reef, through some of the inlets, and when he had got an anchor, he sees through the clear water, that he is surrounded by rocks and shoals, which are more appalling to the eye than dangerous in reality, often lying in deep places. It is then the wrecker makes his appearance, and the frightened master of a rich laden vessel, is compelled to accede to the terms of the only pilots who can take him safely out.*
>
> Charles Blacker Vignoles, "Observations Upon the Floridas", 1823.

As a result of global exploration, followed by early American expansion across North America, increased maritime traffic resulted in increasing numbers of shipwrecks, including in the waters

of the Keys. Salvaging ships and their cargo became a lucrative industry known as wrecking. Wreckers salvaging property from shipwrecks in U.S. waters were required to report their activities. Subsequent laws required that all salvaged materials be brought into a U.S. port of entry and be appropriately awarded. Key West became an official port of entry in 1822, and later became a maritime and admiralty court jurisdiction.

Fishers mended their nets while in port in Key West Harbor in 1938. Image: Arthur Rothstein, courtesy of the Library of Congress.

The frontier town eventually gave way to a more settled community as the economy grew and more settlers came. Through all its incarnations, the economy of Key West and the entire chain of islands was primarily founded on maritime activities. One of those was fishing, an unusually (for the time) diverse community that included Bahamians, Cubans, Europeans, and Americans, that fished, collected shellfish, and harvested sponges and turtles.

Wrecking was such a lucrative industry that Key West became the richest city in Florida. In the 18th and 19th centuries, the Florida Straits were a primary route used by vessels traveling between New England and Caribbean ports, which became busier when traffic increased in the Gulf of Mexico to take advantage of the new port of New Orleans. Poor navigational skills, poor knowledge of shoals, and unpredictable hurricanes provided conditions ripe for shipwrecks, of which wreckers were quick to take advantage. They were obligated to save the crews of and assist distressed vessels and were awarded a percentage of the value of salvaged cargo. Today these early shipwrecks are remembered through the reefs that bear their names such as Looe (1744), Carysfort (1771), and Alligator (1822).

Wrecking as a profession died out as navigation in the Straits was improved with the installation of lighthouses and increased navigational knowledge. Beginning in the 1800s the U.S. Coast Survey spent nearly 30 years in the Keys mapping and marking the reefs. A succession of lightships, unlit beacons, and iron framed skeletal lighthouses were initiated along the Keys coral reefs and shoals to provide assistance to mariners traveling these dangerous waters. The

remains of a number of remarkable lighthouses can be seen today as they stand proudly along the Florida Keys including Carysfort Lighthouse (1852), Sand Key (1853), Rebecca Shoal, and Sombrero Reef (1858).

The military importance of Key West has also been recognized since the 1820s, as Key West first served as a naval base for American patrols against pirate bases. Later, during the Civil War, Fort Taylor at Key West and Fort Jefferson in the Dry Tortugas were essential to the Union naval blockade of the Southern ports. Key West and other locations in the chain played crucial roles in the Spanish-American War, World War I, and World War II, and Key West remains an active naval base today.

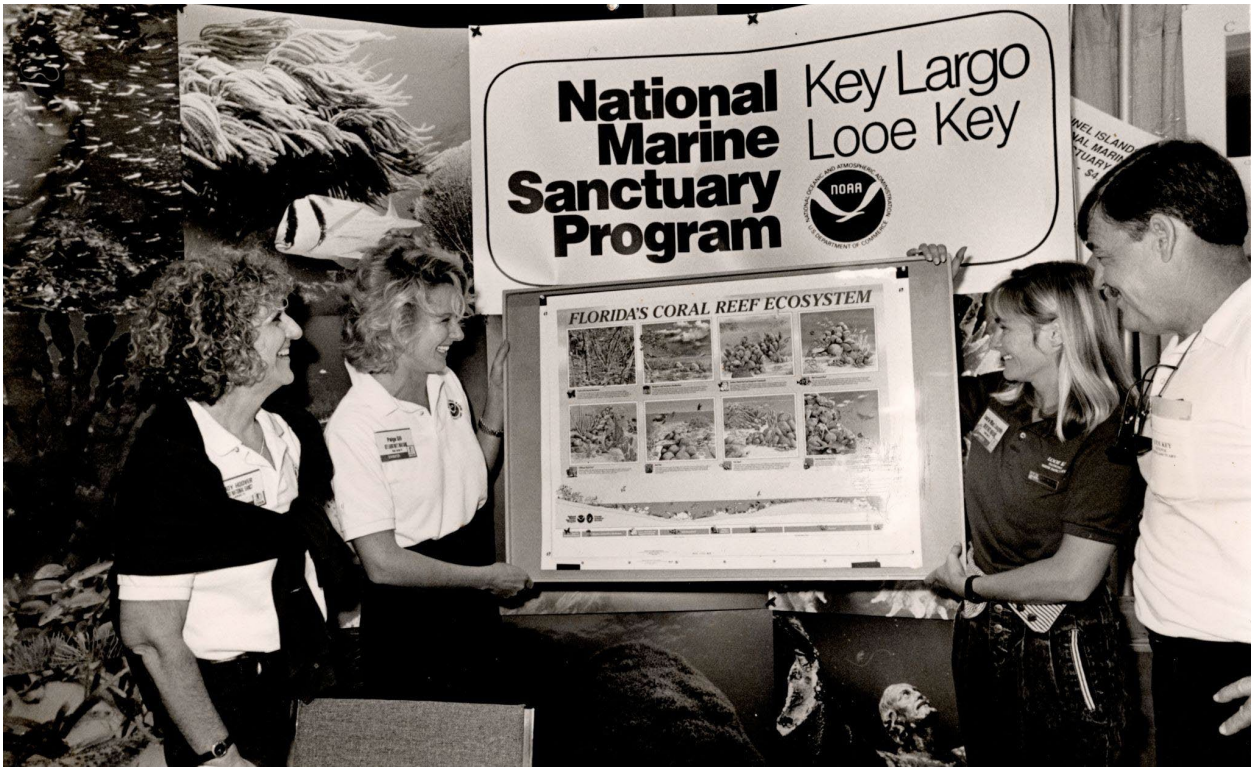
The first modern conservation protection extended to the Keys came in 1908 when President Theodore Roosevelt created the Key West National Wildlife Refuge, only five years after he had designed Pelican Island National Wildlife Refuge, the first of its kind in the nation. The first protected area was followed by others in the ensuing decades, including Fort Jefferson National Monument (1935), Great White Heron National Wildlife Refuge (1938), Everglades National Park (1947), and Biscayne National Monument (1968). While the national monument included a water extension off the islands, it was in 1960 that the first underwater state park was established. President Eisenhower dedicated Key Largo Coral Reef Preserve. Later that same year, Governor Collins renamed the park as John Pennekamp Coral Reef State Park, which would form the nucleus of a much larger park that would come thirty years later.

Sooty terns nested in Dry Tortugas National Park (then Fort Jefferson National Monument) in 1937. Image: J.O. Stevenson, courtesy of the National Park Service History Collection.

Sheltered (1975 to 1990)

The first national marine sanctuary was designated in January 1975, two years and some months after the passage of the Marine Protection, Research, and Sanctuaries Act. At the time, NOAA was at work on what would become Key Largo National Marine Sanctuary (which had been nominated by Dr. Dennis O'Connor of the University of Miami and Dr. Rezneat Darnell of the nonprofit American Institute of Biological Science in 1974) and in August 1975, released a draft plan that proposed establishing a national marine sanctuary in the federal waters besides John Pennekamp Coral Reef State Park, to be managed by the State under an agreement with NOAA. After a public review period and public hearing that netted mostly positive suggestions and support, a final management plan was issued in December 1975, designating the country's second national marine sanctuary. At 103 square miles, it was over a hundred times bigger than the one square mile of Monitor National Marine Sanctuary. The designation ceremony was attended by Dr. Robert White, the NOAA Administrator, members of Congress, and officials from the State of Florida; the designation ceremony, we are told by the NOAA Week newsletter of December 19, 1975, was held on a glass bottom boat over the reef.

With two sanctuaries under its belt, the national program spent the next several years developing a process to request and consider nominations of areas from the public to be considered as sanctuaries. When the resulting List of Recommended Areas was published in October 1979, two areas in Florida were included: Big Bend Seagrass Beds (located offshore of the Florida panhandle) and Florida Middle Ground (a reef complex about 80 miles off the coast of Tampa). Though no additional areas in the Keys were included on the LRA, Looe Key had already been named as an active candidate in designation in August 1979, following a recommendation by a coalition of citizens and nongovernmental organizations in 1977 and a public workshop in 1978. After initially delaying at the request of the Atlantic and Gulf of Mexico regional fishery management councils, the designation process was initiated in May 1980 with the release of a draft plan and finalized in January 1981, as a seven-square-mile sanctuary. On the same day, Gray's Reef and Greater Farallones national marine sanctuaries were designated, making them the third, fourth, and fifth sanctuaries in the program. The National Park Service joined in, expanding Biscayne National Monument into Biscayne National Park in 1980.



Sanctuary staff gathered around to celebrate the newly released poster for Key Largo and Looe Key national marine sanctuaries. Image: NOAA.

Key Largo and Looe Key national marine sanctuaries got down to the business of building their programs and protections as the 1980s advanced. The first mooring buoys in the world, designed by sanctuary staff, were installed on French Reef in the Key Largo sanctuary in 1981 to help keep boat anchors off fragile coral; they are now a commonly utilized tool for protecting sensitive resources worldwide. Down further south, Looe Key implemented the first zoning system in the sanctuary program in 1983 and hosted the first annual underwater music festival in 1984. The sites teamed up in 1986 to hold an underwater photo contest. NOAA, wanting to draw attention to the detrimental impacts of some human uses to the reef systems, worked with the *Miami Herald* to produce an article on the high incidence of boat groundings in the sanctuaries and also with UPI to produce a feature article on diver impact to coral reefs. In 1987, Key Largo installed day markers at Carysfort Reef, South Carysfort Reef, Key Largo Dry Rocks, Grecian Rocks, White Bank Dry Rocks, French Reef, Sand Island, and Molasses Reef to help warn boaters of their presence.

In spite of this kind of progress made in creating conservation areas in the Florida Keys, the detrimental impacts of human use and pollution were making themselves known. In 1979 came the first large-scale coral bleaching recorded in lower Florida Keys, which would be followed by other bleaching events in ensuing years.Years of intensive boating, fishing, and diving; unwise development; and pollution were taking their toll. Throughout the 1980s, the Keys faced a series of declines, including algal blooms in Florida Bay, sponge die-offs, bleaching and losses in living coral cover, seagrass die-offs, and unusual reef fish mortality.

Residents were looking to NOAA to step up to other areas besides Key Largo and Looe Key. Three additional areas—Alligator Reef, Sombrero Reef and American Shoal—were officially made study areas in 1988 to consider them for future sanctuary status. The specter of oil drilling in the Keys came up at public hearings in 1989 for a proposed five-year plan to open coastal areas in Florida to oil and gas development. Conditions were coming together for the possibility of new sanctuaries in the Keys. Then events in October 1989 changed everything.

Protected (1990 to 2010)

Within a period of seventeen days October through November 1989, three large vessels; M/V *Elpis*, *Alec Owen Maitland,* and *Marvo Vetranic* ran aground on coral reefs in the Florida Keys, two of them grounded in Key Largo National Marine Sanctuary. The impact destroyed hundreds of acres of coral. In many ways, what happened next conveyed both the Florida Keys and the sanctuary system into a new phase of maturity.

The Florida Keys National Marine Sanctuary and Protection Act was passed in early 1990, legislatively creating a sanctuary for the first time. The Act also came with a host of other firsts for the sanctuary program; NOAA was ordered to establish the first community-based advisory council for the program, seek an Area to be Avoided from the International Maritime Organization to move large vessels far from the reefs, to prepare a management plan (the first time one had been done subsequent to instead of in tandem with a designation process), and to establish a comprehensive water quality protection program. The act also banned oil drilling and hard minerals mining in the sanctuary.

The process laid out to prepare the management plan was unlike anything NOAA had attempted. A core group of federal and state agency partners was created to oversee a process to be supported by GIS and large-scale mapping efforts and guided by the wisdom of a sanctuary advisory council of community members. Issues of how long the background reviews of potential members of the council took under the Federal Advisory Committee Act later prompted an exemption from such requirements in the 1992 reauthorization of the National Marine Sanctuaries Act. Staff and infrastructure from other parts of NOAA were called into service to support the effort with facilitation, information, and technical services. A scoping process, including six public meetings, began in April 1991, after which the sanctuary, its advisory council, and partners got to work crafting the new management plan.

But the new sanctuary, which now overlapped with the two older ones, did not wait on the completion of the management plan to get to work on its programs. The sanctuary partnered with Monroe County schools in 1990 to introduce the Coral Reef Classroom curriculum and released a new coral reef ecosystem poster, and in 1991 organized the first of many coastal cleanups. The first newsletter came out that year as well, later becoming *Sounding Line*. By 1993, the sanctuary became partners in the Comprehensive Everglades Restoration Plan, a joint project between Everglades National Park and the Environmental Protection Agency. The TV series *Waterways* was launched to inform viewers of the diverse wonders of the South Florida ecosystem and the research and conservation programs that protect them. 1994 also saw another first for the program, when a full-time enforcement agent was assigned to the sanctuary.

The initiation of long-term monitoring strategies for coral reefs, water quality, and seagrass began in 1995, which allowed the program to build baseline knowledge of and track trends in the

health of the sanctuary's natural resources. In 1996, the sanctuary began efforts to assess the status of recreation and tourism in the Keys and how the sanctuary impacted them, the start of a long-term study that continues to assess the socioeconomics of the sanctuary and the Keys.

The long years of preparing the management plan and simultaneously building programs were hard enough under the best circumstances. Those involved often faced hostile engagement with a vocal segment of the communities calling themself the Conch Coalition. The Conch Coalition soon made itself heard and felt, rallying under the slogan: "Say No to NOAA." Coconuts mailed to Congress, weekly interviews on the "Victims of NOAA" television show on local cable channels, and local radio shows funded by out-of-state anti-government activists fueled an opposition movement to what critics viewed as a governmental takeover of the Keys. At its most strident, the sanctuary superintendent was burned in effigy; staff were refused service in local restaurants, gas stations, and stores; and some were even threatened.

The mooring buoy team of Florida Keys National Marine Sanctuary oversees a network of more than 900 buoys that protect reefs from anchor damage. Image: Matt McIntosh/NOAA.

But the sanctuary staff and supporters persevered. A draft management plan and implementing regulations were proposed for public review in March 1995. The plan was structured around eleven action plans for channel/reef marking, education, enforcement, mooring buoys, regulations, research, submerged cultural resources, volunteers, water quality, and zoning. The implementing regulations included those prohibiting hydrocarbon activities, coral removal,

seabed alteration, discharges, operation of large vessels, release of invasive species, and wildlife disturbance. A nine-month public comment period followed, with six public hearings held along the island chain; more than 6,400 comments were received. NOAA reviewed the comments and then with the sanctuary advisory council, began to prepare the final plan and regulations.

By 1997, after a long seven years of work by dozens of people from the government, environmental groups, user organizations, and community members, the first management plan for the sanctuary was done, creating the first large-scale marine zoning scheme in the U.S. and the then-largest network of marine reserves in U.S. waters. The plan also outlined project goals that would take a number of years to achieve. Resource protection projects included creating a no-discharge zone for the city of Key West; signing a Programmatic Agreement among NOAA, the Advisory Council on Historic Preservation and the state of Florida for Historical Resource Management in FKNMS; and continuing restoration work at the sites of ship groundings. Two projects were particularly important, with profound conservation impacts on the Florida Keys.

The first was undertaking a process to create a marine reserve around the Tortugas, which used an abbreviated version of the process used to create the management plan: harnessing the technical expertise and knowledge of NOAA and working with agency partners, community members, and user groups in an iterative, interactive process. The process resulted in 2001 with the Tortugas Ecological Reserve, then the largest no-take area in American waters. In 2007, for the first time since their surveys began in the late 1990s, scientists from NOAA and the state observed thousands of individual mutton snapper spawning over two consecutive months. This was the first mutton snapper spawning captured on record in Florida. In 2013, the sanctuary released a report with monitoring data from the Tortugas Ecological Reserve that showed overfished species increased in presence, abundance, and size inside the reserve and throughout the region; commercial catches of reef fish in the region increased; and no financial losses were experienced by regional commercial or recreational anglers.

The second involved working with the U.S. Coast Guard and the International Maritime Organization to declare the sanctuary as a Particularly Sensitive Sea Area, an international designation recognizing the valuable and fragile nature of its resources and allowing protective measures to be put in place. The instrument chosen was an Area to be Avoided, which required large vessels to remain offshore and away from the coral reefs and other sensitive habitats of the sanctuary. These protections, put in place in 2002, were the first time such measures were used in the nation; similar measures were enacted in Papahānaumokuākea Marine National Monument in 2007.

Catlin filmed a coral reef nursery in Florida Keys National Marine Sanctuary. Image: Mitchell Tartt/NOAA.

Following on these signature projects, the sanctuary continued its resource protection, research, and education work throughout the 2000s and 2010s. In a major conservation effort, a no-discharge zone in state waters in the sanctuary established in 2002 was followed in 2010 by expanding the no-discharge zone to the federal waters of the sanctuary as well. In 2003, the sanctuary rescued and transplanted more than 1,000 pieces of coral from a project to restore the navy pier in Key West; in response to the project, the sanctuary also established a first-of-its-kind coral nursery program, and protocols for rescuing and transplanting corals that might otherwise be lost in underwater construction projects. In 2005, the Safe Sanctuaries drill helped build oil spill response capacity in the Keys. In 2007, the sanctuary updated its management plan and programs, reporting on progress made since the original 1997 plan, but made no regulatory or zoning changes.

The sanctuary continued to develop outreach projects over the next two decades. In 1997, the sanctuary launched its Shipwreck Trail to increase public awareness of the unique underwater heritage. Selected for their condition, stability, and historical, biological, archaeological and aesthetic values, the nine shipwrecks on the Shipwreck Trail represent the 500-year-history of Keys maritime heritage and all regions of the Keys. The sites range from easy, shallow-water locations to deeper shipwrecks for divers with more experience.

In 2007, the sanctuary opened the Dr. Nancy Foster Florida Keys Environmental Center dedication ceremony in Key West, named for the former director of the program who died a few months later after a battle with cancer. The center is now referred to as the Eco-Discovery Center and remains one of the largest and active visitor centers in the system. More than 6,000 square feet of interactive and dynamic exhibits inform visitors about the ecology of Keys' habitats, from the upland pinelands through the hardwood hammock and beach dunes through mangroves and into the sea and its seagrass flats, hardbottom, coral reef, and deep-shelf communities. The Living Reef exhibit includes a 2,500-gallon reef tank with living corals and tropical fish, a live Reef Cam, and other displays that highlight the coral reef environment and the extensive maritime history.

The sanctuary launched a series of innovative partnerships with local businesses designed to reduce the impacts of users on the wildlife and habitats of the Keys. The first, launched in 2007 with partners, was Dolphin SMART, which recognizes commercial wild dolphin tour operators who have made a commitment to educate their customers about the importance of minimizing wild dolphin harassment. The second, which debuted in 2009, was Blue Star Diving, recognizing tour operators who are committed to promoting responsible and sustainable diving, snorkeling, and fishing practices to reduce the impact of these activities on ecosystems in the Florida Keys. Its counterpart for fishing guides, Blue Star Fishing, debuted in 2018.

Sanctuary science work saw equal strides forward. A comprehensive science plan was released in 2002 and in 2005 the sanctuary and its partner Mote Marine Laboratory launched a new BleachWatch program that trained volunteers to report bleaching and provide information for sanctuary scientists and managers to make better decisions. After the first lionfish (an invasive species capable of causing significant impacts) was spotted in the Keys, the sanctuary launched an awareness campaign and hosted fishing derbies designed to help remove the species from the Keys. After the Deepwater Horizon oil rig exploded in 2010, spilling oil into the northern Gulf of Mexico, sanctuary staff and community teams monitored shorelines in the Keys for tar balls. While there were no significant impacts in the Keys from the spill, the first comprehensive assessment of the sanctuary's resources set the stage for the next major shift in conservation in the Keys.

Cherished (2011 and ongoing)

In 2011, the sanctuary released its condition report, the first comprehensive assessment of the status of the resources it was charged with protecting. The condition report summarized: "Generally, the status and trends of the resources protected by Florida Keys National Marine Sanctuary reflect the inherited condition of a system that has been heavily exploited during the past century, more so than the relatively short time frame that these resources have been managed at the current geographic scale. For example, many of the historically abundant species (e.g., green turtles) and biogenic habitats had already been severely altered or reduced when the sanctuary was designated. Thus, resource managers are working to conserve pieces of the former system so that it can be restored to an improved state."

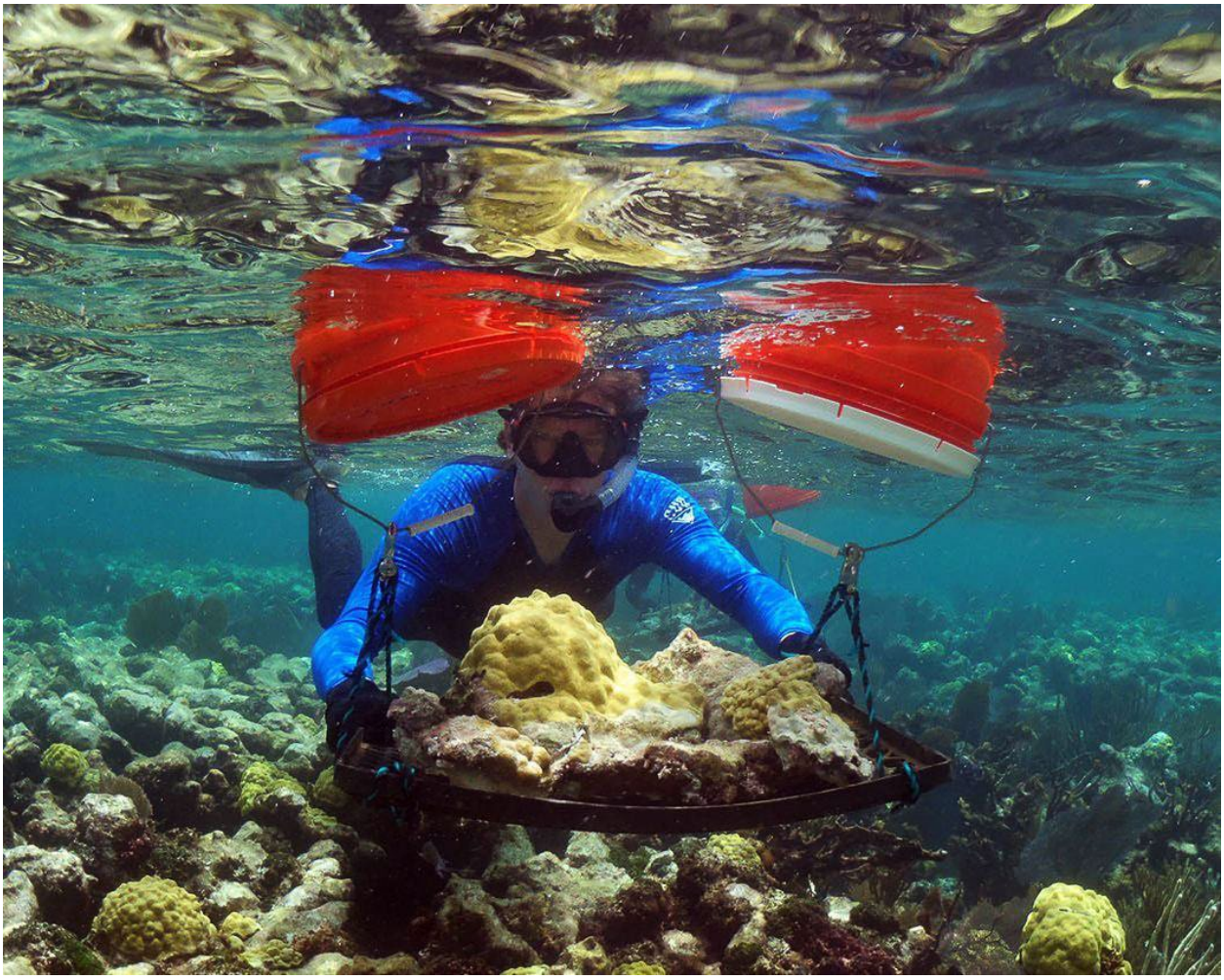
As a result of the condition report's findings, the sanctuary advisory council asked the sanctuary to conduct a comprehensive review of the sanctuary's marine zones, boundaries, and regulations, a process the site kicked off in April 2012. Public scoping and sanctuary advisory council reviews and discussions took up much of 2013 and in 2014, the sanctuary advisory council completed its work plan for reviewing topics raised in public scoping and requested that the sanctuary analyze a range of ideas for how to revise its zones, boundaries, and management plan in a draft environmental impact assessment.

As NOAA worked to prepare its proposal, two consequential events impacted the Keys. Reefs in the sanctuary suffered significant declines due to disease outbreaks affecting multiple species of coral that began in 2014 near Miami and continued moving south in the following years. An emergency workshop convened in 2018 outlined responses to the new coral disease that are now being implemented. The second event came when Hurricane Irma struck in 2017, leading to efforts to clean up debris from the storm through the community-led program *Clean Seas Florida Keys* and partnerships with restoration groups and partners to conduct rapid response

triage programs for coral restoration. 2017 also saw the removal of 31 derelict migrant vessels, in partnership with local, state, and other federal agencies. To complement those and other efforts, the sanctuary launched a new online boater course to teach operators about the natural and historical resources within the sanctuary, offer strategies for responsible boating and stewardship, and highlight relevant sanctuary rules and regulations.

> *So the sanctuary really comes in to make sure to guarantee that the value that our community has with this ecosystem remains steadfast and into the future for my kids and future generations.*
>
> Will Benson, Stories from the Blue, 2018

Iconic Reefs launched in 2019, an unprecedented, long-term, and ambitious plan developed by NOAA and its partners to restore seven important reef communities at Carysfort Reef, Horseshoe Reef, Cheeca Rocks, Sombrero Reef, Newfound Harbor, Looe Key Reef, and Eastern Dry Rocks. The approach is multi-pronged, first removing (and continue monitoring and removing for the duration of the effort) invasive species, then transplanting elkhorn and other species of coral from coral nurseries to increase coral cover to about 15 percent and provide habitat for other species, and finally add additional coral species to increase cover to about 25 percent.



Coral restoration efforts like this one, reattaching coral after a vessel grounding on South Carysfort Reef in 2015, are key to helping restore the health and function of the sanctuary's coral reefs. Image: NOAA.

By 2019, the sanctuary had also completed both its review and consultation process with its advisory council and the complicated task of determining appropriate proposals. These alternatives—no action and three alternatives of varying changes to boundaries, zones, and regulations—were packaged together as the Restoration Blueprint and released for public review and comment on August 30, 2019. The public comment period on the Restoration Blueprint closed on January 31, 2020, with more than 1,200 unique comments received.

Proposed regulations and boundary changes, and a draft revised management plan were prepared and released for public comment in July 2022. The comment period is open until late October 2022 and includes virtual and in-person public hearings. After consideration of public comments received during this period, the sanctuary will prepare final regulations and a final management plan that will guide the sanctuary into the future.

In his signing statement for the 1990 act that created the sanctuary, President Bush said: "Today I take great pleasure in signing H.R. 5909...It is an accomplishment of which we can all be

proud." There are significant accomplishments of which we can be proud. But significant challenges lie ahead, and it is all hands on deck to restore and protect this cherished ecosystem.

Cormorants roosting in the roots of mangroves in the sanctuary. Image: David J. Ruck/NOAA.

Origins of the Sanctuary's Name

The Florida Keys take their names from the state's name, given by Spanish explorer Juan Ponce De Leon in 1513, in honor of the Feast of Flowers, Pascua Florida, Spain's Easter celebration, and the Spanish word *cayo* (small island), from which the word *key* derives. The original name given to the Keys by De Leon was Los Martires, the Martyrs, as he thought the low-lying islands looked like suffering men.

Sanctuary Superintendents

Looe Key

- Billy Causey, 1983 to 1990
- George P. (G.P.) Schmahl, 1991 to 1997

Key Largo

- Bill Harrigan, 1984 to 1987
- Michael White, 1987 to 1991
- Alan Bunn, 1991 to 1993

Florida Keys

- Billy Causey, 1991 to 2006
- Dave Score, 2006 to 2010
- Sean Morton, 2007 to 2016
- Ed Lindelof, 2016 to 2017
- Sarah Fangman, 2017 to present

Chapter 15
Flower Garden Banks National Marine Sanctuary

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Flower Garden Banks National Marine Sanctuary

Down Under, Out Yonder

The 17 bank features included within Flower Garden Banks National Marine Sanctuary are located between 80 to 124 miles off the coasts of Texas and Louisiana, and include the following features: East and West Flower Garden Banks, Stetson Bank, Horseshoe Bank, MacNeil Bank, Rankin/28 Fathom Banks, Bright Bank, Geyer Bank, Elvers Bank, McGrail Bank, Bouma Bank, Sonnier Bank, Rezak Bank, Sidner Bank, Parker Bank, and Alderdice Bank. The sanctuary contains underwater communities on features pushed upward by salt domes below the continental shelf of the northwestern Gulf of Mexico. The banks range in depth from 55 feet to nearly 500 feet. Geologically they are underwater hills formed by ancient depositional salt layers pushed up through more dense overlying sedimentary layers due to structural uplift or weaknesses in the overlying beds. The banks provide a wide range of habitat conditions that support several distinct biological communities, including the northernmost coral reefs in the continental United States. These and similar formations throughout the northern Gulf of Mexico provide the foundation for essential habitat for a variety of species. The combination of location and geology makes the sanctuary extremely productive and diverse and presents a unique set of challenges for managing and protecting its natural wonders. Dive in to learn more about this ocean treasure!

Rumors of a Garden (to 1992)

Like other parts of the country the Texas coastline was home to groups of Native Americans. The Atakapas lived along the northern part of the coast and the Karankawas along the southern part of the coast, utilizing the marine resources to feed, shelter, and heal themselves. While both cultures used canoes in the quieter waters of bays and estuaries, and were skilled anglers, neither was a sea-going people and did not venture offshore for their fishing activities. It would be modern anglers who first discovered the banks.

> *The Gulph of Mexico, from the vast body of water continually forced into it, may be considered as one giant whirl-pool; this great body of water enters by Cape-Catoch, and proceeds along the shores of this very extensive Gulph in a kind of circular motion, and makes its egress between Cuba and the Florida-Shore, where there is least resistance.*
>
> Captain Lawrence Furlong, “The American Coast Pilot, First Edition”, 1796

Although scientists would be surprised by it later, it was the colorful coral and associated life of the banks that first caught the eyes of snapper and grouper fishermen starting in the early 1900s. They called them the Flower Garden Banks because of the brightly colored sponges, plants, and other marine life that came up on their hooks and anchors. The first scientific study of the area took place in 1936, when the banks were included in a hydrographic exploration of

the Gulf of Mexico conducted by the U.S. Coast & Geodetic Survey. The survey provided valuable information about the geology and topography of the banks. Data from that survey and others that followed allowed researchers to determine that the banks were actually created by salt domes, underwater mountains created by plugs of salt pushing the overlying sediments upward.

A diver took a coral sample during a 1967 research expedition to the Flower Garden Banks. Image: World Book Science Series.

Curious about what they had heard from anglers, in 1960, a group of divers led by Dr. Thomas Pulley, of the Houston Museum of Natural Science, conducted the first underwater exploration of the Flower Garden Banks. Some scientists thought the area would be too cold or too turbid to sustain any extensive coral reef development. However, these scuba diving expeditions revealed that the Flower Garden Banks supported healthy, pristine coral reef systems, the kind more commonly found in the warmer waters to the south. The first scientific description of the banks was published in 1961 by Dr. Pulley, kicking off a long, prestigious research pedigree that continues to this day.

> *125 miles SSE of Galveston, and in the same latitude as Aransas pass, are two tropical West Indian coral reefs. These reefs have been known for half a century as Flower Garden Banks to the snapper fishermen because of the colorful specimens they occasionally brought up when their lines snagged the bottom.*
>
> Dr. T.E. Pulley, “Texas to the Tropics”, 1963

By the early 1970s, the results of over a decade of study—including assessments that showed nearly half the reef area of the banks consisted of live coral—had government agencies, divers,

and other groups discussing the need to protect the banks from increasing human activities in the Gulf of Mexico; the first of many "multi-use" meetings was convened in 1973 among agencies and scientists to discuss how to protect the banks in a region seeing increasing levels of oil and gas exploration and development and other uses. The passage of the National Marine Sanctuaries Act in 1972 prompted discussions of the Flower Garden Banks as a candidate for designation. The area was nominated in September 1977 by the Texas Coastal and Marine Council. In June 1978, an issue paper was prepared and shared among federal agencies, interested organizations, and the public. NOAA agreed, swiftly making the area an active candidate for designation and initiating the designation process in 1980, publishing proposed regulations and a draft environmental impact statement in June that year.

However, the designation process hit a snag soon after. When the draft management plan and its proposal to ban new oil and gas development in and around the banks for five years was released to the public, an uproar ensued. With this opposition, combined with an ongoing effort to declare a fishery management plan for coral in the Gulf of Mexico, NOAA chose to withdraw the site as an active candidate.

When resource evaluation teams considered areas to recommend to NOAA for the Site Evaluation List in 1982, the team for the Gulf of Mexico recommended Flower Garden Banks for a single reason. Their report noted: "The resource evaluation team devoted a substantial portion of its time to discussion of the pros and cons of Marine Sanctuary status for the Flower Gardens, and concluded that there was only one reason for such a designation - to prevent anchoring on the coral reefs of the Flower Garden Banks." By 1984, when it was clear the fishery management plan would not provide the kind of protection for the banks that national marine sanctuary status could (the fishery management plan did not include no-anchoring provisions, for example), the active candidacy was re-initiated.

Delicate coral species like those shown here are easily damaged from anchoring and can take decades or longer to recover. Image: Emma Hickerson/NOAA.

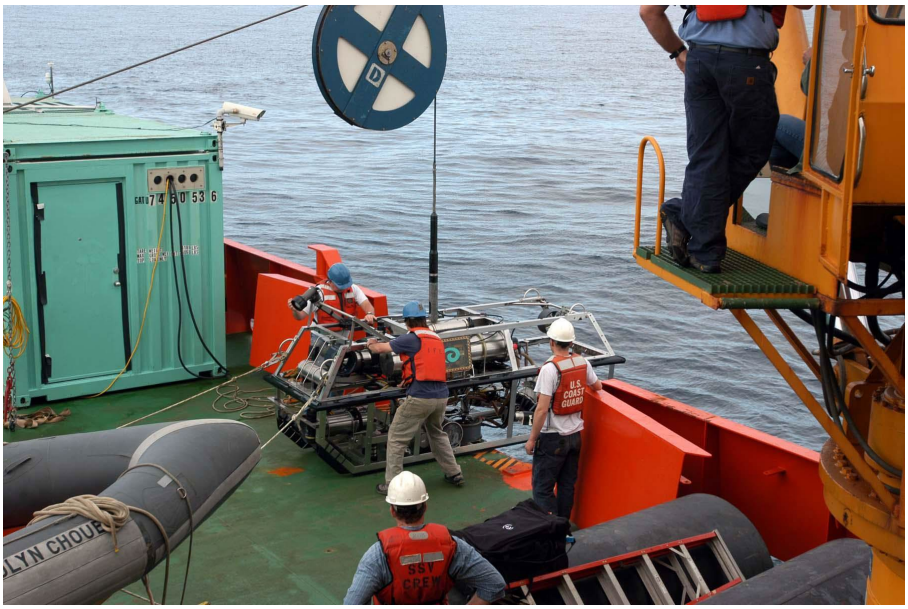
The site began its designation process again in 1984 after a high profile anchoring incident caused substantial reef damage and ignited considerable political and public support. All but one of the forty-one public comments received encouraged NOAA to begin the designation process. In early 1989, a draft management plan was prepared and released, proposing eleven regulations that included prohibitions on activities, including anchoring and exploring for oil and gas, in the two components of the sanctuary. The management programs focused on resource protection, research, interpretation, and visitor use. Supportive comments were again received on the proposed regulations and management programs. Active public and industry involvement continued as well. In collaboration with NOAA, twelve mooring buoys were installed in 1990 on the banks by the non-profit Gulf Reefs Environmental Action Team to prevent anchor damage by small boats. Mobil also invited NOAA officials to see the oil and gas operations around the banks and discuss the positive relationship between industry and other sanctuary users, particularly scientists and the dive community. In January 1992, the sanctuary was designated, the tenth in the sanctuary system and the first and still only one in the Gulf of Mexico.

