



# OUR BLUE LEGACY

## FIFTY YEARS OF IMPACT OF THE NATIONAL MARINE SANCTUARY SYSTEM



National Oceanic and Atmospheric Administration

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**NATIONAL  
MARINE  
SANCTUARIES**

Cover photos (left to right, from top): Greater Farallones National Marine Sanctuary, Matt McIntosh/NOAA; Hawaiian Islands Humpback Whales National Marine Sanctuary, NOAA, under NOAA Permit #774-1714; Thunder Bay National Marine Sanctuary, David Ruck/NOAA; Flower Garden Banks National Marine Sanctuary, Emma Hickerson/NOAA

## Executive Summary

The Marine Protection, Research, and Sanctuaries Act was signed on October 23, 1972, creating one of the oldest and largest networks of underwater parks in the world. Today the National Marine Sanctuary System covers more than 620,000 square miles of protected ocean and Great Lakes waters in 15 national marine sanctuaries and two marine national monuments. On October 23, 2022, the sanctuary system celebrates its 50th anniversary and is using the opportunity to, among other things, issue this report summarizing its impacts and accomplishments as it looks forward to the next 50 years.

### Findings

1. The National Marine Sanctuary System offers a unique authority and proven performance in ocean conservation.
2. The National Marine Sanctuary System has changed the way people and organizations think and behave about our ocean.
3. The National Marine Sanctuary System catalyzes action across a diverse sector of interests and partners.
4. The National Marine Sanctuary System has fostered projects, generated innovations, and made discoveries that benefit the conservation efforts of the U.S. and of the world.
5. The National Marine Sanctuary System has benefited sanctuary gateway communities and the American people.
6. The National Marine Sanctuary System has demonstrated and proved a new management model for protected areas and ocean governance in the United States.
7. The National Marine Sanctuary System has changed the way the federal government views, manages, engages, and protects maritime and cultural heritage resources.
8. The National Marine Sanctuary System is a world leader in marine protected area management.

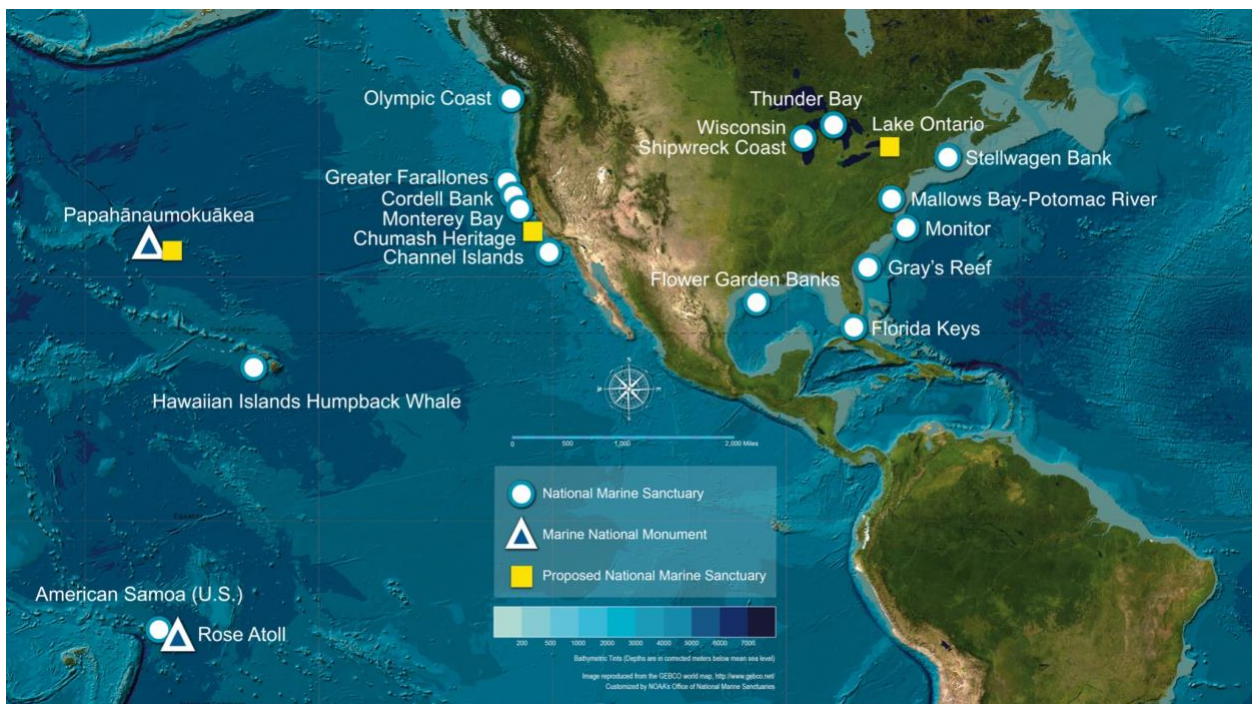


Thunder Bay National Marine Sanctuary protects a historically-significant collection of shipwrecks in the country, including this one, the steam barge *B.W. Blanchard*. Photo: David J. Ruck/NOAA

## Introduction

On October 23, 1972, a few things of note happened. *Pippin* opened on Broadway where it would enjoy over 1,900 performances before ending. *MASH* debuted the month before, in its first of what would be 11 award-winning seasons. *My Ding-a-Ling* by Chuck Berry was #1 on the top 40 and *Lady Sings the Blues* starring Diana Ross debuted at the box office the Friday before. A major offensive had recently ended in the Vietnam War, and a federal grand jury had just charged the Watergate burglars. On that unseasonably warm and sunny Monday, President Richard Nixon signed a key piece of legislation that would have profound impacts on the nation's marine conservation.

The Marine Protection, Research, and Sanctuaries Act had the primary purpose of, and was at its signing most lauded for, prohibiting ocean dumping through its first two titles. Title III, added after much compromise in Congress and reluctantly signed by the president, created the National Marine Sanctuary Program and would later be reauthorized on its own as the National Marine Sanctuaries Act. Today the National Marine Sanctuary System covers more than 620,000 square miles of protected ocean and Great Lakes waters in 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments.



There are 15 national marine sanctuaries and Papahānaumokuākea and Rose Atoll marine national monuments in the National Marine Sanctuary System. Image: NOAA

The nation's marine legacy from the last half century contains both victories—a global moratorium on commercial whaling, recovery of fisheries, creation of some of the largest underwater parks on the planet—and challenges—climate change, species on the brink of extinction, continuing habitat and biodiversity losses, and a growing problem with plastic pollution. As an integral part of that marine legacy, the sanctuary system has a story to tell of change, growth, and impact. This report tells the story of our blue legacy.

A series of findings follow, based on evidence as varied as the external reviews that have been conducted of the system since the mid-1970s, to the scholarly words of academic, legal, and policy experts, to our own condition reports and performance measures. Together, they speak to a legacy in which America can take pride. Together, they speak to a challenge that remains.



Some visitors take in the view of Monterey Bay National Marine Sanctuary from Franklin Point. Photo: Robert Schwemmer/NOAA

## Findings

### ***Finding 1: The National Marine Sanctuary System offers a unique authority and proven performance in ocean conservation.***

*The National Marine Sanctuaries Act (NMSA) is the only federal authority for taking an ecosystem approach to marine conservation and establishing national marine protected area networks.*

At least one early critic criticized the NMSA for its broad authority, writing: “[T]he Office’s responsibility for the Marine Sanctuary Program gave it control over a vague, open-ended authority to designate ocean areas for their ‘conservation, recreational, ecological, and esthetic values’ and regulate them as necessary to protect those values. The place of this program and broad statutory authority in an Office devoted to ocean management raised widespread questions about both the mission of the Office and the mission of the sanctuary program.”<sup>1</sup> But others, from very early on, had different opinions in noting the differences of the NMSA (and its earlier incarnation as Title III of the Marine Protection, Research, and Sanctuaries Act, MPRSA) among the nation’s marine conservation acts. Early expert commenters made the case that, rather than act as a restrictor of single uses like other laws, the MPRSA was (and is) a proactive, comprehensive approach to protecting important marine areas.<sup>2</sup> The NMSA has been consistently cited as the only and/or the best federal authority for taking an ecosystem approach to marine conservation and establishing national marine protected area networks.<sup>3</sup> Authorities such as the Congressional Research Service (CRS) and the Government Accountability Office (GAO) have found the NMSA offers unique benefits and fills gaps left by other laws. The CRS states: “Research reveals a variety of respects in which the marine sanctuaries act appears to offer environmental protection benefits not directly achievable through other federal statutory authorities...A generalized benefit of the MPRSA sanctuary program is its apparent position as the only Federal authority for comprehensive management of sensitive marine areas, an approach that is arguably superior to seriatim response to environmental threats as they materialize. Finally, the unqualified nature of Title III coverage as to activities occurring within a sanctuary raises the possibility of its future utility in dealing with some environmental threat not envisioned by existing environmental protection law.”<sup>4</sup> CRS followed that up in 2010 with a similar assessment: “[T]he National Marine Sanctuary Program is the closest to providing a comprehensive approach to using MPAs.”<sup>5</sup>

GAO agreed: “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.”<sup>6</sup> “Similarities can be found with national or state park

<sup>1</sup> Bleicher, 1984


<sup>2</sup> Blumm & Blumstein, 1978 and Kifer, 1975

<sup>3</sup> Congressional Research Service, 1979, 1980, and 2004, and GAO Comptroller General of the US, 1981

<sup>4</sup> Congressional Research Service, 1979

<sup>5</sup> Congressional Research Service, 2010

<sup>6</sup> GAO Comptroller General of the US, 1981



and refuge programs...[sanctuaries] can be seen as special areas which are managed for the public benefit and use in concert with protection of resource values” notes a 1981 article.<sup>7</sup> An attorney writing in a law journal agreed in 2002: “The National Marine Sanctuaries Act (NMSA) is the strongest, most readily-available counterpart to the legislation used to create land-based terrestrial reserves such as national parks, forests, and wildlife refuges.”<sup>8</sup>

