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May 2008

Masters project submitted in partial fulfillment of the requirements for the Master of Environmental Management degree in the Nicholas School of the Environment and Earth Sciences of Duke University

2008
ABSTRACT

The evolution of ocean governance began in the late 1960s and early 1970s with a number of resource-specific acts aimed at protecting certain species or environments. In the midst of this legislative activity, policy-makers realized that current measures would not protect all aspects of a marine environment. The result of this realization was the enactment of the Marine Protection, Research, and Sanctuaries Act of 1972, Title III of which is now known as the National Marine Sanctuaries Act (NMSA). The NMSA was the first, and remains the only, place- and ecosystem-based piece of ocean management. The mission given the National Marine Sanctuary Program (NMSP) was to manage and protect these areas while incorporating existing regulatory authorities, facilitating between multiple jurisdictions, and representing the interests of all international, public, and private communities and their uses. Given the continuing decline of our ocean environments, and increasing recommendations to move towards the type of management the NMSP practices, there is a need to better understand the current status of the program and how it can be improved.

This masters project evaluates the progress the NMSP has made towards achieving its mandate of resource protection, focusing on habitat conservation. Research was undertaken to investigate the Program as a whole, in addition to habitat protection in three individual sanctuaries. Inquiries focused on four key conservation project components: goals and objectives; science and monitoring; management tools; and, performance measures. An evaluation method already in use by the NMSP was modified to assess habitat conservation at the program and the individual site levels based on the four components.

Results indicate that while the Program does have habitat conservation as a working goal, methods implemented to better guide individual sanctuaries in achieving this goal are recent. As
a consequence, the new program measures are still being incorporated into each sanctuary management structure. Time will therefore be required for the program’s achievements to be recognized at the site level. The results of the case studies indicate varying degrees of habitat conservation per site. While one site was able to facilitate and regulate a good measure of protection, another study essentially failed on both levels and continual degradation of the habitat in this region readily occurs. A multitude of factors influence the performance of each sanctuary and ultimately, the sanctuary is only as good as the sum of its many parts.
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In the late 1960s and early 1970s catastrophic environmental events and congressional reports brought awareness to both the public and policy makers that our oceans were not as invincible as we had once believed. In the wake of this realization, policy makers responded with a barrage of resource-specific legislation such as the Marine Mammal Protection Act of
1972 (MMPA), the Coastal Zone Management Act of 1972 (CZMA), the Endangered Species Act of 1973 (ESA), and eventually, the Magnuson Fishery Conservation and Management Act of 1976 (MFCMA). In the midst of this legislative activity, policy makers realized that

“...these laws cannot in all cases provide a coordinated and comprehensive approach to the conservation and management of the marine environment.”

Their solution was to enact the Marine Protection, Research and Sanctuaries Act of 1972, Title III of which is now known as the National Marine Sanctuaries Act (hereafter NMSA). The NMSA was unique in that the Secretary of Commerce, acting through the National Oceanic and Atmospheric Administration (NOAA) was instructed to

“...identify and designate as national marine sanctuaries areas of the marine environment which are of special national significance and to manage these areas as the National Marine Sanctuary System.”

(Emphasis added)

Within these areas of special significance, the National Marine Sanctuary Program (hereafter NMSP) was directed to “...maintain the natural biological communities... and to protect...restore and enhance natural habitats, populations, and ecological processes.” The NMSA had just become the first, and only, place and ecosystem-based piece of ocean legislation.

The task given the NMSP had not yet been tried, and to complicate matters, the program was also given several additional stipulations. Because of the preexisting governance structures already in place within these marine areas, the NMSP was directed to manage in a fashion that complemented “existing regulatory authorities.” Furthermore, they were instructed to cooperate with the

“...appropriate Federal agencies, State and local governments, Native American tribes and organizations, international organizations, and other public and private interests concerned with the continuing health and resilience of these marine areas.”

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1 The National Marine Sanctuaries Act 1 [hereafter “NMSA”].
2 qtd. in Chandler 1.
3 NMSA 1. Note: the word “System” was added to the mandate during the amendment process in 2000.
4 NMSA 1.
5 NMSA 1.
The final and most controversial stipulation given the NMSP was “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....” Already in unfamiliar territory, the fledgling program had been given yet another untried task, civic ocean governance. Essentially, their assignment was to figure out how to protect ocean areas and all the resources contained within, while incorporating existing (and overlapping) legislation, facilitating between multiple jurisdictional boundaries, and representing the interests of all international, public, and private communities and their uses.

Today, the Sanctuary system consists of 13 Sanctuaries and one National Monument that encompass 158,000 square miles of ocean waters, and submerged lands. Geographically, they range from the Hawaiian Islands to American Samoa, and include the Pacific Coast, the Gulf of Mexico, the Atlantic Coast, and the Great Lakes. Sanctuaries range in size from a mere ¼ of a square mile to nearly 140,000 square miles. They were designated to protect a variety of resources, from a single shipwreck, to critical habitats such as kelp forests and coral reefs, to whale migration and feeding grounds, and eventually an entire string of islands.

In the current marine climate of crashing fish stocks, devastating declines in apex predator numbers, increasing numbers of species on imperiled lists, coral bleaching, habitat destruction, disease, invasive species, ocean acidification, and climate change, it is increasingly critical to revisit and re-evaluate our mechanisms of ocean governance. Today, concepts like ‘ecosystem-based management’, ‘adaptive management’, ‘sustainable use’, and the participatory process of ‘civic governance’ are being touted as the means by which we should manage our ocean spaces. As the NMSA is the only Act that even attempts to address all of these recommendations, it is extremely important to evaluate the program to find out if the NMSP has

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6 NMSA 1.
been able to live up to their mandate of resource protection, and, if not, what needs to happen in order for us to preserve these fragile spaces for future generations.