Protection of the Garden (1992 to 2012)

The Department of Interior and industry funded most of the research and monitoring on the banks of the northwestern Gulf of Mexico during the 1970s and 1980s. NOAA supported studies on a unique brine lake on one bank and conducted high resolution multibeam surveys of the banks in 1990, producing the best maps to date. The Minerals Management Service (forerunner to today's Bureau of Ocean Energy Management) initiated the first long-term coral reef monitoring on the banks in 1988. A significant event, witnessed first by sport divers, then documented by scientists from Texas A&M University, was the first synchronous release of coral gametes by multiple species ever witnessed in the Atlantic Ocean. Sanctuary status allowed NOAA to study this mass coral spawning in depth, as well as implement additional programs at the site. For example, in 1993, the sanctuary established an informal group of advisors from academic, industry, and non-profit organizations. One partner, the Gulf of Mexico Foundation, established the Flower Gardens Fund to accept donations that would support sanctuary operations and fellowships. Industry collaborators began an annual Agency/Industry Cruise to help enhance relationships between users, managers, and constituents of the Gulf. In 1996, Shell support was used to launch the highly regarded Down Under Out Yonder teacher training workshops and cruises.

Aside from the fishing history at the Flower Garden Banks, the oldest part of the banks' human heritage is their long research history. Conducted since the 1930s on vessels that have included shrimp boats, Navy destroyers, dive boats, and research ships, science activities intensified when the sanctuary's research vessel *Manta* began operations in 2008. The long-term monitoring program begun on East and West Flower Garden Banks was expanded onto Stetson Bank in 1993. Partnering with the Reef Environmental Education Foundation, a new fish species subsequently dubbed the Mardi Gras wrasse was discovered in the sanctuary. Subsequent discoveries include a new mantis shrimp species in 2001; six new algal species in 2005; the movement of mantas and sea turtles between banks in 2006; mass spawning by sponges in 2006; and an entirely new habitat type, mud volcanoes with gas seeps, in 2007. In 2009, the sanctuary documented for the first time the movement of whale sharks between the

Northwestern Gulf of Mexico and Mesoamerican reefs. In 2018, scientists reported that the banks and surroundings were a rare nursery habitat for manta rays.



The crew readied the remotely operated research submarine *Argus* for launch as part of the 2007 Secrets of the Gulf Expedition. Image: NOAA.

An unfortunate discovery was made in 2011 when the first lionfish, an invasive species from the IndoPacific, was recorded in the sanctuary. The Atlantic invasion likely originated with releases from home aquaria, but the species spread over a decade or so to affect the entire region. Lionfish are indiscriminate, voracious eaters and have the capacity to disrupt the ecological functions and balance of the reef ecosystem. The sanctuary removes them whenever encountered, but frequent culling using derbies similar to those held elsewhere are not possible given the offshore location of the sanctuary. Instead, for the last several years, the sanctuary has hosted annual lionfish invitationals, four-day events in which up to a dozen dive teams remove as many lionfish as possible while collecting data on lionfish and native species abundance and take samples to help scientists continue their study of the species. Concentrated eradication in small areas has been found to be effective in helping control the effects of the species.

Findings from the ongoing monitoring programs, as well as dive explorations of a nearby rise named Stetson Bank, prompted calls for that bank to be added to the sanctuary. When the sport diving community of the Gulf added their requests, Congress added the bank to the sanctuary in the 1996 reauthorization of the National Marine Sanctuaries Act. Boundary and regulatory changes were finalized in 2000. Expanding the sanctuary to include a new component centered on a bank feature would set the stage for a more expansive expansion twenty years later. More on that to come!

Besides expanding its protective regime to Stetson Bank, the sanctuary continued its work to protect its resources in the existing two components. A “Naturalist Onboard” program debuted in 2000, sending trained naturalists out with dive boats to help ensure divers didn’t damage the reefs and other sensitive features of the banks. In 2001, the sanctuary’s anchoring provisions

were adopted by the International Maritime Organization and printed on international nautical charts, ensuring that large vessels didn't drop their anchors on any of the fragile bank habitats. The new regulation provided additional protection to the sanctuary's already strong measures, including the maintenance of seventeen mooring buoy locations.

> *Most people, like I did, have no inkling that something so spectacular is in the sanctuary. No matter how much we can talk about it, it's hard to wrap your head around how much coral is there. The extraordinary size and health of the reef is really mind blowing. I feel like I know it, and it's like a friend. Some of the animals that we get to see, you know you've seen them before.*
>
> Emma Hickerson, FGNMS Research Coordinator, 2017

Like others that are far offshore, the sanctuary's visitors are primarily scientists, anglers, and experienced divers. Its outreach and education programs focus on bringing the banks and their spectacular features to shoreside audiences and communities. In 2001, the sanctuary launched its ongoing Ocean Discovery Day, an annual open-house event at its offices in Galveston, Texas. It features scientific demonstrations, information booths, displays, lectures, hands-on art projects, musical performances, tours of the NOAA lab, sea turtle center, and NOAA vessels, and children's activities. Seaside Chats, started in 2012, offer informal presentations to local communities about ocean topics associated with the sanctuary and surrounding Gulf of Mexico. On Wednesday evenings through February, residents learn about everything from coral spawning to megafauna, from shipwrecks to science, and from the history of bank names to cutting edge underwater technology.

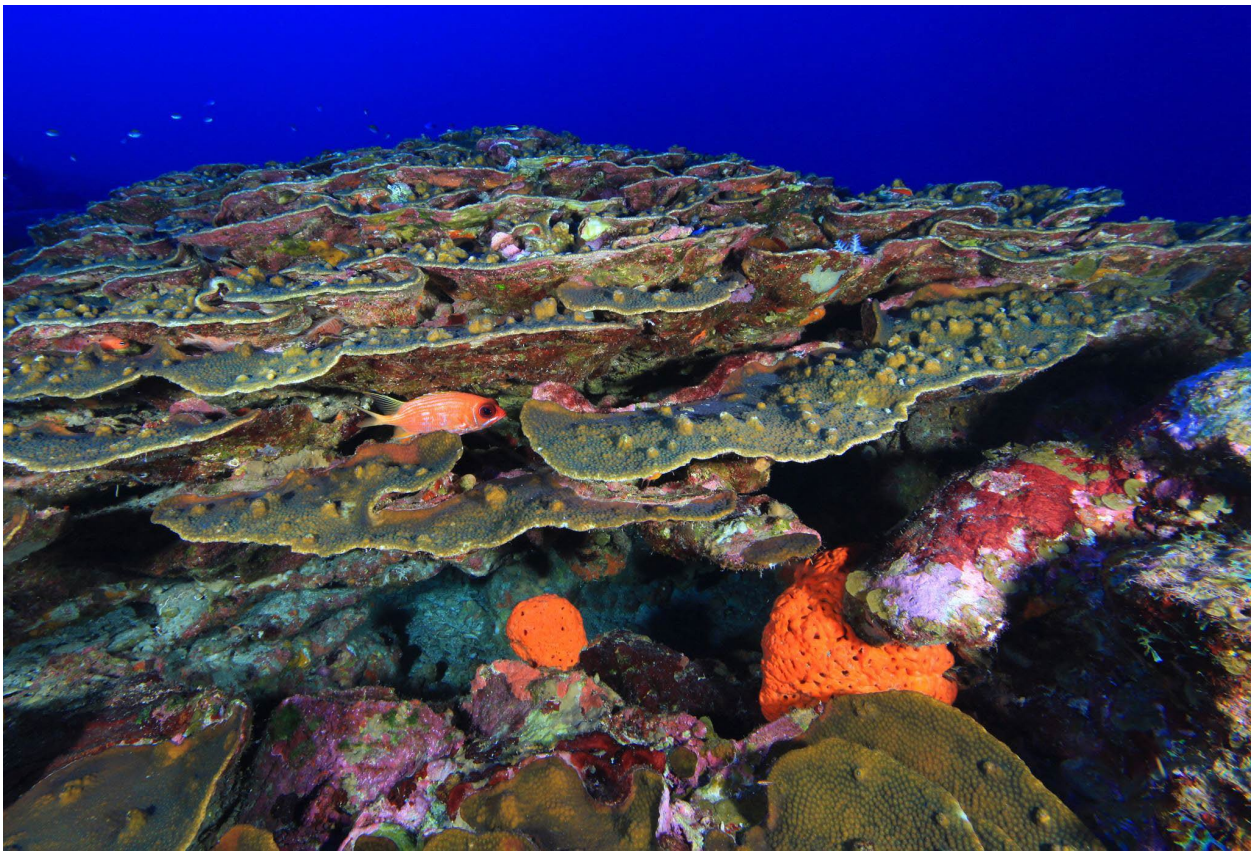
Partners have been crucial in this and other outreach efforts. In 2005, a sanctuary feature was included in the Brazos River Country Exhibit of the Cameron Park Zoo, which was followed the same year by an immense replica of the banks and their wildlife at the Tennessee Aquarium, in Chattanooga. Another exhibit about the banks at the Texas State Aquarium, installed in 1990 and predating the sanctuary, was updated in 2011. The most recent partner exhibit debuted in 2017 at Moody Gardens Aquarium. That facility added a coral rescue lab in 2019, designed to help safeguard healthy Florida corals from Stony Coral Tissue Loss Disease, which is devastating Florida's reefs.

Although its outreach and science programs were and are most obvious to the public, the sanctuary also ensures its less glamorous conservation efforts are as up to date and effective as possible. In 2005, this meant undertaking preparations for its next-generation management plan, starting with the creation of a formal sanctuary advisory council. The council is composed of sixteen voting members, including seats for conservation, dive operations, recreational diving, education, commercial and recreational fishing, research, and the oil and gas industry. Non-voting members from governmental partners, including the Bureau of Ocean Energy Management, Bureau of Safety and Environmental Enforcement, the U.S. Coast Guard, other NOAA offices, and Texas Parks and Wildlife, help in ensuring cross-sectoral communication and coordination. The council meets four times a year and provides crucial advice to the sanctuary.

Teachers taking part in an annual educators training program from the sanctuary and its partners learned to identify fish species. Image: NOAA.

In 2008, using information from its monitoring program and other studies, including a recently completed biogeographic assessment, the sanctuary produced its first condition report. In general, the health of most sanctuary resources was rated as either "good" or "good/fair." The main concerns identified were the presence of mercury in fish, reports of ciguatera, apparent decreases in certain fished species, and increases in the level of fishing. Of particular concern was fishing targeting grouper, jacks, and snapper, the dominant predators in the ecosystem. Lionfish, though not present when the condition report was prepared, are an additional concern.

Based on those findings, and with help and input from their advisory council, the sanctuary prioritized the issues facing the site and specific actions to address them, and then prepared a draft revised management plan that consisted of six action plans: sanctuary expansion, education and outreach, research and monitoring, resource protection, visitor use, and operations and administration. The sanctuary also proposed regulatory changes, including ones to improve dive safety, reduce discharges into the sanctuary, and provide stronger protection to rays and whale sharks. Both the draft management plan and proposed regulations were released for public review and comment in October 2010. After extensive public review, the new management plan and regulations came into effect in April 2012, setting the stage for the next phase in the sanctuary's evolution.



A coral crest in the sanctuary. Image: Greg McFall/NOAA.

Extending the Garden (2012 and ongoing)

During the process that led to the new management plan, numerous public comments suggested, and the sanctuary advisory council recommended that the sanctuary consider expanding its protections to other banks in the Gulf. Numerous research expeditions conducted over the years, as well as new high resolution bathymetry and ongoing diver observations, had documented other areas of coral richness and other important features; they had also noted impacts to these areas from anchoring, diving, and treasure hunting. Adding these areas to the sanctuary would provide the ability to protect, study, and share them, as East and West Flower Garden and Stetson banks had had for two decades. Nineteen such areas were suggested during the scoping process.

After those areas were examined and vetted by sanctuary staff, a subcommittee of the advisory council and the full council itself recommended nine areas as the first priority to be included in an expansion to the sanctuary. As outlined by the Sanctuary Expansion Action Plan contained in the 2012 management plan, the primary sanctuary council recommendation included Horseshoe Bank, MacNeil Bank, the Rankin/28Fathom/Bright Bank Complex, Geyer Bank, McGrail Bank, Sonnier Bank, and Alderdice Bank. Due to extensive additional exploration and information obtained since the original advisory council recommendation, NOAA decided to include another six banks (Bouma/Bryant/Rezak Sidner complex, and Elvers and Parker Banks) for consideration.

A public scoping process to consider sanctuary expansion kicked off in February 2015, including three public hearings in New Orleans, Houston, and Galveston. During the review process, NOAA received approximately 200 comments, generally supportive of the expansion concept. A draft environmental impact statement was prepared and released in June 2016 proposing to add a number of areas under five alternatives to the sanctuary, applying existing sanctuary regulations to the new areas. The preferred alternative identified in the DEIS proposed to expand the area from 56 to about 383 square miles. The sanctuary received nearly 8,500 comments on the proposal, with ¾ of them in favor of expansion. After an additional review and recommendation by the Sanctuary Advisory Council, NOAA revised its preferred alternative and on May 4, 2020, the sanctuary proposed an expansion to about 160 square miles protecting portions of 14 additional banks. The expansion was finalized in March 2021, tripling the size of the sanctuary.

Even as the sanctuary undertook the expansion process, it remained committed to its ongoing conservation, research, and education programs. In 2013, at Texas A&M University at Galveston, an inaugural specialty diving class trained scientific divers in fish and coral identification and survey techniques; the class, offered annually since then, helps build a cadre of trained volunteer divers to help the sanctuary in long-term monitoring and research activities. The sanctuary's traveling exhibit, *Reef on the Road*, won first place at the annual meeting of the Association of Zoos and Aquariums in 2014 and reached almost 50,000 people when deployed to Sea Center Texas in 2016. It had modular, interactive components that focused on the habitats and wildlife of the sanctuary. The sanctuary's first ever telepresence offering came in 2019 when the sanctuary and its partners live-streamed divers and ship-board scientists working on coral projects from the *Manta*.

Sanctuary scientists called on colleagues around the country in 2016 to help investigate the driver of an event that caused a high level of coral mortality on a portion of the East Flower Garden Bank; other invertebrates were also killed in the event, including sponges, mollusks, and crustaceans. Scientists looked into a broad spectrum of possible causes for the events, including warmer water temperatures and freshwater intrusion, and later determined that while low dissolved oxygen was the most likely cause of the event, they weren't able to pinpoint an exact cause. Because of this event, the sanctuary and its partners now watch more closely for evidence of regional processes that could affect these remote banks.

The banks in and around the sanctuary are largely named for scientists—geologists, oceanographers, geophysicists—who played important roles in the discovery, study, and protection of these rises in the Gulf of Mexico. Their work is a testament to the accomplishments of the sanctuary…and all the achievements to come!

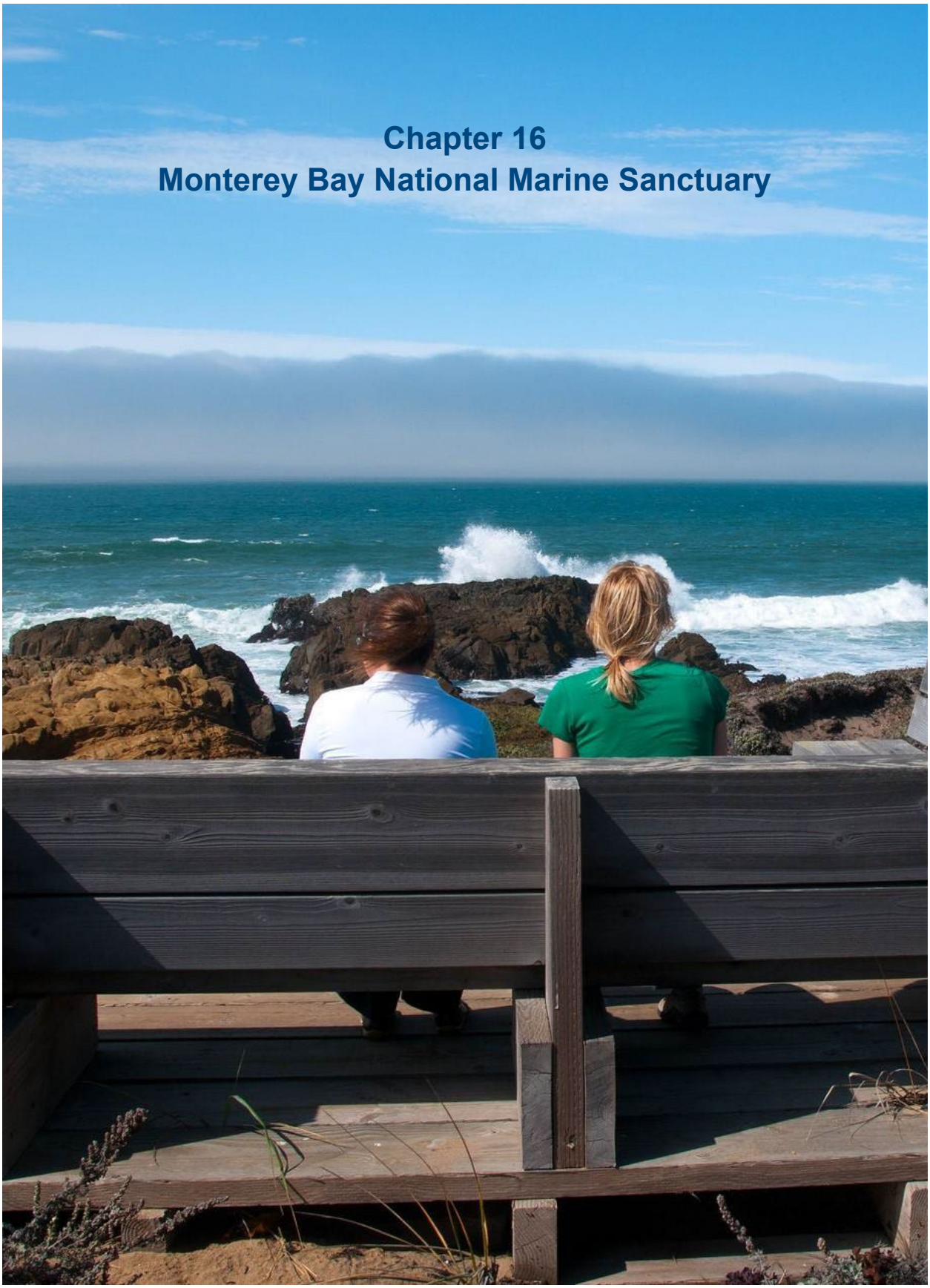
Whale sharks are giant but gentle denizens of the sanctuary. Image: Marissa Nuttall/NOAA.

Origins of the Sanctuary's Name

The banks we now call "flower gardens" were first discovered by snapper and grouper anglers in the early 1900s. They named the banks after the sponges, plants, and other marine life they could see on the colorful reefs below their boats. The name was already in use during the first survey conducted by the U.S. Coast Survey in 1936.

Sanctuary Superintendents

- Steve Gittings, 1992 to 1999
- George P. (G.P.) Schmahl, 1999 to present



Chapter 16
Monterey Bay National Marine Sanctuary

Chapter 16
Monterey Bay National Marine Sanctuary

The Serengeti of the Sea

Monterey Bay National Marine Sanctuary, located in the Pacific Ocean off the central California coast, was designated as a national marine sanctuary in 1992. This vast area stretches almost 300 miles north to south, extends an average of 35 miles offshore, and encompasses over 6,090 square miles. The sanctuary allows for recreational and commercial uses while protecting natural resources, water quality, habitats, and its bountiful resident and migratory marine life. In the southern half, visitors will find a mostly undeveloped shoreline of rocky cliffs and steep mountainsides. The northern shoreline is similar but is dotted with settlements of small towns and moderate-size cities. Read on to learn how this phenomenal stretch of coast came to be nicknamed the Serengeti of the Sea.

Rocky Waters (to 1992)

Over thousands of years, humans moved down along the west coast of North America, shifting inland as sea level rose and the shorelines receded. The ancestors of the tribes who were present when Europeans arrived eventually settled around the lagoons and marshes, hunting, fishing, and taking shellfish and other animals from their maritime environment. A variety of tribes eventually developed into the Ohlone culture about 4,000 years before European contact. In addition to collecting acorns and shellfish, the Ohlone hunted birds, fish, small mammals, seals, and sea lions, and traded shell beads, obsidian, pine nuts, and cinnabar. They used canoes made from bundles of lashed tule rushes to fish and travel in the estuaries and sheltered bays. Although they didn't venture into offshore seas, many Ohlone creation stories begin with the world being made only of water.

Although the Spanish first sighted California in 1542, it wasn't until 1603 when Sebastian Viscaino explored Monterey Bay in search of a suitable port and watering station for Spanish galleons. "Along the coast are great numbers of gulls, cormorants, crows and other sea-fowl," he wrote of the bay. "In the rocks are a great many cavities, some like the matrices of large shell-fish with conques equal to the finest mother of pearl. The sea abounds with oysters, lobsters, and crabs. Also huge sea wolves and whales." Viscaino named the bay in honor of his viceroy, the Conde de Monterey. For about two centuries thereafter the Central California coast received few foreign visitors.

A postcard with a view of Monterey Bay from the Santa Cruz Mountains, c.1875. Image: C. Prang, courtesy of the Library of Congress.

As the presence of Russian and English explorers in the Pacific increased, Spain increased its colonization efforts, establishing a series of missions along the coast including in Monterey, Carmel, and Santa Cruz. Sea otter and seal pelts, caught and processed by Native Americans, became valuable trade items and drove the development of Monterey as a trading center. But the mission system and its desires to convert the Ohlone to both Christianity and agriculture had devastating effects on the native people. By 1810, Spanish influence had destroyed the social organization of the Ohlone.

In 1808, the Russian-American Company hired skilled fur-hunting Alaskan Aleuts to hunt along the coast between San Francisco and Monterey. As a result of the fur trade, California was brought into the rapidly developing network of Pacific trade routes that connected California, Hawaii, and China. As California passed from Spanish hands to the newly independent Mexico, sea otters were over-exploited, and cattle hide and tallow products took over as the main economic export.

Among the ports of greater consideration which I discovered was one in thirty-seven degrees of latitude, which I called Monterey…this port is sheltered from all winds, while on the immediate coast there are pines from which masts of any desired size can be obtained…

Letter to His Majesty from Sebastian Vizcaino, dated at Mexico on the 23rd of May 1603, announcing his return from the exploration and demarcation of the coasts of the Californias as far as latitude 42° north.

As trade boomed, European and American economic and political interests in California increased. Settlers moved into Monterey and other coastal communities along the central coast. While whaling didn't become the booming business it was for San Francisco, small shore-whaling stations existed around Monterey Bay. Observers spotted whales from the cliffs and dispatched rowed whaleboats after their quarry. Nearshore kills were towed to trying stations on the beaches (including one at the mouth of Elkhorn Slough) where the blubber was flensed and melted down to produce whale oil.

California came into U.S. possession in 1848, following the Mexican-American War, and it achieved statehood in 1850, just in time for the Gold Rush. Discovery of gold on land in 1848 set off an ensuing maritime boom in the 1850s. The needs of a rapidly expanding population were met by exploiting the abundant resources of the Pacific coast. Lumber, fish, manufactured goods, and other supplies were sent north to meet San Francisco's insatiable appetite.

Chinese fishermen came to the Monterey region in the 1850s and 1860s to work the commercial fisheries that fed the exploding Gold Rush population. They also harvested and dried seaweed before shipping it in bundles through San Francisco to China. In 1867, a group of Italian fishermen moved into the area to challenge the Chinese fishing monopoly, soon clashing with and pushing out the original Chinese immigrants. Monterey's commercial sardine fisheries began in the early 1900s. Sardines rapidly became the most important fishery in California and many canneries were built along Monterey's waterfront, but the industry faded in the 1940s after the collapse of the sardine population due to overfishing and climate change. It was the latest in the serial depletions and ecological disasters. Centuries before, European encroachment and over-exploitation began the near-extirpation of sea otters, followed by those of gray whales, abalone, and sardines.

> *Cannery Row in Monterey in California is a poem, a stink, a grating noise, a quality of light, a tone, a habit, a nostalgia, a dream. Cannery Row is the gathered and scattered, tin and iron and rust and splintered wood, chipped pavement and weedy lots and junk heaps, sardine canneries of corrugated iron…*
>
> John Steinbeck, "Cannery Row," 1945

One of the first modern conservation measures taken in the Monterey Bay area, and one of the first modern ocean parks declared independently of a land-based park, was Hopkins Marine Life Refuge, declared in 1931 in tandem with the Hopkins Marine Station. Dr. Julia Platt, a zoologist and mayor of Pacific Grove, envisioned the refuge as a source of larvae that could help repopulate surrounding areas, a conservation measure now championed by modern scientists. Prescient in its protection of all marine life inside its boundaries, the refuge was a harbinger of more parks to come.

An interpreter talks to visitors, c.1973, during an open house of the Hopkins Marine Institute, a forerunner to the education programs run by the sanctuary and its partners today. Image: EPA Documerica Project, courtesy of the National Archives.

In 1977, after NOAA called for nominations to the List of Recommended Areas, the pool from which future sanctuaries were chosen at the time, the state of California responded, recommending Monterey Bay along other sites. In December 1978, NOAA released an issue paper discussing potential boundary and regulatory options for each site. In 1979, after holding public workshops on the ten sites the state had nominated, NOAA agreed to add Monterey Bay, along with future sanctuaries Channel Islands and Greater Farallones, to its list of active candidates. But the other two sites moved ahead first, and the workload associated with those two ongoing designations, combined with other program priorities and what was viewed as adequate existing protections, led NOAA to remove the site from consideration in December 1983.

But a few years later, Congress continued to have concerns about the area and in the 1988 reauthorization of the Marine Protection, Research, and Sanctuaries Act, ordered NOAA to again make the site an active candidate for sanctuary designation. In January 1989, a public

scoping process for the site began, including two scoping meetings that month in Monterey and Santa Cruz. The public favored starting a designation process. In August 1990, NOAA released proposed boundaries and regulations, banning among other things oil and gas exploration and production, discharges, seabed alteration, low overflights, and unfettered use of motorized personal watercraft. At the same time, a draft management plan was released for comment, with action plans for resource protection, research, education, and administration.

In September 1992, after an extensive public review process including three public hearings in Monterey, Santa Cruz, and Half Moon Bay, NOAA designated the sanctuary and released its final boundaries, regulations, and management plan. Fifteen years after it was first proposed, Monterey Bay National Marine Sanctuary was finally a reality. At the time of its designation, the sanctuary was by far the largest national marine sanctuary to date, encompassing twice the ocean area of the next largest sanctuary.

Ebb and Flow (1992 to 2009)

The sanctuary's need to address resource protection issues began again almost immediately after designation. In late 1993, NOAA became aware of shark diving operations using chum to attract white sharks in the sanctuary. While not prohibited, different groups including scientists, surfers, and local conservation organizations raised concerns about how such an activity might impact the behavior of white sharks and the safety of ocean users. These concerns were brought to the sanctuary advisory council, newly established in 1994, which advised the sanctuary to enact a regulation to protect white sharks by preventing the deliberate attraction of sharks. After an extensive public scoping and comment period, a final rule was adopted in December 1996 enacting the prohibition.

At the same time, another group of citizens, residents, and divers in the Big Sur area approached the sanctuary about creating an exemption to the oil, gas, and mineral prohibition to allow the continuation of a small-scale jade collection practice that had been going on for years in Jade Cove. These groups argued the practice, which involved individual divers using hand tools to collect loose jade or chip it away from an exposed vein in the seabed, was not of the scope and didn't have the impacts of industrial-scale sand mining or oil and gas production. After consulting with the advisory council and investigating the activities, NOAA developed a regulatory exemption for small scale collection of loose jade.

Another user group also objected to the sanctuary regulations, this time in court, as the Personal Watercraft Industry Association sued NOAA in 1993 over regulations requiring the operation of jet skis to four zones in the sanctuary. The plaintiffs alleged the regulation was not supported by adequate evidence; that NOAA had no basis for regulating personal watercraft but not other vessels; that the record did not contain evidence to show that restricting the use of personal watercraft was necessary or reasonable; and that NOAA failed to respond to the association's comments that the restriction was unreasonable and unnecessary. The federal district court of the District of Columbia ruled that the restriction on personal watercraft was arbitrary and capricious because NOAA had not sufficiently explained why it treated personal watercraft differently from all other vessels. In 1995, however, a three-judge panel for the federal court of

appeals for the District of Columbia circuit unanimously rejected each of the four arguments and ruled in favor of NOAA, overturning the earlier district court ruling and affirming that there was ample evidence to support the design of the regulation (i.e., creation of operating zones); that motorized personal watercraft presented unique threats that justified immediate regulation while NOAA reviewed threats from offshore ship traffic; that the record was replete with evidence that limiting the use of motorized personal watercraft was both necessary and reasonable; and that the Association's argument that NOAA failed to respond to its comments was moot, as the Association submitted those comments 21 months after the public comment period for the draft rule had closed.

As these regulatory and legal processes played out, the sanctuary was building its stewardship programs. The sanctuary advisory council, with twenty-four members representing conservation, research, education, commercial fishing, diving, agriculture, business, tourism, recreation, and government agencies, began meeting in 1994. The Monterey Bay Sanctuary Foundation was launched in 1995. A regionally based, non-regulatory Water Quality Protection Program, modeled on that of Florida Keys National Marine Sanctuary, was also established in 1995. In 1996, the sanctuary held the first of its long-running Sanctuary Currents Symposium, an annual highlight of the science activities in the sanctuary. The Agricultural Water Quality Alliance formed in 1999 as a regional partnership among farmers, ranchers, scientists, and agency managers to help protect water quality in the sanctuary while supporting agricultural productivity in its watershed.

A Team OCEAN volunteer greeted kayakers in the sanctuary in 2007. Image: Lisa Emanuelson/NOAA.

In 1997, the sanctuary launched its first volunteer program, Beach COMBERS, which monitors local beaches for dead wildlife and other indicators of significant events. In 1998, Bay Net started, placing naturalists at overlooks along the sanctuary to engage the public in safely exploring the sanctuary and observing its diverse wildlife. These dedicated volunteers engage close to 40,000 people every year. The Team OCEAN volunteer program was established in 2000 to place naturalists aboard kayaks to encourage responsible wildlife viewing by the public in coastal waters. Snapshot Day began that same year: on the first Saturday each May, trained volunteers from sanctuary communities fan out all over the sanctuary to measure water quality parameters in the field and collect samples for later laboratory analysis of nutrients and bacteria levels. The event is designed to increase information and public awareness about water quality issues affecting watersheds that drain to the sanctuary.

> *We come to Monterey, all of us, with an appreciation for the divine beauty of this patch of coast…But we have to leave with a renewed determination to maintain the living, thriving seas beyond, not only for Americans but for the whole world.*
>
> President Clinton, Remarks to the National Ocean Conference in Monterey, California, 1998

The sanctuary also put great emphasis on building partnerships with the many organizations sharing its missions in the central California region. Recognizing the area as a hub for marine research, the sanctuary founded SIMoN, the Sanctuary Integrated Monitoring Network, in 2000, providing a centralized database for scientific information. SIMoN has expanded to include scientific information for all four California sanctuaries. In 2001, partnerships with local communities created the Sanctuary Scenic Trail, as well as the Multicultural Education for Resource Issues Threatening Oceans) program offering adult and youth education programs, family field experiences, professional development for teachers and youth leaders, teaching resources, bilingual outreach, internships, and career mentoring. In partnership with California State Parks, the sanctuary opened its first visitor center, the Coastal Discovery Center at William Randolph Hearst Memorial Beach in 2006. In 2005 and 2006, the sanctuary partnered with the Monterey Bay Aquarium Research Institute, US Geological Survey, and Moss Landing Marine Laboratories to conduct in-depth surveys of the USS *Macon*, a huge dirigible with five onboard aircraft that crashed into the sea in 1935 off Point Sur. The *Macon* was added to the National Register of Historic Places in 2010.

Vessel traffic in the sanctuary was also a highlight for much activity in the 2000s. In 2000, working with the U.S. Coast Guard and the International Maritime Organization, the sanctuary led efforts to shift vessel traffic lanes further offshore to help protect sensitive habitats. In 2004, the cargo ship *Med Taipei* lost fifteen 40-foot-long cargo containers in the sanctuary when they went overboard during a winter storm. One of the containers was later found during a survey by the Monterey Bay Aquarium Research Institute. While not an unusual experience at sea, this incident provided the first clear evidence that containers were lost in a marine sanctuary. The responsible parties later paid an assessment of $3.25 million to NOAA to perform compensatory habitat restoration. NOAA used the funds to restore benthic habitats damaged by the containers, including a long-term monitoring project to record the impacted habitat where one container was found. It was the only known study of its kind.

The sea otter is one of the sanctuary's most charismatic and iconic animals. Image: Steve Lonhart/NOAA.

A second incident occurred in November 2007 when merchant vessel *Cosco Busan* hit a bridge in San Francisco Bay and spilled 58,000 gallons of fuel oil, which entered both Greater Farallones and Monterey Bay national marine sanctuaries. Thousands of seabirds were oiled and killed, among other impacted wildlife, and more than 3,000 acres of shoreline habitat were oiled. More than one million user-days of recreation and fishing were estimated to have been lost. A restoration plan was finalized in 2012, and a settlement of more than $32 million has been used to restore shore and benthic habitats in and around the sanctuary.

In better news, in 2008, the sanctuary, along with Cordell Bank and Greater Farallones, wrapped up the Joint Management Plan Review process, a complicated undertaking started in 2001 to update the management plans and regulations of all three sanctuaries simultaneously. The 2008 plan, like those of other sanctuaries at the time, was based on a series of issue-based action plans, including coastal development, ecosystem protection, partnerships and opportunities, water quality, and wildlife disturbance. A series of cross-cutting action plans, administration, community outreach, and maritime heritage among them, helped link and leverage the issue-based action plans. The process also expanded the sanctuary by 766 square miles to include the Davidson Seamount, an extinct underwater volcano populated by an abundance of diverse deep-sea corals, vast sponge fields, and high numbers of rare and unidentified benthic species.

In another major action, the sanctuary released its condition report in 2009. Because the sanctuary is so large, the report contains three parts: estuarine environments, nearshore, and offshore. The water quality in the offshore environment of the sanctuary was found to be degraded, mainly due to vessel traffic and land-based activities, such as those linked to urban development and agriculture. Living resource conditions within the offshore environment of the

sanctuary were considered to be diminished as the relative abundance of many species, such as marine mammals, seabirds, and predatory fishes, have been altered substantially by natural and anthropogenic pressures over the past several hundred years. Water quality parameters in the nearshore environment are slightly more degraded than the offshore environment. Kelp, seagrass beds, and invertebrates were healthy but the relative abundance of native species, including abalone, mussels, and sea otters, in the intertidal and nearshore subtidal zones has been altered throughout the sanctuary by a variety of factors. Though the condition report was released after the management plan (a lesson learned from early management plan review that soon resulted in the policy of completing condition reports first), new measures laid out in the document, as well as actions taken by the National Marine Fisheries Service and State of California, aimed to reduce marine debris and recover overfished stocks and impacted habitats.

The trifecta of actions—new management plan, boundary expansion, release of the condition report—closed what could be called the first chapter of the sanctuary's history. The coming decade of the 2010s brought new challenges and achievements.

Elephant seals in the sanctuary. Image: NOAA.

Rising Tides (2010 and ongoing)

The third decade of the sanctuary began with an emphasis on outreach and communication. The site hosted the first Blue Ocean Film Festival, an international event bringing together the best ocean films and ocean minds to boost marine conservation that continues on today. Keeping with the media theme, in 2011 the site launched *Your Sanctuary*, a public television series that aired on Access Monterey Peninsula TV and online, highlighting sanctuary communities and businesses involved in ocean stewardship. In 2014, the sanctuary partnered with the organization The Whale Trail to install new signs along the coastal trail to introduce hikers and bikers to the whales of the sanctuary. But perhaps its proudest outreach achievement was opening the state-of-the-art Sanctuary Exploration Center in Santa Cruz in 2012. Overlooking the ocean, the Sanctuary Exploration Center is located in the heart of Santa Cruz's famed beach area and features 12,000 square feet of engaging interactive, multimedia exhibits, and classroom space to help visitors explore the sanctuary. In 2015, the sanctuary was the focus of a BBC and PBS production, *Big Blue Live*, which featured nine live hour-long broadcasts. The production brought together scientists, filmmakers, and photographers to film and photograph the diverse marine life that feeds in the sanctuary; species seen in the broadcasts include whales, sea lions, dolphins, elephant seals, sea otters, white sharks, shearwaters, brown pelicans, and blue whales.

