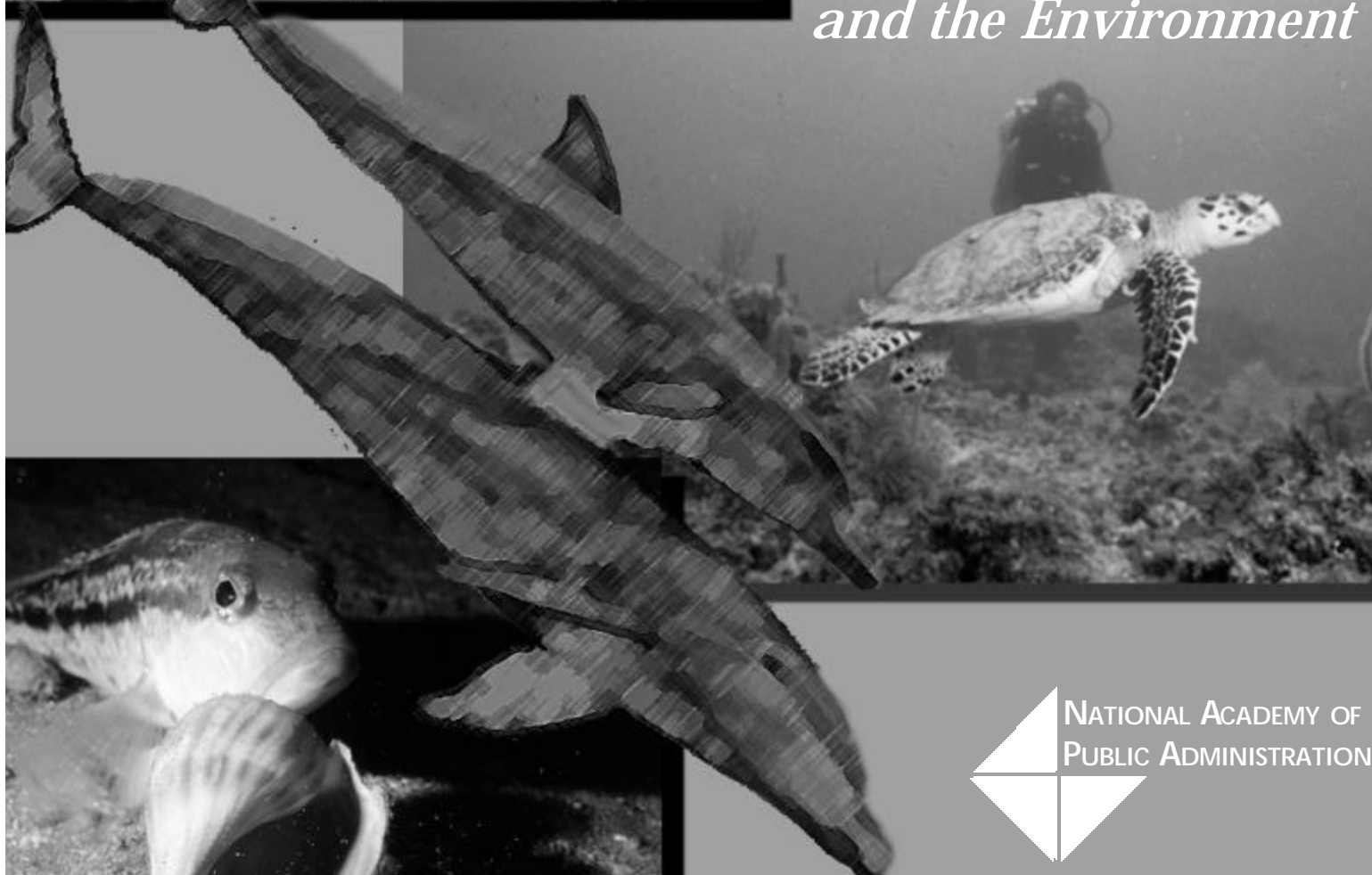


January 2000

Protecting Our National Marine Sanctuaries

*A report by the
Center for the Economy
and the Environment*



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Foreword

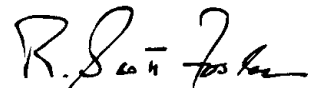
Our national parks, wildlife refuges, and national forests are products of the Progressive era 100 years ago. They were born in a time of confidence in the capacity of government and faith in the value of scientific, professional management.

National marine sanctuaries are coming of age in a different time. The federal government is much bigger and more professionalized, but so are states, local governments and nonprofit organizations. So sanctuaries have to shoulder their way through a bigger and tougher crowd of “cooperating agencies” than did our first national parks and refuges. Citizen confidence in government, especially the federal government, is low, and citizens’ have more tools than ever before (from litigation to hearings to the Internet) to press their point of view on agencies.

This report tells how the sanctuary program is beginning to develop its own, very modern approach to protecting natural resources, in tune with the times as well as with the demanding conditions of the ocean environment. The sanctuary program is learning lessons that will be valuable to all of us who care about preserving the balance of our natural world on land as well as by sea in the political conditions of the 21st century.

The Academy thanks the National Ocean Service of the U.S. Department of Commerce’s National Oceanic and Atmospheric Administration for this opportunity to learn from this small but creative and path-breaking program. We have learned lessons that will enrich our work with the Environmental Protection Agency, the Department of the Interior, other NOAA agencies, and a wide array of other federal, state, local, and nonprofit institutions. We appreciate the willingness of the sanctuary program employees, sanctuary council members, and many others to share their insights with us.

The sanctuaries are marvelous places. We hope this report will assist NOAA and others to protect the sanctuaries.



R. Scott Fosler
President

National Academy of Public Administration

Executive Summary

The National Marine Sanctuary Program is fundamentally well conceived and is beginning to demonstrate notable successes in protecting valuable parts of the ocean. However, many close observers of, and some participants in, the program feel that it is uncertain, ineffective, and pitifully small. This judgment overlooks what the program has accomplished in the 10 years since it began placing permanent federal managers at the sites. Perhaps unavoidably, the program has spent a great deal of energy in the past 10 years on planning and building its institutional capacity. Some sanctuaries are still without “defenses”—that is, without enough resources, authority, or community support to protect their valuable resources. Most sanctuary managers and staff have also drifted into an unnecessary and unproductive posture of fearing a strong sanctuary advisory council.

It is time for the sanctuary program to focus attention on results rather than on process and to build more confident and trusting relationships with communities. Specifically, the program could:

- Take steps to protect marine resources in the sanctuaries more effectively:
 - make sanctuaries more visible to the public by erecting informative signs, building visitor centers, and working with museums, whale-watching companies, nonprofits with volunteers, and other groups to create a more prominent presence in the community and on the water
 - use sanctuary advisory councils and working groups as vehicles to engage the local community in designing marine reserves where fishing or other activities is prohibited, where appropriate
 - clarify sanctuaries’ strategies for public education by setting priorities for particular audiences

and approaches that hold the most promise for protecting sanctuary resources

- use the mystique that comes with the designation “sanctuary” to educate the public, shape agency policies, and mobilize resources to address problems that affect conditions within the sanctuary
- Work more confidently with communities:
 - make public involvement part of the mission of the sanctuaries
 - clarify the roles and responsibilities of sanctuary councils
 - welcome councils as active partners rather than holding them at arm’s length
 - train sanctuary managers to work with strong-minded boards of advisers
 - help build stronger nonprofit “friends of the sanctuary” organizations
- Manage for results:
 - focus on protecting resources in the existing 12 (and soon to be 13) sanctuaries
 - emphasize results rather than planning, capacity-building, or other processes
 - publish a “state of the sanctuaries” report at least every three years that analyzes threats and agency actions
 - clearly state to Congress and the public whether the program has adequate resources to protect each sanctuary from important threats
 - work with sanctuary councils to establish annual work plans that set priorities and make strategic choices

- invest in building staff and capacity at the sites
 - place more senior staff at the sites, rather than at headquarters
 - fill more top jobs at headquarters with staff who have worked at the sites
 - create career tracks for sanctuary managers, assisting their promotion to more responsible positions after a number of years as successful managers
- clarify the roles, responsibilities, and skills of sanctuary staff

- NOAA should designate a senior official in the front office to encourage and give incentives to agencies to work closely with sanctuaries.
- Congress and NOAA should provide additional resources to the program and demand more competent performance.

The National Oceanic and Atmospheric Administration (NOAA) and Congress can help build a stronger sanctuary program. Doing so will provide many benefits to NOAA.

Each of the 12 national marine sanctuaries has taken some significant steps to protect marine resources at their sites. The future for the program is promising. It has the potential to begin to establish in parts of the ocean the civic culture and public support that is the foundation of governance.

- NOAA could direct all of its agencies and programs to provide stronger support to the sanctuaries by taking the following steps:
 - creating marine reserves that prohibit fishing or other activities in the sanctuaries where possible and appropriate
 - providing information for “state of the sanctuaries” reports
 - providing support to sanctuary activities

List of Acronyms

EPA	Environmental Protection Agency
FTE	Full-Time Equivalent
GIS	Geographic Information System
IMO	International Maritime Organization
MMS	Minerals Management Service
MPAs	Marine Protected Areas
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
SAC	Sanctuary Advisory Council

Chapter One

Take a Fresh Look

The National Marine Sanctuary Program protects 18,000 square miles¹ of particularly beautiful and productive ocean off our coasts. The 12 sanctuaries are treasures—with spectacular coral reefs, highly productive fishing grounds, and rich habitat for whales, sea lions and sea elephants, seabirds, and many endangered species. Thus, the sanctuaries are the marine analog of national parks, national forests, or wildlife refuges.

The sanctuary program has a promising future if it can show that it produces results. Every year, new technologies make it easier for us to go deeper into the ocean and to see its wonders. Scuba-diving, whale-watching, the use of small remotely operated submersibles with television cameras, live underwater video telecasts via the Internet to classrooms—these and other ways to bring people into personal contact with the ocean are evolving rapidly. The beauty and richness of marine life in the sanctuaries attract attention from educators, scientists, tourists, and residents of nearby communities. Public interest in and support of the program is bound to grow.



Diving for logger-head turtle; Morehead City, North Carolina. Drawing by H.W. Elliott, 1883.

The sanctuaries have a special place in the long list of federal programs that affect the ocean. The sanctuary program is beginning to demonstrate new and more effective ways to govern human's use of the ocean. Other federal marine programs address only specific uses or narrow issues such as fishing, dumping, research, public safety, or defense. The sanctuary program is unique; it can address the full array of issues in a place, including issues that cut across the boundaries of the sanctuary itself. Thus a sanctuary can begin to establish, relative for parts of the ocean, the civic culture that is the foundation of governance.

However, the program is far from fulfilling its potential. Most close observers of the sanctuaries say that the program is uncertain, ineffective, and pitifully small. They complain that the sanctuaries program is buried inside an organization, the National Oceanic and Atmospheric Administration (NOAA) of the Department of Commerce, which has very different traditions, constituencies, and culture than the sanctuary program's place-based, comprehensive, civic approach.

Even friends of the program routinely express skepticism:

“Even after 25 years, the advocates [of the program] admit that the concept [of marine sanctuaries] is still murky. Where are the boundaries, what is protected, what isn't? No one has all the answers.”

—Francesca Cava, former director
of the sanctuary program²

“No one knows how to manage an ocean or even part of one . . . Our marine sanctuary system remains a work in progress, gathering influences from near and far. [The question]—why one more bureaucracy when others have failed to turn things around?— deserves an answer. Perhaps the sanctuary system’s strength in educating people and encouraging cooperation will help.”

—concluding lines in a 1998
National Geographic article celebrating
the sanctuary program³

This conventional wisdom is half right. The program is small and does suffer from a limited budget. It has an annual budget of only \$14 million (FY 1999) and a staff of about 115 career and contract employees.⁴

For years, the program was plagued by controversy. It was a battleground between the oil industry and environmentalists. In the 1970s and 1980s, the most persuasive reason for creating sanctuaries was to block the leasing of federal oil and gas reserves off the coasts of California, Washington, and Massachusetts.

Now the sanctuaries may become a new battleground in a struggle between environmentalists and fishermen. Many environmentalists are urging sanctuaries to create “no-take zones” where fishing would be banned. This certainly sounds a lot like what a sanctuary should be. What is a sanctuary if not a refuge, a place where marine life is protected from being captured and killed? But Congress charged the sanctuary program with “facilitating” existing uses, such as fishing. As local fishermen remember clearly, most of the sanctuaries promised not to regulate fishing when they were created because this is the responsibility of the National Marine Fisheries Service.

Though accurate in part, the conventional wisdom about sanctuaries is out of date. It overlooks what the program has accomplished in the past decade. There were no permanent federal managers at the sanctuaries until 1990, so it is not an exaggeration to say that the program is really less than 10 years old.

Perhaps unavoidably, it has spent a great deal of energy in the past 10 years planning and building its insti-

tutional capacity. Some are still sanctuaries without defenses—without enough resources, authority, or community support to protect their valuable resources. However, the field staff and their partners in communities have learned practical lessons about how to manage special places in the difficult setting of the coastal ocean. The sanctuaries are beginning to find effective ways to establish a physical presence on the water, establish and enforce regulations, nourish public understanding of the sites and the threats they face, and encourage research. To perform these tasks, the sanctuaries have to invest their own funds and staff prudently and, just as importantly, have to be able to mobilize active cooperation from other agencies, private business, non-profits, and citizens.

The next steps for the sanctuary program are to reach out more confidently to work with communities near the sanctuaries, and to move beyond planning and capacity-building to managing for results.

The next steps for Congress and NOAA are to provide additional resources and demand more competent performance. The sanctuary program may seem out of place within NOAA, but it provides the agency with promising new tools and, with nurturing from leaders in NOAA and in the department, has the potential to help transform NOAA by showing how to engage citizens and communities in addressing marine issues more effectively, rather than symptom by symptom.

The National Ocean Service (NOS), which houses the sanctuary program, asked the Academy to assess the achievements of the 12 sanctuaries and recommend how the program could reach its fullest potential.

This report is based on an intensive onsite review of how the 12 sanctuaries are actually operating in the field. The field research included interviews with over 200 divers, fishermen, teachers, scientists, community leaders, and agency officials at the 12 sanctuaries. The research also included a review of program documents and interviews with key program officials, congressional staff, and other knowledgeable people in Washington, D.C.⁵

Chapter Two explains what a marine sanctuary is. It describes the resources at the 12 sites and the threats the sites face, and it analyzes the legal authority and statutory purposes of national program. *Chapter Three* analyzes how the 12 sanctuaries are defining their responsibilities and getting the job done. It summarizes successful approaches the sanctuaries have taken

to deal with the special problems of managing natural resources in the ocean and offers recommendations for improvement. *Chapter Four* describes how the national program is managed and presents detailed recommendations about how the program can move to a higher level of performance. *Chapter Five* summarizes the major conclusions and recommendations.

Chapter Two

What is a National Marine Sanctuary?

The 12 marine sanctuaries are diverse in a number of ways. They range from a quarter of a square mile to over 5,300-square miles, an area almost as large as the state of Connecticut. Most lie near the coast, but one is about 105 miles from shore. Some include waters within three miles from shore, where states have legal jurisdiction. Others are partly or wholly within federal waters, which reach out to 12 miles, or in international waters on the continental shelf, where there are limits on federal authority. Some are easy to reach; others are remote and invisible to anyone but a few fishermen or venturesome, expert divers. (See *Table 1*.)

Each sanctuary has a particularly interesting and attractive combination of marine resources. Most are national treasures—places with outstandingly rich marine life, unusual physical features or habitats, or in some cases unique “submerged cultural resources” such as shipwrecks. The Monterey Bay National Marine Sanctuary sometimes calls itself the “Yosemite of the sea,” with good cause. A few are perhaps not national treasures. Instead, they are only outstanding examples of a particular combination of attractive marine features. But all of the sanctuaries are special places. Each has a magnetic appeal that attracts fishermen, researchers, and curious citizens. And each has resources that deserve special protection.

The Natural and Historical Resources of the Twelve Sanctuaries

Reefs are the key features of four sanctuaries. Five others lie along the spectacular coasts of California or Washington. Three others don’t fit into any larger category.

Coral reefs are the centerpiece of three sanctuaries. The Florida Keys sanctuary includes the third largest coral reef



Blackbar soldierfish huddle within a coral reef.

in the world. The sanctuary stretches the full 220-mile length of the Keys and is literally at the front door of 82,000 residents and 2.5 million tourists each year. The Flower Garden Banks sanctuary in the Gulf of Mexico centers on two small, pristine coral reefs in the middle of an actively producing oil field and at the northern limit of waters warm enough for coral reefs to grow. The Fagatele Bay sanctuary is a beautiful eyeful of cliff, beach, reef, and water on the southern coast of the most populated island in American Samoa. Its coral reefs are recovering from two hurricanes, coral bleaching, and a 1979 epidemic of starfish that ate live coral

A fourth sanctuary, Gray’s Reef off Georgia, contains two highly productive but small reefs. They are not coral reefs but rather outcroppings of rock, up to six-feet high, covered with soft coral and plants, and sheltering a rich variety of fish. There are several similar reefs elsewhere off Georgia, but Gray’s Reef is larger than most and closer to shore. It is a small oasis of life on a vast, flat, sandy sea-bottom.

Table 1
The Twelve National Marine Sanctuaries

Name	State	Date Designated	Size(sq. miles)	Proximity to Shore	Includes State Waters
Florida Keys	Florida	November 1990	3,674	Adjacent	Yes
Flower Garden Banks	Texas/ Louisiana	January 1992	56	105 miles	No
Fagatele Bay	American Samoa	April 1986	0.25	Adjacent	Yes ⁷
Gray's Reef	Georgia	January 1981	23	20 miles	No
Channel Islands	California	September 1980	1,658	adjacent to islands 9–46 miles offshore	Yes
Monterey Bay	California	September 1992	5,328	Adjacent	Yes
Gulf of the Farallones	California	January 1981	1,255	Adjacent	Yes
Cordell Bank	California	May 1989	526	7–23 miles	No
Olympic Coast	Washington	September 1992	3,310	Adjacent	Yes
Stellwagen Bank	Massachusetts	November 1992	842	3–25 miles	No
Hawaiian Islands Humpback Whale	Hawaii	November 1992	1,300	Adjacent	Yes
Monitor	North Carolina	January 1975	1	16 miles	No

Five other sanctuaries—all quite large—lie along the West Coast, from the Channel Islands off Santa Barbara, California, to the Olympic Coast off the state of Washington. They lie alongside the most spectacular undeveloped coastline in the lower 48 states, abutting 4 national parks. The sanctuaries contain areas where cold currents rise from the deep ocean floor to the surface, bringing nutrients that feed a rich diversity of fish, shellfish, and numerous other marine species. Forests of kelp grow in shallow areas, and there are rich commercial fishing grounds as well as feeding grounds for sea lions, sea otters, and sea elephants, and vast numbers of seabirds.

The Channel Islands sanctuary lies off the mainland coast, and includes water within seven miles of the Channel Islands. Most of the islands and the first mile offshore are within Channel Islands National Park. Although the major zone of upwelling and mixing between cold and warm currents lies just outside its boundaries, the sanctuary is still a rich fishing ground, home for seabirds and sea lions, and visiting spot for

whales. The sanctuary also includes one federal oil lease, which has not been developed. Local citizens fought to create the sanctuary partly to prevent federal oil leasing.

The Monterey Bay sanctuary lies about 150 miles to the north and runs for 360 miles along the Big Sur Coast, through Monterey Bay, and north to San Francisco and a few miles beyond the Golden Gate Bridge. It is a spectacular and rich area. Among many other features, it includes the Monterey Canyon, which begins a few hundred yards off shore and drops to 10,000 feet below the surface—twice as deep as the Grand Canyon. Residents of the Monterey Bay area fought for 20 years to establish the sanctuary to protect Monterey Bay from oil leasing and development.

The Gulf of the Farallones sanctuary is adjacent to the northern end of the Monterey Bay sanctuary and runs north along the coast of Point Reyes National Seashore. The sanctuary gets its name from the Farallones Islands, a small rocky chain that is a

national wildlife refuge. The Cordell Bank sanctuary lies beside the Farallones sanctuary. It is entirely offshore on a submerged bank with steep pinnacles that rise to within 115 feet of the surface.

The Olympic Coast sanctuary lies along the northern third of the coast of Washington, next to the Olympic National Park and four small Indian reservations. Like the other West Coast sanctuaries, it is dramatic—a rich fishing ground, home to many seabirds, and a visiting spot for whales.

Like the West Coast sanctuaries, Stellwagen Bank off Massachusetts is a zone of upwelling and great marine productivity. Endangered humpback and right whales, as well as many other species of whale and dolphin, visit Stellwagen.

Whales also visit the Hawaiian Islands Humpback Whale sanctuary, a beautiful shallow area between Maui and two other islands that includes small areas off other islands. The Hawaiian sanctuary is unique in having responsibility for only one species, rather than the full array of marine resources. Whale watching is popular and profitable in Hawaii and at Stellwagen, as well as increasingly along the California coast.

The Monitor sanctuary off Cape Hatteras, North Carolina is unique in having no natural resources of particular interest. It is the site of the wreck of the Monitor, the first ironclad ship in the U.S. Navy and one that fought in a celebrated civil war battle. The Monitor lies upside down in 230 feet of water on flat, sandy bottom. Its distinctive turret and much of the hull are still intact. However, the wreck is decaying rapidly, especially since a fishing boat that dropped its anchor in 1991 fouled in the Monitor's propeller and began to tug the wreck apart. The sanctuary has now recovered the propeller and other artifacts, and there are hopes to retrieve other parts of the wreck for display at the world class Mariners' Museum in Newport News, Virginia. There are historic shipwrecks in several other sanctuaries, including the Florida Keys sanctuary, where some shipwrecks may contain Spanish gold.

Threats to Sanctuary Resources

Each sanctuary contains valuable resources that deserve protection: shipwrecks, coral, kelp, fish, manta rays, shellfish, and endangered whales and turtles, as well as less charismatic but equally important species in the food chain, such as krill, algae, and worms and sea cucumbers, as well as other invertebrates. The threats to these resources are diverse. (For a full catalog of the resources and threats, as well as the activities of each sanctuary office, see the profiles in *Appendix 1*.)

Some sanctuaries are heavily used and in immediate danger of serious damage. For example, the coral reefs in the Florida Keys are in worsening condition, plagued by disease, bleaching, and slow growth. The visibility of the water at the reefs has dropped dramatically from its gin-clear condition a few decades ago. Now one can often see only 30-50 feet, not over 100 feet. The impact of land-based development on water quality is particularly severe. The sewage from approximately 4,000 cesspits and 20,000 septic systems runs almost directly into the sea, passing quickly through the porous, cracked limestone. Development far north in central Florida has altered the flow and added nutrients to water that moves through the Everglades, into Florida Bay and out to the reefs, with consequences that are not fully understood but are certainly not benign.

Boats in the sanctuary also inflict damage. The shipping lanes from the Gulf of Mexico to the Atlantic pass nearby, and occasionally freighters run aground. Many smaller boats run aground on the reefs as well, crumbling the fragile coral. Others damage deeper coral by dragging anchors through it. The propellers of small boats cut permanent tracks through beds of shallow sea grasses. Though asked not to, some people touch the coral, take shells, or leave trash on the reef or in the backcountry.

At every sanctuary, there are one or more stocks of fish that are very low because of overfishing in the general area. In addition, in some sanctuaries, particular fishing practices are causing damage. The Stellwagen Bank sanctuary has helped finance research into bottom trawling, which has denuded some of the sea floor. Some fishermen have used dynamite to kill fish in Fagatele Bay, crumbling coral

reefs that were not already smashed by hurricane waves. In the Channel Islands, where endangered sea otters are moving close to the sanctuary, local fishermen fear they will eat so many sea urchins that they will destroy the commercial urchin fishery. Overfishing has already eliminated most of the abalone.

Oil spills are a threat to many sanctuaries, especially the five along the West Coast and Stellwagen Bank outside Boston Harbor. Tankers, large container ships, and barges run through the sanctuaries or close by. Several of these sanctuaries have worked with shipping firms to move traffic lanes offshore where possible and have organized volunteer beach watchers who spring into action if there is a spill. Oil spills or leakages from oil wells and pipelines are also a concern at Channel Islands and Flower Gardens.

In busy sanctuaries, there are often conflicts among different users. For example, volunteers at the Gulf of the Farallones sanctuary northwest of San Francisco warn kayakers and weekend visitors who are digging for clams to stay away from sea lions that are giving birth to pups on tidal flats. As more people walk among the tidepools and along the beaches of heavily visited California sanctuaries and take a few shells home, this damage may become more significant. At the southern end of the Big Sur coast, Monterey Bay sanctuary and the California Department of Transportation built a highway where people can read interpretive signs and watch enormous elephant seals and their pups but stay far enough away to be safe from protective mother seals—a bit like keeping people away from the bears at Yellowstone.

In the Hawaiian Islands and Stellwagen Bank, there is concern that whale-watchers may disrupt whales while they court and mate. One commercial whale-watching boat ran into a whale at Stellwagen Bank in 1998, and another collision killed a whale in 1999. There is also some evidence that private boats and even some researchers may unintentionally harass whales.

Jet skis are an issue in some places. The Monterey Bay sanctuary restricted jet skis to specific locations, and the Farallones sanctuary has proposed to ban jet skis in a particularly vulnerable estuary. However, at Florida Keys the county tried ineffectively to restrict jet skis, and the sanctuary has chosen not to assert its authority.

There is concern about testing of military missiles in the Florida Keys and the Channel Islands and about military and commercial airplanes flying low and possibly disturbing birds nesting at Channel Islands and Olympic Coast.

In contrast, other sanctuaries are remote and face relatively few threats. No one lives on the ridge around Fagatele Bay, only a few small plots are cultivated intermittently, and the tiny beaches, which are under water at high tide, are inaccessible to anyone but a determined hiker who has permission from local landowners. There is no road along most of the shore beside the cold, storm-tossed waters of the Olympic Coast sanctuary. Commercial fishermen and some private boaters and commercial whale-watchers visit Cordell Bank and the offshore parts of the Gulf of the Farallones and adjacent Cordell Bank. However, the area is so stormy and foggy much of the year that whale-watch firms usually cancel a third of their planned visits and most private boats stay close to shore. Few people dive there because of the weather, rough seas, and presence of great white sharks.

Gray's Reef and Flower Gardens are also remote. They lie two and eight hours from land, respectively; dive boats regularly cancel visits. If weather has been rough, the visibility is too limited to see much at Gray's Reef. However, even far at sea, Flower Gardens gets many visits from commercial fishermen and occasional visits from vessels serving oil rigs and from tankers and freighters that anchor next to busy shipping lanes into Galveston and Houston.

Why Call them Sanctuaries?

The name "sanctuary" implies a high standard of protection. According to Webster's Third International Dictionary, a sanctuary is:

- *a consecrated place, one devoted to the keeping of sacred things, as in Jerusalem*
- *a place of inviolable asylum, a place of refuge and protection*
- *a refuge from turmoil and strife*
- *a place of refuge for birds or game... where...hunting is not allowed*

Marine sanctuaries do contain many valuable treasures. The name “sanctuary” suggests that some activities should be strictly out of bounds—that perhaps the sanctuaries should limit public access or not permit commercial fishing or perhaps any fishing at all.

The National Marine Sanctuaries Act of 1972 authorizes NOAA to create marine sanctuaries. It begins with a “finding” that Congress means to establish a marine counterpart to the well-established federal programs that protect “special areas” that government owns on land, such as national parks, national forests, and wildlife refuges. The statute emphasizes the goal of resource protection. NOAA can designate sanctuaries when:

“(A) the area is of special national significance due to its resource or human-use values;

“(B) existing State and Federal authorities are inadequate or should be supplemented to ensure coordinated and comprehensive conservation and management of the area, including resource protection, scientific research, and public education. . .”⁸

The act spells out several purposes for the sanctuaries and gives the program authority to conduct a wide variety of different activities. Three broad purposes stand out:⁹

The statute states explicitly that protection is the “primary objective” of the program, as is suggested by the name “sanctuary.”¹⁰ The statute authorizes NOAA to:

- *“develop and implement coordinated plans for the protection and management of these areas”*
- *“support, promote, and coordinate scientific research on, and monitoring of” resources and*
- *“maintain, enhance, and restore living resources by providing places for species that depend on these marine areas to survive and propagate”¹¹*

The act also directs NOAA to a second major purpose: to look beyond the specific sites and use the sanctuaries to promote the broader social goal of “enhancing public awareness, understanding, appreciation, and wise use of the marine environment.”¹² This provision

encourages sanctuaries to be windows through which the public can learn about and appreciate the ocean. Pursuant to this authority, the program conducts various education and outreach activities and assists private groups in educational activities within the sanctuaries.

The third major purpose of the sanctuary program is to encourage multiple uses of sanctuary waters. The statute directs the program to

...facilitate to the extent compatible with the primary objective of resource protection, all public and private uses of the resources of these marine areas not prohibited pursuant to other authorities.¹³

Consistent with the statute, the program helped Arnold Schwarzenegger film a dramatic explosion on an abandoned bridge in the Florida Keys. Sanctuary employees flew overhead, radioing down to give the go-ahead when no dolphins or turtles were present.

There are long-standing debates among friends and employees of the program about whether this third purpose is consistent with the goal of protection and the name “sanctuaries.” From time to time, individuals suggest that NOAA should either forbid current activities that damage the environment or ask Congress to either rescind the third purpose or change the name of the program.

In the end, however, these debates are not likely to be productive. In this law, as in many others, Congress has left to the executive branch the difficult task of reconciling divergent purposes. The statute clearly emphasizes protection as the primary purpose. As it protects, the sanctuary program faces the same difficult balancing act that other federal land management agencies face. National parks have to accommodate hordes of visitors while protecting their treasures, and national forests have to protect watersheds and endangered species while allowing recreation and some amount of logging.

Even if Congress were to change the statute and drop the third purpose, it is unlikely that the sanctuary program would find a simple formula for balancing use and protection. In the ocean environment, where there are many well-established uses and natural processes that cut across jurisdictional boundaries, it

would be impossible to wall off the sanctuaries from human impacts. National parks and national forests have realized that they cannot manage their lands effectively if they limit their concerns to what lies within their borders. As described later in this report, the sanctuaries also have no choice but to come to terms with their social, legal, and economic surroundings, no matter how difficult this may be.

The breadth of its authority makes the sanctuary program unique in marine governance. Other marine programs focus on particular species, particular forms of pollution, particular industries, or particular governmental functions. The National Marine Fisheries Service (NMFS) manages commercial fisheries and protects whales and other marine mammals. The Army Corps of Engineers and the Environmental Protection Agency regulate the dumping of materials in the ocean. The Coast Guard enforces federal law and ensures marine safety. The Coastal Zone Management Program supports state regulation of pollution and promotes sound state and local land use on beaches, in estuaries, and in coastal watersheds.

In contrast, the sanctuary program is designed to supplement the efforts of other authorities to protect marine sanctuaries. The statute charges the program with “comprehensive and coordinated conservation and management of [sanctuaries] and activities affecting them, in a manner which complements existing regulatory authorities.”¹⁴

The phrase “comprehensive and coordinated management” might suggest that the sanctuaries should be out in front, leading and perhaps pushing other agencies to take special care to protect the sanctuaries. But it would not be easy for the sanctuary program to coordinate other agencies because it is the “young kid on the block”—younger than most of these other agencies and lacking technical expertise, legal precedents, and political constituencies that they have developed over the years.

The sanctuary program’s influence is also constrained by its small size and location deep inside NOAA. The

sanctuary comes within the jurisdiction of an office that also manages the large federal-state coastal zone management program and 40 national estuarine research reserves. This office is one unit of the NOS, which has such diverse responsibilities as preparing coastal charts, aeronautical charting, geodetic surveys, emergency responses, and various research and monitoring activities. NOS is a small agency compared with the other units of NOAA: the NMFS; the National Weather Service; the National Environmental Satellite, Data, and Information Service; and the Office of Oceanic and Atmospheric Research. Thus, the sanctuary program cannot easily influence other agencies without strong support from the top management of NOAA, (which it sometimes does get).

Alongside the ambitious mandate to “coordinate,” the statute includes legal checks on sanctuary authority. The authority to coordinate is constrained to “in a manner which complements [other agencies’] existing regulatory authorities.” The statute also states that regional fisheries management councils shall have first chance to draft any regulations for regulating fishing within the sanctuary. The sanctuaries must also cooperate with state fishing regulators “at the earliest practical stage” in writing regulations about fishing in state waters, i.e., within three miles of shore. Also, NOAA cannot designate a sanctuary and adopt rules for its management within state waters without obtaining the written approval of the state’s governor.

In the field, sanctuaries do have difficulty reconciling protection within the concept of multiple use, and they also have difficulty inserting themselves into situations that other agencies feel they can manage effectively without help from the sanctuary program. However, as we shall see in the following chapter, the sanctuaries are beginning to develop workable ways of managing these difficulties. The remark quoted in the previous chapter, that “no one knows how to manage the ocean or even part of it,” is overstated. No one can manage the ocean itself. But the sanctuary program is beginning to learn how to manage human activities to protect special places within the ocean.

Chapter Three

How to Protect a Marine Sanctuary

The sanctuary program has a small budget—only \$14 million annually. This amounts to \$778 per square mile, compared to \$6,167 per square mile for the Forest Service and \$16,667 for the National Park Service (see *Table 2*). The total area of the 12 sanctuaries—18,000 square miles—is about the same as New Hampshire and Vermont combined, or as Maryland and New Jersey combined. The first two state governments spend over \$84 million on environment protection and natural resource management; the latter two states, with larger populations, spend over \$553 million.¹⁵

With its limited resources, the sanctuary program must cope with the borderless, fluid world of the ocean, where natural resource management is different and perhaps more difficult than on land. The sanctuaries must, first of all, establish their physical presence on the water and in the community. They cannot mark boundaries easily, but they can put buoys in strategic spots, erect signs along the coast, distribute brochures, and build exhibits either in their own visitor centers or in museums and other facilities. Second, the sanctuaries have the authority to regulate and some capacity to enforce regulations. The program is now struggling with its role in creating no-take marine reserves. Third, the sanctuaries can support different kinds of educational and research activities. Many sanctuaries have invested heavily in these activities. Finally, the sanctuaries can convene citizens, non-profit organizations, and other agencies to discuss issues, share information about activities, and develop joint efforts that will protect the sanctuary. The advisory councils that several sanctuaries have created could be useful vehicles for building collaboration.

The sanctuaries have tried innovative approaches to each of these tasks and had a good measure of success. Often they must protect resources by winning support from the

public and from other agencies. However, some sanctuaries have not been able to develop good working relations with other agencies or to overcome local opposition. Lacking resources and public support, these are sanctuaries without defenses.

Resources of the Twelve Sanctuaries

The sanctuary program started very slowly, with no sites for three years, no separate budget for five years, and no field staff for the first 10 years. During this period, the oil industry fiercely resisted growth of the program, fearing quite rightly that it would cut off access to oil off the California coast.

During these early years, a very small staff in Washington wrote cooperative agreements with state agencies or with the National Park Service to manage the sites. In the 1980s, the sanctuary program began posting NOAA Corps officers for two-year assignments, a practice that continues at five sites today (Florida Keys, Gray's Reef, Channel Islands, Monterey Bay, and Olympic Coast).



Snorkeler visits the Marine Resources Lab now in a lagoon off Key Largo, FL. Location: Key Largo, FL.

Table 2
Federal Agency Budgets

Program	Total Budget	Total Area in Square Miles	\$ per Square Mile
National Marine Sanctuary Program	\$14 million	18,000	\$778
U.S. Forest Service	\$1.85 billion	300,000	\$6,167
National Park Service	\$2.1 billion	126,000	\$16,667

The NOAA Corps is a uniformed service of almost 300 officers who command NOAA research vessels, fly aircraft that track hurricanes, and fill top civil service positions in the agency on a rotating basis. One advantage of using NOAA Corps officers is that the sanctuary program does not have to pay their salaries. The disadvantage is that a two-year tour is not enough for some NOAA Corps officers to learn how to work effectively in the unusual setting of a marine sanctuary. The skills required to command a vessel are quite different from those needed to work with community leaders, local fishermen, or unsympathetic managers of other programs.

The sanctuary first hired civilian federal employees at sanctuaries in 1990, and now there is a federal manager at every site but one, where the manager is a NOAA Corps officer.¹⁶

There are big differences in staffing and budget among the sanctuary offices (see *Table 3*). The Florida Keys office is by far the largest, with Monterey Bay and the Hawaiian Islands Humpback Whale tied for second. Several years ago, the national program made a deliberate decision to invest its scarce funds in the Florida Keys and in Monterey Bay, which Congress created in 1990 and 1989 respectively. The hope was that these two sites would demonstrate what well-funded program could achieve.

There were good reasons to funnel funds to these two sanctuaries. In 1990, led by a powerful local congressman with ties to the environmental community, Congress gave the Keys sanctuary a much broader and more ambitious mandate than any previously existing sanctuary. Congress specifically directed it to convene a local advisory committee, prepare a comprehensive multi-agency management plan, and set aside areas for specific uses (such as no-take zones). Congress

also directed the EPA to invest millions of dollars in studies of water quality problems in the Keys. EPA investigated the causes of disease and decline at the reefs south of the Keys as well as the algae-covered “dead zones” in Florida Bay north of the Keys.

The national program already had a good working relationship with the Florida state government, which managed two small sanctuaries in the Keys that were to be incorporated into the new sanctuary. So the program was familiar within the Keys and had capable people on site. The hope was for strong support from the state government.

The reasons to invest in Monterey Bay were similar. The local member of Congress was powerful and had been fighting for years to create a sanctuary to forestall federal leasing of offshore oil. Like the Keys, Monterey Bay contains world-class marine resources. There are over a dozen marine research labs in the area, with many well-funded scientists using this convenient location to study the deep ocean. The threats to Monterey Bay are perhaps less immediate than the threats to the reef in Florida: In the Monterey sanctuary there are some depleted stocks of fish and endangered species, but the waters are almost pristine except in a few estuaries, and there have been no large oil spills yet.

There have been difficulties in getting programs started at both sites, but the investments have paid off. The national program has used both sites as showcases, often taking decision-makers down to the Keys or holding meetings in Monterey to spread the word about their unique resources and successful programs. (More about both sites later.)