The range of protected resources and the all-inclusive nature of this program make it necessary to limit the scope of evaluation for this project. As Norse points out, “...physical alteration of ecosystems is the greatest single threat to biological diversity on land” and “the importance of physical alteration on marine biodiversity is often overlooked” even though “it probably ranks with overexploitation and pollution as the greatest near-term threats to life in the sea.”

Therefore, this project will concentrate on the habitat conservation component of the program, focusing on the physical alteration of marine habitats.

The basic structure of the NMSP, which consists of a broad program and unique individual sites, warrants a two-tiered evaluation approach. The first tier will evaluate the program as a whole to determine if habitat conservation is a working goal or essentially a ‘paper park’ (i.e. written but not implemented). If conservation of habitat is a working goal, is the program evaluating their progress towards this goal? The tier will conclude with a brief foray into the nature of the system of National Marine Sanctuaries (hereafter NMSs) and how this may relate to a system or network of Marine Protected Areas (hereafter MPAs). The second tier will evaluate the program at the individual site level, to determine how guidance from the Program is being translated into action on the ground. This tier will also address whether habitat conservation is a working goal at the site level. If so, how do sanctuaries go about conserving, and are they evaluating their progress towards conservation goals as well?

7 Norse 106.
CHAPTER 2. Methods

Research conducted for this study consisted of an in-depth literature and web-based review on several levels. I began with the history of the Act, the motivation behind its inception, the changes it has experienced over its 35 year narrative, the legislative Act itself, and the Sanctuary-wide regulations that govern it. I then reviewed the documents that guide the NMSP such as the Strategic Plan, the Regional Program Structure, the System-Wide Monitoring framework (hereafter SWiM), the Performance Evaluation Manual, the NMSP Progress Report and an external evaluation of the Program, in addition to other sources.

Following the initial background research, I investigated conservation evaluation literature to determine what elements were needed to administer an effective conservation project. My inquiry identified four key components:

1. clear goals and objectives so that the organization was clear in its purpose;
2. adequate science and monitoring to a) identify what was found within the environment, and b) determine how the environment was changing over time;
3. effective management tools to effect change; and
4. performance evaluation to measure the organization’s progress toward its goals and objectives.

The four criteria were applied to the evaluation of both the program and the sites however; management tools were excluded from the first tier since the overall program does not participate in the direct management of each site.

Because of the number of unique NMSs, the scope of this project made it necessary to select a small representative group of sites for evaluation. To begin, the two sites not entirely biological in nature, the Monitor NMS and the Thunder Bay NMS, were excluded because they are small and protect primarily historical shipwrecks. The Northwest Hawaiian Islands National Monument was also eliminated because of its recent establishment and its non-sanctuary status. From the remaining 10 sites I chose the Channel Islands NMS, the Flower Garden Banks NMS,
and the Stellwagen Bank NMS as the representative sample. The sites were selected based on several criteria. Each site in the sample group occupied a recently designated program region and together, represented three out of the four regions. The three primary water bodies surrounding the United States, the Pacific and Atlantic oceans, and the Gulf of Mexico, were also represented by the sample group. Most important, each sample site contained a unique combination of habitats.

Once the case study sites were identified, the literature and online review continued. I examined designation documents, sanctuary-specific regulations, management plans, action plans, current monitoring and scientific activities, and in one case study a sanctuary condition report, in addition to a multitude of other sources.

The analysis of the program and site tiers based on the four conservation project components required an evaluation method, and after some investigation into various methods I opted to slightly modify the format of the SWiM Condition Reports that the NMSP is now producing for each site. I adopted the format of unified questions asked of each case study, but refashioned the questions to fit the conservation components. The condition report also assigned qualitative scores to each question using a dual rating system which was also incorporated into the evaluation but again, slightly modified. The first score assigned a rating of good to poor that corresponded to a color strip ranging from green to red. The criteria used to apply the score were modified to fit this evaluation and can be found in Appendix I along with the scoring key. The second score is simply a directional symbol. An up arrow indicates progress or improvement, the dash signifies there is no evidence of a change occurring in the near future, and a down arrow implies a lack of progression or a decline. The scores were assigned to each question based on the best available information and value judgments.
CHAPTER 3. Legislative History and Management Structure

The first segment of this paper will complete the introduction of the NMSP by briefly describing the legislative evolution the NMSA has undergone during its long history. In addition, it will also outline the NMSPs managerial chain of command and its partnerships with other agencies to establish the program’s unique role in ocean governance. In section two, the evaluation of the program based on the three relevant conservation components will be presented, followed by conclusions. Section three presents the three chosen case studies, their evaluations, and conclusions to illustrate habitat conservation actions and effectiveness at the site level. Section four will draw general conclusions between the three case studies and describe the differences among them. Finally, connections among the overall program and the case studies will be offered, followed by final thoughts.