Other advantages of the NMSA and of the sanctuary system have also been called out over the years. In 2008, a law professor observed: “Thus, the NMSA is the one existing federal statutory tool for multiple-use management in the United States ocean waters.”<sup>9</sup> The ability of the system to adaptively manage was called out by an article in 2010: “[T]he National Marine Sanctuary Program is one of the few federal agencies with a Congressional authorization to undertake an adaptive approach to management.”<sup>10</sup> An analysis in 2011 looking at how the NMSA met the three objectives of the National Ocean Policy (ecosystem-based management, marine spatial planning, and public participation) found that “...the provisions of the NMSA provide a basis for achieving all these goals.”<sup>11</sup> An article by an array of scientists and economists concluded of the NMSA and the Antiquities Act: “Because they are place-based, these Acts necessarily manage marine resources on an ecosystem-wide basis to achieve their purposes. By contrast, most other marine resource laws primarily manage a single sector or protected resource. As a result, the Antiquities Act and Sanctuaries Act have the potential to be among our nation's most effective policy tools for linking ecosystem-wide management authority with science-based decision making. These statutes are thus key to meeting the government's public trust responsibility in our ocean waters.”<sup>12</sup>

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<sup>7</sup> Epting, 1980-81

<sup>8</sup> Brax, 2002

<sup>9</sup> Hildreth, 2008

<sup>10</sup> Etheridge *et alia*, 2010

<sup>11</sup> Lynch, 2011

<sup>12</sup> Bruno *et alia*, 2018



This brilliantly orange lion's paw scallop is only one of many types of colorful invertebrates found in Gray's Reef National Marine Sanctuary. A Research Area in the southern third of the sanctuary allows scientists to compare the impact of human uses on surrounding and similar habitats. Photo: Greg McFall/NOAA

### **We have demonstrated conservation results.**

When sanctuaries are designated, NOAA takes on management responsibility for areas that have been subjected to human use and abuse for centuries. NOAA also must manage discrete areas that are still subject to the long-term, large-scale issues facing the larger ocean, including climate change, pollution, habitat loss, and overfishing. Nevertheless, we are seeing results after years of conservation efforts, ours and those of our partners at all levels of government. The National Academy of Public Administration (NAPA) noted in their 2006 review: "The National Oceanic and Atmospheric Administration, the Executive Branch, and Congress should look to the National Marine Sanctuary Program as an essential part of ocean governance, and invest resources in the program accordingly."<sup>13</sup> NAPA affirmed this view in their most recent review of the system, completed early in 2021: "While a relatively small Agency with a modest annual program budget of about \$55 million and construction budget of about \$3 million, ONMS is embedded in the Department of Commerce's National Oceanic and Atmospheric Administration (NOAA), and has nearly a half century track record of successfully advancing its mission and vision."<sup>14</sup>

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<sup>13</sup> National Academy of Public Administration, 2006

<sup>14</sup> National Academy of Public Administration, 2021





This coral is part of the third-largest coral barrier reef system protected by Florida Keys National Marine Sanctuary. Photo: Matt McIntosh/NOAA

These threats show that even the strongest localized protection cannot fully protect sanctuary wildlife and habitats from threats like climate change and disease outbreaks, and that we must do all we can to reduce stressors we can control in order to make resources more resistant to those we have little to no control over. We also need to embrace the advice to “act locally and think globally” to protect the natural resilience of local resources. For example, healthy coral reefs, seagrass beds, and kelp forests that are not stressed by pollution or overharvesting can withstand warmer temperatures better than those already struggling to stay alive. Likewise, robust wildlife populations are more likely to survive a disease outbreak. At the same time, we need to build a strong global ocean stewardship ethic that produces a healthier world ocean, thereby supporting local resources and the communities that depend on them.

We also conduct and/or facilitate other types of projects. Our hands-on stewardship work with volunteers, students, and at our facilities in 2019, for example, removed nearly 82,000 pounds of trash from our beaches and waterways, eradicated nearly 440,000 square feet of non-native plants, planted more than 7,600 native and fruit trees, and prevented the use of more than 230,000 single use plastic water bottles.

**Every formal review of the system, while noting specific challenges that needed to be addressed, has found the system to be fundamentally sound and well-managed.**

The National Marine Sanctuary System has been formally reviewed a number of times in its 50-year history. Every review, while highlighting issues needing attention, has found the program

to be fundamentally sound and well-managed.<sup>15</sup> For example, the 2000 report from NAPA states: “The National Marine Sanctuary Program is fundamentally well conceived and is beginning to demonstrate notable successes in protecting valuable parts of the ocean,” and further agrees in 2006: “It offers a unique and promising model for effective multipurpose marine governance. Its design and, at their best, its day-to-day operations follow the recommendations of two recent national commissions on ocean policy.” The PART (Program Assessment Rating Tool) review conducted by the Office of Management and Budget in 2005 noted: “The NMSP [National Marine Sanctuary Program] has clear purposes and is well-managed.”<sup>16</sup> The 2008 review by the Inspector General of the Department of Commerce, NOAA’s parent agency, found: “The sanctuary program is generally making progress towards long-term protection of marine ecosystems and cultural resources.”<sup>17</sup> NAPA, in 2021, urges building on the system’s success to help address coming challenges; “...based on a respectable ONMS success track record and trusted reputation with large segments of the marine stakeholder community, the Panel urges NOAA and ONMS leaders to act expeditiously and opportunistically to expand the vision and role of the System in the domestic and global movement on marine environment policy.”<sup>18</sup>

### **We have received extensive external recognition and honors.**

Staff, programs, and facilities have won well over a hundred significant awards, including prestigious Gold, Silver, and Bronze Medals from the Department of Commerce, and Administrator’s Awards from NOAA, for actions as varied as responding to emergencies and saving the lives of colleagues to leading high profile conservation actions and innovating in conservation technology. Two of the system’s volunteer programs have won Take Pride in America Awards: Channel Islands National Marine Sanctuary’s Channel Islands Naturalist Corps in 2011 and Hawaiian Islands Humpback Whale National Marine Sanctuary’s Ocean Count in 2012. The Advisory Council on Historic Preservation Award for exemplary performance was given to the system in 2007. Two sites have been recognized as Blue Parks by the Marine Conservation Institute: the entire Papahānaumokuākea Marine National Monument and the marine protected area network of Channel Islands National Marine Sanctuary. Papahānaumokuākea Marine National Monument has been inscribed as a World Heritage Site and California national marine sanctuaries are part of the Man and the Biosphere Reserve Network. Experts from the Whale and Dolphin Conservation Society recognized the positive benefits that sites like Stellwagen Bank and Monterey Bay national marine sanctuaries have brought to protect whales in their regions.<sup>19</sup> Individual sites and the sanctuary system as a whole have been featured in national and international media outlets, including *National Geographic*, PBS, BBC, Discovery Channel, National Public Radio, and many others.

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<sup>15</sup> Center for Natural Areas, 1977; GAO Comptroller General of the US, 1981; External Review Team, 1993; National Academy of Public Administration, 2000, 2006, and 2021; White House Office of Management and Budget, 2005

<sup>16</sup> White House Office of Management and Budget, 2005

<sup>17</sup> Department of Commerce Office of the Inspector General, 2008

<sup>18</sup> National Academy of Public Administration, 2021

<sup>19</sup> Hoyt, 2005

## Case Study: Recovery of Monterey Bay National Marine Sanctuary



The sea otter is one of the most iconic animals found in Monterey Bay National Marine Sanctuary.  
Photo: NOAA

California's central coast is an area of rich productivity, habitats, and biodiversity, but the human toll on it has been severe, evidenced in such factors as the decimation of sea otters and whales from hunting, the serial depletion of abalone populations since the 1950s, and the collapse of the sardine fishery in the 1950s. While recovery of some populations remains stalled or slow, other species have rebounded with the conservation measures of Monterey Bay National Marine Sanctuary and other authorities including the National Marine Fisheries Service and the State of California. The site's 2015 condition report summed up: "Overall, 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...Most of the sanctuary's regularly monitored key species and species assemblages appear to be stable or slightly improving in status."<sup>20</sup> In 2017, as BBC aired its *Big Blue Live* show, featuring Monterey Bay National Marine Sanctuary, the producer was a little more effusive: "This is a very special place that attracts animals from the four corners of the Pacific. It's a wildlife spectacle unique in the world. Most of the animals recently made a miraculous recovery. Few people thought they'd recover at all, let alone in the numbers you find here. If it can work here, it should inspire the rest of the world to take care of their ocean."

<sup>20</sup> Office of National Marine Sanctuaries, 2015

## Case Study: The MPA Network of Channel Islands National Marine Sanctuary



California sheephead swims in kelp forest in Channel Islands National Marine Sanctuary. Photo: Robert Schwemmer/NOAA

In sites that have marine reserves or other types of no-take areas, we consistently see results. In the mid-2000s, the sanctuary system, National Marine Fisheries Service, and the State of California established a network of no-take and restricted-take marine protected areas (MPAs) inside Channel Islands National Marine Sanctuary. After more than 15 years of monitoring the marine protected area network, scientists found the biodiversity was greatest inside the oldest protected areas and lowest in areas outside of them; landings of California spiny lobster increased. A 2017 report from the state of California sums up: “Twelve MPAs were implemented within state waters at the northern Channel Islands in 2003, and a thirteenth was implemented in 2007, prior to the establishment of other South Coast MPAs in 2012. Eleven of the thirteen are SMRs, which restrict all take. The biomass of reef-associated fish species targeted by commercial and recreational fishing has increased throughout the northern Channel Islands since 2003. Researchers detected biomass (total weight in a given area) increases both inside and outside of northern Channel Islands MPAs, but the rate of change was much greater inside northern Channel Islands MPAs. The average size of individual Kelp Bass and California Sheephead was significantly larger inside northern Channel Islands MPAs than outside. The abundance of targeted invertebrate species, including California spiny lobster, warty sea cucumber, and red sea urchin, was higher inside northern Channel Islands MPAs. Non-targeted fish species also showed increases in biomass, but at similar rates inside and outside northern Channel Islands MPAs.”




A humpback whale and her calf linger near the ocean surface in Hawaiian Islands Humpback Whale National Marine Sanctuary. The way whales and other marine mammals are viewed and valued by Americans have changed in the last fifty years and helped support conservation action to protect them. Photo: J. Moore/NOAA under NOAA Permit #15240.