Table 3
National Marine Sanctuary Budgets

Name	FY 1997 Budget	FY 1999 Budget	Changes in Budget (\$000)
Florida Keys	\$2,259,000	\$2,544,171	+ \$285,171
Monterey Bay	\$942,000	\$980,491	+ \$38,491
Hawaiian Islands Humpback Whale	\$372,000	\$900,000	+ \$528,000
Channel Islands	\$567,000	\$685,401	+ \$118,401
Olympic Coast	\$409,000	\$551,034	+ \$142,034
Gray's Reef	\$412,000	\$509,192	+ \$97,192
Monitor	\$283,000	\$500,000	+ \$217,000
Gulf of the Farallones	\$409,000	\$456,089	+ \$47,089
Stellwagen Bank	\$469,000	\$406,335	– \$62,665
Flower Garden Banks	\$252,000	\$357,663	+ \$105,663
Cordell Bank	\$123,000	\$121,421	– \$1,579
Fagatelle Bay	\$151,000	\$100,552	– \$50,448

The Hawaiian Islands Humpback sanctuary is a new-comer. Though NOAA first suggested a sanctuary near Maui in 1980, there was active local opposition from many fishermen, boaters, local officials, and others who were fearful of federal intervention. In 1992, Congress directed NOAA to propose a management plan subject to the approval of the governor. In 1997, the governor agreed to the designation, with the clear understanding that NOAA would provide additional funds for research and education about humpback whales. Now those funds are flowing, including a recent cooperative agreement of \$300,000 to the state.

The other sanctuaries must make do with less. Two—Fagatelle Bay and Cordell Bank—get less than \$120,000. For a time, Fagatelle Bay had only one staff member and Cordell had none; now they have two and one, respectively. Stellwagen Bank, Olympic Coast, Channel Islands, and Gulf of the Farallones must manage large areas with budgets of only \$456,000 to \$685,000. Olympic Coast and Channel Islands have received help by attracting NOAA corps officers, one of whom is the only NOAA Corps officer now managing a sanctuary. Gulf of the Farallones has helped form the non-profit “Friends of the Farallones,” which does work on contracts both with the sanctuary and with other agencies. This effectively doubles the staff of the sanctuary.

Stellwagen Bank has only two full-time professional staff and is clearly understaffed, given its location in a busy center for whale-watching and in a fishing grounds where stocks are crashing and the federal fisheries management has clearly failed. Three other sanctuaries—Monitor, Flower Garden Banks, and Gray's Reef—also have skimpy budgets but have less territory to cover.

The Challenge of Establishing a Physical Presence

A sanctuary cannot raise public understanding about the marine environment or enforce regulations if no one knows the sanctuary is there. But it is hard to establish a physical presence on the ocean.

The best way to establish a physical presence for a sanctuary is often to work with or through another organization, such as a museum, a whale-watching company, or a nonprofit organization with many volunteers. Several sanctuaries have invented creative ways to make these links. But establishing a physical presence and letting local residents and tourists know that a sanctuary exists is a job that is never completed.

Indeed, many sanctuaries are almost invisible to the ordinary citizen. Most of the local citizens we interviewed said that in their communities, few people are aware that there is a marine sanctuary nearby. Of these, even fewer have more than a hazy idea about the boundaries of the sanctuary.

Marking the Sites

It was not easy to mark the boundaries of national forests or national parks. Today, the Forest Service has built signs with the familiar phrase “Land of Many Uses” where public roads enter national forests. But when President Theodore Roosevelt created the United States Forest Service by executive order, it was no simple task to place markers and erect fences in forests and on rangelands. Ranchers had been grazing their cattle and sheep on public lands for many years and often resisted federal intrusion. Surveys were uncertain. The first Forest Service employees were “forest arrangers,” and where they are remembered they get special respect.¹⁷

The physical environment is even more challenging in the ocean. There are no roads to the sanctuaries; people enter by boat from many different directions. It is not practical to place buoys all along the boundaries of big sites or in any location where the water is over a few hundred feet deep.

The boundaries of sanctuaries are almost always unmarked. However, several sanctuaries have placed buoys at special places. The Key Largo national marine sanctuary, which is now part of the larger Florida Keys sanctuary, invented a mooring buoy several years ago to provide an alternative to dropping an anchor that might damage a coral reef. The sanctuary has helped other sites worldwide design and install mooring buoys.¹⁸

In 1997, the Florida Keys put yellow buoys to warn people from entering 19 small no-take or research-only areas on shallow reefs. This effort cost over \$100,000, and the annual maintenance and replacement costs will be significant. The sanctuary did not try to mark the boundaries of the much larger no-take “ecological reserve” as the cost was prohibitive.

Buoys mark three small offshore sanctuaries—Flower Garden Banks, the Monitor, and Gray’s Reef. At Gray’s Reef, there is a NOAA weather buoy. Divers and fishermen dial it up on the Internet to read about conditions at the reef at the NOAA internet website before they take the two-hour trip out. But the reefs themselves are a mile from the buoy, and boats use Geographic Positioning Systems or other navigational aids to find their way. The sanctuary is now considering whether to put mooring buoys at the reefs, but that would make it easier for boaters to find the reef and might lead to more visits and more damage. Only a submerged buoy that emits an electronic signal marks the Monitor.

For sanctuaries near major shipping lanes, it is important to get markings on the nautical charts that commercial ships must carry. NOAA’s charts are prepared by a sister agency within NOS, so that if there is enough funding to revise a chart where there is a marine sanctuary, it is a comparatively straightforward process to make necessary notations on the chart.¹⁹ It is a much more complicated process to get sanctuary markings on international charts approved by the International Maritime Organization (IMO). Any request from NOAA to create a traffic separation system or “area to be avoided” must be agreed to by all other federal agencies. Then the U.S. government must take the request to the IMO for discussion and approval by member nations.

Brochures, Maps, and Signs on Shore

Several sanctuaries have worked hard and creatively to let the public know where they are and invite them to “get wet”—to get in a boat and fish, snorkel, dive, or watch whales. All sanctuaries except Cordell Bank print colorful brochures and distribute them to dive boats, charter boats, and commercial whale watching operations. Some firms use the brochures, and a few hire naturalists to come along and explain what a visitor will see. Sanctuaries have talked about training these naturalists, and a few have held workshops for boat captains and naturalists. Most of the businesses that take people into sanctuaries are small and entry to the industry is easy. No sanctuary has yet been able to persuade captains that they might attract more passengers if they carried sanctuary-trained experts.

Where they can, the sanctuaries have helped museums or aquariums create exhibits about the site. The Monterey Bay sanctuary has a great advantage here; unlike any other site, the local aquarium is world class and focuses its exhibits entirely on waters within the sanctuary. At other locations, the museums and aquariums have only small exhibits about the sanctuary.

A few sanctuaries have acquired permission from agencies that manage adjacent coastlines to place signs along the shore. The Gulf of the Farallones sanctuary, for example, has built a half dozen signs overlooking the ocean from national parks. The Florida Keys sanctuary has erected signs at 20 public boat ramps and distributes its brochures widely.

Some sanctuaries have experimented with more innovative ways to make their presence known. For example, a popular local artist has donated several paintings of the Hawaiian Islands sanctuary, copies of which hotels have exhibited in their lobbies. The hotels have established spots to fix large telescopes so tourists can look for whales and read an explanatory plaque nearby. There are billboards with pictures of humpbacks and the name of the sanctuary on buses in Honolulu. The Fagatele Bay sanctuary distributes a popular and attractive calendar with pictures by local children of marine life and with information about tides. Almost every sanctuary makes tee shirts, and a few sell them.

But the bottom line is that these measures are not adequate. In the Florida Keys, seven years of controversial planning has ensured that local residents are aware of and have strong views about the sanctuary. But tourists may never learn that the sanctuary exists. The sanctuary's brochures are often crowded out by literature about motels, restaurants, and tourist attractions. There are no signs by roadside turnouts, so it is possible to drive the full length of the Keys, passing over dozens of bridges with spectacular views, without learning that one is looking at a national marine sanctuary.

Offices and Visitor Centers

National forests and national parks usually have visitor centers that provide information, explain what the agencies do, and give the programs a visible presence

in the community. Only two marine sanctuaries have found funds for this.

The office of the Farallones sanctuary is in a beautiful old lighthouse in an easy-to-see but hard-to-reach location beside San Francisco Bay. It has set aside a room staffed by volunteers with a mural, displays, a small fish tank, and brochures. The office for the Hawaiian Islands sanctuary is an equally beautiful former marine rescue station on the main road of a busy section of the Maui coast. There is a telescope out back for looking at whales. A big room on the brightly decorated ground floor welcomes tourists and volunteers. One crusty local resident scoffed that it had become a social club for retired people from the mainland. But at least people know that the sanctuary is there.

Most of the sanctuary offices are in less welcoming locations—for example, in the basement of a government office building, on a university campus, or in a storefront on a side street. The Channel Islands sanctuary has no facilities for visitors but it is next door to a new museum on the dock in the harbor. Sanctuary staff rub shoulders every day with commercial fishermen and charter boat operators. To build links with them, the sanctuary has built a kiosk by the fuel pump on the pier where one can touch a screen to check weather at the sanctuary, which is 6–20 miles offshore.

Some sanctuaries have undertaken only limited efforts to let the public know where they are. The Olympic Coast sanctuary, for example, does pay part of the cost for Park Service rangers who lead walks in the intertidal zone where the park and the sanctuary share jurisdiction. But the sanctuary office is 60 miles from the coast, even though there are possible locations in a smaller town near the coast.²⁰ The only sign for the Olympic Coast sanctuary is at the end of a dirt road leading to a foot path to the northwest corner of the Olympic Peninsula. The sign is big and bright, but its message is entirely negative: don't throw trash, don't do anything that might damage the resources, and don't get too close to the cliffs. There is no explanation of what the visitor might see on the water or under the surface.

The sanctuary program invested several hundred thousand dollars in planning unsuccessfully for a major marine education center that would feature all

12 sites near Fisherman's Wharf in San Francisco. And it has requested \$3 million in the FY2000 budget to build four visitors centers, including funds to pay for numerous attractive, informative signs at turnout areas along coastal roads and in marinas near all of the sanctuaries.

Having a Presence on the Water

The sanctuaries need to establish a physical presence on the water, both to enforce sanctuary regulations and to keep track of natural changes and human activities that might threaten sanctuary resources. To do this, sanctuaries usually find it necessary to work with other government agencies or with nonprofit organizations.

The sanctuaries rely primarily on the Coast Guard and enforcement officers of the National Marine Fisheries Service to patrol the sanctuaries and enforce regulations. But these agencies must worry about smuggling, boat safety, fishing regulations, and ordinary crimes, and they cover much larger areas than the sanctuaries. Thus they pay little attention enforcing sanctuary rules or monitoring activities in the sanctuaries.

Most of the sanctuaries have a boat or two, but a boat and a small staff can have little physical presence in the larger sanctuaries. Some sanctuaries pay NMFS to assign enforcement agents to sanctuaries. The Channel Islands and Monterey Bay sanctuaries share an aircraft that patrols regularly. The crew counts boats so that there is some reliable data about who visits the sanctuary, watches for signs of possible violations such as oil slicks, and gathers data for scientific research.

The Keys sanctuary is unusually well equipped. It owns 20 boats and has six Florida Marine Patrol officers on staff. But six officers cannot cover an area 220-miles long and 20-miles wide. The state has other Marine Patrol boats in the Keys, but the commanding officer in the Keys office announced shortly after the sanctuary regulations took effect that his officers did not have time to enforce the sanctuary regulations. The federal Department of Justice agreed to grant funds to pay the salaries of additional officers, but the state turned the funds down because the grant would run for only a few years and not cover all of the costs.

So the Keys sanctuary relies on trained volunteers to conduct "interpretive enforcement." "Team Ocean," as the volunteers are called, uses sanctuary boats to approach boats at the reef to offer information and friendly advice. They distribute leaflets about sanctuary regulations and tell people if they seem to be in violation but do not write tickets. All they can do is to call the Marine Patrol or try to reach one of the six officers on the sanctuary staff.

Some sanctuaries can rely on private individuals to tell visitors about sanctuary regulations and to report information about conditions at the sites. For example, the Flower Garden Banks staff has held workshops for workers at the oil rig inside the sanctuary, and the workers have warned fishing vessels and other ships not to anchor in the sanctuary. Captains of dive boats at the Flower Garden Banks and Gray's Reef also warn other boats against anchoring on the reef. At Stellwagen Bank, fishermen and whale-watchers burned up the air with radio chat about "whale-killers" when a new, high-speed whale-watching boat roared up to the bank and hit a whale in the summer of 1998.

And in Hawaii, a small cadre of "condo commandos"—retired people with telescopes on the balconies of their condominiums—watch for whales and call the sanctuary office when they think that whale-watchers or researchers are harassing the whales.

Regulation in the Sanctuaries

Most sanctuaries were created because local residents wanted the federal government to stop an activity offshore, and only the sanctuary program had authority to make such rules.²¹ The first sanctuary to be created—the Monitor—was established because no other agency was willing to accept authority to prohibit divers from taking artifacts from the site. The next sanctuary—a small site in the Florida Keys—was nominated by the state when courts ruled that a state marine park had no authority outside the three-mile limit. NOAA created the sanctuary and wrote a cooperative agreement with the state, so park employees could manage the site.

The Flower Garden Banks became a sanctuary because no other agency has the authority to prohibit anchoring

over the coral reefs. In 1984, a fishing boat's anchor dragged and ripped a trench 5-foot wide and 400-foot long through a reef. The Minerals Management Service (MMS) tried to regulate anchoring, but it had jurisdiction only over boats in the offshore oil and gas industry, which it regulates. Persuasion and voluntary codes did not work. So the oil and gas industry, MMS, the diving industry, and researchers at Texas A&M University, who had been studying the reefs for some time, agreed to seek designation of a sanctuary.

The West Coast sanctuaries were the product of local desire to stop offshore oil development. Most of the sanctuaries did not adopt regulations forbidding development, and they had no authority to stop development of pre-existing leases. However, just creating a sanctuary put political obstacles in the path of development.

Oil development has been a concern at Stellwagen Bank and the Florida Keys, but the oil reserves are not of a high-enough quality to warrant development. In the Keys, the trigger was the grounding of three cargo ships on the reef within two weeks in 1989. In Stellwagen, the triggers were proposals to build a whole city of casinos and hotels on offshore platforms and to mine sand and gravel at the bank.

The sanctuaries have been able to satisfy these initial needs with relatively few regulations. The precise phrasing varies from site to site, but all sanctuaries generally forbid dredging, dumping, and placement of structures on the seabed. Sanctuaries forbid removal of historical artifacts and certain valuable natural resources without permits. For example, the Keys forbids removal of live coral rock, and Monterey regulates taking of jade. The West Coast sanctuaries forbid aircraft from flying so low as to disturb seabirds and marine mammals (usually not below 1,000 feet).

These regulations also provide protection against other threats, many of which were not issues at the time the sanctuary was created. Regulations against discharging materials effectively prohibit ships from flushing their ballast tanks within sanctuaries, and they give the sanctuary a role in handling offshore oil spills. When NOAA created the Olympic Coast sanctuary, the Navy agreed to stop bombing runs on a small island which is heavily populated by seals. In Channel Islands, the sanctuary is negotiating with the

Navy to remove as much as possible of large arrays of underwater sonar equipment that is no longer needed, even though the cost could be substantial. The Florida Keys and Channel Islands have had to deal with long-standing missile tests and other military exercises.

Sometimes the sanctuaries have pushed hard to resist activities which their staff feel are damaging or set bad precedents. For example, when a treasure-hunting salvor "mail-boxed" the seabed—using deflected propeller wash to blow holes in the sand the size of buses—in the Florida Keys while looking for sunken Spanish ships, the sanctuary program took legal action and recovered \$600,000 in damages.

At other times, either program managers or other officials have decided to accept activities that might seem unusual, at the least. The Olympic Coast sanctuary did not become actively involved when the Makah Indian tribe decided to invoke its treaty rights to kill a whale in the sanctuary. Whale hunts were a central part of Makah culture until the 1920s. The tribe obtained permission from the international whaling authorities to kill up to 20 whales over the next five years on the basis that this was a traditional subsistence activity. The Coast Guard and NMFS managed the situation, keeping television teams and protesters at a distance. National television made little reference to the fact that the hunt took place in the sanctuary.

Marine Reserves or "No Take" Zones

State fish and game commissions and federal fishing management councils have long tried to prevent overfishing by regulating bag limits, seasons, and fishing gear. But commercial and sport fishermen dominate most councils and commissions and have resisted tough limits.²¹ As fish stocks have crashed, regional fisheries management councils have closed some fisheries. In the last several years, to prevent overfishing, environmental groups, marine scientists, and several foundations have campaigned to set aside marine reserves where no fishing would be allowed. Colloquially, these are often called "no-take" zones.²²

Scientists are studying the design of no-take zones and trying to formulate principles for their design. There are many unanswered scientific questions. How much do different species move around? Where do they

spawn? Do larvae drift long distances? (There is substantial evidence that the lobsters and corals in the Keys may be dependent on larvae that drift from waters off the Yucatan peninsula.) Some scientists feel that a regional network of fairly large zones is the only sound basis for marine reserves. Others calculate that the best way to develop such a system is to create as many small zones as possible in plausible areas, hoping that an effective network will eventually emerge.

There are also sociological and management issues. Many reports on successful no-take zones in traditional fishing villages in the tropics and in other locations say that community acceptance is a necessary precondition for making a no-take zone work. If there is no acceptance, then people will fish in the area, whether or not regulations prohibit fishing.²³

The sanctuary program must now decide whether to join this movement. At almost every site, commercial fishermen and some charter boat captains initially opposed designation of a sanctuary, fearing that it would try to regulate fishing. All along the West Coast, in Hawaii, and in Massachusetts, the local members of Congress promised that sanctuaries would never regulate fishing. NOAA wrote this promise into the initial sanctuary management plans.

The legislation directing NOAA to establish a large sanctuary in the Florida Keys broke this mold. It did not mention fishing but did explicitly direct NOAA to consider zoning areas for special uses. An NMFS research scientist had written an article proposing that 20 percent of the Atlantic coast be set aside for no-take areas and that three zones be established in the Keys. The sanctuary planners began studying this proposal.

In 1994, the planners proposed three smaller "replenishment reserves" to boost fish stocks. They ran into a storm of opposition. Fishermen joined with real estate developers and commercial treasure hunters (who explore for wrecks of Spanish ships, hoping to find gold) in a "conch coalition" opposing creation of the sanctuary. (Long-time residents of the Keys are called "conchs," after the large, beautiful Queen Conch that is now almost extinct in the Keys.) The coalition hung the sanctuary manager in effigy, placed "Say No to NOAA" signs along the highway that runs down the Keys, and sent coconuts marked with the same message to Congress.

In 1996, the sanctuary program consulted its local advisory council and retrenched, proposing in its final plan to establish only one small "ecological reserve" and to study another. Even so, 55 percent of residents of the Keys voted in an advisory county referendum against establishing the sanctuary. The state sought additional authority over sanctuary decisions and then approved the management plan, ignoring the vote.

The sanctuary program is now on the brink of a policy decision to establish no-take areas elsewhere. The Stellwagen, Gray's Reef, and Channel Islands sanctuaries have all begun revising their management plans and will consider no-take zones. In interviews with community leaders at the sanctuaries in California, Massachusetts, and Washington state in the second half of 1998, we found no one who thought it would be wise to break the old promises. The sanctuaries should leave the issue to NMFS, they said, not break promises.

However, opinions about such a move seem to be changing. Word has spread among commercial fishermen about successful no-take zones, including an area off New Jersey where scallop beds are said to be several feet thick. In the Keys, there are early indications that the fish population is booming at the no-take ecological reserve. The Keys has not finished its research about the effect of its no-take zones on fish populations, but the county's Tourist Development Board, a well-funded and powerful institution, has already run advertisements in national magazines encouraging people to vacation in the Keys to see the plentiful fish in protected areas. In May 1999, a working group of local fishermen, environmentalists, divers, and state and federal agency staff unanimously recommended creating two additional reserves in the Tortugas Islands at the western end of the Keys.

Among the program staff, there is strong sentiment in favor of zones. Most of the staff, especially in the Washington headquarters, are young professionals who are deeply committed to the program and to marine conservation. As one sanctuary manager put their views, when ordinary people visiting the sanctuary learn that commercial fishing is permitted, they are astonished. When program staff go to international conferences, they are embarrassed to admit that fishing is allowed. A sanctuary program that does not regulate fishing is "inconsequential," they say.

As a practical matter, some sanctuaries are better positioned than others to manage a no-take zone. The larger sanctuaries along the West Coast and in the Florida Keys may include enough territory to encompass a workable no-take zone. But other sanctuaries may be too small; the key populations of fish may spawn outside the sanctuary or spend little time inside the sanctuary, so closing it to fishing may not be effective. Even in the Keys, the spawning ground for one of the key species being considered for the additional reserves lies outside the sanctuary. The best no-take zone might require either adding the spawning area to the sanctuary or asking the regional fish management council to ban fishing in the spawning area.

If it will take council action to create a workable no-take zone, why not leave the whole task to the council and NMFS? The answer is probably that the sanctuary is acting because the fisheries management council is unlikely to do so. This is fair enough; the sanctuaries can provide a vehicle for local fishermen, advocates of no-take zones, and others to sit together to discuss their views and craft a proposal.

As discussed above, a sanctuary's ability to enforce no-take regulations is limited. Currently, there is minimal enforcement of the no-take zone in the Keys, and no one really knows whether there is any poaching, especially at night. The most effective way to enforce regulations against fishing may be to rely on fishermen to pass along tips about where and when other fishermen are poaching. But if the fishing community becomes embittered about the sanctuary, fishermen may not be willing to give this information to enforcers.

The most prudent course for the program is to make site-by-site decisions rather than an across-the-board policy shift and to create zones only if there is substantial support in the local fishing community for doing so. The Channel Islands sanctuary may have found one such path. As explained above, it has worked hard to build relationships of trust with the fishermen who keep their boats in the harbor where the sanctuary office is located. Several articulate fishermen have become convinced that no-take zones are inevitable. Indeed, the state legislature has directed the state fish and game commission to study such zones. The fishermen have calculated that they will have more influence on decisions if they work

through task forces of the sanctuary advisory council, which will be made up of mostly local members. If the sanctuary is not involved in designing the zones, then debates may revolve around the state fish and game commission, which is based in Sacramento and is actively lobbied by environmental groups based in San Francisco. For its part, the commission is willing to let the sanctuary take the lead. The commission will make the final decision about zones within the first three miles offshore anyway.²⁴

The Channel Islands sanctuary is taking a substantial political risk. It does have the support of several prominent local fishermen, but given the individualistic culture and the fragmented structure of the fishing industry, long-term support is far from certain. The sanctuary can call on experts at the local university for technical assistance. The university experts are leading a major foundation-supported international study of the design of marine reserves and are interested in field-testing their ideas in the sanctuary. But the sanctuary has no technical capacity itself and must find ways to work cooperatively with the nearest NMFS laboratory.

Though daring, the Channel Islands proposal is certainly interesting. It is the most ambitious example of the special contribution that sanctuaries can make to marine governance—the ability to create a forum where representatives of diverse local, state, and national interests can come together to make decisions about broad, cross-cutting issues.

All of the sanctuaries have invested substantial effort in building the ingredients for mutual understanding and effective action. They have invested heavily in education and research and in becoming a convenor.

Research and Education

Just designating a sanctuary and promulgating regulations provides some protection. But these initial steps are not enough to ensure compliance with the rules, educate the public about broader marine issues, or facilitate existing uses. The foundation for effective place-based governance is a strong civic culture built on a rich mix of information about local conditions, shared understandings, good working relationships, and institutions where people can meet to address

issues. The sanctuaries have put a great deal of their limited resources into a variety of non-regulatory activities to build this culture.

Research

Each sanctuary has tried to develop a basic inventory of its natural and cultural resources, and some have managed to organize long-term monitoring programs. However, the sanctuary program has lacked the financial resources to support much research.

The Florida Keys water quality research, which is managed by EPA, is the only example of a major, federally funded research program specifically designed to provide information for the management of a sanctuary. This program has been quite effective, but more in influencing state and county decisions than in helping the sanctuary manager. The research documented poor water quality close to shore. This information convinced a state hearing officer to reject the county land use plan and instead to impose numerical limits on how many new dwelling units can be built in the Keys. The county is now preparing a wastewater management plan that may call for spending as much as \$500 million to replace cesspits and septic systems with more effective wastewater treatment.²⁵ The research program is helping to test alternative technologies. The county commissioners have accepted in principle the need for better wastewater treatment, but they are asking the state and the federal government to help cover the cost. Except for a very small experimental plants in one small neighborhood, no new systems have yet been built, but action does seem to be more likely.

The Florida Keys sanctuary has also designed and funded a three-part study of the effects of its seven-square mile, no-take marine reserve. Other sites have found effective but inexpensive ways to encourage research that is funded primarily by others. The sanctuary advisory council at Monterey Bay has a particularly active research subcommittee, which gathers top scientists from the many research institutions in the area for regular informal meetings. Other sanctuaries have research coordinating committees that are less active.

Stellwagen Bank shares the salary of a researcher who has done important work on the environmental

impacts of bottom trawling. The manager of the Farallones sanctuary has been an active member of research teams working at the wildlife refuge on the Farallones Islands. Professors at Texas A&M university documented the coral reefs at Flower Garden Banks and trained many students who now work for the Interior Department's MMS, which manages offshore oil development, or for oil companies with leases near the sanctuary. The first manager of the sanctuary was a former Texas A&M student who held a faculty position and continued to advise students working on the sanctuary.

Since 1997, large NOAA research vessels have visited nine of the sanctuaries each year, (all but Monitor, Hawaii Humpback and Fagatele Bay), providing valuable ship time for scientists nominated by the local sanctuary. The Channel Islands, Olympic Coast, and Gray's Bank sanctuaries have refitted their own boats as platforms for researchers, and the Olympic Coast sanctuary operates a small house where researchers can live near the dock. Free use of the boats and house is enough to attract many researchers to work in the sanctuary. These and other sanctuaries also help convene periodic conferences to share research findings.

Some sanctuary managers have been able to use free boat time and small amounts of money to interest researchers in gathering information that has been important for management decisions. For example, when fishermen in the Channel Islands began catching large numbers of squid, the sanctuary encouraged researchers to investigate whether this cut into the food supply of whales.

The NOS, the NOAA agency which houses the sanctuary program in a unit with the coastal zone management and the national estuarine research reserve programs, has made concerted efforts on occasion to encourage NOAA research offices and line agencies to help provide funds, information, or technical support to research projects on the sanctuaries.

Perhaps the most systematic and successful recent effort to mobilize resources from other NOAA programs took place as part of the National Geographic's Sustainable Seas Expedition. This is a large, multi-year project funded initially by a foundation grant and led

by NOAA's former chief scientist Sylvia Earle and Francesca Cava, a former NOAA Corps officer who was the first manager of the Channel Islands sanctuary and later director of the national sanctuaries program. Sustainable Seas is an unusual opportunity for the sanctuary program; it combines research and exploration using submersibles, education for school children and teachers, and a large component of public education and publicity.

For Sustainable Seas, NOS staff have canvassed their own programs and other NOAA units systematically and have been successful in getting many kinds of assistance, such as detailed maps, information from previous research projects, special weather forecasts for the days when submersibles plan to work, and funding. Sustainable Seas is proving a once-in-a-lifetime opportunity, not just for NOAA to showcase the sanctuaries, but also for demonstrating the many products and services that its far-flung programs have developed.

Recently, the program promoted a sanctuary manager to a headquarters position responsible for science at all of the sanctuaries. In addition to helping organize Sustainable Seas activities, he has written a plan that calls for each site to hire a full-time research manager. This would substantially increase the capacity of the program to acquire resources and conduct research. Even so the program will still be forced to rely largely on other agencies and sources of funding. At this point, there is little prospect that the sanctuary program can mobilize sustained, integrated, multi-dimensional research programs at any of the sites. In the long run, this will limit the ability of the program to design effective protection efforts.

Education

Even the smallest sites have at least one staff person who works in marine education, usually with school-age children. Their efforts have won a good deal of respect and some local visibility for the sanctuary program.

One of the earliest examples was Los Marineros, a hands-on marine camp for underprivileged children at the Channel Islands sanctuary. Since its founding in the mid-1980s, it has evolved into a program for all fifth-graders in the city of Santa Barbara. Other particularly successful programs include summer camps

in Fagatele Bay, a Flower Garden Banks effort that reaches a third of all seventh-grade public school students in Houston as part of a larger effort by the Houston Museum of Natural History, and an award-winning video by the Stellwagen Bank and Gray's Reef sanctuaries about endangered whales.

Fagatele Bay, Monterey Bay, Channel Islands, and Gray's Reef sanctuaries have formed multi-agency partnerships to plan programs, develop curricula, and mobilize resources. Others work closely with dive clubs and non-profits. Some sanctuary staff train volunteers so they can reach more students. With funding from the oil industry through the Gulf of Mexico Foundation, the Flower Gardens sanctuary trains high school teachers and takes them on dives to the sanctuary. The Fagatele Bay and Hawaii sanctuaries co-authored a coloring book on coral reefs with text in English, Samoan, and Hawaiian.

It is hard to evaluate the impact of efforts like these. No doubt in the long run the health of the ocean depends on how well citizens understand and appreciate marine resources. In the short run educational programs for school children no doubt also have impacts on parents. In many communities near the ocean, remarkably small numbers of teachers, children, and citizens get into the water or have direct contact with the special resources of the sanctuaries.

The questions for the sanctuary program are in two groups: (1) What should be the specific objectives of educational programs? How much energy should be directed towards elementary schools, high schools, divers, fishermen, or the public in general, and what kinds of increased understanding or changes in behavior should the sanctuaries seek? (2) How should the sanctuaries best invest their scarce resources in education? Should the program develop curricula, help get curricula into the hands of other educators, train teachers or volunteers, or work directly with students?

For the most part, each sanctuary has worked out its own answers to these questions. Some sanctuaries have convened working groups of marine educators from public, nonprofit, and private agencies to organize joint projects. These groups could help the sanctuaries think through the best role for sanctuaries in environmental education locally. So far, the groups

have been working mostly on specific activities rather than on setting concrete objectives or strategies.

The Sustainable Seas project created an opportunity for education staff from the sanctuaries to develop a system-wide approach. They decided to put their energies for this project into training public school teachers, bringing schoolchildren together with scientists who were doing research as part of Sustainable Seas, and tapping NOAA's vast warehouse of technologies and resources, such as expert divers, underwater video, and live television links from the ocean to school classrooms. For example, as one part of Sustainable Seas at each site, Sylvia Earle is convening summits where students who have been working on marine projects in school can ask scientists questions about their work and can talk with the pilots of the submersibles that are exploring or conducting research. The next step could be to assess whether these creative efforts are leading to changes in public attitudes, increased understanding of marine issues, or specific actions that will reduce threats to sanctuary resources.

Sanctuary Councils

Given the limited resources available to the sanctuaries and their need to recruit allies and win community acceptance, one might expect that they would try to enlist community leaders and key staff from other agencies as official advisers and supporters. One way that sanctuaries have done this is to form advisory councils. In 1997 there were councils at Stellwagen Bank, Florida Keys, Olympic Coast, and Monterey Bay. Since then councils have been established at Channel Islands and Hawaiian Humpback, and another will soon be formed in Gray's Reef.

However, among program staff there is a widespread fear of losing control to sanctuary advisory councils. Consequently, it is not surprising that many members of the councils reported that their work on the councils was frustrating and ineffective.

The Florida Keys council is perhaps an exception. It was of immeasurable help in getting the sanctuary started. A staff team from the sanctuary and other agencies prepared the management plan. Periodically sanctuary staff consulted with the council. When the

draft plan was published, it included provisions which suggested that the sanctuary would assume sweeping authority for everything from airplane over-flights to local land-use decisions. There was a storm of protest. The Conch Coalition had a field day.

Although the sanctuary advisory council had not seen these portions of the draft plan, it played a central role in defending the plan and making changes. The council formed small task forces that met with dozens of groups of fishermen and other citizens, asking for suggestions and dealing with complaints. The council voted on specific changes to the plan and endorsed the final draft. Several individual council members organized a pro-sanctuary campaign for the county referendum, and they later invested a great deal of time lobbying the governor and other state officials to approve the plan. It is not an exaggeration to say that NOAA almost lost the chance to create the sanctuary—perhaps forever. The advisory council—as a group and through individual efforts—saved the bacon.

The story in Monterey Bay is different, but the bottom line is the same. It was the council that was responsible for creating the sanctuary. In Monterey Bay, the local members of Congress convened a small group of prominent local citizens to advise him about the proposal for a sanctuary. They fought for years to create the sanctuary and won when President Bush decided to endorse the Monterey sanctuary just before the 1992 election. Then NOAA appointed most of the congressman's advisory group to the sanctuary advisory council.

This is when things began to sour, not just for Monterey Bay but for all councils. The council included several influential and articulate community leaders. Its chair was a strong-minded county commissioner — in a state where counties are large and powerful. For whatever reasons, the sanctuary manager and the advisory council did not get along. There was no particular substantive disagreement, other than a generalized frustration on the part of the council about how long it took to get things going. There were disagreements about the council's authority, including whether it could have its own letterhead and to whom it could write. Conflict came to a head when the program revised the council's charter, which was only a draft, spelling out a more limited role in the final version.

In our interviews in 1998, it was clear that years later relationships in Monterey seem much improved. A new sanctuary manager is a former county planner who seems comfortable and skilled in working with a board of prominent citizens. The council has a new chair. But at several other sanctuaries, staff recalled the conflicts in Monterey and spoke about the necessity of keeping their own councils from taking over. At some sites, the sanctuary manager chaired the council meeting or monopolized discussion by reporting at length on recent activities. Council members complained publicly that discussions never came to closure.

The national program has written the charters for the new councils to make clear the limitations on the council's authority. A council advises the sanctuary manager on topics that he or she suggests. The council cannot discuss another topic without the manager's approval in advance. The council cannot write a letter or make a public statement without the manager's explicit approval. The council cannot make any decisions or perform any management functions. According to the charter, council members "shall recall that the primary objective of the Sanctuary and the Act is resource protection."²⁶

Certainly there are precedents for fearing the influence of local advisory councils. Often fishermen on regional fisheries management councils have effectively resisted tight regulation. District grazing councils for decades kept the federal Bureau of Land Management from regulating ranchers tightly. But unlike these committees, the sanctuary advisory councils are not dominated by any single user group. (The Forest Service and the Park Service do not have local advisory committees.)

Perhaps the charter's strictures are not unreasonable ground rules. Certainly statutes vest decision-making authority with NOAA, not the Councils, and it would be inappropriate to do otherwise. But the charters clearly convey distrust, and they utterly fail to suggest how the council can help a sanctuary become a more influential and effective force for marine conservation. Since the sanctuary program appoints council members for limited terms, one might think that the sanctuary manager would have a great deal of influence over the council and would not want to spell out the council's limited authority quite so plainly. Our

interviews suggested that virtually all of the council members were proud to have been selected and, with very few exceptions, were enthusiastic supporters of the program, eager to do whatever they could to help the sanctuary. However, the charter is hardly an invitation to council members to roll up their sleeves and help.

The national leaders of the program could take steps to improve the situation. The program might prepare a more positive statement about the role of the councils, focusing on how the council can help achieve the goals of the program, especially protection of sanctuary resources. The statement could explain how important it is for a sanctuary to win active support from other agencies and community organizations; it could charge the council with helping with this outreach. It could describe useful projects that council members have undertaken at various sites. It could explain how council members could help the public to learn about the sanctuaries by speaking out publicly on issues before the council. It could include a statement from the secretary of Commerce thanking council members for giving their time freely.

Perhaps the program should even change the name of the councils, dropping the word "advisory" to make the point that joining a council means accepting some responsibility for making the sanctuaries more effective, as well as giving advice to the manager.²⁷

Program leaders could also make clear their support for the councils by meeting with them periodically and maintaining an appropriate level of direct contact with council chairs. The program should encourage sanctuary managers to recruit the most influential, most articulate council members possible.

If necessary, the sanctuary managers could be trained in the skills of how to work with a strong-minded board of community leaders. The advisory council chair should always run the meeting. The sanctuary manager should plan each council meeting to include an opportunity for the council to give advice on specific issues. Periodically, the manager should explicitly make a point of changing course in response to this advice.

There is another issue about the councils that is worthy of attention. The National Marine Sanctuaries Act describes citizen members of the councils as “representatives” of local user groups, conservation organizations, or other organizations. Most of the sanctuaries seem to have taken this quite literally. They divide the seats on the council among various groups, advertise for people to fill these particular slots, then they inform the members that their responsibility is to convey the views of the group they represent. This approach has several disadvantages. Some groups feel excluded from the process because they lack a seat on the council. Some user groups have difficulty with the concept of having a single representative. Fishermen, in particular, are independent-minded people, and at many sites there is relatively little communication between fishermen from different ports or between fishermen who catch different species.

By asking council members to express the views of separate user groups, the sanctuary encourages conflict. This might seem to put the manager in a more controlling position of reconciling diverse viewpoints, but it is likely to make the manager’s job harder. There is a better way. Certainly it is important to balance the membership of the councils. But rather than setting aside seats for each group, the sanctuary should advertise for members in general, ask applicants to describe their experience, interests, and community leadership roles, and balance the membership as a whole. Furthermore, the sanctuaries should ask advisory council members to consider the full array of sanctuary programs and to help balance interests and build communication between different user groups.

Along with advisory councils, most sanctuaries have helped organize “friends of the sanctuary” organizations. These organizations take many different forms, but all are non-profits that can raise funds from donations, memberships, government contracts, or other activities. A few of these organizations play important roles in the sanctuary. The Farallones Marine Sanctuary Association has a staff of four who work alongside sanctuary staff. The sanctuary provides some of the funds for this group, but it also has contracts with other agencies and raises some funds from various activities. In Monterey Bay, a “friends” group raises funds from the community and supports various activities.

Many of the “friends” groups, however, are young and quite small, or even inactive. For example, the Gulf Reef Environmental Action Team, which has worked with Flower Garden Banks, had slowed “to a crawl” by mid-1999. There was little communication, if any, among organizations at different sites. The national office helped create a national nonprofit to support the sanctuary program but has given little attention to working with local groups. At one site local community leaders see the national nonprofit as competition rather than as a partner. With more active encouragement, both local and national nonprofits could become far stronger allies for the sanctuary program.

One other point: Some small sanctuary staff may feel they do not need a council because there are so few people who know and care about the sanctuary. The sanctuary manager may feel he or she knows each of these people well and can call on them informally for advice. Perhaps so, though if the sanctuaries are indeed treasures, presumably the manager could interest other individuals in the site and could benefit from getting them actively involved. Furthermore, what will happen when the sanctuary manager leaves? There should be a mechanism for an incoming manager to engage local leaders without having to rely on the personal relationships of the former manager.

This report does not suggest that every sanctuary must have the same kind of council. Perhaps a “friends of the sanctuary” organization or an advisory council established for a broader set of functions could serve the purpose, which is more important than the form. Each sanctuary could benefit from having a formal council of leading citizens to provide counsel to the manager and to assist in mobilizing resources, educating the public, and speaking out about the potential of the sanctuary and its needs. The sanctuary could also benefit from an active local non-profit, which could become an active fund-raiser and would have far greater ability than an advisory council to speak to Congress and the public in support of the program.