National Marine Sanctuary Program Legislative History

The NMSA began under a cloud of ambiguous language, conflict, and varying interpretation. The original idea was to design a governance system for the ocean akin to the terrestrial National Park system. But the ensuing battle over privatizing a public open-access resource and the economic hardships this would cause, served to weaken but not demolish the Act. The result was an Act whose purpose was contradictory and vaguely described, leaving room for interpretation and conflict. The law’s stated primary purpose was to preserve and restore unique ocean areas, but it did not mention any specific activities that would be prohibited. Instead, it gave complete autonomy to the Secretary of Commerce to decide what would be regulated or allowed within the sanctuary on a case by case basis. The ambiguous nature of the Act’s language led many policy-makers and industry leaders to the interpretation that sanctuaries

\[8 \text{ Chandler 42.}\]
would protect ocean resources for a variety of uses, including exploitation. As a result, the Act was viewed as a means for both preservation and multiple-use, ultimately balanced by the Secretary through NOAA. The balancing act, as Chandler pointed out, was further confounded by a number of other factors. The NMSA failed to set specific guidelines for sanctuaries on methods to accomplish the stated goals. In addition, instructions for integrating authority and responsibility among agencies and complementary legislation were omitted, and the program suffered from poor, inconsistent funding both politically and economically.  

Overlaying the initial policy is a hodgepodge of amendments handed down since 1972 that subtly changed the nature of the Act. To summarize Chandler’s analysis, from 1974-1984, oil developers and commercial fishermen, intent on limiting restrictions to their activities, worked diligently and fairly successfully to force the regulatory focus and purpose of the NMSA toward multiple-use. Increasing accounts of oil spills, beach contaminations, algal blooms, and mass dolphin deaths from 1985-2000, however, galvanized political and public will, and the language of ensuing amendments saw a subtle shift back towards a focus on the Act’s original purpose of preservation and restoration. In 1998, President Clinton extended the moratorium on existing oil leases and indefinitely prohibited any new leases within sanctuary boundaries. The effects of this shift although positive, were unfortunately small. Even though the preservation focus was strengthened, the multiple-use focus also remained strong. Furthermore, an Amendment to the NMSA enacted in 2000 placed a temporary moratorium on new designations until the current sites were adequately supervised and sanctuary resources were fully recorded.

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9 Chandler 53, 153.
10 Chandler 74.
The process of designating a Sanctuary was also a bit contentious. Each individual sanctuary was designated for a unique purpose—such as protection from oil and gas development; conservation of a unique natural habitat (Florida Keys NMS); protection of a cultural heritage site (Monitor NMS); or protection of a specific species whose condition has reached a critical stage (Hawaiian Islands Humpback Whale NMS). As a result, we have a system of randomly selected individual sites varying in size, program goals, activities, and issues with no real connection to each other, either biologically or administratively. As Chandler points out, the designation process was complicated and lengthy, and at times, out of frustration it was bypassed completely by the body that authored it, Congress.  

In addition, this same process must be followed if any change to current Sanctuary designation documents or regulations is deemed necessary.

National Marine Sanctuary Management Structure

The working structure of the NMSP is an intricately woven and all-inclusive framework that takes a broad and comprehensive approach to management. The structure is relatively simple, beginning with the President, the Congress, and the Secretary of Commerce (hereafter SOC). The SOC acts through NOAA, which houses several different departments, including the National Ocean Service (NOS), out of which the NMSP is now run, albeit unofficially. The Program structure itself is led by the Sanctuary Director, Regional Superintendents, and supporting staff.

At the individual sanctuary level the lines of authority and responsibility become considerably less clear. Sanctuary managers and staff now orchestrate a veritable circus of

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11 Chandler 80.
12 Chandler 134.
federal and state agencies, organizations, interest groups, and uses, while at the same time trying to protect the resources within their boundaries. For example, if a sanctuary lies in both federal and state waters, in general, the state has jurisdiction over the area extending from the shoreline to the 3 mile marker, and predominantly regulates fishing activities and manages some species of wildlife. From the 3 mile boundary to the 200 mile edge of the EEZ, various federal agencies have jurisdiction over certain resources, including fisheries, marine mammals, and endangered species. In addition, other activities are parceled out to different federal agencies. For example, the Minerals Management Service (hereafter MMS) regulates any existing oil and gas leases and their subsequent activities, while the Environmental Protection Agency (hereafter EPA) is responsible for regulating and maintaining water quality from land-based sources. Enforcement responsibilities are also divided with state departments of fish and game enforcing state regulations within their jurisdictions, and the U.S. Coast Guard along with NOAA’s Office of Law Enforcement assuming responsibility for enforcing federal regulations, including Sanctuary regulations. The NMSP has jurisdiction within the boundaries of the sanctuary and essentially assumes the role of facilitator among all agencies involved and any potentially affected interest groups. It also fills in any regulatory gaps left by the state and federal agencies. (See Appendix II for NMSP management structure flowchart)

Despite the wide variety of agencies that play a management role, the tremendous number of stakeholders involved (see table 1, pg. 19), and the management difficulties this can create, partnerships are the cornerstone of any sanctuary. Without the 385 partnerships that span the NMS system, the sanctuaries’ ability to conduct research, educate the public, monitor their resources, and involve the public in the management of their ocean spaces would be severely
curtailed. Partnerships allow a sanctuary to expand its resource base, and they are particularly important considering the limited funding allotted to the program.\textsuperscript{13}

\textsuperscript{13} “Partnerships in the National Marine Sanctuary Program” 1.
CHAPTER 4. Program Evaluation

Building the NMS Program and System

The temporary moratorium placed on new designations in 2000, and the conditions set forth to reinstate the designation process (effective performance)\textsuperscript{14}, forced the Program to concentrate on refining its mechanisms of management. Under the leadership of the program’s first long-time director, Dan Basta, who came to the program in 2000\textsuperscript{15}, the program has taken steps to move itself from a quasi-autonomous group of individual sites to a program “with shared goals, procedures, and standards.”\textsuperscript{16} Several program-level management mechanisms have been developed to achieve these goals, three of which will be the focus of this evaluation—the NMS Strategic Plan, the Performance Evaluation Manual, and the System-Wide Monitoring framework (SWiM)—and correspond to the three relevant conservation components of goals and objectives, science and monitoring, and performance evaluation.