Scientists were busy as well, working with expedition partners to conduct the first ever exploration of Sur Ridge in 2014, the deepest part of which plunges to 4,400 feet. In 2016, the National Oceanographic Partnership Program recognized sanctuary scientists, through the Marine Biodiversity Observation Network, with an Excellence in Partnership Award. In 2019, a sanctuary research expedition got worldwide attention when scientists discovered aggregations of more than 1,000 brooding octopuses along geological fissures and fractures on the seafloor.

Scientists were also crucial to the effort kicked off in 2016 to consider whether desalination facilities might be allowed to operate in national marine sanctuaries, when community needs for fresh water become pressing. The sanctuary worked with state and federal partners to complete environmental impact reports by 2018 that allowed the initiation of a water supply project in the sanctuary that could provide 9.6 million gallons per day of drinking water to the Monterey Peninsula with minimal impacts on the sanctuary.

The sanctuary turned its attention in 2013 to adding to its protections by identifying sixteen Sanctuary Ecologically Significant Areas, which then served as the basis for a proposal submitted to the Pacific Fishery Management Council of the National Marine Fisheries Service to modify bottom trawling fishing boundaries. The result of a yearlong effort involving commercial anglers and environmental groups, the proposal closed new areas to protect sensitive coral and sponge habitats, designated Habitat Areas of Particular Concern, and included voluntary management areas adopted by anglers as no bottom-trawl zones. Identifying these areas also allowed the sanctuary to share information to help researchers focus their efforts in key areas.

The identification of the Sanctuary Ecologically Significant Areas also helped set the stage for the next review of the sanctuary's management plan. The plan summarized information for each area into Quick Look Reports, which include site descriptions, resource management issues,

historic and ongoing research and monitoring, science needs, maps, imagery, and references. The site's condition report was also updated in 2015. "Overall," the assessment found:

This updated assessment of the state of sanctuary resources indicates that the sanctuary is doing quite well in comparison to other parts of the world's ocean. The abundance and diversity of wildlife seen in Monterey Bay is remarkable compared to many parts of the world, and many sanctuary resources are showing relative stability or improvement. Long-term monitoring along rocky shores and in kelp forests shows that biogenic habitat, including canopy-forming kelp, understory algae and many structure-forming invertebrates, have been generally abundant and stable. The number of native species in sanctuary habitats, one measure of biodiversity, appears to be stable with no known losses of native species. Though some non-native species are present in the sanctuary, no new introductions are known to have occurred in any of the sanctuary's environments. Most of the sanctuary's regularly monitored key species and species assemblages appear to be stable or slightly improving in status.

Areas of continuing concern identified included marine debris, vessel traffic, commercial and recreational fishing, agricultural and urban runoff, harmful algal blooms, coastal development, disturbances to wildlife, and global issues like climate change and ocean acidification.

The sanctuary officially kicked off its management plan review in August 2015, by opening a scoping process and asking the public for ideas and comments about what the sanctuary needed to address in its management programs. Some of the regulatory changes the sanctuary considered included adding a new low overflight zone to protect a restoration area for common murres called Devil's Slide and creating zones where fireworks may be permitted within the sanctuary. In July 2020, a draft management plan containing a mix of issue-based action plans (including those for climate change, coastal erosion, marine debris, and water quality) and functional action plans (including education, research, and maritime heritage) was released for public review and comment, including through three virtual meetings. Over 150 comments were received, all of which were considered in the preparation of final regulations and a new management plan released in October 2021.

At the end of their 2011 book *The Death and Life of Monterey Bay*, Stephen R. Palumbi and Carolyn Sotka make the point that it isn't scientists and politicians saving Monterey Bay but everyday people harnessing their ocean passion into activism to protect what they love. Because of advisory council members, citizen scientists, and those who provided input on the new management plan, all of whom care enough to take action, we couldn't agree more!

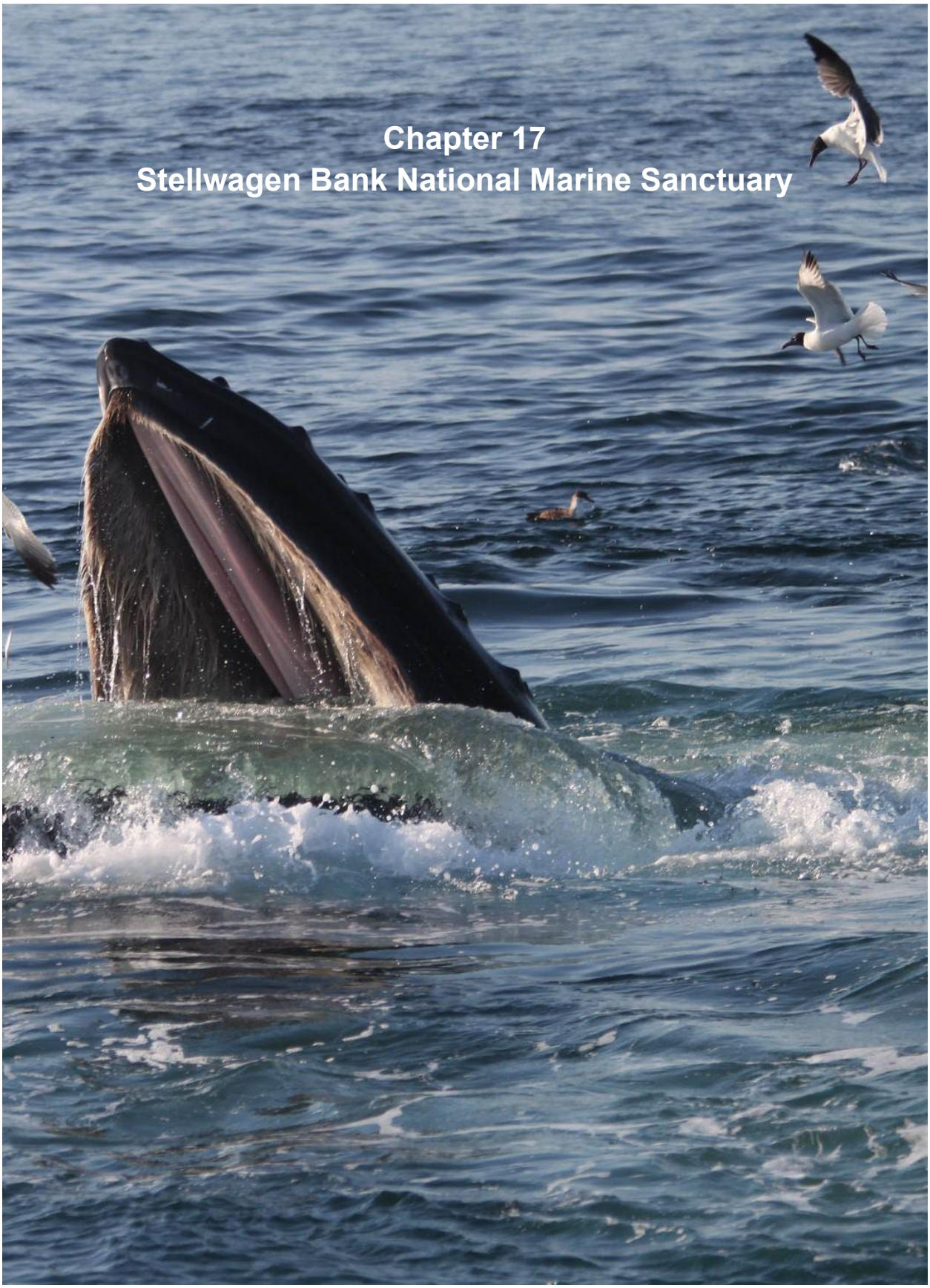
A lobate comb jelly in the sanctuary. Image: Chad King/NOAA.

Origins of the Sanctuary's Name

The sanctuary is named after the bay that is its centerpiece, which in turn takes its name from the city of Monterey, named by Spanish explorer Sebastián Vizcaíno, possibly after the Spanish city Monterrei, meaning "mountain of the king."

Sanctuary Superintendents

- Terry Jackson, 1992 to 1997
- Bill Douros, 1997 to 2007
- Paul Michel, 2007 to 2020
- Lisa Wooninck, 2021 to present



Chapter 17
Stellwagen Bank National Marine Sanctuary

Chapter 17
Stellwagen Bank National Marine Sanctuary

From the Depths of History

Stellwagen Bank National Marine Sanctuary is located at the mouth of Massachusetts Bay. The sand and gravel plateau that gives the sanctuary its name was formed by the slow retreat of massive Ice Age glaciers, which sculpted the seafloor into a diverse topography. The nutrient-rich waters above and around the bank support a vibrant ecosystem that has been a famous fishing ground for more than 400 years and claims status as the birthplace of East Coast whale watching. Historic New England shipping routes cross the sanctuary and over the course of centuries, the seafloor has become a repository for shipwrecks, time capsules of our maritime heritage. The sanctuary, which encompasses 842 square miles of open ocean about 25 miles east of Boston. Voyage on to learn more about why this area of historic human activity still has new wonders to discover!

A Deep Discovery (to 1992)

The coastal lands and waters of Massachusetts have been utilized by humans as far back as 12,000 years ago. At about that time, Stellwagen Bank was dry land where Indigenous people likely hunted. By the time European explorers first arrived, Indigenous people had developed complex societies and the region was inhabited by the Penobscot, Abenaki, Pequot, Massachusett, Narragansett, Wampanoag, and Confederated River tribes. These Indigenous peoples gathered shellfish and caught fish with spears, hooks, and weirs. While they made use of stranded whales, they likely didn't venture into more distant waters.

But offshore waters offered bountiful fisheries to the Europeans who first arrived in the sixteenth century, when English, French, and Portuguese vessels began taking mackerel and cod. Those catches were hauled back to Europe, but arrivals from England soon began settling what they called the New World. One of the more well-known explorers working for the King of England was Captain John Smith. In 1616, Smith drafted a surprisingly accurate chart of the Gulf of Maine. He amended it in 1635, adding a pyramid of cod heads below his ship, which is positioned over what is now Stellwagen Bank, indicating exceptionally good fishing in the area. After several unsuccessful attempts at colonization, the Puritans established their first settlement in Massachusetts in 1620. American maritime tradition was born here as colonists learned to fish, shellfish, and whale—as well as to build and sail ships. Fishermen at first stayed close to land, exploiting the fish stocks in Massachusetts Bay at Jeffreys Ledge and Stellwagen Bank, and began venturing farther out to sea as larger vessels were built, and local populations of fish and whales became depleted. They recognized the relatively shallow area at the mouth of Massachusetts Bay, often referred to as Middle Bank, as a place of particularly rich fisheries, though they didn't know why.

> *...there lay the low sandhills of Cape Cod over our larboard quarter, and before us the wide waters of Massachusetts Bay, with here and there a sail gliding over its smooth surface. As we drew in toward the mouth of the harbour, as toward a focus, the vessels began to multiply, until the bay seemed alive with sails gliding about in all directions; some on the wind, and others before it, as they were bound to or from the emporium of trade and centre of the bay...Every sight was full of beauty and interest. We were coming back to our homes; and the signs of civilization and prosperity and happiness, from which we had been so long banished, were multiplying about us.*
>
> Richard Henry Dana Jr., "Two Years Before the Mast," 1840

By the American Revolution and into the early 19th century, the New England region had a bustling maritime economy. Shipbuilding grew from its small, open-fishing-boat origins to large, multi-masted sailing vessels constructed for trade. Due to its sheltered harbor and proximity to interior forests for timber for building ships, Boston was the most prominent port in New England, the colonial center of trade with Europe, the Caribbean, and other parts of the world. As ships sailed frequently in and out of Boston, they passed over a shoal area teeming with cod, whales, and seabirds. The depth and extent of this shoal was unknown at the time.

A chart of the New England coast was made by John Smith in 1616.

The mid-1800s brought more accurate knowledge about the shoals and seafloor in and around Stellwagen Bank. Needs for maritime boundaries, safe shipping, and the national defense led President Jefferson to create the U.S. Coast Survey in 1807, after which its clipper-borne surveyors got to work, conducting surveys and creating the first nautical charts for the country. In 1854, Lieutenant Henry Stellwagen, a U.S. naval officer on loan to the Coast Survey and commanding the steamer *Bibb,* discovered a shallow bank at the entrance to Massachusetts Bay, which the Coast Survey would later name for him. Accompanying Henry Stellwagen on his surveying vessel was cartographer Edward Cordell, who would later survey and serve as the namesake of a similar-sized bank in 1869 on the west coast. Cordell Bank. This bank became the central feature of Cordell Bank National Marine Sanctuary, established in 1989. Stellwagen, who retired as a captain, served in far-flung locations like Africa and Mexico and commanded vessels for the U.S. Navy during the Civil War; he died in 1866.

> *In the case of Stellwagen's Bank, after finding it in the regular progress of surveying, and traversing it by lines of soundings, Lieutenant Commanding Stellwagen proceeded to inquire if it was known…As a mark for vessels entering Massachusetts bay, its value is so great that, had its existence been known with certainty, it would have been duly pointed out in the accredited publications. Finally, it had no definite name, and l have therefore given it that of its discoverer, Lieutenant Commanding Stellwagen.*
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> Report of the Superintendent of the United States Coast Survey for 1854

In the years between its discovery and into the 1980s, Stellwagen Bank was the site of maritime misadventures. The steamer *Portland* went down in a storm in 1898 with the loss of everyone on board—an estimated 200 people. Two coal schooners, *Frank A. Palmer* and *Louise B. Crary*, collided and sank in December 1902; eleven crew members drowned or died of exposure. Rumrunners used the bank during the Prohibition era of the 1920s as a site to transfer cargoes between large ships carrying alcohol from other countries and smaller vessels that would bring it into Boston. German submarines passed near the bank during World War II. Eventually, livelihoods transitioned from whale hunting to whale watching, while maritime technologies advanced fishing and cargo vessels from sail to diesel power.

Through the years, the bank was primarily utilized for its rich fisheries, including whales, but in the 1970s and 1980s other industries began eyeing the bank for uses that threatened its natural resources, including dredging for sand and gravel, disposing sewage sludge and tires, and developing oil and gas. One of the more outlandish proposals was as an offshore location for a floating casino. When the site was nominated to NOAA by the North Atlantic Regional Evaluation Team for the Site Evaluation List process, they highlighted its importance as a special rather than representative site based on its high productivity, value to whales, and accessibility to researchers and recreationists. When Stellwagen Bank was included in the proposed pool in 1982, it garnered more than 85 commenters supporting its inclusion. In 1983, the bank was added to the Site Evaluation List.

In 1989, in response to a requirement from Congress in the 1988 reauthorization of the National Marine Sanctuaries Act, the site was made an active candidate. The scoping process began in April with four public hearings in June, held in Provincetown, Gloucester, and Boston, Massachusetts; and Portsmouth, New Hampshire. The hearings wrapped up later that year. Most comments supported a larger sanctuary area or proposed regulations banning sand, oil, gas, and other mineral development in the sanctuary.

In February 1991, NOAA released a draft rule proposing a boundary of about 600 square miles and regulations banning discharges; sand, oil, and gas exploration and development; altering the seabed; taking sea turtles, seabirds, or marine mammals; and injuring or taking historical artifacts. Public meetings were held in March 1991 in Portsmouth, New Hampshire; Gloucester, Duxbury, and Provincetown, Massachusetts; and Washington, D.C. After the public comment period closed and as NOAA was considering the comments received, the 1992 reauthorization of the National Marine Sanctuaries Act designated Stellwagen Bank National Marine Sanctuary.

NOAA followed the congressional designation by publishing the site's first management plan and environmental impact statement including final boundaries and regulations in July1993.

Deepening Stewardship (1992 to 2010)

It took half a year after the Congressional designation and signing of the Act by President George H.W. Bush, for Stellwagen Bank National Marine Sanctuary to be dedicated with a public event on the waterfront in Plymouth, Massachusetts. Soon after, the sanctuary's first office opened on Plymouth's Water Street, near the famous Plymouth Rock.

The fledgling sanctuary's priorities included building its protective programs, which included actions to address centuries of fishing impacts. Sanctuary researchers proposed a five-year research program that included closing a small section of the sanctuary to compare the effects of fishing near the closure with a geologically similar area where fishing is prohibited. After a series of contentious public meetings, the sanctuary chose to put the idea on indefinite hold.

At that time, an area of concern was the ongoing construction of a nine-mile outfall pipe for the Massachusetts Water Resources Authority. Under court order, the Commonwealth had begun a massive project to provide secondary treatment of sewage from the Boston metropolitan area, with treated effluent discharged into Massachusetts Bay almost midway between Boston and the sanctuary. In advance of the discharge, Woods Hole Oceanographic Institution and U.S. Geological Survey studied prevailing ocean currents to determine potential threats to coastal and offshore waters. They found sanctuary waters would not be adversely impacted. When the pipe went online in 2000, stations were established in and near the sanctuary to monitor water quality; the results showed no detrimental effects.

At the same time, another massive infrastructure project in Boston, The Big Dig, which reconfigured highways and tunnels in the city, resulted in the need for an area to dump construction wastes. The Massachusetts Bay Ocean Dredged Material Disposal Site was designated by the U.S. Environmental Protection Agency in 1992 just west of the sanctuary boundary. Management and monitoring plans provided guidance for the times, quantity, and physical/chemical characteristics of the dredged materials suitable for ocean disposal under the Marine Protection, Research, and Sanctuaries Act. The site was placed near the Industrial Waste Site, terminated by EPA in 1977, where barrels of radioactive, chemical, and hospital waste; contaminated dredged material; derelict vessels; ordnance; and other toxic items were dumped. A recent temporary expansion of the Massachusetts Bay Disposal Site into the industrial site uses clean dredged materials to bury the hazardous wastes.

Science and monitoring played a critical role in the beginning years of the sanctuary as important partnerships were developed to help better understand the setting and the resources. These partnerships included the National Undersea Research Center, which became part of NOAA Ocean Exploration after its establishment in 2001. The center, located at the University of Connecticut, the regional center for the National Undersea Research Program, devoted ship time of R/V *Connecticut* and the technical expertise of its staff to studying seafloor communities. NURC-UConn also incorporated education features into their research program,

bringing high school students and the research submersible *Delta* to the sanctuary for biological survey and sampling dives.

During the early years, the sanctuary's education team also partnered with The Barn School Trust and the sailing vessel *Mimi* (the star of a multi-part video and curriculum package). During three week-long MimiFests, hundreds of students from such disparate school districts as Brockton, Quincy, and Martha's Vineyard traveled to Plymouth to view *Mimi* (and the replica of *Mayflower*), to learn about whales and safety at sea, and to get an introduction to the sanctuary.

Because the sanctuary had no vessel suitable for extensive offshore excursions (research vessel *Hawk*, acquired in 1995, was only 29 feet long), another priority was figuring out how to get eyes on its offshore waters. This led to a 1995 agreement with the U.S. Coast Guard to increase air and sea patrols of the sanctuary. The sanctuary also began meeting with the Center for Coastal Studies and other partners to establish an emergency disentanglement network to respond when whales were found entangled in fishing gear and other debris. Additional cooperative work with the National Marine Fisheries Service, conservation organizations, and the whale watching industry led to the development of a set of whale watching guidelines for the Northeast Region. 1995 also saw the start of what would be a pioneering and long-term sister sanctuary network, as sanctuary staff began working with colleagues in the Dominican Republic, where some of the sanctuary's humpbacks spent the winter.

In 1996, the sanctuary established its advisory council, which remains active today. Eighteen community members and eighteen alternates—representing conservation, education, research, recreational and commercial fishing, diving, whale watching, business, maritime heritage, and a youth seat—continue providing advice to the superintendent today. The council also includes representatives from the sanctuary's government partners, including the Coast Guard, New England Fishery Management Council, National Marine Fisheries Service, and Massachusetts state agencies.

Working with partners on multiple expeditions, the sanctuary's scientists began surveying and learning more about the sanctuary as well. By 1996, the sanctuary, in partnership efforts with the U.S. Geological Survey and the National Undersea Research Center, was entirely mapped with high resolution multibeam sonar, providing managers with the clearest picture yet of the seabed. The seafloor survey provided the foundation for many subsequent research activities, such as a ten-year seafloor habitat recovery monitoring program, initiated in 2001; and identifying and inventorying historic and cultural resources.

In 2002, the sanctuary superintendent and three student aquanauts prepared to drop flowers in remembrance of the passengers lost with Portland. Image: NOAA News, October 2002.

The sanctuary conducted its first ever cultural resource survey in 2001, and in 2002 confirmed the wreck of *Portland*. A paddle wheel steamer—large, palatial vessels carrying passengers and cargo—*Portland* traveled between Portland and Boston. It went down in a storm (later dubbed the "Portland Gale") with all hands—an estimated 200 people. Underwater footage, taken by remotely operated vehicles between 2002 and 2010, revealed not only components of the ship but many intact artifacts such as white chinaware, much of it unbroken, lying in silt in what had been the galley. Four years of historical and archaeological studies by the sanctuary and its partners culminated in *Portland*'s inclusion in the National Register of Historic Places in 2005.

> *Stellwagen Bank National Marine Sanctuary's collection of shipwrecks and maritime heritage stories represents a vibrant part of this nation's connection to the ocean. From accounts of the War of 1812 sea battle between USS Chesapeake and HMS Shannon to whale hunts and rumrunners anchored on Stellwagen Bank during Prohibition, these events and activities have shaped our past and can again enrich the lives of current and future generations.*
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> "Shipwrecks of Stellwagen Bank" by Matthew Lawrence, Deborah Marx, and John Galluzzo, 2015

The sanctuary's educators also got down to business. As with other offshore sanctuaries, their efforts were aimed at introducing this offshore marvel to shoreside audiences. The *Stellwagen Soundings* newsletter started in 1995, sharing news with sanctuary fans. Exploring and celebrating biological diversity in the sanctuary, the *Creatures of the Bank* traveling photo exhibit, made up of images donated by professional wildlife and nature photographers, debuted in 1996 on Capitol Hill. In 1997, Stellwagen Bank partnered with Gray's Reef National Marine

Sanctuary on *The Northern Right Whale: From Whaling to Watching,* a film tracking the changes of two centuries of human interaction with what is now one of the most endangered marine mammals in the world. A right whale education package, which included a poster and workbook detailing the history of whales and whaling; information about whale anatomy, physiology, behavior, and migration; and conservation efforts, was provided to teachers along with the video.

One of the sanctuary's two signature education programs debuted in 1996 with the arrival of Lefty, a 50-foot-long (life-size!) inflatable right whale. Made of plastic sheeting, Lefty was a construction project between the sanctuary and a local high school environmental club. Deployed to local schools, museums, and events, Lefty was quite the hit. It remained a favorite educational tool of the sanctuary until replaced in 2016 by a professionally constructed, life-size, walk-through model of Salt, a humpback, who is the grand dame of sanctuary whales. Retrofitted in 2019, Salt is now wheelchair accessible.

In 1998, the second signature education program was started: a student Marine Art Contest, jointly sponsored with the Massachusetts Marine Educators, that continues to this day. Each year, students in different grade categories are invited to submit artwork focused on the diversity of sanctuary species and have the opportunity to win best in grade as well as additional special awards. Prizes for students each year include certificates, small cash awards, and passes to the New England Aquarium. Every year hundreds of submissions of artwork are received. Winning entries have become part of traveling exhibits that tour venues around coastal Massachusetts and used in a variety of education and outreach products.

By 1998, the sanctuary had outgrown its offices in Plymouth, Massachusetts and moved into the recently vacated U.S. Coast Guard station in nearby Scituate. The move provided more offices and storage space, as well as dockage for R/V *Hawk* and its replacement vessel, the bigger R/V *Auk*, which arrived in 2006. *Auk* was purpose-built for the sanctuary and allowed staff to undertake longer and farther research expeditions to the bank.

R/V *Auk* in the sanctuary in 2012. Image: NOAA.

The sanctuary closed out the millennium with three notable achievements, one of which has lasting implications for protecting the bank. The first was in 1999 when a new exhibit about the sanctuary opened in the New England Aquarium, the Immersive Theater providing an interactive experience for visitors to explore the sanctuary. As the nation's first exhibit featuring interactive digital animation, the installation contained 25 individual computer consoles, in addition to a large viewing screen, which allowed participants to enjoy an immersive experience tailored to their interests.

1999 also saw the sanctuary's turn in the Sustainable Seas Expedition, a partnership between the National Geographic Society and NOAA, which was supported by a $5 million grant from the Richard and Rhoda Goldman Fund. The three fundamental goals of these expeditions to the sanctuaries were undersea exploration, scientific research, and education. As part of 4th of July celebrations in Boston, the sanctuary and Sustainable Seas Expedition team opened an exhibit tent at the New England Aquarium, while down the street at the US Coast Guard pier, workers loaded the DeepWorker submersibles onto the back deck of NOAA research vessel *Ferrel*. The scientific dives focused on deep-boulder reef fish communities; additional science projects during the expedition looked at background noise and whale behavior, and the microscopic world of the waters and sediments of the sanctuary.

Another achievement was the sanctuary's historical ecology project, which is the study of the past interactions of humans with the environment. Using an array of information about the past, the project constructs a more complete picture of specific ecosystems or habitats prior to large-scale human impact. This reconstruction helps managers make more informed decisions. The sanctuary was the first site in the system to initiate a historical ecology project, an effort that began with partners including the University of New Hampshire in 2005 and ended in 2010, with publication of its Stellwagen Bank Marine Historical Ecology Final Report. The report found massive shifts in the ecosystem and wildlife of the bank and its surroundings, including sustained overharvesting of commercial species, significant declines in top predators, and losses of habitat and biodiversity in the bottom-dwelling species. These dramatic changes were partly due to the development of new technologies such as gill nets and trawl gear that improved the efficiency and catch-levels of fish.

While the new exhibit and Sustainable Seas Expedition brought new attention and knowledge to the sanctuary, it was another accomplishment of 1999 that provided the foundation for a program of lasting protection for some of the most important resources of the sanctuary: its whales. After several years of working with the U.S. Coast Guard and the International Maritime Organization, in July 1999, a mandatory ship reporting system (MSRS) was implemented which required that all ships traveling through the northeast right whale critical habitat (which included the sanctuary) had to report their location, course, speed, and destination; in return, they received automated messages containing more specific information about whale sightings in the area, as well as precautionary tactics, like changing course and speed, to avoid contact or collision with whales.

This foundational tool allowed the sanctuary to implement a long-term whale protection program that continues to this day. Once the MSRS was in place, the sanctuary began in 2005 to monitor ship traffic using the Coast Guard's new ship collision avoidance system called the Automatic Identification System (AIS). The Coast Guard required all ships over 300 gross tons to carry an AIS transponder, which broadcasts data in two-second intervals, including the ship's position, course, and heading; as well as its ship particulars and cargo. All other ships in the area with an AIS transponder automatically receive these broadcasts, enabling them to avoid a collision. The sanctuary began using the AIS data in 2005 to monitor and understand ship traffic patterns and speeds in relation to the distribution of whales in order to reduce collisions between ships and whales, particularly the critically endangered right whale. At this time, use of AIS data as a long-term database was in its very early stages, so the sanctuary collaborated with the Coast Guard's Research and Development Center for this work.

Meanwhile, sanctuary scientists had been working with whale research organizations to compile sighting data for baleen whales from more than 25 years of whale watching trips and research cruises. The data resulted in a map that indicated areas with low to high density whale aggregations. Sanctuary scientists who analyzed the data realized the Boston shipping lane bisected the highest density whale aggregation area in the sanctuary, putting the whales at high risk of ship strike. Consequently, after several years of working with the shipping industry, the sanctuary and other partners in NOAA put forth a proposal to the International Maritime Organization to move the shipping lane twelve degrees to the north to protect right whales and other baleen whales from getting struck by ships. The IMO approved this shift in the shipping

lane in 2007, resulting in a 58% reduction in risk of ship strike to right whales and an 81% reduction for all baleen whales.

The whale tagging boat in Stellwagen Bank National Marine Sanctuary got a treat in 2012 when this humpback whale breached right by them. Image: NOAA/taken under NOAA Fisheries Permit #14245.

At the same time, two liquid natural gas (LNG) companies were proposing to install two of the nation's first offshore deepwater LNG ports in order to avoid the risk of transporting LNG through the port of Boston. The Coast Guard and the Maritime Administration permitted the construction of two separate deepwater LNG ports several kilometers west of the sanctuary's western boundary. To mitigate the potential increased risk of ship strike to whales, NOAA required the two companies to install the world's first automatic whale detection system in 2008. The system comprises 10 "listening buoys" located between the inbound and outbound lanes of the reconfigured Traffic Separation Scheme. The buoys are constantly listening for right whale calls. If a call is detected, the system automatically sends the recording to an analyst at Cornell University for confirmation. If deemed a right whale call, a message is sent back to activate a 10-knot slow speed zone around the buoy and a notice is sent to LNG ships in the area to slow down.

In 2009 NOAA implemented seasonal slow speed zones offshore major East Coast ports, including Boston, to slow ships to 10 knots when right whales are migrating up the coast from their breeding ground off Florida and Georgia. One of these zones overlaps the traffic lanes in the sanctuary from April to May. To evaluate the effectiveness of this slow speed regulation, the sanctuary began an innovative corporate responsibility project. Sanctuary researchers use AIS to

analyze the tracks and speeds of all vessels transiting the slow speed zone in the sanctuary and send annual report cards to the companies that operate the vessels as a non-regulatory incentive to protect the whales. Throughout the winter and early spring, listening buoys in the shipping lanes often highlight the presence of calling whales, providing additional information shippers can use to reduce their risk of collision. To help shippers comply with the many rules and information resources available for protecting right whales, the sanctuary's research coordinator worked with several partners to create the Whale Alert app in 2012. This free and easy-to-use app provides a clearinghouse of information for mariners as they enter the port of Boston on the location of whales and also allowable (in seasonal zones) or recommended (in dynamic zones) speeds based on their location, which the app automatically detects.

Congruent with the scientific and management work, the sanctuary reached out to bolster awareness and better protect whales in the sanctuary. In 2001, it partnered with Whale and Dolphin Conservation and the National Marine Fisheries Service to initiate the "See A Spout, Watch Out" campaign which today still encourages protective behavior to help protect marine mammals in and around the sanctuary. It contains six simple tips:

- See a spout, watch out!
- Head on is wrong.
- Lots of boats, then talk to folks.
- Avoid trouble, steer clear of bubbles.
- Don’t chase, give the whales space.
- Drop your sails when watching whales.

In 2009, the same partners established Whale SENSE, a voluntary education and recognition program offered to commercial whale watching companies to help them develop and maintain responsible whale watching practices. Participating companies agree to adhere to whale watching guidelines, educate their clients about whales, notify appropriate parties of whales in distress, and encourage ocean stewardship. Both programs were joined in 2016 by the Boater Outreach for Whale Watching (BOWW) project, where sanctuary staff meet individual recreational boaters face-to-face on the water to raise awareness about the sanctuary and safe boating around whales.

Beyond the long-term protective plan for whales, the sanctuary had other responsibilities, including meeting requirements to review its original management plan. The sanctuary initiated such a review in 1998, in cooperation with the sanctuary advisory council. When a new superintendent took over the sanctuary, the review was delayed to allow time for the new sanctuary leader to become familiar with the issues and challenges facing the site, and consider how to respond to them. NOAA restarted the review in June of 2002 with the publication of the State of the Sanctuary Report, a forerunner to the condition reports used today. The report set the stage for nine public scoping meetings, held in different coastal communities in New England, and a public comment period that ended in October 2002. More than 20,000 comments were received.

In addition to its importance for whales, the sanctuary is also an important feeding and resting ground for a variety of seabirds, including these gulls using a whale as a convenient perch. Image: Photo Credit: NOAA/WCNE, under NOAA Fisheries permit #605-1904.

In 2004 the sanctuary and its advisory council formed twelve working groups—including ones for ecosystem management, marine mammals, maritime archaeology, education, and water quality—to consider comments received from the public, and begin drafting action plans that would form the backbone of a new management plan. In 2005, the sanctuary adopted a new vision developed by the advisory council. The advisory council also approved eleven draft action plans and prioritized among the hundreds of activities contained in them. The sanctuary worked to finalize the drafts of each action plan and prepare the additional material for the management plan.

In 2008, a draft management plan was released for six months of public review, including eight additional public meetings. More than 25,000 additional comments were received. After considering all the comments, a final management plan was prepared and released in 2010. Its eleven action plans—administration and infrastructure; interagency cooperation; outreach and education; compatibility determination; ecosystem protection; ecosystem alteration; water quality; marine mammal disturbance; marine mammal vessel strikes; marine mammal entanglement; and maritime heritage—laid out the activities of the sanctuary for the next five to ten years.

New Depths (2011 and ongoing)

With the management plan process completed, the sanctuary looked toward a new decade and began with some significant achievements in long-running signature projects. The first was with the sister sanctuary network, which fosters cooperation to protect and improve knowledge of the shared humpback whale population between the sanctuary's feeding/nursery grounds, their Caribbean breeding and calving grounds, and migratory corridors in between. In 2007, the

sanctuary signed its first formal agreement, with the Dominican Republic's Santuario de Mamíferos Marinos de la República Dominicana, extending a partnership that began with joint research projects in 1995. This partnership was followed in 2011 by a sister sanctuary agreement with the Agoa Marine Mammal Sanctuary in the French Antilles (Guadeloupe, Martinique, St Martin, and St Barthelemy). In 2012, another agreement was signed with the newly established Bermuda Marine Mammal Sanctuary that encompasses the territorial waters of the island nation.

Even as studies continue on whales, the sanctuary science team has expanded its efforts into the animals' prey. The biology of sand lance, a key forage fish for humpback whales and a host of other animals, is little understood; yet this small, schooling fish is essential for a productive ecosystem. In partnership with USGS, the US Fish and Wildlife Service, and others, the sanctuary is building a database that determines co-location of sand lance with humpback whales. Additional studies include great shearwaters, one of the sanctuary's most common seabirds, and another predator of sand lance. The distribution of these birds provides a visible indicator of food availability, while the well-being of the birds can indicate ecosystem health.

The sanctuary's next achievement involves the larger seabird community. Though well known for its whales, the sanctuary is equally important for other wildlife, including seabirds; in 2002, it was designated an Important Bird Area by BirdLife International, meaning it provides essential habitat for breeding, wintering, or migrating birds. In 2010, the sanctuary provided some focused stewardship attention to its avian denizens by establishing the Stellwagen Sanctuary Seabird Stewardship Program. The program recruits experienced birders as citizen scientists who support research projects on the water in collaboration with the Massachusetts Audubon Society. Five research trips are conducted annually to the sanctuary to identify and record bird and other wildlife sightings, all of which are entered into a database to help sanctuary managers identify long-term population trends in seabirds and provide information on the health of the ecosystem. The winter trip also functions as the sanctuary's contribution to the annual Audubon Society Christmas Bird Count.

The new decade also brought new projects for the sanctuary's educators. A new traveling exhibit, *Animals Without Passports*, debuted in 2013, focusing on humpback whales, their biology, sanctuary research, and the sister sanctuary program. In 2016, a Stellwagen Bank exhibit in the Cold Water Gallery at the New England Aquarium was updated and joined by new tanks featuring species from the Olympic Coast National Marine Sanctuary. The sanctuary worked with the Gloucester Maritime Heritage Center (now Maritime Gloucester) to install a major exhibit that was updated in 2018. In 2019, the sanctuary hosted a series of nine Sanctuaries Live broadcasts reaching more than 1,400 students in 29 schools during the first expedition of a three-year project to study sanctuary shipwrecks. But perhaps the largest undertaking of the 2010s was the 2014 *Charles W. Morgan* project.

Charles W. Morgan was once one of thousands of whaling ships that sailed the ocean and hunted whales for their oil and baleen. Retired in 1921 after an eighty-year career, *Morgan* was restored by Mystic Seaport and in 2014 began a tour of New England's former whaling ports. This four-month education mission spread the importance of endangered whales and their role in the nation's maritime heritage. The sanctuary partnered with Mystic Seaport to offer tours,

day sailing to the sanctuary, and dockside exhibitions. Nine OceanLive web streaming productions were offered on the days when *Morgan* sailed in the sanctuary.

Whale watching, such as seen here, is an important component of the tourism economy of Massachusetts. Image: Anne Smrcina/NOAA.