A Sanctuary’s Power to Shape Public Opinion and Agency Actions

The quality of the working relationships between the sanctuaries and their sister agencies varies from excellent to terrible. There are a variety of reasons. In some

places, the sanctuary fills a useful niche, helping other agencies address problems that they lack authority to solve. In other places, personalities clash and there are no obvious reasons to cooperate.

For example, national parks are close partners with the Gulf of the Farallones and Olympic Coast sanctuaries. These parks lack authority below the low tide mark and see the sanctuary as a partner with authority over waters further offshore. However, at the Channel Islands working relationships with the park are strained. Here, the park has some authority out to one mile, so there is overlapping jurisdiction. Tensions may arise also from the fact that the sanctuary program terminated two cooperative agreements that provided funds to the park. One agreement provided funds for the park to manage the whole sanctuary in the early 1980s. A more recent agreement supported park enforcement activities in the sanctuary.

Old, discontinued cooperative agreements are an irritant in other locations as well (e.g., Gray's Reef). In recent years, some sanctuaries have canceled agreements and used the funds to expand their own staffs. These are often sound decisions; sanctuary budgets are very tight. It is difficult for a sanctuary to establish its presence in the community if most of its funds go to state agencies or nonprofits that are struggling to build their own presence and programs. But once a sanctuary has enough resources to establish its presence in the community, it might protect its resources more effectively by sharing some of its funds with agencies or nonprofits that share its goals. In Hawaii, the state and the sanctuary are currently negotiating about the substantial funds that are starting to flow to the state. In the Keys the situation is somewhat different; the sanctuary has covered the salaries of many state employees for years, and some state officials and other observers say it is time for the state to pick up more of the burden.

Sanctuaries enjoy good working relationships with NMFS in Hawaii, the Keys, and the Farallones. The Farallones manager was once a NMFS employee. At the national level, the sanctuary program has less success in working with NMFS and some other NOAA offices. At Stellwagen Bank relationships have been so troubled as to be embarrassing. The regional NMFS office faces a difficult situation, with fish stocks crash-

ing in the Gulf of Maine and on the Georges Bank. The sanctuary has documented damage to the seabed by bottom trawling and pushed vigorously for tough regulation of fishing. This insistent pressure has made NMFS' job more difficult. Without consulting, NMFS created an experimental no-take zone that overlapped part of the sanctuary.

Although they lack the budgets, technical skills, and political clout of larger agencies, the sites have a mystique that comes with the word "sanctuary" and with the charismatic beauty of their resources. This mystique can be used effectively to influence public attitudes, shape agency policies, and mobilize resources to address problems in the sanctuary. The first chair of the sanctuary advisory council in the Florida Keys grasped this potential quickly and established the sanctuary as a significant player in multi-billion-dollar decisions about water management in South Florida.

At the time, the state of Florida and the federal government were embroiled in costly litigation with the powerful sugar industry about pollution flowing from canefields in central Florida hundreds of miles south to Everglades National Park. The Superintendent of the park said the pollution was a "cancer" spreading south, threatening to clog the park with algae, cattails, and mud. South of the park and 20–50 miles across Florida Bay lie the Keys, and six miles past the Keys are the reefs. In the late 1980s and early 1990s, algae bloomed and sea grasses died in large areas of Florida Bay, turning it muddy and smothering young lobsters and other marine life. Studies showed that some of this nutrient-rich, less-than-crystal-clear water flowed between the Keys out to the reef.

The chair of the sanctuary advisory council, an articulate, dedicated and wealthy developer, focused public attention on problems in Florida Bay and the reef. The story of the powerful sugar industry killing the reefs made excellent copy. In actuality the problems in the park, the bay, and the reefs are far more complex and still a matter of scientific disagreement. Changes in the timing, volume, and chemical composition of waters flowing into and from the canefields do contribute to the declining health of the reef. It is unclear whether these factors are as important as untreated sewage from Keys themselves or a host of other possible causes of reduced visibility and disease at the reef.

The sanctuary has drawn some benefit from being linked to the larger issue of the health of the south Florida ecosystem. The federal government and the state established an interagency committee that helped design a \$7.3 billion restoration of the ecosystem. For two years, the sanctuary manager chaired the committee. The sugar industry, Congress, and the state have all committed some funds to the restoration. County officials hope that some of the \$7.3 billion will come to the Keys to help pay for wastewater treatment on the islands.

When the interagency committee allocated the first federal appropriation package for the South Florida restoration, it earmarked funds for a study by the Corps of Engineers of the carrying capacity of the Keys. But it seems certain that most of the money will be spent on the mainland where it will have a direct impact on the Park. If the restoration does clean up Florida Bay, this will benefit the sanctuary, which includes a small portion of the Bay. As of late 1998, the technical studies for the restoration covered the impacts of restoration efforts on the mainland on the reefs but stopped short of looking at other causes of problems at the reefs.

Nonetheless, it is still quite possible that additional funds will flow to the Keys. Tragically, the first chair of the sanctuary advisory committee was killed in a plane crash on his way to a meeting with top state and federal officials. With no dynamic public figure as a champion, the public link between the sanctuary and the larger restoration effort faded for a time. However, in 1999, a new governor appointed two Keys residents to important spots in the South Florida restoration effort. One will be chair of the South Florida Water Management District, which is the state agency that will be most directly involved in managing the restoration; the other will coordinate the state's participation in restoration of the Everglades. Both of these individuals have long been active in local affairs in the Keys and had used their influence to build public support for the sanctuary. One was the second chair of the sanctuary advisory council and the other a former vice-chair. Both will now have more opportunities to keep the Keys on the agenda of restoration efforts.

In short, the sanctuary will probably play a significant, if secondary, role in the South Florida restoration.

The sanctuary lacks the technical capacity to make major contributions to planning restoration, and it has far less clout than does the park or other mainland interests. But its mystique and the practical reality that restoration in South Florida will influence conditions in the Keys guarantee it a seat at the table.

Sanctuaries Without Defenses?

In view of the small budget of the sanctuary program and the tiny staffs and budgets of some sites, one must ask whether the sanctuaries have enough money to protect the resources that Congress has asked them to conserve. Are these "paper" sanctuaries, just like the "paper parks" in some developing countries, where logging, farming, and other extractive activities go on unchecked under the noses of a few, powerless park rangers?

Clearly each of the sites has had some successes in protecting marine resources. *Table 4* lists two of the most impressive ways that each sanctuary has protected marine resources.

Just as clearly, all of the sanctuaries could and should do better. Many sites have found creative ways to establish a physical presence on the water and to let people know what they are doing, but most sites are still invisible to many residents and most visitors. Some sites have written important regulations, a few are finding effective ways to enforce those regulations, and most are struggling to find an appropriate role in the regulation of fishing. Some sites have built useful alliances and working relationships with other agencies and user groups, but most are still struggling with the role of sanctuary advisory councils.

The first appendix to this report includes profiles of the 12 sanctuaries, including a statement of the critical challenges at each site, along with basic facts about that site. Each of the sites has a special story to tell, with some achievements and some important challenges ahead.

But to return to the question: Are some of these sanctuaries "paper" sanctuaries? The unfortunate truth is, some of the sites probably have too few resources of their own, working relationships with other agencies that are too shaky, and too little community support to protect the resources that have been entrusted to them.

The sanctuary program has never tried to assess the issue explicitly. From time to time, the program has tried to define the minimum amount of staff and resources that a sanctuary would need to be fully operational. Usually this has taken the form of estimating what types of staff and facilities a sanctuary must have: a manager, an educational coordinator, perhaps a boat and someone to drive it, perhaps a research staffer, etc. Such estimates might be helpful in deciding how much staff and funding a sanctuary would need to be an effective player in inter-agency discussions. But these estimates do not address the level of protection the sanctuary is able to provide against threats to marine resources. There has been no systematic, explicit analysis of the threats to the sites and the resources it would take to provide an adequate level of protection.

The Monitor sanctuary faces the simplest challenge and clearly lacks the resources to meet this challenge on its own. Scanty budgets and storms kept the sanctuary from putting a research team on the shipwreck for five years after the first report that the wreck was deteriorating rapidly and for four years after a fishing boat's anchor began pulling the wreck apart. NOAA

and local members of Congress persuaded the Navy to lend its ships for an expedition in 1998 and might persuade the Navy to help again with full-scale recovery. But the sanctuary's small budget would not cover NOAA's share of the costs, much less the costs of preserving objects recovered from the wreck. The full cost of recovery and restoration would be about \$20 million. Without more money than the national program can afford today, the Monitor will disintegrate soon.

Clearly Stellwagen Bank, Fagatele Bay, and Cordell Bank are skeletal operations.²⁸ These sites and others are sanctuaries without adequate defenses. There are important threats to resources at each of these sites. Research has documented how bottom-trawling has leveled the seabed at Stellwagen and stripped vegetation. Some fishermen have used dynamite and others are decimating fish populations all around the main island of Samoa and perhaps in Fagatele Bay by spearfishing with lights at night while using scuba gear. Though it would be difficult and perhaps embarrassing to analyze the capacity of each sanctuary to respond to such threats, NOAA would be wise to attempt such an exercise.

Table 4 How NOAA Protects Sanctuaries: A Sample of Accomplishments

Reefs

Florida Keys

- "Team Ocean" trained volunteers on sanctuary boats offer advice and information on sanctuary regulations
- courts uphold a \$600,000 fine on treasure hunters for using boat propellers to blow holes in the sea-grass bed in a search for Spanish shipwrecks

Flower Garden Banks

- sanctuary staff give hands-on training in marine science to one-third of all Houston city fifth-graders every year as part of a month-long program at the Houston Museum of Natural History

Fagatele Bay

- sanctuary staff organize and lead summer marine science camps for over 200 elementary and ninth-grade students
- sanctuary supported baseline studies of coral and fish resources in Fagatele Bay in 1985, 1988, 1995, and 1998

Table 4, cont'd
**How NOAA Protects Sanctuaries:
A Sample of Accomplishments**

Gray's Reef

- produced award-winning video on endangered right whales in cooperation with the Stellwagen Bank sanctuary
- helps build exhibits on Gray's Reef at 10 visitor centers, museums, and aquariums

West Coast***Channel Islands***

- developed and helped finance a summer marine science field program for fifth-graders from inner city schools, now integrated into the curriculum for Santa Barbara city schools
- sanctuary's 56-foot boat and aircraft help with research on kelp forests, near-shore pollution, and plumes of pollution reaching offshore islands during major rainstorms

Monterey Bay

- water-quality planning leads to labeling of storm water drains to discourage dumping of pollutants and to installation of pump-out systems and absorbent pads for oil wastes at marinas
- bans jet skis except in four designated zones; enforcement by cross-deputized state fish and game officers

Gulf of the Farallones

- volunteer beach watchers document effects of oil spills, providing data that justify claims for millions of dollars for cleanup and restoration
- visitor centers reach over 13,000 annually

Cordell Bank

- human-piloted submersibles in 1999 Sustainable Seas expedition will determine if trawling has damaged pinnacles that reach within 115 feet of the surface

Olympic Coast

- organizes conferences of researchers who have studied the sanctuary
- documents violations of the International Maritime Organization's "area to be avoided" rules for commercial ships

Other***Stellwagen Bank***

- supports research-detailed mapping and created a video about the sanctuary seabed, documenting damages by trawling nets
- works with two regional museums to develop exhibits on whaling and on the current status of whales

Hawaiian Islands Humpback Whales

- extensive publicity and education about whales through tourist sites, community events, and sanctuary office
- sponsors beach cleanups and other volunteer programs

Monitor

- 1998 expedition raised the propeller and its 15-foot shaft for restoration and exhibit
- assists researchers working on the Monitor

Chapter Four

Time for Results

What is the best way to manage a national program so far-flung, so diverse, so young, and so dependent on other agencies and on community support?

The sanctuary program is slowly developing a common understanding of how it should make decisions. The next step in the evolution of the national program should be to focus on results.

Establishing a Way of Doing Business

Every organization, like every family, has its own way of operating. To be effective, members of the group must share basic agreements about what is important, how people should behave, and how decisions are made. The federal land management agencies offer one possible model for how the sanctuary program could organize itself to get work done. But the sanctuary program is slowly developing a different and indeed more modern model.



Scientists preparing to drill into a coral reef to study climate over the past 20,000 years.

How the Forest Service Works

For decades, the U.S. Forest Service, the National Park Service, and to a lesser extent the Fish and Wildlife Service and Bureau of Land Management held their sprawling operations together for decades by adhering, at least on paper, to a bureaucratic model that is almost military in character. The chief of the Forest Service, for example, sits at the top of a clearly defined structure of regional offices, national forests, and district offices. The chief and congressional appropriation committees together set broad policies and specific targets. Forest Service regions and individual forests set their goals through a formal planning process. The plans rely on quantitative models to balance the board-feet of timber to be cut, the miles of road to be built to get the timber out, and the many environmental benefits to be delivered—days of recreational use, levels of water quality, and so forth. To ensure consistency across the system, the Forest Service has trained employees in an explicit code of behavior and rotated key employees from one part of the country to another for relatively short assignments. Traditionally, the best employees have risen from part-time summer jobs when they were young to front-line jobs in districts, to staff and management jobs in regions or headquarters, and—for a special few in each generation—to the job at the top as chief.

Moderating the controls that drove this system from the top was an ethos, which has come down from the early days of the Forest Service, of trusting the commanding officer in the field to make the key decisions that strike a balance between different uses of the land. The guiding myth of the Forest Service has long been that front line managers make the best decisions in the field, perhaps literally around a campfire after listening to their staff with the watchful, quiet support of a visiting senior official.

Of course, this is an idealized model. Today the model is under tremendous stress. In the Forest Service, many of the key systems and relationships have broken down. The budget of the agency is still built around measures of timber cuts and roads built to access the timber, but consensus about how to set the proper level of timber to be cut is long gone. The agency continues to produce forest management plans, but virtually all those plans end up in court.

The most important reason for the erosion of the traditional model for governance of national forests is that the agency is now pulled apart by outside groups and divided internally by radically different conceptions of the purpose of the agency. For decades after World War II, the Forest Service's prime purpose was to produce a relatively even flow of timber to build homes for America's growing middle class and to provide steady employment in small logging and mill towns.

The environmental revolution of the past 30 years first undercut this understanding of the agency's mission. In recent years, many of the small western towns where the Forest Service has its field offices have been transformed by the influx of retirees, telecommuting consultants, and Californian suburbanites in search of a different lifestyle. These towns used to be dependent on logging, but no longer. In short, the Forest Service works in a radically different, more complex, and more dispute-ridden context both locally and nationally.

For some time, the Forest Service and other federal land management agencies have been trying to adapt to these changes by redefining their mission as ecosystem management.²⁹ In this model, the agency would concern itself, not so much with outputs from the land which it manages, as with the health of the broader landscape within which its land is located. Instead of providing local communities (and their representatives in Congress) with steady jobs in the timber industry, national forests would provide clean watersheds, trails and wilderness areas for recreation, habitat for endangered species, and as much timber as fits in to this larger pattern.

To address the diverse problems facing ecosystems, the Forest Service must rely on the cooperation of local and state governments and of other federal agencies that have technical capacities and legal

authorities that the Forest Service lacks. Now the front line forest supervisor has new companions at the campfire where decisions are made. And in some cases, it is not the local Forest Service representative but another agency, responsible for protecting species or delivering drinking water to communities, which makes the most important decisions. It is not easy to adapt the military model to fit these new necessities.

How the Sanctuary Program Operates

The sanctuary program has never had enough control over marine resources to adopt a military model, such as the Forest Service's, but has not yet found a satisfactory alternative. It is taking time for the sanctuary program to develop its own way of doing business. One reason is that many people in the program are not entirely comfortable with the lack of control and would prefer to be unchallenged by advisory councils. But there are more fundamental reasons. There has been very little continuity at the top of the program until a few years ago. The turnover in the position of division director has been rapid, and the job was vacant for long periods. At the same time, several of sanctuary managers who came on board in the early 1990s have held now their job for long periods. Five of the current managers have held their jobs over five years, some much longer. As a result, the sanctuaries become rather independent. At least some of the sanctuaries sometimes have taken on the personality of the sanctuary manager. In the words that the staff uses, the program has become a "collection of sites" rather than a national system.

In the last four years, the National Ocean Service and the senior leaders of the sanctuary program have explicitly tried to change this.

The senior leadership team includes about 20 people: the sanctuary managers and key officials, who manage the organizations from headquarters in Silver Spring, Maryland, just outside Washington, D.C. The leadership team meets regularly—currently for a week every three to four months—and stays in close touch by e-mail. In the early 1990s, a previous program manager called them a "board of directors." When budgets get tight, managers occasionally volunteer to give some of their own scarce resources to another unit that is scraping the bottom of its barrel.

Most of the leadership team and the staff are younger than 45. Almost all share a deep personal commitment to the program. It embodies their love of the ocean and their desire to protect marine life. Many of them can imagine no more rewarding career than staying with the sanctuary program as it grows. For managers and the staff of small sanctuaries in tiny offices, being part of a national program keeps morale up, helps set direction, is useful for commanding respect in the community, and provides access to the technical skills and tools at headquarters. The dedication and shared values of this team are a great strength, essential to the survival of a program that is so young, under-funded, and often over-powered by other agencies.

Drawing on these shared values, top staff and headquarters and the sanctuary managers have gone through a strategic planning process to develop a mission statement, a vision, and broad strategic goals. This process has not been fully effective yet.

For example, the four sanctuaries in California are taking somewhat different stances on the hot issue of no-take zones. As described previously, the Channel Islands sanctuary is leading an effort in cooperation with the state to design zones, while the Farallones and Cordell Bank sanctuaries are emphatically leaving the issue to NMFS and the state. Headquarters would like a consistent position on zoning and a unified response to California's plans for various kinds of reserves in state waters.

The centrifugal forces in the sanctuary program are still quite strong. In any agency with numerous field offices, there are inevitable tensions between headquarters and the field. The field feels that headquarters is not in direct touch with day-to-day realities at the sites. Meanwhile, in the field there are inevitable pressures to ignore the kinds of mission statements, goals, and policies that the sanctuary program headquarters has worked so hard to establish to "get the job done," as the sanctuary staff puts it.

The next step for the program is to move beyond shared values and broad goals. The program can now focus on producing concrete results and has begun to do so. Currently, it produces many effective brochures that describe the beauty of its sites and diversity of activities at the sites. The program must now show it can deliver what the brochures promise.

If the program can show results, it can make progress on three important management issues. First, focusing on results will be a good way to manage the relationships between headquarters and the individual sanctuaries. A focus on results will provide a more useful way than goals and broad themes to reconcile tensions within the program. Second, by showing results the program itself can build a stronger, broader national constituency and be better-positioned to win the budget increases, support from top NOAA officials, and local cooperation that it will need to protect the sites. Third, by showing results the senior leaders of the program can break into new career paths, bypassing the traffic jam that is developing at the top of the program.

Today's Management Tools: Goals, Policies, and Plans

The systems that the sanctuaries and the program currently to manage their affairs are geared towards capacity-building and planning.

Perhaps this has been inevitable. Over the past decade, the program has added six new sanctuaries and—at least as importantly—has concluded long, exhausting, and unsuccessful efforts to designate other sanctuaries. In 1996, the state of Washington acceded to local opposition and withdrew its support from creating a sanctuary in Puget Sound near Seattle. The national sanctuary program used this occasion to make a policy decision to focus on existing sites rather than expanding the program. This decision relieved Olympic Coast of the burden of worrying about opposition to creating another sanctuary next door. Thunder Bay in Lake Huron, off the northeastern coast Michigan, will become the thirteenth sanctuary soon, but additional sanctuaries are not being considered at this time. (Thunder Bay will be the first fresh-water sanctuary and the second sanctuary, after the Monitor, created to protect shipwrecks.)

The program's budget has grown with the sites. It doubled between 1990 and 1993 and doubled again between 1993 and 1998 (see *Table 5*). As a result, the sanctuaries have spent a good deal of time planning and building their basic operating systems, down to such mundane matters as buying office equipment, putting in modern telecommunications systems, and

Table 5
National Marine Sanctuary Program Growth Since 1990

Year	Appropriations (\$000)	Number of Sites	Total Area of Sanctuaries (Sq. mi)
1990	\$3,100	7	7,137
1991	\$3,800	7	7,137
1992	\$5,150	11	13,363
1993	\$7,144	11	13,363
1994	\$9,150	12	17,973
1995	\$12,000	12	17,973
1996	\$11,685	12	17,973
1997	\$11,685	12	17,973
1998	\$14,000	12	17,973
1999	\$14,000	12	17,973

obtaining and equipping boats. Older sanctuaries like Gray's Reef and Channel Islands have canceled cooperative agreements and invested these resources in acquiring boats, hiring additional staff, and starting new projects.

At the national level the sanctuary program has also developed new procedures and management systems. These systems work well in some respects, but they do not focus on specific achievable objectives or actual results.

The meetings of the senior leadership team and the programwide strategic plan naturally focus on broad themes and programwide operational issues. The budget documents provide detailed information about activities in the sanctuaries but do not explain why these particular activities are necessary, how well they are going, or how they fit together. The program has strained to get beyond incremental budgeting—tweaking last year's allotment—but has rarely done so. The program's leaders need to hold sanctuary managers and headquarters staff accountable for how funds are spent and what is achieved.

There are also annual work plans for each sanctuary. The work plans show how various kinds of activities will contribute to the broad strategic goals of the pro-

gram. For example, specific educational activities will help "instill a national conservation ethic for the marine environment" and help "people value and respect all ocean and coastal resources."³⁰ But the work plans do not define specific objectives. They do not pose or answer questions about operational choices that each sanctuary makes implicitly, such as who the sanctuary should seek to educate (children, fishermen, or tourists, etc.) and how (directly or through developing curricula for others, etc.) The work plans do not pose or answer questions about the different challenges, described in detail in the appendix, that each of the sanctuaries face.

The sanctuary program also has job descriptions and annual evaluations for sanctuary managers. But once again, the focus of these documents is on generalized skills and processes rather than on achievable objectives and actual results.

The sanctuary management plans could articulate strategies and set priorities for sites, but they do not. Law requires that the management plan support a decision to officially designate the sanctuary and put its regulations into effect. Since 1992, law also requires that the plans be updated every five years, but none of the sanctuaries have done so recently. Three sanctuaries will do so in 1999-2000.

Management plans must follow the format and procedures prescribed by the National Environmental Policy Act (NEPA). This seems to put them under a blanket of fog. Perhaps NEPA is flexible enough to allow plans to be written in common English and in a style which allows the direct, concise presentation of real options. But for the multi-faceted programs of sanctuaries, which depend so much on fragile working partnerships with other agencies and non-profits, the NEPA approach does not seem to work.

The national program invested a great deal of time and resources in preparing the management plan for the Florida Keys sanctuary. The planning took six years—far too long, everyone agrees, was highly controversial, and diverted attention from activities that might have more immediate impacts in the Keys or elsewhere. At the same time the Keys management plan was being written, the Monterey Bay sanctuary began working its way through lengthy planning exercises about polluted runoff into the sanctuary and resolved its problems with the advisory committee.

The Keys planning process resulted in a three-volume tome. It does try to set priorities. It goes so far as to estimate the costs to NOAA and other agencies of various activities. It notes whether these funds are available or not. But like other management plans, the result is unwieldy, difficult for the reader to absorb, and largely unread. During the run-up to the county referendum, the sanctuary printed a short summary. The summary did not follow the NEPA format. It included a concise section on what would change when the plan was approved. The summary was a far more effective tool for explaining the sanctuary to the public.

Perhaps the most important drawback of the current planning process in individual sanctuaries is that it tries to be comprehensive and long-term. The guiding philosophy of the Florida Keys plan was explicitly “integrated coastal management.” This is in keeping with the purposes of the program, as described in statute. Sanctuaries are responsible for “comprehensive and coordinated conservation and management...”³¹ However, in the real world a small program like a sanctuary’s cannot accomplish everything at once and should not try. Priorities must be set for each sanctuary. The design and the format of management plans make them useful for long-term planning but not useful for managing for results.

Recommendations for Moving to Results-Oriented Management

The starting point for results-oriented management should be a clear statement of goals; the next steps are to define strategies to meet these goals, to set specific achievable objectives, to discuss possible objectives with key collaborators (such as sanctuary councils), and then to hold line managers responsible for results.

Managing the Sanctuary Managers

It is neither necessary nor desirable to write detailed statements of annual objectives into the various management documents listed above. Nor is it necessary to develop careful quantitative measures for all objectives. It may be useful to undertake a certain amount of formal evaluation to determine whether objectives are met or not, and why. A small agency like the national marine sanctuary system can afford to invest only a moderate amount of energy and resources in measurement and written documentation.

The key to managing for results in a small agency, such as the sanctuary program lies in the formal but oral interactions between the program manager, site managers, and sanctuary council. Discussions at this level must go beyond values, missions, and goals and become quite specific. Exactly what does each sanctuary manager hope to accomplish this year to protect vulnerable resources with limited resources? Why has the manager chosen this approach? What has been learned from last year’s efforts, and how are these lessons being applied to this year’s work plan. These are the key questions.

The national program manager must manage the sanctuary managers actively. This does not mean the program manager should second-guess the site managers. The better model is the Forest Service ideal: to invest in inculcating a set of values in the sanctuary managers, to ask tough questions of the site managers, generally to accept their judgment, but then to hold them responsible for results.

Focusing the Program on Existing Sites

At this point, the sanctuary program can best serve its broad statutory goals by focusing its efforts on pro-

tecting resources at the 12 (soon to be 13) existing sanctuaries. The program should work to achieve other objectives to the extent that they serve this primary purpose. The program is at the point where it may be able to dispel the conventional wisdom that it is ineffective.

Several years ago, the program made a strategic decision to put its resources into the Florida Keys and Monterey Bay sanctuaries. Now it needs to make a similar decision: to cut back any activities that are not likely to lead to immediate improvements in conditions at the sites or to new public policies that are highly likely to result in better protection of marine resources at these sites.

The program has a dramatic success in the sharp increase in fish populations at the no-take zone in the Keys—assuring the research bears out early signs. It needs two or three more such successes, backed up by solid but perhaps less dramatic accomplishments at each site.

Insofar as is politically possible, the program should invest its energies in international coral reef issues, the debate about marine reserves, and formulation of program-wide policies and guidelines *only* to the extent that this results in improved protection in the 12 sites.

This is probably not the right time to create more sanctuaries. Perhaps if Congress were to increase the budget and the clout of the program dramatically, the program could handle additional sites, but no one is talking about such a step now. Eventually, the program could grow to include more sites. There are only a few small sites along the Atlantic Coast and in the Gulf of Mexico now, and none in Alaska. However at this point, the program cannot afford to spend its resources on a long, expensive process to add more sites.

The first priority should be to demonstrate what the program can achieve with its current sites. The program can then rethink its site-designation process so that it sharply reduces the time spent on comprehensive planning and works in a more incremental way to identify key threats to the site, demonstrate the program's capacity to provide this protection, and then address other issues and threats.

A "State of the Sanctuaries" Report

To focus itself and its constituents on the task at hand, the program could prepare a "state of the sanctuaries" report, describing in concise, non-technical language and using clear graphics a small number of threats to sanctuary resources. The report should be prepared on a regular schedule, perhaps every three years. If conditions at one or more sites change in the interim, the report could be updated. The report could describe threats to the sites and identify steps that the sanctuary program, other NOAA agencies, or organizations or individuals could take to provide adequate protection. The "state of the sanctuaries" report could also identify measures of environmental conditions that the sanctuary would publish regularly on the Internet, to allow managers, users, and the public to monitor conditions at each site.

Many other agencies have written such reports. For example, several state environmental agencies and some local communities have prepared "comparative risk analyses," which bring citizens and scientists together to study local environmental problems and set priorities. Other states have written "state of the environment" reports that describe what is being done to address the most pressing environmental issues. Such reports might be good models for a "state of the sanctuaries" report.

The Monterey Bay sanctuary recently published a 1998 annual report of "Ecosystem Observations" that is a first step towards a state of the sanctuaries report. It compiles data from a variety of sources on marine resources (e.g., populations of sea otters, gray whale calves, and rhinoceros auklets) as well as information about use of the sanctuary and measures to protect resources (e.g., numbers of tide pool explorers, commercial fishing licenses, water permit violations, and pounds of trash picked up from beaches). A state of the sanctuaries report would add an assessment of what all these data say about the health of the sanctuary and what priorities they suggest.³²

When another agency is taking the lead in designing or implementing protection against an important threat, the report could describe what the other agency is doing (or could do) and indicate that the sanctuary is investing its energies elsewhere. For example, in the Florida Keys there is little that the sanctuary can do to influence

which level of government pays for upgrading sewage treatment and very little it can do to expedite the decisions. The report could say so.

Scientific understanding about site-specific problems often is limited. For example, we know that whales, many fish, dolphins, endangered sea turtles, and sea otters all move across sanctuary boundaries—in some cases, they move across thousands of miles of ocean. Some of the movement across sanctuary boundaries is well-understood, but much is unknown. Some summers the humpback whales do not visit Stellwagen Bank; instead they go to Jeffries Ledge just north and, outside the sanctuary. No one knows why. When female turtles rest at Gray's Reef before taking the 20-mile swim to lay their eggs on the beach, the whereabouts of the males are unknown.

Or to cite another example, it is well established that excessive nutrients and super-heated waters harm coral reefs. Thus it is clear that polluted sewage from the Florida Keys and phosphorous-laden runoff from mainland South Florida cannot be good for the reefs nearby. But there are disagreements among scientists about how well these corals are doing in comparison to coral elsewhere and about how important other factors are, such as the number of hurricanes passing through or changes in currents that bring more warm water to Florida's reefs.

When there is such uncertainty, a state of the sanctuaries report can explain issues and propose courses of action. Action may include research to define the threats more precisely or active measures to protect resources. The sanctuary may not have the funds, staff, or authority to deal with the threat or undertake the research. To build broader public understanding and willingness to deal with threats, the sanctuary could ask its council to review drafts of the report.

Annual Work Plans

Each sanctuary could prepare a short document annually which explains in non-technical terms how it is investing its limited resources and what it intends to accomplish in terms of increased protection. The appendix to this report includes profiles for each sanctuary, with brief introductions that define the major strategic choices at each site. The profiles do not recommend one option or another. An annual work plan should, however, recommend specific

approaches, identify key activities, and state achievable objectives.

A sanctuary may decide that a good use of its funds is to invest in a long-term strategy such as educating schoolchildren. If so, it could set specific objectives about which schoolchildren it is targeting, what it hopes they will learn, and how this will reduce threats to the sanctuary.

The annual work plan could be the foundation of the work of the sanctuary council as well as the centerpiece of the national program's annual evaluation of each sanctuary manager's performance.

Annual Report of Accomplishments

Currently the national program publishes an annual "accomplishments report." The reports are well written, attractively designed, and distributed widely. Thus they are excellent tools to focus the attention of staff, supporters, other agencies, and Congress on the results that the program is achieving.

The most recent reports have included accounts of processes like conferences and fund-raising activities, along with substantive accomplishments (see *Table 6*). The accomplishments report should emphasize substantive changes that will result in better protection of the resources, rather than processes. As *Table 4* of this report shows, such accomplishments exist. Certainly some meetings can result in great steps ahead if they change attitudes, yield new information, or lead to substantive changes in policies and activities. If this is the case, the report could explain why the meeting was worth listing.

The reports are also an excellent opportunity to give full credit to other agencies, nonprofits, and citizens that have taken actions which protect sanctuary resources. Sharing credit is an excellent way to win friends and influence people.

Eliminating "Sanctuaries Without Defenses"

The program is mature enough so that it can afford to be quite clear about what it cannot do. It faces enough doubters so that it cannot afford to admit its limitations. The first step would be to face squarely

the question of whether Cordell Bank, Stellwagen Bank, Flower Garden Banks, Fagatele Bay, and perhaps other sanctuaries have enough resources to provide adequate protection.

The core of this exercise would not be to establish a minimum set of activities or jobs that a sanctuary needs to function effectively. Rather, the core is to identify the risks to the resources at each sanctuary and to state clearly to the public whether or not the sanctuary can provide a reasonable level of protection.

It could be that a sanctuary needs very few resources. For example, in Cordell Bank, some species are over-fished. Perhaps it is more appropriate to let the regional fishery management council address this issue than for the sanctuary to take it on. Also, at Cordell, perhaps fishing nets are toppling the underwater pinnacles that are the crown jewels of this sanctuary. If the Sustainable Seas expedition in the summer of 1999 finds no damage, perhaps there is nothing to do but check again later.

The “state of the sanctuaries” reports would be an opportunity to address explicitly whether the sites can be protected adequately or are “sanctuaries without defenses.” In addition, annual plans and reports should keep the public, NOAA, and Congress updated about conditions at any sanctuary where protection is marginal.

Learning

Deliberate efforts to learn are an essential feature of managing for results. When a program is staffed by a small group of individuals who share deeply held beliefs and face similar great challenges, as with the sanctuaries, it is essential to reach out for independent views. The sanctuary councils can help provide an outside perspective and make suggestions for improvement. But they should be part of the local management team. They could play a central role in writing the state of the sanctuary reports and annual work plans.

The sanctuaries could encourage other groups to review their performance. Perhaps state Sea Grant programs and the national park service would be willing to organize peer review teams with a mix of sanc-

tuary staff, university-based researchers, and federal land managers.

Dealing with Criticism

Like other government agencies, sanctuaries operate in a political environment where it can be dangerous to be too candid about shortcomings and failures. As the sanctuary program moves towards managing for results, it can take some steps to avoid exposing sanctuary managers and others to unfair criticism.

The most effective step would be to engage the sanctuary council in setting specific annual objectives and then to use this opportunity to ask the council to take responsibility in its work plan for specific tasks for meeting these objectives. If the sanctuaries can find influential local council members and can make the members feel that they share the goals and responsibilities with the staff of the sanctuary, they will be likely to speak up in the event of unwarranted criticism. Hopefully, some of the council members will be so widely respected in the community that journalists and the local congressional delegation will ask for their views and take them seriously.

Inevitably, however, there will be criticism. This is the price of visibility, power, and effectiveness. Collaboration and consensus building can resolve many conflicts, especially during a planning process. But managing for results requires making difficult decisions that may upset some people.

The alternative to criticism is not praise but a lack of interest and a lack of trust. Currently, skepticism about government, especially the federal government, is at an all-time high. In an information age, the public has more information than ever about what governments are doing and demands more responsiveness and more honest explanations of government policies and programs. The sanctuary program cannot protect sites without public support, so it cannot accomplish its mission without being open, articulate, and ready to listen.

Table 6
Meetings, Decisions, and Events:
The Sanctuary Program's Report of Accomplishments in 1998

Reefs

Fagatele Bay

- leads Samoan "Year of the Coral Reef" activities, including monitoring of a National Park site in Samoa, organizing related ceremonies publicity
- accomplishes agreement with territorial fish and game office that leads to a limited number of patrols of Fagatele Bay
- leads educational programs for 2,000 schoolchildren

Florida Keys

- accomplishes state agreement to designation of sanctuary
- agrees with state to prohibit anchoring by large ships in an area where anchor dragging had damaged coral
- organizes 63 volunteer divers in survey of conditions of reefs at 23 sites; they find reefs are "much better off than the rest of the world"

Flower Garden Banks

- holds concert at annual Houston diving show to raise funds
- hosts 18 high school teachers on training/research cruise to the sanctuary

Gray's Reef

- with Stellwagen Bank produces award-winning video on right whales
- supports research that finds fossils of terrestrial animals in sanctuary
- tagging of three endangered turtles to track their movements

West Coast

Channel Islands

- organizes symposium about squid harvesting
- conducts air patrols begin over the sanctuary
- organizes a committee of 28 organizations involved in environmental education

Monterey

- arranges for the sanctuary foundation to obtain an anonymous donation, purchase a boat, and donate the boats to state agencies for enforcement in the sanctuary
- holds symposium on marine refugia
- center for Marine Conservation manages a beach watch volunteer program

Gulf of the Farallones

- helps negotiate restoration of 500 acres of wetlands
- organizes field outings for 2100 people
- El Niño hampers restoration of seabird population

Cordell Banks

- begins research project on krill
- completes field guide to birds at the sanctuary
- introduces interpretive wayside signs

Olympic Coast

- organizes cruise for researchers on NOAA research vessel
- organizes volunteer survey of four shipwrecks
- organizes workshops for coastal management agencies on Geographic Information Systems (GIS)

Other***Stellwagen Bank***

- organizes travelling photo exhibit on sanctuary
- participation of staff in interagency team on endangered right whales

Hawaiian Islands Humpback Whale

- state agrees to official designation of sanctuary
- formed sanctuary advisory committee

Monitor

- contractor completes plan for stabilization and recovery of shipwreck

Source: The 1998 Accomplishments Report published by the national marine sanctuary program lists these accomplishments and describes the research and educational activities at each site.

Staffing the Sanctuaries

We did not review the staffing of the sanctuary program in detail, nor did we examine the activities of the program's headquarters in depth. Our task focused on how the sanctuaries were fulfilling their statutory purpose of protecting the sites. However, as we looked at this broader question it became clear that the program has staffing problems.

A Job Description for Sanctuary Managers

Several interviewees said that the program needed a fresh, clear statement about the responsibilities of a sanctuary manager and the skills needed for this position. There are, of course, formal job descriptions but they do not focus sufficiently on results. Also, they tend to emphasize technical and managerial skills and give less attention to the responsibilities and skills necessary to work collaboratively with others. Accordingly, here is a draft of the responsibilities of the sanctuary manager and the skills necessary to fill these positions:

- The responsibility of a sanctuary manager is to protect marine resources in the sanctuary. To do so, he or she must manage both the internal assets of the sanctuary office (funds, staff, and facilities) and the external assets (working relationships, community support, and public understanding, including the mystique of the site and public's view of the program as a whole.)