NMS Strategic Plan

The original NMS Strategic Plan published in 2000, was a brief document containing broad goals and objectives but lacking specific guidelines on ways to accomplish the stated goals – or even a clear strategy in general.\textsuperscript{17} During the Office of Management and Budget’s (hereafter OMB) 2004 Program Assessment Rating Tool (hereafter PART) review, a performance-based assessment tool utilized by the Federal Government, the initial strategic plan was considered incomplete, and the NMSP immediately began to reformulate what is now its 10-year plan.\textsuperscript{18} Published in April of 2005, the new Strategic Plan consists of seven goals drawn from the

\textsuperscript{14} Chandler 83.
\textsuperscript{15} National Academy of Public Administration [hereafter “NAPA”] 4.
\textsuperscript{16} NAPA 5.
\textsuperscript{17} NAPA 16.
\textsuperscript{18} NAPA 16.
NMSA, along with 29 other objectives, and presents 19 performance measures designed to “serve as a bridge between the broad programmatic mandates contained in the NMSA and the daily operations as outlined in management plans and annual operating plans.”19

It is unclear if the goals and objectives were listed by order of importance but it is encouraging to note that habitat protection is included in the first goal of the Strategic Plan and mirrors the primary goals set by the NMSA.

“Goal 1: Identify, designate, and manage sanctuaries to maintain the natural biological communities in sanctuaries and to protect and, where appropriate, restore and enhance natural habitats, populations, and ecological processes, through innovative, coordinated, and community-based measures and techniques.” (Emphasis added)20

To aid sanctuaries in reaching this goal, the plan has outlined seven objectives, six of which are indirectly related to habitat conservation but are components of a successful conservation project and therefore have the potential to affect the preservation of habitats.

- **Objective 1**: Prepare sanctuary-specific management plans and regional and national programs and policies that utilize all program capacities to protect and manage resources.
- **Objective 2**: Conduct and maintain routine contingency planning, emergency response, damage assessment, and restoration activities to preserve and restore the integrity of sanctuary ecosystems.
- **Objective 3**: Develop and maintain enforcement programs and partnerships to maximize protection of sanctuary resources.
- **Objective 4**: Review and evaluate the NMSP’s effectiveness at site, regional, and national levels, through both internal and external mechanisms.
- **Objective 5**: Anticipate, characterize, and mitigate threats to resources.
- **Objective 6**: Assess and predict changes in the NMSP’s operating, natural, and social environments and evolve sanctuary management strategies to address them, through management plan reviews, reauthorizations, and program regulatory review.21

The final objective involves the designation of new sanctuaries and although this may be a possible consideration towards the end of this 10-year plan (2015), it is not relevant while the moratorium is still in place and so is not included here. The remaining six objectives are specific

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20 NMS Strategic Plan 4.
21 NMS Strategic Plan 4.
enough to indicate actions to be taken to achieve the ecosystem protection goal, but at the same time are general enough for each sanctuary to tailor the details of exactly how to execute the objectives to their own needs. This kind of flexibility is important in an organization composed of unique spaces, at varying levels of development, with distinct issues, resources, and needs.

The strategic plan also provides guidance on the direction in which forthcoming science and monitoring endeavors should be focused. The goal instructs sanctuaries to concentrate their efforts on understanding ecosystem processes, by continuing scientific research, monitoring and characterization activities that will enhance ecosystem-based management both within sanctuaries and throughout oceans in general. Three specific yet flexible objectives are put forth to accomplish this task.

- **Objective 1**: Expand observing systems and monitoring efforts within and near national marine sanctuaries to fill important gaps in the knowledge and understanding of ocean and Great Lake ecosystems.
- **Objective 2**: Support directed research activities that support management decision-making on challenges and opportunities facing sanctuary ecosystems, processes, and resources.
- **Objective 3**: Develop comprehensive characterization products of ocean and Great Lakes ecosystems, processes, and resources.\(^{22}\)

The goals and objectives clearly support and guide ecosystem-based protection, science, and monitoring activities, which follow the recommendations given by a host of scientists and the two major ocean governance evaluations, the Pew Oceans Commission Report, and the U.S. Commission on Ocean Policy.

**NMS Program Performance Measures**

In addition to the goals and objectives, the Strategic Plan takes a step toward performance-based management by including 19 Program Performance Measures (hereafter PPMs)\(^{23}\). The PPMs set measurable targets intended to help the program assess its progress

\(^{22}\) NMS Strategic Plan 5.  
\(^{23}\) NMS Strategic Plan 7.
toward goals and objectives. The targets are either impact- or output-oriented, and seven of these are being tracked actively by the OMB for use in the next PART review,\textsuperscript{24} which is estimated to be performed in FY 2009. \textsuperscript{25}

The PPM directly related to habitat conservation is an impact-oriented measure gauging the “number of sites in which habitat, based on long-term monitoring data, is being maintained or improved.”\textsuperscript{26} The NMSP Performance Evaluation Manual (hereafter PEM) outlines the measurement descriptions and procedures, target determination criteria, and staff responsibilities with which to assess the performance of the target.\textsuperscript{27} Habitat is to be assessed based on the status of abundance and distribution indicators, “structure, contaminant levels and human impacts.”\textsuperscript{28}