The Voluntary Shipwreck Avoidance Program, a cooperative project with the National Marine Fisheries Service, was initiated in 2020. The Fisheries Service posted a bulletin to anglers who frequent the southern portion of the bank requesting that they avoid several shipwrecks located there. The project has mutual benefits by protecting the wrecks from damage by fishing gear and preserving expensive equipment.

In 2020, the sanctuary released its second condition report in preparation for the next review of the sanctuary's management plan. The previous report had been released in 2007. The updated condition report found water quality in the sanctuary is fairly good; but habitat, living resources, and maritime heritage resources continue to be impacted in various ways by human activities, such as shipping traffic and commercial and recreational fishing. Ecosystem services in the sanctuary are generally improving, and in either good or fair condition.

A draft management plan was released for public review in November 2021, with fourteen actions plans: marine mammal protection, seabird research, vessel traffic, maritime heritage and cultural landscapes, compatible uses, climate change, education and outreach, interagency/intergovernmental coordination, sanctuary advisory council, research and monitoring, soundscape, water quality monitoring, habitat, ecosystem services, and administration and infrastructure capacity. The public review period closed in January 2022;

two virtual public hearings were held in addition to opportunities to submit written comments. Public comments are now under review and will help in preparing a final management plan.

In an 1854 log, Henry Stellwagen wrote, "I consider I have made an important discovery in the location of a 15-fathom bank lying in a line between Cape Cod and Cape Ann." He likely didn't realize how important it would be in the years to come—for cod anglers and whale hunters, rum runners, and steamship passengers, and now seabird seekers and whale watchers. The bank's promise to future generations lies in the ongoing work of the sanctuary that bears its name.

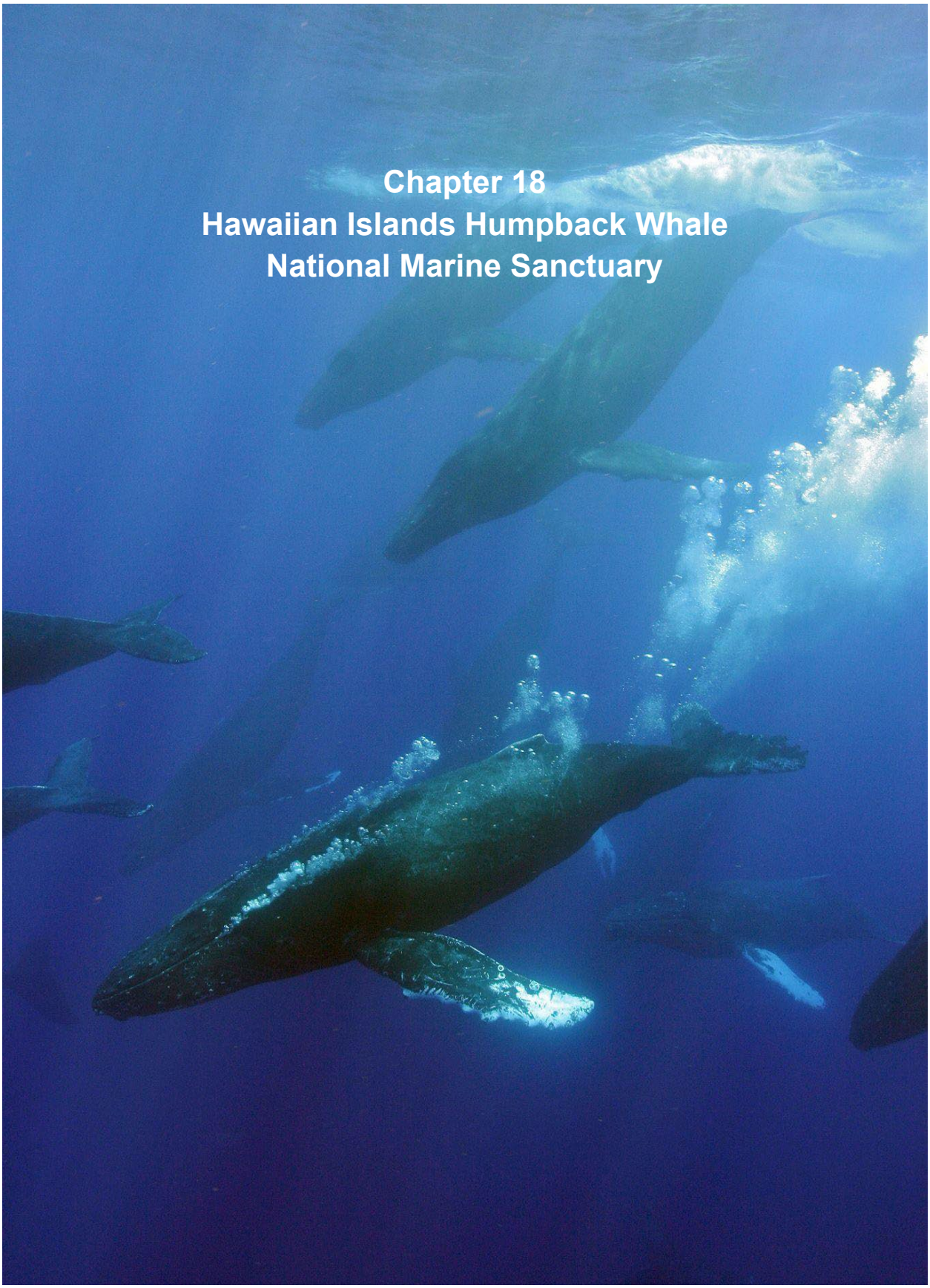
A gray seal takes a look around the sanctuary. Image: Matt McIntosh/NOAA.

Origins of the Sanctuary's Name

The bank was long known from colonial times because of its rich productivity, and it had the unofficial name of the Middle Ground. In 1854, the bank was named for Henry S. Stellwagen, a naval officer working with the Coast Survey. Stellwagen carried out the first detailed exploration of the entirety of the bank in 1854 and 1855. The last name Stellwagen, meaning "cart-maker," was of German origin. Stellwagen later held a patent for a depth sounding device used for many years by the Coast Survey. On an interesting note, his survey vessel also carried a young cartographer named Edward Cordell, who, about fourteen years later, would explore the bank that today's bears his name, as does the sanctuary around it.

Sanctuary Superintendents

- Brad Barr, 1992 to 1999
- Ed Lindelof, 1999 to 2000
- Craig McDonald, 2000 to 2016
- Ben Haskell, 2016 to 2018
- Peter DeCola, 2018 to present



Chapter 18
Hawaiian Islands Humpback Whale National Marine Sanctuary

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Magnificent Creatures

Hawaiian Islands Humpback Whale National Marine Sanctuary is a vital component for the protection of the humpback whale population, as it is the only place in the U.S. where humpback whales reproduce. Scientists estimate that two-thirds of the entire North Pacific humpback whale population (approximately 10,000 whales) migrate to Hawaiian waters to breed, calve, and nurse their young. No one knows exactly when humpback whales first began wintering in the warm, shallow waters around the Hawaiian Islands. Narrative reports from whalers document the appearance of these majestic giants in Hawai‘i in the 1840s, but evidence substantiates an earlier presence. In addition to the wonderful whale watching opportunities, the sanctuary also provides opportunities for surfing, diving, and snorkeling. Voyage on to learn more about these magnificent creatures and how the sanctuary helps ensure their survival.

Hānau Ka Palaoa Noho I Kai (to 1992)

Centuries ago, the ancestors of Hawaiians voyaged across the Pacific, using clouds, winds, stars, and currents to navigate the vast distances of ocean.[1] Native Hawaiians are thought to be the descendants of people who ventured from Southeast Asia into the Pacific, arriving in the Hawaiian Islands via central and eastern Polynesia.

The ties of Native Hawaiians to the ocean are deep and old. Survival meant learning how to respect and use the sea’s bounty. Ancient Hawaiian fishing traditions using hooks, lines, and spears are still practiced today, and seaweed is still gathered along the shorelines. Fish ponds in the nearshore supplemented what was caught at sea; encompassing shallow coastal waters up to the shoreline, the rock wall enclosed an area of water in which Hawaiians could manage and raise fish. A sluice gate allowed small fish to enter and prevented larger fish from escaping.

As befits a voyaging people, the ancient Hawaiians specialized in developing boats to suit their needs in different marine settings. Large wood double-hulled voyaging canoes called wa‘a kaulua were used on open ocean passages to and from distant archipelagos such as Tahiti, the Marquesas, and the Northwestern Hawaiian Islands. Smaller sailing canoes with one outrigger were built for inter-island travel.

[1] Hānau Ka Palaoa Noho I Kai means “The Whale is born, living in the sea” – from the Hawaiian Creation Chant, The Kumulipo.

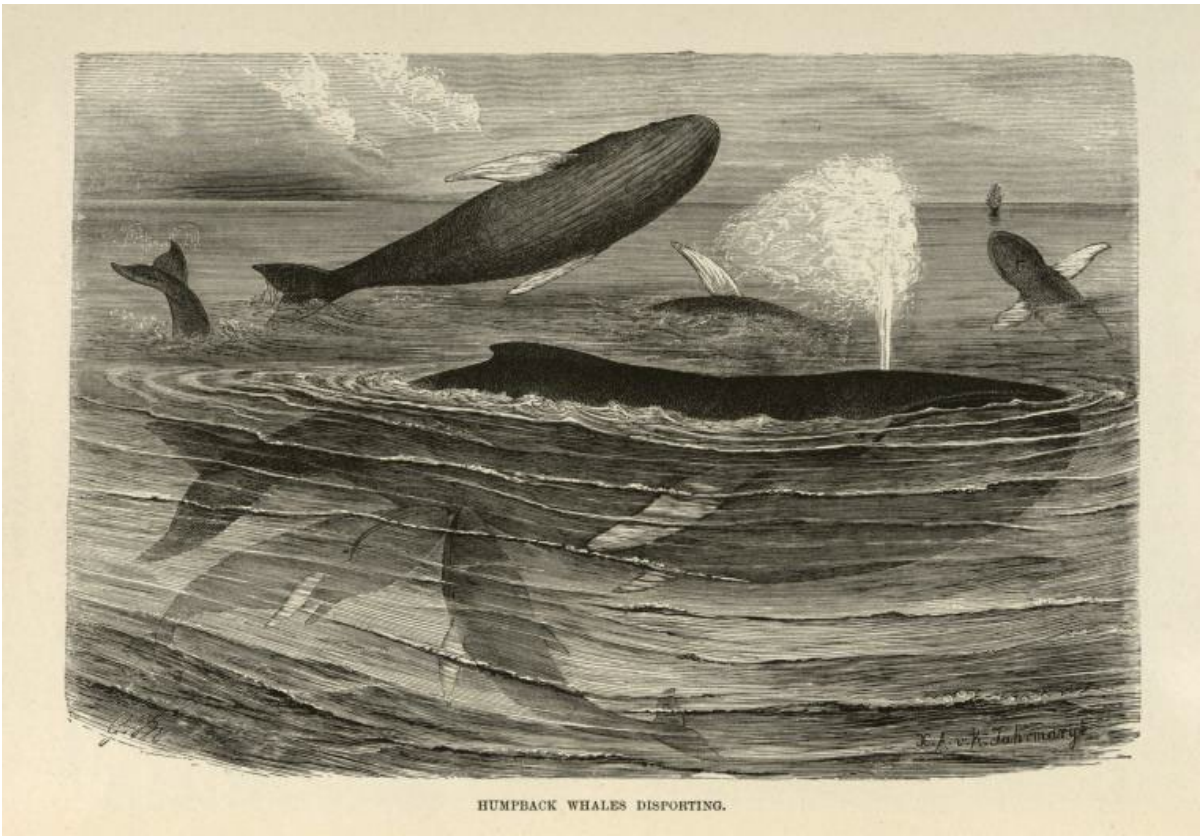
Kumulipo was born in the night, a male.
Poele was born in the night, a female.
A coral insect was born, from which was born perforated coral.
The earth worm was born, which gathered earth into mounds,
From it were born worms full of holes.
The starfish was born, whose children were born starry.
The phosphorous was born, whose children were born phosphorescent.
The Ina was born Ina (sea egg).
The Halula was born Halula (sea urchin).

The Kumulipo (Hawaiian creation chant), translated by Queen Liliuokalani, 1897

Native Hawaiians view all forms of sea life as "iʻa and although the common translation is understood as fish, it is synonymous with marine life. Many iʻa had sacred attributes and some were considered to be ʻaumakua. An ʻaumakua is the spirit of a family ancestor that has assumed the physical form of an animate or inanimate object, and often animals such as a specific individual shark, turtle, or other marine life that were identified as such. These ʻaumākua protected the families, who in turn cared for the ʻaumakua. ʻAumākua are still honored today by many Hawaiian families.

We are not certain when humpback whales first appeared in Hawaiian waters, but they have a long cultural history in the islands. Early Native Hawaiians spoke reverently in sacred chants and legends about the whales they named koholā. Humpback whales are ʻaumākua for some Hawaiian families. Koholā are acknowledged by legendary place names throughout the islands. For example, Koholālele, meaning "leaping whale," is a place name used on various islands; Laeonākoholā on Kahoʻolawe refers to the "cape of whales;" and Halepalaoa, "whale house," is on Lānaʻi. Puʻukoholā Heiau, one of Hawaii's largest heiau (temples) and an important landmark in the life of Kamehameha I, a prominent chief from the island of Hawaiʻi who united all the islands under his rule in 1810. This temple was built on Puʻukoholā, which translates to "whale hill" or the "hill where the first strict law is promulgated by the chief." Humpback whales are also seen in petroglyphs in different places in the islands, including one that appears to illustrate a Hawaiian legend about a whale carrying a devout believer from the mortal plain to dwell among the gods.

Western contact with Hawaiʻi began with Captain James Cook's arrival in 1778, which spurred shipping traffic and visitation in the 1780s. Vessels carried sea otter furs from the U.S. Pacific Coast to China, stopping regularly in the islands. Provisioning became a major activity for ships in Hawaiʻi, increasing inter-island commercial trade, and Native Hawaiians joined the crews of trading vessels and whalers as expert seamen and informants.



A c.1900 illustration of humpback whales. Image: Richard Lydekker, courtesy of the New York Public Library.

In the first half of the 1800s, whaling operations spread north into the Pacific basin, steadily seeking out lucrative whaling areas off South America, Australia, Japan, and the Gulf of Alaska and Bering Sea. Hawaiian waters were less a whaling ground and more a familiar point for where whaling vessels could rest and reprovision before working in other waters. American vessels increasingly dominated Pacific whaling grounds, particularly the sperm whale fishery in the mid 19th century. By 1845, almost 600 whalers were annually making port in the islands. Whaling continued in the Pacific, but humpback whales weren't targeted until other species had been depleted, starting around 1905.

The influx of European and later American interests into the islands led to the suppression of many aspects of Hawaiian culture, culminating when the Kingdom of Hawai'i came under the control of American commercial interests following an illegal coup on January 16th, 1893. Though recognized as an action unsupported by the U.S. government, little attempt was made to restore sovereignty to Queen Liliuokalani and the citizens of the Hawaiian Kingdom. This lack of redress was succeeded by official annexation by the U.S. in 1898, an act for which the U.S. officially apologized in 1993.

The islands' strategic location was one reason for the annexation, and it remained important in ensuing wars. In the 1930s, as the threat of World War II grew, military construction accelerated, and forces transferred to the islands, Hawai'i became home to the U.S. Pacific Fleet. Numerous naval air stations are also located throughout the Hawaiian archipelago.

By the middle of the 20th century, only about 1,000 humpback whales remained in the North Pacific. Sightings off Hawai'i were so rare that even some experts dismissed the idea of the islands as habitat for humpback whales as pure rumor. These majestic whales were protected from further harvest in 1996, by treaties through the International Whaling Commission; and in 1973, when the United States made it illegal to hunt, harm, or disturb humpback whales.

Wise stewardship of terrestrial and marine resources is integral in Native Hawaiian culture. From the mountains to the sea, a land and sea management system, which included parcels known as ahupua'a, helped govern trading, farming, fishing, and maintenance of resources under the supervision of a supreme chief and lesser chiefs. The system also used the concept of kapu, meaning forbidden, a practice that involved designating areas and resources as kapu to stop fishing or harvesting in certain areas or for certain resources to allow for replenishment. While this traditional system was disrupted after European contact, many cultural practices are being revived and integrated with modern conservation programs.

Snorkelers prepared to explore Hanauma Bay in 1973. Image: Charles O'Rear, EPA Documerica Project, courtesy of the National Archives.

Hawai'i is home to one of the oldest underwater parks in the nation established independently of a land component. Hanauma Bay was designated, in 1967, to protect a pristine lagoon once used by Hawaiian royalty. The idea of an underwater park to protect the whales of Hawai'i first took root about ten years later, when NOAA received a nomination from a group of scientists and managers to establish a sanctuary in the waters between the islands of Maui, Moloka'i, Lāna'i, and Kaho'olawe. NOAA agreed and added the site to the List of Recommended Areas in October 1979.

The site was made an active candidate for designation in March 1982. NOAA hosted public workshops in April that year. But a mixed review of the proposal, as well as opposition from some state agencies and a prominent whale-focused environmental organization, led the state to ask NOAA to suspend its consideration, and in 1984 NOAA did so. As Lasse Brautaset of the Ocean and Coastal Law Center stated in 1985, "Public hearings on the draft management plan and DEIS revealed that commercial and recreational fishermen opposed the sanctuary primarily out of fear of fishing restrictions. The chances of successful designation were further reduced when a local advisory committee recommended against the designation due in part to the adequacy of existing legislation protecting the Whales."

In 1990, Congress ordered NOAA to assess the feasibility of creating a national marine sanctuary around Kahoʻolawe, the smallest of the main Hawaiian islands. Though the report delivered to Congress in 1992 did not find a significant whale habitat in the waters around Kahoʻolawe, the report recommended additional study and further recommended a multi-component, multi-resource sanctuary be studied.

The report was delivered to Congress as a reauthorization of the National Marine Sanctuaries Act was being developed. Hawaiian Islands Humpback Whale National Marine Sanctuary was designated as part of the reauthorization in November 1992, after the state of Hawaiʻi testified at hearings in support of a sanctuary to protect the whales.

Lele Aʻe Ke Koholā (1992 to 2017)

Once established, the sanctuary got to work, exploring how management, science, and education programs could be harnessed to better protect humpback whales and their habitat.[2] NOAA had been directed by Congress to finalize the boundaries of the sanctuary and to issue a management plan and regulations for the site. Onsite staff began that process and in early 1993, NOAA held scoping meetings on each of the main Hawaiian islands with an additional meeting in Washington, D.C. As a management approach began to take shape, NOAA decided additional public input was required, and the agency conducted another round of public meetings on each main island. In 1994, NOAA also consulted with federal, state, and local agencies, as well as with technical experts and interest groups. A draft management plan was jointly developed by NOAA and the state, and released for public review and comment in September 1995. Over 250 written and oral comments were received. The plan articulated the goals and objectives of the sanctuary and offered, like other management plans of the time, a series of functionally-based action plans including those for resource protection, research and monitoring, education and interpretation, and administration. The proposed regulations included approach limits for vessels and aircraft, restrictions against harassing or harming whales, and prohibitions against discharging materials or altering the seabed, among other protections.

Another public review period of 90 days was held on the draft management plan, including more than 25 statewide informational meetings and seven formal public hearings to collect

[2] Lele Aʻe Ke Koholā means "The humpback whale breaches."

comments. More than 250 comments were received, touching on concerns related to, among other things, programs for research and education, potential socio-economic impacts, Native Hawaiian culture, and the need for a federal presence in state waters. Based on the comments, NOAA clarified boundaries and some regulatory definitions, removed operation of a vessel from the scope of activities the sanctuary could regulate, and clarified the sanctuary would not charge user fees. The final management plan was released in February 1997.

Under the terms of the National Marine Sanctuaries Act, a governor has the right to disapprove a sanctuary if it includes state waters, so the release of the final regulations triggered a gubernatorial review. After three months, then-Governor Cayetano requested a number of regulatory and boundary changes, including provisions requiring gubernatorial approval for emergency regulations or any regulations governing fishing. The governor also asked that the state not be required to provide funding to support the sanctuary and some portions of state waters be removed from the final boundary. The final management plan also called for the sanctuary to be co-managed by the state of Hawai‘i. The original co-managing agency was the Office of State Planning, but management changed hands in 1998, when it transferred to the Department of Land and Natural Resources. The final regulations were amended in November 1999.

Sanctuary volunteers checked their lists during 2006’s Ocean Count. Image: Kevin Brammer, in NOAA Report, February 2006.

As the sanctuary developed its management plan, it also built its programs, including its signature annual event. Established in 1995, the Ocean Count trains and uses citizen scientists to count and document patterns of whale behavior from designated shore stations throughout the state. With well over 2,000 participants counting from 60 locations each year, the whale census has become a favorite project of many residents and tourists. The Ocean Count was

named a Take Pride in America Outstanding Volunteer Program for 2012. Another citizen science program, the Nā Pali O Ke Kai Volunteer Coastal Monitoring project, was launched in 1998.

In 1998, the sanctuary also took another large step forward when it opened a new visitor center and headquarters located in a restored building alongside the offices formerly from NOAA's National Environmental Satellite, Data, and Information Services (NESDIS) program. The shorefront headquarters also included signage, a garden of native Hawaiian plants, and a viewing deck with telescopes to see distant humpbacks. A three-acre Native Hawaiian fishpond known as Ka Loko Iʻa ʻo Kōʻieʻie fronts the ocean side of the sanctuary campus, which has become a focal point for Native Hawaiian education and training. The center features displays, videos, brochures, and books on the humpback whale; methods of modern resource management and Hawaiian stewardship; and the latest humpback whale research. In 2010, the Maui campus gained its Kīhei Sanctuary Learning Center, with 4,600 square feet of classroom and lecture space. In 2020, the sanctuary established Kauaʻi Ocean Discovery, a visitor center devoted to sharing information on humpback whales and other Hawaiian wildlife through videos, interactive displays, and hands-on activities. Housed within the islands' largest outdoor shopping center, this innovative partnership has cemented the sanctuary as a key member of the Kauaʻi community.

With the new millennium, the sanctuary turned its attention to one of the critical issues impacting humpback whales in Hawaiian waters: marine debris and potential entanglements. In August 2000, the sanctuary convened the first International Marine Debris Conference expressly, in the words of the conference proceedings, to "address the Pacific-wide nature of lost and discarded fishing gear and its impacts on protected species, coral reefs, and the marine environment." Among the recommendations resulting from the conference were developing an international action plan, giving greater attention to the problem of marine debris through the International Maritime Organization, and creating more public-private partnerships to better implement international agreements and guidelines.

Following the conference, the sanctuary and its state partners established the Hawaiian Islands Whale Disentanglement Network in 2002. Dozens of trained volunteers were—and remain today—ready to be mobilized at the detection of a whale caught up in fishing gear or other marine debris. Several dozen whales have been successfully freed from life-threatening entanglements since the first rescue in 2003, and sanctuary staff have trained international colleagues to do the same procedures in waters all over the world. In 2010, the sanctuary's disentanglement efforts were featured in the award-winning film *In the Wake of Giants,* produced by Akua Films.

A new management plan was released in 2002, built around five action plans for natural resource protection, education and outreach, research and monitoring, cultural resource enhancement, and administration. One strategy in the research action plan—to characterize and monitor the central North Pacific stock of humpback whales—set the stage for what would become one of the largest whale-focused science efforts in the world.

Humpbacks come to Hawaiian waters every winter to breed and calve their young. Image: Ed Lyman/NOAA under permit #14682.

The Structures of Population, Levels of Abundance, and Status of Humpback Whales (SPLASH) project launched in 2003 with partners from around the globe, including Canada, Mexico, Japan, Russia, the Philippines, and numerous countries in Central America. This international cooperative research project sought to understand the abundance and population structure of humpback whales, in addition to potential human impacts on the species across its entire North Pacific Ocean range. Data collection was obtained primarily through the field techniques of photo-identifying whale flukes and biopsy tissue sampling in the whale's breeding and feeding grounds. After five years of work, including three field seasons from 2004 to 2006, SPLASH scientists encountered more than 3,600 groups of whales, resulting in the identification of 8,037 individuals; collected more than 15,000 images for use in photo-ID efforts; and took more than 2,000 biopsies, all of which continue to be studied to this day. Together, the information helped give NOAA and its partners a more comprehensive picture of the Pacific humpback whales.

One long-term issue impacting the humpback whales was—and is—collisions with vessels. In 2003, the sanctuary organized the Vessel-Whale Collision Avoidance Workshop to assess ship strike risks to whales in Hawaiian waters and to identify possible actions for reducing the occurrence of vessel-whale collisions. Coming out of the workshop, the sanctuary and its partners launched a comprehensive outreach campaign to better inform boat operators and other ocean users of the need to be on the lookout for whales during November through May. Since 2004, the sanctuary has annually disseminated collision avoidance guidelines in

newspaper articles, lectures, workshops, and outreach events and products. In 2006, the sanctuary intensified its efforts with the ongoing Responsible Recreation Campaign that shares guidelines and tips on how to responsibly enjoy the ocean while respecting its wildlife.

> *Could it be that the whale was not as prominent in the culture as other animals, suggesting that they were not a significant part of everyday life? Could it be that the whales were not present or recorded to be present in Hawaiian waters until the past two centuries when western influence encouraged better record keeping? Or, could it be that ancient Hawaiians may have viewed this animal as a sacred creature which may have caused information about the whale to be kept a secret and reserved only for a chosen few?*
>
> HIHWNMS Brochure "The Cultural Significance of Whale in Hawai'i"

While the sanctuary's protective regulations are focused on humpback whales and their habitat, its programs also work to support Native Hawaiian traditions. One such long-term project has been the restoration of the historic Ka Loko I'a 'o Kō'ie'ike, a Native Hawaiian fishpond located on the sanctuary campus on Maui. Starting in 2005, the sanctuary partnered with 'Ao'ao O Nā Loko I'a O Maui (Association of the Fishponds of Maui), a local non-profit to begin restoration work using traditional techniques. Rocks were collected from within the fishpond, checked for appropriate sizing, and put together like a jigsaw puzzle, fitting each piece carefully to ensure its stability. The wall built by the volunteers is about eight feet tall, ten feet wide, and about thirty feet long, and helps to contain the wave action and erosion problems at the Maui campus.

As the first decade of the new millennium ended, the sanctuary had matured into an international leader in whale study and protection. That leadership advanced into the sanctuary's role in 2009 as one of the organizers and co-host of the first International Conference on Marine Mammal Protected Areas. Although there were, at the time, more than 500 ocean parks for marine mammals in nearly 90 countries around the world, a dedicated venue for sharing and gathering information had never existed until the conference was organized, the first of so far five such conferences (the last was in Greece in 2019). More than 200 ocean park managers, scientists, and educators representing forty countries came together to discuss issues, establish valuable relationships, and exchange information on effective approaches to studying and protecting marine mammals.

The sanctuary began laying the groundwork for a new management plan review in 2010, when its first ever condition report was released. The report found water quality and habitats used by humpbacks to be in good to good/fair condition. Issues of concern included increasing human use in areas frequented by the whales while on their winter sojourn in Hawai'i. The status of the humpback whales themselves is rated as good/fair; however, their health is rated only as fair. Although humpback whale abundance has generally been increasing in the sanctuary, there has also been an increase in the number of reported collisions, entanglements, and associated impacts. Because entanglement and whale-vessel collisions are the primary human cause of mortality for humpback whales, these two issues have been identified as immediate and pressing issues for the sanctuary.

Following the release of the condition report, in July 2010, NOAA announced its intention to review the management plan for the sanctuary, and the agency began the public scoping process. Ten scoping meetings were held on six islands throughout August of that year, and public comments were collected over the course of the summer. NOAA closed the scoping process and began working with its sanctuary advisory council to produce a draft management plan and revised regulations.

While management plan activities were ongoing, the sanctuary continued its other work. In 2011, a new 36-foot vessel named *Koholā* began operations in support of sanctuary research. Based in Maui at Maʻalaea Harbor, the vessel was specifically designed for whale research and entanglement response efforts. In addition to *Koholā*, another 15-foot rapid deployment inflatable boat was donated to support entanglement response efforts. In 2012, the sanctuary hosted 150 students and teachers aboard the *Oscar Sette*, one of the larger NOAA research vessels, for "A Day in the Life of a Marine Science Researcher."

The same year, NOAA hosted a workshop to explore a new management approach for the sanctuary. The workshop resulted in the creation of the *Aloha ʻĀina Guidance Document,* which recommends ways to implement cultural perspectives, customary practices, and place-based knowledge into management planning and decision-making. Aloha ʻāina means deep love for the land and sea.

Returning to its management plan work, in March 2015, after considering public comments and working with its advisory council and working groups, NOAA proposed transitioning the sanctuary from one focused on a single species to focusing on the entire ecosystem, with attendant regulatory changes and boundary expansion. An additional ten public hearings were held in April and May that year; more than 15,000 comments were received, expressing a mix of support and opposition to the proposal. In June 2015, a letter from the state arrived, expressing concern about an increased federal role in state waters; a second letter from the state in January 2016 asked NOAA to consider adding new species but not their habitat. As this approach was not consistent with the resource protection mission embodied in the National Marine Sanctuaries Act, in March 2016, NOAA chose to withdraw the proposal and to refocus its efforts on the whales and their habitat, as it kicked off the next stage of the sanctuary's evolution. To guide that stage, a new management plan was released in 2020, with four action plans for humpback whale research and response, education and outreach, living cultural traditions, and management effectiveness.

The sanctuary closed the first chapter of its evolution in 2016 with two big projects that, while united in protecting the whales, were on opposite ends of the geographic spectrum. First, the sanctuary co-hosted the 2016 World Conservation Congress with other partners in Hawaiʻi—the first time this global gathering had ever been held in the United States. The congress brought thousands of practitioners together to discuss and plan for global conservation. The second project was more locally focused when the sanctuary launched a new volunteer program. Team OCEAN (Ocean Conservation Education Action Network) joined the Ocean Count as a community-based stewardship effort. A fleet of kayaking naturalists who have undergone training to serve as ambassadors took to the water to greet and interact with visitors and ocean users.

Expert practitioners of hula demonstrated their craft at the opening of Kaua‘i Ocean Discovery, the sanctuary’s newest visitor center in 2020. Image: NOAA.

Ka Leo O Ke Koholā (2017 and ongoing)

Humpback whales are famed for their songs, the haunting underwater noises that scientists theorize could be used for courtship or to investigate rivals, or even as a type of sonar to explore their underwater world.[3] In their ongoing research work, sanctuary scientists in 2017 deployed moored listening stations called cetabuoys to record their songs and help characterize the whales and their behaviors. Understanding humpback whales and their natural history remains an important priority because, for all the sanctuary has learned in its twenty-eight years of operation, there is still much to discover. In 2017, for example, the population of humpbacks arriving in Hawai‘i for the winter breeding season declined fifty percent compared with the count in 2014. Scientists, whale watch boat operators, and the sanctuary’s Ocean Count program helped point out the trends.

Seeing trends isn’t discerning the cause, however. The sanctuary convened a workshop of researchers and managers in November 2018 to share information and better understand and address what might be happening to the whales. More than 30 participants provided expertise on humpback whale habitat usage, population estimation and structure, and health/risk analysis in Hawai‘i and Alaska. While the exact cause may never be known, the expert consensus was that a perfect storm of events—extreme marine heatwaves and El Niño events in the mid-2010s—may have impacted the krill on which humpbacks feed. Fewer krill meant less food for

[3] Ka Leo O Ke Koholā means “the voice of the humpback whale.”

humpbacks, who feed all summer long in Alaska before they arrive in Hawai‘i—where they don’t eat at all. Restricted food availability meant some whales might have lingered in Alaska in search of more food. Some may have died before leaving.

Future data will tell a fuller story about the trends in humpback populations. For now, the sanctuary continues its work studying, sharing, and protecting the whales, faithful to the Hawaiian proverb: “Inā mālama ‘oe i ke kai, mālama no ke kai iā ‘oe.” If you care for the ocean, the ocean will care for you.

After being disentangled from fishing gear in 2018, this humpback whale breached several times near responders in the sanctuary. Image: J. Moore/NOAA, under MMHSRP permit #18786-02).

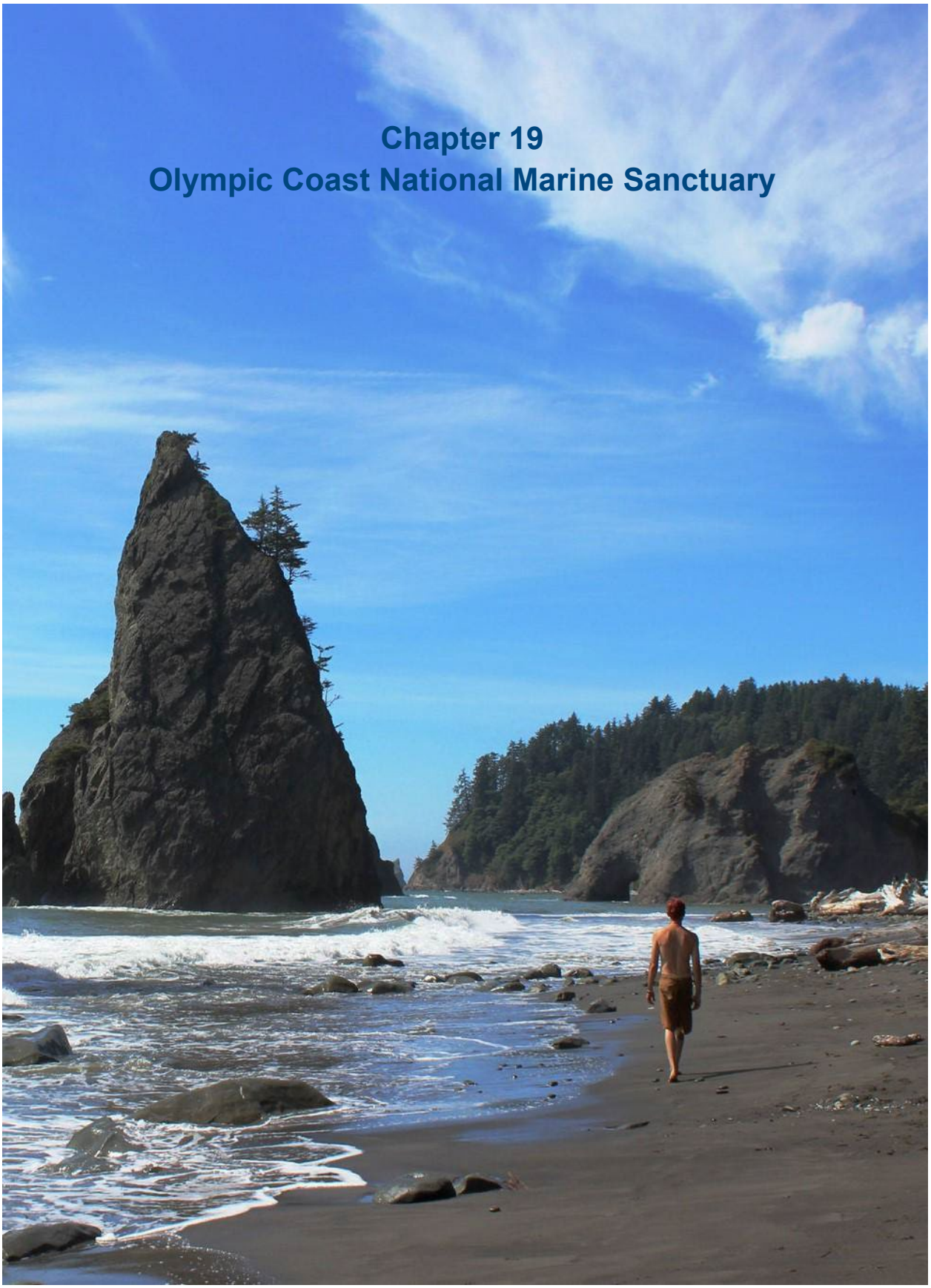
Origins of the Sanctuary’s Name

The name of the sanctuary derives from the name of the state and from the whale that is the focus of its protection. Hawai‘i comes from the name of the largest of the islands that comprise the state and may mean *homeland* or be the name of the island’s founding deity, Hawai‘iloa. Humpback whales take their name from the arch of their backs as they prepare to dive. The Hawaiian name for humpback whales is koholā.