The sanctuary manager must

- Manage internal assets
 - build a strong team of staff and volunteers capable of using the limited assets of the site effectively
 - make sound decisions—scientifically, legally, politically, and administratively—about how to best protect the sanctuary
 - delegate appropriate responsibilities and authority to staff, holding them accountable for results (especially in large offices)
 - contribute to development of a strong national sanctuary program

- Manage external assets
 - reach out, keeping other agencies, the community, and NOAA informed about the health of the sanctuary and about the threats it faces
 - encourage and assist collaborative and independent activities that will help protect the site
 - be an active leader in the local community, making clear by his or her participation in community affairs that the sanctuary depends on local support and is prepared to be a good citizen in return

Accordingly, the sanctuary manager should have the following skills:

- working knowledge of as many fields as possible that are relevant at the site, such as commercial fishing, sport fishing, diving, marine science, economic development, recreation management, education, and enforcement
- ability to analyze threats and opportunities, to set priorities clearly, and to take prudent management risks when necessary to protect the sanctuary
- ability to attract and inspire a capable staff and volunteers
- ability to work constructively with a sanctuary council, encouraging it to provide advice on priorities and work programs and helping to find opportunities to make substantive and philosophically satisfying contributions to the sanctuary's work
- ability to communicate effectively with community and agency leaders and with users of the sanctuary resources
- desire to work collaboratively with citizens and with other organizations, sharing credit and resources rather than demanding recognition and claiming credit

The Role of the Headquarters Staff

As the sanctuary program focuses on producing results, the primary responsibility of the headquarters office will be to support site-level activities that protect the sanctuaries. There are several ways that the headquarters office can provide such support.

In current circumstances, the first and most important role for the national office is to help acquire the resources that the sites need to provide adequate protection. This means working closely with senior officials in NOAA and on Capitol Hill to provide the information they need in order to be confident that the sanctuaries can use such resources effectively.

The national program can also provide information, expertise, and useful tools to the individual sites. Less helpful at this point are team-building exercises and more policies, strategic plans, and legal advice that is not connected to specific situations. The national program has made investments in efforts such as these and can now move on to focus on specific steps to protect resources, site by site.

It is not necessary for the headquarters staff to have all of the specialized expertise that sanctuaries need but cannot afford on their own. The program already brings skilled staff from the sanctuaries to headquarters for special short-term national projects. In addition, headquarters could pay part of the salaries of experts at the sanctuaries to provide technical assistance to other sites. If Congress decides to boost the program's budget, the best way to spend this money could be to hire additional field staff and give them responsibilities for national leadership.

It is striking how few of the national program staff have ever worked in the field at a sanctuary. Of course, it may not be easy to entice field staff to come to desk jobs in Silver Spring. However, if the national program staff is to be of service to the sites, it would be highly desirable that most of the staff have sustained experience working in the sanctuaries. Similarly, field staff would have a clearer grasp of what headquarters can provide if they had worked in Silver Spring.

In addition to clarifying the responsibilities of key line officers in the field and at headquarters, the marine sanctuary program would benefit from a hard look at other staffing issues. The current organization plan for the division calls for eight senior managers at grade 14 and 14 at grade 13. Half of these 22 people are sanctuary managers and half work in the headquarters office or on special assignments for the headquarters office.³³

There are two issues. One is whether the balance between headquarters and field is appropriate. Perhaps 11 senior staff are needed in the national program to support 11 site managers. Certainly several sites, if not all, could use the talents and expertise of an additional senior staff person.

The second and more fundamental issue is, what the career track is for these senior career staff and for other staff as well. Five of the sanctuary managers have been in their jobs for over six years, some much longer. At present, only one sanctuary manager has moved into a headquarters job, and only two permanent senior staff members at headquarters have ever worked at a sanctuary. It would seem desirable for the headquarters staff to include more people with field experience, and it is likely that many of the current headquarters staff would find it personally rewarding to work at a site.

The program may want to look for opportunities to rotate managers to other sanctuaries or to headquarters. Since a sanctuary manager must work hard to develop good working relationships with other agencies, recruit influential community leaders for the sanctuary council, and build community support, after a time there is the risk that the community will see the manager and the sanctuary as the same thing. This can create problems, because no strong manager can make everyone happy. The program need not rotate its managers through the sites as rapidly as federal land management agencies do, although some agencies try to move managers on after three years. However, putting a limit on the tenure of managers can provide opportunities for personal growth for managers, allow senior program staff to keep in close touch with the operational level, and build the professionalism of the program.

It is not at all clear that any of the managers would like to move to another sanctuary or work in headquarters. Furthermore, with a few exceptions, all of these senior staff members are in the early or middle years of their careers. What is their future? What future is there for junior staff?

This is a traffic jam, at least at present. Of course, if the budget for the program does grow, as was pro-

posed by the administration in its FY2000 request, there will be plenty of opportunity for exciting work in the near future. But the number of top positions within the program cannot increase much.

There are no easy answers. In the long run, the best course would be to open up career paths for senior program staff in other agencies. As the sanctuary program demonstrates that it can deliver results, these opportunities will presumably open up. In addition, senior NOAA officials should encourage other agencies to recruit sanctuary staff into their programs. It would certainly benefit the sanctuary program if there were former program staff working in key spots in NMFS, the Sea Grant program, the Coastal Ocean Program, and various science-oriented offices at NOAA. Perhaps the Park Service or Fish and Wildlife Service would consider hiring sanctuary managers, especially at parks that include coral reefs or other marine habitat.

The Responsibilities of NOS and NOAA

The sanctuaries can be a tremendous asset to NOS and NOAA, assuming the leadership of NOAA and the Department of Commerce take time to work with this tiny part of their multi-billion dollar operation. The sanctuary program is important because it is quite different from almost all of the other agencies and programs within NOAA. Most of these programs are highly technical or scientific, whereas the sanctuary program focuses on practical natural resource management issues and has to work closely with communities. Most of the other programs are narrow in scope, whereas the sanctuaries must take note of the full array of marine activities and threats at each site. The sanctuary program is place-based and civic-oriented; other NOAA programs are professionally specialized and technical.

The uniqueness of the sanctuary program is what makes it so valuable to NOAA. The sanctuaries are—or can be—places where NOAA displays its multifaceted capabilities to a supportive local community and to a larger national audience. They can be places where the diverse parts of NOAA come together to protect natural treasures of national and international importance.

But of course the sanctuary program is tiny, and there are two layers of management between it and the top leadership of NOAA and the department. It is easy to overlook the concerns of the tiny sanctuary program. Nonetheless, from time to time, top officials in NOAA and the department have recognized the potential importance of the sanctuaries. The Keys gets a great deal of attention from national and international delegations and has been visited by President Bush, Secretary of Commerce Daley, and others. In 1998, the Monterey sanctuary hosted the Year of the Ocean conference, which was attended by both the President and the Vice President.

And in 1999, for the first time in several years, the department proposed, and the President forwarded, this proposal to Congress doubling the program budget. As this report went to print, Congress had approved an increase to \$26 million for FY 2000. There are several ways that NOAA can help the sanctuary program fulfill its potential while also benefiting NOAA itself.

The Budget of the Program

This report has identified several opportunities for making wise investments in the sanctuary program. To make the sanctuaries more visible and increase public understanding, Congress and NOAA could provide funds for signs by highways along the coast and for visitor centers. To ensure that resources are protected adequately, Congress and NOAA could provide funds for improved enforcement that would supplement and expand volunteer-based enforcement like Team Ocean in the Keys. Either NOAA, the Navy, or another agency could invest over \$10 million in funds and services-in-kind in recovering and conserving the wreck of the Monitor.

The soundest way to approach the issue of possible budget increases would be for NOAA leadership to direct NOS and the sanctuary program to prepare the first “state of the sanctuaries” report and pay specific attention to the issue of “paper” sanctuaries. This approach could lead to budget proposals that are based on a systematic assessment of threats to sanctuary resources and opportunities for better protection. Such assessments would lay the foundation for well-grounded budget proposals in the future, as threats change and

better information becomes available. Congress and NOAA might also provide funding to upgrade the scientific and technical information available to the sites, for example, by supporting additional inventories of marine resources and ensuring that there are adequate GIS-based mapping systems for each site.

Technical Support From Other NOAA Agencies

Other NOAA agencies support research, develop tools, and have equipment that can be used to measure the health of the sanctuaries and protect their resources. Indeed, most sanctuary managers spend a significant portion of their time scrounging for such assistance from NOAA agencies, non-profits, and just about any other place they can think of. Some of the sanctuaries—e.g., the Florida Keys and Monterey Bay—are of special interest to scientists and agencies.

Top NOAA and NOS leaders can encourage agencies to share resources with sanctuaries and to focus their activities at sites within the sanctuaries whenever possible. For example, although the Sustainable Seas “expeditions” were financed initially by a philanthropic foundation, the Navy and NOAA both earmarked funds to support the effort and encouraged operating units to become actively involved.

NOAA and NOS could direct their units to focus their work on the sanctuaries as a matter of standing policy. To back up a generalized statement of intent, top leaders might assign a senior career official to search out opportunities and ask for an annual report on the level of agency support for the state of the sanctuaries report, signage, enforcement and other top priorities. A small pool of matching funds controlled by top officials in NOS or NOAA could be used to increase the incentives to agencies to work with the sanctuary program. The proposed visitor centers at the sanctuaries and at Fishermen’s Wharf in San Francisco could be multi-agency NOAA efforts, showcasing the sanctuary program and demonstrate how other NOAA agencies are helping to protect sanctuary resources.

NOAA-Wide Policies

Some of the issues that the sanctuaries are working on are of great interest to other NOAA agencies. The most obvious is the topic of marine zoning and no-take

marine reserves. The sanctuary program is currently developing a program-wide policy on marine zoning. NOAA leadership could recognize this effort and direct other agencies to participate in and support it.

NOAA could also direct NMFS and the regional fisheries management councils to locate no-take zones in sanctuaries whenever feasible. Currently, NMFS and other agencies are directed to notify sanctuaries of activities that they are considering which might have impacts on the sanctuaries. NOAA could direct its component agencies and also request others to give special consideration to the need to protect resources in the sanctuaries. NOAA should try to divert possibly harmful activities to other sites, when at all possible.

Reorganization

From time to time, friends of the sanctuary program suggest that the program might flourish better if it were moved out of NOAA to an agency whose mission centers on managing natural resources, such as the National Park Service or Fish and Wildlife Service. Or perhaps the sanctuary program could become a free-standing unit inside the Department of the Interior. Another option would be to move the sanctuary program from the National Ocean Service to the National Marine Fisheries Service, where it would work alongside endangered species programs as well as regulators of commercial fishing.

We did not study how the sanctuary program fits into NOS operations or examine other possible homes for the program. The field research does suggest strongly that the sanctuary program does need close working relationships with other NOAA agencies in order to function effectively, and it also suggests that the sanctuaries might not be comfortable in an agency with a military culture. But the research also makes it clear that the sanctuary program has a way of doing business that does not fit easily within its current home either.

This report does not address the question of where the sanctuaries should be housed within the federal government. However, we can make three suggestions that might help it work more effectively where it is located today.

The previous section already hinted at one possibility: the front offices of NOS and/or NOAA could designate a senior official who would encourage all NOAA agencies to provide as much technical and policy support to the sanctuary program as possible. Inevitably, the director of the sanctuary program is at somewhat of a disadvantage in dealing with senior officials of other NOAA programs. An advocate and partner in the front office might help, provided that the top officials in NOAA and NOS continue to be strong supporters of the program.

A second possibility would be an “outside” strategy. Many other federal programs work closely with associations of state and local officials who have responsibility for implementing federal programs. For example, NOAA’s coastal zone management program works closely with the Coastal States Organization; there is a national association of state officials who manage National Estuarine Research Reserves; and in 1995 the EPA provided important financial and moral support for a new association of state environmental commissioners. The sanctuary managers cannot form an independent association of their own because most of them are federal employees. However, the members of the sanctuary advisory councils could be the nucleus of a useful partner to the program. In Monterey and at some other sites, the councils include remarkably distinguished and influential people, locally, nationally, and internationally. There are almost no occasions when council members from different sites meet each other. The national office and NOAA leadership should reach out to the members of the councils, seeking their guidance on how to craft national policies and deploy NOAA resources most effectively—not just at one site but generally. Either a private foundation or NOAA might provide a small amount of initial support for the formation of a nonprofit with two subsidiaries, one to conduct research and educational activities to foster public understanding and support of marine protected areas and one to be an advocate for the sanctuary program. In the past, a member of Congress whose district includes a sanctuary has occasionally taken a particular interest in the program, and on one or two occasions has tried to earmark funds for the site in his or her state or district. NOAA has usually discouraged this, rather than seeing it as an opportunity to educate

the member about the program as whole. It could now be time to reverse course and encourage independent efforts to create a national network of supporters of the program.

Currently, the sanctuaries are benefiting from a third option: personal interest by top NOAA and NOS offi-

cials. The sanctuaries have cultivated this interest deliberately by making Monterey and the Florida Keys show places for the program. This strategy has paid off in the current high level of interest in the sanctuary program within NOS and NOAA. This has helped create opportunity to institutionalize a position of higher visibility for the program, as suggested above.

Chapter Five

Recommendations

The sanctuary program is fundamentally well conceived and is beginning to demonstrate notable successes in protecting valuable parts of the ocean.

A former director of the national program once said that the sanctuary program is much stronger than its staff and closest admirers think. This is accurate. However, the program does have serious weaknesses—sanctuaries without defenses, self-defeating apprehensions about advisory councils, and at times a preoccupation with planning and process. The strong personal commitment of the staff to the program is a source of strength but also, at times, a barrier to working effectively with people who do not share this faith.

However, this report should conclude with a note of affirmation because the sanctuaries are treasures, the staff and council members are deeply committed to the mission of the program, and each site can take credit for at least one truly important substantive accomplishment (see *Table 4*). That is a tall achievement for a young, small program with work unlike that of any other NOAA agency.

The future for this program is promising. The path ahead can lead to wider recognition of the beauties of the sites and greater respect for the sanctuary program. The key steps for the sanctuary program are to:

- show how to protect sanctuaries effectively
- work more confidently with local communities
- manage for results

NOAA can also take steps that will make the sanctuary



Haul-seine fishing at Sutton Beach, Albemarle Sound, North Carolina. Boating the seine. From a photograph.

program more effective and, at the same time, will enhance NOAA's overall activities. Working with Congress, NOAA can:

- give more attention, stronger support, and more visibility to the sanctuary program
- provide additional funding and demand more competent performance.

Recommendations to the Sanctuary Program

Show how to protect sanctuaries effectively.

1. Make sanctuaries more visible to the public:
 - invest in an intensive effort to erect informative signs at turnout areas along coastal roads and at marinas near all of the sanctuaries
 - build visitor centers in partnership with other organizations

- in cooperation with other organizations—e.g., museums, whale-watching companies, or nonprofit organizations with many volunteers—establish a physical presence on the water and in the community
 - persuade state highway departments to show the actual boundaries of sanctuaries on highway maps
2. Establish marine reserves where appropriate:
 - make site-by-site decisions about marine reserves, which prohibit fishing, jetskis, or other uses that may damage marine reserves, rather than an across-the-board policy shifts
 - take special care at sites where NOAA promised not to regulate fishing, to create “no-take” zones only if there is substantial support in the local fishing community for doing so
 - seek opportunities to establish “no-take” zones but see them as a means to protect marine ecosystems rather than as ends in themselves
 - use the sanctuary councils and working groups to provide a way for local fishermen, environmental advocates, divers, and other members of local communities to participate directly in designing no-take zones, in cooperation with other agencies that have authority to designate or approve such areas
 3. Clarify sanctuaries’ strategies for education.
 - identify the most important customers for the sanctuary’s educational efforts in cooperation with working groups of marine educators from public, nonprofit, and private agencies at each site
 - specify the objectives of educational activities and articulate how they will increase the protection of marine resources, sooner or later
 4. Link sanctuaries to broader natural resource issues:
 - use the mystique that comes with the name “sanctuary” to influence public opinion, shape agency policies, and mobilize resources to address problems
 5. Make public involvement part of the program’s mission statement. Articulate the mission of the sanctuary program in language that clearly invites involvement and support from the public and from other federal, state, and local agencies: “With your help, we protect these special places.”
 6. Clarify the role and responsibilities of sanctuary councils:
 - create a formal council of leading citizens at each site that provides advice and shares responsibility for protecting the sanctuary
 - embrace the councils as partners rather than holding them at a distance as unneeded and uncontrollable meddlers
 - ensure that the members of the councils represent the full array of user groups but do not set aside seats for each group
 - charge council members with the responsibility to consider the full array of sanctuary resources and to help with balancing interests and building communications among different user groups, rather than asking them only to represent one user group
 - take steps at the national level to improve relationships between sanctuaries and their councils by:
 - preparing a policy statement, affirming how councils can help achieve the goals of the program
 - participating periodically in council meetings where specific strategies and priorities are set for the sanctuary
 - training sanctuary managers how to work with strong-minded board members
 - revise the current charters for sanctuary advisory councils to reduce the long lists of actions that councils cannot take and emphasize their positive role

Work more confidently with local communities

- allow each sanctuary to design its own institutional mechanism for a council
 - encourage communication among the sanctuary councils
7. Help build stronger “friends of the sanctuary” nonprofit organizations. Invest more time and energy at the national level and in each sanctuary aiding private efforts to build stronger non-profit “friends” organizations that raise funds to supplement sanctuary budgets and help advocate a strong national program.
- engage the sanctuary council in setting specific annual objectives
 - ask the council to take responsibility in its work plan for specific tasks for meeting these objectives
 - take a go-slow approach to creating new sanctuaries and rethink the site designation process to make it faster, less encumbered by detailed and confusing planning processes, and quicker to show results
 - be prepared for criticism, the sanctuary program cannot protect sites without public support, which requires being open, articulate, and ready to listen

Manage for results.

8. Focus on protecting resources as the best way to serve broad statutory goals:
- make protecting resources at the existing sanctuaries the highest priority
 - reduce activities to those most likely to lead directly to improvements in conditions at the sites or to changes in public policies likely to result in better protection of sanctuary resources
 - limit the investment of energies in international coral reef issues, the debate about marine reserves, and the formulation of sanctuary-wide policies and guidelines to that likely to result in improved protection at the designated sites
9. Emphasize results, rather than planning, capacity building, or other processes:
- prepare a “state of the sanctuaries” report at least every three years (perhaps more often initially, and updated more often if conditions change dramatically) that describes threats to sanctuary resources and steps that sanctuaries and others are taking to protect marine resources
 - clearly state the threats to marine resources in each sanctuary on the basis of the best available scientific evidence, and clearly state whether the sanctuary can provide adequate protection
 - prepare a short public annual report explaining the strategic choices that each site has made to protect the sanctuary resources with its limited resources
10. Invest in building staff and capacity at the sites:
- adjust the balance of senior program staff between headquarters and the sites
 - if Congress decides to boost the program’s budget, spend this money on additional field staff and give them responsibilities for national leadership, rather than adding more managers to the headquarters office
 - build expertise in the program by paying part of the salaries of specialists at the sanctuaries for assisting other sites, rather than adding to headquarters staff
 - open the career paths at NOS and NOAA for senior program staff in other agencies
 - fill a significant number of top jobs in headquarters with people who have had responsible positions in the field
 - create career tracks for sanctuary managers by periodically moving managers to other positions in order to provide opportunities for personal and professional growth, share experience with other NOAA offices, bring fresh ideas to the sites, and focus public attention on the resources and the capabilities of the program rather than on personalities

11. Clarify the roles, responsibilities, and skills needed at headquarters and at the sanctuary site:
 - provide a fresh, clear statement of the responsibilities of a sanctuary manager and the skills needed for this position, emphasizing manager's responsibility to be a community leader and to make tough decisions to protect resources, as well as scientific and management skills
 - clarify the primary responsibilities of the headquarters office:
 - to support adequate site-level protection
 - to help get the resources that the sites need
 - to provide information, expertise, and useful equipment to the individual sites
 - to help establish good relationships between the sanctuaries and national leaders and the national media
 - to set a standard of excellence
12. NOAA should provide stronger support to the sanctuary program:
 - direct NMFS and the regional fisheries management councils to locate no-take zones in sanctuaries, where possible
 - establish a policy that NMFS and other offices will notify sanctuaries of activities that might impact on them and gives special consideration to the need to protect resources in the sanctuaries
 - encourage its science-oriented offices to focus as much of their work on sanctuaries as possible
 - direct its agencies to provide information for "state of the sanctuaries" reports, research studies, and operational efforts to protect sanctuaries
13. NOAA should designate a senior official in the front office to encourage and give incentives to agencies to work closely with sanctuaries.
14. Congress and NOAA should provide additional resources and demand more competent performance.

Recommendations for NOAA and Congress

Pay attention, provide resources, and demand competent performance.

Endnotes

- ¹ Values are in miles, not nautical miles. (1 mile=1.15 nautical miles)
- ² Francesca Cava, speaking in story 1 of *Radio Expeditions: Frontiers in the Sea*. Compact disc. Produced by National Public Radio and National Geographic Society. NPR Classics, CD 0007, 1998.
- ³ Douglas Chadwick, “Blue Refuges: U.S. National Marine Sanctuaries”, *National Geographic*, March 1998, p. 31.
- ⁴ The May 5, 1999 Directory of the Marine Sanctuaries Division shows that there were 33 people on staff at the national headquarters in Silver Spring, Maryland and 82 at the sanctuaries. About 20 percent of those working in headquarters and almost half working at the sites were contractors rather than federal employees.
- ⁵ The last outside review of the sanctuary program was conducted in 1990-91 by a panel of 12 experts and stakeholders. Marine Sanctuaries Review Team, *National Marine Sanctuaries: Challenge and Opportunity: A report to the National Oceanic and Atmospheric Administration*, February 22, 1991.
- ⁶ The sanctuary also includes a smaller reef at a distance from the oil field.
- ⁷ The legal status of waters around American Samoa and Hawaii is complex but the territorial and state governments, respectively, do have substantial authority.
- ⁸ The National Marine Sanctuaries Act of 1972 as amended (16 U.S.C. 1431, Title 3), section 303 (a) (2) (A and B)
- ⁹ “The statute also mentions other purposes such as “to contribute positively to marine resources conservation, research, and management . . . create models of, and incentives for, ways to conserve and manage [sanctuaries] . . . [and] cooperate with global programs encouraging conservation of marine resources” Section 301 (a) (4) and (b) (7) and (8).
- ¹⁰ Section 301 ((b) (5)
- ¹¹ Section 301(a) (b) (3 and 9)
- ¹² Ibid (4).
- ¹³ Ibid (5)
- ¹⁴ Ibid (2)
- ¹⁵ R. Steven Brown and Karen Marshall, *Resource Guide to State Environmental Management*, 3rd edition, Council of State Governments, Lexington, KY, 1993, pp. 119-125.
- ¹⁶ The top officials at three sanctuaries (Florida Keys, Monterey Bay, and Olympic Coast) have a higher civil service rank and hold the title of superintendent. The top position at Stellwagen Bank is being upgraded. At other sanctuaries, the top official has the title of manager. This report refers to them all as managers.
- ¹⁷ See, for example, Ivan Doig, *English Creek*, Peter Smith Publishers, ISBN 0844666084, 1992.
- ¹⁸ At Fagatele Bay, someone cut the mooring buoys—presumably local fishermen who did not want to make it easy for other fishermen to moor there.
- ¹⁹ However, tight budgets have kept NOS from updating charts as rapidly as desired. Many are outdated.
- ²⁰ This town was also a convenient site for planning a second sanctuary in the Northwest Straits north of the Olympic peninsula and in the northern part of Puget Sound. Because of local opposition and fear of sanctuary regulation in state waters, this sanctuary was never created.
- ²¹ For a discussion of tools that can be used to control access to and use of marine areas, see National Research Council, Committee on Marine Area Governance and Management, *Striking a Balance: Improving Stewardship of Marine Areas*, National Academy Press, 1997, pp. 103-113.

- ²² There is some confusion about these terms. The sanctuary program prefers to call “no-take” zones “marine reserves” or “marine ecological reserves” because of the negative connotation of “no-take.” The sanctuaries themselves are one type of Marine Protected Area, a term defined by the IUCN as an area “which has been reserved by law or other effective means to protect part or all of the enclosed environment.” The Resources Agency of the State of California released a draft report on August 23, 1999, that proposed a system to classify “Marine Managed Areas” that would include any marine area set aside “to protect, conserve, or otherwise manage a variety of resources or uses”. This report calls strict “no-take” areas “marine reserves” but also suggests other terms for places where fishing and other extractive uses are limited but not prohibited entirely.
- ²³ See, for example, B.B. Walters and M. Butler, “Should We See Lobster Buoys Bobbing in a Marine Park?,” pp. 205-213 in *Marine Reserves and Sustainable Fisheries*, ed. Nancy L. Shackell and J.H. Martin Willison, Science and Management Association of Protected Areas Association, Wolfville, Nova Scotia, Canada, 1995.
- ²⁴ Technically, the federal National Marine Sanctuaries Act provides that a governor has authority to veto sanctuary regulations within the three-mile limit only when the sanctuary is designated and the first management plan is adopted. However, the program has granted the governors of Florida and Hawaii the right to approve later management plans. It seems unlikely that NOAA would force a no-take zone on the state of California over objections by the fish and game commission, unless the governor disagreed with the commission.
- ²⁵ Implementation of the wastewater master plan is estimated to cost \$184 to \$418 million; implementation of the stormwater master plan is estimated to cost \$379 to \$680 million.
- ²⁶ Channel Islands National Marine Sanctuary, Sanctuary Advisory Council Charter, p. 3.
- ²⁷ The term “advisory council” is in the statute, in Sect 315. The responsibilities of the councils are very broad, and could be interpreted as much more than providing advice: “to provide assistance to the Secretary regarding designation and management of national marine sanctuaries.” The program might retain the name “advisory council” official documents but drop it otherwise, if indeed it is legally required to use the term at all.
- ²⁸ Flower Gardens Banks also has a tiny staff, but it has been able to tap into substantial resources at Texas A & M University and the Gulf of Mexico Foundation, a non-profit which is supported heavily by the oil industry. As the site profile in Appendix 1 explains, it may be harder to get support from Texas A & M in the future. The sanctuary is currently moving its office to another location, where it hopes it can make up this loss by winning stronger support from the community and the dive industry.
- ²⁹ There are some similarities between this new model and the way that the Forest Service operated before World War II. Then, its primary purpose was often described as preserving watersheds, not so much to ensure safe drinking water for communities—which is the thrust of watershed protection today—as to provide as much water as possible for ranching and farming in the arid west.
- ³⁰ These phrases are from the sanctuary program’s third strategic goal.
- ³¹ Section 301 (b) (3).
- ³² See <http://www.mbnms.nos.noaa.gov/Educate/newsletters/1999Eco/index.html>
- ³³ There is no manager at Cordell Bank. There is an assistant manager who reports to the manager of the Gulf of the Farallones sanctuary.

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Appendix 1

Sanctuary Profiles

Profile: Channel Islands National Marine Sanctuary, June 1999

Summary

Congress established the Channel Islands National Marine Sanctuary in 1980, primarily as another way to constrain offshore oil and gas development in Santa Barbara Channel, 100 miles northwest of Los Angeles. The sanctuary began operations as a small unit operating within the Channel Islands National Park, but in the past few years it has become an increasingly visible presence in the Santa Barbara community.

In the mid-1980s, the sanctuary opened its own office and in cooperation with a local natural history museum created highly successful educational programs for elementary and high school children. Starting in 1996, the sanctuary boosted its staff from two to seven full-time employees and six part-time employees, and began to develop its own programs rather than working primarily through cooperative agreements with other organizations. It obtained an airplane and two boats, which support research and monitor use of the sanctuary. And it has remodeled its office in the Santa Barbara harbor alongside offices of the commercial fishing industry and a new maritime museum.

In late 1998, the sanctuary began two ambitious projects that will give it an even higher profile. The first is to interject itself into the middle of a growing debate about marine protected areas both locally and statewide. Many observers feel that over-fishing has depleted fish and shellfish in the channel. The Channel Islands National Park recommended that the California Fish and Game Commission set aside 20 percent of its in-shore waters around the Channel Islands as no-take areas, and state-level environmentalists are also pushing the state to create

no-fishing marine protected areas. It is also likely that in 1999 the California legislature will pass and the governor will sign legislation directing the state fish and game commission to create marine protected areas statewide.

In other places, most fishermen have opposed any role for the local sanctuary in establishing no-take zones. But in the Channel Islands, several leading local fishermen encouraged the sanctuary to jump in. These fishermen strongly oppose the Park Service proposal but are willing to participate in planning smaller zones. They asked the sanctuary to establish a sanctuary advisory council to draft a proposal for such areas.

The council includes local fishermen, other community leaders, as well as local, state and federal agencies with jurisdiction in the sanctuary, so it is a useful vehicle that the state fish and game commission can use to implement new state legislation calling for "collaborative" fisheries planning. The commission agreed to use the sanctuary's process to prepare proposals for its own consideration. The council is establishing a working group and a panel of expert scientists to design proposals for its consideration. Researchers at the local university, who are leading a large foundation-funded effort to design criteria for marine reserves, have agreed to participate actively.

The sanctuary's second high-profile initiative would dramatically expand its educational and public outreach activities. The sanctuary's relationship with the natural history museum has recently ended; the museum will now operate these programs independently. Through its small new foundation, the sanctuary is working with other Santa Barbara organizations to develop extensive educational and outreach programs for schools, local residents, and tourists.

Santa Barbara is a center of environmental activism and also home to a well-funded marine science institute with active community outreach programs, prosperous whale-watching companies, a small cadre of world-class marine photographers, and several nonprofits that are involved in environmental education. The sanctuary joined these organizations to design outreach and education programs for a proposed new aquarium in Santa Barbara. Voters turned down the aquarium proposal, fearing that it would generate lots of traffic but not be a financial success. The company that would have run the aquarium is now planning to build it 30 miles down the coast in Ventura, next door to the visitors' center of the Channel Islands National Park, which would help develop the aquarium's educational program.

The sanctuary and its partners are now developing plans whose centerpiece would be educational and research trips on a 100-foot whale-watching vessel, as well as live underwater video and downlinks to classrooms in the region and beyond.

Both of these initiatives will test the capacity of the sanctuary. The educational plans are ambitious financially, technically, and organizationally. Navigating through the controversy about marine reserves will require great political skill and technical expertise. The debate about reserves will be especially controversial in the Channel Islands because endangered sea otters are moving into the area and may eat enough sea urchins and other shellfish to put many commercial fishermen out of business.

All of these issues will come up as the sanctuary revises its management plan in 1999-2000, replacing a plan adopted in 1983. If it manages to write a plan that wins broad support and is successful with either the education or the marine protected area initiative, the sanctuary will establish itself as an influential force in marine governance in the channel.

The Site¹

- Sanctuary waters are within seven miles of four islands on the south of the Santa Barbara Channel, plus another small island 35 miles further south off Los Angeles.

- The islands are 9–46 miles off the coast, so the sanctuary also lies offshore.
- It takes at least 1 1/2 hours to reach the sanctuary by boat.

Inland and on the Channel Islands

- Four of the islands lie in the Channel Islands National Park. The fifth is owned by the Nature Conservancy (80 percent) and by the Park (20 percent).
- The park boundary is one mile into the sea, overlapping the sanctuary.
- The islands are rocky and windblown. Most areas are treeless.
- The mainland coast is undeveloped at the northwest end of the Santa Barbara Channel.
- Along most of the channel, the coast is a thin but intensively developed strip of land, including a population over 100,000 in and around Santa Barbara.
- The city of Ventura is at the southeast end of the channel just beyond the northwest corner of the Los Angeles metro area.

Marine resources

- Ocean currents
 - Cold Alaskan and warm Californian currents converge at Point Conception at the north end of the Santa Barbara Channel, outside the sanctuary. A large seasonal upwelling is present in this area, with very rich waters flowing past the Channel Islands through the sanctuary.
 - The Channel itself is mostly a bowl of warmer, shallower water circulating in a gyre with little leakage past the islands into the ocean.
 - The Channel and the waters around the islands provide some of the most productive marine habitat in the world
 - Water quality in the channel is generally excellent.
- Fish
 - mix of both warm water and cold-water fishes
 - rich fishing ground for rockfish, squid, shrimp, crab, sea urchins, sea cucumbers, and other marine life

¹ The total area is 1,658-square miles (value in land miles; 1 mile is the equivalent of 1.15 nautical miles).

- Excellent habitat large is provided by kelp forests around the islands.
- Whales and other cetaceans—27 different species
 - feeding and summer area for the endangered humpback whale
 - since 1992, regular visits by the largest concentration of endangered blue whales in the world; causes of their arrival are unclear
 - unusually large variety and abundance of dolphins and porpoises
- Large breeding rookeries for five kinds of seals and sea lions
 - large population of seabirds; breeding colonies; threatened brown pelicans
 - some of the most windy and roughest waters along the West Coast
 - spectacular scenery
 - oil
 - extensive deposits of low-quality heavy petroleum; extensive production since the early 1900s; currently 137,000 barrels per day in federal waters
 - 13 exploratory wells have been drilled within the sanctuary
 - one development well in a small corner of the sanctuary was shut-in in March 1998

Environmental threats

- Oil production
 - large 1969 oil spill from an offshore rig in state waters sparked early growth of the environmental movement
 - technologies much improved, but still small occasional spills as well as natural oil seeps
 - active concern by many in Santa Barbara about oil spills from rigs and pipelines
 - President Clinton extended ban on federal offshore leasing until 2010
 - 47 existing leases, mostly north of the sanctuary near the area where upwelling is concentrated; spills might threaten production of krill and plankton and upset marine conditions widely
 - oil deposits not worth developing at current prices
 - oil companies, local governments, and the federal government agreement to postpone decisions about developing existing leases

- pending a multiyear study of possible impacts of development
- Oil spills from ships
 - about two dozen cargo ships per day passing through the Santa Barbara channel; large container ships with substantial quantities of oil
 - almost all oil tankers pass 50 miles outside mainland, 25 miles off the Islands, outside the sanctuary
 - currents, fog, storms, and the presence of oil rigs make channel hazardous area for navigation
 - traffic separation system in effect—keeping northbound traffic inshore from southbound traffic
 - collision caused sinking of a freighter laden with copper in the late 1980s; some evidence of toxic contamination of water in the channel
- Over-fishing
 - The pounds of fish caught commercially dropped to one-third of 1979–81 levels.
 - The number of fish caught by recreational fishermen on party boats also dropped to one-third of the 1979–91 peak.
 - Stocks of some rockfish are severely depleted at many areas along the California coast; stocks of bocaccio are less than 10 percent of the level before commercial fishing began.
 - Current restrictions on the size of rockfish do not work well because the fish die when they are caught; to keep populations up, regulations must control fishing gear or set aside no-take areas.
- Sea otters
 - a threatened species under the Endangered Species Act: only 2,114 in 1998
 - population rose steadily 1985-95; living mostly many miles north of the sanctuary
 - 1995–98: population drops 11 percent; no clear understanding of reasons why
 - rising number of otters move into the Santa Barbara Channel for substantial parts of the year—over 100 in 1998
 - otters consume vast quantities of sea urchins, crabs, lobsters, and other shellfish; general agreement that if sea otters establish a significant presence in the Channel Islands, this will reduce the number of sea

- urchins enough to destroy the commercial sea urchin industry
- Marine Mammal Commission stops the capture and relocation of otters out of the channel when 16 percent of relocated otters die
- failed effort to establish a colony in a third area that would survive a major oil spill; 139 relocated but many return home, others die, and only 17 remain; otters in the channel might provide some protection that the population would survive in the event of a major oil spill north of the channel
- sediment plumes from rivers draining into the channel
 - sediments and other pollutants flow from rivers into the channel as far as the sanctuary during major rainstorms, mostly during the winter

Resources and Authorities

Purposes and authorities

- sanctuary created to help constrain oil and gas development that might threaten marine resources
- oil exploration and development prohibited within the sanctuary
- commercial boats excluded within one mile of the islands, except for local traffic
- overflights under 1,000 feet that disturb seabirds or mammals are prohibited within a nautical mile of the Islands; civil penalties are higher than Park Service regulations
- dredging, discharging materials, deposits on seafloor, removing historical or cultural resources are prohibited

Resources

- annual budget: \$710,000 (FY1999)
- six NOAA full-time equivalent staff (FTE) including two NOAA Corps officers plus one contract FTE and six part-time employees
- newly renovated office in the Santa Barbara Harbor; new southern office in Channel Islands Harbor—created in partnership with the County of Ventura
- two boats, including the 56-foot Ballena, equipped as a base for research; carries four scientists overnight or 10 on day trips; 100 days at sea in 1998

- patrol aircraft, shared with the Monterey Bay National Marine Sanctuary

Channel Islands Sanctuary Foundation

- created in 1997
- small staff publishes sanctuary newsletter, works in the sanctuary office
- small board working to develop major educational projects

Sanctuary Advisory Council and advisory groups

- various advisory groups functioned on specific issues or topics in the 1980s; fell into inactivity
- in 1997-98, sanctuary helps form roundtables on research and education
 - research panel meets periodically but has no formal projects
 - Marine Educators' Regional Alliance (MERA) includes educators, oil and fishing industry, museums, etc. Meets monthly to discuss relationships, working on a memorandum of agreement, several months of inactivity, now meeting again
- SAC established in 1998; first meeting in 12/98
- Members
 - 10 agency representatives (five federal, three state, two county)
 - 10 citizens and alternates designated to represent specific interests: business, tourism, recreation, fishing, education, research, conservation, and three at-large members
 - no members representing oil or divers; one member represents diverse commercial fishermen as well as charter boats
 - SAC currently discussing how to accommodate left-out interests—possibly by working groups that advise SAC members for the various interest groups
 - some SAC members wish to use informal methods to stay in touch with their peers; the education representative might use MERA informally
- SAC meets bi-monthly, focusing most of its attention on internal organization, the upcoming revision of the management plan, and marine protected areas.

Unique overlapping federal jurisdictions

- National Park Service
 - jurisdiction over the Channel Islands except for one in private ownership and one where the Park Service and the Navy share jurisdiction
 - jurisdiction over water within one mile of shore, but the state owns the seafloor and has jurisdiction over subsurface waters
 - Park Service regulates surface use of waters
 - state regulates fishing and other subsurface uses
- Naval Air Warfare Center
 - part of the Ventura County Naval Complex
 - 36,000 square miles of special use airspace and sea range
 - testing and training for missiles, aircraft, ships, and targets
 - exclusion of civilian air and sea traffic in areas where hazardous testing is under way
 - Navy avoids conducting exercises within the sanctuary
 - small installations on the Channel Islands for instrumentation of sea operations

Original Expectations and Evolution of the Sanctuary

Original expectations for the sanctuary

- active interest by NOAA in the Channel Islands as a possible site because of distinctive marine resources
- local interest in the sanctuary as an additional barrier to oil and gas development

Initial close relationship with the Channel Islands National Park

- in the early 1980s, a one-person sanctuary staff at the Channel Islands National Park headquarters, under the supervision of the park superintendent
- cooperative agreement with the Park for administration, research, interpretation and resource protection
- cooperative agreement with the California Department of Fish and Game to help protect living marine resources in state portions of the sanctuary

Partnership with the Santa Barbara Museum of Natural History

- In the mid-1980s, the sanctuary moved to a small Santa Barbara office.
- In 1987, the sanctuary and the Santa Barbara Museum of Natural History develop *Los Marineros*, a very successful summer marine science field program for fifth-graders from inner-city schools:
 - operated out of the sanctuary office and through a cooperative agreement with the museum
 - program later extended to all Santa Barbara public schools for the full academic year
- The museum and the sanctuary developed other educational programs, including a limited number of subsidized whale-watching trips for students and the public.
- In 1987, cooperative agreement with the museum supports development of exhibits about the sanctuary at Sea Center, a very small aquarium on a pier in Santa Barbara; hosts 60,000 visitors annually.
- A cooperative agreement with the museum supports publishing of a newsletter about the sanctuary.