The status within each sanctuary will be reviewed and updated on an annually using the SWiM condition reports as a guide (see following discussion for SWiM details). If any of the indicators are experiencing a declining trend the sanctuary will receive a deteriorating mark.\textsuperscript{29} If a trend is not clear because of insufficient data, it is automatically presumed that conditions are being maintained and will be rated as such.\textsuperscript{30} The target set for measure 2 requires 9 sites to be listed as maintained or improved by the year 2010, with the ultimate goal of 12 sites by 2015.\textsuperscript{31}

The NMSP 2006 progress report—an internal evaluation of movement toward target measures—reveals that the program is ahead of schedule, with 10 sites in which habitat is being maintained or improved.\textsuperscript{32} Two items should be mentioned here. First, the Monitor NMS and the Thunder Bay NMS are not included in this target because of their purely archeological

\textsuperscript{25} “NMSP Response to NAPA Report Recommendations” 3.
\textsuperscript{26} NMS Strategic Plan 7.
\textsuperscript{27} “Performance Evaluation Manual for the National Marine Sanctuary Program” [hereafter “PEM”] 16.
\textsuperscript{28} PEM 16.
\textsuperscript{29} PEM 16.
\textsuperscript{30} PEM 17.
\textsuperscript{31} PEM16-17.
\textsuperscript{32} Progress Report 12.
nature. Second, although the Hawaiian Islands National Monument is included in the target, it is not considered in this analysis because it is not a sanctuary. Of the remaining 11 sanctuaries, habitats in 7 sites are exhibiting a maintenance trend or show “no indication of change.”

Two sites have deteriorating habitats based on siltation and invasive species indicators in one and on fishing impacts on deep-sea corals in the other. Status in the final two sites are rated as improving because of a trawling ban in one sanctuary and indications from seagrass and coral monitoring in the other.

One other PPM is worthy of discussion relative to habitat conservation, for as Salafsky et al. points out, “the starting point for any project is to define the specific conservation target that the project ultimately would like to influence.” In other words, you cannot protect it if you don’t know it’s there. PPM 4 addresses this problem by setting the target that “by 2015, 100% of the System is adequately characterized.” The NMSP Performance Manual first defines site characterizations as “records of information describing natural and cultural resources, biological and physical processes, as well as the human dimensions of sanctuaries and the ecosystems that contain them.” However, a characterization of this kind requires an enormous amount of resources and effort to obtain the necessary information, so the manual further refines the definition to distinguish between “adequate” and “adaptive” characterizations. An “adequate characterization” simply provides enough of the information from the original definition to inform decision makers and influence management responsibilities. A “characterization for

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33 Progress Report 12.
34 Progress Report 12.
35 Progress Report 12.
36 Salafsky et al. 1471.
37 PEM 22. Additional note: the Strategic Plan states the target date as 2010 but both the evaluation manual and the progress report indicate 2015 as the target date. Since these documents are slightly more current than the Strategic Plan the latter of the two dates was chosen.
38 PEM 22.
adaptive management’ takes the initial description one step further and expands it based on sanctuary-specific management concerns.  

Currently, each site has a characterization profile divided into seven components: “oceanography, water quality, habitat, LMR (Living Marine Resources), maritime heritage, anthropogenic influences, and bibliography.” Components are scored individually and added together across all sanctuaries to calculate a final percentage score that is updated annually. The NMSP reports that progress towards PPM 4 is ahead of schedule, with 85% of sites possessing an “adequate characterization” at the time of the evaluation in 2006. The remaining 17 performance measures are not directly related to habitat conservation but are still important, and so a complete list of measures can be found in Appendix III.

**System-Wide Monitoring Framework**

Until this point, the enhanced management mechanisms have covered shared goals and procedures, or performance measures, used to gauge the program’s progress towards the common goals. The System-Wide Monitoring framework or SWiM, provides the scientific data needed for the program to evaluate progress effectively. The combination of specific goals, procedures, and supporting science is slowly forming the basis of a common platform from which all individual sanctuaries can continue to grow and evolve as a network of protected areas.

Until recently, it was not a common practice for sanctuaries to gather scientific information concerning impacts to sanctuary resources or outcomes of sanctuary activities. Instead, monitoring and data collection within the NMSP were conducted “on a site-by-site basis, with independent development of monitoring programs tailored to address some, but not

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39 PEM 22-23.  
40 PEM 23.  
41 PEM 23.  
42 Progress Report 15.
all, priority information needs...”

This limited and short-sighted monitoring approach resulted, in part, from limited and fluctuating funding and, in part, from the fact that sanctuaries are inherently diverse, which causes their primary concerns and needs to be diverse, as well. For instance, most sites were not designed with a spatial context in mind and, as a result, cover only a portion of the feature, or represent only the specific species they were designated to protect (Hawaiian Islands Humpback Whale NMS). In addition, the emphasis placed on common issues depends on the available resources and the sanctuary’s location. For example, water quality is a common concern for all sanctuaries, but the exact issue can change from nutrient loading in coral reef sites, to visibility in maritime heritage sites, to various forms of pollution in sites located close to shore and human populations. In response to the challenges diversity of this kind presents to the design of a program-wide monitoring strategy, SWiM sets forth not a definitive plan requiring each site to gather like information, but an ecosystem-based design, implementation, and reporting process that can be applied at varying spatial scales and to multiple resources.