***Finding 2: The National Marine Sanctuary System has changed the way people and organizations think and behave about our ocean.***

**We reach and engage increasing numbers of people every year.**

Our media impressions have grown from 175 million in 2005 to 3.9 billion in 2020, with over 25 billion total in just the last decade, through such major outlets as Associated Press, Reuters, USA Today, New York Times, Washington Post, Christian Science Monitor, Los Angeles Times, San Francisco Chronicle, Huffington Post, National Geographic, Discovery, PBS, ABC, CBS, NBC, CNN, FOX, NPR, Yahoo News, and major city online and daily newspapers. We regularly work with news reporters, editors, and production crews to generate focused news, magazine, television, radio, and online feature coverage of national marine sanctuaries and monuments. This includes PBS, NPR, Associated Press, regional media, online news, science publications, recreation publications, and filmmakers such as BBC and Netflix. Our news stories are regularly distributed nationwide and often are picked up by international media.

Our social media reach has grown substantially too. We were the first NOAA program on Tumblr, one of the first on Instagram, and the first to run a focused social media campaign, Earth is Blue, with its associated Stories from the Blue videos. More than 39,000 new followers joined us on Facebook, Twitter, and Instagram. Our new National Marine Sanctuary Webinar Series saw an increase of 240% in viewership from its first year to its second and, like other



online offerings during the COVID-19 crises, saw an order of magnitude in increased demand in 2020. The webinar series is a virtual opportunity that provides attendees with educational resources, scientific expertise, and training to support ocean and climate literacy in the classroom.

Over 44 million people annually visit our visitor centers and those of our partners in the zoo and museum community to learn about our sites and our marine conservation mission. We annually engage more than 75,000 people about ocean literacy, help more than 6,000 teachers bring the ocean into their classrooms, and teach more than 68,000 students about ocean conservation.

### **We encourage conservation behavior.**

We have changed the way businesses—local to international—conduct their operations. The Vessel Speed Reduction Program in Channel Islands National Marine Sanctuary saw compliance with speed reduction requests by large cargo vessels grow from 21% to 53% in three years, and has been so successful it has been established in the San Francisco Bay area, where compliance went from 50% to 66% in three years. A voluntary Area to be Avoided for maritime traffic in Olympic Coast National Marine Sanctuary, which moves large vessels further offshore away from sensitive habitats, has had nearly universal compliance for over two decades. In Stellwagen Bank National Marine Sanctuary in 2020, 84% of ships received grades of A+ or A for slowing their speed in compliance with a voluntary seasonal management area protecting whales. In Florida Keys National Marine Sanctuary, Blue Star-recognized businesses (just over 30 diving charters and nearly 20 fishing guides in 2021) commit to conservation practices as part of their business model and educate their staff and customers on these practices. Two reviews of the Blue Star Diving program in 2012 revealed that the environmental pre-dive briefing that operators regularly offered to their clients reduced impacts on the reefs by those divers.

Evaluations by participants in the Ocean Guardian School Program regularly note K-12 students changing their behavior by, for example, recycling more, reducing waste, and taking part in stewardship activities such as beach clean ups outside school. Schools who had participated in the Ocean Guardian program continued or extended their projects after grant funds had been expended and nearly 90% indicated that their Ocean Guardian School project had inspired other stewardship practices in their school.

### **We enhance the ability of all the nation's MPAs to protect resources and improve resilience.**

The National Marine Protected Areas Center (MPA Center) is the leading source of technical assistance and advice for federal and state MPA agencies around the country, including in best practices for climate change impact assessment and adaptation for MPAs and in mapping ocean uses. Its social science research priorities have helped guide social science research on a national and regional basis for the last decade. With its MPA Federal Advisory Committee (2003-2019), a diverse stakeholder committee, the MPA Center advanced best practices for more effective, resilient MPAs and MPA networks in the U.S. The committee's products include: best practices and/or tool kits on enforcement and compliance, marine spatial planning, recreational use, sustainable financing options, cultural resource management, ecological connectivity in MPA networks, diversity and inclusion, and MPA benefits.



## **We foster and stimulate future ocean stewards.**

We support a number of programs, both our own and those of NOAA, designed to recruit and develop the marine stewards of tomorrow. Ocean Guardian Schools, B-WET grants, LiMPETS, and other school-based programs engage students in grades from elementary to high school. We regularly host undergraduate students for NOAA internships through both the Ernest F. Hollings Scholarships and the Educational Partnership Program Undergraduate Scholarship, geared toward minority students, helping them prepare for careers in marine science and conservation. Knauss Sea Grant Fellows hosted by the sanctuary system have gone on to make their careers with us and other NOAA programs.

## Case Study: The Community Scientists of Greater Farallones National Marine Sanctuary



Some members of the Beach Watch volunteer program check out what is happening in Greater Farallones National Marine Sanctuary. Photo: NOAA

One of NOAA's first modern community science programs and the first in the sanctuary system, Beach Watch was established in 1993 by Greater Farallones National Marine Sanctuary. Highly trained volunteers patrol the beaches of the sanctuary, monitoring and recording changes using rigorous scientific standards. Beach Watch data have been used to acquire over \$52 million in settlements from four oil spills. The funds are being used to restore damaged habitat and wildlife, and restore lost recreation uses. The data have also been used to identify and designate wildlife protection areas, increase protection for threatened and endangered species, detect mortality events of birds and mammals, assess impacts from and reduce marine trash, understand how human activities might impact wildlife, and assess damages from oil pollution. Beach Watch is a cost-effective program. For every \$1 the government spends on Beach Watch, volunteers contribute at least \$2 of in-kind work. They have donated over 1.3 million hours of work and surveyed over 70,000 miles of coast, while fostering stewardship and protection of the sanctuary.



## Case Study: Dr. Nancy Foster Scholarship Program



Carina Fish, a Dr. Nancy Foster Scholar, conducts research in Cordell Bank National Marine Sanctuary. Photo: Julie Chase/ACCESS/NOAA Point Blue Conservation Science

The Dr. Nancy Foster Scholarship Program, funded by 1% of our annual appropriation, provides support for students earning masters and doctoral degrees in oceanography, marine biology, or maritime archaeology, particularly for women and members of minority groups. To date, 95% of the former Foster fellows are currently employed professionally, nearly all of them at work in a STEM-related field. Their work has ranged from examining deep-sea coral communities in Channel Islands National Marine Sanctuary to checking out the herbivores on shallow reefs in National Marine Sanctuary of American Samoa, from looking at the effects of climate change on the deep habitats of Cordell Bank and Gray's Reef national marine sanctuaries to tracking the behavior of fish, seals, and whales in numerous sanctuaries. One alumna of the scholarship program currently serves as our program's deputy director.

## Case Study: The National Marine Sanctuary System and Knauss Sea Grant Fellowships



Dr. Michelle Johnson, shown here diving in Flower Garden Banks National Marine Sanctuary where she is a research ecologist, began her sanctuary career as a Knauss Fellow working with the ONMS HQ science team. Photo: John Embesi/NOAA.

The Knauss Sea Grant Fellowship, founded in 1979 and named for one of Sea Grant's founders and former NOAA Administrator John A. Knauss, provides a unique experience for graduate students with an interest in ocean resources and in the national policy decisions affecting those resources. Highly qualified graduate students work with executive agency and legislative hosts located in the Washington, D.C. area, on a one-year paid fellowship. The sanctuary system has launched the careers of 17 high-performing marine professionals through hosting their fellowships, many of whom still work for the sanctuary system. At least 13 other Knauss alumni have or currently work for the sanctuary system in all functional and regional areas of the system, including science coordinators and specialists, communicators, and administrators. The sanctuary system hosts dozens of interns every year, including Hollings Scholars, EPP/MSI Scholars, and Presidential Management Fellows.



Aerial view of anchored boats in the ocean in Florida Keys National Marine Sanctuary. Recreational users, such as boaters and anglers, are members of many sanctuary advisory councils. Photo: Matt McIntosh/NOAA

### ***Finding 3: The National Marine Sanctuary System catalyzes action across a diverse sector of interests and partners.***

#### **Our culture maximizes public participation.**

Since the sanctuary system was established, we have encouraged public participation to an extent beyond those normally undertaken by federal agencies. An early examination of the NMSP noted that: “The potential of the program is further enhanced by the unique role which it offers to members of the general public to shape the form and direction of the program...The MPRSA encourages these groups to play an affirmative and aggressive role in its procedures.”<sup>21</sup> NAPA noted in their 2021 review of the system, that external stakeholders considered the system’s community engagement mechanisms to be the “gold standard” for such public participation processes.<sup>22</sup> While extensive public participation is costly in terms of both staff time and a drawn-out planning and decision-making processes, it remains a fundamental aspect of sanctuary culture. We maintain permanent sanctuary advisory councils and volunteer opportunities at all sites; create working groups as needed to support important processes like reviewing management plans; and offer public participation opportunities during formal processes like creating or amending regulations or making major boundary changes. Though the staff of the program remains around 300, the number of people involved in our conservation efforts is in the thousands.

#### **We value our partners and are excellent partners in return.**

Partnering and collaboration have been part of our culture since the sanctuary system’s establishment in 1972. Some of our strongest associates and allies today date back to the

<sup>21</sup> Blumm & Blumstein, 1978

<sup>22</sup> National Academy of Public Administration, 2021



establishment of our first sites including Monitor, Key Largo, and Channel Islands national marine sanctuaries. The National Park Service, U.S. Navy, and state agencies in Florida and California are among our oldest and ongoing partners.

We had over 700 partners in 2017, an increase of 43% since the last partnership census in 2004. Most partners are other government agencies, followed by NGOs, schools, businesses, aquariums/museums, and use associations. Partnerships are integrated at every level of the system and are used to support and complete every kind of project imaginable, from the prosaic repairs of a dock and sharing of ship time to the innovative Ocean Guardian School Program. Most partnerships correlate naturally to our primary functions of conservation, science, and education, and most of our partners are those who share our marine conservation mission and values.

Cooperating with other agencies and organizations, and pooling resources and efforts maximizes efficiency and effectiveness. Nearly every science and education undertaking includes partners of some kind, and most of our management, enforcement, and response efforts do as well. Every dollar we spend on education activities is matched by partners, doubling the reach of our education and interpretive efforts. Facilitating the research of external scientists, sharing ship time and maximizing the number of research projects conducted on our small vessels and on board NOAA's larger research ships maximizes the data and information available to sanctuary managers and decision-makers.