Growth of the sanctuary staff and programs

- In 1995, the sanctuary terminated cooperative agreement with the National Park Service for enforcement.
- In 1996, sanctuary refits a 56-foot NOAA vessel as a platform for research; and the Channel Islands and Monterey Bay sanctuaries jointly obtain an airplane to monitor use and conduct research.
- Between 1996–1999, the sanctuary staff expands from two to seven FTE.
- Changes in leadership and policies at the museum; cause rising tension over museum-sanctuary working relationships.
- In 1998, the cooperative agreement with the museum for educational programs, Sea Center exhibits, and the newsletter is terminated.

Current Management Activities

Education and public outreach

- *Los Marineros* continues as a Museum of Natural History activity, now reaching all fifth-graders in Santa Barbara schools.

- Sea Center continues as a museum activity.
- The sanctuary foundation assumes responsibility for the newsletter; staff work in the sanctuary office.
- The sanctuary forms Marine Educators' Regional Alliance.
- Sanctuary staff participate actively in developing programs for the Santa Barbara Maritime Museum.
- The sanctuary foundation is developing a proposal for a major outreach/education effort based on whale-watching vessel.
- Volunteer programs
 - marine watch
 - naturalists on whale-watching vessels (in cooperation with the Museum of Natural History, until recently)
 - Great American Fish Count
 - equivalent of almost three FTE
- Internet weather kiosk
 - at fuel dock in Santa Barbara harbor, used by fishermen and recreational boaters
 - provides information on conditions at various sites in the sanctuary
 - replaces marine weather information services eliminated by government cutbacks
- major investment in building website; close working relationship with a well-established community-based internet service provider which develops curricula and programs for internet-based school education
- desire to upgrade signage about the sanctuary in the Channel Islands National Park and to improve/expand exhibits about the sanctuary in the Park visitor center and/or establish a separate sanctuary presence in Ventura

Research

- sanctuary provides air and boat support for multi-year university research to calibrate satellite measurement of ocean color in the Santa Barbara project; measures plumes of sediments from rivers during major storms, blooms of algae, and chlorophyll
- sanctuary boat contributes data on offshore conditions in the channel to a study of near-shore pollution along the full Southern California coast
- measured the impact of El Nino on kelp forests in the sanctuary, using NOAA aircraft

- aircraft flies the sanctuary weekly (weather permitting) to develop data base on vessel traffic, marine mammals, oil spills, kelp forests, and runoff
- cooperates with other agencies on developing GIS for the channel, study of fish reproduction, and other matters

Regulation and enforcement

- about a dozen permits annually, mostly for fisheries research, marine mammal and seabird research
- successfully prosecuted looters of a shipwreck in 1987
- sanctuary participates in oil spill contingency planning

Management plan

- adopted in 1983
- SAC to play a central role in writing a new management plan, to be adopted in 2000
- 1983 plan included extensive research and educational activities; some completed, some not, others in progress
- possible boundary expansion to include the productive area of upwelling off Point Conception

Strategic Questions and Choices

Will the sanctuary be able to play an effective role in designing and managing marine reserves?

- an unusual opportunity
 - leading local fishermen ready to participate actively in designing reserves
 - well-funded international group of scientists, based in Santa Barbara, working to develop criteria for design of reserves, willing to play active role locally as a test site
 - 1998 state legislation mandates community-based, collaborative, science-based approach to fishery management; sanctuary is the only entity with a mechanism and mandate to convene a community-based planning group
- challenges to the sanctuary's continued leadership on this issue

- new governor expected to sign legislation passed but vetoed in 1998 mandating reserves; this process could supersede the sanctuary's process
- state and national environmental advocates may feel constrained by or excluded from a direct role in the sanctuary's planning process
- local fishing community, like most, is highly diverse and individualistic; may not continue to support leaders who are willing to design reserves
- lack of solid information will frustrate any reserve planning; sanctuary has no technical capacity of its own about marine biology or fisheries management
- sanctuary handling of reserves must fit into sanctuary management plan process; mandates, timetables, reviews, and approvals for the plan are complex and may not fit with the state fish and game commission's decision process

Will the sanctuary be able to develop new educational and outreach services, now that its long-term relationship with the Museum of Natural History has lapsed?

- planning is at an early stage; relationship with the museum ended in late 1998
- highly-respected, well-placed individuals working closely with sanctuary leadership
- current plans envision large-scale programs, would require financing and expertise not currently present in the sanctuary office
- strong community interest in and support for marine science and education
- sanctuary has assumed responsibility for volunteer programs including naturalists on whale-watching cruises

Profile: Cordell Bank National Marine Sanctuary, June 1999

Summary

Cordell Bank is perhaps the most invisible of all the national marine sanctuaries. It lies 7 to 23 miles offshore and some 52 miles northwest of San Francisco Bay, adjacent to the Gulf of the Farallones NMS. The small Farallones sanctuary staff also manages Cordell

Bank; one member of the Farallones staff, housed at the Farallones office, is designated as assistant manager of Cordell Bank. But this manager and the other staff spend most of their time on matters that concern either the Farallones alone or both sanctuaries.

The primary question facing the Cordell Bank sanctuary program is whether there is a need for more active management. Recently, the program turned down a request of \$10,000 for preparing a brochure for the sanctuary, suggesting that work on Cordell Bank is a low national priority.

There are some significant issues on Cordell Bank. It is a highly productive fishing area, and there is evidence that rockfish in the sanctuary are severely depleted. The state legislature and the Department of Fish and Game, and the Pacific Fisheries Management Council are considering establishing marine reserves that would protect rockfish and other species.

It is also possible that trawling in the sanctuary is damaging hard-bottom habitat, including the pinnacles of sea mounts that are the most distinctive feature of the sanctuary. In the spring of 1999, the Sustainable Seas Expedition provided the first information about the conditions of the pinnacles and bottom since the expeditions in the 1980s, which produced dramatic photographs of the dramatic and distinctive plants and creatures on the pinnacles. These pictures, reproduced in *National Geographic*, sparked public interest that led to the designation of the sanctuary.

However, the designation document that created the sanctuary specifically withholds authority to regulate either the impacts of fishing on the bottom or fishing itself.

The Site

The sanctuary

- almost 526 square miles
- adjacent to and offshore of the Gulf of the Farallones NMS
- centers on the Cordell Bank plateau 300-400 feet below the surface, with pinnacles and steeply-sided ridges that rise to within 115 feet of the surface

- includes a buffer area 6-15 miles wide around the bank
- at the edge of the continental shelf; the bottom drops to over 6,000 feet only a few miles from the bank

Inland

- The sanctuary is off the northern coast of Marin County and part of Sonoma County, 50 miles northwest of San Francisco Bay.

Marine resources

- a pristine marine environment
- rich fishing grounds because of seasonal upwelling of cold water, especially around pinnacles
- unique mix of subtidal and ocean species, especially on the pinnacles and ridges, because of clear waters and other unique local conditions
- includes one of the densest populations of seabirds along the California coast, attracted by abundant rockfish and other organisms
- active commercial and sport fishing by boats from San Francisco and a small local harbor
- a dangerous area for diving because of depths, temperature, currents and white sharks
- unknown oil and gas resources but no recent active interest in leasing, exploration or development

Environmental threats

- rockfish populations appear to be substantially depleted, though scientific understanding is limited
- concern that bottom trawling may be damaging the pinnacles.
- nearby shipping lanes; occasional small spills from tankers and commercial shipping

Resources and Authorities

Mandate and purposes

- established in 1989 to increase protection from discharges (mostly oil spills) and to provide for more research and public awareness
- lacks authority to prohibit oil and gas development, but may regulate such development (according to the designation document for the sanctuary)

Important regulatory authorities

- can prohibit discharge of substances (other than fish, bait, water for routine cleaning of boats, etc.)
- lacks authority to regulate either fishing or the impact of routine fishing on the bottom

Resources

- annual budget: \$120,000; one full-time employee; managed as a collateral responsibility of the Gulf of the Farallones NMS
- there was no separate budget for the Cordell Bank sanctuary between FY1989 and FY1996
- assistant manager of the Farallones supervises Cordell Bank and has a small part-time office at Point Reyes National Seashore nearby

Expectations for the Sanctuary

Designation

- scientists become aware of the unique formations and ecosystem on the bank during the 1970s and 1980s
- expert volunteer divers from Marin County explore the banks, take pictures, and push for designation of the sanctuary in the late 1980s
- *National Geographic* magazine article about the banks
- some mild interest in oil and gas development in the late 1970s and early 1980s; no leases offered
- administration pushes for designation shortly before the 1988 presidential election
- little public awareness that the banks exist

Current public uses

- active fishing grounds for commercial fishermen and sport fishing
- several studies by independent scientists of complex currents and upwelling in Cordell Bank and the Gulf of the Farallones

Management Activities

- sanctuary staff has conducted annual monitoring of physical and limited biological conditions at five locations since 1995
- University of California-Davis marine lab is planning large, multi-year study of currents, upwelling, and biological conditions in both sanctuaries
- free use of NOAA ship McArthur during annual 10-day visits
- review permits for research within sanctuary
- sanctuary education activities focus mostly on the Farallones, which are more familiar to the public

Opportunities for the Future

- sanctuary research could document impacts of over-fishing and trawling on the unique physical and biological features of the sanctuary
- limited recreational use is likely, except for sport fishing
- the unique features of the bank could be a focus for public education in some settings, e.g., as part of more extensive education efforts

Strategic Questions and Choices

- Should NOAA invest in raising public awareness about the sanctuary?
- If research shows that fishing, especially bottom trawling, is damaging the pinnacles and bottom, should the sanctuary seek authority to regulate fishing, or should it seek protective measures by NMFS and the Pacific Fisheries Management Council?
- How can the sanctuary best encourage and support research about the special conditions at the banks and more generally about the highly productive marine area of the Farallones and Cordell Bank area?

Profile: Fagatele Bay National Marine Sanctuary, June 1999

Summary

The smallest of the sanctuaries, the Fagatele Bay National Marine Sanctuary is a dramatic eyeful of clear blue water, reef, beach, jungle, and cliff on the

rugged coast of the main island of American Samoa. The bay is in relatively pristine condition and well-protected on the land side. No one lives beside the bay, and a high ridge borders it on three sides, so there is little surface runoff into the bay. It is difficult to reach the bay by land; the only road is gated and footpaths from the ridge to the water are steep and narrow, so very few visitors walk down to the small beaches to fish, picnic, and perhaps leave trash or harm the coral reef.

But from the ocean side, both natural forces and humans have hammered the sanctuary in recent years, seriously damaging the reef and depleting the fish. In 1979, crown-of-thorns starfish infested the bay and killed much of the coral, which had only partly recovered in 1990 and 1991 when hurricane waves smashed most of the coral as much as 30-feet below sea level. The bottom of the bay is still covered by rubble. However, coral is growing on the rubble rather more rapidly than expected, and a few large coral heads survived.

Some fishermen may also be hurting the reef. Sanctuary rules prohibit most forms of fishing in the inner two-thirds of the sanctuary, but there is little enforcement of fishing regulations anywhere on the islands. No one lives close enough to Fagatele Bay to watch what is happening at night and report violators to the territorial department of marine and wildlife resources. In Samoa, some fishermen dump bleach in the water to kill fish and others use dynamite. Also, in the past five years about 15 Samoans and a few other Pacific islanders have begun spear-fishing at night using scuba gear. They operate all around the island, especially in places like Fagatele which are far from villages and thus once had more big fish.

No one really knows how often scuba spear-fishermen or other fishermen work in the sanctuary or use illegal methods. Presumably they do visit the sanctuary, because most people feel that Fagatele Bay contains fewer big fish than ever, and a research scientist once heard dynamiting in the bay.

When American Samoa's delegate to Congress and the territorial government sought to create the sanctuary, they were looking not for more regulation but for more revenue. The island is heavily dependent on

federal funds. A special federal grant pays over two-thirds of the territory's budget, and the territorial government employs a third of the workforce. NOAA adds a small amount to the territorial budget by making a grant for managing the sanctuary. But the NOAA grant is tiny, just enough to pay one person part-time until 1993 and only two full-time since 1995. They work within the territorial department of commerce, closely linked to the coast zone management program.

The sanctuary management plan, written in 1984 before the sanctuary began operations, promised to build a visitor center near the sanctuary, have an active interpretive program, and conduct boat tours of the bay. There have never been sufficient funds to meet these commitments.

Instead, the sanctuary has focused its energies on marine and environmental education for schoolchildren. It provides most of the funds for a three-week, half-day summer camp for about 50 middle school children operated by the Department of Education. The sanctuary and four other agencies support a day-long summer program for younger children. Sanctuary staff also speak and organize field trips at many schools, help organize exhibits at fairs and festivals, distribute a coloring book they wrote in Samoan about coral reefs, and train teachers. The sanctuary's educational efforts describe the sanctuary in Fagatele Bay but primarily address island-wide issues, encouraging young Samoans to learn about the sea and to be good stewards.

The sanctuary's educational efforts are well-known and respected, even though access to the sanctuary is so limited that few schoolchildren will ever see it. Several other environmental agencies have joined the sanctuary in conducting educational programs, and the sanctuary staff has been a spark plug in coordinating their efforts.

Educating schoolchildren is a good way to protect the sanctuary over the long run. The same factors threaten the sanctuary and other reefs and in-shore fishing grounds. American Samoa's population grows 3.7 percent annually; although Samoa imports much of its food, the market for local fish is much stronger than are efforts to enforce fishing regulations; and lots of

trash finds its way into the ocean from ships, when torrential rains wash backyard litter into the sea, and sometimes when people simply throw bags of garbage off cliffs into the ocean.

The Department of Marine and Wildlife Resources is proposing to attack over-fishing directly. It has drafted regulations to prohibit scuba-spearfishing. Also, it is developing a program that would provide technical assistance to any village councils that would assume legal authority to regulate off-shore fishing and would agree to establish no-take zones. Village councils traditionally managed fishing on adjacent reefs, but recent court decisions say that villages have no legal authority beyond mean high tide level. The department's proposal thus enters a legal thicket with a proposal to blend scientific fishery management with traditional cultural practices.

If more resources were available, the sanctuary might expand its educational efforts. However, with several other agencies now providing marine and environmental education, the sanctuary would have to consider what its unique contribution might be.

Or the sanctuary might use additional resources to help the Department of Marine and Wildlife Resource's efforts to enforce existing regulations and write better ones. The sanctuary is already providing its comments on the department's plans and has offered to pay for enforcement in the bay, if it were effective in reducing damaging and illegal activity.

Another option would be to invest in research on the bay. The sanctuary has provided moderate grants to support monitoring of the bay in 1985, 1988, 1995, and 1998 but much more could be done.

Or the sanctuary could encourage eco-tourism in the bay, as envisioned in the original management plan. There is little tourism in American Samoa, and many Samoans would rather rely on federal subsidies than risk further erosion of *fa'asamoa*, the traditional Samoan way of life, by opening the gates to foreign tourists. However, if the sanctuary could design and spark a small tourist presence in the bay, it might persuade local landowners and other Samoans that protecting the coastline is both profitable and consistent with traditional values.

The Site

The sanctuary

- 163 acres—just over one-quarter square mile
- a bay on the southern coast of Tutuila, the largest island in American Samoa
- jungle along most of the shore; three short, thin sandy beaches; cliffs; shallow reef; and deeper reefs averaging 20-50 feet below the surface near shore and dropping to 200 feet at the deepest

Inland

- The ridge behind the bay is private land, with a few temporary homes and small plots that are farmed intermittently.
- The ownership of the ridge and of the land between the ridge and public roads is disputed, with one influential elected official claiming most of the area, and several claimants of smaller portions.
- The bay is not easily accessible from land; the nearest public road is almost a mile away; a private access road is rough and gated; near the bay visitors must walk down a steep, over-grown path through jungle to the shore.
- The landfill for the island lies behind the ridge; there is no surface water drainage from the landfill to the bay, but the underlying rock is highly porous and perhaps some day groundwater will carry pollutants to the bay.
- The bay is easily accessible by boat (about 40 minutes from the closest boat ramp) during the six months of the year when winds come from the north; access is tricky in stormy weather.

Marine resources

- excellent water quality
- much of coral reef in the sanctuary destroyed by large waves during the 1990 and 1991 hurricanes; some areas recovering more rapidly than expected
- a calving ground for the endangered southern Pacific humpback whales
- a nesting site for endangered hawksbill sea turtles; visited by endangered green sea turtles
- a relatively rich population of fish; the area has been fished comparatively lightly until recently
- a dramatic, beautiful spot

Environmental threats

- pollution
 - not significant because little nearby human activity and few visits to the sanctuary
- fishing
 - Local landowners do some fishing and may also “glean” parts of the reefs periodically—a traditional use, taking all edible plants and animals in a small area.
 - In the past five years, American Samoans and, according to most people on the islands, fishermen from Independent Samoa and Tonga spear-fish with scuba at night; scuba spear-fishermen catch almost three times as many fish per hour as other fisherman.
 - There is little effective enforcement of fishing regulations at present.
 - As elsewhere along the coast, dynamiting for fish has reduced some parts of the Fagatele reef to rubble; and some fishermen may use chemical poisons which kills all marine life (as well as traditional poisonous plants which serve the same purpose but are somewhat less effective).
- Other problems
 - In 1979, crown-of-thorns starfish destroyed coral in much of the bay, but these areas had largely recovered until hit by hurricanes.
 - In 1990 and 1991, hurricane waves smashed much of the coral.
 - In 1994, unusually warm water caused coral bleaching from 90 feet to at least 120 feet and killed one-third of the coral; rising sea temperatures near Samoa suggest there may be similar events in the future.

Samoa

Basic facts

- a U.S. territory since 1900, when it became a refueling station for the U.S. Navy
- 2,276 miles south and west of Honolulu, and about 4,400 miles southwest of San Francisco
- population of 60,000, over 95 percent of which is on Tutuila, where the sanctuary is located
- population has grown from 6,000 in 1900; growth rate is now 3.7 percent annually—higher than 19 of 22 countries in the southern Pacific

- Independent Samoa, a separate nation but with many family and cultural ties, lies about 70 miles west of American Samoa, and was once governed by Germany, later by New Zealand.

Society and culture

- Traditional culture was village-based subsistence agriculture, supplemented by fishing.
- Land is owned in common by the village, governed by chiefs who head families.
- Under traditional Samoan land tenure, the use of offshore waters out to the reef belonged to the owners of the shore. Court decisions have now determined that all land beyond mean high-tide is territorial.
- Traditional Samoan culture is resilient but changing to accommodate some Western practices.
- The culture is very conservative, with a great deal of respect for parents and chiefs.
- Samoans have extremely high attendance in large and beautifully-constructed Christian churches of multiple denominations.
- Many village chiefs are also deacons in local churches. There is a close interweaving of religious, cultural, social, family, and land-use governance.

Tourism

- a major industry in Independent Samoa but not American Samoa
- 10–20 day-long visits per year from cruise ships; most of the 10,000 visitors stay on the docks or nearby in the spectacular Pago Pago harbor
- estimate up to 8,000 overnight tourists per year
- only two airplanes per week from Honolulu
- very limited accommodations
- friendly people but cultural resistance to increased visits by Westerners
- no use of most beaches and few other tourist activities on Sundays, when Samoans go to church

Economy and government

- two large tuna canneries in the Pago Pago area (the territorial capital)
 - built in the late 1950s
 - serve fleets fishing in large parts of the Pacific
 - have duty-free access to U.S. markets

- provide one-third of all paid employment in the territory
- account for 94 percent of exports from American Samoa

■ The rest of the economy

- limited farming (16 percent of surface area); much land is too steep to farm
- minimal local industry
- fewer than 150 commercial fishermen
- government provides one-third of paid employment
- many unemployed Samoans depend on Food Stamps and other federal food programs; a congressional staffer who helped write legislation making American Samoans eligible now says, with many others, this was a great mistake because it undercut the willingness to work

■ Territorial government

- an elected governor, bicameral legislature, and non-voting representative in the U.S. House of Representatives
- a single U.S. Department of the Interior grant pays for over \$70 million of the territory's \$113 million budget (FY95)

- diet includes many imported foods—corned beef, salt beef, lamb from New Zealand; major shift in food preferences since World War II, when American troops used the island as a base
- much-reduced military importance; little visible presence today

Resources and Authorities

Mandate and purposes

- established in 1986 for “preserving and protecting this unique and fragile ecosystem”
- regulations on fishing gear forbid commercial fishing and prohibit other fishing, except with hand-thrown nets or fish traps, in the inner half of the sanctuary

Resources

- annual budget: \$99,000 (FY99); two full-time employees and two young Americorps volunteers
- crowded one-room office
- recent purchase of a small boat
- no sanctuary advisory council

Original expectations for the sanctuary

- Territorial officials hoped that the sanctuary would bring funds to hire coastal and marine experts.
- Some landowners near the bay expected that the sanctuary would pay them for easements for public access and for facilities on shore.
- The management plan (written in 1984, before designation) promised a vigorous outreach and tourism program, including a visitor center and boat rides in the sanctuary.

Management Activities

Educating schoolchildren

- annual marine science summer camp
 - 50–70 ninth-graders
 - two to three half-day sessions of three weeks each
 - held at local elementary schools
 - taught by teachers from the territorial school system, managed by sanctuary staff
- annual summer enviro-marine discovery camp
 - 150–200 elementary schoolers
 - four to six overnight campouts
 - held at local elementary schools
 - taught by staff of sanctuary and other environmental agencies plus a teacher
- presentations about marine stewardship to students at island schools
- teacher training sessions
- a coloring book on coral reefs in English, Samoan and Hawaiian, produced jointly with the Hawaiian Humpback Whale sanctuary

Public education and outreach

- annually publish a popular tide calendar, with color pictures by local students
- annual pamphlets on tides
- sponsor occasional public whale-watching trips
- starting evening village outreach programs—videos, talks, skits, cleanups
- cooperate with other environmental agencies to present environmental programs and exhibits on holidays and celebrations
- regular column in the local newspaper; periodic appearances on TV and radio
- sanctuary provides posters and signs about Fagatele and about marine life to other agencies

Regulation and site management

- contract with territorial fish and game department for enforcement has proven ineffective; few visits made
- lack of a boat has precluded on-site management or enforcement by sanctuary staff in the past; small boat about to become available
- soon to sign an agreement to reimburse the territorial marine and wildlife resources department for patrols in the sanctuary; visits will be during the night and early morning
- placed mooring buoys in the sanctuary to substitute for anchoring in coral; buoys were cut loose, perhaps by local residents to discourage others from entering the bay; may place sub-surface buoys for use by agency staff and local residents

Research

- supported baseline studies of coral and fish resources in Fagatele Bay in 1985, 1988, 1995 and 1998; journal article on changing conditions over 20 years was to be published in 1999
- participate in various professional conferences

Management and inter-agency activities

- close links to the territorial coastal zone management program
 - sanctuary manager and educational coordinator have been territorial employees working with the coastal zone management program
 - the sanctuary manager will become a federal employee shortly but will continue to function as part of the territorial system
 - sanctuary manager participates as a program director in Department of Commerce, investing up to 15 percent of time in various management issues
- organization of environmental educators
 - sanctuary staff took the leadership in creating the organization
 - initially considered becoming a nonprofit to pool agency funds, but some agencies objected
 - now a mechanism for informal coordination
- some competition among agencies engaged in environmental education; little cooperation with the territorial fish and game department, which has a statutory mandate to conduct environmental education

- few direct links to village chiefs, who are powerful figures in land-use, village policing, cleanup, and many other matters of interest to the sanctuary and generally to environmental agencies
- substantial frustration with the territorial government in obtaining NOAA contract funds and in paying bills

Strategic Questions and Choices

A continued role in environmental education

- sanctuary established itself as respected source of activities, materials, and assistance to teachers
- other agencies are now more active also
- education of the future generation is of fundamental importance in protecting the marine environment in the long run
- some public resistance to agency “preaching” about the necessity of cleanup
- questions about leadership if current sanctuary staff move on to other jobs
- questions about the sanctuary’s role in environmental education

Marine reserves

- little sanctuary capacity to enforce existing no-take requirement; may require a “sting” operation to catch perpetrators in the act
- department of fish and game designing island-wide regulations to ban scuba spear-fishing at night and to help village councils create no-take zones; difficult to see how the sanctuary can help the department to get this program going or to manage it, given the sanctuary’s limited links to village councils and the independence of the department

Potential for growth

- small size of NOAA contract and lack of available territorial funds limits activities
- small size of sanctuary limits impact
- solid, recognized niche for the sanctuary in education and outreach: Does this provide a foundation for future growth?

Profile: Gulf of the Farallones National Marine Sanctuary, June 1999

Summary

The Gulf of the Farallones National Marine Sanctuary includes about 70 percent of the continental shelf off San Francisco. (The Farallones sanctuary staff currently manages the Cordell Banks National Marine Sanctuary and used to co-manage the northern portion of the Monterey Bay sanctuary; together the first two sanctuaries and the northern portion of the third include all of the shelf off San Francisco.)

This is an area of rich fishing grounds and excellent seabird habitat, frequented by 13 species of whales and many marine mammals. Although the water is in almost pristine conditions, there are difficult natural resource conflicts in the area. Major shipping lanes run through the sanctuary, and there are small-to-medium sized oil spills every year. The sanctuary is intensively fished, and the stocks of rockfish are far below historic levels. An old radioactive dump in the sanctuary is the largest in the United States, and there are periodic proposals to dump other materials in the sanctuary.

The sanctuary receives far less public attention than nearby San Francisco Bay and the beautiful coastline which the sanctuary borders. One reason is that sanctuary waters are often rough and foggy, so most people stay on the beach or close to shore. Signs warn of riptides; winter waves erode the cliffs, sometimes undercutting highways and houses; and occasionally a great white shark attacks a swimmer. The Farallones Islands, which give the sanctuary its name, are the home of the largest seabird colony in the lower 48 states, but the islands are closed to the public.

The visibility of the sanctuary is also limited by its tiny staff—only 1/100 of the size of the two national parks that own much of the coastline.

To get its work, the sanctuary operates in close working partnership with the parks and with the many other nonprofits and government agencies. The sanctuary often makes small contributions to multi-agency research projects, leads and thus helps take the heat when other agencies try to regulate jet skis or other vocal users, and plays a visible and useful role in cleaning up oil spills. A nonprofit set up to help the sanctuary raises private funds to

help operate volunteer programs, run visitor centers, and get the sanctuary's message out to the public.

These efforts have given the sanctuary more visibility and more influence than it would have had if it operated independently. But the lack of resources is still a significant constraint.

The original reason for creating the sanctuary—preventing the leasing and development of off-shore federal oil and gas—was accomplished when the sanctuary was officially designated in 1981. The sanctuary lacks authority to regulate fishing. With additional resources, it could extend its regulatory protection or help support research to explain why the gulf is such a productive area. It also could organize a much larger effort to reaching out to the public and the millions of tourists who pass through San Francisco each year, explaining how the gulf, other sanctuaries, and the world's oceans function.

The national sanctuary program office invested heavily in just such an effort—a proposed marine education center only a few blocks from Fisherman's Wharf which would become a major tourist attraction for San Francisco. For a time the program office worked closely with the national park officials who are partners with the Farallones sanctuary and sought to bring other NOAA agencies into plans for the center. However, these plans have lapsed. The Park Service is moving ahead with other local partners and will certainly invite the Farallones sanctuary to contribute an exhibit if it can raise funds to create the center

The Site

The sanctuary

- 1,255 square-miles—six miles into the ocean along the coast and 12 miles around the Farallones Islands
- continental shelf as much as 600 feet deep, plus part of the continental slope to 8,000 feet
- west of San Francisco Bay
- includes four estuaries, one of which is co-managed with the National Park Service

Inland

- coastline is mostly in public ownership—National Park Service or Marin County open space

- the coastline is part of a major metropolitan area, but mostly open space or ranchland with some small towns
- Farallones Islands are a national wildlife preserve; craggy rocks totalling about 1 square mile, with the largest seabird colonies in the lower 48 states, not open to the public; only eight researchers allowed to be on land simultaneously

Marine resources

- rich fishing grounds caused by seasonal upwelling of cold water
- large local fishing industry; some stocks declining
- extensive sport fishing, except in stormy months
- regularly visited by 13 species of whales including endangered humpback and blue whales, as well as 33 species of marine mammals
- limited year-round whale-watching; one non-profit operator; rough seas force cancellation of an average 30 percent of trips per season
- very little diving because of dangerous depths, currents, cold temperature, and white sharks
- limited scientific understanding of marine life in deep waters in the sanctuary, but many ongoing research projects
- contains one large and almost pristine estuary, a mid-sized estuary, and two smaller estuaries
- some oil and gas resources but no recent interest in leasing, exploration or development

Coastal habitat and activities

- miles of spectacular beaches and rocky cliffs
- Point Reyes National Seashore has over 2 million visitors annually; even more visit the Golden Gate National Recreation Area
- total annual use of the sanctuary waters: 10 million people, 80 percent of whom stay within the intertidal area or swim just beyond
- extensive fishing, clamming, kayaking, etc. in estuaries and along accessible parts of the coast
- estimated 50,000–100,000 whale-watchers (mostly noncommercial)
- estimated 50,000 divers, almost all close to shore
- two small streams that flow into the sanctuary are important habitat for endangered coho salmon

Environmental threats

- major shipping lanes (most shipping into San Francisco Bay) pass through the sanctuary; periodic small and some medium-sized spills from commercial shipping and sometimes tankers; no massive spills yet; three spills since 1986 killing about 10,000, 7,000, and 5,000 birds
- waters are in excellent conditions except near outfalls and in some estuaries;
- rockfish populations appear to be substantially depleted, though scientific understanding is limited

Resources and Authorities

Mandate and purposes

- established in 1981 to forestall oil and gas leasing; oil and gas development is forbidden
- lacks authority to regulate either fishing or the impact of routine fishing on the bottom
- can prohibit discharge of substances (other than fish, bait, water for routine cleaning of boats, etc.); this makes the sanctuary an important player in oil spills, dumping, dredging, and marine safety

Resources

- budget of \$427,000 has been stable for many years, was once 33 percent higher. Local congresswoman obtained an earmark of additional funds in 1993 but NOAA discourages this
- two FTEs and one contract FTE; also three FTEs and one contractor on the staff of the nonprofit Farallones Marine Sanctuary Association
- old, 27-foot boat that is too small to go outside San Francisco Bay into the sanctuary three-fourths of the time because of waves and weather
- offices in space provided by the National Park Service; uses park administrative services
- no formal sanctuary advisory council
- present manager, since 1990, had worked with NMFS in the Bay for many years, has a strong network of personal relationships with agency officials and user groups

Farallones Marine Sanctuary Association

- established in 1995 with an initial planning grant from a San Francisco community foundation

- board is diverse and includes key community leaders
- exists to provide assistance to the sanctuary in stewardship, education, research, and emergency monitoring (especially oil spills)
- staff works very closely with sanctuary staff
- receives about half of its budget in contracts from the sanctuary; raises the remainder from foundations, memberships, and other agencies

Expectations for the Sanctuary

Designation

- designation motivated largely by concern about offshore federal oil and gas leasing
- some mild interest in oil and gas development in the late 1970s and early 1980s; no leases offered

Early history

- managed from national headquarters with a small contract to the National Park Service until 1989
- briefly staffed by a NOAA corps officer
- regulatory issues—an old dump site for radioactive materials and a proposed sewage outfall—became controversial in early 1990s

Current public uses

- active fishing grounds for commercial fishermen and sport fishing
- several studies by independent scientists of complex currents and upwelling in Cordell Bank and the Gulf of the Farallones
- extensive publicity and public concern when a freighter or tanker gets in trouble, threatening an oil spill
- little public debate about decline of the rockfish population; public concern is limited because rockfish are brought in from other parts of the coast; no environmental advocacy yet focussing on the Farallones, but significant advocacy for state action to create reserves to protect rockfish and other species
- good success in recruiting volunteers, but limited broad public awareness of the sanctuary

Management Activities

Regulation

- permits issues for educational and research activities and other activities that discharge or place materials in the sanctuary
- success in opposing sewage disposal of one city, but the San Francisco sewage outfall is not included within the Monterey Bay sanctuary, which lies inshore from the Farallones
- efforts to restrict state highway agency from dumping spoils from coastal highways into the ocean; initial success in getting mitigation funds for two spills; state has now agreed not to dump into the sanctuary
- Beach Watch volunteer program mobilizes quickly to monitor baseline conditions and oil spills on beaches; data enables agencies to win large damage assessments from shipping companies
- citizens petition to ban jet skis in estuaries and coastal waters; sanctuary holds hearing and regulations are forthcoming; national park bans jet skis within one-fourth miles of coast – much of the area where jet skis had been used
- joint planning by sanctuary and Point Reyes seashore about oyster farming in an estuary; concern about introduction of alien stock with diseases

Research

- sanctuary manager and another staff member lead field research on Farallones Islands 3 times each year; research assists with damage assessment and other management activities
- sanctuary staff has conducted annual monitoring of physical and limited biological conditions at 15 locations since 1995
- sanctuary provides access to boats, logistical help, or limited financial aid to many research efforts
- University of California–Davis marine lab is planning large, multiyear study of currents, upwelling, and biological conditions in both sanctuaries
- the sanctuary association is managing education and outreach activities of the Sustainable Seas expedition in the Farallones and Cordell Bank sanctuaries

Public education

- sanctuary association organizes visitor centers at sanctuary headquarters (1,200 annual visitors) and in a suburb along the coast (10,500 annual visitors) and exhibits in other facilities
- sanctuary manager appears on TV periodically in news coverage of the area or in feature stories
- little current outreach to schools or business groups
- sanctuary association helps other agencies and nonprofits organize exhibits about the sanctuary

Volunteer programs

- sanctuary association (nonprofit) helps manage Beach Watch—volunteers who monitor oil spill impacts on beaches
- sanctuary association created volunteer program to keep clam diggers and kayakers from disturbing harbor seals as they raise young on beaches
- volunteers also staff visitor centers and assist other programs of the sanctuary association
- sanctuary and sanctuary association both work closely with many other nonprofits with volunteer programs in the Bay area—e.g., marine mammal stranding network

Relationships with the National Park Service and other agencies

- sanctuary manager and staff invest substantial time in inter-agency committees and advisory groups to other agencies building good will and collaborative efforts
- Park Service is quite entrepreneurial, dwarfs the sanctuaries, but reaches out to cooperate with the sanctuary; Golden Gate National Recreation Area (GGNRA) and the Point Reyes National Seashore have over 300 FTEs, and the nonprofit for the GGNRA has 150 FTEs as well (Another 300 FTE work for the recreation area at the Presidio, adjacent to San Francisco Bay.)
- close ecological links between parks and sanctuary resources—e.g., elephant seals on Park beaches feed in the sanctuary
- numerous park signs about the Farallones sanctuary, even in locations where the Monterey sanctuary is closer to shore

Relationships between the Farallones and Monterey Bay NMS

- northern portion of the Monterey Bay sanctuary was added by the White House at the last minute, outside the area proposed by NOAA.
- Farallones staff have felt, and some other leading SF officials and citizens still feel, that the northern part of the Monterey Bay sanctuary should be legally transferred to the Farallones sanctuary; sanctuary HQ office resists
- regulations and regulatory policies of the Farallones sanctuary are somewhat stricter
- one Farallones visitor center is in a coastal town next to the Monterey sanctuary (the Farallones lies further offshore); visitor center was established at the request of local chamber of commerce

Strategic Questions and Choices

- Should the national sanctuary program invest in a larger budget for the Farallones sanctuary or continue to rely on partnerships with other agencies and organizations?
- Should the national sanctuary program join with the Park Service and others in investing in a marine education center in San Francisco?
- What other strategies could the Farallones sanctuary use to make the sanctuary more visible to the public?
- How should tensions between headquarters and field about the independence of the Farallones sanctuary be resolved?
- Should the sanctuary program encourage local efforts to lobby for a larger budget for Farallones and Cordell Bank marine sanctuaries?

Profile: Florida Keys National Marine Sanctuary, June 1999

Summary

Expectations are higher for the Florida Keys National Marine Sanctuary than perhaps for any other sanctuary. The grounding of three large ships on coral reefs in 1989, combined with the threat of oil and gas leasing, sparked national interest and led to creation of the sanctuary. But quickly the proponents of the sanctuary persuaded Congress to address far tougher issues.

Virtually everyone in the Keys agrees that conditions at the coral reefs six to eight miles offshore have gotten steadily worse over the years. There are fewer fish, more diseases in the coral, and fewer days of crystal clear water. The sanctuary's management plan promises to take steps to protect the reefs as well as sea grasses and other key features of the marine environment.

To this ambitious end, the sanctuary has made several commitments, including "zoning"—setting aside areas where no fishing and in some cases few other activities will be permitted; instituted "integrated coastal management"—assuring that a wide variety of federal, state, and local agencies work together harmoniously and effectively; and improved water quality by working with EPA and the state to assure adequate treatment for the sewage which flows from one-third of the homes in the Keys into shallow cesspits and septic systems and then quickly into canals and near-shore waters.

And the sanctuary has committed itself to accomplishing these tasks by working collaboratively with state and local officials and the public in a county with a long tradition of individualism, stubborn defiance of outside authority, and a certain amount of political corruption.

It took six years for the sanctuary to produce a final management plan. When it was done, 55 percent of local voters voted in an advisory referendum to "Say No to NOAA" by opposing the creation of the Florida Keys sanctuary. Since 65 percent of the sanctuary is in state waters, the state had to approve the management plan. The governor and cabinet did vote 7-0 to approve the plan. To win their support, NOAA agreed to allow further state reviews every five years and to accept a state employee as an "equal partner" with the NOAA sanctuary superintendent on management of both federal and state waters.

The questions now facing the sanctuary are: Can it deliver what it has promised? Will it win public acceptance in Keys? And will the governor and other top state officials support the sanctuary in 2002, when the sanctuary plan must be updated and approved again?

The sanctuary staff is working hard to turn the corner, moving beyond the six years of planning and controversy (which everyone agrees was too long) into a phase of focusing on action. There are already some

promising results. The sanctuary has prohibited fishing in 19 zones, including much of the coral reef and a larger ecological management area. The zones are marked with yellow buoys, and fishermen seem to be staying away. NOAA designed an ambitious monitoring plan which will involve scientists, volunteers, and commercial fishermen. Already, anecdotal evidence suggests that there are more fish and more species in the no-take zones.