The framework begins by defining the three primary components of an ecosystem that are common to all sanctuaries—water, habitats, and living resources—and the general factors that affect the structure and function of these components (See Figure 1). Each sanctuary is able to tailor this basic design to its individual needs by adding details that identify important resources or processes within the particular site.

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44 SWiM 12.
45 SWiM 9.
Once primary resources and functions are identified, sanctuary staff begins to design the monitoring plan. The process outlined by SWiM consists of three phases: requirements, protocols, and observing.\(^{46}\) In the ‘requirements’ phase, staff members utilize sanctuary management objectives and their knowledge of current threats to develop a set of detailed questions “...clarifying priority issues, objectives and information needs...”\(^{47}\) In order to incorporate the primary ecosystem components into the monitoring plan, a set of 14 “system questions” are also considered.\(^{48}\) The system questions cover each of the three general components and correspond closely to the common resources and processes identified in Figure

\(^{46}\) SWiM 3.

\(^{47}\) SWiM 11.

\(^{48}\) SWiM 3.
1. The framework outlines four inquiries into water quality conditions and poses six questions designed to evaluate the status of living marine resources. To assess the state of habitats within the sanctuary, four questions are presented:

- What is the distribution of major habitat types and how is it changing?
- What is the physiological condition of biologically-structured habitats and how is it changing?
- What are the contaminant concentrations in sanctuary habitats and how are they changing?
- What are the levels of human activities that may influence habitat quality and how are they changing?  

Once the general and site-specific questions have been compiled and evaluated, sanctuary staff creates a “requirements matrix” that identifies significant resources and the variables that will need assessment in order to track changes in the resource over time.  

The second phase, “protocols”, involves crafting the details needed to carry out assessments on the variables the matrix identifies. Decisions are made regarding suitable sampling protocols that are based on the “field capabilities, prioritization of key variables, sampling and statistical requirements, and cost” to the sanctuary.  

Pilot studies are run if necessary, and the phase concludes with a set of implementation options that include “sampling intensity, expected detection capabilities, partners, timelines, milestones, and costs.”  

Logically, phase three, “observing”, consists of activating the chosen implementation options and actually conducting the science of “collection, processing, and reporting of data in order to make it useful for the continued protection and management of resources.”  

The implementation process will utilize development workshops, partnerships with other organizations, and program reviews to build upon the strengths and activities already existing.

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40 SWiM 10.
41 SWiM 12.
42 SWiM 3.
43 SWiM 3.
44 SWiM 3.
within each sanctuary. Ultimately, this will allow sanctuaries to expand their capacity to design a plan, manage data, and present information on a spatially appropriate scale.

The desired outcome of this entire design process is not only to collect the scientific data needed to evaluate progress toward conservation goals, but also to communicate the results of the sites’ current conditions in an appropriate manner to the specified audience. SWiM’s solution was to design a standardized reporting format in the form of a condition report. The report addresses the 14 general ecosystem questions and can be expanded easily to include future issues and concerns. Each question receives two grades, one indicating the quality of current conditions and one signifying the status of these conditions. Quality is identified using a color scale ranging from green to red that corresponds to scores from good to poor. Status is represented by a symbol: an arrow pointing up indicates improving conditions; an arrow pointing down symbolizes declining conditions; and a single horizontal bar means conditions are stable.

Condition reports will serve a couple of important functions. At the site level, the reports can be used to guide the direction of research efforts, contribute to management decisions, and enhance scientific understanding. They will also help program officials evaluate the NMSP’s progress toward – or any regression from – the goals and performance measures set forth by the Strategic Plan. Ultimately, once reports are completed for each sanctuary, the program will have the first-ever baseline status of current general conditions at each site since the program’s inception. Unfortunately, the program has failed to meet the target set by impact-oriented performance measures—water quality, habitat protection, and living marine resources—that call for condition reports. The goal was to produce condition reports for all sites by 2007, but by

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54 SWiM 16.  
55 SWiM 16.  
56 SWiM 15.  
57 NAPA 27.
March of 2008 only two sanctuaries had released reports, although a third (Flower Garden Banks NMS) has submitted its report to NOAA for comments.  

Evaluation

The following presents the evaluation report of the habitat specific guidance the program is providing for the sanctuaries in the areas of goals and objectives, science and monitoring, and performance measures. Management tools were not included in the evaluation, as direct management actions are employed only at the site level. The criteria used to determine the scoring can be found in Appendix I.

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### National Marine Sanctuary Program
#### Habitat Conservation Evaluation

<table>
<thead>
<tr>
<th>#</th>
<th>Question/Resources</th>
<th>Rating</th>
<th>Basis for Judgment</th>
<th>Description of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the program present clear and specific habitat conservation goals and objectives?</td>
<td></td>
<td>Specificity of goals and objectives stated by the NMSP's 2005-2015 Strategic Plan</td>
<td>Goal specifies protection of natural habitats - objectives include management plans, enforcement programs, and effectiveness evaluations.</td>
</tr>
<tr>
<td>2</td>
<td>Does the program present clear and specific habitat-specific science and monitoring goals and objectives?</td>
<td></td>
<td>Specificity of goals and objectives stated by the NMSP's 2005-2015 Strategic Plan</td>
<td>Goal specifies understanding of ecosystem processes through research, monitoring, and characterization - objectives include observing systems, research support for challenges facing resources, and characterization products.</td>
</tr>
<tr>
<td>3</td>
<td>Does the program present clear and specific performance measures and measurable targets?</td>
<td></td>
<td>Performance measures outlined by the NMSP's Performance Evaluation Manual</td>
<td>Measures are specific, targets are measurable by number, or % of sites, and by completion timeline.</td>
</tr>
</tbody>
</table>