Sanctuary Superintendents

- Allen Tom, 1992 to 2003
- Naomi McIntosh, 2003 to 2011
- Malia Chow, 2011 to 2017
- Various acting superintendents, 2017 to 2019
- Allen Tom, 2019 to 2021
- Kim Hum, 2022 to present

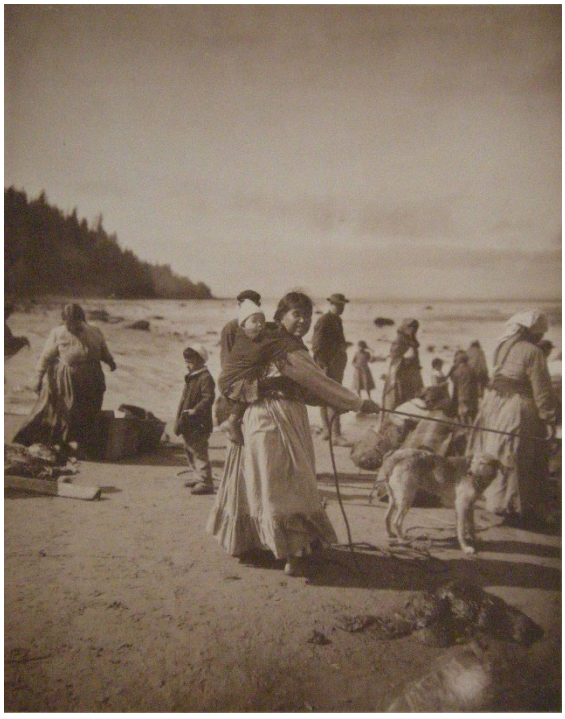
Chapter 19
Olympic Coast National Marine Sanctuary



Chapter 19
Olympic Coast National Marine Sanctuary

A Wild Sanctuary

Olympic Coast National Marine Sanctuary includes the longest stretch of wilderness coast in the lower 48 United States and is unmatched in pristine nature, timeless landscapes, and sublime serenity. The sanctuary protects a productive upwelling zone, home to dozens of marine mammals and seabirds. Along its shores are thriving kelp and intertidal communities, teeming with fishes and other sea life. Communities of deep-sea coral and sponges scatter the dark seafloor and form habitats for fish and other important marine wildlife. The sanctuary shares 135 miles of coastline with the Makah Tribe, Quileute Tribe, Hoh Tribe, and Quinault Indian Nation, Olympic National Park, the Washington Maritime National Wildlife Refuge Complex, and Washington State Parks. It also offers visitors a wide variety of activities ranging from cultural enrichment to ecosystem exploration. Read on to learn how this sanctuary earned its Olympian moniker.



Makah families were photographed on the beach of Neah Bay in c.1910. Image: Asahel Curtis, “Artwork of Seattle and Western Washington: Edition Deluxe of Photogravures,” courtesy of Wikimedia Commons.

Vast Unknown (to 1994)

Humans, whether they migrated overland on the Bering land bridge or in watercraft along the shoreline of the land bridge, or both, arrived on the Olympic peninsula at least 8,000 years ago.

Sea level fluctuated along what is now Washington's outer coast for tens of thousands of years, settling down to its present level about 2,000 years ago—a mere sliver of geological time. Human inhabitants moved with the sea, setting up camps and settlements, hunting and fishing, telling stories, and creating unique cultures. The distribution of historically known Native American tribes along the coastal Olympic Peninsula includes the Makah Tribe to the northwest and the Quileute and Hoh Tribes, and the Quinault Indian Nation in succession to the south. All of the Northwest tribes are renowned for their expert utilization of locally abundant wood for tools, shelter and watercraft, and for their elaborate decorative and cultural motifs. They were maritime peoples, crafting different kinds of sophisticated watercraft for different purposes, including ocean-going dugout canoes. Coastal tribes were able to voyage for days beyond sight of land to hunt whales and marine mammals.

> *Every time Thunder-bird went to hunt whales the man went along. Then one day they saw a whale and Thunder-bird went and approached the whale. Then he told the man to seize the whale by the back. Then Thunder-bird seized the tail of the whale, but the young man was unable to lift the whale when he seized it. Then Thunder-bird made lightning and lifted the whale and took it home.*
>
> From the Quileute tale "The Man Who Married Thunder-bird's Daughter," collected by Manuel J. Andrade in "Quileute Texts," 1931

The first Europeans to explore the waters of the Pacific Northwest were the Spanish, rumored to have arrived in the 16th century, but historians disagree about whether Greek-born navigator Juan de Fuca ever saw the strait that bears his name. Though Spanish explorers surveyed the region, Spain did not attempt to establish any settlements in the area for two centuries—until Russian, English, and American fur traders began encroaching on their territory in search of otter pelts, a lucrative product in high demand in Chinese markets.

Spain briefly erected two outposts in the late 1700s, which fell to the British after less than a year. For nearly a century, British and American interests jockeyed for dominance. This colonial rivalry resulted in the 49th Parallel Convention, which added Oregon and Washington to the American territories. After Washington became a state in 1853, pressure from American settlers moving into the area led to most of the tribes being moved to coastal reservations. The Makah were relocated under the Treaty of Neah Bay, in 1855; the Hoh, Quileute, and Quinault under the Treaty of Olympia, in 1856. In exchange for moving to the reservations, the tribes reserved certain rights, like fishing, in perpetuity within their usual and accustomed areas. Like other Native American cultures, the tribes saw their populations become decimated by disease, their food species exterminated, and their cultures disrupted as a result of their contacts with Europeans and then Americans.

During the latter half of the 19th century, increased shipping to and from Puget Sound, combined with notoriously bad weather, resulted in more frequent shipwrecks along the Olympic Coast. Ships risked destruction on the many uncharted submerged pinnacles. Many of the ships that wrecked along the Olympic Peninsula coast at this time were wooden sailing vessels. As the regional economy expanded at the turn of the century and communities evolved,

new vessels appeared in the coastal waters. Steam-powered ships brought trade from Pacific Rim countries, while smaller coastal steamers, sail traders, and wooden fishing boats traversed the straits and coastal waters.

As in other places in the nation, modern conservation in the Pacific Northwest began on land, first with the creation of the 1897 Olympic Forest Reserve by President Cleveland, which became Olympic National Forest in 1907. Two years later, President Theodore Roosevelt designated the Mount Olympus National Monument, which became the Olympic National Park in 1938. Its coastal strip was added in 1953, and the Olympic National Wilderness Area was established in 1988.

A ranger gave a sunset naturalist talk in Olympic National Park in c.1960. Image: Jack E. Boucher, courtesy of the National Park Service.

The history of the sanctuary begins in earnest in 1982 when the Eastern Pacific Resource Evaluation Team, a group of contracted experts, was considering sites to recommend to NOAA for its new Site Evaluation List (a pool of sites for future consideration as sanctuaries). The team, naming the site as Western Washington Outer Coast, noted: "...it is one of the most scenic, wild and rugged sections of the Pacific coastline and consequently is an ideal candidate for Marine Sanctuary Status." NOAA agreed and the site was added to the SEL in August 1983.

In 1988, the reauthorization of the National Marine Sanctuaries Act ordered NOAA to issue a notice of designation for the site by June 30, 1990. The language noted its unique and nationally significant flora and fauna, and its proximity to Olympic National Park. NOAA prepared an issue paper describing the site and held four scoping meetings in April 1989 (in Seattle, Aberdeen, Port Angeles, and Forks) to gather information and comments from the public. A designation notice was published in September 1991, proposing a sanctuary of about 3,450 square miles, with draft regulations prohibiting hydrocarbon activities, discharges, seabed alterations, removal or damage of historic resources, taking wildlife, and low overflights. The notice also changed the name of the site to Olympic Coast. Six public meetings were held in November that

year—in Port Angeles, Seattle, Olympia, Aberdeen, Seaview, and Washington, D.C.—along with a four-month long public comment period. After considering the comments and other information gained through formal consultations with federal and state agencies, the sanctuary was designated in 1994 with largely the same regulations but a slightly smaller area of 3,311 square miles.

Epic Protection (1994 to 2008)

When the sanctuary was designated in 1994, a management plan was released as part of the process. Though it contained four action plans (resource protection, research, education, and administration) like other sanctuary management plans of the time, unlike others it also offered four vital objectives right up front: establish relationships with other agencies to carry out a cooperative management strategy; create a sanctuary advisory council; coordinate with Coast Guard to conduct an emergency drill for the sanctuary; and develop a way to manage vessel traffic for the sanctuary. These priorities came to quick fruition in the early years of the sanctuary. By 1995, an advisory council had been established, today with fifteen voting members representing conservation, education, fishing, marine business, research, tourism, and the community at large, working together with government representatives from the four treaty tribes, and non-voting seats for local, state, and federal agencies.

1995 also marked the beginning of one of the sanctuary's most enduring and successful protection measures, the launch of a voluntary Area to be Avoided. The sanctuary worked with the U.S. Coast Guard to request the International Maritime Organization designate the ATBA to move vessels further offshore "to reduce the risk of marine casualty and resulting pollution and damage to the environment of the Olympic Coast National Marine Sanctuary." The ATBA was updated in 2002 and 2012. It now advises vessel operators carrying oil or hazardous materials as cargo or cargo residue, and all ships 400 gross tons and above to maintain a 25-mile buffer from the coast. Since 1998, the ATBA has had a compliance rate of over 95 percent, which the sanctuary attributes to its partnership with the maritime industry and the U.S. and Canadian coast guards.

The sanctuary built its partnerships and protective programs throughout the 1990s and 2000s. Workshops were held in 1998 to train partner agencies and enforcement personnel on marine mammal protection and stranding protocols. In 1999, a marine debris initiative was launched that continues today. The following year, the sanctuary launched a ten-year monitoring program for a recently installed trans-Pacific cable and multiple mapping expeditions to chart the seabed of the sanctuary started in 2002. That same year, "swat teams" were deployed to conduct rapid invasive species assessments at eighteen locations along the coast.

Representative Norm Dicks spoke at the 2004 dedication ceremony of the new sanctuary offices and visitor center in Port Angeles, WA. Image: Sarah Marquis/NOAA, in NOAA Report, August 2004.

In its early years, the sanctuary's headquarters was based at the Federal Building in downtown Port Angeles, Washington, but as its tenth anniversary approached, the sanctuary decided to move to the city waterfront. The sanctuary moved to its current location at the Port Angeles Landing in July 2004, when it opened its new 800-square foot visitor center featuring an information booth, graphics, maps, interactive kiosks, and models of submersibles used by the sanctuary for research. The sanctuary also maintained R/V *Tatoosh*, the only dedicated Olympic Coast-region research vessel. In 2005, the sanctuary provided another unique opportunity in Neah Bay as it coordinated an archaeological survey and field school for college students from numerous universities at Neah Bay to explore the 3,000-year-old archaeological site on the Makah Reservation.

One of the sanctuary's signature management approaches came in 2007 with the foundation of the Intergovernmental Policy Council, which at that time NOAA called "a landmark collaborative opportunity" and one of the first of its kind in the country. Composed of the coastal treaty tribes, State of Washington, and the sanctuary, the council provides a forum for the tribal, state, and federal governments to coordinate activities within the sanctuary. The council continues to be integral to the sanctuary's management today.

2007 also saw the launch of, with seven other partners, another long-term project of the sanctuary, the Washington Coastal Cleanup Alliance. The alliance was formed to increase public awareness of the threats and causes of marine debris and to expand beach cleanup events from past years. Now known as the Washington CoastSavers, the group continues its work, hosting cleanups multiple times a year and initiating an adopt-a-beach program in 2017.

Bold Developments (2008 to 2017)

As the sanctuary matured past its first decade, it became clear that its management plan was no longer effective in outlining conservation priorities and programs, and the decision was made to move forward on a complete overhaul. A condition report—a prelude to management plan review—was prepared and released in 2008, finding that overall, sanctuary resources appeared to be in good to fair condition. Water quality parameters were found to be in good condition, likely due to isolation from major urban or industrial complexes. The quality of seabed habitats was degraded after years of bottom contact fishing gear and wildlife populations were significantly altered with respect to historical values. Gaps in knowledge about understanding of fishery resources, levels of exploitation, and marine ecosystem function were identified as research priorities.

With the condition report having set the stage, NOAA issued a notice for the scoping process for the management plan review in September 2008, which lasted through the autumn. Seven public meetings were held in Seattle and Olympia, and in communities along the outer coast. Afterward, the sanctuary worked with its advisory council and the Intergovernmental Policy Council to consider the comments received from the public and to characterize and prioritize issues to be addressed in the management plan.

The advisory council formed working groups and held workshops involving more than a hundred subject matter experts and interested members of the public to develop specific strategies and activities. The full advisory council reviewed these suggested strategies and activities, and they provided their recommendations to the sanctuary for what should be included in a new management plan.

Hardy surfers braved gray weather and cold water to enjoy the waves of the sanctuary in 2015. Image: Kate Thompson/NOAA.

The sanctuary adopted the recommended strategies and activities from the advisory council, alongside activities it had developed internally based on agency priorities and shaped them into twenty action plans grouped under five main action areas: collaborative and coordinated management; collaborative research and monitoring; improvement in ocean literacy; natural resource conservation; and understanding the cultural, historical, and socioeconomic significance of the sanctuary. The sanctuary also developed changes to the regulations to implement several activities identified in the draft management plan.

The draft management plan and proposed rule underwent a several-month-long public review in early 2011, with two public hearings in Port Angeles and Forks. Afterward, the sanctuary considered the input it had received from the community and prepared a final management plan and final regulations, which included a prohibition on discharges from cruise ships and other, more minor technical clarifications and corrections. The final management plan was released in November 2011.

> *It's just finding a respect for water, the surroundings, the wildlife, there's so many elements out there. You can get really lost in it… Keeping all those things protected would allow them to be used by future generations.*
>
> Todd Fischer, on surfing in Olympic Coast National Marine Sanctuary, *Stories from the Blue*, 2018

With the management plan review process behind it, the sanctuary was able to pivot to address a unique resource challenge when debris from the March 2011 tsunami in Japan (which killed more than 20,000 people and caused an economic loss of more than $235 billion) began turning up on shores in the Pacific Northwest. One of the largest pieces, a floating concrete dock weighing an estimated 185 tons washed ashore in December 2012 in a remote and wilderness-designated beach part of both the sanctuary and Olympic National Park. After consulting the Japanese government, the agency confirmed the dock had washed to sea from the Aomori Prefecture. In March 2013, both the dock and invasive species were successfully removed in a complicated and expensive operation involving federal and state agencies, as well as a contract firm specializing in marine salvage operations.

In happier happenings in 2013, new Whale Trail signs—signifying areas where the public may view marine mammals from shore—were installed along the coast and on Washington state ferries. A partnership of the sanctuary, Olympic National Park, and The Whale Trail, the signs were projected to reach 22 million people each year. The sanctuary continued to diversify its education efforts including debuting Big Mama, a life-size, inflatable humpback whale, in March 2016 at the 30th Annual Beachcombers' Fun Fair. The inflatable whale was modeled after a large female from the North Pacific humpback whale population who travels through and feeds in the sanctuary each year on her way to Alaska. Participants of the fair took guided tours inside Big Mama to learn about whale anatomy and the need to protect whales and other wildlife.

In 2013, the sanctuary also embarked on a long-term effort, which continues today, to identify and address the effects of climate change on its natural and cultural resources. In April 2013, a report prepared in partnership with Washington Sea Grant was released regarding the potential

effects of climate change on species and habitats. The report also proposed how the sanctuary might begin to address these threats which could include rising seas; extreme weather events such as high winds, heavy waves, and catastrophic storms; coastal erosion from those events; an increase in ocean acidity and water temperature; and more extreme weather patterns. Based on the report, the sanctuary began working with partners to establish itself as a sentinel site for ocean acidification, developing early warning capabilities regarding the effects of ocean acidification in Olympic Coast and inland waters. The collaborative group continues to share information on conditions of and threats to natural and cultural resources as they build out the sentinel site capacity and function.

In 2016, the sanctuary joined other sites in the system who had partnered with Marine Advanced Technology and Education (MATE) to host workshops and competitions in which mentored teams of high school students build and operate remotely operated vehicles (ROVs). The project is designed to build skills in science, technology, engineering, and math, while encouraging interest in marine science and ocean exploration careers. A workshop held in February 2016 focused on sharing mission objectives and building and operating the ROVs that would be used in competition. In May 2017, the sanctuary co-hosted the regional competition, where thirteen student teams of 60 students from schools throughout the Olympic Peninsula participated. During the competition, students demonstrated their year-long efforts in designing, developing, and piloting their underwater robots. Students were required to pass multiple technical and safety inspections, deliver an oral presentation on their engineering design, and provide a marketing display to entice potential partners or clients. The final challenge was for students to complete missions in the pool, which emulated real world situations where ROVs might be used.

Students from the Quileute Tribal School pilot remotely operated vehicles that they built themselves with help from the sanctuary and the University of Washington School of Oceanography in 2016. Image: NOAA.

Cosmic Heights and Grand Depths (2017 and ongoing)

The sanctuary progressed into its fourth decade reaching new heights (and depths). In a real-world application of the principles being taught at the ROV workshops and competitions, in 2017, E/V *Nautilus*, the exploration vessel of the Ocean Exploration Trust, explored three minimally explored submarine canyons of the sanctuary, as well as conducted an archaeological survey on an important WWII era submarine, USS *Bugara*. Via telepresence, *Nautilus* broadcasted from the bottom of the sea to viewers throughout the world.

The following year, the sanctuary had an unprecedented opportunity to go looking for a star. The largest meteorite to strike the U.S. in decades fell into the sanctuary in spring 2018. It broke into pieces before entering the water west of Taholah, Washington. Scientists from NOAA,

NASA, and Ocean Exploration Trust aboard E/V *Nautilus* mapped debris on the seafloor and recovered rock fragments. The fragments proved inconclusive but a second expedition in 2019 was more successful, recovering fragments in the first known recovery of a meteorite from the ocean. Thousands witnessed the live recovery operations and millions more were reached by media coverage of the expedition.

The excitement of unexplored seas and meteorite recovery is one aspect of managing a special marine place. But to match every newly discovered species and newly enlightened student is a host of mundane tasks that provide the backbone to the protective efforts of the sanctuary. A new condition report was released in 2019, which found that while most habitats are in good conditions with stable or improving trends, the greatest challenges are intractable issues like climate change and related conditions of marine heatwaves, harmful algal blooms, and ocean acidification. As the 2020s begin, the sanctuary is gearing up for its review of its management programs and regulations to chart a path forward to address those issues. As complicated and intense as such efforts are, they help guarantee that the grandchildren of those who enjoy the sanctuary today will enjoy it in their turn.

Tufted puffins in the sanctuary. Image: Mary Sue Brancato/NOAA.

Origins of the Sanctuary's Name

The sanctuary takes its name from the Olympic Mountains and Olympic Peninsula place names used on nearby land. The Olympic Mountains were named by Englishman John Meares in 1774 after Mount Olympus, highest mountain in Greece and the mythological home of the Greek Pantheon. The moniker subsequently was used to name Olympic National Park and its forerunners which now enclose most of the mountain range. The original Native American names for the range might have been S'ngazanelf or Sun-a-do, the latter from the Duwamish Tribe.

Sanctuary Superintendents

- Todd Jacobs, 1994 to 1998
- Carol Bernthal, 1998 to 2021
- Kevin Grant, 2022 to present

Chapter 20

Thunder Bay National Marine Sanctuary

Chapter 20
Thunder Bay National Marine Sanctuary

History Preserved

Thunder Bay National Marine Sanctuary is located in the Great Lakes off the coast of northeastern Michigan. Lake Huron's unpredictable weather—murky fog banks and sudden gales—coupled with rocky shoals helped Thunder Bay earn the unfortunate nickname of "Shipwreck Alley." During the Great Lakes' 200-year shipping history, scores of vessels ended their careers on the lake floor in the area. However, the known wrecks are only some of the total wreckages that have occurred; many remain undiscovered. These vessels, preserved in time by the fresh, cold waters of Lake Huron, still have stories to tell of Great Lakes maritime history and commerce, from the earliest explorations to westward expansion in the 1800s to modern day lake trade. Steam on to understand why this sanctuary is such a success story.

Great Lake (to 2000)

Humans are theorized to have reached the land areas adjacent to Thunder Bay about 5,000 years ago, at the earliest. Though water levels were much lower than today, Indigenous peoples still hunted and camped along the shorelines and near river mouths, drawn to the abundant natural resources including fresh water, berries, nuts, game, birds, fish, and shellfish. Large-scale fishing and lake travel began about 3,000 years before present when mariners navigated small open boats, particularly dugout and bark canoes, onto lake waters. These craft, the beginning of Michigan’s maritime history, were vectors for trade, communication, hunting, fishing, and food gathering.

For as long as humans have plied the waters of Thunder Bay, they have been wary of its temper. Hundreds of shale discs, many of them incised with Algonquin symbols, have been found by archaeologists. Among those symbols is Me-she-pe-shiw, a mythical panther that lived beneath the waters of Lake Huron. He was believed to cause storms and high, deadly waves by thrashing his long tail through the water. Sacrifices of dogs or tobacco were offered to appease Me-she-pe-shiw in the hopes he would remain calm and still his tail.

> *They heard such thunder as they never knew before, and then something in the shape of a human being came down with lightning; then they ran to the spot where he sat, and it was their long-lost brother, who had been gone seven years. He had been in the Thunder-world. He told them how he had been playing ball with the Thunder-boys; yes, how he had been turned into a real Thunder himself.*
>
> Algonquin legend collected by Charles G. Leland, 1884

The first Europeans to arrive in Michigan were the French, when Jean Nicolet came through the Straits of Mackinac by canoe along the Ottawa and French Rivers in 1634. In 1669, Adrien Joliet was likely the first European to see Thunder Bay during his paddle along the eastern shore of Lake Huron, but the first European to suffer the wrath of Thunder Bay came ten years later when René-Robert Cavelier La Salle and the crew of *Griffon* sailed into a violent storm. Though *Griffon* survived that storm, the vessel was lost a month later in northern Lake Michigan, the first of thousands to go down in the Great Lakes. Its location remains unknown.

A 1778 map showed the Great Lakes as rendered by John Lodge. Image courtesy of the New York Public Library.

As in other parts of the country, missionaries, traders, and adventurers followed the first explorers into new territory. Considered French territory, tensions rose when English explorers ventured into the Great Lakes region. Both nations rushed to lay claim to and fortify strategic locations throughout the region. The Straits of Mackinac, only 90 miles northwest of Thunder Bay, saw extensive colonial activity. Over a century of squabbling came to end with the signing of the Jay Treaty in 1796 at the close of the American Revolution, when all territories were ceded to the newly established United States. The first vessels lost in the area that would become the sanctuary came after the founding of the United States; the oldest known shipwreck is *New Orleans*, a wooden paddle steamer built in 1838, that ran aground a reef in 1849.

For a newly formed nation, the Great Lakes provided a natural corridor for the exploration, colonization, and development of both the United States and Canada, connecting the Atlantic Ocean with the heartland of North America. Sea-lanes became the primary routes of trade long before a system of roads and railroads were established. Abundant natural resources, inexpensive land, and a safe border encouraged the development of lakefront communities early in the 19th century. Transient fishermen led the way in the 1830s for traders and lumber interests to establish the town of Alpena in about 1840. The townsfolk used the Thunder Bay

River and Lake Huron to transport raw materials and finished products, and they altered the coastal landscape to accommodate their trade.

The first lighthouse on Thunder Bay Island was completed in 1832, and the lighthouse on Presque Isle was built in 1840. They were part of an extensive maritime cultural landscape that saw thousands of schooners, steamers, and other vessels carrying immigrants and finished goods westward, and returning to American industrial centers like Detroit, Toledo, Cleveland, and Buffalo with raw materials including copper, iron ore, coal, and grains. Fish, then lumber, and ultimately cement were extracted, processed, and shipped from Alpena. Lighthouses and lifesaving stations were established on Middle and Thunder Bay islands, Sturgeon Point, and Presque Isle to protect and rescue mariners in distress. Despite these measures, many ships were lost to rough seas, fog, ice, collisions, or intentional abandonment in the passing centuries.

> *The systems of waterways which pour their floods from the south and west into the northwestern extremity of Lake Huron and those which gather from Presque Isle county in the north, Montmorency in the west and Alcona in the south, push their way through their thousand islands in Alpena county and make the grand exit into Thunder Bay.*
>
> Perry F. Powers, "A History of Northern Michigan and its People," 1912

In 1980, the state of Michigan, in recognition of the important maritime heritage of the Great Lakes, created its Underwater Preserve System and in 1981 named its first Underwater Preserve: Thunder Bay. The following year, the site was recommended for placement on the Site Evaluation List by the Great Lakes Resource Evaluation Team, which had been contracted by the National Marine Sanctuary Program to recommend sites. The team noted Thunder Bay had generated more local support than any other site in the Great Lakes region. Its supporters included the Alpena City Council, Alpena County Planning Commission, Alpena Chamber of Commerce, Thunder Bay River Watershed Council, the Michigan Department of Natural Resources, and Michigan State Travel Bureau. In their report to NOAA, the Resource Evaluation Team wrote that it was "impressed by the amount of enthusiastic local support for the proposal and believed sanctuary status would help preserve the numerous shipwrecks in the area from treasure hunters." The site was included for both its natural and cultural resources. The report to NOAA contained the following rationale: "The underwater limestone sinkhole, the large concentration of historical shipwrecks, and the proximity of the idyllic Michigan Islands National Wildlife Refuge establish this area as a particularly valuable historical, educational, and recreational resource." NOAA agreed, adding the site to the final SEL in 1983.

Thunder Bay remained on the SEL until 1991 when NOAA decided to start the designation process. In July that year, the site was made an active candidate, with a study area of 400 square miles. In addition to a several-month-long public scoping period, two public meetings were held in September. After the scoping process had collected information and ideas from the general public, the next several years were focused on meetings with informal working groups to bring together local, state, federal, tribal governments, organizations, and businesses to discuss what a sanctuary should look like. At that point, it had become clear that most support was for a

sanctuary focused on cultural resources, with opposition from fishing and property rights advocates for a sanctuary that might regulate the use of natural resources.

In 1994, the Thunder Bay Core Group was formed of agency representatives to review and assess management alternatives for a sanctuary. By mid-1995, the Core Group had narrowed the focus of the sanctuary to underwater cultural resources, and NOAA and the state of Michigan focused on preparing a draft management plan and proposed regulations. In June 1997, NOAA proposed a sanctuary with three boundary alternatives, with the preferred alternative having 808 square miles with regulations prohibiting the damage and disturbance of underwater cultural resources and lake bottom alteration (associated with an underwater cultural resource). The proposal also had a draft management plan focused on resource protection, education, research, and sanctuary administration. Another public comment period and three public meetings followed, some supporting the economic development and tourism opportunities but others questioning the need for a federal presence in Michigan state waters. The opposition came to a head in November 1997 with a nonbinding referendum, held by the City of Alpena, where almost 1,800 residents voted against having a sanctuary, and 770 residents supported it. Working with the state of Michigan and the local community, NOAA decided to continue the designation process in hopes of addressing concerns about the proposal.

A sanctuary advisory council, formed in 1997, was important in building support for this sanctuary proposal. Today the council remains an integral part of the sanctuary's culture and management. Fifteen voting members, representing local jurisdictions and tourism, business, fishing, diving, education, and community interests, provide advice to the sanctuary superintendent; an additional four non-voting members represent the state, the U.S. Coast Guard, the Chippewa Ottawa Resource Authority, and the sanctuary's friends group, which was established in 2010 to help support education and outreach programs.

In 2000, after several years of negotiating with the state and building local community support, NOAA designated Thunder Bay National Marine Sanctuary. At 448 square miles, it was slightly more than half than originally proposed, at the request of the state of Michigan. The regulations were the same as those proposed, with the addition of banning the use of grappling hooks or other anchoring devices on shipwrecks marked with a mooring buoy. The regulations also established a Joint Management Committee between NOAA and Michigan to provide oversight responsibility for site management.

Great Protection (2000 to 2014)

From the outset, the sanctuary set out to become a valued member of the greater Alpena community. In one of its first actions, in 2001, a partnership with the Marine Advanced Technology (MATE) Center brought a national ROV (remotely operated vehicle) building competition for area high school students. The competition helps develop technical and other job skills in the hopes that some of the students will pursue marine technology careers. The MATE partnership continues to this day, with the sanctuary hosting the 2014 international competition, which has expanded to other national marine sanctuaries around the country.

In 2003, the sanctuary facilitated the donation of the Thunder Bay Sanctuary Research Collection to the Alpena County Library. Though the initial donation was a collection amassed by historian C. Patrick Labadie and his wife, other collectors have since added to the collection. A unique maritime history resource, the collection today is composed of 80,000 ship photographs, more than 1,000 published works, 56 linear feet of vertical files, 40 linear feet of periodicals, and hundreds of drawings, blueprints, nautical charts, and ephemera. Dozens of volunteers and grants of almost $400,000 have since then digitized and helped make the collection more accessible to the public. In a different kind of donation, the sanctuary provided funds to assist in the purchase of hyperbaric chambers in 2007 for Alpena Regional Medical Center, to make the area safer for divers coming to enjoy the sanctuary's shipwrecks.

The dedication ceremony for the Great Lakes Maritime Heritage Center in 2005 drew local and NOAA dignitaries. Image: Adam Jurkow/STC Images, NOAA Report, November 2005.

2005 was a banner year for the sanctuary, seeing major strides in its multiple roles as community member, science organization, and educator. The dedication of the Gold LEED-certified Great Lakes Maritime Heritage Center brought an outstanding interpretive and research venue to Alpena. The 20,000-square-foot visitor center houses a 93-seat theater, 9,000-square-foot exhibit area, distance learning equipment, artifact conservation lab, viewable artifact storage, education and research facilities, dockage for research vessels and visiting tall ships, and the sanctuary's administrative offices. In 2008, the "Shipwreck Century" exhibit opened and in 2013, NOAA's Science on a Sphere theater was added to the Center, featuring a global display system that helps illustrate Earth system science. The Center's dive tank was retrofitted in 2018 and since then has been utilized by Michigan State Police for their Marine Services team training and for cold water training classes. Close to 100,000 visitors come to the center each year.

Scuba diving archaeologists explore these sunken relics to learn about ship architecture and construction. From wooden schooners to sidewheel

> *steamers to modern freighters, the shipwrecks of Thunder Bay represent a cross-section of Great Lakes maritime history and they are open to anyone that is scuba certified.*
>
> Brett Israel, LiveScience, 2010

A substantial investment in science also came in 2005. In partnership with NOAA's Great Lakes Environmental Research Lab, the 41-foot research vessel *Huron Explorer*—once a Coast Guard utility boat before being retrofitted for its new research role—began supporting research expeditions to study the shipwrecks of the sanctuary *in situ*. What made *Huron Explorer* even more special was that as part of its retrofit, it was transformed into an environmentally friendly craft. Perhaps the first vessel in the nation to use all-natural oil-based fuel and lubricants, *Huron Explorer* operated without any petroleum products and served as a working demonstration of the merits of bio-products in the marine environment until she was replaced by the 50-foot research vessel *Storm* in 2010. An Integrated Coastal Observing System buoy—providing real-time meteorological data—was placed at the shipwreck *Montana*, nine miles from shore.

Also in 2005, the sanctuary, in partnership with NOAA's Office of Ocean Exploration, conducted an expedition aimed at documenting deepwater shipwrecks within the sanctuary. The two-week project focused primarily on two sites: an unidentified two-masted schooner located in 2001 and the wooden passenger steamer *Pewabic*, which sank in 1865. Because both wrecks lie in 160 feet of water, mixed gas diving techniques were necessary for the research team as they took the photos that would later be used to create detailed, high-resolution photomosaics of both wrecks. The dramatic visual products from the project were both added as exhibits in the Great Lakes Maritime Heritage Center so visitors can experience these wrecks for themselves.

In addition to finding ways to share the sanctuary's shipwrecks with the public, the sanctuary also supported university field schools in 2005 to help prepare future maritime historians and archaeologists. In June, seven graduate students from East Carolina University's Program in Maritime Studies spent two weeks documenting shipwreck remains on North Point Reef. The following month, the sanctuary collaborated on a 10-day field school for graduate students from the University of Rhode Island's Institute for Archaeological Oceanography. In cooperation with the PAST Foundation, the students conducted an archaeological field investigation of the Middle Island Life Saving Station.

In 2011, the sanctuary provided a different kind of field experience to five high school students from Saginaw, Michigan. As part of Project Shiphunt, a partnership with Sony and the Intel Corp, these students accompanied a team of scientists and historians from NOAA. They conducted a full-fledged research mission as they searched the deep waters of northeastern Lake Huron. The team located the 138-foot schooner *M.F. Merrick*, which sank in 1889, and the steel freighter *Etruria*, which had been lost in 1905. Project Shiphunt was chronicled in a documentary released in 2011.

By 2006, it was clear the sanctuary had become a valued member of the greater Alpena community. As it began the public scoping process in preparation for an update to its 2000 management plan, it received a number of comments expressing interest in expanding the

sanctuary's boundaries to include waters adjacent to Alcona County (south of Alpena Country) and Presque Isle Country (north of Alpena County), including from local governments and NGOs. The sanctuary advisory council formed a working group to further examine the idea and, in 2007, it passed a resolution supporting the working group's recommended expansion.

When the new draft management plan was released in February 2009, it contained four action plans: resource protection, education and outreach, research, and sanctuary operations and administration. NOAA held four public meetings; a total of 61 comments were received on the draft management plan. When NOAA released the final plan in August that year, it included a strategy in in the resource protection action plan a strategy to "evaluate and assess a proposed expansion of the sanctuary to a 3,662-square-mile area from Alcona County to Presque Isle County, east to the international border with Canada to protect, manage, and interpret additional shipwrecks and other potential maritime heritage resources." More than a dozen years after Alpena had voted against having a sanctuary, its neighbors were now supporting a large expansion. In another show of community confidence in the sanctuary, local leaders formed the Friends of Thunder Bay National Marine Sanctuary, a nonprofit group to support the operations of the sanctuary and educate residents and visitors about the maritime heritage of the Great Lakes. Today the friends group operates Alpena Shipwreck Tours and annually sponsors such events as the Cardboard Boat Regatta and the Battle of the Paddles.

Participants in the cardboard boat regatta in 2011 had the community cheering them on. Image: NOAA.

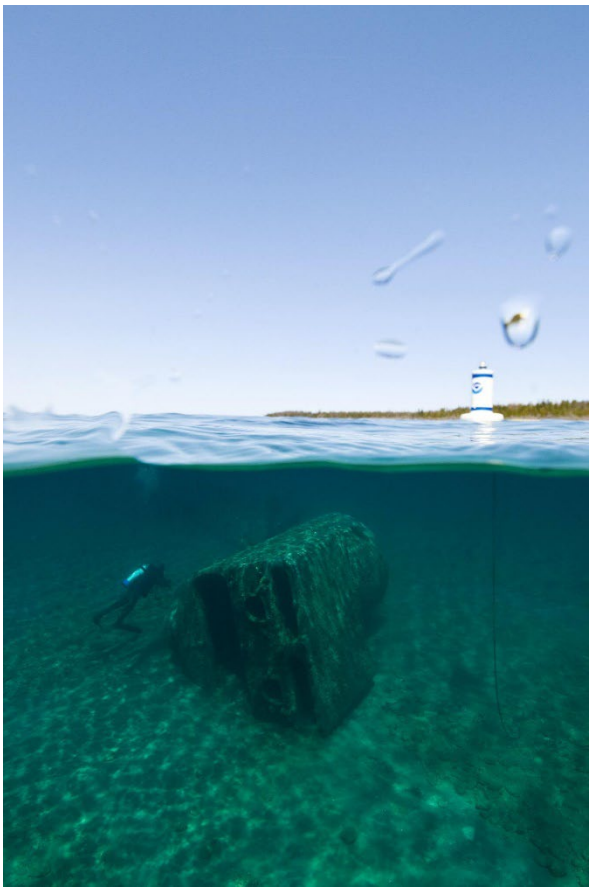
In 2012, the sanctuary launched the Thunder Bay International Film Festival. A partnership with the Friends of Thunder Bay National Marine Sanctuary, each year the festival brings independent films about the Great Lakes and the ocean from all over the world. The festival entertains, educates, and inspires audiences in Alpena and surrounding communities. Each year, a student film competition, centered around an annual theme, highlights the work of emerging filmmakers.

In April 2012, the sanctuary also formally kicked off the expansion process, officially issuing a notice of intent to review the boundaries of the sanctuary. Three public meetings were held, at which most of the comments were supportive of the expansion proposal. In early 2013, the sanctuary's first condition report was released, finding the condition of the sanctuary's maritime archaeological resources, both individually and as a collection, to be good. Management actions such as the sanctuary's mooring buoy program, avocational archaeological training for divers, and education and outreach programs were found to help in limiting human impacts on sanctuary resources, while increased research was producing a better understanding of the state of sanctuary resources and the pressures on them, as well as establishing a baseline for future monitoring.