Also, only weeks after the state agreed to the management plan, three ships ran aground on the reef, reminding everyone of one reason for creating the sanctuary. Soon after, when dragging anchors of several large ships destroyed deep coral formations, NOAA and the governor moved quickly to prohibit anchoring in such areas. The fines on these violations will support restoration of the coral and well as installation of new navigational aids to warn ships to stay off the reefs.

Even with these initial successes and more staff and funding than other sanctuaries, the work ahead is daunting. For example, the only active enforcement of sanctuary regulations in its 3,674-square nautical miles is done by six members of the Florida Marine Patrol who work on contract for NOAA. The Patrol has other officers on the water, but they focus on enforcing other rules. To supplement the six, the sanctuary contracts with nonprofits to provide trained volunteers which use federal boats to patrol and offer information about rules – but not to enforce. Perhaps this presence will deter most violators, but there are skeptics.

The sanctuary is also trying to make its presence more visible to residents and tourists. For six years, most of the sanctuary's outreach focused on the management plan. Today one can drive the length of the Keys without learning that the beautiful waters on every side are in a national marine sanctuary. Signs announcing the sanctuary are few and far between, and brochures in shops are often missing or lost among the piles of other information for tourists. The sanctuary offices are out of the way and have no displays for tourists. The sanctuary does contract with several nonprofits for public education, especially for public schools and local residents, but much remains to be done.

Improving water quality will also be a challenge. EPA provided several million dollars for research on water

quality both at the reefs and in Florida Bay north of the Keys, but still there is no scientific consensus about why the reef is deteriorating. The causes could include inadequate sewage treatment on the Keys, changes in the quality and volume of water that moves from central Florida through a large agricultural area and the Everglades into Florida Bay and then out to the reef, pollution in currents from the west coast of Florida or even the mouth of the Mississippi, or changes in large weather systems and ocean currents.

Even without complete answers, this research is starting to drive decisions about land-use and wastewater treatment on the Keys. The state determined that wastewater on the Keys had degraded canals and near-shore waters so much that it required the county to restrict new construction and to require that builders replace a certain number of cesspits and septic systems at existing sites before adding any new sources. The state and EPA also approved a Water Quality Protection Plan for the Keys, as required by legislation creating the sanctuary, that calls for spending \$500 million to upgrade wastewater treatment in the Keys. The county is now preparing a more detailed plan for specific facilities.

Even with these plans and requirements, it not certain that the county will spend money or mandate replacement of inadequate systems. The county has resisted other state and federal requirements for decades. (For example, for 20 years the Federal Emergency Management Administration has threatened to cancel all flood insurance in the Keys if the county will not enforce requirements that houses be built on stilts to avoid hurricane damage.)

Meanwhile, to the immediate north of the sanctuary, the Army Corps of Engineers has prepared a draft plan for a \$7.3 billion for restoration of water quality and water flows in South Florida and the Everglades. Staff at NOAA headquarters and in the sanctuary have invested a great deal of time in extensive interagency coordination for the South Florida ecosystem, but the draft plan does not fully address the causes of problems at the reef, and it is not likely that any of the \$7.3 billion will find its way to the Keys.

In short: lots of planning about water quality, but little action yet.

Another major area of uncertainty is the sanctuary's relationship with the state, the county, and the public. On the surface things are calm. Several of the leaders of the "Conch Coalition" opposition to the sanctuary have dropped out of public life. The sanctuary has begun planning another large "no-take" ecological reserve, and there have been no angry public meetings or protests this time. Sanctuary staff and journalists report that many citizens are saying the fears of a NOAA takeover were grossly exaggerated.

On the other hand, after two years the sanctuary has not finalized the agreements with state agencies that NOAA promised to win approval by the governor and Cabinet. County officials refused to sign an agreement with the sanctuary, saying that it did not answer all of their questions and concerns.

The sanctuary advisory council played an important role in the planning process. When there was widespread criticism of the draft, the council played the central role in negotiating changes in the management plan. After approval of the plan, the council's term expired. The new council includes several skeptics and open opponents, and it has not found a comfortable role in dealing with on-going management.

The Florida Keys National Marine Sanctuary has accomplished a great deal and defused at least some of the fears that its opponents and NOAA's own missteps had created during the long planning process. It has also begun to ratchet down the high expectations that the agency and its supporters had had at the start of the planning process. But the management plan that it took so long to write was not really a strategic plan; it did not set priorities or define a clear approach to handling the sanctuary's many responsibilities.

Getting things done is always tougher than creating a vision and writing a plan. By the deadline for review of the management plan, there should be a strong record of accomplishments as well as a much clearer understanding of what roles the sanctuary can actually play in saving the reef, improving water quality, improving fisheries management, and restoring the South Florida ecosystem.

The Site

The sanctuary

- 3,674 square miles
- 220-miles long, 20-miles wide
- extends the full length of the 126 miles of the Florida Keys, including 1,700 small islands

Marine resources

- ocean currents
 - at the borderline between the tropics and the temperate zone; supports a diverse biota characteristic of both climatic areas.
 - fast-moving Florida Current flows north from the Caribbean with warmer water that carries larvae of several species to their northern limit and allows conditions for extensive coral reef growth.
- coral reefs, the most extensive living coral reef system in North American waters; third largest system in the world
- seagrass
 - seagrass beds cover 2,200 square miles
 - provides critical habitat for a variety of organisms
 - functions to anchor sediments and minimize turbidity
 - maintains oxygen levels in the water
- fishing grounds
 - extremely diverse
 - rich for snapper, grouper, mackerel, spiny lobster, stone crab, and pink shrimp
- many threatened or endangered species—four species of fish, four invertebrates, 15 species of birds, 13 species of mammals, dozens of species of plants

Environmental threats

- rapid growth of population and human activity
 - 82,000 full-time residents
 - 2.5 million tourists—\$ 2.1 billion tourism economy
 - multi-million dollar commercial fishing industry; lands nearly 20 million pounds of seafood and marine products annually
 - residential and commercial development causes clearing of wetlands and dredge-and-fill activities; state-approved county land-use plans restrict development to 255 dwelling units per year

- boating and ships
 - greater use of personal watercraft in the back country disturbs wildlife nesting and feeding areas
 - commercial, research, and recreational vessel groundings have damaged thousands of acres of corals and seagrass beds
 - boat propeller destroy seagrass root systems in shallow waters (“prop-scarring”)
 - in 1989 three freighters ran aground on the reefs within 17 days in October and November
- Threats to coral reefs
 - In the 1970s the visibility in the waters around the reef was usually 100 feet or more; now visibility is only 50 feet.
 - Since the early 1980s, reefs have experienced massive bleaching events, disease outbreaks such as black band and yellow band disease, and degradation from increased visitation and hundreds of vessel groundings
 - damage by physical contact from large numbers of recreational divers
 - nutrient-rich and silty water periodically flows from Florida Bay between the Keys to the reefs
 - effects on coral reefs of sewage disposal, near-shore pollution, and flows from Florida Bay are disputed and highly controversial
 - natural climatic trends, global climate change and other factors probably also contribute to decline of the reefs
- Near-shore water quality
 - near-shore waters in many areas do not meet water quality standards; algae blooms likely caused by nutrient loading
 - no adequate stormwater management system
 - highly porous limestone with little soil substrate makes the islands unsuitable for untreated sewage disposal
 - 670 injection wells and approximately 25,000 septic tanks and cesspits provide minimal treatment, contaminate nearshore water
 - nineteen facilities discharge directly into surface waters (industrial and power plants, water treatment facilities)
 - discharges from three municipal sewage plants include nutrients
- Water quality problems in Florida Bay
 - starting in the early twentieth century, the federal government built over 1,000 miles of canals in South Florida to drain large areas for farming and to prevent floods.
 - canals reduced the amount of freshwater draining into the Florida Bay and changed the timing of flows; linked to the decline of shrimp, spiny lobsters, mangroves, sea grass, and sponges
 - lack of strong hurricanes in recent years may affect the healthy functioning of the ecosystem; storms may flush out accumulated sediments
- treasure salvaging
 - once a lucrative industry, now a celebrated aspect of Keys culture
 - only 140-150 persons participating in activities during the peak of the treasure salvage industry in the 1980s
 - in 1992 a treasure-hunting salvor blew holes the size of buses in the sandy seabed in the Keys looking for sunken Spanish ships; received a \$600,000 fine from the courts

Resources and Authorities

Mandate and purposes

- established by Congress in November 1990 after groundings of three large ships on reefs
- scope of legislation:
 - includes all waters around the Keys, not just the coral reefs
 - mandate for sanctuary advisory council
 - mandate to consider temporal and geographical zoning to ensure protection of sanctuary resources
 - \$9 million authorized (\$5 million appropriated) to EPA to develop a comprehensive water quality protection program

Resources

- annual budget: \$2,544,171 (FY1999)
- 33 FTE; 6 Florida marine contract patrol officers on staff
- 20 boats

Sanctuary Advisory Council

- In 1991-1993 Core Group (an interagency team) worked to prepare management plan.
 - eight people on staff
 - met every six weeks between 1991-1993 at NOAA headquarters close to technical support
 - in February 1992, solicited suggestions in a public session in the Keys
 - highly structured; work was not in open, free-ranging discussion; had numerous forms and exercises in order to identify issues, management strategies, and alternative approaches
- SAC holds first meeting in 2/92, six months after Core Group had begun its work
- represented most of the groups with specific interests in management of coastal waters and included several people who were well-connected politically
 - governor's office involved in the selection of the advisory council
 - representatives of each of the major user groups in the Keys (commercial fishermen, charter boat operators, sport fishermen and guides, dive shop operators, tropical fish collectors, developers, scientists), the governor's office and the county commissioners, and each of the major environmental groups active in the Keys.

Original Expectations for the Sanctuary

Creation of two small sanctuaries in the Keys

- Key Largo Sanctuary
 - created by Congress in 1975 after a federal court made clear that the reefs in the John Pennekamp State Park were not in state waters
 - state and local residents supported creation of federal sanctuary adjacent to the Park
 - state officials working for the park continued to manage the reefs
 - sanctuary employees invented mooring buoys for boats visiting the reefs; started routine patrols on the reefs

- Looe Key Sanctuary
 - established as a federal-state joint venture
 - includes small but particularly impressive reef in federal waters about two-thirds of the way from Key Largo to Key West
 - some opposition to its creation; first manager had a short and controversial term of office
 - second manager developed good relations between sanctuary and scientists, environmentalists, the public school, dive shops, and local residents.

State-county conflict over land use

- all of the Keys lie within Monroe County
 - county government is the strongest unit of local government
 - only one city (Key West, 25,000) and two small municipalities within the county
- Keys declared an "Area of Critical State Concern" in the mid-1970s, under new state land-use planning legislation
 - county must prepare comprehensive land-use plans and win approval from State Department of Community Affairs
 - strong resistance to state oversight in the 1970s and 1980s
 - rapid development in the Keys in the 1980s after building of new bridges and facilities for drinking water and cable television, plus increased spraying for mosquitos
 - 1986: "Concrete Coalition" opposing state involvement in control of the board of county commissioners
 - 1990: new majority elected, more supportive of environmental protection
 - 1997: state-approved county land-use plan restricts development to 255 dwelling units per acre per year, requires replacement of cesspits and septic systems

Environmentalists organize

- environmental community in Keys grew rapidly in the late 1980s
 - local residents organized groups to protect reefs
 - national environmental groups open offices in the Keys with support from national foundations

- Coral Reef Coalition, uniting local and national groups in 1989, works to create sanctuary

Conch Coalition

- treasure salvors and commercial fishermen unite in 1992: “Say No to NOAA”
- coalition forges loose links to national property rights organizations
- public rallies, signs, publicity stunts, letter-writing and hanging in effigy of the sanctuary manager

Links to Restoration of the South Florida Ecosystem

- 1993: federal government makes major commitment to restoring the Everglades
- extensive structure of federal-state committees to plan restoration; sanctuary manager chairs key committee for two years
- 1998: Army Corps of Engineers proposes \$7.3 billion restoration effort; scope does not include treatment of stormwater and sewage in the Keys

Achievements

Planning process

- design of the process
 - core group of state and federal agencies prepares the plan, meeting often outside the Keys
 - planning process was an effort in integrated coastal management—describing in detail the responsibilities of all agencies and availability of resources
 - sanctuary advisory council forms after the core group planning begins
 - NOAA consults periodically with SAC on key decisions—e.g., boundaries of proposed small no-fishing areas
- scope of draft management plan
 - three large no-take areas
 - 17 smaller restricted areas at shallow, heavily used coral reefs: some areas set aside for research, others closed only to spearfishing, shell collecting, tropical fish collection, and fishing
 - extensive plans for zoning, marking channels with buoys, education, research/monitoring, enforcement

- response to draft plan
 - strong opposition from commercial fishermen to no-take zones
 - widespread concern in community about scope of NOAA authority; Appendix K suggests extensive NOAA role in the process of permitting docks, regulating all overflights, etc.
 - SAC criticizes draft but organizes working groups to meet with citizens and votes on specific amendments to the draft to overcome objections
 - NOAA accepts SAC recommendations, including dropping one large no-take area and postponing decision on another area

Winning state acceptance

- state approval needed
 - 65 percent of the sanctuary is in state waters
 - regulations cannot take effect in state waters without state approval
- after NOAA publishes the final management plan, the county votes 55 percent-45 percent in an advisory referendum to oppose creation of the Florida Keys sanctuary
- to win state support, NOAA agrees
 - to allow a state review every five years of whether the sanctuary regulations can have effect in state waters
 - to accept a state employee as an “equal partner” with the NOAA sanctuary superintendent on management of both federal and state waters
 - not to promulgate emergency regulations without prior state approval
 - to sign agreements with several state agencies governing decision-making processes
- the governor and cabinet votes 7-0 to approve the plan

Marine reserves

- the first large no-take zone in the sanctuary program
 - initial indications are that fish populations are growing rapidly in the zone. Research is underway.
 - minimal enforcement presence in the no-take zone; apparently little poaching so far, but an uncertain future

- monitoring plan will involve scientists, volunteers, and commercial fishermen
- seventeen other small areas of restrictions on fishing and other activities
 - includes much of the coral reef
 - zones marked with yellow buoys
- June 1999: a working group of local fishermen, environmentalists, and others recommends creation of two additional large no-take zones

Protection of the reefs

- fines on anchoring violations and damage assessments on large ships ran aground support the restoration of damaged coral as well as the installation of new navigational aids to warn ships to stay off the reefs
- slow increase in enforcement of penalties on small boats that run aground
- NOAA and the governor agreed to prohibit anchoring by large ships in an area where anchor dragging had damaged coral

Enforcement

- six Florida Marine Patrol officers enforce sanctuary regulations; other officers are on the water but do not enforce sanctuary rules
- sanctuary contracts with nonprofits to provide trained volunteers; "Team Ocean" uses federal boats to patrol and offer information about sanctuary regulations
- courts upheld a \$600,000 fine on treasure hunters for using boat propellers to blow holes in the sandy seabed in a search for Spanish shipwrecks
- SAC pressures the sanctuary to ban jet-skis in specific areas; sanctuary resists; county passes ordinances which courts reject

Research

- Congress appropriated \$5 million for EPA research on water quality
- multi-faceted research on the effects of the single large "no take"
- visits of NOAA research vessels
- informal coordination, linkage, and encouragement of the extensive research taking place in the Keys

- 63 volunteer divers helped in a survey of conditions of reefs at 23 sites; find that reefs are "much better off than the rest of the world"

Education

- extensive public outreach and publicity through television, radio, and print media, focused on the sanctuary planning process as well as on specific activities
- training workshops and school programs such as the Coral Reef Classroom combine classroom and field activities for eighth-graders and promote the sanctuary's mission of marine preservation
- on-site interpretive tours
- contracts with several nonprofits for public education, especially for public schools and local residents
- more than 11 person-years of volunteer help annually through contracts with nonprofits

Other activities

- sanctuary is trying to make its presence more visible to residents and tourists
 - signs announcing the sanctuary are few and far between
 - brochures in shops are often missing or lost among the piles of other information for tourists
 - two of three sanctuary offices are out of the way and have no displays for tourists
- plans for a visitors' center in Key West

Strategic Questions and Choices

Will NOAA be able to win over the 55 percent of voters who opposed creating a sanctuary?

- In the hot battles before state endorsement of the sanctuary, there was widespread public concern that NOAA might abuse its authorities. There are still bitter feelings, especially among some of the people who were most directly involved in the controversy. But it is becoming clear that most of these fears were grossly exaggerated. Furthermore, many of the most vocal opponents have left the Keys and others have been discredited. And many commercial fishermen now seem ready to accept no-take zones. If the sanctuary's day-to-day

educational, enforcement, and research programs are well-managed, it should be able slowly to win over the vast majority of citizens.

Will the state continue to support the sanctuary?

- It is hard to imagine a future governor asking NOAA to disband the sanctuary. Nonetheless, there is room for improvement in the relationships between the state and the sanctuary. Two years after the governor and cabinet voted to approve the sanctuary, only two of the agreements between state agencies and the sanctuary have been signed, and the county has refused to sign a memorandum of agreement with the sanctuary. There is some continuing feeling that the sanctuary fails to consult adequately with the state.

Will the Sanctuary Advisory Council continue to support the sanctuary strongly?

- The Sanctuary Advisory Council played a key role in getting state support for creating the sanctuary. With the planning process over, the sanctuary must now find other useful ways to tap the energies and skills of SAC members.

Will the marine reserves work?

- Many people in the Keys are now assuming the first no-take zone is a dramatic success. It is hoped that research will bear this out. When fish populations rise, the sanctuary may face increased poaching as well as pressure from commercial fishermen to allow fishing to resume in the zone.

Will the county and state follow through on their plans for eliminating cesspits and septic systems?

- Treating sewage and stormwater runoff in the Keys will be expensive—perhaps over \$700 million. In early 2000, a consultant will submit proposals about how to finance these improvements. The county has fought off many other federal and state regulatory requirements, such as the requirement to build homes high enough to survive hurricane flooding. Will the county have the political will to tax its poorer and retired residents enough to pay a substantial share of the cost for better water quality? If not, who will pay?

Delivering results

- From 1990 until 1997, the sanctuary put most of its energies into an exhausting and overly lengthy planning process. The sanctuary has begun to make the transition from planning to showing results. Fulfilling the many requirements in the management plan will be a challenge. There is still room for improvement in enforcement, making the sanctuary visible to the public, and perhaps improvement in other programs as well.

Will the sanctuary be able to show that it has helped protect the reefs?

- Most people in the Keys, and perhaps elsewhere, expect that the sanctuary will be able to slow or even reverse the decline of the reefs. The expectation may be unwarranted; there are many stresses on the reefs, and some factors—such as global climate change and natural cycles—are far beyond the ability of the sanctuary to control. However, in the long run, the sanctuary will have to show that it provided significant protection for the reefs.

Profile: Flower Garden Banks National Marine Sanctuary, June 1999

Summary

The Flower Garden Banks National Marine Sanctuary encompasses about 500 acres of submerged coral reefs, located 105 miles offshore of the Texas-Louisiana coast. The reefs lie at the top of steep rock mounds pushed 400 feet up from the muddy sea floor by salt domes. There is a producing oil and gas platform immediately within the boundary of the sanctuary and five others, along with 100 miles of pipeline, within four miles. Yet the reefs are in excellent condition, as healthy as 30 years ago before oil and gas development.

The biggest threat to the reefs is dragging anchors from fishing boats, service boats for the oil industry, or tankers and cargo ships. The major shipping lane to the Houston area passes within four miles of the reefs. The sanctuary prohibits anchoring, but since the sanctuary is so far from shore, only the 150 dive boats that visit the reefs each summer and the workers

on the closest oil rig are in a position to warn ships against anchoring and report violations.

The sanctuary is at a time of transition in 1999. The federal Minerals Management Service, which regulates offshore oil and gas development, spent millions on research at the Flower Gardens, but now only small monitoring studies are necessary. There has been a strong connection between the sanctuary and Texas A&M University, whose professors, students, and former students did much of the research. But the Texas A&M connection is waning; key professors have left, students are interested in other sites, and in 1998 the first sanctuary manager, who was an A&M graduate and professor, left for a job at the national headquarters of the sanctuary program.

The incoming sanctuary manager must chart a new course. He may move the sanctuary office from the Texas A&M campus, 145-miles inland, to Houston to be closer to the diving community and to the oil and gas industry. In this location, the office might develop a volunteer program and try to expand its small but well-regarded educational and outreach activities.

The sanctuary might also reorient its research activities to focus less on documenting the site and monitoring coral health. It might encourage research on why these isolated reefs, which lie at the northern edge of waters warm enough for coral, are in such better condition than reefs in the Florida Keys and the Caribbean 400 miles or more to the south. The sanctuary has a tiny staff and virtually no funds for research. It has worked with a nonprofit organization to raise funds for education and research from dive clubs and the oil and gas industry.

Eventually the sanctuary might expand to additional sites. Congress has already approved the inclusion of another high spot 40 miles to the west, where there is much less coral but at least as many fish. Most of the other high spots on the continental shelf are muddy hills with no coral, but one or two might be worth attention.

Another possibility would be to eliminate fishing in the sanctuary. There is some commercial fishing and more recreational fishing in the sanctuary in deeper areas off the coral reefs. At this point there is limited information about fishing pressure at the sanctuary, but clearly stocks of snapper and grouper are under pressure in the northern Gulf.

The Flower Gardens sanctuary will always be a small operation, but it is a gem and perhaps an important piece in the larger puzzle of effective marine management in the Gulf.

The Site

The sanctuary

- 56 square miles
- two units at the Flower Gardens; 8 miles apart both about 21 square miles
- much smaller unit at Stetson Banks, 40 miles west, boundaries yet to be decided will be less than one square mile
- Flower Gardens banks are 105 miles offshore, due south of the Texas–Louisiana border
- steep rock outcroppings on top of salt domes, rising about 400 feet from the shelf to within 50-70 feet of the surface
- Flower Gardens is at the edge of the continental shelf; Stetson Banks is further inshore

Surroundings

- on a wide flat muddy bottom
- in an area of extensive active oil and gas development and production—about 4000 functioning platforms in the northern Gulf of Mexico
- oil production offshore as far as the Flower Gardens began in the 1970s; these areas still being developed; substantial new development now occurring off the continental shelf in much deeper waters
- Texas–Louisiana coast is mostly wetlands and forests, not much developed

Marine resources

- Flower Gardens
 - coral
 - steep rock covered with rich coral reefs
 - 4 peaks totaling 500 acres of coral reef
 - big coral heads; no branching coral
 - less diverse coral cover than in Florida Keys or Caribbean
 - an isolated “island” of coral habitat, further north than any other coral reefs in the United States; water too cold for coral only a short distance away
 - dramatic mass spawning of coral for eight consecutive days in August–September

- fish, rays, turtles
 - rich fishing grounds for snapper and grouper
 - plentiful tropical reef fish
 - schools of hammerhead sharks in the winter; reasons unknown
 - often a large number of 6-8 foot manta rays
 - some loggerhead turtles (endangered) and dolphins
- Brine seeps
 - seeps of sulfurous brine, as sea water dissolves buried salt deposits
 - 90- by 60-foot “lake” of brine 10-inches deep, emptying into a “waterfall,” canyon, stream where brine mixes with sea water
 - only known brine seeps on a continental shelf
 - unusual sulfur-eating bacteria live in the inch where brine and sea water meet; also found in thermal vents at mid-ocean ridges where tectonic plates meet
- Stetson Bank
 - different from Flower Gardens: steep rock face, large boulders, no coral heads, much less coral
 - numerous tropical fish—perhaps more than at Flower Gardens
- oil spill on surface might have little effect on the coral reef since they are submerged 50 feet or more
- break in a pipeline, or rupture by a dragging anchor, could cause serious damage
- over-fishing
 - no solid data on commercial fishing use; 15-20 boats based in west Florida may visit occasionally
 - popular for recreational fishing; perhaps peaking at 10 boats on a summer weekend; probably focuses on deeper areas adjacent to the coral reefs
 - total fish populations seem stable and healthy; little solid data
 - past fishing may have reduced the number of large grouper and snapper near tops of reefs; anecdotal data only
- anchor dragging
 - 1984 incident dug trenches 10 feet by 100 feet and 5 feet by 400 feet, overturning and breaking over 200 coral heads
 - major shipping fairway to Galveston and Houston passes four miles from Flower Gardens; estimated three to five supertankers tankers and cargo vessels weekly, plus supply vessels for oil rigs and fishing boats
 - ships often leave fairway, may pass through sanctuary
 - foreign ships more likely to anchor within sanctuary, waiting for berths or cleaning ballast tanks
 - sanctuary not on IMO maps
 - seismic ships and fishing boats often pass over reefs; sometimes hit and detach anchoring buoys
 - three known cases of anchoring in 1994-98: one fishing boat, one cargo ship, one oceangoing tug

Oil and gas development

- seven known fields within four miles of the Flower Gardens
- 10 producing platforms within four miles, mostly producing gas
- one platform in the sanctuary at the edge, one mile from the reef
- 20 pipelines, totaling 100 miles within four miles
- recent leases and active exploring likely to lead to additional development within four miles

Environmental threats

- oil production
 - no known impacts of oil exploration, development, production, or spills on marine life at Flower Gardens
 - major environmental impacts on coastal areas
 - 20 years of coral monitoring have shown consistent high quality, perhaps improved conditions

- no significant water pollution
 - generally excellent visibility—up to 100 feet
 - algae blooms in July cause discoloration
 - occasional lenses of pollutants on the surface of turbid, less-saline water from rivers
 - circulation in northern Gulf is generally from Texas to Louisiana; hence Mississippi River “dead zone” does not impact the sanctuary

Resources and Authorities**Purposes**

- MMS has extensive regulations prohibiting oil and gas development on the coral reefs and regulating development within four miles
- sanctuary was created to supplement MMS authority—primarily to forbid anchoring that is not associated with oil and gas development and thus unregulated by MMS

Regulations

- anchoring
 - no anchoring in areas less than 100-feet deep
 - no anchoring in shallow areas if buoy is available
 - must use soft fibre line, not chain to secure anchor
- dredging, discharging materials, deposits on seafloor, removing shells or coral or other resources life are prohibited
- fishing
 - spearfishing illegal
 - only hook-and-line fishing is allowed; no long-lines, trawls, or traps
- preexisting oil and gas leases remain valid; only one within the sanctuary, one mile from the reef and at the edge adjacent to the MMS no-activity area

Program Resources

- annual budget: \$ 357,663 (FY1999)
- two NOAA FTE and one contract FTE
- office at Texas A&M University in Sea Grant offices, over 100 miles from the coast
- may move office to a coastal location south of Houston
- no boat; hire charter boats for cruises; 19 days in FY98, 6 days in FY 99
- no sanctuary advisory council
- Gulf of Mexico Foundation's Flower Gardens Fund
 - foundation was created by the citizens advisory committee of the EPA Gulf of Mexico program
 - raises money from the oil and dive industries and other sources for education and research in the Flower Gardens; staffed by a professor/consultant at Texas A&M University at Corpus Christi's Coastal Studies program
 - funding Goal: \$50,000 (FY1999)

Original Expectations and Evolution of the Sanctuary**Role of Texas A&M professors and students**

- active interest by two Texas A&M professors and their students in the Banks since the early 1970s
- first thorough documentation of coral reefs in 1971 by A&M doctoral student
- state legislature funds first larger research project, staffed by A&M experts
- MMS funds extensive studies in preparation for oil and gas leasing near the banks; much work done at A&M or by consultants who hire former A&M students
- about 20 former A&M students still working for MMS or oil companies
- first sanctuary manager—1992–98—was former student and later the head of A&M Flower Garden research efforts

Early efforts to regulate activities on Flower Gardens

- MMS predecessor agency establishes “no activity” area at the reefs and four-mile special area for oil and gas operations in the 1970s
- industry efforts to encourage no anchoring on the banks
- MMS forbids anchoring, but lacks jurisdiction over boats not linked to oil and gas

Designation by Congress

- In 1973 and 1979, NOAA proposes to create sanctuary, withdraws proposal in the face of opposition from the oil and gas industry.
- Divers and dive shops actively support designation as do Houston area environmental groups.
- In 1984, NOAA proposes again to create sanctuary, but moves slowly.
- In 1989, draft environmental impact statement and management plan published.
- In 1992, Flower Garden Banks is designated a sanctuary.
- In 1996, Congress directs NOAA to expand to include Stetson Banks; no boundaries established or formal designation yet.

Current use

- estimated 3,000 divers annually in 150 boats
 - takes eight hours to reach the Flower Gardens; trips are usually two full days or more
 - as many as 50 percent of trips canceled because of sea conditions or weather
 - most diving in summer
 - currents and depths make site inappropriate for beginners
- unknown amount of recreational and commercial fishing—presumably significant but not intense
- active oil and gas operations, including seismic surveys

Current Management Activities

Education

- annual three-day training and dive cruise to Flower Garden Banks for 17 teachers
 - chosen competitively
 - financed by oil industry donations to the Gulf of Mexico Foundation
- annual classes for seventh-graders at Houston Museum of Natural Science
 - three 45-minute classes each day in February
 - reaches one-third of all Houston public school seventh-graders
- 15–20 classroom presentations on Flower Gardens annually
- now participating in development of curriculum for Texas state education agency
- no formal volunteer program; occasional volunteer help with seventh-graders and other activities

Public outreach

- annual Houston dive show
- science teachers conferences
- annual event at Houston Museum of Natural Science
- 10–15 presentations to dive clubs annually
- brochures
- exhibits and kiosks
 - Houston Museum of Natural Science
 - county park near coast
 - kiosk at Houston airport
 - observation tank at Texas state aquarium in Corpus Christi at university

- annual VIP dive cruise for photographers, agency personnel, industry representatives
- TV special by local station in Beaumont TX
- occasional features on local TV and articles in local press

Research

- contribute \$45,000 annually since 1992, matched by MMS, for monitoring coral health
 - photos at two 100-by-100-foot sites at Flower Gardens
 - plans to add monitoring of water quality
 - no monitoring of fish or invertebrate populations
- former sanctuary manager was on faculty at A&M, supervised several graduate students, encouraged research at Flower Gardens
- help organize dive cruises (five in 1998, two in 1999)
- raise funds from diving clubs and dive shops to finance boat time for graduate students and professors
- help Gulf of Mexico Foundation's Flower Gardens Fund obtain funds for research from oil and dive industries
- platform within the sanctuary allowed researchers to stay overnight, store equipment, and conduct training until recent change in ownership and level of activity on the platform

Regulation and enforcement

- enforcement
 - negligible enforcement presence due to great distance from shore
 - dive boats and workers on nearby oil rig warn boats against anchoring, sometimes report violations to sanctuary staff
 - no prosecutions yet; difficult to gather evidence that could prove responsibility for damage
- 12 anchoring buoys at Flower Gardens and 3 at Stetson Banks
 - installed by dive industry in 1980s
 - sanctuary contract with major dive boat operator for maintenance
 - sometimes used by fishing boats
- 1998: sanctuary worked with local firm and public schools to raise funds to install radar-reflecting buoys at Flower Gardens

- pipelines
 - informal MMS pressure and public outcry deter oil company from locating a pipeline between two Flower Garden sites
 - sanctuary successfully petitions MMS to require tighter controls on pipeline safety within four miles

Management plan

- management plan published in 1991
- new plan scheduled for 2002

Strategic Questions and Choices

Has the sanctuary used its limited funds for education and outreach to maximum effect? Which of many possible audiences need more attention?

- leveraging other resources
 - volunteers
 - Perhaps as many as 100 divers in the Houston area might be interested in helping with education, outreach, and research.
 - Currently the sanctuary lacks time and space for a volunteer program.
 - Co-locating with another organization in Houston might make it easier to recruit and manage volunteers.
 - funding
 - The Gulf of Mexico Foundation, dive clubs, and the Houston Museum of Natural History already help raise funds for sanctuary-related outreach and education.
- taking new messages to new audiences
 - encouraging workers at new rigs near the sanctuary to be mindful of protecting the reef
 - public education via television
 - divers at the sanctuary
 - dive shops would welcome more appealing information about the sanctuary to carry aboard charter boats
 - sanctuary could subsidize naturalists on dive boats
 - interest in diving the Flower Garden Banks will be limited because Mexican and Caribbean dive sites are no more expensive, less likely to be canceled because of sea conditions, and less demanding technically

- appealing to a new generation of well-off Houston residents, which may be more interested in outdoor recreation and environmental issues

What are the new research issues and new research cadre to replace the old Texas A&M connection?

- current challenges
 - past research at the sanctuary has focused on documenting this unique site and monitoring coral health
 - no sustained intensive research program as at other field stations, that use the site as a natural laboratory
 - decline of major MMS (and possible oil industry) funding
 - little interest by other NOAA researchers or NSF-funded researchers in the sanctuary
- possible new issues
 - coral
 - why coral so much healthier at Flower Gardens than in the Keys and Caribbean
 - question of Flower Garden Banks providing larvae to other sites; depending on other sites
 - DNA tracking of coral just beginning
 - fishing
 - current fishing pressures at the sanctuary
 - health of snapper stocks
 - potential of ban on fishing to increase populations at the sanctuary and beyond
 - reason why hammerhead sharks school at the sanctuary
 - monitoring of physical and chemical conditions at the sanctuary
 - mass spawning
 - what triggers it, exactly
 - why is it more synchronous than at other sites
 - brine seeps
 - reason salt formations move, crack, dissolve, and seep
 - how deeply below the seep do sulfur-eating bacteria live?
 - similarity of the bacteria to those found at mid-ocean thermal vents
- possible loss of the platform
 - that is close to the reef

- substantial interest in maintaining the platform for research and education
- liability issues and cost of maintenance (about \$300,000 annually) might be unmanageable

Management issues

- marine reserves
 - potential of a no-take zone at the sanctuary to increase stocks locally and beyond
 - willingness of recreational and commercial fishers to discuss a no-take zone
- other resources worth protecting at other high spots on the shelf
- capacity to manage additional sites effectively
- potential oil and gas industry resistance to creating additional sites, for fear of getting boxed in

Profile: Gray's Reef National Marine Sanctuary, June 1999

Summary

Over the past decade the Grays' Reef National Marine Sanctuary has been operating well-regarded educational programs for schoolchildren and building its capacity for more visible and extensive activities. It will expand its research activities, starting in the summer of 1999, with a newly refitted 65-foot boat. It will reach out to community leaders in the fall of 1999 as it forms sanctuary advisory council and begins updating its 17-year-old management plan.

The sanctuary has not been controversial. It is a small-23-square-mile site, 20 miles off the Georgia Coast, that faces no serious environmental threats and is invisible to everyone except divers, recreational fishermen, marine educators and marine scientists. But the sanctuary has an environmental importance disproportionate to its small size. It is the largest example near the 90-mile coast of Georgia of "live bottom" ledges and ridges, which rise from a few inches to six feet high and support rich colonies of plants, fish, and other marine life. Gray's Reef and the other widely scattered live bottoms are oases in a desert of flat, sandy sea bottom.

The state of Georgia nominated the reef as a sanctuary in 1979, hoping to attract more resources for research at this highly productive fishing grounds. President Jimmy Carter, who knew marine scientists working in the area and visited the coast many times, created the sanctuary in his last days in office as a way to protect a representative habitat.

For years management of the sanctuary was low-key. Initially, sanctuary regulations provided special protection to the reef, but federal fishing regulations became tighter over the years, and now fishing regulations at the reef are no tougher than elsewhere. State agencies managed the sanctuary for 10 years and conducted useful research and educational programs there.

NOAA installed an on-site manager in 1990 and has been adding to the sanctuary's staff and budget slowly since then. Now the program is poised for a big step forward. Revising the management plan will raise the sanctuary's visibility and may be controversial. Working in tandem with the South Atlantic Fisheries Management Council, the sanctuary may propose a no-take marine reserve at Gray's Reef, pushing out the recreational fishermen who have prized it for many years.

The next two years will test whether the sanctuary's program has built the organizational capacity needed to effectively manage its own resources as well as a more active, more visible force in marine and environment issues along the Georgia coast.