### **We unite, share, and catalyze the MPA network of the country.**

The MPA Center created and maintains the MPA Inventory, a comprehensive, geospatial database of all MPAs in U.S. waters. This inventory has become the authoritative source of data on MPAs, including for reporting on progress toward international MPA targets and providing timely reports on trends of MPA coverage and types. As part of building the inventory, the MPA Center provided the first ever legal definition of and classification system for MPAs in the nation. The website receives more than 1.2 million hits per year. The MPA Center's ocean use atlas continues to help build a common language of ocean uses and develop space use profiles to enhance management of the nation's marine and Great Lakes waters.

### **We maximize collaboration.**

Voluntary programs through the sites on the West Coast and Stellwagen Bank National Marine Sanctuary have shifted vessels away from sensitive areas to protect them from spills and discharges, and from areas frequented by whales to help prevent collision, and slowed vessels down to both prevent ship strikes, improve air quality, and reduce noise impacts. Programs like Florida Keys National Marine Sanctuary's Blue Star and Monitor National Marine Sanctuary's ANCHOR projects reward responsible operators with special recognition that tells clients they care about the ocean and how people should behave there. The sanctuary system's national Business Advisory Council, founded in 2013, brings together experts on key sectors, projects, or issues to provide advice and recommendations to the director related to the management and conservation of sanctuary resources.

## Case Study: Managing Sanctuaries in a Changing Ocean



Coral bleaching, like this coral shown on the right in National Marine Sanctuary of American Samoa, is only one example of how a changing climate is impacting sanctuaries. Photo: Wendy Cover/NOAA

The impacts of climate change are intensifying both globally and locally, threatening marine ecosystems and the benefits they provide to coastal communities, visitors, and our nation's economy. National marine sanctuaries and monuments are contending with rising water temperatures and sea levels, water that is more acidic and contains less oxygen, shifting species, and altered weather patterns and storms. While every sanctuary and monument is facing global climate impacts, each is affected differently. The sanctuary system began focusing on climate impacts in the early 2000s, leading to the establishment of the Ocean Climate Center at Greater Farallones National Marine Sanctuary in 2010. That same year, the Marine Protected Areas Federal Advisory Committee, managed by the National Marine Protected Areas Center, issued recommendations to the Departments of Commerce and the Interior on the role of MPAs in addressing climate change. Since then, the sanctuary system and the MPA Center have taken a leadership role to assess climate impacts to sanctuaries and plan adaptation strategies. In 2019, these lessons were shared globally at the United Nations' Climate Conference COP 25, leading to the creation of a new international partnership of MPA programs focused on exploring and explaining the role of MPAs as one part of the solution to dual biodiversity and climate crises. Today, the system is focused on implementing a new climate resilience plan to integrate climate into all aspects of sanctuary management, including science, management, education, and operations.

## Case Study: The Co-Management of Olympic Coast National Marine Sanctuary



Hikers enjoy a beach stroll on Rialto Beach, along Olympic Coast National Marine Sanctuary. Photo: Karlyn Langjahr/NOAA

Unlike many sanctuary shorelines, those of Olympic Coast National Marine Sanctuary are largely undeveloped, stretches of wild shoreline that include parts of Olympic National Park, three National Wildlife Refuges, and the reservations of four treaty tribes, the Makah Tribe, Quileute Tribe, Hoh Tribe, and Quinault Indian Nation. The sanctuary also uniquely shares jurisdiction of its waters with the four tribes, the only site in the sanctuary system that does so. As sovereign nations, the tribes have treaty fishing rights and co-management responsibilities with the state of Washington for fishery resources and fishing activities within the sanctuary. These factors present a unique need for collaborative management. While the sanctuary has similar management arrangements as other sites (such as an MOU between NOAA and the state of Washington) and also has its own Sanctuary Advisory Council, the site in 2007 formed the Intergovernmental Policy Council. This management forum, the first of its kind in the nation, consists of the sanctuary, the state, and the four tribes, and provides a regional forum for managers to exchange information, coordinate policies, and develop recommendations for resource management within the sanctuary.

## Case Study: Cordell Expeditions and Cordell Bank National Marine Sanctuary



Coral like these strawberry anemones and orange hydroids still enthrall divers in Cordell Bank National Marine Sanctuary. Photo: Joe Hoyt/NOAA

More than 100 years before it became a sanctuary, experts knew there was a productive bank feature of some kind in the locale of Cordell Bank. Studies carried out by the Coast Survey in the mid-1800s, including one by surveyor Edward Cordell, had identified the general location of the feature and the presence of so many feeding seabirds and marine mammals showed it was a productive area. But the full riches of the bank weren't known until 1977, when the divers of Cordell Expeditions, a nonprofit research association founded by Dr. Robert Schmieder, first explored the bank. They continued their efforts, passionate and dedicated volunteers studying and documenting its diversity for a decade. In 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 1983, the site was made an active candidate for designation and was designated in 1987. While other sites have been carried through designation processes by public support, Cordell Bank National Marine Sanctuary remains one of the few that was documented and nominated by such a small group of devoted fans.



The buoy team checks on a mooring buoy in Florida Keys National Marine Sanctuary, one of hundreds such buoys that provide an alternative to anchoring on coral or other sensitive habitats. Photo: Matt McIntosh/NOAA


***Finding 4: The National Marine Sanctuary System has fostered projects, generated innovations, and made discoveries that benefit the conservation efforts of the U.S. and of the world.***

**We value creativity and experimentation.**

As a program that in some ways invented itself as it grew, and as one that always wants to do more than its resources will allow, the sanctuary system has fostered a creative, can-do culture since its inception. One of the earliest examples is the development of mooring buoy systems that allow vessels to remain in place without dropping anchors on sensitive resources like coral reefs, seagrass beds, and shipwrecks. Seeking a way to protect the reefs of Key Largo National Marine Sanctuary (designated 1975, the second sanctuary after Monitor National Marine Sanctuary), sanctuary staff developed and installed the first mooring buoys. There was demand almost immediately in sharing the technology and techniques with park managers all over the world. Today, mooring buoys are a common tool to help manage carrying capacity and protect against anchor damage.

A more recent example of the sanctuary system’s can-do culture, is the development, and patenting, of a trap to catch lionfish, an invasive species found in the western Atlantic basin, Gulf of Mexico, and Caribbean Sea that has seen dramatic increases in the last two decades. While spearfishing helps manage the lionfish population in shallow waters, the trap, a net fastened to a hinged steel circle that closes on lionfish like a change purse, is designed to help





remove the pest from deeper depths. The trap has other benefits including eliminating ghost fishing and bycatch from the trapping process, minimizing impacts on the seabed, and being easy to construct, deploy, and retrieve. The lionfish trap was patented to ensure that NOAA can continue to test and develop the trap and make it freely available to anyone who wishes to use it.

NAPA notes the achievements of the sanctuary system as an innovator: “The establishment of the System helped to lead the way for other similar initiatives and the adaptive management and sustainably focused work of the System have been transferred to other spheres of conservation across the globe...The System is viewed as having a legacy of innovation that is held in high regard by many of its international counterparts and is still considered to be a leader in many fields within protected area management despite its lack of robust funding for a program of its scope.”<sup>23</sup> As one of the oldest networks (if not the first) of underwater parks, the sanctuary system has also been able to share its experiences with domestic and international colleagues, and benefited from their growing experience and expertise as well. One example can be seen in our condition reports. In the late 1990s as the program launched an effort to review and update management plans for all its sites, it quickly became apparent that a sense of the status and trends of the resources was needed to help make decisions about changing or enacting new regulations and boundaries, creating research and education programs, and formulating budget decisions. The result was a condition report that assesses the status of a site’s resources using expert workshops, a standardized rating system, and a multi-step peer review process. The reports present results in a user-friendly color code scheme. The condition reports and the process used to create them have influenced similar efforts in the National Park Service, Australia, Mexico, Canada, and other countries, and our condition report process was in turn improved by lessons learned from partners around the world as they refined their approaches. Similarly, our Ocean Guardian School Program was inspired by the Great Barrier Reef Marine Park’s Reef Guardian School Program, through a staff exchange program in the early 2000s. Similar exchanges have influenced the operation of advisory committees, permitting processes, management planning processes, and other aspects of managing underwater parks in the U.S. and around the world.

The sanctuary system has often been an early adopter, providing loaner slide shows to local schools in the 1970s, to CD-ROMs in the 1980s and 90s, to tailored and ever evolving apps and high resolution 360° virtual dives online today. We were the first office in NOAA to join Tumblr, one of the first on Instagram, and the first to run a focused social media campaign.

### **We facilitate discovery and share the wonder of what we find.**

The vast majority of the ocean is still unexplored, about 80% of the seabed unmapped. Even areas such as national marine sanctuaries and marine national monuments that have been studied and mapped better than most other parts of the U.S. EEZ still have many surprises to share. Over 130 new species of flora and fauna have been found in sanctuaries since the system was founded in 1972, including algae and seaweeds; invertebrates such as coral, sponges, and tunicates; shrimp and fish, and even a new bird species, discovered in the Northwestern Hawaiian Islands. New shipwrecks too have been found, over 15 of them, from the *Kyle Spangler* in Thunder Bay National Marine Sanctuary in temperate Michigan to the *Two Brothers* in Papahānaumokuākea Marine National Monument in tropical Hawai‘i. The oldest living thing recorded in the marine environment is a stand of black coral in the monument and

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<sup>23</sup> National Academy of Public Administration, 2021

several of the largest single coral colonies in the ocean are found in National Marine Sanctuary of American Samoa.


Perhaps the only thing more exciting than describing a species no one has ever seen before, or finding what was lost, is discovering a new phenomenon no one even knew to look for. NOAA and NASA recovered fragments from a meteor that broke up over Olympic Coast National Marine Sanctuary in 2018. Footage from ROV research dives in Monterey Bay National Marine Sanctuary thrilled the world with the discovery of the octopus gardens—hundreds of octopuses brooding their eggs in the depths of the sanctuary—followed by a whale fall, a dead whale lying on the bottom at over 10,000 feet being scavenged by a host of species.