By June 2013 an official expansion proposal was made, enlarging the sanctuary from 448 to 4,300 square miles and applying the sanctuary's existing regulations in the new waters. During the process, requests were received from the Governor, other officials, and commercial entities asking that three ports (Rogers City, Presque Isle, and Alpena) be excluded from the boundary expansion, to allow ballasting operations, and make several technical clarifications, which NOAA agreed to. In September 2014, the sanctuary was officially expanded.

Great Growth (2014 and ongoing)

With a successful expansion behind it, the sanctuary continued fulfilling its role as a valued community member. In 2014, a wide range of research aimed at generating baseline data on shipwrecks and testing new technologies was conducted by the sanctuary and its partner scientists. Researchers generated updated side scan sonar imagery of many shipwreck sites and conducted a two-week technical diving mission to monitor wrecks and explore new sites. In a first for the sanctuary, working with 2G Robotics, the sanctuary used laser-scanning technology to obtain a highly accurate model of the stern of *Monohansett*. The tripod-mounted laser scanner allows sanctuary archaeologists to document complex areas of shipwreck sites that would be otherwise difficult to capture in detail. Two new shipwrecks were discovered in the expanded waters of the sanctuary in 2017, the 202-foot wooden steamer *Ohio* sunk in1894 and the 267-foot steel-hulled steamer *Choctaw* which went down in 1915.



A mooring buoy marked the location of Monohansett in 2009, also helping protect the wreck from anchor damage. Image: NOAA.

In 2017, the sanctuary also built on its strong foundation as a hub for applied marine technology. Building upon its partnership with Alpena Community College's Program in Marine Technology, the sanctuary created a "maritime makerspace" which is utilized by K-12 teachers and students, university partners, private companies, and international science organizations.

In another first for the sanctuary, in 2018, the sanctuary along with partners, volunteers, and students conducted multibeam and side-scan-sonar surveys and dove to identify targets to locate military aircraft lost over what are now sanctuary waters, specifically from the Tuskegee airmen, the first Black military aviators. During World War II, both Tuskegee and Free French fighter pilots conducted training missions over Lake Huron. Unfortunately, as with many similar training programs during the war, dozens of accidents occurred resulting in the loss of both aircraft and crewmen. Two Tuskegee airplanes were discovered near the sanctuary and have since been documented by members of the National Association of Black Scuba Divers and Diving with a Purpose working with sanctuary divers and scientists.

In 2019, the sanctuary began exploring options to expand and enhance the Great Lakes Maritime Heritage Trail. Originally established in 2007 by the sanctuary with local and state partners, the trail fosters an appreciation for the maritime heritage of the state. The sanctuary has established segments of the trail along the Thunder Bay River, which features a boardwalk

and a pedestrian bridge, historically themed riverfront park, historic docks, and outdoor interpretive signage. Long-range plans include expanding the trail to Lake Huron shoreline and creating a park next door to the Great Lakes Maritime Heritage Center with a playground area, outdoor pavilions, additional parking areas, sports courts, and a festival space including an amphitheater. Funding obtained from the state to move ahead on the project was suspended in 2020 when the economic downturn due to the Covid-19 pandemic interrupted public financing.

Included in the sanctuary's environmental impact statement for the expansion is the statement: "[T]he shipwrecks identified in this document reflect the movement, bravery, tenacity and innovative spirit of generations of maritime people." It is an important reminder that as much as its focus is on the past, the sanctuary is also intent on investing in the future of Alpena and its other gateway communities. In its long history with MATE and investments in developing the region as a marine technology hub, in its partnerships with local community institutions like public libraries and community theaters, and in its innovations like adding new features to the Great Lakes Maritime Heritage Center and establishing the Great Lakes Maritime Heritage Trail, the sanctuary is doing just that.

A diver hovered over the wreck of *New Orleans* in 2016. Image: David J. Ruck/NOAA.

Origins of the Sanctuary's Name

The sanctuary takes its name from the bay that is the center of the sanctuary. Thunder Bay traces back to the old French name *L'anse du Tunnere* that appeared on French maps as early as 1688, which may reflect a similar meaning Native American name for the area. According to oral tradition, while canoeing across Thunder Bay, the daughter of an Ottawa chief and her suitor were killed by a jealous rival, much to the dislike of the Manitou, or Great Spirit. A roar of thunder and flash of lightning followed and afterward the area was known as the Bay of Thunder.

Sanctuary Superintendents

- Ellen Brody, 2000 to 2002
- Jeff Gray, 2002 to present

Chapter 21

Papahānaumokuākea Marine National Monument

Chapter 21
Papahānaumokuākea Marine National Monument

ʻĀina Momona - A Place of Abundance

Papahānaumokuākea Marine National Monument is one of the largest conservation areas in the world, protecting over 580,000 square miles of Pacific Ocean.[4] The extensive coral reefs found in Papahānaumokuākea—the rainforests of the sea—are home to thousands of species, many of them endemic to the Hawaiian Archipelago. Many of the islands and shallow-water environments are important habitats for rare species such as the threatened green turtle and the endangered Hawaiian monk seal. On less than six square miles of land, over 14 million seabirds representing 22 species breed and nest. Land areas also provide a home for four species of bird found nowhere else in the world, including the world's most endangered duck, the Laysan duck. Read on to find out what great protections are at work in the monument.

Early Conservation (to 2000)

Ancestral Polynesians were the first to discover the islands that now make up the state of Hawaiʻi, arriving from other Pacific islands in successive waves of settlement starting in about 300 CE. The islands were part of the grand voyaging tradition of the Polynesian cultures, moving from Southeast Asia into and across the Pacific basin, using the natural world of waves, currents, stars, and other signs to navigate. The ocean played a fundamental role in the lives of Native Hawaiians, providing the resources they needed to survive physically and spiritually. Because of their dependence on this remote archipelago of islands and ocean, Native Hawaiians developed specialized skills and resource management methods.

[4] ʻĀina Momona means "Fat or Fertile Land" but in Hawaiian thought ʻĀina (land) is literally "that which feeds" which is not just land although it is the most commonly used translation. And feeding more than just physically.

Nihoa as seen from aboard the Polynesian voyaging canoe *Hikianalia*. Image: Brad Ka‘aleleo Wong/Office of Hawaiian Affairs.

The Northwestern Hawaiian Islands are sacred, the source of all life and the place to which spirits return after death. Oral and written histories, genealogies, songs, dance, and cultural resources tell the story of the islands, in heroes and gods, seafaring ancestors, sacred places and sacred beings, the origin of life and what happens when its time is done. The Kumulipo, the Hawaiian creation chant, describes the Northwestern Hawaiian Islands as pō, a place of darkness reserved for gods and spirits and the Main Hawaiian Islands as *ao*, a place of light for the living.

The source of deepest darkness.
Of the depth of darkness, of the depth of darkness,
Of the darkness of the sun, in the depth of night,
It is night,
So was night born.
Kumulipo was born in the night, a male.
Poele was born in the night, a female.
A coral insect was born, from which was born perforated coral.

"The Kumulipo", the Hawaiian creation chant, translated by Queen Liliuokalani, 1897

Both Nihoa and Mokumanamana, culturally and historically significant, are listed on the National and State Registers of Historic Places and are protected by the U.S. Fish and Wildlife Service. Together, the islands became a center of power, a place of ritual and rites of passage for ancient chiefs. Nihoa holds at least 89 cultural sites with ceremonial, residential, and agricultural features. On Mokumanamana, which is considered to be an axis point between the worlds of the supernatural and the mortal, there are 52 cultural sites, including ceremonial and temporary habitation features.

European and American explorers conducted surveys into the Northwestern Hawaiian Islands in the 18th and 19th centuries. Economic interests drove others there, as whalers sought new hunting grounds and guano traders, new sources of guano and bird feathers. Many of the islands gained their non-Hawaiian names from these activities, which also left behind traces on and around the islands and the seabed. For example, Pearl and Hermes Reef is named for the twin wrecks of the British whalers *Pearl* and *Hermes* in 1822 and Midway was originally sighted by the whaler *Oscar* in 1839. Guano extraction and support facilities were developed on Laysan and other islands, and the industry drove an increase of vessel traffic in the area as ships carried in supplies and workers, and departed with their loads of guano. Commercial fishing in the waters surrounding the islands targeted species such as sharks, tuna, lobster, sea cucumbers, and sea turtles. One consequence of the increased visitation and vessel traffic in this poorly charted region was the increase in the number of shipwrecks; at least ten whalers are known to be sunk in the islands, for example, and a salvage business sprang up around them, immortalized by Robert Louis Stevenson's 1892 story *The Wrecker*.

I climbed into the rigging, stood on the board, and eagerly scanned that ring of coral reef and bursting breaker, and the blue lagoon they enclosed…over these there hovered, shattered, screamed, and clanged, millions of twinkling sea-birds; white and black; the black by far the largest. With singular scintillation, this vortex of winged life swayed to and fro in the strong sunshine, whirled continually through itself, and would now and again burst asunder and scatter as wide as the lagoon.

"The Wrecker" by Robert Louis Stevenson, 1892

Midway Atoll, which is made up of the three small Sand, Eastern, and Spit islands, was an exception to the norm of little knowledge about the Northwestern Hawaiian Islands, due to military interest in the atoll since the mid-1860s. Its large harbor and relatively ample land led to the U.S. Navy taking formal possession in 1867. In 1903, the transpacific submarine cable was completed via Honolulu, Midway, and Guam. At Midway, the establishment of the cable station forever altered Sand Island. Tons of imported soil and numerous introduced plants significantly altered the landscape. Midway would later play a pivotal role in World War II.

As foreigners encroached on their waters and lands, Hawaiian aliʻi (nobles) mounted expeditions to assert their continued sovereignty of and interest throughout the archipelago. Queen Kaʻahumanu conducted an expedition to Nihoa in 1822, which was later visited in 1857 by King Kamehameha IV (Alexander Liholiho). The following year, the king voyaged again to Nihoa. Though he later returned to Honolulu, the king ordered Captain John Paty to continue to distant islands. Captain Paty proceeded to Mokumanamana, Gardner, Laysan, Lisianski, and Pearl and Hermes on *Manuokawai*. In 1885, Princess (later Queen) Liliʻuokalani visited Nihoa on the ship *Iwalani*.

By the early 1890s, European and American activity in the main islands had grown into a full-scale maritime economy, with Honolulu an important provisioning and trading port and the islands a valuable strategic location in the burgeoning activity of the Pacific basin. In 1893, Queen Liliʻuokalani was overthrown by the self-proclaimed provisional government, driven primarily by the business and other interests of American and European residents. Following the coup, Hawaiʻi came under the control of American commercial interests; official annexation by the U.S. came in 1898, and statehood arrived in 1959. An Apology Bill signed by President Clinton in 1993 acknowledged the wrongful role of the United States and its officers in the overthrow of the Kingdom of Hawaiʻi. The bill “apologizes to Native Hawaiians on behalf of the people of the United States” for the unlawful overthrow.

Birds nesting on Laysan Island were photographed in 1902. Image: Alexander Wetmore, courtesy of the Biodiversity Heritage Library.

The increased presence at Midway and other islands had one unexpected benefit: it led to the first modern conservation effort in the northwestern region. Illegal poaching of seabirds for their feathers and eggs in the remote archipelago led President Theodore Roosevelt to bring Midway under the control of the Navy in 1903; he followed that order in 1909 by creating the Hawaiian Islands Bird Reservation around islands from Nihoa to Kure Atoll. In 1940, President Franklin Delano Roosevelt changed the name of the protected area to Hawaiian Islands National Wildlife Refuge and broadened it to protect all wildlife.

World War II soon interrupted this burgeoning conservation movement. By 1940, the construction began of the naval air facility at Midway, which became a vital center for submarine, surface fleet, and aviation operations. This strategic area became a target for enemy forces and in June 1942, the Japanese Imperial Navy attempted an unsuccessful invasion of Midway Atoll. The battle for Midway proved a decisive U.S. victory, turning the course of World War II in the Pacific. Midway Atoll was designated a National Memorial to the Battle of Midway in 2000, ensuring those who fought and died in this battle on both sides will always be remembered for their sacrifices.

A naval presence was maintained on Midway after the war; its duties included protecting wildlife. but in 1988, the stewardship of Midway was reassigned from the Navy to the U.S. Fish and Wildlife Service and it became an overlay National Wildlife Refuge. In 1996, all management responsibility for Midway was transferred to the Service. After years of occupation by the US Coast Guard, Kure Atoll was turned back to the state of Hawai‘i, which designated

Kure as a State Seabird Sanctuary in 1993. But an even greater conservation measure would soon eclipse these accomplishments.

A New Age of Conservation (2000 to 2016)

On December 4, 2000, President Clinton spoke before an invited audience of governmental officials, Native Hawaiians who had advocated for this protection, and members of the ocean community at the National Geographic headquarters. The president announced what was then the largest conservation area on the planet: "Today I am proud to protect America's greatest unspoiled reefs by creating the single largest nature preserve ever established in the United States, the Northwestern Hawaiian Islands Coral Reef [Ecosystem] Reserve." Using his authority under the National Marine Sanctuaries Act, he signed Executive Order 13178, which created the reserve. It ordered the co-managing agencies—NOAA, the U.S. Fish and Wildlife Service, and the State of Hawai'i—to prepare a comprehensive management plan, create a Reserve Advisory Council, initiate the process to designate the area as a National Marine Sanctuary, and establish a series of no-take Reserve Preservation Areas, among other conservation measures. The co-managers stepped up their ongoing work and achieved the executive order objectives, and more, over the next several years.

President Clinton spoke in 2001 at the National Geographic Society Headquarters in Washington DC after the creation of the coral reef ecosystem reserve. Image: NOAA.

By 2000, the first of many Reef Assessment and Monitoring Program (RAMP) expeditions conducted by NOAA and its partners ventured into the islands in order to build a better understanding and knowledge base for their management efforts (and these research cruises built on a long history of science and exploration trips taken to the region since the early 1900s). Early efforts included mapping the seabed, which led to the release of the first benthic atlas of the reserve in 2003, and conducting rapid ecological assessments of key areas of the reserve. Later expeditions not only continued building knowledge of the islands, but they made amazing discoveries, including many new species of seaweed, coral, and fish; a new species of bird; and numerous historic shipwrecks. In 2005, the first ever education-dedicated NOAA cruise took place as research vessel *Hiʻialikai* visited the reserve and 2009's Deep Reef expedition built on work of prior research cruises and conducted multidisciplinary studies on deep reef ecosystems. In 2015, the researchers of the monument documented that deep coral reefs at Kure Atoll comprised the only known area in the ocean with complete endemism, meaning every species present was found only in the Hawaiian Archipelago and nowhere else. 2018's Enigmatic Seamounts Expedition explored and documented ten seamounts added to the monument in the 2016 expansion.

A series of expeditions, starting in 2002 and continuing today, have also focused on or included the study of the maritime heritage landscape and resources of the islands. During these research trips, the monument staff and partners discovered, surveyed, and documented shipwrecks and aircraft; surveyed, documented, and in some cases retrieved artifacts associated with wrecks; and filmed documentaries and short features. Known wrecks include the 19th century whalers *Pearl*, *Hermes*, *Parker*, *Gledstanes,* and *Two Brothers* and other vessels such as the sailing bark *Dunnottar Castle* and schooner *Churchill*; 20th century vessel *Carrollton*, and World War II's USS *Saginaw*, USS *Macaw*, USNS *Mission San Miguel*, and a downed American aircraft.

Of all the wrecks, *Two Brothers,* rediscovered by NOAA archaeologists in 2008, might be most famous. She was captained by George Pollard Jr., whose previous whaler *Essex* was struck and sunk by a whale in the South Pacific, inspiring Herman Melville to write his most famous novel, *Moby-Dick*. Pollard gained national notoriety after the loss of the *Essex*, when he and a handful of his crew resorted to cannibalism in order to survive their 95-day open-ocean ordeal. Misfortune struck Pollard twice, as *Two Brothers* struck a reef in French Frigate Shoals during a storm. Initially reluctant to abandon another ship, Pollard at last relented to the pleas of his crew. They left the vessel for small boats and the next morning were taken up by their sister whaler *Martha*; all were returned safely to Oahu. Nathaniel Philbrick's 2001 bestseller *In the Heart of the Sea* reintroduced Pollard, *Essex*, and *Two Brothers* to American audiences.

The first half of the 2000s also saw an emphasis on engaging the communities of the Main Hawaiian islands in their stewardship of the Northwestern Hawaiian Islands. In 2003, the Mokupāpapa Discovery Center opened in Hilo to bring the place to the people and interpret the natural science, culture, and history of the Northwestern Hawaiian Islands. The center relocated and reopened in 2014 as a 20,000-square-foot facility housed in Hilo's historic Koehnen Building. Having five times more space than its prior locale allowed the center to expand its offerings and it now features a 3,500-gallon saltwater aquarium, interactive digital displays, a monk seal exhibit with life-size models and artwork inspired by the Northwestern Hawaiian Islands and Hawaiian culture. In 2005, the reserve worked with photographers and authors

David Littchwager and Susan Middleton on a photo exhibit and its companion book *Archipelago: Portraits of Life in the World's Most Remote Island Sanctuary*, which featured artful photographs of the wildlife of the Northwestern Hawaiian Islands.

In 2001, the reserve joined the rest of the sanctuary system in having a community-based advisory group. The Reserve Advisory Council includes, as it has since the beginning, citizen-at-large, conservation, education, tourism, recreational fishing, research, and Native Hawaiian seats. Today the council meets quarterly and has several subcommittees and working groups on specific issues. Over the years the council has provided input on everything from preparing reserve (and later, monument) management plans, as well as education and research planning, to the monument's role in international projects supporting very large marine protected areas.

The reserve and its partners launched its signature education program in 2004. *Navigating Change* combines traditional knowledge with western science to inspire the next generation of conservation leaders. This education and stewardship program engages teachers and students in classroom and field experiences, helping them prepare and conduct a restoration project in their own communities. Such projects have included alien algae removal, stream sediment studies, marine debris cleanup, and forest restoration. In 2011, the program was featured in *Midweek* magazine as students from Island Pacific Academy planted native plants in a restoration site near Kaʻena Point Natural Reserve on Oʻahu.

In 2004, the reserve also fulfilled one of the primary directives of the Executive Order when it released the Reserve Operations Plan. Ten action plans were contained within it, for operations; education and outreach; Native Hawaiian cultural resources; maritime heritage; research and monitoring; mapping; response, damage assessment, and restoration; marine debris; enforcement; and sanctuary designation. Recognizing this and other accomplishments in implementing the Executive Order, the 2005 State of the Reserve Report stated, "This review of the management of the reserve has resulted in a determination by NOAA that the reserve is meeting and exceeding its responsibilities as outlined in the EO and ROP."

President Bush was surrounded by dignitaries in 2006 as he signed the proclamation creating the Northwestern Hawaiian Islands Marine National Monument. Image: NOAA.

The latter half of the 2000s featured additional conservation measures taken by the state and federal governments. In 2005, Governor Lingle established the Northwestern Hawaiian Islands Marine Refuge in state waters around all the islands except Midway (which is not part of the State), providing management and long-term conservation of marine resources within state waters. President Bush followed the state action in 2006 when he issued Presidential Proclamation 8031 under the Antiquities Act in 2006 which renamed the reserve as the Northwestern Hawaiian Islands Marine National Monument and included both marine and terrestrial areas under its protection. The monument was expressly created to promote coordinated management among the federal and state agencies with stewardship responsibilities in the Northwestern Hawaiian Islands; the proclamation also created contiguous boundaries for the monument, to include the reserve, Midway Atoll National Wildlife Refuge, Hawaiian Islands National Wildlife Refuge, Battle of Midway National Memorial, Kure Atoll Wildlife Sanctuary, and the state's Northwestern Hawaiian Islands Marine Refuge. Regulations for the monument published in August 2006 include restrictions on access to the monument; taking of natural or cultural resources; seabed alteration; discharges; bans on anchoring, petroleum or mineral exploration or development; release of introduced species; and requirements for a ship reporting system to track vessel traffic in and around the monument. The coordinated management structure of the monument also provides for a streamlined permitting process that helps facilitate appropriate access to the monument.

A year later, after Native Hawaiian elders had worked with the monument's managers to determine an appropriate name for the monument, First Lady Laura Bush announced its new name, Papahānaumokuākea Marine National Monument. In her remarks, she summed up: "Today, I'm delighted to announce that the Northwestern Hawaiian Islands will be named the Papahānaumokuākea Marine National Monument…the name reminds us of our responsibility to care for the archipelago."

In 2008, the International Maritime Organization, after being requested by the U.S. Coast Guard and NOAA, designated the monument as a Particularly Sensitive Sea Area, which put in place internationally recognized measures designed to protect its significant marine resources from damage by vessels while helping keep mariners safe. Areas to be Avoided were created around groups of the islands and appear on international nautical charts to direct ships away from coral reefs, shipwrecks, and other sensitive areas in the monument. A ship reporting system was also created, requiring U.S. vessels, or all foreign vessels greater than 300 gross tons planning on passing through the monument on their way to or from a U.S. port to notify monument managers by reporting into the system. For other vessels transiting the area, reporting is voluntary but highly encouraged. A vessel inspection program joined these protective measures in 2009, requiring all craft headed to the monument, except military vessels or those transiting through, to undergo hull inspections in Honolulu before entering the monument. Inspecting the hulls of vessels and testing their ballast water helps prevent the introduction of alien species into the monument, which could have detrimental impacts on the native species.

A scientist counted fish in the monument in 2006. Image: Claire Fackler/NOAA.

During the 2000s, the monument was making linkages with its Pacific and other international partners. In 2007, NOAA and UNESCO co-hosted *Our Sea of Islands: A Regional Forum for Oceania on Marine Managed Areas and World Heritage*. Participants from more than 20 states and nations included American Samoa, Commonwealth of the Northern Mariana Islands, Cook Islands, Federated States of Micronesia, Fiji, Guam, Hawai'i, Kiribati, New Zealand, New Caledonia, Niue, Palau, Papua New Guinea, Republic of the Marshall Islands, Samoa, Solomon Islands, Tonga, Vanuatu, Australia, and the U.S. The five-day forum of discussions resulted in the Our Sea of Island Communiqué that, among other things, called for urgently needed investment in developing marine protected areas, reiterated the cultural and ecological ties among the nations and states of Oceania, and committed to strengthening World Heritage activities in Oceania.

As World Heritage activities were gaining new commitments internationally, the U.S. was also revitalizing its own World Heritage efforts, which had been dormant for nearly 15 years. In 2008, after a few years of nominations and evaluations, the National Park Service issued a new Tentative List, the pool of sites from which future World Heritage Site nominations are to come. Included was the monument and Fagatele Bay National Marine Sanctuary (to become National Marine Sanctuary of American Samoa in 2012). World Heritage cooperation was also one of the

cooperative efforts outlined in the sister sanctuary agreement between the monument and Kiritbati's Phoenix Islands Protected Area signed in 2009.

The monument closed out its first decade by laying the groundwork for the second. In 2009, its first condition report was released, indicating that due to the remote location and the long history of protection, the natural resources of the Northwestern Hawaiian Islands are overall in a good state. The report also highlights the need to address potential impacts of key habitats, degrading conditions of some living resources, such as Hawaiian monk seals, resident seabirds and migratory shorebirds; a general need to increase knowledge of regional biodiversity; and enhanced research and discovery of marine archaeological resources. A new management plan was produced the same year. Twenty-two action plans grouped under six priority management needs were the focus of the Monument Management Plan and included:

- Understanding and Interpreting the Northwestern Hawaiian Islands
- Conserving Wildlife and Habitats
- Reducing Threats to Monument Resources
- Managing Human Uses
- Coordinating Conservation and Management Activities
- Achieving Effective Monument Operations

Two of the action plans are devoted to Native Hawaiian culture: the Native Hawaiian Culture and History Action Plan and the Native Hawaiian Community Involvement Action Plan. Others address specific resources, like protecting migratory birds and endangered species, or specific threats, such as alien species and marine debris.

On July 30, 2010, the United Nations Educational, Scientific, and Cultural Organisation (UNESCO) inscribed the monument as a mixed natural and cultural World Heritage Area. This long-sought honor made it the first mixed site in the U.S. and one of only two dozen mixed World Heritage Sites in the country. Becoming a World Heritage site is not easy. Once nominated by a country, UNESCO must deem a site important for the collective interests of humanity; it must represent a unique, most significant, or best example of the world's cultural and/or natural heritage. Sites must meet at least one of 10 strict criteria under either natural or cultural categories, making dual inscription as both is that much more difficult. Among the four percent of all World Heritage Sites to be inscribed for natural *and* cultural significance, the monument met multiple criteria for both.

Having joined the elite ranks of World Heritage Sites, the monument continued its international partnerships moving into the 2010s. In 2010, the monument and its sister site Phoenix Islands Protected Area of Kiribati facilitated the first meeting of Big Ocean, an informal peer group of managers of large scale marine protected areas. Other founding members included Marianas Trench Marine National Monument (US), Great Barrier Reef Marine Park (Australia), Chagos Marine Protected Area (UK), and Motu Motiro Hiva Marine Park (Chile). Designed to allow managers to share their unique experiences, challenges, and solutions, Big Ocean has since focused on improving the governance and science of large parks, including issuing the *Shared Research Agenda for Large-Scale Marine Managed Areas* in 2012 and the *Large-Scale Marine Protected Areas: Guidelines for Design and Management* in 2017, in cooperation with IUCN. The shared research agenda outlines the unique scientific needs and challenges of large marine

protected areas. The guidelines provide considerations and lessons learned in creating and managing such massive parks in such areas as management planning, sustainable financing, research, access, zoning, and public engagement.

The monument continued to pioneer at home as much as it did internationally. In 2013 the monument hosted NOAA's first-ever dedicated expedition using closed circuit diving rebreathers, an advanced form of diving technology that recycles a diver's exhalations to provide oxygen. Rebreathers allow divers to dive deeper and stay longer underwater which increases the length of time and the accessibility of places that diving scientists can visit; rebreathers have the added advantage of not generating bubbles which prevents frightening wildlife. For ecosystems like the monument's deep reefs, scientists can now study in person what they could only visit with ROVs before. The technology paid dividends on the first expedition it was used on in 2013. Researchers documented numerous fishes never recorded in the Northwestern Hawaiian Islands, increasing the number of species of fish by a quarter, collected specimens of ten new species of algae, and discovered a new type of coral reef habitat, that of nursery grounds for deep coral reef fishes in over 200 feet of water. Monument scientists also documented the highest levels of endemism known of any marine ecosystem on Earth. In 2015, using the same technology, a new species of deep-water black coral was discovered. The species of coral form growth rings (like trees on land) and radio-carbon dating proved the species to be at least 4,000 years old, making it the longest-lived marine organism known to date.

The use of cutting-edge technology for science was not limited to under the water; monument scientists were also able to reach new heights in the sky above the ocean. Unmanned Aircraft Systems (UASs) were deployed in 2014 from the *Hi'ialakai to* search for marine debris and survey and photograph wildlife. The mission confirmed that UAS technology could gather significant data without disturbing wildlife.

Cutting-edge technology, discovered species and habitats, uncovered shipwrecks, celebrated culture, advanced conservation: the monument had already achieved a great deal in its first fifteen years. But 2016 would bring many new opportunities for growth.

President Obama visited Midway Atoll to announce the expansion of the monument in 2016. Image: Pete Souza/White House Photographer.

Conservation for the Future (2016 and ongoing)

When the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve was established in 2000, it was the largest conservation area on the planet, land or sea. In subsequent years, it was overtaken by larger marine protected areas, mainly in the Pacific. President Obama expanded the monument on August 25, 2016, by way of Presidential Proclamation 9478 under the Antiquities Act, to its current size of about 580,000 square miles, making it once again the largest conservation area in the world. It has since been surpassed by marine protected areas in the Cook Islands and Antarctica.

In remarks given at Midway on his expansion of the monument, the president stated: “And so for us to be able to protect and preserve this national monument, to extend it and, most importantly, to interact with native Hawaiians and other stakeholders so that the way we protect and manage this facility is consistent with ancient traditions and the best science available, this is going to be a precious resource for generations to come.” President Obama’s proclamation reaffirmed existing protections, and it ordered NOAA to begin a designation process for the consideration of the monument as a national marine sanctuary, which would bring additional authorities to bear on its protection that don't exist under the Antiquities Act.

A month later, the monument, Hawaiian Islands Humpback Whale National Marine Sanctuary and NOAA as a region, in partnership with the State, other federal agencies, and nongovernmental organizations, helped host the World Conservation Congress in Hawai‘i. It was the first time the U.S. had hosted the congress, which is held every four years. This conference is one of the largest conservation gatherings in the world. For the September 2016 congress, ten thousand people representing 192 nations convened in Hawai‘i, where the expansion of the monument helped set the stage for plenary discussions and presentations.

In the years following this major expansion and conference, the monument continued to strengthen its protection measures. In 2017, the Office of Hawaiian Affairs, which is "responsible for improving the well-being of Native Hawaiians" was added as the fourth Co-Trustee of the monument, joining the Department of Commerce, the Department of the Interior, and the state of Hawai‘i. OHA adds another voice to the chorus speaking for the Native Hawaiian values and culture of the monument. In 2017, the wreck of *Two Brothers* was added to the state's Register of Historic Places and the National Register of Historic Places. The 2018 Enigmatic Seamounts Expedition, along with 2015 and 2016 missions to explore the seamounts in the monument's expansion area by NOAA's *Okeanos Explorer,* provided valuable information to be used in the protection of these little-explored features.

The Enigmatic Seamount Expedition also maintained the monument's ongoing efforts to engage the communities of the main Hawaiian Islands and around the world. Constant live streaming of ROV dives and ship-to-shore interactions reached thousands of people in real time and millions more all over the world in ensuing outreach efforts. Under the category of being a good neighbor, the Mokupāpapa Discovery Center shared its visitor center with the staff of Hawai‘i Volcanoes National Park, its neighbor on Hilo, when the Kīlauea volcano eruptions closed most of the park in 2018. Rangers and the center's staff presented over 130 health and safety updates to the community and supported education programs for hundreds of school children over four months. In 2019, the monument hosted the Symposium on Science in Support of Archipelagic Management attended by over 200 and featuring 46 presentations over two days.

The islands of the monument are one of the few places in the world where sea turtles bask on shore. Image: Mark Sullivan/NOAA.

More troubling, in 2019 research teams found thick mats of a nuisance alga (named *Chondria tumulosa* in 2020) covering extensive areas of reef at Pearl and Hermes Atoll. Grazing fish such as parrotfish feed upon native species of algae to keep them from growing out of control but scientists did not observe any species grazing on the nuisance algae. Its origins and full impacts are still being investigated.

In December 2020, Congress directed NOAA to initiate the process to designate the monument as a national marine sanctuary under the National Marine Sanctuaries Act. This process does not change the monument designation but will add an additional layer of protection and permanency to safeguard resources in the marine portions of the monument. A public scoping period ran from November 2021 to January 2022, including four virtual public meetings in addition to opportunities to submit written comments. Now the monument's co-managing agencies are examining the public comments and considering how to update the Monument Management Plan.

In 2020, the monument celebrated several key anniversaries: the 20th since the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve was created, the 15th since the state created the Northwestern Hawaiian Islands Marine Refuge, and the 10th of its World Heritage inscription. All represent conservation achievements resulting from the efforts of many heads, hands, and hearts at work in the monument. Great challenges lie ahead, in the worsening impacts of climate change, in the fight to save endangered species, in continuing to perpetuate Native Hawaiian culture, but they are and will be met with all the passion, wisdom, and dedication that can be

mustered. “Those who contemplate the beauty of the earth,” Rachel Carson wrote in *Silent Spring*,” find reserves of strength that will endure as long as life lasts.” Indeed.

Origins of the Sanctuary’s Name

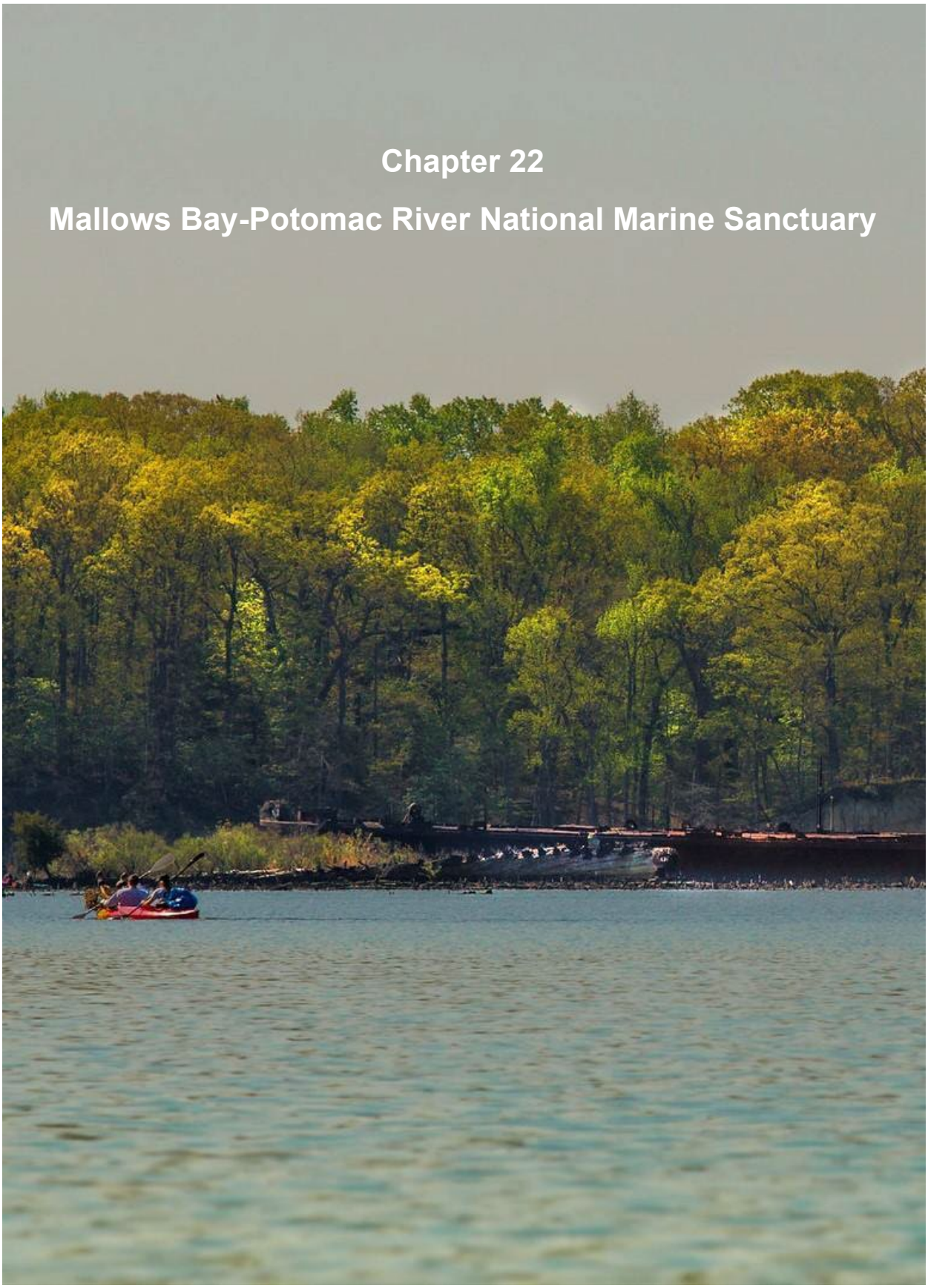
The name Papahānaumokuākea (pronounced Pa-pa-hah-now-mo-koo-ah-keh-ah) comes from an ancient Hawaiian tradition concerning the genealogy and formation of the Hawaiian Islands, and a deep honoring of the dualisms of life. Papahānaumoku is a mother figure personified by the earth and Wākea is a father figure personified in the expansive sky; the two are honored and highly recognized ancestors of Native Hawaiian people. Their union resulted in the creation, or birthing, of the entire Hawaiian archipelago––thus the naming of the monument is to honor and preserve these names, to strengthen Hawaii’s cultural foundation and to ground Hawaiians to an important part of their history. In reviewing each part of the name, “Papa” (earth mother), “hānau” (birth), “moku” (small island or large land division), and “ākea” (wide) speak of a fertile woman giving birth to a wide stretch of islands beneath a benevolent sky. Taken as one long name, Papahānaumokuākea can be seen as a symbol of hope and regeneration for the Kūpuna (Elder) Islands and the main Hawaiian Islands. The name replaced the original name of Northwestern Hawaiian Islands Marine National Monument, which in turn had replaced the name Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve.