### Progress of Performance Measures

<table>
<thead>
<tr>
<th>#</th>
<th>Performance Measure</th>
<th>Rating</th>
<th>Basis for Judgment</th>
<th>Description of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Number of sites in which habitat is being maintained or improved</td>
<td>▲</td>
<td>2006 National Marine Sanctuary Program Progress Report</td>
<td>10/12 sites maintaining or improving, surpassing 2010 target of 9 sites - 7/10 show no change - Major caveat found which questions performance rating.</td>
</tr>
<tr>
<td>5</td>
<td>By 2015, 100% of the sanctuary system adequately characterized</td>
<td>▲</td>
<td>2006 National Marine Sanctuary Program Progress Report</td>
<td>Target was 80% by 2006, and the program surpassed this by 5%.</td>
</tr>
<tr>
<td>6</td>
<td>By 2017, all sanctuaries will have monitoring programs that adequately track the status and trends of resources</td>
<td>▲</td>
<td>Performance measures outlined by the NMSP's Performance Evaluation Manual</td>
<td>New performance measure added since the 2006 progress report - target is 1 site by 2008 and all 14 sites by 2020.</td>
</tr>
<tr>
<td>7</td>
<td>By the end of 2007 all sites will have in place a Condition Report</td>
<td>▲</td>
<td>Number of published Condition Reports</td>
<td>Only 2/13 have published Condition Reports, although others have been submitted for comments.</td>
</tr>
<tr>
<td>8</td>
<td>Complete final management plans for all sites currently in management plan review by 2008</td>
<td>▲</td>
<td>2006 National Marine Sanctuary Program Progress Report</td>
<td>7 sites in review when target was made - 6 are still under review with only one completed - FGBNMS has also begun the review process.</td>
</tr>
<tr>
<td>9</td>
<td>By 2010, 100% of marine zones or networks of zones have methods implemented to assess their effectiveness</td>
<td>▲</td>
<td>2006 National Marine Sanctuary Program Progress Report</td>
<td>Target was 80% by 2006, status at the time of report was 70% - 2007 PPM has refined target to 100% by 2017 and indicates only 30% complete by 2007.</td>
</tr>
<tr>
<td>10</td>
<td>By 2010, all sites have a cooperative enforcement agreement and are able to demonstrate results</td>
<td>▲</td>
<td>2006 National Marine Sanctuary Program Progress Report</td>
<td>Target was 9 sites by 2006, and the program surpassed this by 2 sites.</td>
</tr>
</tbody>
</table>

### Evaluation Conclusions

The evaluation indicates that the NMSP is providing relatively clear and specific goals with respect to habitat conservation, particularly in light of just how specific the goals can be while still applying to the various sites. The gap left by the modicum of generality in the goals
and objectives allows each sanctuary to utilize the guidance and direction, but still tailor their plans towards the specific needs required by their individual environments and circumstances. Although the guidance for science and monitoring provided by the Strategic Plan’s goals and objectives is slightly less habitat specific, this gap again allows the sanctuaries the freedom to incorporate these ideas and strategies into their current science and monitoring frameworks focused on their specific management issues. In addition, the program supplements the scientific goals and objectives with the newly implemented SWiM design and reporting process, which concentrates specifically on issues facing our ocean habitats and will eventually promote the sanctuaries’ awareness of, and attention to, habitat concerns.

In addition to providing strategic directions, the program is also beginning to track its performance and progress using measurable targets delineated by timelines. The evaluation indicates that measures directed toward healthy habitat conditions, characterization, and enforcement are proceeding satisfactorily and ahead of schedule. At the same time, measures regarding monitoring programs, condition reports, management plan reviews, and zoning effectiveness are either doing poorly in meeting their targets or have not yet reached their first timeline benchmark, so their performance has yet to be determined.

A key factor to consider here is that, overall, these measures are relatively new to the program, and the measures that are deficient or undetermined require a number of elements to achieve success. First, the sanctuaries must devote an enormous amount of resources, staff, and time to facilitate these projects within the civic governance structure, particularly the management plan reviews. Second, since many of these measures and processes (condition reports, monitoring programs, and management plan reviews) are new, the learning curve tends to be quite high during the first run-through, increasing the amount of time it takes to complete
these projects as adjustments are made along the way. Third some of these measures are contingent on the completion of others such as the condition reports and the creation of monitoring plans. Finally, projects, particularly the management plans, must ultimately be approved by NOAA – and unfortunately, NOAA has been and remains sluggish in response, making it difficult for the sanctuaries to move forward in a timely manner.

While the results of the program evaluation indicate that the program is heading in the right direction in terms of goals and objectives and the use of performance measures, the program’s rating of these measures are a reminder that despite all the positives, the program is still struggling to balance human use and resource protection. For example, the second performance measure, which assesses the number of sites in which habitat is being maintained or improved, assigns a rating based on the conditions of abundance and distribution, biological structure, contaminants, and human activities. If any one of these factors is damaging the habitat’s health, the site should be assigned a declining rating according to the performance manual. However, the rating assigned to the site by the program excludes the human activity category on the grounds that there have been documented cases in which human activity has not harmed the habitat.59 As a result of this exclusion, the habitat at a site can be declining because of human activities such as bottom trawling but can still be rated by the program as being maintained or improved. It is disturbing that the very reason for the creation of the NMSA—the increasing negative human footprint on ocean resources—is the very thing that is excluded from the performance rating of all three impact-oriented performance measures (habitat, water quality, and living marine resources).