More than a thousand octopuses brooding over their eggs were observed on one ROV dive during a research expedition in Monterey Bay National Marine Sanctuary in 2018. Photo: Ocean Exploration Trust/NOAA

### **We innovate, evaluate, adapt, and/or let programs go or grow as our needs change.**

The needs of each sanctuary and its resources and communities differ, as do needs at the national and international level. We have a strong track record in creating new projects, events, and partnerships to meet our needs. The Savannah Ocean Film Festival, the first of its kind in the nation when it debuted in 2003, paved the way for ocean film festivals around the country. Thunder Bay National Marine Sanctuary, working with a variety of state and local partners, established the Great Lakes Maritime Heritage Trail, which includes segments along the Thunder Bay River with a boardwalk, historically-themed riverfront park, historic docks, and outdoor interpretive signage. Florida Keys National Marine Sanctuary established a different



kind of trail, one for divers, with the Florida Keys Shipwreck Trail, featuring nine historic shipwrecks, scattered along the coral reefs and buried in the sandy shallows a few miles offshore; an underwater guide is available for each site, providing the shipwreck and mooring buoy positions, history, a site map, and information about marine life divers might encounter. A variety of apps have been developed with partners including Whale Alert, which prevents ship strikes by notifying mariners of the real-time locations of whales, and the California Tidepools App, designed to educate and inform visitors about tide pools.

We have been instrumental in helping found and grow a number of underwater park organizations around the world. Big Ocean was founded in 2010 by Papahānaumokuākea Marine National Monument and its partners as a peer-learning network and communication forum for managers of large-scale (over 100,000 square miles) underwater parks, and has grown from its original six to 17 members. The IUCN Joint Marine Mammal Protected Area Task Force grew out of an informal working group coordinated with our partners to a formal standing group under IUCN designed to help managers meet the unique challenges of managing parks for marine mammals. The international Marine Protected Area Agency Partnership originally founded by the sanctuary system in 2012 now meets regularly, hosted by other country partners, and recently experienced 60% growth in membership, with increased representation from European, Asian, and Latin American countries.

## Case Study: The Discoveries at Flower Garden Banks National Marine Sanctuary



Whale sharks are one of the largest animals found in Flower Garden Banks National Marine Sanctuary.  
Photo: Ryan Eckert/NOAA

From the time of their discovery due to the colorful invertebrates brought up by fishermen in the late 1800s, the Flower Garden Banks have been the site of one surprising revelation after another. After the first scientific surveys from the 1930s to 1950s, scientists discovered that the underwater banks were in fact salt domes, created by ancient, massive deposits of Jurassic Age salt left when the shallow sea evaporated, then becoming overlain with mud, sand, and silt when sea level rose. Finding thriving coral reefs in water that scientists thought would be too deep, too cold, or too turbid was an enormous surprise revealed on the first dives made there in the early 1960s. It triggered decades of intensive studies.

Throughout the 1960s, the species of the Flower Gardens were documented, resulting in a 1974 book on the biota found there. Habitats and their biological assemblages were delineated. Maps and samples were collected to study the geology of the banks. And the oceanographic regime was studied to determine why the communities were so well developed. A large brine lake was discovered in 1976 on the flank of one bank, a first of its kind shallow water chemosynthetic biome that yielded numerous new species. Mass spawning of corals, a phenomenon already known in the Pacific, was first seen and reported in the Gulf of Mexico at the Flower Gardens in 1990, and has continued ever since like clockwork, eight to 10 evenings after the August full moon.

After sanctuary designation in 1992, the discoveries kept coming. ROV surveys discovered that mud volcanoes formed by gas seeps could create new habitats for both reef growth and soft bottom communities; animal tracking confirmed the migration of whale sharks between the northwestern Gulf of Mexico and Mesoamerican reefs off Mexico; and records from the diving community surprisingly revealed that the sanctuary was part of a nursery for manta rays. Nine new species, from the Mardi Gras wrasse to new algal species, have been discovered in the sanctuary. These most recent discoveries came as a result of the scientific study and attention brought to the area by sanctuary status.

### **Case Study: The Disentanglement Program of Hawaiian Islands Humpback Whale National Marine Sanctuary**



Volunteers with Hawaiian Islands Humpback Whale National Marine Sanctuary's annual Ocean Count are treated to the sight of two humpback whales breaching offshore. Photo: Bruce Parsil/NOAA

One unfortunate byproduct of the ocean coexistence of humans and marine mammals is that whales and seals can be entangled in fishing gear like nets and lines. Entanglement may result in starvation or drowning due to restricted movement, physical trauma and systemic infections, and/ or contribute to other threats, like ship strikes. In 2002, the Hawaiian Islands Entanglement Response Network was established by the sanctuary to help disentangle whales from fishing gear, the first of its kind in the Pacific, and built itself on the techniques and training pioneered by Center for Coastal Studies and their work on disentangling large whales on the East Coast since the mid-1980s. The Hawaiian network helped train others around the world and helped establish the Global Whale Entanglement Response Network in 2011. The Hawaiian network, with over 350 trained participants, has freed more than 30 whales since its founding.

## Case Study: The Pioneering Coral Reef Protection and Restoration Work of Florida Keys National Marine Sanctuary



A diver uses a special camera to create the 3D images in a coral nursery in Florida Keys National Marine Sanctuary. Photo: Mitchell Tartt/NOAA

Including the two earlier, smaller sanctuaries subsumed under the larger Florida Keys National Marine Sanctuary in 1990 (Key Largo in 1975 and Looe Key in 1981), we have spent over 40 years innovating in coral reef protection and restoration. We pioneered “interpretive enforcement” to educate rather than punish violators whenever possible, as well as the use of mooring buoys to help prevent anchor damage. We worked with the International Maritime Organization to declare the reef tract a Particularly Sensitive Sea Area (PSSA) and Area to be Avoided (the first PSSA in the USA and the fourth in the world). We developed reef damage response and reconstruction techniques to repair several coral reefs damaged by ship groundings in the 1990s, then the world’s first large-scale rescue and transplantation of corals threatened by seawall, marina, and dock constructions and repairs. The viability of underwater coral nurseries was explored and proven by researchers permitted by and working with the sanctuary, their potential verified when transplanted corals raised in a nursery spawned at the same time as their wild kin. Some of those innovative restoration techniques and tools developed at the ship grounding sites over the years are today being used in the multi-partner *Mission: Iconic Reefs* project. One of the largest investments of its kind anywhere in the world, the project is restoring reef ecosystems on a large scale at seven important sites in the sanctuary.



Kayakers enjoy the sights of Mallow's Bay-Potomac River National Marine Sanctuary. Photo: Kate Thompson/NOAA

### ***Finding 5: The National Marine Sanctuary System has benefited sanctuary gateway communities and the American people.***

#### **We protect valuable resources.**

It's hard to separate the economic values of an area's natural resources from the economic value granted by the presence of a protected area like a national marine sanctuary. For example, 60% of the jobs in the Florida Keys are connected to the marine environment and thus to the sanctuary. Challenges like helping corals recover from disease, damage, and bleaching and successes such as protecting spawning grounds to promote the recovery of mutton snapper populations are tied directly to sanctuary efforts. Protecting the resources that businesses from fishing to diving to wildlife watching depend on helps build and preserve thriving coastal communities.

Humpbacks and other whales in the waters of sanctuaries in Hawai'i, California, and Massachusetts support the big business of whale watching, while healthy seabird populations in those and other sanctuaries generate community revenue from wildlife observers and photographers. The tour boat industry in Hawaii has an estimated annual value of \$350 million. Stellwagen Bank National Marine Sanctuary was voted the best place to see marine wildlife in a *USA Today's* 2016 Reader's Choice contest; Monterey Bay National Marine Sanctuary took second place. Both are celebrated as areas to witness amazing birds and animals, wildlife that is protected by the sanctuaries and their many partners.

As one of the busiest ports in the U.S., Seattle/Tacoma sees thousands of container ships passing through Puget Sound and up and down the Washington Coast, which is also home to many marine mammals, seabirds, and fish, and stretches of remote and beautiful beaches. The presence of a voluntary Area to be Avoided (ATBA) established by Olympic Coast National Marine Sanctuary has had nearly universal compliance for more than two decades and helps

protect against a catastrophic oil spill. Similar ATBAs in Florida Keys National Marine Sanctuary and Papahānaumokuākea Marine National Monument protect sensitive coral reef and seagrass habitats.

### **We provide stability in our institutional presence.**

At a time when our lives and societies are in constant flux, a permanent institution such as a protected area that is designated in perpetuity is a source of stability. Knowing that a sanctuary is an enduring part of the community reassures partners that building relationships and investing time, energy, and funds into projects will not go to waste. Dozens of partners contribute to the Sanctuary Integrated Monitoring Network (SIMoN) project to help assess resource conditions in the four California sanctuaries. Nationally, every dollar the sanctuary system spends on education activities is matched by partners, doubling the reach of education and interpretive efforts. Papahānaumokuākea Marine National Monument's investment of \$10 million in science and management funds has leveraged over \$40 million in matching funds from partner agencies and organizations since 2005.



Two volunteers help clean up beach litter on Second Beach beside Olympic Coast National Marine Sanctuary, one of many such volunteer efforts offered by the sanctuary system and its partners. Photo: Karlyn Langjahr/NOAA



## **We invest in our sanctuary communities.**


Because we are also members of communities, we are invested in their prosperity, and work as part of those communities to support diverse, healthy economies. We are members of and/or work with nearly 20 chambers of commerce or visitor bureaus across the country. Eighty percent of the businesses with whom we partner are local and small business operators. We work with small business owners and operators, including those of charter boats and dive shops, and we meet regularly with representatives of local civic and use associations. Local elected officials sit on sanctuary advisory councils. We support small businesses in some sites by developing recognition programs, like the Blue Star program in Florida Keys National Marine Sanctuary, or in others by placing volunteer naturalists on charter boats and wildlife viewing tours, like Channel Islands National Marine Sanctuary's Naturalist Corps. We operate tourist-drawing visitor centers in many sites and invest in the visitor/tourism centers, museums, and nature centers in others. For example, Monitor National Marine Sanctuary has provided over \$18 million in financial support to Virginia and North Carolina museums supporting *Monitor* artifact conservation and interpretation. We teach at schools, civic organizations, and events, run volunteer programs for all ages, and patronize local businesses. NAPA found in 2021: "The System's achievements in preservation and conservation, in addition to its community engagement and buy-in, have resulted in secondary achievements and numerous positive externalities and benefits to sanctuary communities, partners, and stakeholders."<sup>24</sup>

Our volunteer opportunities, available at every site, range from serving as citizen scientists to staffing our visitor centers to being wayside and boat-based docents. Since we began tracking its volunteers in 2004, the number has grown from a few thousand to almost 12,000 in 2019, most of whom are citizen science volunteers helping sanctuary researchers and partners. Over 1.6 million hours have been donated since 2004, with a value of over \$33 million.