Reserve/Monument Superintendents

- Robert Smith, 2000 to 2004
- ‘Aulani Wilhelm, 2004 to 2013
- Various acting superintendents, 2013 to 2015
- Athline Clark, 2015 to present

Chapter 22

Mallows Bay-Potomac River National Marine Sanctuary



Chapter 22
Mallows Bay-Potomac River National Marine Sanctuary

The Ghost Fleet

Located along an 18-square mile stretch of Potomac River coast in Charles County, Maryland, the Mallows Bay-Potomac River National Marine Sanctuary boasts a collection of historic shipwrecks dating back to the Civil War. It also contains the World War I era Ghost Fleet and archaeological artifacts nearly 12,000 years old. Its culturally rich landscape also includes sites that represent the history of Native American communities in the area, the once-booming Potomac River fishing industry, and the Civil War. Paddle on to learn more about the first sanctuary in a generation.

Laying the Keel (to 2014)

The natural treasures of the Chesapeake Bay region—rich fisheries in rivers and bay, productive shellfish beds, marshes, forests, and estuaries full of plants that provided everything from food to medicine—have drawn humans to the coast since they arrived on the continent. Paleo-Indians are believed to have arrived in the region at least 12,000 years ago, ancestors to the many tribes who lived in the area, among them the Algonquian, Iroquoian, and Siouan cultures. Today there are numerous state- and federally recognized tribes in the Chesapeake Bay area. Maryland recognizes the Piscataway Indian Nation and Piscataway Conoy Tribe, Virginia the Patawomeck Indian Tribe. The Piscataway have identified Mallows Bay and Liverpool Point as areas of significance.

Though Spanish ships traversed the Chesapeake Bay sometime in the 1500s, it was the English who further explored and colonized the area, led by Captain John Smith in 1607. They discovered a confederacy of Algonquian tribes who dominated the area under the paramount chief Powhatan. Powhatan and his people aided and fed Smith and the English colonists of Jamestown. The Algonquian tribes numbered about 12,000 at Smith's arrival; less than a century later, wars, disease, and disenfranchisement from their land and cultures had devastated the Native American population to only about 1,000.

> *Potomack-River separates Virginia from Maryland: its entrance is formed by Wichocomaca-Point on the South side, and Point-Lookout on the North side; the distance between these two points is about 3½ leagues.*
>
> Captain Lawrence Furlong, "The American Coast Pilot," First Edition, 1796

Smith explored and mapped the Chesapeake Bay, up the navigable length of the Potomac River, including what would become known as Mallows Bay. The English colonized and settled on lands throughout the region. By 1670, the famed map *Virginia and Maryland*, drawn by Augustine Hermann, showed several plantations and farms near Mallows Bay. Walter Hoxton's

1735 *Mapp of the Chesapeak* contains the first mention of the southern lip of the bay identified as Liverpool Point and Anthony Smith's 1776 *New and Accurate Chart of the Bay of Chesapeake* shows the northern lip of the bay, named Sandy Point. The early European settlers in the area survived on agriculture and fishing, and Mallows Bay served as a convenient natural refuge and anchorage for shallow-draft work boats and other vessels plying the Potomac. Mallows Bay and surrounding areas were the site of some skirmishes between patriot and British forces during the Revolutionary War. Contemporary maps in the early 1840s show that one of two creeks feeding the embayment had been named for the Marlow family who dwelled upon its banks. By the onset of the Civil War, the bay itself was being called Marlow's Creek.

After the Revolutionary War and in the decades leading up to the Civil War, the subsistence fishing of the Potomac River region shifted into an industrialized sector of a growing American economy. Mallows Bay, with its naturally protected harbor, served as a staging area for commercial fishing on the Potomac. By the turn of the century, valuable target species included shellfish and finfish, such as shad and herring. The shores of the bay from Sandy Point to Liverpool Point were the site of haul-seining operations, which would become the most efficient manner of commercial fishing prior to the Civil War. By the late 1830s, fishers dragged large seines over a mile in length up and down the river, which had the effect of severely impacting or destroying the spawn and shutting down many of the small fisheries that lined the river. By 1860, other kinds of nets were being used to block portions of the river and the streams feeding it to catch bass and shad, which soon too depleted the fish stocks of the Potomac.

During the Civil War, Mallows Bay and its surrounding areas were the scene of numerous skirmishes and raids between Union and Confederate forces, as well as the more surreptitious smuggling of information across this stretch of river, which divided Maryland from Virginia. Commercial fishing resumed after the war. By 1888, a sturgeon fishing station and caviar processing plant had been built at Liverpool Point, where they remained active until 1926. From the late 1800s, steamers such as the 315-ton steamboat *Potomac* stopped regularly at the service wharf at Liverpool Point to take on and offload passengers, produce, livestock, and mail. Despite these developments, Mallows Bay remained an isolated area of farmers, anglers, mariners, watermen, and the occasional visitor. In the 1880s and 1890s, the area was a favorite destination of President Grover Cleveland for fishing and duck hunting. With the beginning of World War I, however, the remoteness of the little embayment would lead to its transformation into the largest ship graveyard in the country.

A poster from 1918 showed the construction of wooden steamships during World War 1. Image: Jonas Lie, courtesy of the Library of Congress.

When the United States entered World War I in April 1917—a few years after much of the rest of the world was already engaged in the costly conflict—its capacity to engage the sea-going might of Germany was in question. With its attention on domestic issues since the Civil War, the United States had not built up its merchant fleet or naval vessels. To help remedy the situation, the U.S. Shipping Board Emergency Fleet Corporation was created in April 1917 with the charge of increasing the merchant fleet. One of its immediate projects was the construction of a fleet of wooden steamships to ferry food, supplies, soldiers, and ammunition to allied countries who had been devastated by Germany's ruthless and efficient submarine warfare in the Atlantic. More than forty shipbuilding yards were soon busy at work. By the time Germany surrendered in November 1918, 134 wooden steamships had been completed, and another 263 ships were in various stages of construction. Yet not a single wooden steamship delivered wartime aid to the nation's European allies.

After the war, some of the wooden steamships carried cargo in the Atlantic and Pacific, where they performed well. But the Great Depression in the 1920s reduced international commerce, resulting in much of the merchant fleet, including 264 wooden steamships, remaining inactive in ports around the country. The shipping board, in order to reduce soaring maintenance costs from keeping docked vessels afloat, decided to auction off the wooden steamships. By late 1922, the fleet, anchored in the James River, was sold to the Western Marine and Salvage Company, which expected to make a substantial profit from stripping and salvaging the steamships of steel, iron, brass, copper, cable wire, piping, engines, boilers, tanks, winches, rope, gauges, and anchor chain, and retrofitting the hulls as barges. The sale was conditioned on a contract to share proceeds with the government; under the terms of the contract, salvagers must also dispose of hulls so as to not impede the navigable waters of the Potomac River.

By April 1923, the salvage operation was well underway, with the vessels being brought from the James River to anchorage near Widewater, Virginia; then off Mallows Bay, its neighbor due west across the Potomac. But a series of calamities beset the salvage operation over several years. A fire broke out on April 18, 1923, spreading to ten vessels that had been cabled together. It burned through the night, and all ten ships either burned to the waterline or were later reburned and scuttled in place. In 1925, although salvage operations were completed, concerns about the company's finances and the threat of fines for not fulfilling its government contract forced the company to cable together 31 ships and set them ablaze in a conflagration that caused alarm at the nearby Quantico Marine Barracks.

Removal of the stripped vessels to Mallows Bay continued through the 1920s until 1932 when the Western Marine and Salvage Company deemed its job done. The company removed its operations from the shores of the Potomac, though some steamship hulls remained a navigation issue in the river. Nearby residents began salvage operations of their own, removing metals from the abandoned hulls and giving rise to a local cottage industry of scrappers, haulers, and sellers. Through the 1930s, as the value of scrap metal began to increase, both locals and outsiders worked to strip the vessels of anything of value. Various legal battles about ownership of the wrecks played out until, in January 1936, a court ruled that the wrecks were open to salvage by anyone and the cottage industry grew. Occasionally, one of the hulls would float out and would have to be hauled back into Mallows Bay.

With the onset of World War II, the value of scrap metal increased again and the War Production Board, formed in 1941 to oversee production related to the war, undertook a national salvage effort. By October 1942, the vessels of Mallows Bay were included on a list of special projects; the remaining hulls were estimated to be capable of yielding up to 20,000 tons of scrap metal. The board contracted with Bethlehem Steel Company to recover the maximum quantity of metal they could from the wrecks. But the company's salvage efforts ran into difficulties through much of the war and by 1944, not much had been recovered. Nearing the end of the war, the demand for salvaged metal lessened and the Bethlehem Steel contract was canceled in 1944.

A c.1944 aerial view of the Mallows Bay area showed the scuttled remains of the Ghost Fleet. Image: U.S. War Department, courtesy of the National Archives.

Following the war, the question of what to do with or about the wrecks surfaced periodically, including in Congressional hearings in the 1960s. But public and civic sentiment was changing toward the wrecks and their unique ecological setting, and the public chose to protect this national cultural treasure. By 2001, Maryland's GreenPrint Program had acquired much of the land adjacent to Mallows Bay and in 2010 the state made an additional purchase that allowed Charles County to establish Mallows Bay County Park in Nanjemoy. The new park provided opportunities for recreation and small boat access to the bay. But a new opportunity for protection soon presented itself to those who loved and enjoyed Mallows Bay.

Planking the Vessel (2014 to 2019)

In 2014, with the establishment of the Sanctuary Nomination Process, the Maryland Department of Natural Resources and the Mallows Bay Steering Committee, representing a broad base of constituency groups, convened a committee to discuss the idea of a national marine sanctuary and ultimately decided to develop the nomination to submit to NOAA. The state of Maryland and a coalition of community groups—among them Charles County, the Chesapeake Conservancy, Maryland Historical Trust, the Piscataway-Conoy Tribe, and The Nature Conservancy—submitted a nomination for Mallows Bay on September 15, 2014. In his cover letter, Maryland Governor Martin O'Malley touted the national significance of the site, stating: "Mallows Bay is a beautiful area of the Potomac River with national significance and

outstanding and unique historical, archaeological, cultural, ecological, conservation, recreation, and educational qualities. Its maritime landscape is home to the largest and most diverse collection of historic shipwrecks in the United States from the Revolutionary War through the present, totaling nearly 200 known vessels." The nomination was endorsed by individuals and organizations at the local, state, regional, and national levels, including elected officials; businesses; Native Americans; environmental, recreational, conservation, fishing, and tourism advocates; and museums, historical societies, and education groups. After reviewing it for its national significance and suitability under numerous management categories, NOAA approved the nomination and added the site to the inventory on January 12, 2015. In further evidence of its national importance, it was also added to the National Register of Historic Places later that year, on April 24.

> *The Mallows Bay study area, incorporating a section of the Potomac River formed by the waters within the Sandy Point-Liverpool Point-Widewater triangle, contains the largest known concentration of historic shipwrecks and maritime shipbreaking facilities in one discrete locale in North America, and possibly the Western Hemisphere. The historical maritime and industrial archaeological resources discovered through archival and archaeological research to date therein are formidable indeed.*
>
> National Register of Historic Places Registration Form, 2013

In October 2015, NOAA began the scoping process for a possible designation, including an opportunity for interested members of the public to provide written comments or during one of two scoping meetings that were held in November at La Plata and in Annapolis. NOAA received 264 comments from individuals, businesses, organizations, and local, state, and federal agencies. Comments were also submitted by Representative Steny Hoyer and Senator Ben Cardin. Most comments generally supported the proposed sanctuary designation based on the considerable value and significance of its natural, maritime, archaeological, and cultural resources, including those related to Native American history; the potential for ecological and archaeological research of the area's resources; and the economic and educational benefits of increased tourism and public awareness of and access to the site.

The designation ceremony for the new sanctuary was held in September 2019. Image: Matt McIntosh/NOAA.

After considering the comments and information received during scoping, NOAA decided to proceed with a designation process. Using the public comments and other information collected about the site, NOAA prepared a draft management plan and proposed regulations. In January 2017, the agency published a proposal to start the designation process. The draft management plan contained five action plans: for resource protection; recreation and tourism; education; research, science, and technology; and sanctuary operations and administration. A co-management arrangement among NOAA, Maryland, and Charles County was proposed. The proposed regulations prohibited damaging the shipwrecks, other maritime cultural resources, or sanctuary signs; as well as interfering with enforcement activities.

NOAA opened an 81-day public comment period on the proposed rule and draft management plan, which closed on March 31, 2017. NOAA also held two separate public meetings in La Plata and Arnold, Maryland. Approximately 170 people attended the meetings, with 73 providing verbal comments. Most comments expressed support for the sanctuary designation because of its positive impact on cultural resource protection of known and potential shipwreck sites through increased public awareness, education, interpretation, and related programs.

> *The Mallows Bay landscape truly tells the story of our beginnings, our struggles, and our progress as Marylanders and Americans. Through this*

designation, we are ensuring that this national treasure will attract families, anglers, kayakers, and history buffs for years to come.

Governor Hogan, Maryland, at the dedication ceremony of MPNMS, 2019

The sanctuary was formally designated in September 2019, the first new sanctuary in a generation and the closest to the headquarters office in the Washington, DC metro area. A celebration and dedication event was held at the site in November 2019, attended by federal and state dignitaries, and more than 20 organizations, including the Institute of Maritime History, Chesapeake Conservancy, the Maritime Archaeological and Historical Society, Diving with a Purpose, and the National Marine Sanctuary Foundation.

Students stand around a fish tank to learn about aquatic wildlife in the sanctuary. Image: Matt McIntosh/NOAA.

Launching the Vessel (2020 and ongoing)

With the designation complete, NOAA turned its attention to building its programs. Its first volunteer program was a joint project with Potomac Riverkeeper to develop a citizen-science monitoring program at Mallows Bay. This program adds to the data available to better manage the sanctuary and support its recreational uses. The sanctuary's first education effort, actually

predating designation, was a partnership with the National Association of Black Scuba Divers and Diving with a Purpose to provide classroom and in-pool scuba instruction to students at North Point and Lackey High Schools. The dive program included a day visit to Mallows Bay with sanctuary partners related to environmental stewardship, cultural heritage, and advanced technologies. It introduced students to educational, vocational, and career opportunities.

In May 2020, NOAA began the process to establish a sanctuary advisory council for the site, recruiting for 15 seats including maritime history, cultural heritage, recreation, business, tourism, education, research, fishing, and citizen-at-large. Additional non-voting members include the states of Maryland and Virginia; Charles County; the U.S. Navy and Coast Guard; the Piscataway Conoy Tribe and Piscataway Indian Nation, both of Maryland; the Patawomeck Indian Tribe of Virginia; and a youth representative. The advisory council met for the first time in December 2020. With its help, the sanctuary has a bright future.

Kayaks await passengers for another excursion into the sanctuary. Image: Matt McIntosh/NOAA.

Origins of the Sanctuary's Name

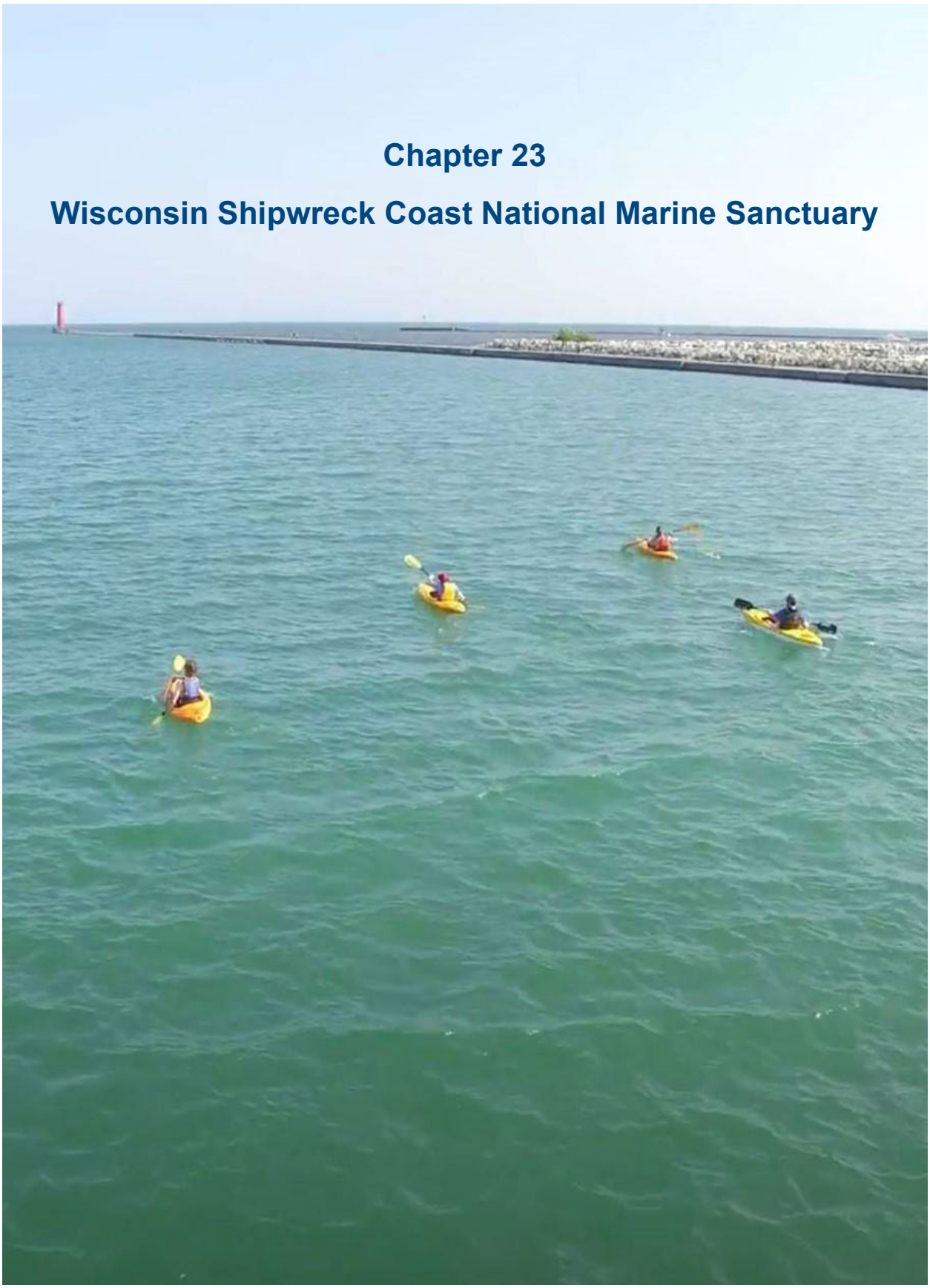
The exact origin of the name Mallows is unknown, but is believed to come from an early colonial family named Mallow or Marlowe who lived in the area. Both names were used on maps and in documents into the late 19th century, but Mallows has appeared on official maps of the area since the early 20th century. The name Potomac derives from a European corruption of the Algonquian name for a village that once stood on the shores of the river and may have several different meanings.

Sanctuary Superintendents

- Paul "Sammy" Orlando, 2020 to present

Chapter 23

Wisconsin Shipwreck Coast National Marine Sanctuary



Chapter 23
Wisconsin Shipwreck Coast National Marine Sanctuary

A Shipwreck Graveyard

The historic wrecks of the Wisconsin Shipwreck Coast National Marine Sanctuary represent the vessels which sailed and steamed Lake Michigan, carrying grain and raw materials east as other vessels came west loaded with coal, cargo, and people. Well preserved by the lake's cold, fresh water, shipwrecks and other underwater cultural resource sites in and around the sanctuary possess exceptional historical, archaeological, and recreational value. Many of the shipwrecks are listed on the National Register of Historic Places. These vessels retain an unusual degree of archaeological integrity, with several virtually intact. The maritime cultural landscape of the mid-Lake Michigan region also contains many additional features, including five lighthouses, three breakwater lights, and three life-saving stations. Read on to find out why this area is a national marine sanctuary.

Furled Sails (to 2008)

Wisconsin's sprawling maritime cultural landscape dates to its earliest human inhabitants. About 12,000 years ago, the ancestors of the Menominee, Ho Chunk, and other tribes settled along its shorelines to take advantage of its wealth of natural resources. Numerous tribes emerged, with a shared culture of farming, fishing, and trading among these maritime people. The fish of Lake Michigan, for example, were important enough to the Ho Chunk people to include a Fish clan among their other families, which included Snake, Buffalo, Deer, Elk, Bear, and Bird clans.

> *The early history of Sheboygan was much like that of other ports on the Wisconsin shores of Lake Michigan…For a number of years connection with the outside world was maintained only by means of boats on the lake, which occasionally touched at Sheboygan.*
>
> "History of the Great Lakes," J.H. Beers & Co., 1899

The first Europeans to arrive on Wisconsin's shores, in the 1600s, were explorers, missionaries, trappers, and hunters from France. Many arrived via Canada, including trader Jean Nicolet, who is considered the first European to set foot in the state of Wisconsin, and explorer and mariner Samuel de Champlain who called Lake Michigan the Grand Lac, the first of several monikers it would bear before gaining its present name. French interests remained focused mainly on the fur trade, an interest the British shared as they took control of the territory after their victory in the French and Indian War (1754–1763). Trapping, trading, and exploration continued during the Revolutionary War. The area was finally controlled by the nascent United States after the War of 1812. By 1836, with the creation of the Wisconsin Territory, American settlers moved

into the area, drawn by the waning but still lucrative fur trade, lead mining, logging, and ample land for farming. Statehood followed in 1848.

The Sheboygan Light Station shown in c.1940. Image: Bureau of Lighthouses, courtesy of the National Archives.

Throughout this period and into the early 20th century, the shipping trade of the Great Lakes and the interconnected inland waterways that acted as a maritime highway into the nation's interior helped develop what had been an isolated frontier into the nation's busiest industrial waterway. Thousands of vessels of diverse designs soon plied the waters of Lake Michigan, from schooners and bulk carriers conveying raw materials and finished goods to grand steamers full of passengers. The maritime trade dramatically increased immigration to Wisconsin, leading to expansive growth in the state's population, cities, and economy.

> *Preservation of the sites will ensure their availability as an important and non-renewable source of scientific data relating to Great Lakes underwater archeology, maritime history, marine architecture, and maritime anthropology.*
>
> Nomination of Great Lakes Shipwrecks of Wisconsin to the National Register of Historic Places, 1992

Aware of the maritime industry's vital role on and around Lake Michigan in the history of Wisconsin, the state has long protected and studied its shipwrecks. Wisconsin's Maritime Preservation and Archaeology Program, established in 1988, surveys, inventories, evaluates, preserves, studies, and shares the state's underwater archaeological resources. In 1992, Wisconsin submitted its *Great Lakes Shipwrecks of Wisconsin* nomination to the National Register of Historic Places. The high integrity of the wrecks and their cargo makes them nationally significant, as does the potential to find additional prehistoric and historic cultural resources. Today, the register includes over 60 individual shipwreck sites in Wisconsin, more than any other state. Sanctuary highlights include *Gallinipper* and *Home*, two of the oldest but still largely intact wrecks in the country, in addition to well-preserved vessels of many types, including schooners, steam barges, and sidewheel steamers.

2001 saw the initiation of the Wisconsin Maritime Trails Initiative along four stretches of its coastline, linking shipwrecks and historic vessels, lighthouses, historic waterfronts, museums, shore-side historical markers, and other attractions. A fifth segment connects Wisconsin's inland waterways, offering a similar set of historic information and highlighting maritime attractions. The resources highlighted along these trails illustrate the state's diverse maritime heritage and place it in context within the broader landscape of maritime heritage across the Great Lakes.

Fairway (2008 to 2017)

In 2008, Wisconsin's formal cooperation with NOAA on national marine sanctuaries began with the Wisconsin Historical Society's report entitled *Wisconsin's Historic Shipwrecks: An Overview and Analysis of Locations for a State/Federal Partnership with the National Marine Sanctuary Program*.[5] This report analyzed all Wisconsin shipwrecks in both Lake Superior and Lake Michigan, concluding that the 875-square-mile area of Lake Michigan had the best potential for a national marine sanctuary designation based on the national significance of the shipwrecks. This area was later contained in Wisconsin's package to the Sanctuary Nomination Process. The nomination also identified opportunities for NOAA to strengthen and expand Wisconsin's resource protections, education, and research programs in four coastal communities along Lake Michigan.

In December 2014, the governor of Wisconsin submitted the nomination to NOAA. The nomination focused on protecting and interpreting a nationally significant collection of 37 shipwrecks, including 18 listed on the National Register of Historic Places. It also defined six major goals, including to expand on the state's 30-year effort to identify and protect its shipwrecks; extend and promote the ongoing regional approach; create a heightened appreciation for the maritime heritage of the Great Lakes; expand tourism opportunities; bring NOAA resources in the Great Lakes to bear on the area; and enhance education and outreach efforts. The nomination included letters of support from federal, state, and local elected officials,

[5] "Fairway" is a nautical term meaning a navigable channel that is the normal route for a vessel in an area.

local economic/community development and tourism agencies, historical societies, recreational user groups, and historical societies, a hundred letters in all. NOAA responded in February 2015, accepting the nomination into the inventory; a few months later the agency decided to initiate the designation process for the site.

Visitors enjoyed a visit to ships in the marina for Get Into Your Sanctuary events in Sheboygan in 2017. Image: NOAA.

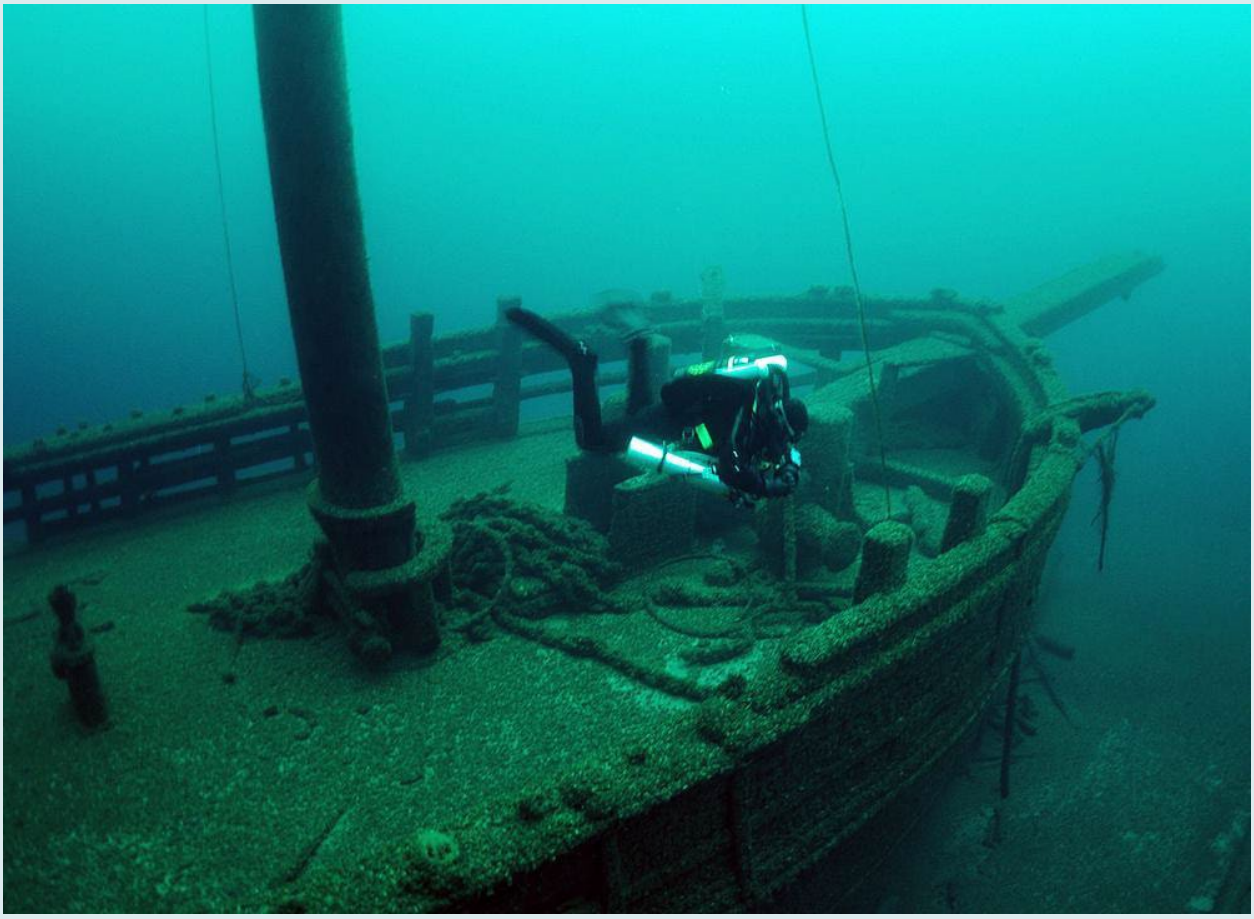
In October 2015, a Federal Register notice began the formal scoping process, including holding three public meetings in Manitowoc, Port Washington, and Sheboygan. About 135 individuals provided their input, most of it strongly supportive of designation. With a preponderance of positive public support and the agreement of the state of Wisconsin, NOAA prepared and, in January 2017, issued proposed regulations and a draft management plan, A joint management structure with the state of Wisconsin was proposed, along with an area of 1,075 square miles (slightly larger than the nomination area of 875 square miles) and regulations prohibiting damaging sanctuary resources and anchoring on a shipwreck site, among other prohibitions. The draft management plan included four action plans: resource protection; education and outreach; research; and operations and administration. A nearly three-month public review and comment period followed, including four public meetings held in the towns of Algoma,

Manitowoc, Sheboygan, and Port Washington. During the public review, NOAA received over 600 comments, most supporting the action.

Full and By (2020 and ongoing)

Based on public comments and collaboration with the state, NOAA published a final environmental impact statement and final management plan in June 2020.[6] At 962 square miles, the area was slightly smaller than the proposed area in the draft management plan, which was in response to public comments. New and expanded information about shipwreck locations, additional maritime heritage sites and resources, and updated information from consultations during the review were added to the final management plan. A year later, in June 2021, NOAA designated the Wisconsin Shipwreck Coast National Marine Sanctuary—our nation's 15th!

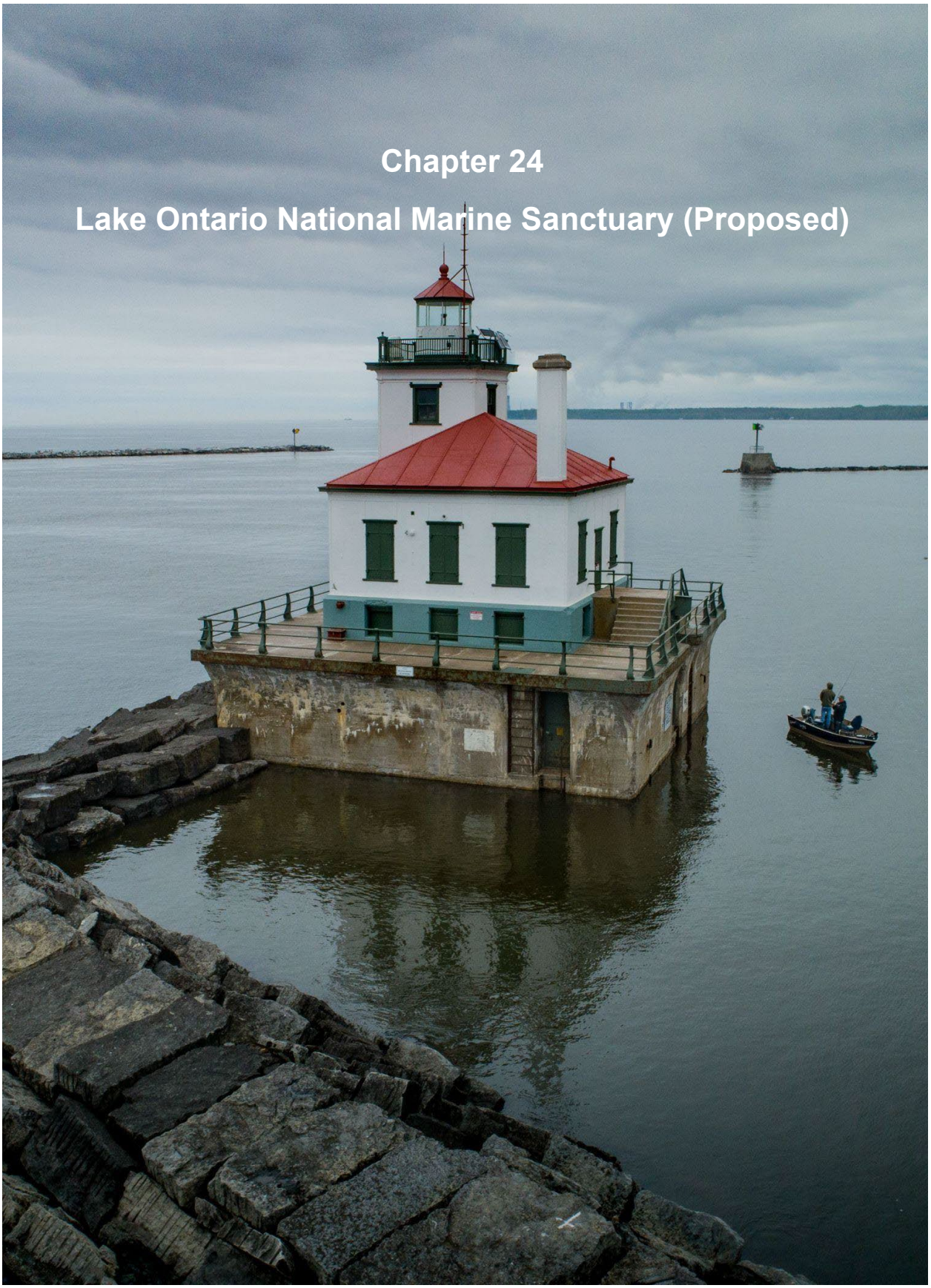
[6] "Full and by" is a nautical term meaning to sail in a way to keep the sails full of wind; colloquially, meaning to get on with things in a steady, calm way.



A diver checks out the wreck of *Walter B. Allen* in the sanctuary. Image: Tamara Thomsen/Wisconsin Historical Society.

Origins of the Sanctuary's Name

The sanctuary is named for the state of Wisconsin, which itself was named for the Wisconsin River. *A*ccording to the Wisconsin Historical Society, *Wisconsin* derives from the Miami Tribe, who used it to mean "river that meanders through something red."



Chapter 24

Lake Ontario National Marine Sanctuary (Proposed)

Chapter 24
Lake Ontario National Marine Sanctuary (Proposed)

A Shipwreck Collection

Eastern Lake Ontario and the Thousand Islands region of the St. Lawrence River comprise a historically rich area where the long relationship between human activity and the maritime environment has created a sense of place. That meaning is expressed and preserved in a wide variety of maritime cultural resources, from sacred places and cultural practices to lighthouses and historic shipwrecks. The first regional inhabitants, the ancestors of the Haudenosaunee Confederacy, developed a deep understanding of the lake and its resources. Together, these tangible and intangible elements form a rich maritime cultural landscape. The region includes an extraordinary collection of historic shipwrecks and underwater cultural resources, which are a central feature of its cultural landscape. These historic treasures include *Lady Washington* (1797–1803), the oldest known commercial sailing vessel in Lake Ontario; *Iroquoise*/HMS *Anson* (1759–1761), the oldest known shipwreck in the Thousand Islands region; the wreck of the schooner *St. Peter* (1873–1898), which is listed on the National Register of Historic Places; and a World War II-era aircraft, the Beechcraft C-45 Expeditor. Dive in to learn more about the ongoing process to create a sanctuary in Lake Ontario.

Below Deck (to 1983)

Lake Ontario's shores have been inhabited for thousands of years, and there is evidence of early human occupation in eastern Lake Ontario and the St. Lawrence River. Like other areas of the Great Lakes, humans are estimated to have reached eastern Lake Ontario about 12,000 years ago, when Indigenous peoples settled the region. These tribal ancestors gave rise to the Mohawk, Oneida, Onondaga, Cayuga, and Seneca nations who depended on the lake and its tributaries for food and other materials. These waterways also functioned as transportation arteries, playing a key role in tribal cultures.

A sketch from c.1760 showed a view of Oswego, NY and Fort Ontario. Image: Thomas Davies, courtesy of the Library of Congress.