The Site

The sanctuary

- 23 square miles
- 20 miles off the coast
- 50–70 feet deep
- "an oasis in an otherwise barren, sandy sea floor"
 - hard ledges as tall as 6 feet and as long as 100 feet, with some overhangs
 - "live bottom"—extensive vegetation and many fish along the higher ledges
- the largest live bottom off the Georgia coast relatively close to shore
- almost two hours by boat from the two nearest cities: Savannah and Brunswick

Inland

- 90 miles of relatively undeveloped Georgia coast
 - extensive undeveloped sea marshes
 - large islands in public ownership as wildlife refuges or national seashore
 - large private islands with no public access operated as reserves or serve as locations for exclusive homes
 - expensive, low-density resort development on Jekyll and St. Simon islands 40 miles southwest of the sanctuary
 - dense resort development on Tybee Island near Savannah, 40 miles northwest
- inland watersheds
 - extensive holdings by large timber companies
 - comparatively good water quality in the Altamaha River—the largest watershed
 - increasing development for retirement and tourism
- urban areas
 - Savannah and Brunswick, 40 miles northwest and southwest, respectively
 - small cities with large chemical and paper/pulp mills
 - significant tourism and retirement populations
 - small fishing/retirement communities along the coast

Marine resource

- typical of widely scattered live bottom reefs offshore of the Carolinas and Georgia
 - patchy reefs, from six inches to six feet high, covering 24 percent of the sanctuary
 - reefs are sedimentary rock outcrops—not coral
 - higher reefs are densely covered with plants and some soft coral
 - comparatively rich diversity of resident and seasonal fish on and near the reefs
 - some tropical reef fish present during the summer
 - extensive flat, barren sand between the reefs
- fish
 - excellent fishing grounds: black sea bass, grouper, snapper, mackerel and in summer, king mackerel, bluefish, bonito, wahoo, barracuda

- no significant commercial fishing—large shrimp and shellfish fisheries near shore and in estuaries
- turtles
 - three endangered and two threatened species
 - threatened loggerheads, the most common at the site: females often rest under overhangs between sessions of laying eggs on the beach, movements of males are unknown
- whales
 - endangered right whales visit in the winter to calve along the shelf; infrequent at the sanctuary, not attracted by live bottom because they do not eat while off Georgia
 - numerous other whales and dolphins on the shelf
- archaeology
 - the area was above water during the last ice age; fossils from mastodons and other terrestrial life at the site
 - no evidence of human settlements; may have been submerged before humans arrived

Environmental threats

- few serious environmental threats today
- widespread desire to preserve current conditions
- some signs of damage from dragging anchors
- current concern that one fisherman may be using spearguns illegally and greatly exceeding legal limits at various locations, possibly including the sanctuary
- gradually increasing pressure from recreational fishermen and divers; some anecdotal reports of reduced fish populations on the reef; clear evidence of overfishing of some species of snapper and grouper on the continental shelf off the Carolinas, Georgia, and Florida

Resources and Authorities

Authorities

- fishing regulations since 1983 for all federal waters of Georgia: no wire traps, no powerhead spearfishing, no roller trawling
- no regulation of anchoring at the sanctuary; considered but rejected this in 1983

Resources

- annual budget: \$509,000 (FY99)
- two federal FTE plus four FTE through contract with state university research lab
 - manager, executive officer, education, data/research, planning/outreach, boat captain and equipment manager
 - contract staff work in sanctuary office as integral members of the staff
- 65-foot boat obtained from US Navy, refitted with informal assistance from state university lab for marine research, newly available in summer 1999
- two older, smaller boats, faster but not equipped for overnight stay at the sanctuary

Sanctuary Advisory Council (SAC)

- 1983 management plan called for two steering committees; not active for many years
- SAC to be formed in 1999 to guide revision of management plan and long-term management
- new staff hired for planning: well-known, respected local environmental advocate

Original Expectations and Evolution of the Sanctuary

Original expectations

- in response to a solicitation by NOAA, the Georgia Department of Natural Resources nominated the site in 1979, hoping for new resources for research about the reef
- sanctuary was created to represent live bottom habitat, not because of spectacular beauty or serious environmental threats
- no significant opposition to designation
 - limited public interest in the designation
 - some initial concern by fishermen and divers about possible restricted access
 - concerns alleviated by NOAA decisions not to prohibit spearfishing or anchoring
- one of three sanctuaries designated in the closing days of the Carter Administration in 1981
 - President Carter had long time personal interest in a nearby barrier island
 - a former founder of a key Georgia environmental group, working in the White House, shepherded designation of the site

Early management by state agencies

- initially, managed with funds provided to state department of natural resources
 - funded study of how roller-trawls damage reefs; field work outside the sanctuary; results in prohibition of roller trawls by the South Atlantic Fisheries Management Council (University of Georgia had developed roller trawls and had also encouraged commercial fishing at Gray's Reef, with little success)
- late 1980s, management by the University of Georgia marine extension program
 - published posters and brochures
 - supported educational programs for school-children on marine issues, especially about the sanctuary
 - promoted underwater photography at the sanctuary to educate the public about its rich, beautiful resources
- initial state resentment at decline and withdrawal of federal funds is remembered by some

Growth of the sanctuary staff and programs

- 1990: national decision to replace cooperative agreements with on-site federal staff
- initial staffing: manager, and soon thereafter one educational staff
- gradual rise of budget and staff to six FTE in FY99
- refitted separate building for sanctuary HQ
 - co-located on island campus with university extension, research offices and labs, small public aquarium, research vessel docks, and a small TV studio linked to 440 schools and other sites in Georgia

Current uses of the sanctuary

- no hard data on usage; estimated 2,000 fishing boats and 200 divers annually
- commercial fishing
 - little if any commercial fishing at the sanctuary
 - shrimpers, the largest commercial fishing industry, fish inshore, trawl the bottom, avoid reefs for fear of snagging nets
- popular site for recreational fishing
 - most popular, closest-to-shore natural live bottom site

- extensive fishing in the sanctuary especially during organized tournaments, which often target the sanctuary
- state has built 17 artificial reefs for recreational fishing elsewhere—usually closer to shore than the sanctuary—by sinking old ships, tires, hollow concrete “reef balls,” and even 40 old army tanks
- increasing but limited diving
 - reefs in excellent condition; little human impact
 - less than six commercial diving charter companies
 - most divers visit artificial reefs as often as the sanctuary
 - underwater visibility is sometimes minimal
 - often strong bottom currents and reduced visibility; best diving at dead low tide
 - large portion of commercial dive trips cancelled because of weather or poor visibility
 - too deep for snorkeling; not a good site for novice divers
- limited access
 - reefs are not visible from the surface
 - sanctuary has been marked by a buoy for many years, but the largest reefs are almost a mile from the buoy, so boats must search for them

Current Management Activities

Education and public outreach

- educational programs for schoolchildren; curriculum, teaching aids
 - nine modules on whaling, links between rivers and reefs, tour of sanctuary, funded by corporate donations
 - award-winning video on right whales prepared jointly with University of Georgia and Stellwagen Bank National Marine Sanctuary
 - lectures at Marine Extension programs, summer camps
- participation in community events and celebrations
- participation in informal monthly gatherings of environmental educators
- exhibits
 - at aquarium on the campus where the sanctuary office is located

- at marine education center on the beach at Tybee Island
- four other visitors centers and four museums
- volunteers
 - no formal volunteer programs
 - occasional individual volunteers
 - two commercial diving companies participate in Great American Fish Count in 1998, 1999
- NOAA Ocean data buoy at the sanctuary
 - provides information about weather and waves but not sub-surface visibility
 - very popular with divers, fishermen, and other boaters

Research

- key studies completed or under way
 - annual surveys since 1993 of fish assemblages
 - tagging studies of turtles, right whales, fish
 - growth rates at artificial reefs
 - archaeological sites on the sanctuary reefs
 - studies in summer 1999:
 - damage to reefs from anchors
 - comparison of conditions from shore, to sanctuary, to deeper reefs, to the edge of the continental shelf
- knowledge about Gray’s Reef
 - much better studied than other live bottom reefs
 - many questions important for management are still unanswered:
 - extent of live bottom reef off the Georgia coast
 - location of spawning areas for snappers, groupers, and other important fish species
 - whereabouts of male loggerheads
 - amount of fishing and diving occurs at the sanctuary
 - details about long-term trends in conditions at the reefs
 - movement between different live bottom reefs
 - comparisons of artificial and natural reefs
- resources
 - heavy reliance on annual visits of a NOAA research vessel and on in-kind aid to researchers; few funds available for grants to researchers

- close cooperation with Savannah State University, a historically black college with undergraduate marine sciences program
- researchers co-located with sanctuary office have limited interest in sanctuary issues; Skidaway Institute of Oceanography does little biological work generally but does do some biological and geophysical work at the sanctuary; also helps with sanctuary boat and logistics, and handles contracts for sanctuary staff
- comparatively fewer links to University of Georgia researchers; closer relationships with Georgia Southern University undergraduate programs and with South Carolina and NMFS researchers
- new sanctuary research vessel will enable expansion of research efforts, permitting overnight stays at the reef by small groups of scientists

Regulation and enforcement

- very limited enforcement; handled by Coast Guard as part of work in a much larger area
- very limited presence of sanctuary boats in the past, more presence in summer 1999 with new boat and in conjunction with Sustainable Seas expedition
- no serious enforcement problems identified; some concern among divers and others about a spearfisherman who reportedly uses explosive powerheads and greatly exceeds bag limits working in many areas presumably including the sanctuary
- routine overflights by Coast Guard on weekends to monitor use

Management plan

- management plan developed primarily by Georgia Department of Natural Resources, adopted in 1983; promises extensive research and advisory committees
- 1983 plan included extensive research and educational activities; many completed, some not, some in progress
- formal start of preparation of new management plan in fall 1999
- SAC to play a central role in writing new management plan, to be adopted in 2000

Interagency cooperation

- generally good relationships with state and federal agencies, but weaker links to some parts of the university system
- sanctuary organized a council of managers of public and private barrier islands
- sanctuary helps lead informal meetings of marine educators for mutual support and cooperation

Strategic Questions and Choices

Making the most of the opportunity to revise the management plan

- The opportunity
 - making the sanctuary much more visible on the Georgia coast
 - engaging community leaders in thinking about the future of the sanctuary
 - educating the public about marine issues
 - great public awareness that the Georgia coast is much less developed than coasts of adjacent states
 - substantial public sentiment to “do better” than adjacent states
 - far more public awareness of coastal issues—rivers, salt marshes, islands—than of offshore reefs

Key issues

- marine reserves (no-take zones)
 - possible sites
 - deeper reefs may be spawning areas, could be better MPA
 - fishing community may prefer MPAs on new artificial reefs, resist restrictions on fishing at the popular Gray’s Reef site
 - links to the South Atlantic Fishery Management Council
 - council has found several species of snapper and grouper that are over-fished
 - council now considering Marine Reserves, has designated sites in Florida, open to sites in Georgia
 - sanctuary representative sits on the education/outreach subcommittee for the council’s effort
- consideration of other fishing and spear-fishing regulations
- placing mooring buoys on site

- reduce anchor dragging
- increase public visibility and use
- however:
 - increased visitation could damage resources
 - maintenance would be costly
- boundary expansion
 - could expand to highly productive deep reefs—but they are 20 miles from existing sanctuary
 - other less productive, smaller reefs lie closer
 - may be politically difficult to expand boundaries at the same time as establishing no-take zones

Challenges of preparing the management plan

- recruiting capable community leaders to the SAC
- building a good working relationship with the SAC
- linking the sanctuary's planning process effectively with the Fisheries Management Council's process for designating MPAs

Moving to a higher level of performance

- The opportunity
 - additional staff, new offices, and the boat equip the sanctuary with the resources to protect the sanctuary and engage the public more effectively
 - new emphasis on the management plan and expanded research
- The challenges
 - engaging the interest of a wider array of scientists
 - framing research issues that will be of interest both to sanctuary managers and to academic scientists
 - strengthening working partnerships with Georgia marine institutions

The long-term potential of this sanctuary

- The challenges
 - a comparatively small, inaccessible site
 - no current crisis to galvanize public interest
 - well-preserved site but increased use might degrade conditions

Questions for the future

- What potential is there to engage the public and the research community more actively in this site?
- Could Gray's Reef raise its profile by expanding?
- What level of priority should the national program give to this site?

Profile: Hawaiian Islands Humpback Whale National Marine Sanctuary, June 1999

Summary

The Hawaiian Islands National Marine Sanctuary has a tight focus: research and education about the humpback whales and their habitat. It is a test case of what a non-regulatory approach can achieve in partnership with a state government.

Humpback whales are an endangered species, down from a population of perhaps 120,000 worldwide when they were first hunted in 1905 to about 10-12,000 in the 1970s. The major cause for the decline was commercial whaling, which was banned in 1966 and stopped entirely in the 1970s. Since then, the population in the Hawaiian Islands has risen slowly from under 1,000 to somewhere between 3,000 and 4,000.

The whales come to Hawaii for four winter months to mate, give birth, and nurse calves. Both the state and the National Marine Fisheries Service have regulations to protect the whales from being disturbed; they both forbid boats to approach within 100 yards, and the state prohibits the use of jet skis and other "thrill craft" in the shallow waters between Maui and nearby islands when the whales are present.

There are other threats to the whales in Hawaii, but none appear to harm enough whales or disrupt whale behavior so severely as to slow recovery of the population. Water quality is generally quite good, and the whales do not eat while they are in Hawaii, so they do not ingest pollutants. Speeding boats occasionally hit whales, some whales are caught in nets or fishing lines, and noise in the ocean may disrupt communication among the whales. As human use of the waters and the population of humpback whales increases, these factors may become more severe problems.

The sanctuary does lend some support to the regulations of other agencies. It increased the penalties for approaching whales too closely, and it pays the cost of a NMFS enforcement officer. But the sanctuary did not add new regulations, and its main job is to support education, outreach, and research. Many residents actively opposed the creation of the sanctuary, on the grounds that the whales are already adequately protected and fearing that once it was established, the sanctuary would try to regulate other aspects of fishing and boating.

Indeed, there are other threats to the marine environment in the area. Commercial fish collectors have depleted the stocks of many colorful reef fish. There are other species of endangered whale and two species of endangered sea turtles. There are some polluted waters in bays and river mouths near shore, where the whales rarely venture.

In 1980–84, NOAA prepared a draft proposal for a multipurpose sanctuary. The then-governor of Hawaii said he would veto the management plan for state waters, which comprise about 80 percent of the sanctuary today. In 1992, at the request of a new governor, the Hawaii congressional delegation sponsored a provision in the reauthorization of the sanctuary program to designate a sanctuary in Hawaii for humpback whales, hoping that this would bring funds to the state for research and education. The legislation allowed the governor to withdraw state waters from the sanctuary and allowed NOAA to close the sanctuary if it would be too small to be practical without state waters.

NOAA pushed again for a multipurpose sanctuary, but in the face of widespread and noisy opposition and resistance from the state, NOAA whittled down the purposes and authorities of the sanctuary. After three years of planning and negotiation, a third governor approved the management plan after winning a final concession that the state would “co-manage” the sanctuary and that future governors would reconsider every five years designation of the sanctuary and withdraw state waters if they wished. To support co-management, NOAA is giving the state \$300,000 of the \$719,000 sanctuary budget in its first full year of operations. This leaves the sanctuary enough money to hire staff but not to issue many contracts for research, education, or outreach.

Thus, the sanctuary faces three challenges: First, it must negotiate workable procedures for co-management with the state. Second, it must overcome local skepticism and opposition. And third, to do so, it must develop a smooth working relationship with the Sanctuary Advisory Council, which includes both proponents and skeptics.

Substantively, the sanctuary and the state must design effective research and educational programs. The sanctuary created some programs during the three years of planning and negotiations with the state. Lacking strong support from the state, the national sanctuary program office, and national environmental groups, the sanctuary’s on-site staff tried to develop good relationships with the local community. Although the staff did not win over the leading opponents, they won support from local environmentalists and citizens, and recruited a large cadre of volunteers, many of whom are retirees from the mainland. The sanctuary provided small grants to several small nonprofits that provide education or conduct research on humpbacks. It opened a small but attractive and visible visitor center on Maui and began to place signs and telescopes for whale-watching along the coast. Hotels, bookstores, and civic groups welcomed the sanctuary as a partner in beach cleanups, celebrations, and other community events.

Many national advocates and some NOAA staff feel that without tough regulations to protect all resources, a sanctuary can have no significant impact. The Hawaiian Islands Humpback Whale sanctuary is testing a different approach: non-regulatory and focused on the humpback, at least for now. Perhaps this approach will build enough local support and credibility so that, if conditions warrant in coming years, the sanctuary can broaden its scope.

The Site

The sanctuary

- 1,300-square miles: about a third in a more or less enclosed area between the islands of Maui, Lanai, and Molokai; another third in open ocean west of Molokai; and the remainder in five thin bands along the coast of Oahu, Kauai, and the “big island” of Hawaii.

- all areas reach from the high water mark out to 600 feet in depth: humpbacks prefer shallow, protected waters for mating, calving, and nursing
- about 80 percent of the sanctuary is in state waters (within 3 miles from shore)

Inland

- the sanctuary lies offshore from major resort communities on Maui as well as undeveloped land and some ranches, farms, and small towns
- no significant federal parks nearby: they are upland
- small national wildlife refuges on Kauai and Maui and a national historic monument on the big island, Hawaii, are adjacent to the sanctuary
- the sanctuary does not include waters that are heavily used by the military (as ports, bombing ranges, or areas for exercises)

Marine resources

- generally very good water quality, except in small near-shore areas (mostly bays and river mouths)
- extensive coral reefs near shore
- moderately productive fishing grounds: the productivity of Hawaii waters is only moderate partly because the islands are so isolated
- very dramatic, beautiful shorelines
- extensive sportfishing, snorkeling, diving and other tourist activities
- large concentrations of humpback whales
- three other species of endangered whales; two endangered turtle species

Environmental threats

- as the whale population rises and boat traffic increases, more collisions with whales are likely, and it will probably become harder for boats to avoid approaching whales within 100 yards
- overfishing of bottom fish (snapper) and live capture of reef fish for the pet trade have depleted stocks sharply (over 50 percent depletion for some reef fish, more in some areas)
- some researchers feel that dolphins and other marine mammals are being harassed by some recreationists and eco-tourism businesses

- some whale-watchers and others feel that some researchers are harassing whales and not conducting valid published scientific research, notwithstanding NMFS regulation of research activities

The Humpback Whales

Basic facts

- adults are about 45-feet long
- while in Hawaii, humpbacks do not eat; they wait until returning to rich, cold waters off Alaska in the summer
- Hawaii's whales are one of three or more major groups of North Pacific whales; others migrate from Alaska along the coast of California and Mexico or the coast of Japan. There are also populations in the South Pacific and the Atlantic.

Uncertainties about the threats to humpbacks

- major strides in recent years in knowledge about humpback numbers, movements, and behavior
- new technologies and methods—observation from aircraft and satellite, tagging, cataloguing of distinctive markings on whale flukes, etc.—yield new information
- an unknown amount of mixing, probably not extensive, among the three North Pacific populations; lack of solid information about whether the increase of humpbacks in Hawaii is partly due to shifting from the other populations.
- lack of basic information about mating and calving; no documented observations
- lack of information about communication among humpbacks; whale “songs” apparently play a role in mating, but the effects of man-made sounds on communication are unknown
- lack of solid information about effects of pollution on whales

Economic and cultural importance of humpbacks

- native Hawaiians did not kill or eat whales, but did honor them
- whale-watching is a major part of the tourism industry and an ancillary activity of most snorkeling and diving trips

- no solid data is available yet about the dollar importance of whales, but the sanctuary is funding a study
- hotels welcome brochures, posters, and telescopes for guests to use to watch whales from shore
- “condo commandos” with spotting scopes on their balconies watch whale-watchers and report violations of regulations about harassment and approaching too close
- humpbacks are widely observed and celebrated; the humpback is the Hawaii “state marine mammal”

Resources and Authorities

Mandate and purposes

- established in 1992 to protect “humpback whales and their habitat”
- congressional prohibition in sanctuary to levy fees
- legislation authorizes NOAA to consider expanding management activities to include other species or aspects of the marine environment; facing state and community opposition, NOAA decided not to do so in its first management plan in 1997

Important regulatory authorities

- at state’s insistence, NOAA agreed to promulgate no new regulations but rather to rely on the existing regulatory authorities of other agencies—especially NMFS regulations concerning whales
- sanctuary did increase the maximum fine for harassing whales from \$20,000 to \$100,000

Resources

- annual budget: \$731,000; four full-time employees and four contract employees
- of the total budget, \$300,000 goes to the state for activities yet to be determined
- of the total budget, \$20,000 goes to NMFS for enforcement of regulations
- main office and visitor center at a central location on the beach on Maui; additional staff and offices on Kauai, Oahu, and Hawaii
- no boat

Sanctuary Advisory Council

- after initial hesitations, NOAA created a sanctuary working group of citizens to advise in writing the management plan in 1994-97
- after agreement with the state in 1997, NOAA forms a SAC
- membership: 6 ex officio state agency officials, 4 federal officials, and 15 citizens from Maui and other islands (of whom 3 are currently state employees)
- although some members of the Sanctuary Advisory Council had expressed skepticism about the sanctuary (in one case, active opposition), the SAC is generally supportive
- initial dissatisfaction about structuring meetings in order to make effective decisions and about whether the state must consult with the SAC

Expectations for the Sanctuary

Initial effort at designation

- 1977: County of Maui proclaims a whale reserve in waters less than 30 feet deep; no legal effect as county jurisdiction stops at high tide mark
- 1977: scientist nominates area between Maui and adjacent islands as a sanctuary for humpbacks
- 1980-84: NOAA studies the area, writes a draft management plan
- 1984: governor notifies NOAA he will disapprove inclusion of state waters; NOAA suspends efforts

Second effort at designation

- 1989: native Hawaiians ask Navy to stop using the island of Kahoolawe (near Maui) as a bombing range and request that the Navy turn the island over to them
- 1989: Senator Inouye proposes and Congress passes legislation directing NOAA to study waters near Kahoolawe as a sanctuary for the humpback
- 1991: study shows few humpbacks near Kahoolawe but calls for more research and proposes a sanctuary in other areas
- 1992: governor’s office supports sanctuary proposal for other areas, hoping to gain funding from NOAA for marine management activities; congressional delegation obtains legislation designating a sanctuary around Maui and neighbor islands, and directs NOAA to study the possibility of including Kahoolawe and all other islands

Drafting and approval of the management plan

- 1993–5 planning and negotiations
 - under state pressure, NOAA gradually trims the geographic size, purpose, and authority of the proposed sanctuary management plan
 - major national environmental groups decline to support the proposed sanctuary, saying they do not favor single-species sanctuaries and want sanctuary regulations; key national NOAA staff also are skeptical
 - substantial local opposition to designation of the sanctuary; resentment about congressional designation without local hearings; majority of attendees at NOAA scoping sessions and hearings oppose designation of any sanctuary
 - little, if any, personal criticism of sanctuary staff by opponents of the sanctuary
- 1996: Congress forbids levying fees in the sanctuary
- 1997: governor agrees to sign a management plan, allowing state waters to be included in the sanctuary
- mayor of Maui County opposes the sanctuary in 1995, then runs for governor and almost upsets the incumbent in 1998, but the sanctuary is not a significant issue in the election; both congressmen continue to support the sanctuary and win reelection

Management Activities

Community outreach

- facing limited interest from the national office and opposition both from national environmental groups and local fishermen and boaters, and at a great distance from the national program office, the on-site staff reached out in 1993-97 to the local community, especially but not exclusively on Maui, where most of the whale-watching is concentrated and most of the opposition is located
- leaders of local environmental nonprofits and some whale-watchers help organize support for the sanctuary
- series of small grants to nonprofits for education and researchs

- sanctuary staff develops volunteer programs for cleanup, public education, and refurbishing an old federal facility as a headquarters and visitor center
- hotels, tourist sites, and stores seek out sanctuary involvement; welcome posters, telescopes for viewing whales, and programs
- active sanctuary participation in county fairs, community cleanups, celebrations, and other public events

Research

- funded a major aerial survey of the locations where humpbacks are present
- provided small matching grants for other humpback whale research; these small grants are valued because there is no steady source of federal funds for humpback research and most researchers support their work with foundation grants and private donations or by charging “interns” substantial fees to assist in research expeditions

Education

- series of short handouts and brochures about the humpbacks and other related animals like dolphins, and about the sanctuary program
- local artists and volunteers donate paintings and other materials
- public service ads on Honolulu buses about humpbacks and the sanctuary

Setting priorities and obtaining resources

- clear expectation by state and local residents that the Hawaii congressional delegation will help to obtain funds for the sanctuary
- SAC organizes three working groups—on education, research, and conservation—to provide written guidance and strategies for the sanctuary;
- education working group holds public meetings on all islands and produces useful broad statement and list of possible specific activities for discussions with national sanctuary office and congressional delegation
- other working groups just getting started

NOAA-State Co-management

The context: claims of the state of Hawaii and of native Hawaiians

- growing concern since the 1980s about preserving native Hawaiian culture and rights
- insistent state claims that all waters adjacent to the islands are subject to state sovereignty and that secession of submerged lands outside three miles to the federal government was illegal, court decisions to the contrary notwithstanding

The compact between Hawaii and NOAA

- state officials learn of the NOAA-Florida agreement about management of the Florida Keys sanctuary; discussions between elected officials in the two states provide reassurances
- state demands similar provisions as in the Florida-NOAA agreement
 - a state employee will “work in consultation with the [NOAA] Sanctuary manager as an equal partner in the oversight of Sanctuary operations”
 - the management plan will be reviewed every five years, and at that time the governor may refuse to allow any provisions of the plan to apply to state waters

Key differences between the Florida and Hawaii situations:

- initial impetus for the first, small national sanctuary in Florida came when a court ruling prohibited state management of the part of an existing state marine park that is outside the three-mile limit; the state then requested NOAA to assume management of this part of the park
- for 20 years, state employees help to manage two small Florida sanctuaries, paid by NOAA
- manager of the larger Florida sanctuary (which incorporated both small national sanctuaries) is former tropical fish collector and opponent of the second small sanctuary, longtime resident of the Keys, and former state employee at the second sanctuary
- the state official designated as co-manager says clearly that the federal manager is the single director of sanctuary operations, with state oversight

- Florida sanctuary has comparatively strong regulatory powers, including marine reserves that are fishing “no-take” zones

Implementation of the compact so far

- NOAA-Hawaii compact signed in 1997, but both agencies move slowly to write a contract passing NOAA funds to state; many issues still to be resolved about how the funds will be managed
- state moves slowly to hire a co-manager; plans to engage a person in May 1999 (almost two years after the agreement between NOAA and the state)
- SAC members express concerns over state’s initial indications that it will not seek SAC advice about how to spend funds obtained from NOAA

Current Challenges

Accomplishments

- NOAA and the state will do the five-year review of the sanctuary in 2002
- some misgivings by SAC members that the sanctuary has not yet produced enough results to obtain broad community and state support at the five-year review; eagerness to support sanctuary staff in achieving such results
- current budgets do not provide enough funds for a substantial increase in sanctuary activities beyond what the sanctuary was doing before the state endorsed the management plan in 1997

Working relationships

- need to develop effective working partnerships, not only between the sanctuary and the co-manager, but between the co-manager and other state agency staff
- search by SAC members to find an effective and satisfying way of providing support for the sanctuary
- need to develop impartial, widely-accepted procedures for peer review of sanctuary grants for education, outreach, and research; need to establish a clearly-defined role for the SAC in providing policy guidance for these activities while avoiding an appearance of conflicts of interest by SAC members who win contracts from the sanctuary

Strategic Questions and Choices

What does state–NOAA co-management mean?

- How much control will NOAA have over the use of funds contracted to the state?
- Will the NOAA sanctuary staff have other funds under direct control for education, outreach, and research? or will the state make the key decisions on these topics?
- Can the sanctuary afford to support both federal and state staffs and have enough funds left over for contracts and other activities beyond coordination and management?

Building more community support and involvement

- As it becomes clear that the sanctuary is not regulating fishing, boating, or whale-watching, will the opponents accept the sanctuary and, indeed, welcome its educational, outreach and research activities?
- Can the sanctuary tap the active interest of the local tourism industry and the strong public interest in humpback whales to create a non-profit organization that could raise private funds to supplement federal funds for sanctuary-related activities? Would existing nonprofits welcome such a step as a way of bringing in new resources or would they see it as competition to their own fund-raising?

Protecting the humpback whale and its habitat

- The simple presence of the sanctuary may be building public awareness and understanding about the whales and the ocean, thus compliance and stewardship.
- As the number of whales increases, will there be more whale-boat collisions and more harassment of whales? If so, will the sanctuary be able to assist other agencies manage conflicts between boats and whales? or should the sanctuary try to regulate whale-watching and other boat traffic?
- Should the sanctuary become more directly involved in other marine issues in the sanctuary? education, organizing volunteers, supporting research, or regulation? What issues will emerge in the future that might require a sanctuary response?
- Should the sanctuary try to extend its authority to include other species and/or to regulate?

Profile: Monitor National Marine Sanctuary, June 1999*Summary*

The Monitor National Marine Sanctuary is unique in several respects. It was the first sanctuary to be designated (in 1975); it is very small (less than a square mile); and it contains no significant natural or biological resources. The sanctuary, 16 miles off Cape Hatteras in North Carolina, is the resting place of the *Monitor*, which was the first ironclad ship of the U.S. Navy and fought in a celebrated Civil War battle.

This sanctuary has an immediate, pressing need for more resources to retrieve parts of the wreck of the *Monitor* or to protect them on site. The wreck is deteriorating, and its hull could collapse at any time. The question is, will NOAA, Congress, the Navy, and local partners of the sanctuary decide to invest enough resources soon enough to “save” the *Monitor* in some form?

The sanctuary staff has ambitious plans for recovering major sections and in 1998 recovered the propeller and 11 feet of its shaft. It could cost \$20 million to save other valuable parts, unless the Navy provides substantial free assistance. The pieces that are not recovered will disintegrate, perhaps quite soon.

As the result of a national competition in 1987, the Mariners’ Museum in Newport News, Virginia, has been the curator of *Monitor* artifacts, such as the propeller, since 1989. The sanctuary office, which houses two NOAA employees and two museum employees paid by an annual grant from NOAA, is located on museum grounds. They plan for recovery of the wreck, assist researchers on the *Monitor*, catalog the written materials about the ship, and provide educational materials to schools and the public.

The museum has impressive facilities and an extensive collection of materials about human use of the sea. It has a substantial but private endowment from its original benefactor, a competent new management team, and an ambitious campaign to raise additional funds. The *Monitor* artifacts comprise a small but attractive exhibit. The museum is enlarging the exhibit and would like to make it a central attraction for the museum. However, restoring and maintaining artifacts from the *Monitor* is even more expensive than retrieving materials from the wreck, and the museum’s current \$12 million fundraising

target does not include special funds for the *Monitor*. It is unclear at this point who will pay to restore the propeller for long-term preservation. The museum is providing funds for a contract conservator, supplies, and equipment.

Even with help from the Navy, which the local congressional delegation has requested, the costs of recovery would take a large bite out of the sanctuary budget. Should Congress or NOAA request additional funds necessary to recovery the *Monitor's* turret, cannons, and iron-clad hull?

In the not-too-distant future, NOAA must grapple with a second question. Whether portions of the wreck are retrieved or not, eventually the portions remaining at the site will be in much more fragmented form. Should NOAA then ask Congress to de-designate the sanctuary?

The Site

The sanctuary

- 16 miles south of Cape Hatteras, North Carolina
- all waters within a half-mile of the wreck

Marine resources

- no significant natural or biological resources
- limited exploration of the area around the wreck; mostly flat, sandy bottom with some rocky areas near the boundary

Activities on site

- average two private/commercial dive groups per year—less than 50 people
- average two research groups dive per year
- commercial and sport fishing in the vicinity; regulations prohibit trawling in the sanctuary
- limited but increased trespassing by commercial and sport fishers; extensive damage to the wreck in 1991 from illegal anchoring
- very limited scientific interest in studying marine life on the wreck

Access to the Wreck

- a subsurface buoy marks the wreck
- difficult and expensive access

- depth (240 feet) requires mixed-gas breathing, short visits to the wreck, and lengthy decompression times
- the Labrador Current and the Gulf Stream both pass through the area, sometimes passing each other at different depths, visibility can be poor
- sanctuary has worked with a private deep-diving club (including former Navy SEALs) to train NOAA personnel in deep, untethered diving procedures
- for tethered diving, surface vessel must be stationary, held by four anchors
- weather conditions are often difficult—rough seas, storms
- limited support facilities on land complicate the logistics of diving

Resources and Authorities

Regulatory authorities

- regulations prohibit anchoring, trawling, diving without permit, or other underwater activities
- little capacity to monitor or enforce regulations
- limited recreational diving permitted since 1990, with permit

Resources

- \$307,000 annual budget (1998) plus special funds for recovery expeditions
- two FTE plus two museum employees whose salaries are paid by grant from NOAA
- no boat; hires private boats or relies on visits by NOAA research vessels or a Navy salvage vessel
- cooperative agreement with Mariners' Museum supported by small contracts to museum, plus assistance with conservation of new artifacts, maintenance of Monitor Collection
- no sanctuary advisory council today; various advisory groups did function beginning in the mid 1970s to the late 1980s and helped prepare the first management plan

Mariners' Museum

- resources and program
 - extensive, world-class collection of paintings, model ships, books, photos and other materials about man's experience of the sea—marine technology, shipping, and the

role of the seas in politics, economics, and culture. Recent exhibitions on popular topics—e.g., tattoos, pirates

- park-like, 550-acre campus; several attractive buildings
- location in residential area limits visitorship; active current interest in developing its website and links to educational and research institutions
- management
 - first professional director five years ago; dynamic, experienced top staff today
- financing
 - privately endowed by local philanthropists
 - endowment based on revenues from coal lands in Virginia, which are declining
 - income (1997): \$8.8 million including \$5 million from coal and other investments, plus contributions, grants, admissions and other income; total expenses \$6.3 million
 - working to raise \$12 million for capital improvements and endowment by 12/31/00

Original Expectations for the Sanctuary

Designation—1975

- initial purpose: to establish legal authority to control access to the wreck, and to prevent pilfering of artifacts or other damage
- early 1950s: unsuccessful commercial efforts to locate the wreck
- 1973: Monitor discovered by an expedition supported by the National Science Foundation, National Geographic Society, Duke University Marine Lab, and private business; extensive publicity
- 1974: Concerns about security of the wreck, including possible disappearance of artifacts taken by some of the discoverers. Smithsonian Institute, Navy, and the North Carolina state historic preservation office organize two conferences of international experts to discuss management options
 - Navy denies desire and authority to manage the wreck—signed off its rights to the wreck in 1953 at the request of private parties who financed the unsuccessful search for the wreck; title reverted to the General Services Administration

- National Park Service expresses no interest, citing distance from the Hatteras National Seashore and recalling difficulties in raising other Civil War vessels
- wreck is outside state waters
- NOAA not in attendance at the conference, but the National Marine Sanctuary Act mentioned as an option
- NOAA learns of the wreck and expresses interest, although the Sanctuary Act (1972) refers to environmental resources and contains no reference to submerged cultural resources (wrecks). (The Act, as revised, does mention historical and cultural resources.)
- governor of North Carolina nominates the site as a sanctuary, on encouragement from state historic preservation office
- designation in January 1975

Active state involvement in management—1975–1983

- no sanctuary manager on site; regulations adopted and management through sanctuary program national office
- North Carolina state historic preservation office operates research program, aided by a technical advisory committee, reviews requests of occasional researchers and others for permits to conduct scientific studies, and gathers documentation
- 1978: state writes research management plan
- 1981: NOAA HQ staff writes management plan; revised 1982, 1983, 1987
- 1983: first manager hired
- sanctuary work becomes a burden to small state historic preservation office; there are hundreds of other wrecks off the Hatteras coast and in other North Carolina waters
- key state staff move to state university posts; university conducts research program for a time; it and the state willing to relinquish responsibilities

Decision to partner with Mariners' Museum (1986–87)

- Navy ready to hand over collection of artifacts; state willing to donate written records
- sanctuary program consults with experts, writes RFP for a museum to be custodian of the Collection of Monitor Artifacts and Materials
- five museums apply, including a proposed museum on Cape Hatteras in North Carolina,

but no concerted effort by North Carolinians to promote this option

- NOAA chooses The Mariners' Museum; selection done by a committee composed of directors of maritime museums
- 1987: initial agreement signed
- 1989: over two years of negotiations result in a cooperative agreement
- 1990: sanctuary hires a former staff member of the state historic preservation office to serve as education coordinator and curator of the *Monitor* Collection
- 1991: education coordinator moves to museum research library
- 1996: staff moves to new facility on Museum grounds

Sanctuary Activities

Research

- sanctuary staff does detailed research on the vessel to support plans for recovery and restoration
- sanctuary staff (and museum) assist researchers in using *Monitor* documents and artifacts

Education

- frequent presentations to public schools, elder-hostels, civic groups, college classes; online curriculum
- contracts to develop educational materials based on extensive existing research
- sanctuary staff catalogs the collection of written materials from the *Monitor* Collection, which is curated by the Mariners' Museum
- in cooperation with the Museum, assistance in organizing travelling exhibits to Virginia, North Carolina, and other locations, including Presidential libraries
- some knowledgeable observers would favor more aggressive program of touring exhibits of artifacts at the Mariners' Museum

Coordination with other agencies

- not a major purpose or issue at this sanctuary
- Coast Guard helps with enforcement; sanctuary seeks help with expeditions from Navy
- a small group on the Outer Banks of North Carolina has been working for many years to develop a "museum of the graveyard of the

Atlantic," including the *Monitor* and other wrecks

- 1987: group submits a proposal to locate the artifacts and written materials in North Carolina; NOAA chooses the Mariners' Museum instead
- 1997: Congress authorizes a NOAA grant for constructing a facility and for exhibits about the *Monitor* on National Park Service land at Cape Hatteras

Enforcement

- no significant capacity to monitor visits to the site or to enforce regulations

Rising Concern About the Condition of the Monitor

Early information

- 1974 expedition produces first detailed map of the wreck. *Monitor* is in one piece, but upside down with the lower hull and stern badly deteriorated
- 1977: first NOAA expedition, cosponsored with the state of North Carolina
- 1979, 1983, and 1985: additional NOAA expeditions; anchor retrieved in 1983

Discovery of Deterioration

- 1987 dive uses new technologies to get much improved information about the wreck
- 1989 draft report of 1987 expedition describes deterioration
- 1990 final draft says the *Monitor* "will not be recognizable in 5–10 years" if no action is taken; many experts skeptical of this prediction
- 1990, 1991, 1992: small expeditions with submersibles provide limited data
- 1991: fishing boat snags anchor on the *Monitor* propeller and support skeg; substantial damage to the wreck, breaking the skeg loose from the hull and opening the stern to more rapid disintegration
- 1992, 1993, 1994: weather restricts dive time on major expeditions
- 1995: expedition—using a large NOAA-leased research vessel for the first time, with new capacity for four-point (stationary) mooring documents serious deterioration since 1987

Action to combat deterioration

- 1996: Congress requests comprehensive plan for stabilization and recovery of *Monitor*
- 1998 expedition
 - based on a research vessel leased by the Navy and a NOAA research vessel
 - uses Navy, NOAA, National Undersea Research Program (NURP) and volunteer divers
 - mapped parts of the hull for future stabilization effort
 - recovered the propeller and 11 feet of its shaft, a large valve, and other artifacts
- 1998 final recovery plan submitted to Congress
 - considers several options: preserving the wreck by covering it with silt, trying to stop rusting of the iron plates, full recovery, partial recovery, and no action
 - recommends partial recovery—turret, cannons, engine, artifacts
 - would cost \$12 million for recovery and \$10 million for conservation—less if the Navy provides a salvage vessel, divers, and support at no cost
 - some commercial dive operators critical of plan; want full protection so the *Monitor* can continue to be dive site
- continuing efforts by Virginia congressional delegation to encourage Navy support of additional recovery expeditions at minimal cost to NOAA

Current condition of the *Monitor*

- the distinctive turret, the aft section of the lower hull, and the belt of armor around the ship (the “iron-sides”) are relatively intact
- the major portion of the hull that was originally under water has partially disintegrated; the upper hull is still in place but has deteriorated and the stern has disintegrated.
- the iron plating was about 22 percent of its original thickness in 1977, 9 percent in 1998 (estimated)

Strategic Questions and Choices

The *Monitor* sanctuary needs money and substantial on-the-water assistance from the Navy fast. The congressional delegation seems interested in helping and recently wrote the Chief of Naval Operations to

encourage action. If they and the sanctuary can mobilize enough resources to recover the highly distinctive turret—the symbol of the *Monitor’s* victory in its famous Civil War battle—it just might be possible for the museum and the sanctuary to raise enough additional money to conserve the turret, recover other items, and organize a larger, permanent educational and research program about iron-sided ships.

In any event, the focus of the sanctuary will have to shift in the near future. Whether or not the planned stabilization and limited recovery efforts are carried out, the site will continue to deteriorate and the hull will finally collapse. At that point, there will still be thousands of artifacts buried under mud and the remnants of the hull. Future NOAA expeditions might attempt to recover them: If the site were to be de-designated, private expeditions might well visit and remove these objects.