## **We support, practice, and celebrate the cultural values and traditions of our communities and partners.**

We partner and sometimes share management responsibilities with numerous Native American Tribes, Native Samoans, and Native Hawaiians, including through formal arrangements like memoranda of understanding, seats on advisory councils, and in the case of Olympic Coast National Marine Sanctuary, the Intergovernmental Policy Council. We also support a variety of projects that honor and celebrate the traditional cultures of our partners. Channel Islands National Marine Sanctuary supports the annual crossing of the Chumash tomols from the mainland to the islands, as it has since the first modern crossing in 2001, among other projects. Papahānaumokuākea Marine National Monument and Hawaiian Island Humpback Whale National Marine Sanctuary both incorporate Native Hawaiian values, traditions, and ways of thinking into their management, science, and education programs, including the Navigating Change program, supporting the voyages of *Hōkūle'a* and work of the Polynesian Voyaging Society, and the forthcoming release of *Mai Ka Po Mai*, the Native Hawaiian Guidance Document written by the Native Hawaiian community to provide guidance on incorporating Hawaiian values and management perspectives to the monument's co-managers. National Marine Sanctuary of American Samoa frames and implements its management programs in *Fa'a Samoa*, the traditional way of life in the islands, and provides numerous programs in support of it, including a recent workshop on *fautasi*, the traditional longboats once used to

<sup>24</sup> National Academy of Public Administration, 2021



journey among the islands and highlighted now in annual races every Flag Day. Programs and presentations are presented in Samoan and materials are printed in both Samoan and English. Our Heritage of the Blue project, founded in 2017, celebrates the official seven heritage months of the year, and highlights diversity and inclusion efforts all year round.

## Case Study: Supporting Community and Economy Through Thunder Bay National Marine Sanctuary



A diver examines the wreck of the steamboat *New Orleans* in Thunder Bay National Marine Sanctuary. Photo: David Ruck/NOAA


The designation process for Thunder Bay National Marine Sanctuary was long and fraught with local and state concerns about the role of a federal program in what was to become an entirely all-state-waters sanctuary. But working with the Sanctuary Advisory Council and the state of Michigan in Alpena, Michigan at last produced a designation that changed the way the community viewed the sanctuary. When an expansion to about 10 times its original size was proposed, the communities beside the expansion areas welcomed the change. What changed the negative views of so many about a sanctuary in the meantime? Put simply, the sanctuary became part of the community from the start. Since its designation, the sanctuary has worked with local officials to recruit new and expand existing businesses; promoted local outfitters, kayak tours, bike rentals, dive shops, and charter boats; and helped create new opportunities for tourism. This included the initiation in 2000 of the Thunder Bay Maritime Festival that now draws more than 10,000 visitors a year; the opening in 2005 of the Great Lakes Maritime Heritage Center; and the launching in 2007 of the Maritime Heritage Trail. A hyperbaric chamber brought to the regional hospital with the sanctuary's help in 2007 made diving in the sanctuary safer and provided other medical benefits in the local hospital. Long-term partnerships with the public library preserve a century's worth of important maritime history documents and with the local theater, brings the Thunder Bay International Film Festival to town each year. A partnership to launch a marine technology program with Alpena Community College in 2012 and a decades-long partnership with the Marine Advanced Technology Education (MATE) Center to host ROV competitions for regional high school students both underscore the sanctuary's commitment to helping build a strong local economy.

## Case Study: Supporting Culture and Community Through National Marine Sanctuary of American Samoa



Some paddleboarders enjoy a nice day out in National Marine Sanctuary of American Samoa. Photo: Ropate Delana/NOAA

While every sanctuary and its communities have their own ways of thinking, some sites have a deeper, older culture that comes into play. One example is the millennia of Samoan culture found in American Samoa, believed to be the oldest Polynesian culture, and the context for all decisions made and programs carried out by the sanctuary. Far from the continental U.S., American Samoa doesn't have the infrastructure of many sanctuary gateway communities. The sanctuary has found a unique community role for itself in helping meet local community and tourism needs, and in turn has been embraced by and benefited from the islands and people. For example, the sanctuary visitor center and its Science on a Sphere provide a venue for student learning from across the islands, and is a draw for day-tripping cruise ship passengers as well as locals who participate in events and activities there. The new hyperbaric chamber, whose acquisition was facilitated by the sanctuary and which makes for a safer visit by dive enthusiasts, is another example. Hosting media briefings and business exchanges, holding workshops on ecotourism and GIS development, and offering certified interpretive training are only a few examples of other ways the sanctuary has invested in its communities.



Fa'a Samoa, the traditional way of life of American Samoa, is inherent in everything the sanctuary does, from conducting its outreach programs in Samoan, the language spoken by 90% of the territory's residents at home, to the meaningful community events hosted by the sanctuary. A 2019 heritage symposium on fautasi, the traditional practice of longboats among the islands, helped revitalize interest in this ancient sport. Science camps offered each summer in various programs—most recently the Summer Sanctuary Science in the Village—have introduced children and youth to their marine environment and invested them in its care. Virtual reality tours engage everyone from the youngest student to village elders by sharing the wonders that lie just offshore. The Fagota Mo Taea fishing tournaments have seen increasing numbers of entrants, reaching 290 fishermen and women by 2019 which bridges outreach and community engagement on sustainable fishing methods.



Some endangered Hawaiian monk seals soak up the sun on the protected shores of the remote Kure Atoll in Papahānaumokuākea Marine National Monument. Photo: Paulo Maurin/NOAA

***Finding 6: The National Marine Sanctuary System has demonstrated and proven new models for protected areas and ocean governance in the United States and beyond.***

**We use a real-world adaptive management model.**

At the outset, the sanctuary program struggled to find its footing. A former director of the Office of Ocean Management, an organizational entity in the brand new NOAA, noted in 1984: “[T]he most demanding and visible area of activity was the effort to bring life and focus into the Marine Sanctuary Program.”<sup>25</sup> But as the sanctuary system matured its management approaches, it found those two legs, and more, to stand on. Numerous authorities recognized the value of what was happening. The National Research Council in 1997 noted that: “The NMS program offers many opportunities for improving governance. Although the primary objective of the sanctuaries program is to protect exceptionally valuable marine resources, the process could be used as a model for improving management and governance beyond sanctuary boundaries.”<sup>26</sup> In its 2006 review, NAPA made a similar finding: “Congress, the Council on Environmental Quality, and NOAA should use national marine sanctuaries, and the national program itself, as

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<sup>25</sup> Bleicher, 1984

<sup>26</sup> National Research Council, 1997

places to test NMSP’s promising approach to regional marine ecosystem governance—a civic approach based on networked governance and citizen participation, rather than on central planning by expert professionals.”<sup>27</sup> Today, the sanctuary system has a proven, practical adaptive management model, one that NAPA called out in 2021: “The establishment of the System helped to lead the way for other similar initiatives and the adaptive management and sustainably focused work of the System have been transferred to other spheres of conservation across the globe.”<sup>28</sup> While the National Marine Sanctuaries Act provides overarching authorities and guidance, other elements dictate how the sanctuary system manages sites of such disparate character and adapts to changing needs and issues for such sites. These elements include the management plans and regulations for each site, driven by the specific issues facing that sanctuary and community-based advisory groups providing local, real-world information to decision makers. Five-year reviews keep management plans up to date and invest the community as participants in the process. Permits allow sanctuary superintendents to make exceptions to regulations, while emergency authorities provide for real-time responses to pressing events and issues.



A team of NOAA scientists observe a humpback whale jumping out of the water. The scientists were on a mission to tag humpback whales in Stellwagen Bank National Marine Sanctuary. Photo: NOAA, taken under NOAA Fisheries Permit #14245

<sup>27</sup> National Academy of Public Administration, 2006

<sup>28</sup> National Academy of Public Administration, 2021

## **We catalyze science and integrate the results with management to achieve resource protection.**

In 1984, in an address to the AAAS, NOAA Administrator John Byrne spoke of the science and management interface in national marine sanctuaries, saying: “In designing regulations for the sanctuaries, our managers—many of whom have scientific backgrounds—must write rules without knowing all the facts. The scientific work that is to be done in the sanctuaries will give the managers more of the data they will need to write sound regulations—will identify information gaps and suggest alterations. But the regulations often have to come first.” Science and research weren’t on the radar for the legislators who passed the original MPRSA in 1972. But based on ongoing work in national marine sanctuaries, a requirement to conduct research and education programs was added 12 years later in the 1984 reauthorization. Sanctuary scientists are charged with characterizing, monitoring, and studying the resources of their sites, and do so in partnership with a host of partners from other federal agencies, universities, and nonprofit organizations.

Perhaps more than any other federal protected area program in the U.S., the sanctuary system closely integrates science into its adaptive management process to ensure that managers are using the best available information to make their decisions. Condition reports containing findings on the status of sanctuary resources—each the product of an intensive, peer-reviewed process—are issued before a review of the management plan for a sanctuary. Having that kind of information in hand ensures that management decisions, including those about boundaries, new or amended regulations, and programs, are framed to address the most pressing issues. Ongoing research and monitoring by sanctuary scientists, their partners, and volunteer citizen scientists are conducted to rigorous scientific standards and also folded into management plan reviews and other actions.