European explorers and settlers found the area attractive for similar reasons. In 1615, Samuel de Champlain traversed the eastern Lake Ontario area as part of his larger explorations. French Jesuit missionaries arrived in the 1650s. In the early 1700s, the English began establishing trading stations and forts around the lake. The competition for land, furs, trading partners, and maritime access resulted in the French and Indian War, from which the English emerged victorious. The area remained under English rule until Jay's Treaty in 1795 ceded the territory to the newly fledged United States. Settlement came rapidly to the area, and towns grew up along the shores of Lake Ontario. In 1809, author James Fenimore Cooper was stationed as a naval midshipman in Oswego, which later provided the setting for his 1840 novel *The Pathfinder*.

After being interrupted by the War of 1812, immigration and settlement again grew once hostilities ceased. The opening of the Erie Canal and the Oswego Canal in 1825 and 1828, respectively, eased both the level of effort and cost of maritime transport, expanding trade and settlement even deeper into the central and western parts of the country. Increasingly faster vessels, railroads, and telegraph systems followed; until by the Civil War, the lake had lost its frontier character, becoming a settled landscape of farmlands and towns, connected by an efficient network of waterways and railroads.

> *Doubtless the Iroquois war-parties frequently pass over it on their way to almost certain victory; possibly a French bateau occasionally landed on its shore, or a French scout glided through its forests, listening every moment*

> *for the step of the vigilant Iroquois. Certainly the missionaries to Onondaga must have frequently passed through here, and it is certain, too, that at this time some Dutch and English traders had made their way up the Mohawk and down the Oswego into the lakes which the French had hitherto claimed as their own.*
>
> Crisfield Johnson, "History of Oswego County, New York," 1877

The commercial importance of the Port of Oswego waned after the Civil War. From the 1930s to the 1960s, fewer but larger, more modern vessels imported grain and exported coal from the region. Today the port sees traffic of about 120 shipping vessels, which move over a million tons of cargo each year, including aluminum, grain, salt, fertilizer, petroleum products, cement, and power-plant components.

On Deck (1983 to 2020)

In 1979, Selkirk Lighthouse and Fort Ontario were placed on the National Register of Historic Places, followed in the ensuing decades by additional National Register placements, including the wreck of *St. Peter* (2004), the Oswego Yacht Club (2010), *Derrick Boat No. 8* (2014), and the New York State Barge Canal (2014), among others. The wreck of *David W. Mills* was designated in 2000 as New York's only Submerged Cultural Preserve and Dive Site in the Great Lakes. The Erie Canalway National Heritage Corridor was also designated that year, recognizing the engineering and construction importance of a canal system that is one of the most successful and influential human-built waterways in North America.

The sanctuary system's history with Lake Ontario began in 1983, when the Great Lakes Regional Evaluation Team recommended the Cape Vincent area for placement on the Site Evaluation List. The recommendation cited Cape Vincent's natural resources—including many species of fish; resting, feeding, and nesting habitats for dozens of species of migratory and resident birds and waterfowl; and extensive invertebrate populations—rather than its maritime heritage resources. "In summary," they noted, "the team believes that because of its great scenic beauty, accessibility and abundance of fish and wildlife, the site would afford excellent opportunities for fisheries research, recreational enjoyment and educational experiences." The final SEL included Cape Vincent in 1983, but the site was never considered for designation.

More than three decades later, in January 2017, NOAA received a nomination from the city of Oswego and the leaders of four counties, including Oswego, Jefferson, Wayne, and Cayuga. Supported by the state of New York, they proposed that NOAA add the Great Lake Ontario National Marine Sanctuary to its inventory for potential designation. Unlike the earlier nomination of Cape Vincent, their application was based on the site's maritime cultural significance. New York nominated the area to protect and increase awareness of a nationally significant collection of shipwrecks; to foster partnerships with education and research groups; and to increase opportunities for tourism and recreation. The nomination was supported by over a hundred individuals and entities, including the Governor of New York, local and state

governments, educational institutions, historical societies, and economic and tourism development councils.

> *I would like to express my full support for this nomination to the National Oceanic and Atmospheric Administration for a National Marine Sanctuary in the waters of eastern Lake Ontario. As envisioned, the Great Lake Ontario National Marine Sanctuary would include many historically important shipwrecks and encompass hundreds of square miles off the eastern coast of the lake. Lake Ontario is one of our State's and country's great historical and cultural treasures with many of the oldest submerged maritime heritage resources in the Great Lakes region.*
>
> Governor of New York, December 2016, letter of support included with the Sanctuary Nomination Package

NOAA accepted the nomination into the inventory on March 21, 2017, noting, "It is clear that many care deeply about the unique resources in and around Lake Ontario." Unlike in 1983, the designation process started immediately in April 2017, when NOAA provided notice that it would conduct a scoping process and prepare designation documents for the proposed sanctuary. Public comments were collected via email and written letters, as well as at four public hearings: two hearings in Oswego and one hearing apiece in Sterling and Watertown.

Tibbetts Point Lighthouse. Image: Matt McIntosh/NOAA.

Aloft (2020 and ongoing)

Watertown played a different role in early 2021, as the proposed sanctuary partnered with the Thunder Bay International Film Festival to bring five Great Lake films to the Snowtown Film Festival.

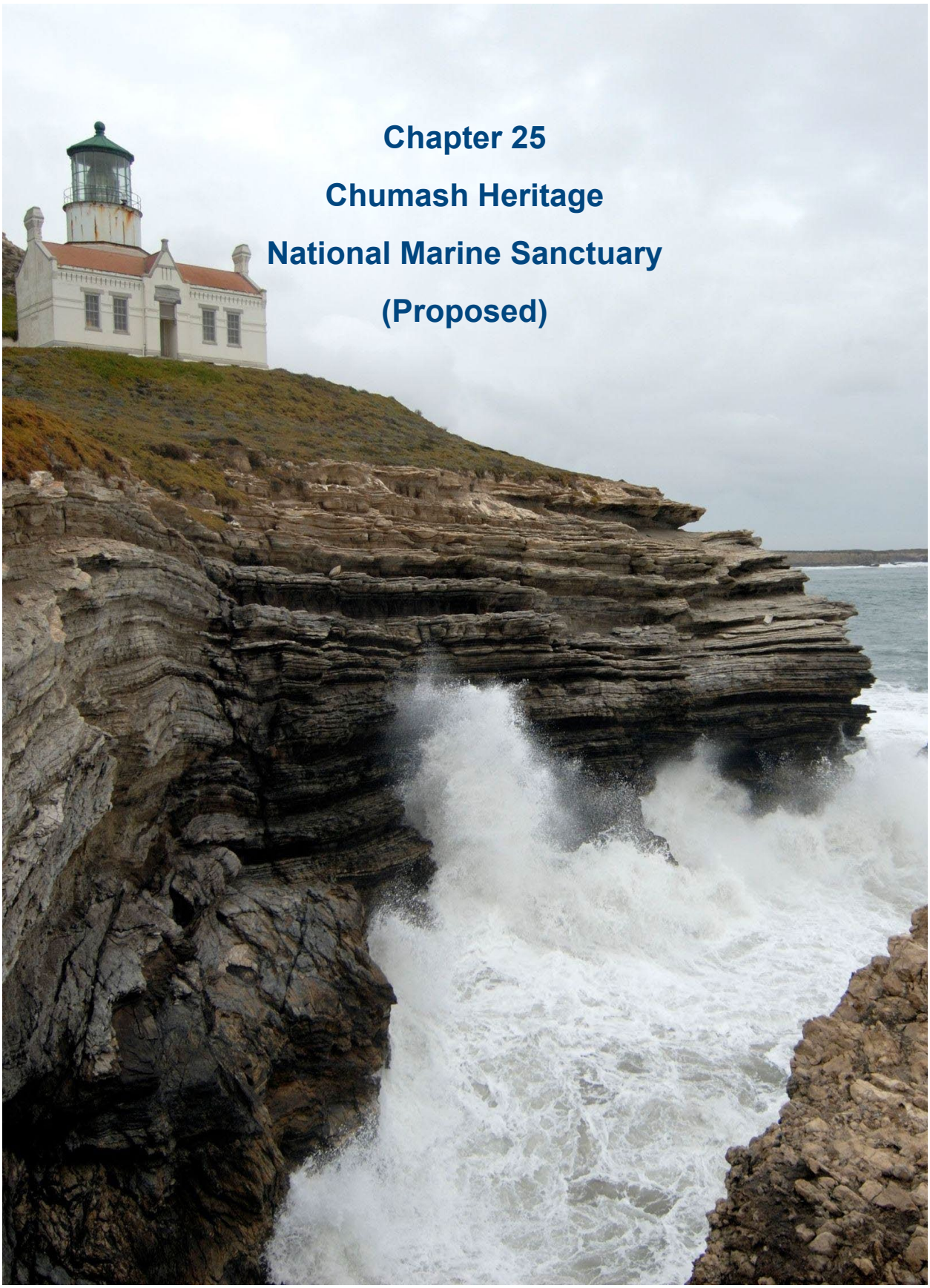
A fifteen-member sanctuary advisory council was seated in April 2020, and it met for the eighth time in March 2021. Governmental members include the U.S. Coast Guard; state of New York; Port of Oswego Authority; Cayuga, Jefferson, Oswego, and Wayne counties; and the city of Oswego. Voting seats included diving, education, maritime history, tourism, economic development, recreational fishing, recreational boating, shoreline property owner, and citizen at large.

In July 2021, a draft management plan and draft environmental impact statement were released for public review. NOAA collected comments through September 2021, including holding four virtual public meetings on August 18, 19, 24, and 26. The draft management plan included five action plans for sanctuary operations, education and outreach, research and monitoring, tourism and economic development, and resource protection. The public comments are now being considered in the preparation of a final management plan which, if the sanctuary is designated, will guide it long into the future.

A diver swims near the boiler of a shipwreck in the proposed sanctuary. Image: Nick Zachar/NOAA.

Origins of the Proposed Sanctuary's Name

The name *Ontario* is thought to come from Native American words that may mean "beautiful lake or water" or "sparkling water."

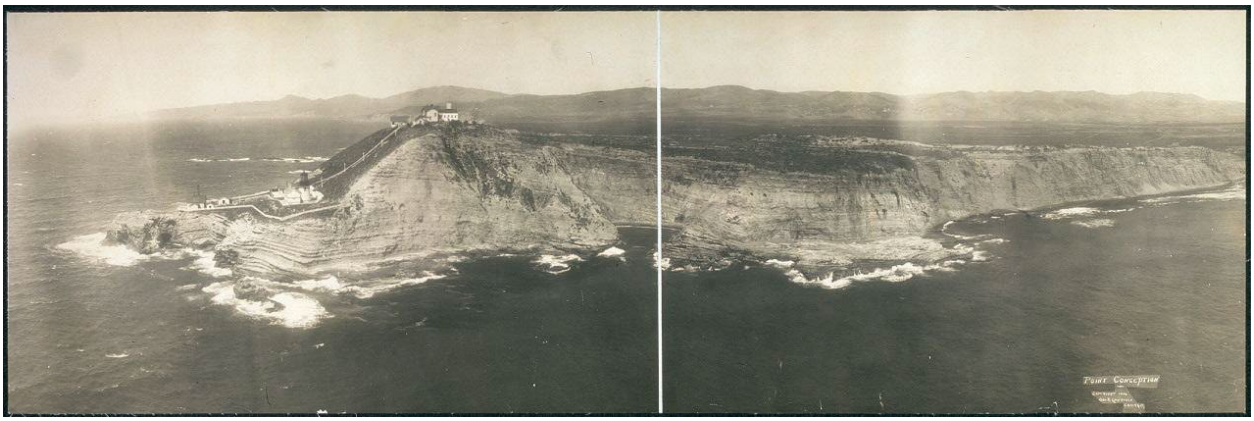


Chapter 25
Chumash Heritage
National Marine Sanctuary
(Proposed)

Chapter 25
Chumash Heritage National Marine Sanctuary (Proposed)

A Cultural and Natural Treasure

This proposed site of 7,561 square miles is adjacent to San Luis Obispo and Santa Barbara counties and abuts the boundaries of Monterey Bay and Channel Islands national marine sanctuaries, in central California, and in the heart of the California Current large marine ecosystem. The sanctuary proposal seeks to protect the area's rich biodiversity, including an ecological transition zone where temperate waters from the north meet the subtropics. It also recognizes and seeks to preserve Chumash tribal history. The area is known for its extensive kelp forests, sandy beaches, coastal dunes, and wetlands, which provide nursery grounds, resting and feeding areas, and migratory routes for numerous commercial fish species and many threatened and endangered species, including blue whales, southern sea otters, black abalone, snowy plovers, and leatherback sea turtles. Known shipwrecks in the nominated area are a significant part of the overall maritime landscape of the region and, as one of the nation's most historically important transportation corridors, the potential for discovery of other shipwrecks and submerged cultural sites is high. Residents and visitors enjoy commercial and recreational fishing, boating, kayaking, surfing, diving, wildlife watching, beach walking, and research.



A gelatin silver print from c.1906 shows the lighthouse at Point Conception. Image: George R. Lawrence, Co., courtesy of the Library of Congress.

A Rich Legacy (to 1983)

The southern California coastline is part of the ancestral lands of the Chumash people, and the ocean has been an integral part of their culture for thousands of years. As the nomination document for the site notes, "They fished with a complex array of fishing gear, including harpoons, shell carved hooks, nets, lines, sinkers, and fish traps. The tomol, the only sewn sea going plank canoe caulked with tar in North America, is central to Chumash heritage even today. Accomplished mariners, Chumash used their solar, lunar, and stellar knowledge to create

complex solstice and stellar alignments only now being rediscovered." Existing shell middens, village and foraging areas, and ceremonial sites have been documented and the potential for more such sites along submerged paleocoastlines is strong. Point Conception is of particular importance to the Chumash people as a sacred gateway where the souls of the dead begin their celestial journey to Similaqsa or paradise. (See also the discussion of the history of the Channel Islands in the culture of the Chumash in Chapter 9, above.)

> *In Chumash culture, the concept of Thrivability is a balanced, connected understanding of the natural world. Observing, learning and adapting to the interconnections of habitat, the Chumash value caring for the ecosystems of both ocean and land. It remains important to Chumash families today. Chumash descendants are in the midst of a cultural revival that is a testament to their rich cultural heritage. The tomol is a symbol of connection with the past, the ocean and maritime culture. The tomol keeps the ways of our ancestors alive for generations to come. The Chumash way of life is interwoven with the ocean and the many clans who still exist and thrive on the Central Coast. Today, Chumash people celebrate their ancestral ocean voyages in tomol canoes to honor their ancestors' crossings.*
>
> Chumash Heritage National Marine Sanctuary Nomination, July 2015

The Xolon Salinan Tribe and another band of Salinan also consider the area around Morro Bay, extending well to the north, as part of their ancestral lands. Ancestors of these and other Indigenous communities in this region thrived along the central California coast at least 13,000 years ago.

Modern conservation in the region may be dated to the early 20th-century establishment of two state parks in the Morro Bay area: Morro Bay State Park (established in 1934) and Morro Strand State Beach, which began its life as a protected area as Atascadero State Beach in 1948 and was expanded and renamed in 1988. Harmony Headlands State Park, south of Cambria, was established in 2003. Numerous state marine protected areas have been established along the coast in the last few decades. Federal conservation efforts include Guadalupe-Nipomo Dunes National Wildlife Refuge, south of San Luis Obispo, which was established in 2000, when the older Guadalupe-Nipomo Dunes Preserve managed by the state and The Nature Conservancy was transferred to the U.S. Fish and Wildlife Service. At the southern end of the proposed sanctuary, Gaviota State Park dates to 1953 and state ownership and operation of Refugio Beach Park (site of Refugio State Beach) dates to 1946.

A Resurgent Present (1983 to 2021)

Sanctuary system involvement with part of this area started in the early 1980s. Morro Bay was one of the sites included on the Site Evaluation List in 1983, at the time the pool of sites from which future sanctuaries were chosen. During the assessment process, the team of scientists working on the SEL noted its importance as a feeding ground and nesting area for both resident and migratory birds, as well as the rich research legacy among scientists from numerous colleges

and universities in the region. When Morro Bay was added to the SEL, the public mostly supported the action. Yet Morro Bay alone was never made an active candidate.

Morro Rock, a volcanic plug, is located at the entrance to Morro Bay and has the tribal place names of the Salinan *Le'samo* and Chumash *Lisamu'*. Image: Robert Schwemmer/NOAA.

During the designation of Monterey Bay National Marine Sanctuary in the early 1990s, and again during a management plan review process in the late 2000s, proposals were considered to expand the sanctuary's border south to encompass parts of the coastline now included in the proposed Chumash Heritage National Marine Sanctuary study area. A similar proposal to include waters along the mainland of the state within the boundaries of Channel Islands National Marine Sanctuary was also under consideration during the sanctuary's designation process in the late 1970s. None of these proposals advanced to active designation.

When the Sanctuary Nomination Process was created in 2014, the Chumash Heritage site was one of the first submitted, in July 2015 by the Northern Chumash Tribal Council. Their submission included letters of support from local universities, fishing clubs, elected officials, businesses, chambers of commerce, and conservation organizations, alongside petitions from students at California Polytechnic State University. The goals laid out in the nomination package included the creation of a "unique indigenous cultural sanctuary" that centers the heritage and philosophy of the Chumash in its management; the protection, studying, and sharing of the area's significant natural, maritime heritage, and cultural resources; stewardship collaboration and partnerships; and protection of the region's economic vitality.

The site was approved for the nomination inventory in October 2015. Its inclusion was renewed, following a review in September 2020, based on the site's national significance, presence of threats, and continuing community support.

A Thriving Future (2021 and Ongoing)

In November 2021, NOAA announced its intent to begin the designation process for the Chumash Heritage site, kicking off a public scoping process from November 2021 to January 2022. During this time, three virtual public meetings were held and comments received by 100 participants. Ultimately, nearly 1,200 individual comments were received during the 83-day public comment period. Some letters included attachments with thousands of comments.

> *The proposed sanctuary aims to recognize and preserve Chumash tribal history, protect the area's rich biodiversity, and build resilience to climate change impacts.*
>
> NOAA Administrator Dr. Richard Spinrad designation announcement

The public comments are now under review, which is the second in a series of steps including preparing a draft management plan, proposed regulations, and a draft environmental impact statement; to be followed by public review of the draft documents, then preparation and release of final documents, including boundaries and regulations. NOAA aims to complete designation by winter of 2023–24. If designated, Chumash Heritage National Marine Sanctuary will join its four older sibling sanctuaries in protecting our thriving ocean waters of the California Current.

Kelp forests like this near Point Conception provide habitat for invertebrates, fish, and marine mammals. Image: Robert Schwemmer/NOAA.

Origins of the Sanctuary's Name

The proposed sanctuary takes its name from the Chumash Tribe. According to the National Park Service, Chumash comes from *Michumash*, which means "makers of shell bead money."

Chapter 26

Hudson Canyon National Marine Sanctuary (Proposed)

Chapter 26
Hudson Canyon National Marine Sanctuary (Proposed)

A Hidden Treasure

Located over 100 miles southeast of New York City, the Hudson Canyon is the largest submarine canyon along the Eastern Seaboard and one of the largest in the world. Extending 350 miles seaward, it reaches depths of more than two and half miles and widths of up to seven and half miles. The size and topography of the canyon provide habitat for a vast array and abundance of marine wildlife, including protected and sensitive species such as sperm whales, sea turtles, deep sea corals, and seep communities. It also sustains commercially and recreationally important fish and invertebrates. Recreational divers enjoy the shallower parts of the canyon, and wildlife watchers from all over the region flock to the area to see whales, seabirds, and other wildlife.

Out of Sight (to 1979)

Hudson Canyon was an extension of the Hudson River when sea levels were lower during the last Ice Age. Given its distance from shore, little is known of what its use might have been to Native Americans in what is now New York and New Jersey. Its depth and distance from shore meant that there was little knowledge of its ecology until the *Arcturus* Oceanographic Expedition, a research voyage led by William Beebe of the New York Zoological Society in February to July 1925.

> *I took thirty-two kinds of deep sea fish, some of which are new to science…the most abundant were the delicate little Cyclothone–pale ones living in abundance at three to four hundred fathoms, while larger black species were more abundant from five to nine hundred fathoms. They were as delicate as tissue paper, with series of lights along the body and relatively enormous mouths with which they engulfed the tiniest of swimming creatures. When they came up they looked like minute bits of string stuck to the nets, but floated gently out in water all their exquisite structure and illuminating apparatus became visible.*
>
> William Beebe, "The Arcturus Adventure," 1926

The *Arcturus*, on its way home from exploring the Galapagos and other locations, made Hudson Canyon its last research location. In late July, the scientists on board spent a few days sampling what Beebe called "the royal gorge of the Hudson River." Their discoveries were only a hint of the research riches that subsequent expeditions have found over the following century.

A drawing of sea devils sampled from Hudson Canyon by the *Arcturus* Oceanographic Expedition in 1925. Image from "The Arcturus Adventure" by William Beebe, 1926.

Since the 1970s, further research expeditions have revealed the geology and geometry of the canyon, how mud settles in shallow places and currents sometimes scour its walls. Scientists have uncovered how oceanographic conditions create the microhabitats that support such rich biodiversity and unveiled communities of organisms living along cold methane seeps. Furthermore, researchers have concluded much remains to be discovered about Hudson Canyon.

A Break in the Night (1979 to 2022)

Sanctuary system interest in Hudson Canyon dates to the late 1970s. In 1979, Hudson Canyon was included on the List of Recommended Areas (LRA), at the time the pool of sites from which future sanctuaries were chosen. When the Site Evaluation List (SEL), the replacement for the LRA, was being built, the team of scientists considered including all the north Atlantic sites from

the LRA, including Hudson Canyon. But the area was not added when the SEL was finalized in 1983.

> *A Hudson Canyon National Marine Sanctuary off the coast of New York and New Jersey will provide a special place for millions to enjoy and use today, while securing an ecological legacy for generations to come.*
>
> New York Aquarium, Hudson Canyon National Marine Sanctuary Nomination

In November 2016, the Wildlife Conservation Society's New York Aquarium submitted a nomination for Hudson Canyon to be included in the Sanctuary Nomination Inventory, citing nationally significant resources such as its rich ecology, biodiversity, and productivity; extensive maritime history; and importance to local recreational and commercial fishers and divers, and other economic uses. Goals proposed for the site in the nomination included conservation of wildlife and habitats, promotion of sustainable economic uses, enhanced research and education programs, and forging of new partnerships. Letters of support were received from members of New York and New Jersey's Congressional delegations, state legislators, local elected officials, chambers of commerce, nonprofit organizations, and recreational divers.

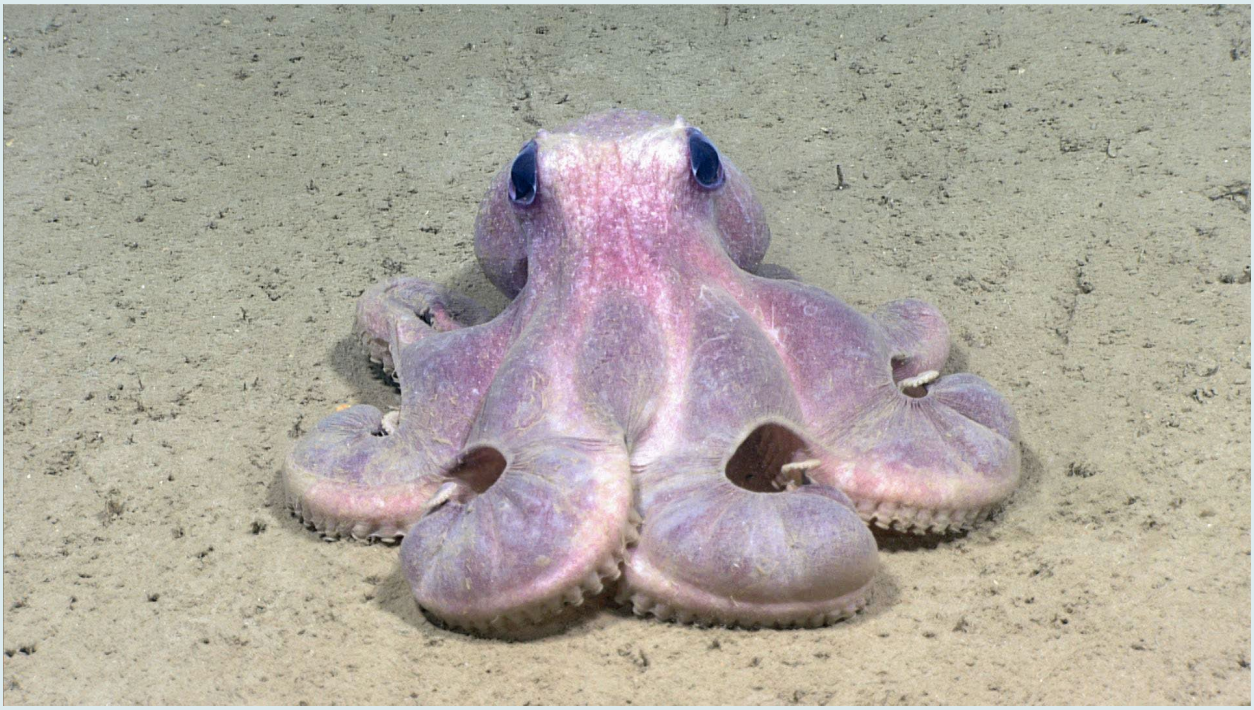
After undergoing its required reviews, Hudson Canyon was added to the inventory in February 2017. The site was renewed for another five years in February 2022, after an assessment to validate its continuing national significance, presence of threats, and community support.

An octopus, sea star, bivalves, and dozens of cup coral all share the same ledge in Hudson Canyon. Image: NOAA/BOEM/USGS.

Bright Light (2022 and Ongoing)

On June 8, 2022, NOAA issued a notice of intent to begin the designation process for the proposed sanctuary in the Hudson Canyon area. The first step was to initiate a scoping process to collect information, ideas, and comments from the public on potential boundaries, management measures, and non-regulatory programs. Interested members of the public were able to submit written comments during the scoping period and at virtual and in-person public meetings. The public comment portion of scoping closed in August 2022.

The public comments are now under review; they will be used to help shape a draft management plan, proposed regulations, and a draft environmental impact statement that will be released for additional public review and comment in upcoming steps in the designation process. It's important to shine a bright light on Hudson Canyon, to bring awareness to the specialness of this area, to bring this place to many people who don't know it exists. And while the designation is estimated to take between three and five years, one day a new sanctuary in Hudson Canyon may join its older siblings in helping protect American waters.



A deepwater octopus rests on the seabed in Hudson Canyon. Image: NOAA Office of Ocean Exploration and Research

Origins of the Sanctuary's Name

Hudson Canyon is named for the Hudson River. The Hudson River was named after English explorer Henry Hudson, who explored the area for the Dutch East India Company in 1609. The name Hudson is believed to derive from the Middle English "son of Hud" or "son of Hugh", which could derive from a Gaelic word meaning *fire*.

Conclusion: Toward a Blue Century

On October 23, 2022, the National Marine Sanctuary System will mark its 50th anniversary. The program has had bitter disappointments and bittersweet victories, has been loudly criticized and warmly lauded. It is, after half a century, still revelatory and still relevant, needed more now than ever before.

The sanctuary system has seen radical changes since its founding. How we do business has fundamentally changed. Official documents have gone from being typewritten on mimeograph paper to Lexitron word processors to laptop computers that are more powerful than those once used to send humans to the moon. Digital color imagery has succeeded the grainy, black-and-white photos of yesterday, while sophisticated digital maps have replaced hand-drawn charts. Our educators once loaned slide shows to local schools, then passed out DVDs of educational material, and now take students on 360° virtual dives. In 1972, most viewers could only visit the sea when the *Undersea World of Jacques Cousteau* aired three times, with episodes about the manatee, octopus, and nautilus; now, we can stream footage from the bottom of the sea and the heights of space whenever we want. The workforce that was once dominated by a single demographic grows increasingly diverse across ages, backgrounds, and ethnicities.

What has remained constant, however, is the system's conservation mission. For three generations, people have devoted themselves to underwater parks, whether as a professional vocation or a passionate avocation, because they care about the ocean and the communities that rely on it. We know great challenges lie ahead. We also know we will rise to meet them because of the extraordinary resolve, dedication, and talent of the 320 people on our team, the more than 700 organizations who partner with us, the 12,000 volunteers who work beside us, and the millions of ordinary citizens who visit, enjoy, and preserve their special ocean places. When *Earth is Blue* launched in 2016, the director of the sanctuary system wrote in his introduction, "I hope this is a tangible reminder that no matter where you are, the ocean and Great Lakes are in your hands. I hope it inspires you to help care for our ocean and to spread the word that Earth isn't green — it's blue." This truth drives all who work, volunteer, and support the sanctuary system. The future of our ocean planet is in our hands. Let's leave it a thriving world for generations to come.

For Further Information and Reading

Websites

National Marine Sanctuary System Homepage: sanctuaries.noaa.gov

Books

America's Marine Sanctuaries: A Photographic Exploration by National Marine Sanctuary Foundation, Smithsonian Books, Washington DC, 2020.

Archipelago: Portraits of Life in the World's Most Remote Island Sanctuary by David Littchwager and Susan Middleton, National Geographic, Washington, DC, 2005.

Explore the Northeast National Marine Sanctuaries with Jean-Michel Cousteau by Jean-Michel Cousteau, Square One Publishing, Garden City Park, NY, 2013.

Explore the Pacific Islands National Marine Sanctuaries with Jean-Michel Cousteau by Jean-Michel Cousteau, Square One Publishing, Garden City Park, NY, 2017.

Explore the Southeast National Marine Sanctuaries with Jean-Michel Cousteau by Jean-Michel Cousteau, Square One Publishing, Garden City Park, NY, 2017.

Explore the West Coast National Marine Sanctuaries with Jean-Michel Cousteau by Jean-Michel Cousteau, Square One Publishing, Garden City Park, NY, 2004.

Fathoming Our Past: Historical Contexts of the National Marine Sanctuaries by Bruce G. Terrell, NOAA National Marine Sanctuary Program. 1995, updated 2007.

Ghost Fleet of Mallows Bay and Other Tales of the Lost Chesapeake by Donald G. Shomette, Tidewater Publishers, Centreville, MD, 1996.

The Invention of the Park by Karen R. Jones and John Wills, Polity Press, Cambridge, UK, 2005.

A Natural History of the Monterey Bay National Marine Sanctuary edited by Michael A. Rigsby, Monterey Bay Aquarium Press, Monterey, California, 1999.

Shipwrecks of Stellwagen Bank: Disaster in New England's National Marine Sanctuary by Matthew Lawrence, Deborah Marx, and John Galluzzo, History Press, 2015.

Stellwagen Bank: A Guide to the Whales, Sea Birds, and Marine Life of the Stellwagen Bank National Marine Sanctuary by Natalie Ward, Down East Books, 1993.

USS Monitor*: A Historic Ship Completes Its Final Voyage* by John Broadwater, Texas A&M University Press, 2012.

Wild Ocean: America's Parks Under the Sea by Sylvia Earle and Henry Wolcott, National Geographic, 1999.

Glossary and Acronyms

Active Candidate	An area that has been selected to begin and is in a designation process
Antiquities Act	Legislation passed in 1906 that allows the President or Congress to create national monuments on land or underwater through an Executive Order
Designation	An administrative process by which national marine sanctuaries are created
LRA	List of Recommended Areas, the pool of sites from which active candidates were chosen in 1979-1982
Management Plan	A document prepared by NOAA that spells out the boundary, regulations, management measures and programs like research and education for a specific sanctuary
Marine National Monument	A specific type of underwater park created under the Antiquities Act
Marine Protected Area	An underwater park
Marine Reserve	A type of marine protected area that does not allow any harvesting activities like fishing or taking shellfish or other materials
MPRSA	Marine Protection, Research, and Sanctuaries Act, the authorizing legislation (Title III) for the National Marine Sanctuary Program in 1972
NMSA	National Marine Sanctuaries Act; the name of the stand-alone Title III as separated from the MPRSA in 1992
National Marine Sanctuary	A specific type of underwater park created under the National Marine Sanctuaries Act

NOAA	National Oceanic and Atmospheric Administration, the parent agency of the sanctuary program
SEL	Site Evaluation List, the pool of sites from which active candidates were chosen from 1983 to the mid-1990s
SNP	Site Nomination Process, a process used to build an inventory of sites to be considered as active candidates, active 2014 to present
Zone	A smaller management area within the boundaries of a larger marine protected area set aside for special measures like restricted activities or for research only

Image Credits

Cover Image: The shoreline of Greater Farallones National Marine Sanctuary. Image: Jennifer Stock/NOAA.

Part I opening image: *The Much Resounding Sea* by Thomas Moran, 1884, courtesy of the National Gallery.

Chapter 1 opening image: *Hauling in the Nets* by Winslow Homer, 1887, courtesy of the National Gallery.

Chapter 2 opening image: A park ranger points out important features of Acadia National Park to visitors in the 1960s. Image: National Park Service.

Chapter 3 opening image: A snorkeler dives in Pennekamp Coral Reef State Park in the Florida Keys in 1975. Image: Flip Schulke, courtesy of the National Archives.

Chapter 4 opening image: A humpback whale dives beneath the surface beside a whale watching boat in Channel Islands National Marine Sanctuary. Image: Bill Faulkner/National Park Service.

Chapter 5 opening image: New signs were installed in vantage points in Hawaii in 1993 after Hawaiian Island Humpback Whale National Marine Sanctuary was established in 1992. Image: Jeff Alexander/NOAA.

Chapter 6 opening image: Boaters enjoy the flats of Florida Keys National Marine Sanctuary in the late 2000s. Image: NOAA.

Chapter 7 opening image: Yoga participants practice on the shores of Olympic Coast National Marine Sanctuary. Image: Karlyn Langjahr/NOAA.

Part II opening image: Kure Atoll sits on the horizon in Papahānaumokuākea Marine National Monument. Image: Paulo Maurin/NOAA.

Chapter 8 opening image: A diver shines a light on the wreck of Monitor. Image: NOAA.

Chapter 9 opening image: Hikers check out a view of Channel Islands National Marine Sanctuary. Image: Claire Fackler/NOAA.

Chapter 10 opening image: Coral found in Gray's Reef National Marine Sanctuary. Image: Greg McFall/NOAA.

Chapter 11 opening image: Tidepooling at Pigeon Point in Greater Farallones National Marine Sanctuary. Image: Sara Heintzelman/NOAA.

Chapter 12 opening image: A view of a lagoon in National Marine Sanctuary of American Samoa. Image: Greg McFall/NOAA.

Chapter 13 opening image: A Pacific white-sided dolphin does a flip out of the water of Cordell Bank National Marine Sanctuary. Image: Sage Tezak/NOAA.

Chapter 14 opening image: Aerial view of anchored boats in the ocean in Florida Keys National Marine Sanctuary. Image: Matt McIntosh/NOAA.

Chapter 15 opening image: A research diver explores Flower Garden Banks National Marine Sanctuary. Image: John Embesi/NOAA.

Chapter 16 opening image: Observers look out over Franklin Point in Monterey Bay National Marine Sanctuary. Image: Robert Schwemmer/NOAA.

Chapter 17 opening image: Seagulls hang out with a humpback whale in Stellwagen Bank National Marine Sanctuary in hopes of snatching up some of its meal. Image: NOAA/WCNE, under NOAA Fisheries permit #605-1904.

Chapter 18 opening image: Submerged humpback whales in Hawaiian Islands Humpback Whale National Marine Sanctuary. Image: Ed Lyman/NOAA, under NOAA permit #774-1714.

Chapter 19 opening image: Hikers explore Rialto Beach beside Olympic Coast National Marine Sanctuary. Image: Karlyn Langjahr/NOAA.

Chapter 20 opening image: Two divers check out Nordmeer in Thunder Bay National Marine Sanctuary. Image: Tane Casserley/NOAA.

Chapter 21 opening image: A pair of red-footed boobies nest in Papahānaumokuākea Marine National Monument. Image: Mark Sullivan/NOAA.

Chapter 22 opening image: Kayakers row near the remains of the Ghost Fleet in Mallows Bay-Potomac River National Marine Sanctuary. Image: Kate Thompson/NOAA.

Chapter 23 opening image: Kayakers set out from Sheboygan to explore Wisconsin Shipwreck Coast National Marine Sanctuary. Image: David J. Ruck/NOAA.

Chapter 24 opening image: A lighthouse in the sanctuary. Image: Matt McIntosh/NOAA.

Chapter 25 opening image: Point Conception Lighthouse. Image: Robert Schwemmer/NOAA.

Chapter 26 opening image: Deepsea octocoral in Hudson Canyon. Image: NOAA's Office of Ocean Exploration.

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https://sanctuaries.noaa.gov