Profile: Monterey Bay National Marine Sanctuary, October 1998

Summary

The citizens of the Monterey Bay “crescent,” the region between Santa Cruz and the Monterey peninsula, fought for over 15 years to win federal designation of the Monterey Bay National Marine Sanctuary. When the sanctuary was designated in 1992, it faced an unusual situation.

The original reason for creating the sanctuary—preventing the leasing and development of off-shore federal oil and gas—was accomplished even before the sanctuary was officially designated. In 1992, Congress banned leasing in the sanctuary for several years. Local opposition to leasing continues to be fervent and unanimous. In any case, the oil reserves are not particularly high quality and hence not worth developing at today’s prices. So the sanctuary has had the opportunity to focus its energies on other issues. The challenge is to set priorities among a wide array of threats and opportunities.

The threats: offshore waters are relatively pristine, but they lie in major shipping lanes, and accidents could result in major spills of oil or hazardous materials. Along the coast there are a wide variety of resource

management issues, including polluted runoff from cities and the rich farmlands of the Salinas Valley, jet skis, and endangered species—such as the photogenic sea otters that were the poster child of the campaign against oil leasing. Over-fishing threatens some species.

The opportunities: more than 15 local marine research institutions and the world-famous Monterey Aquarium are possible partners for sanctuary activities. The Monterey Bay canyon lies close to shore and offers easy access for deep ocean research. The high level of public interest and the presence of strong advocacy and citizens groups make it comparatively easy to get attention from local political leaders, raise funds, and recruit volunteers.

The sanctuary is working on all of these fronts. It has banned jet skis and shark chumming, and has built a broad local agreement to push marine traffic farther offshore to avoid spills. It provides support to four non-profit volunteer programs. With stakeholders it has developed and begun to implement plans to improve water quality. The Sanctuary Advisory Council and its research and education working groups meet regularly to share information and foster partnerships.

The sanctuary faces three challenges. First, how it can protect its resources in the long run? The population of California continues to grow rapidly, and pressures on sanctuary resources will certainly increase. Second, how the sanctuary can show clear results? Now that oil leasing is no longer the major threat, the sanctuary must find a new guiding purpose. The sanctuary emphasizes coordination, education, research, and planning. These processes all take time and rarely show dramatic change. So far, only a few of the plans have been implemented. Third, what, if anything, should the sanctuary do about over-fishing? In order to get broad support for designation, NOAA and local political leaders promised that the sanctuary would not regulate fishing. Breaking that promise could endanger the broad public support that the sanctuary enjoys.

The Site

The sanctuary

- 400 miles of spectacular coast; over a third in Monterey Bay, the rest south along the Big Sur Coast or north in the San Francisco area (adjacent to the Gulf of the Farallones Sanctuary)

- 35 miles offshore (average); 53 miles (maximum)
- narrow continental shelf except in Monterey Bay; a marine canyon over 10,000 feet deep starting in the bay
- the largest US sanctuary—the size of Connecticut, and four times the size of Yosemite National Park

Inland

- adjacent to the San Francisco metro area; 750,000 residents in the two countries adjacent to Monterey Bay expected in year 2005; a large agricultural valley; and isolated coast
- no federal landowner along most of the coast, except for portions of the Big Sur Coast

Marine resources

- rich fishing grounds, especially in areas of cold water upwelling
- strong local fishing industry (\$15 million/year in Monterey Bay plus more from other ports)
- some stocks declining, but the sardines that supplied 23 Monterey canneries until they disappeared in the late 1940s seem to be coming back, for reasons not fully understood—perhaps cyclical or related to warming of waters
- numerous endangered species
- population of elephant seals now increasing rapidly—an endangered species success story
- population of sea otters is stable, not reproducing adequately, but spreading in area
- numerous recreational uses of beaches and ocean, including world class whale watching operations and diving in kelp forests
- very little known about deep waters, but research is ongoing

Environmental threats

- possible spills from tankers and commercial shipping—no major spills recently
- water pollution: urban runoff, boats, agriculture, wastewater systems not in full compliance with environmental regulations
- some beach closings and “red tide” blooms
- over-fishing of some fisheries (e.g., bycatch, “live” fishery)
- numerous small resource conflicts and environmental threats—normal for a very large marine area with a fragile coastal habitat that is located near settled areas

- urban/residential development along the coast—very close in places—has less tangible but huge cumulative impacts

Resources and Authorities

Mandate and purposes

- 1992 statute prohibits oil and gas leasing in the sanctuary
- 1992 designation document, management plan, and regulations say sanctuary will not regulate fishing now or in the future
- 1992 management plan also says the sanctuary will work with other agencies and stakeholders to develop plans for improvement of water quality in watersheds upstream of the sanctuary; may regulate vessel traffic but does not intend to do so then; will consult with the Coast Guard and others in studying vessel traffic issues

Resources

- \$967,000 annual budget (1997)
- six FTE and eight contract employees plus one vacancy (8/98)
- patrol aircraft shared with Channel Islands NMS
- 31 foot patrol and one research boat
- two patrol boats donated for enforcement in the sanctuary, staffed and owned by CA Department of Fish and Game
- annual 10-day visits of NOAA's 175-foot research vessel *McArthur*

Original Expectations for the Sanctuary

Shifting federal policy

- NOAA site evaluation recommends narrow sanctuary, hugging the coast of Monterey Bay and continuing about 25 miles both north and south of the bay
- 1983: NOAA drops consideration of Monterey Bay as a sanctuary; the administration pushes for offshore oil and gas leasing in the area
- 1980s: Congress forbids leasing in annual appropriation bills
- 1988: Congress directs NOAA to designate a sanctuary in Monterey Bay

- during the 1992 elections, President Bush directs designation of the largest possible sanctuary—extending north to the San Francisco area, south along the Big Sur Coast, and 53 miles into the ocean

Local support

- 1967: Sierra Club suggests a sanctuary in the Monterey Bay area
- 1976: Santa Cruz and Monterey counties endorse a sanctuary
- 1987: local Congressman convenes a “steering committee” to guide a campaign for a sanctuary; several members later become the core of the SAC
- 1989–90: Over a thousand people attend public hearings; most favor a larger sanctuary than proposed by NOAA
- 1993–present: annual public birthday celebrations for the sanctuary
- tangible local pride in the sanctuary—“Yosemite of the sea”
- tourism makes a major contribution to local economy

Fishing community

- initially hostile to or fearful of a sanctuary
- local congressman and NOAA promise in 1988–92 that the sanctuary will not regulate fishing
- enlarged boundary includes a critical crab spawning habitat
- leading fishermen support sanctuary actively, but some resist, still fearful of regulation

Research community

- numerous federal and university research labs nearby, many located along Monterey Bay
- number of marine scientists at labs doubles to about 300 between 1992 and 1998
- recent efforts to use marine research as a focus for economic development near the Bay

Achievements

Slow start, high level of activity today

- 1992: large community celebration of designation of the sanctuary

- loss of opportunity to capture public excitement after designation
 - manager named soon after designation but has low visibility
 - 18 months after designation, sanctuary office opens and SAC first meets
 - early emphasis on writing management plan, rather than public education
- monthly SAC meetings during initial years, now bi-monthly plus numerous meetings of three working groups
- first manager leaves in 1997; second permanent manager arrives in early 1998

Coordination

- coordination is a major purpose of the sanctuary
- SAC and working groups—on education, research, conservation, and (recently) business—build rich networks for sharing information, encouraging collaboration among participants
- working groups are continuation of groups established to fight for sanctuary designation, still have some continuing leadership and membership
- sanctuary water quality and vessel traffic efforts are built on cooperative consensus-building
- sanctuary is catalyst for various collaborative problem-solving efforts
 - e.g., work with state highway department, state fish and game, major private landholder, and citizen volunteers to get elephant seals off the highway and tourists out of the rookery, create a turnout
 - educate tourists not to harass seals
- sanctuary provides comments on decisions by other agencies
 - opposition to ocean disposal of contaminated dredged materials at grandfathered site, as advocated by fishermen, prominent research institute, local congressman
 - consultation with state department of transportation to minimize dumping of soil, rocks, and pavement into the ocean during major repairs of coastal highway along the Big Sur Coast after 1998 El Nino rains
 - careful review of other permitting actions

Water quality

- 1992 management plan calls for focus on water quality
- eight agencies sign an MOU; 17 other agencies and nonprofits “sign on” to the MOU’s intent and purpose
- many duplicating, overlapping activities, e.g. 10 monitoring programs
- emphasis on stewardship, public education; sanctuary does not regulate, but does facilitate coordination among regulators and sometimes suggests conditions to be added to permits
- less funding than for National Estuary Projects, but a major investment for the sanctuary
- three action plans completed, partial implementation so far
 - urban runoff
 - public education, including stenciling of stormwater drains
 - consideration of urban runoff in state environmental assessment process
 - regional stormwater management program
 - monitoring, data
 - citizens monitoring network
 - agency cooperation
 - marinas and boating
 - public education, training for marina staff
 - pump-out system, absorbent pads to collect oil in bilges of small boats
- plan for agricultural runoff now being developed
 - perhaps the biggest water quality problem, say sanctuary officials; agricultural interests say pesticides currently in use decay quickly, the only problem is sediments containing old pesticides such as DDT
 - toughest issue politically—little regulatory authority; no regulation by sanctuary
 - before plans, the sanctuary obtained grants to improve data, streamline permitting, and develop marketing for crops grown with conservation measures
 - stakeholder process begins; but Farm Bureau pulls out to develop their own proposal for discussion by stakeholders

Regulations unique to the sanctuary

- ban on jet skis except in four designated zones; enforcement by cross-deputized state fish and game now beginning; working with jet ski shops to educate users
- ban on shark-chumming (one local operation)
- develop regulations to allow continued gathering of small amounts of jade by local artists
- develop consensus on voluntary IMO rules on vessel traffic
 - designation document promises that sanctuary will study offshore spills
 - much controversy; dissatisfaction with the study when it appears
 - sanctuary staff convenes local stakeholders who agree on:
 - tankers and barges stay 25-50 miles from shore; large container ships 12-20 miles
 - changes to traffic separation system
 - reporting of ship location and of near-misses
 - approval now needed by Washington officials and IMO

Research activities

- research advisory panel (SAC working group) has met monthly since before the sanctuary became operational, includes scientists from 18 institutions (mostly academic or federal); shares information, sets priorities for research on management issues
- some initial expectations that the sanctuary would bring major investment in characterizing habitat; did not happen due to small operating budgets
- small grants by sanctuary (total averages \$40,000/year)
- various collaborative research projects relating to management issues (totaling about \$400,000 in grant funds in FY1997)
- maintain searchable on-line data bases for site characterization
- volunteer monitoring and data gathering on dead birds, mammals, and oil on beaches
- annual research symposium (now joint session with education, community working groups)
- free use of NOAA ship *McArthur* during annual 10-day visits; occasional free use of sanctuary boat and plane

- review permits for research within sanctuary
- designation has attracted some outside researchers and funding—“halo effect”

Education

- SAC working group on education exchanges ideas, encourages collaboration among local educational institutions
- sanctuary shares costs for developing books, educational materials
- numerous school-based programs use the sanctuary
- large annual ocean-oriented “celebrations” in the bay area, with active sanctuary support; sanctuary staff participate actively in many other community events
- sanctuary staff assists national marine education projects
- over 20 interpretive signs along the coast, mostly in Monterey Bay area
- extensive media coverage
- some early expectations of additional funding for marine education; little new funding generated
- water quality program has major public education components; other issue-focused outreach and education is being planned

Sanctuary advisory committee

- independent-minded: includes several influential people, such as members of the local congressman’s steering committee that led the fight to designate the sanctuary
- lengthy discussions with NOAA DC leadership and with lawyers about SAC authority, prerogatives, procedures
- significant dissatisfaction with delays in and (sometimes) content of DC-NOAA decisions
- some SAC members who represent interests still fearful of regulation by sanctuary

Opportunities for the Future

Extending sanctuary activities beyond Monterey Bay

- original NOAA plans and citizen advocacy focused on Monterey Bay
- all staff currently stationed in Monterey; city of Santa Cruz has offered space on the wharf
- little public awareness of the sanctuary outside Monterey Bay

- SAC now includes a very active member from south end of the sanctuary
- northern end of sanctuary now managed by the Gulf of the Farallones NMS; some discussion that the Monterey staff should assume more responsibility

Better documentation of environmental conditions, human uses, threats

- substantial activity already underway, but no “report card” or major investment in more data
- sanctuary could aid other agencies to make “fact-based” decisions
- possible partnerships with local research institutions to get more funding

More outreach, public education

- many opportunities for additional public education, especially outside Monterey Bay; Radio station for tourists driving the coastal highway along the Big Sur Coast

Strategic Questions and Choices

There is strong local support for the sanctuary and, notwithstanding some frustrations among local leaders, a pride in accomplishments and hope for the future.

How can the sanctuary protect its resources in the long run?

- continued population growth, pressure from heavy use by tourists
- most impacts are beyond sanctuary’s regulatory reach
- opportunity for “report cards” to monitor long-term impacts, influence public attitudes and others’ decisions

Does the focus of attention on oil leasing and oil spills prevent a clear focus on other, more important, and more likely threats to the environment?

- broad community opposition to oil industry
- little likelihood of oil leasing; much improved capacity to prevent/manage spills
- potential for disagreements on other issues
- complaints that role of sanctuary is nebulous, difficult to understand (other than stopping oil)
- complaint that the sanctuary does not “sell itself” convincingly, though local support is strong

- education/research/coordination approach takes time and rarely results in dramatic changes

Can the sanctuary move beyond planning to on-the-ground implementation?

- some elements of water quality plans are being implemented, but many are not; action on agricultural runoff problems likely to be especially slow and difficult
- vessel traffic recommendations need DC, IMO approval
- local staff is busy “keeping up” with new issues, planning, and opportunities; DC seen as slow in responding to issues, opportunities

What can the sanctuary do, if anything, about over-fishing?

- Is there a meaningful, politically feasible role for the sanctuary, short of outright regulation?
 - sharing information, building consensus about the merits of zones
 - encouraging, supporting research on no-take zones
 - designing experiments to test zones
 - help state implement zones
- firm public commitments not to regulate fishing
- active state debate about no-take zones; two small new zones being implemented by the state in the sanctuary, some others already exist
- certainty of major controversy; probability of little local support if the sanctuary proposes creating no-take zones

Profile: Olympic Coast National Marine Sanctuary, August 1998

Summary

The Olympic Coast National Marine Sanctuary may be at a turning point. During its first four years, the sanctuary has had a low public profile. It has provided some assistance to marine research, given modest support to seasonal rangers at nearby national and state parks, and worked on public education. Its regulatory impact has been very light.

The Olympic Coast Sanctuary, off the coast of the state of Washington, is a pristine area facing no major, immediate environmental threats. Sanctuary leaders

must decide whether to accept a continued low-profile role, to step up efforts in research and education through more aggressive local outreach (perhaps through an interpretative center) or to take on controversial issues like marine zoning and vessel traffic into Puget Sound.

There are three reasons why 1998–99 was a pivotal year. The first is, NOAA and the state have now agreed not to designate a second sanctuary just to the east of the Olympic sanctuary. (There was active local opposition to this second sanctuary from residents who feared intrusive federal regulation and, in the end, insufficient public conviction that a sanctuary would help communities deal with the marine impacts of rapid growth in the islands and along the coast of northern Puget Sound.) The decision not to designate a second sanctuary will free up resources for the Olympic Coast sanctuary, whose manager has been devoting at least a quarter of his time to the proposed sanctuary. The hope is that Olympic Coast sanctuary will get more active support from Seattle-based environmentalists who had been devoting themselves to the effort to establish the second sanctuary.

Also in 1998, leadership at the Olympic Coast sanctuary will change. A new manager will be hired, who will select a new slate of citizen members of the SAC.

The Site

The sanctuary

- off the rugged coast of the northern half of the Olympic peninsula
- landowners along the coast: five small Indian reservations and the Olympic National Park
- largely inaccessible; highways along less than half of the 90-mile coastline of the sanctuary
- less than 5,000 people live along the shore, mostly in the Indian reservations.

Inland

- sparsely populated; largest town within 35 miles of the coast has under 2,000 residents
- large areas in national park; most of the rest is commercial timberland (private, state or federal ownership).

Marine resources

- 25 percent of the oil and gas reserves along the Washington coast
- rich fishing grounds, especially at the north end of the sanctuary just outside the Straits of Juan de Fuca, created by largest spring-summer upwellings of cold water along the Pacific coast
- fishing industry along the coast (only half of which is in the sanctuary) employs about 7,000 in small boats; rising catches but uncertain future because salmon is an endangered species in many rivers
- rich, diverse intertidal communities
- numerous submerged wrecks along the coast
- few birds on the mainland beaches; very large bird colonies on inaccessible islands offshore (managed by the US Fish and Wildlife Service)
- over one million annual visitors to beaches in the Olympic National Park

Environmental threats

- two marine oil spills in the last decade; one resulting in a \$5.2 million damage assessment
- sediments in runoff, especially from logged areas
- a few small unpermitted sewage sources, mostly in Indian reservations along the coast
- controversial plans by the Makah tribe after decades of no hunting to hunt a very small number of gray whales within the sanctuary, exercising their treaty rights and with approval of the International Whaling Commission

Resources and Authorities

Mandate and purposes of the sanctuary (1994 management plan)

- “bolster the existing resource protection system”
- “coordinated research program”
- “broad-based education and interpretive program”
- “a comprehensive plan to protect this habitat”

Sanctuary resources (1998)

- five federal FTE
- two contract FTE
- two seasonal interpreters (hired by National Park Service; sanctuary pays half cost)

- 36-foot boat customized and used extensively by researchers
- large Zodiac inflatable boat for use by researchers
- accommodations for researchers at remote port where the boat is based
- annual two-week visits by a NOAA ship, for use by researchers
- \$600,000 annual budget (FY98)

Authorities of the Sanctuary

- strong emphasis on research and education
- banning of flights under of 2,000 feet (to avoid harassing birds, marine mammals)
- higher fines for disturbing marine mammals, turtles, and seabirds.
- prohibited bombing by the US Navy of a small island along the coast.
- promise that sanctuary can coordinate diverse federal and other efforts
- voluntary Area To Be Avoided (ATBA) for marine shipping carrying oil and hazardous substances, established by the International Maritime Organization, roughly contiguous with sanctuary boundaries
- 1994 management plan explicitly states that sanctuary will not restrict vessel traffic or fishing

Original Expectations for the Sanctuary

On NOAA's original national list of scores of possible sites; the report of a Site Evaluation Team recommended a small sanctuary reaching only a few miles seaward of the Olympic coast.

Designation as a way to prevent offshore federal oil and gas leasing

- lease sale planned for 1992
- strong local opposition, sophisticated after years of fighting proposed a major oil port in Port Angeles, 70 miles into the Straits of Juan de Fuca from the coast
- strong sentiment for a larger sanctuary, reaching as much as 60 miles from shore, as a way to forestall leasing
- some concern about oil spills in the Straits of Juan de Fuca
- Mike Lowry, a congressman whose district is in the Seattle-Tacoma area, led opposition

Leasing banned before sanctuary was created

- before NOAA decision about designation, the President placed a moratorium on leasing, and Congress then permanently banned leasing in the proposed sanctuary
- proponents of the sanctuary followed through, continuing to support designation
- Lowry became governor, so the state supported designation as well

Local support for designation

- satisfaction that coast was being designated as of national note
- some interest in additional research—could help document claims for damage from future oil spills
- hope for stimulus to tourism

Local apprehension about designation

- local anger at, fear of federal agencies: cut-backs in logging on the national forest were decimating the local timber industry, which is the dominant force on the peninsula outside the national park
- sports and commercial fishermen were concerned at first that a sanctuary might attempt to restrict fishing
- local port officials apprehensive about proposals to restrict marine traffic in the sanctuary
- local skepticism about another “layer” of government
- concern about property rights (but very little private land is adjacent to this sanctuary)

Overcoming the opposition

- NOAA formally promises that the sanctuary will not regulate fishing or marine traffic
- promise of a sanctuary advisory council to speak for state and local interests

Achievements (1994–98)

Research

- two research conferences, bringing diverse researchers together
- small but direct funding of research (\$40-60,000 per year)
- availability of NOAA vessels and living quarters to researchers at no cost

- inventory of shipwrecks—significant local interest by citizens
- some research studies immediately useful in addressing current management issues
- sanctuary support for a foundation-funded effort to document bird mortality on beaches; useful baseline data to be gathered by citizens trained by scientists

Education

- attractive newsletter: five issues since 1994
- field trips, in-class instruction, and special events at some public schools
- one teacher has participated in *McArthur* cruises
- student “summit” with Sylvia Earle

Oil spills

- pushed for federal studies of oil spills near the coast and straits, not just in the more populated areas of Puget Sound
- documented that some ships ignore ATBA rules
- encouraged Coast Guard to study innovative strategies for improving tug availability
- participated in oil-spill contingency planning and drills

Marine mammals

- effort to organize information network on stranding
- effort stalls when NOAA staff member leaves

Sanctuary Advisory Council (SAC)

- bi-monthly meetings help share information
- SAC slow to start—first meeting a year after dedication ceremony, after staff was hired
- SAC has languished—no meetings January–July 1998
- high quality of SAC members

Low public profile—tourism, local controversies

- Coast Guard and NMFS take the lead on managing Makah whaling within the sanctuary in autumn 1998; sanctuary takes no public stand
- no role in salmon issues
- research and discussion but no further efforts on marine transportation and oil spills
- limited efforts to promote tourism, educate tourists
 - some encouragement of whale-watching

- many tourist information centers and signs have no information on the sanctuary
- many maps do not list the sanctuary or have incorrect boundaries
- few sanctuary-funded signs for visitors

Opportunities for the Future

Creating a more visible local presence

- sanctuary headquarters is 60 miles from the coast near major tourism facilities and federal offices; some continuing local resentment that NOAA reversed its initial decision to locate headquarters nearer the coast
- there are places near the coast where some staff might be stationed in interpretive centers and offices of other agencies
- there is an old proposal for a national park visitor center on the coast; the sanctuary might help revive it
- placement of interpretive signs along the coast and more information at tourist centers
- more visibility for sanctuary in materials prepared by other agencies; sanctuary could refer to other agencies in their materials also

Strategic Questions and Choices

Can the sanctuary muster the resources and energy to become a high-profile, high-impact presence along the coast?

- Does the demise of the proposal for a Straits sanctuary free up resources for the Olympic Coast sanctuary to become more active and visible?
- Can the sanctuary help develop a private “friends of the sanctuary” organization, a foundation, or other independent nonprofit to supplement agency resources?
- Could the sanctuary help the national park get funding for an interpretative center on the coast?
- Should the sanctuary shift priorities to more aggressive education of tourism?

Should the sanctuary take a stronger role in shaping regulatory policies?

- Should the sanctuary attempt to take a higher-profile role in marine transportation (preventing oil spills)? (This would be popular with local residents.)
- Should the sanctuary work aggressively and visibly to encourage others to establish marine reserves? Should it revise its commitment not to restrict fishing? (This would be highly controversial.)

How can the sanctuary balance the interests and concerns of local residents with others, especially metro-based environmental advocates?

Profile: Stellwagen Bank National Marine Sanctuary, September 1998

Summary

The Stellwagen Bank National Marine Sanctuary, the smallest of the seven larger national marine sanctuaries, is a busy place. It is an easy two-hour boat ride, 25 miles from Boston, and lies only three miles from Cape Cod and Cape Ann at the south and north ends, respectively, of Massachusetts Bay. A million people visit the sanctuary every year, mostly to watch whales. The sanctuary is also a convenient and productive fishing grounds, due to upwellings of cold water around the banks. Commercial shipping passes through the sanctuary on the way to the Port of Boston; the city of Boston's new wastewater outfall is eight miles west of the sanctuary; and a large dump site for dredge materials is even closer to another part of the sanctuary.

There are many conflicts between these uses, as well as other management issues at Stellwagen Bank. Whale-watching boats and commercial ships occasionally run over whales, some of which are endangered species. The whales also become entangled in fishing nets. Over-fishing has depleted the stocks of tuna and groundfish (bottom-dwelling fish, such as flounder and cod). The sanctuary has not been able to assert itself as a major player in these issues. Indeed, some of the people who are most knowledgeable about the sanctuary, including its often-frustrated staff, say that the sanctuary is largely invisible.

The sanctuary has some useful accomplishments to its credit. For example, it has helped finance research, including extensive detailed maps of the seabed, that may help in assessing the impacts of bottom trawling, and it has a small but successful education program targeted to public schools and two regional museums. But the sanctuary has very limited resources, including only three full-time employees. And the sanctuary's regulations have little bite. They prohibit oil and gas exploration, sand-and-gravel mining, and construction of facilities in the shallow waters of Stellwagen Bank—important issues in the 1980s but not today. Furthermore, the most threatened and highly visible resources of the sanctuary—the whales and many of the fish—do not stay within its boundaries long. This encourages the sanctuary's staff to focus their work outside the boundaries of the area they are charged to protect.

In 1999, the sanctuary will prepare a new management plan. This might provide an opportunity to focus the work on specific, achievable objectives and possibly to extend its regulatory reach. But the NMFS overshadows the sanctuary, and working relationships between the sanctuary and NMFS are “appalling,” in the words of one knowledgeable observer.

Should the sanctuary try to influence the whale-watching industry through regulation, new voluntary guidelines, or both? The industry is currently self-regulated. It might be useful to establish a program to train and certify the naturalists on commercial whale-watching excursions, to impose speed limits on whale-watching boats, and to enforce violations of guidelines against approaching whales too closely. But it is NMFS—not the sanctuary—that wrote the current guidelines for whale-watching, has a well-established marine-mammal protection program, and helps finance a program to disentangle whales from fishing nets.

Should the sanctuary create “no take” zones for commercial fishing? NMFS has already designated one zone that overlaps a section of the sanctuary, without taking note of the boundary. Also, the sanctuary lacks the resources to enforce regulations, and its 1992 management plan states that there is no “constructive benefit” to having the sanctuary regulate fishing because other agencies can do so.

Should the sanctuary extend its boundaries? Perhaps. But to do so, it must define achievable goals and build a stronger constituency to support its work. The sanctuary has been reluctant to give a significant role to its advisory committee, which is its main vehicle for reaching out to the wider community.

Recently, the sanctuary added new members to its advisory council, and it hopes to revitalize the council by giving it a central role in writing the new management plan. This could be an important first step toward making the sanctuary an effective steward and influential voice on marine issues in Massachusetts Bay.

The Site

- 25 miles east of Boston Harbor
- reaches across the approaches to Boston harbor from Cape Cod to Cape Ann, but does not include state waters within three miles from shore
- 842-square miles—almost half of Massachusetts Bay plus a slice of adjacent ocean
- the bank itself is 60- to 10- feet deep; other waters are up to 722-feet deep
- the smallest of the larger national marine sanctuaries

Nearby marine areas

- the sanctuary includes all of Stellwagen Bank and Tilley's Bank, but none of Jeffrey's Ledge, a similar bank north of the sanctuary; in 1996-97, most whales stayed near Jeffrey's Ledge, outside the sanctuary
- state waters adjacent to the sanctuary are designated as "ocean sanctuaries"; the state restricts wastewater discharges into these sanctuaries but otherwise provides little active management
- Cape Cod National Park lies three miles from the southern end of the national marine sanctuary

Marine resources

- once-rich fishing grounds, especially in areas of upwelling of cold water along the banks, but groundfish stocks of cod and flounder have been depleted by over-fishing; 75 percent of the catch is now less valuable dogfish and skate

- 280 commercial boats from a dozen harbors, a \$15-million annual industry, fish in the sanctuary or nearby (1990)
- 200,000 fishing charter boat trips annually, plus many small private boats
- regularly visited most years by whales, including three endangered species
- about 50 commercial whale-watching boats with a million passengers annually—\$20 million in gross revenues in 1996—plus private boats, when the whales are present
- ocean birds, including four endangered species, frequent the banks; some bird-watching

Environmental threats

- no significant oil and gas resources
- talk in the 1980s about mining the sand and gravel on the banks, but there has been no commercial interest
- a 1988 proposal to construct Gugel's Arabian Nights—floating hotel/casino/apartments/shopping malls for 100,000 people—stirred active opposition, but attracted no financing
- both whale watchers and commercial ships may hit whales, especially the slow-moving endangered right whale; four hits in 1998, including one right whale
- small numbers of whales regularly become entangled in fishing nets (seven in the first eight months of 1998)
- shipping lanes (2,700 vessels and 20 million tons of cargo/year) cross the sanctuary
- no major oil spills recently
- extensive bottom trawling by commercial fishers
- new outfall for Boston area wastewater lies three miles east of the sanctuary, but no studies show impacts on the sanctuary; some ask for more studies; others say the most important source of pollution is runoff, not the outfall
- long-established dump, formerly for toxic materials and currently for dredged materials, lies just east of the sanctuary; studies suggest a little drifting of spoils into the sanctuary; also, some fish may ingest toxins at the dumpsite and swim into the sanctuary

Resources and Authorities

Regulatory authorities

- 1992 statute prohibits oil and gas leasing, sand and gravel mining, lightering, and construction in the sanctuary; no current commercial interest in any of these activities
- 1992 designation document and management plan say the sanctuary will not regulate fishing
- 1992 designation documentation says the sanctuary will not regulate to protect whales from moving ships but might do so in the future

Resources

- \$ 513,000 annual budget (1998)
- three FTE and three part-time contract employees, including a half-time research scientist based at a National Underwater Research Center office in Connecticut
- 30-foot patrol boat
- annual 10-day visits of NOAA's 175-foot research vessel *McArthur*

Original Expectations for the Sanctuary

Local support for designation

- 1982: local Center for Coastal Studies and national Defenders of Wildlife recommend sanctuary
- mid-1980s: big increase in commercial and charter fishing plus whale-watching on Stellwagen Bank
- 1988: proposal for floating hotel/casino stirs opposition; 100-group coalition formed to fight for designation; one full-time advocate hired to lobby for designation

Congress drives action

- 1988: in reauthorizing the sanctuary program, Congress sets a 1990 deadline for completing a study of designating Stellwagen Bank
- 1992: Congress designates the sanctuary, just before NOAA releases its final proposal for designation

Current state of local interest

- coalition to support Stellwagen becomes inactive after designation; some leaders say that the coalition gave "little thought" to management after designation

- several regional museums and numerous NGOs are actively interested in the sanctuary, but they are scattered among the many communities that encircle the sanctuary
- whale watching operations are based in several different ports
- Center for Coastal Studies helps disentangle whales, with private and NMFS funding
- New England Aquarium, a major tourist attraction in Boston, runs a whale watching boat but has few exhibits about the sanctuary

Sanctuary Advisory Council

- slow to be formed; staff felt "trepidation" that the council might intervene unduly in management issues
- a third of the members stopped attending after the first five or six meetings; loss of quorum at some meetings
- new members added recently; current effort to revitalize the council by giving it a major role in framing a new management plan

Achievements

Coordination with other agencies

- a major objective of the sanctuary
- active involvement by the sanctuary manager in the Gulf of Maine Council and ancillary activities
- other agencies stop sending top managers to SAC after initial meetings
- very poor working relationships with most NMFS officials; little consultation or information sharing, some public disagreements on controversial issues

Research

- for a time, the sanctuary invested \$160,000/year in research to characterize habitat
- 10,000 hours of detailed mapping by submersibles
- substantial investment by other agencies in research near or within the sanctuary
 - USGS invests in mapping in partnership with the sanctuary
 - EPA-mandated monitoring near the Boston sewage outfall, but little monitoring of impacts on the sanctuary

- free use of NOAA ship McArthur during annual 10-day visits

Education

- busy schedule of visits to public schools, with 48-foot inflatable whale
- trying to build volunteer corps to make school visits
- award-winning video on whaling, produced jointly with Gray's Reef sanctuary
- additional curriculum materials and guides to materials
- attractive photo show on the sanctuary tours public spaces
- many other organizations in the area, much larger than the sanctuary, are also involved in public education and outreach

Opportunities for the Future

Favorable local climate for protection of the sanctuary

- political and social conditions in most of southern New England are favorable to measures to protect the sanctuary and other high-profile marine resources
- many nonprofit organizations in the area are working on marine issues and will work cooperatively with the sanctuary, when it has enough resources for cooperative projects

Rising popularity of "no-take" zones for fishing

- recent surge of support for no-take zones among commercial fishing community, after success of zones in increasing the size and number of scallops
- key foundations and environmental groups pushing strongly for marine zoning
- 1992 sanctuary plan rejected the option of regulating fishing, but neither NOAA nor local elected officials promised never to regulate
- however, NMFS has already begun to use "no-take" zones, and the fishing community would clearly prefer that NMFS, instead of the sanctuary, do so

Whale watching could be encouraged to be more environmentally responsible

- NMFS voluntary guidelines about how whale watchers should avoid hitting whales old and inadequate
- some whale watching firms, especially the more established firms, might support a program to certify on-board naturalists, if the certifying agency could demonstrate its capacity to develop a first-class program in consultation with the industry
- however, the sanctuary currently lacks resources to develop a certification program or to enforce regulations to prevent boats from striking whales
- the IMO would have to approve any regulations to avoid whale strikes, since much of the sanctuary lies more than 12 miles from shore

Strategic Questions and Choices

The sanctuary was created at a special time—when oil leasing, sand and gravel mining, and Gugel's Arabian Nights seemed to be imminent threats to the newly popular whale watching industry and when the local congressman was chair of the appropriations subcommittee for NOAA. The congressman has retired, and there are no dramatic threats to the sanctuary from large corporations or developers. Instead the issues are over-fishing and protecting whales from entanglement and ship strikes. NMFS already is working on both issues.

To emerge as an important force for stewardship, the sanctuary will need to set sharper goals, define specific ways it can add value to the activities of NMFS and other agencies, make a sustained commitment to public outreach and working partnerships that will advance these goals, and obtain additional resources.

What is the overriding purpose of the Stellwagen Bank National Marine Sanctuary?

- Unlike other large sanctuaries, Stellwagen Bank lies offshore, away from a stretch of beautiful coastline that it might protect.
- A broad commitment to stewardship or to integrated coastal management does not provide a specific mission or role for the sanctuary.

- The whales and the rich fishing grounds of the bank do provide a legitimate and easily-grasped focus for sanctuary activities.

What distinctive role can the sanctuary play in protecting whales, the fishing grounds, and the marine ecosystem that supports the whales and the fish?

- NMFS has both legal authority and more organizational resources than the sanctuary to protect the whales, fishing grounds, and the ecosystem.

- The sanctuary has a clear mission to protect these resources, and it has also demonstrated that it catalyze and develop useful research to guide protection.
- The sanctuary faces a choice: (1) assert a leadership role in “no-take” zones and regulating whale-watching, supplanting NMFS efforts in these areas, or (2) assert a more limited role and win support from NMFS for this role.

Appendix 2

Research Methods

The study was designed to answer two related questions: What is the potential of the national marine sanctuary program? And what steps can NOAA take to help the program fulfill this potential?

The project was guided by a panel of Academy Fellows and other experts. The panel and Academy staff met with NOAA officials four times during the study to frame key questions, discuss research findings, and review drafts. One meeting was held in the Florida Keys, where the panel met local leaders as well as the sanctuary manager.

The study draws on an intensive investigation of how the sanctuary program is operating at the 12 existing sanctuaries. The data base included extensive written and electronic information: statutes, regulations, brochures, educational materials, newspaper articles, web sites, and management plans, some of which were many years old.

Academy staff conducted over 200 field interviews, each lasting an hour or more, mostly in person but in some cases by telephone. The interviewees included the manager and key staff at each sanctuary, members of the sanctuary advisory committee (where one existed), and a cross-section of informed local residents, including commercial and recreational fishermen, divers, dive shop owners, charter boat operators, state and local officials, environmental advocates, marine scientists at nearby universities, volunteers, teachers, staff of aquariums and museums, and others.

Interviews were structured around four simple questions: What the individual expected of the sanctuary when he/she first became active in sanctuary issues, what had been accomplished, why expectations had or had not been met, and what he/she hoped the sanctuary could

achieve in the next few years. In virtually all cases, the very first question prompted a long discussion about the sanctuary, with many opportunities to probe deeper insights and explanations and to cross-check dates and other points of facts. The field visits to six sanctuaries also included attendance and discussion of the project at meetings of the sanctuary advisory council. At eight of the sites, project staff also made a field trip into the sanctuary (on a vacation day) to watch whales, dive, sail, or in one case to walk the intertidal zone.

Drafts of the sanctuary profiles were sent to the sanctuary managers, who generously corrected factual errors and suggested ways to sharpen the discussion of key strategic questions. The agency also provided comments on full draft report. Brock Bernstein, Graeme Kelleher, Wolcott Henry, William Eichbaum, and Paul Dye also provided very helpful comments on the draft.

The panel guided staff work, reviewed drafts, and met with NOAA officials to discuss the report before approving the final draft.

This project would not have been possible without the assistance of scores of people at each of the sanctuaries and in the national program office. Virtually without exception, they spoke on the basis of a deep personal affection for the sites and a strong belief in the potential of the sanctuary program to demonstrate a better way of managing human use of the ocean. We appreciate their cooperation and extend our thanks for their hospitality and candor.

Appendix 3

Project Panel Members and Staff

Panel Members

Jonathan B. Howes, *Panel Chair** - Special Assistant to the Chancellor and Professor of Planning and Policy, University of North Carolina at Chapel Hill. Former Secretary, Department of Environment, Health and Natural Resources (DEHNR), State of North Carolina; Research Professor and Director, Center for Urban and Regional Planning, University of North Carolina; Mayor, Town of Chapel Hill; Director, Urban Policy Center, Urban America, Inc.; Director, State and Local Planning Assistance, U.S. Department of Housing and Urban Development.

John J. Kirlin* - Director, Center for Urban Policy and Environmental Affairs, and Professor, School of Public and Environmental Affairs, Indiana University. Former Emery E. Olson Chair in Public-Private Entrepreneurship, School of Public Administration, University of Southern California, Sacramento; Interim Dean and Associate Dean, School of Public Administration, and Co-director, Sacramento Public Affairs Center, University of Southern California.

Jerry Schubel - President and Chief Executive Officer, New England Aquarium. Formerly Dean and Director of Marine Sciences Research Center, State University of New York at Stony Brook; Provost, State University of New York at Stony Brook; Adjunct Research Professor, Research Scientist and Associate Director, Chesapeake Bay Institute, The Johns Hopkins University; chair, National Research Council's Marine Board.

Nancy Tosta - Independent consultant. Formerly Research Director, Puget Sound Regional Council; Staff Director, Federal Geographic Data Coordinating Committee; Chief, Branch of Geographic Data Coordination, U.S. Geological Survey; Deputy Director, State of California Teale Data Center; GIS manager, California Department of Forestry and Fire Protection.

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