## **We maximize civic and community involvement in management.**

Perhaps one of the oldest and most deeply vested values in the culture of the sanctuary system is that of involving the public in many aspects of designating, managing, studying, and sharing national marine sanctuaries. The *Program Development Plan* from 1982 states: “The Program represents a mechanism for reversing this ‘out-of-sight, out-of-mind’ attitude toward the marine environment and actively promoting comprehensive management in a manner similar to that used for our land-based resources. From the standpoint of resource protection, public use, and public awareness, the Program mission offers a corollary to some terrestrial programs in that special marine areas are managed for public use and benefit in concern with resource protection.”<sup>29</sup> The 2000 NAPA review of the system encouraged this approach: “Work more confidently with communities; make public involvement part of the mission of the sanctuaries,”<sup>30</sup> and reiterated its advice in its 2006 review: “The sanctuaries have demonstrated that they can work closely with advisory councils, working groups, and the public, during management plan reviews...The sanctuary program should continue to involve advisory councils and working groups in revising management plans.”<sup>31</sup> The 2021 NAPA review concluded that the sanctuary system is the “gold standard” for community engagement.<sup>32</sup>


<sup>29</sup> National Oceanic and Atmospheric Administration, 1982

<sup>30</sup> National Academy of Public Administration, 2000

<sup>31</sup> National Academy of Public Administration, 2006

<sup>32</sup> National Academy of Public Administration, 2021





Certain formal requirements are spelled out in the NMSA, including opportunities for public comment in formal rulemaking processes, but we go beyond its requirements. Every site has a sanctuary advisory council, composed of members from local communities that represent the variety of interests in those communities, over 400 members strong with a similar number of alternates. Each advisory council also has working groups—temporary or permanent—to provide focused attention to a functional area (like science or education), an issue (such as water quality or climate change), or a project (for example, proposing shifts in vessel traffic lanes). Award-winning volunteer programs provide opportunities as disparate as serving as a docent in a visitor center, a naturalist on a whale watching vessel, or a citizen scientist on a beach. Business recognition programs encourage local operators to conduct their activities in environmentally sound ways.

## Case Study: Protecting the Whales of Stellwagen Bank National Marine Sanctuary



Some young whale watchers enjoy the sight of a surfacing humpback whale in Stellwagen Bank National Marine Sanctuary. Photo: Anne Smrcina/NOAA

The North Atlantic right whale is one of the most endangered marine mammals in the world, with an estimated population of 336, with fewer than 100 breeding females left. Every individual in the population is crucially important. Stellwagen Bank National Marine Sanctuary is home to many whales, including the North Atlantic right whale population. But the sanctuary is also part of a major thoroughfare for vessel traffic heading to and from Boston, the 18<sup>th</sup> busiest port in the U.S. in 2017, a combination that leads to deadly ship strikes on whales. In the early 2000s, the sanctuary realized it had to take action, which kicked off a two-decade-long campaign with multiple approaches. Among the steps taken to protect right whales include: using whale watching data to identify hotspots for whales in the sanctuary, using information from ships' automated identification systems to examine shipping traffic and correlate it to whale congregations; modeling potential whale protection levels and economic impacts for various shifts in the traffic lanes approaching the port; gaining industry and regulatory support for traffic lanes that would avoid the highest concentrations of whales; slowing vessel traffic in the vicinity of whales to avoid strikes; establishing a near real-time acoustic detection system for right whales; creating an app to notify vessel operators to the presence of whales; and actively monitor and reward high compliance of vessel operators to voluntary speed measures.

In 2020, monitoring for compliance with Seasonal Management Areas, which require ships to slow to 10 knots or less to avoid collisions, showed that 84% of the vessels received an A or A+ in their report cards, meaning three-quarters of all types of commercial vessels are in compliance nearly all the time.

## Case Study: Monterey Bay National Marine Sanctuary and the Sanctuary Integrated Monitoring Network



A flock of sanderlings searches for their next meal along the beach of Monterey Bay National Marine Sanctuary. Photo: NOAA

When Monterey Bay National Marine Sanctuary was designated, it was faced with a problem that many underwater parks wish they had: an unusually large number of research institutions working in the region and rich in information resulting from their scientific endeavors. But accessing so much data, held in different formats by different institutions, was a barrier for it to be put to use in making decisions about managing the sanctuary. Soon the idea of SIMoN was born. The Sanctuary Integrated Monitoring Network (SIMoN) is a broad ranging information source summarizing on-going, recent and historic monitoring and research projects within sanctuaries. Starting with the formation of an advisory committee in 1999, under the auspices of Monterey Bay National Marine Sanctuary, SIMoN was founded to fulfill a crucial need: facilitate communication among researchers, managers, educators, and the public. Today, SIMoN covers all four California sanctuaries, and includes databases on species and projects, a historical ecology timeline, interactive maps, and a photo bank.

## Case Study: Live Bottom Research of Gray's Reef National Marine Sanctuary



Painted wrasse swim among sargassum seaweed at Gray's Reef National Marine Sanctuary. Photo: Greg McFall/NOAA

Sanctuaries are designated because there is something special about them, termed “special national significance” under the National Marine Sanctuaries Act. For sites that are far offshore or that don't get very many visitors, a member of the public might be uncertain about just what is so special about that particular piece of ocean. For Gray's Reef National Marine Sanctuary, the answer comes from shifting the view from the surface to about 60 or 70 feet below it, where the live bottom—rocky seafloor that supports high numbers of large invertebrates such as sponges, corals and sea squirts—comes into view. The sanctuary is a particularly important example of this type of habitat, supporting hugely productive communities on the bottom and in the water column, but is less well-studied than habitats that have easier access closer to shore, like coral reefs and kelp forests. Yet, because the sanctuary is present and provides coordination, as well as support for researchers through partnerships, vessel time, dive support, and a Research Area that provides a unique opportunity for comparative research.




A diver explores the wreck of the schooner *Van Valkenburg*, which sank in 1887, in Thunder Bay National Marine Sanctuary. Photo: David Ruck/NOAA

***Finding 7: The National Marine Sanctuary System has changed the way the federal government views, manages, engages, and protects maritime and cultural heritage resources.***

**We helped evolve the field of maritime heritage resource management.**

Monitor National Marine Sanctuary isn't only the first national marine sanctuary but one of the oldest shipwreck parks in the world as well. It was also one of the first shipwrecks to be protected on what was then considered the high seas (the U.S. did not assert its Exclusive Economic Zone until 1983, eight years after the sanctuary was established). When the first sanctuary was designated, NOAA knew it was taking a momentous first step in the creation of a network of underwater parks. What they perhaps didn't realize was that they were also on the way to changing the way maritime cultural resources are regarded, protected, studied, and shared.

Shipwrecks are rarely studied by scholars in isolation. We have come to realize, in part due to the evolving approach and work of the sanctuary system, that to understand the full value of a lost ship and tell its complete story, we need to look at the larger maritime cultural landscape of which it is part. The maritime cultural landscape is a scholarly approach originally conceived by Norwegian archaeologist Christer Westerdahl in the late 1970s. But its use as a management approach in the U.S. was endorsed by the MPA Center's Federal Advisory Committee in 2011 and crystallized at a workshop in 2015, organized and co-hosted with the National Park Service, Bureau of Ocean Energy Management, and the Wisconsin State Historic Preservation Office. This approach is analogous and complementary to ecosystem-based management, and examines the relationships among living and non-living resources, and their environment. This approach enables a better understanding of the human connections to places, as well as the important human influences on ecosystems over time. Maritime heritage resource management has



evolved from single shipwrecks to maritime cultural landscapes and from a resource to protect to an integrated discipline on how to approach management and engagement around the resources and stories of the nation's maritime heritage.

This approach is at work now in the proposed expansion of Monitor National Marine Sanctuary to include additional historic shipwrecks. We could simply study each individual German U-boat and Allied merchant marine vessel lost there but doing so in the context of the Battle of the Atlantic and World War II tells a more complete story, as does telling it in the context of the larger, longer history of North Carolina's rich maritime heritage. Designating Mallow's Bay-Potomac River National Marine Sanctuary on the basis of the collection of vessels that make up the Ghost Fleet, and in the context of their historical importance, is another example.

**We have established and strengthened the legal infrastructure around protecting maritime heritage resources.**

The National Marine Sanctuaries Act has had significant influence over the development of laws that protect underwater cultural, historical, and archeological resources. Its influence has been interactive, originally providing a framework to protect a shipwreck that in turn influenced subsequent amendments to the act as well as the language in other federal statutes. Subsequent amendments included 1979's change to program regulations that at least one of several factors, including historic or cultural remains of widespread public interest, must be present for designation and 1984's reauthorization that added nine designation criteria including the area's historical, cultural, archaeological, or paleontological significance.<sup>33</sup>

Some of the provisions for protecting heritage resources contained in the National Marine Sanctuaries Act, and our experience in refining them, have also either implicitly or explicitly influenced subsequent legislation. These acts include the Archaeological Resources Protection Act (1979), the RMS Titanic Memorial Act (1986), the Abandoned Shipwreck Act (1988), and the Sunken Military Craft Act (2004). 2001's UNESCO Convention on the Protection of Underwater Cultural Heritage also, directly or indirectly via the other acts, uses the language in, provisions of, or precedents set by the NMSA and the work of the sanctuary system.<sup>34</sup>

We have also helped establish legal precedents for protection of maritime heritage resources, through case law, starting with two court cases in 1992. Divers taking artifacts from shipwrecks in and damaging the seabed of Channel Islands National Marine Sanctuary were found guilty of violating sanctuary regulations and 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. NOAA was successful through an appeals process.

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<sup>33</sup> Hopkins, 2020

<sup>34</sup> Hopkins, 2020



## **We have made significant contributions to the field of marine archaeology.**

The discipline of marine archaeology is a young one, only coming into practice in the 1960s. Coming on the scene in the 1970s, with the first sanctuary being focused on a historic shipwreck (and the first single shipwreck park in the world), the sanctuary system has become the nation's leader in the exploration, documentation, and stewardship of maritime heritage resources. For example, when the major components of *Monitor* were recovered starting in the late 1990s, the sanctuary system, working with partners at The Mariners' Museum and Park, used cutting edge techniques for deconcretion and preservation of artifacts, techniques that are now considered the gold standard for such processes. We have identified, explored, and interpreted dozens of shipwrecks, and identified dozens of other possibilities to be explored in the future.

## Case Study: Expansion of Monitor National Marine Sanctuary



A diver checks out the wreck of U-701, which is in the proposed expansion area of Monitor National Marine Sanctuary. Photo: Stephen Sellers/NOAA

After a number of years of archaeological research in the waters off North Carolina, the sanctuary system believed the area warranted the protection of a national marine sanctuary. 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. This World War II naval battlefield, the closest area of conflict to the Continental United States, serves as the final resting place for nearly 1,700 men lost during the Battle of The Atlantic. From January through July of 1942, German U-boats sank ships off the American East Coast with relative impunity. In just three years, from 1942 to 1945, 90 ships were lost off North Carolina alone as a result of this action. The result is an amazing collection of 78 merchant tankers and freighters, eight Allied warships, and four German U-boats resting on the seabed as a memorial to this history and to the sacrifice of Allied servicemen and the U.S. Merchant Marine in World War II. In 2016, the sanctuary system proposed expanding Monitor National Marine Sanctuary to protect these additional shipwrecks and would constitute the largest area designated as a World War II battlefield anywhere in the United States.



## Case Study: Designations of Mallow's Bay-Potomac River and Wisconsin Shipwreck Coast National Marine Sanctuaries



A kayaker explores the shipwrecks of Mallow's Bay-Potomac River National Marine Sanctuary. Photo: Matt McIntosh/NOAA

In September 2019, Mallow's Bay-Potomac River National Marine Sanctuary became the nation's first new national marine sanctuary in almost 20 years. The newest national marine sanctuary—Wisconsin Shipwreck Coast—followed in June 2021. Rather than focus on a single shipwreck, the approach taken for these sites is one of the maritime cultural landscape. Mallow's Bay-Potomac River National Marine Sanctuary protects the remnants of 118 World War I-era wooden steamships and vessels as well as other significant maritime heritage resources. The story of Mallow's Bay's Ghost Fleet, the partially submerged remains of more than 100 wooden steamships that were built in response to threats from World War I-era German U-boats that were sinking ships in the Atlantic, is part of the larger story of the nation's involvement in World War I, which stretches from the construction of the steamships in more than 40 shipyards in 17 states to their final resting place in the river. Wisconsin Shipwreck Coast National Marine Sanctuary protects 36 shipwrecks that possess exceptional historic, archaeological, and recreational value; research suggests that as many as 60 additional shipwrecks may be discovered in the sanctuary. This sanctuary will help tell the maritime trade story of Lake Michigan and the vessels that sailed and steamed this corridor, carrying grain and raw materials east, and coal, manufactured goods, and people westward.



A diver swims over the wreck of the schooner *Walter B. Allen* which is in the nation's newest sanctuary: Wisconsin Shipwreck Coast National Marine Sanctuary. Photo: Tamara Thomsen/Wisconsin Historical Society



Hikers enjoy the spectacular view of Channel Islands National Marine Sanctuary from Inspiration Point on Anacapa Island. Photo: Claire Fackler/NOAA

### ***Finding 8: The National Marine Sanctuary System is a world leader in marine protected area management.***

#### **We serve as a model for other underwater parks around the world.**

As one of the oldest underwater park networks in the world, the sanctuary system has been able to learn from and share its experiences with colleagues around the world. The issues faced by underwater protected areas around the world are universal: pollution, overfishing, invasive species, climate change impacts, and user conflicts among them. So are management challenges: how to engage stakeholders, how to obtain scientific information to make management decisions, how to prioritize and leverage budgets and personnel. The lessons learned in the management and protection of one protected area are valuable to the managers of others. Since 1986, with one of the earliest international meetings on underwater park management hosted by Florida Keys National Marine Sanctuary, we have participated in extensive formal and informal exchanges with colleagues from around the world. We have forged long-term partnerships—some as old as 40 years—with nations that include Australia, Canada, Mexico, Chile, South Africa, United Kingdom, France, Italy, China, Indonesia, Palau, Kiribati, Bermuda, and the Dominican Republic. We contribute our expertise to the greater conservation cause (helping, for one example, in developing the guidelines for implementing Particularly Sensitive Sea Areas for the International Maritime Organization) and learn from the efforts of our colleagues (for instance, adapting Great Barrier Reef Marine Park’s Reef Guardian Program into our own successful Ocean Guardian School Program). NAPA in 2021 cites: “The System is viewed as having a legacy of innovation that is held in high regard by many of its international

counterparts and is still considered to be a leader in many fields within protected area management despite its lack of robust funding for a program of its scope.”<sup>35</sup>

### **We foster the creation of formal organizations and informal learning networks.**

Our international work goes far beyond partnerships; we have also leveraged our experience to lead, support, and participate in international organizations. Sanctuary system staff played founding roles in such international ocean park organizations as Big Ocean (devoted to management of large parks of over 100,000 square miles in area); the IUCN Marine Mammal Protected Area Task Force (focusing on management exchanges among managers of parks with high marine mammal concentrations); the UNESCO World Heritage Marine Managers program, and the MPA Agency Partnership (the first group created for federal ocean park managers to exchange experiences.) The sanctuary system also created and continues, now through the MPA Center, to coordinate the International Marine Protected Area Management Capacity Building Program (see case study for more information). Sanctuary system staff serve as members and leaders of numerous regional ocean park groups including the Commission for Environmental Cooperation, the North American MPA Network, the Arctic Council’s Pan Arctic Network of MPAs, and the Caribbean Region’s Specially Protected Areas and Wildlife Protocol. We are also active partners with IUCN Marine and Polar Program, World Commission on Protected Areas, and UNESCO’s World Heritage Program and Man and the Biosphere Program. We have seven ongoing or developing sister sanctuary relationships with other countries and work informally with many more. We have taken a leadership role in planning major conferences on MPAs, including the World Parks Congress (2014), the International MPA Conferences (2009, 2013, 2017, and projected for 2022), and the World Conservation Congress (2016).

### **We maximize use of international legal protections and partnerships.**

The boundaries of underwater parks are invisible to the wildlife that swim in and fly over them; they are also equally porous to impacts like oil spills, pollution, and climate change. Underwater parks must make use of many instruments to accomplish their missions. Most are domestic authorities granted by legislation and regulation. But some tools are international instruments designed to manage uses outside of domestic laws and/or that provide recognition to the significance of the resources protected by a park. The sanctuary system has made pioneering uses of many of these instruments. Vessel routing measures—both voluntary and prohibitive, and including vessel traffic lanes and Areas to be Avoided—protect the resources of Monterey Bay, Cordell Bank, Greater Farallones, Olympic Coast, Florida Keys, and Stellwagen Bank national marine sanctuaries and Papahānaumokuākea Marine National Monument. A ban on anchoring by large vessels protects Flower Garden Banks National Marine Sanctuary. Two esteros in Greater Farallones National Marine Sanctuary are recognized by the Ramsar Convention, and Florida Keys and Flower Garden Banks are listed under the Specially Protected Areas and Wildlife Protocol. Cordell Bank and Greater Farallones are included in the U.N. Golden Gate Biosphere. Papahānaumokuākea Marine National Monument is a UNESCO World Heritage Site, and the national marine sanctuaries of the West Coast, as well as National Marine Sanctuary of American Samoa, are on the list of areas to be considered in the future for the same status.

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<sup>35</sup> National Academy of Public Administration, 2021

## Case Study: Innovations of Papahānaumokuākea Marine National Monument



A white tern chick checks out Kure Atoll in Papahānaumokuākea Marine National Monument. Photo: Carlie Wiener/NOAA

When Papahānaumokuākea Marine National Monument was designated (in its first incarnation as the Northwestern Hawaiian Islands Coral Reef Ecosystem Reserve in 2000), it was the largest conservation area in the world and the (still) largest conservation area in the U.S. But it was soon to add other pioneering achievements to its resume. As other countries followed suit in naming huge conservation areas, the monument began exchanging information and experiences that eventually led to the formation of Big Ocean, a networking and learning group for the managers of very large ocean parks who face unique challenges in trying to protect and manage such large areas. The monument also began working on a nomination to the World Heritage Program, a goal that was realized when the site became the first new U.S. World Heritage Site in a generation and the first ever that was named for both its natural and its cultural resources.

## Case Study: The National MPA Center and the International Marine Protected Area Management Capacity Training Program



Trainers from the National MPA Center consult with Korean colleagues at a training in South Korea in 2017. Photo: NOAA

The International MPA Management Capacity Building Program founded by ONMS in 2005 had by the end of 2019 trained more than 5,500 MPA practitioners in 46 countries and seven regional MPA networks, along with over 50 federal and international partners, in areas such as introduction to MPAs, management planning, sustainable fisheries, sustainable tourism, sustainable financing, marine spatial planning, climate change adaptation, education and interpretation, research and monitoring plans, and conflict resolution and facilitation. It is one of only a few of its kind of ocean park-focused training programs, and has been largely funded by external funding that other organizations and agencies invested to support ONMS ideas and expertise.

## Conclusion



Some young visitors enjoy a day beside Florida Keys National Marine Sanctuary. Photo: NOAA

In 1975, as one of the first staff in a barely three-years-old program, Sanctuaries Coordinator Robert Kifer wrote in an article: “How well we use the authority depends upon our collective imagination, wisdom, and restraint.”<sup>36</sup> Two years later, a consultant contracted to help the young organization in its planning concluded: “[T]he Marine Sanctuaries Program offers the best means of preserving selected areas of the marine environment...no existing programs, even in combination, can provide comprehensive protection to marine resources and values, the need for a viable Marine Sanctuaries Program is clear.”<sup>37</sup>

What was true at the outset of the program is no less true today. The most recent assessment of the program, the 2021 NAPA review, concludes that the sanctuary system has fulfilled its promise by successfully advancing its mission and vision; has developed a trusted reputation with the marine community; has achieved positive externalities for its communities; and has achieved all this despite its small size and modest budget. Our past performance and continued potential led NAPA to recommend an expanded role for the sanctuary system moving forward, calling “for a substantial broadening of ONMS engagement, not only within the U.S. government, but also among stakeholders, and global bodies working in the seas,” and urging the sanctuary system “to take demonstrable steps to significantly expand its role and ambition to protect the marine environment.”<sup>38</sup>

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<sup>36</sup> Kifer, 1975

<sup>37</sup> Center for Natural Areas, 1977

<sup>38</sup> National Academy of Public Administration, 2021



Children run along the shoreline of Hawaiian Islands Humpback Whale National Marine Sanctuary.  
Photo: Claire Fackler/NOAA

Many scientific assessments have converged on the unassailable conclusion that just as human demands on the ocean are about to increase exponentially, our last four centuries of pressure have brought the oceanic ecosystem closer to collapse. The myth of the ocean, of the planet, as being “too big to fail” has been shown to be hollow. As Dr. Jane Lubchenco and Dr. Steven Gaines said in 2019: “The ocean is not too big to fail, nor is it too big to fix. It is too big to ignore.”<sup>39</sup> As we advance on multiple marine conservation fronts, underwater parks will become even more important to a thriving blue planet. The next 50 years of national marine sanctuaries will be crucial to that effort.

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<sup>39</sup> Lubchenco and Gaines, 2019



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