In sum, the program appears to be doing some of the right things with respect to habitat conservation in that it is providing relatively clear goals and objectives for both habitat

59 PEM 17.
protection and science and monitoring activities. The existence of performance measures and the fact that the program is actively evaluating its progress toward these measures can also be viewed as positive. Together, these three components could collectively represent a working goal of habitat conservation for the program. However, it is difficult to ignore the exclusion of human activity from the habitat condition rating given by the program, particularly when the results of human activity fueled the inception of the NMSA to begin with. The status of condition reports and management plan reviews also cannot be discounted, and the combination of these two factors undermines the effectiveness of the performance measure component. It must be concluded, therefore, that the program is on its way to achieving a working goal of habitat conservation but has not successfully completed all the necessary components.

System

The NMS Strategic Plan, Program Performance Measures, and SWiM framework are working together to build a unified yet flexible basis for the program and in doing so are also providing the foundation upon which a NMS System can be built. Despite the fact that the word “system” was added to the NMSA mandate in 2000, it is difficult to say how much progress has been made to this end. The NMSA does little to define what a “system” is, except to say that it “shall consist of national marine sanctuaries designated by the Secretary in accordance with this chapter”. However, the free online dictionary defines a system as “a group of interacting, interrelated, or interdependent elements forming a complex whole”, and it appears that a step in this direction was made in 2005 with the implementation of a regional management structure. The regional structure divides the U.S. EEZ into “four regions: 1) Northeast, Mid-Atlantic, and

60 Chandler 83.
61 NMSA 3.
Great Lakes; 2) Southeast, Gulf of Mexico, and Caribbean; 3) West Coast; and 4) Pacific Islands” and assigns a superintendent to each region. The superintendent serves as a liaison among the director of the program, the sanctuary managers, and other organizations in the region, in addition to being instrumental in many of the upper-level planning and management review activities. Eventually, the structure will “increase overall program coordination and integration, evolve an ecosystem-based management direction to the NMSP and streamline decision-making.” The new management structure will be implemented in five phases and at the present time, the program is in phase one of five. So although the program is not yet acting as a unified system, it is keeping an eye toward the future and working to create a foundation upon which a system can be built.

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64 Regional Structure 5.
CHAPTER 5. Case Study Evaluations

Each of the three case studies represents a conservation project within the NMSP and each evaluation will concentrate on the status of the four key conservation components: goals and objectives specific to habitat; science and monitoring related to habitat conservation; the management measures directly affecting the conservation of habitat; and performance evaluation. It is important to note here that performance measures per se, are not currently in effect for any of the case studies; however, all three sanctuaries studied are in the management plan review process, during which sanctuary-specific measures have the potential to be added to the new plans.

For each of the three case studies, a brief introduction to the sanctuary’s designation and a description of the resources that make the area nationally significant are presented. Second, the unique habitats found within the sanctuary are described and the specific threats these habitats face are identified. Third, habitat-specific goals and objectives are described briefly, along with current science and monitoring activities. Fourth, the distinctive management structure, the combination of major partnerships, and their jurisdictions and responsibilities are laid out. Fifth, the particular blend of mitigation measures—including management plans, regulations, zoning, and enforcement—employed by each sanctuary to manage its habitats is presented. Sixth, a brief foray into the status of performance evaluation is introduced. Last, the evaluation is presented and its conclusions summarized.
Channel Islands National Marine Sanctuary

CINMS Background

Sanctuary Setting

The Channel Islands National Marine Sanctuary (hereafter CINMS) was designated by President Carter in September 1980 and became the third National Marine Sanctuary in the United States. Located 8 to 40 miles off the southern coast of California, the sanctuary covers approximately 1,252 square nautical miles of shallow and deep waters surrounding the islands of

66 CINMS 1983 MP.
San Miguel, Santa Rosa, Santa Cruz, Anacapa, and Santa Barbara.\textsuperscript{67} The boundaries of the sanctuary extend from the mean high water line seaward to a distance of 6 nautical miles.\textsuperscript{68}

Within these boundaries lies a unique ecosystem that supports a rich variety of habitats and sea life. The ecosystem is significant because of the oceanographic conditions created by its geographical position in the ocean. Situated within the “‘Continental Borderland’, a 300-mile long oceanographic region...of basins and elevated ridges” and more specifically, the Southern California Bight (a large marine ecosystem)\textsuperscript{69}, the CINMS occupies a transition zone spanning three distinct bioregions.\textsuperscript{70} The California Current brings cold waters from the north that form the cold Oregonian Province, while the California Countercurrent brings warm southerly waters that fuel the warm California Province region. These two currents meet and mix, creating a transition zone, the third bioregion. The meeting of these currents, in concert with prevailing wind patterns, creates a highly productive seasonal upwelling supporting a rich variety of plants and animals.\textsuperscript{71}

The sanctuary is best known as the feeding and breeding grounds for seven species of pinnipeds.\textsuperscript{72} The area is also home to a multitude of marine plants, invertebrates, fish species and the occasional threatened sea otter. In addition to the year-round residents, the sanctuary plays host to a wide variety of migratory species such as 33 species of cetaceans, the occasional sea turtle, and 195 species of seabirds—several of which are threatened, endangered or species of concern.\textsuperscript{73}

\textsuperscript{67} CINMS 1983 MP.
\textsuperscript{69} DMP 15.
\textsuperscript{70} DMP 16.
\textsuperscript{71} DMP 17.
\textsuperscript{72} DMP 25.
\textsuperscript{73} DMP, pg. 24-25.
Besides sustaining such an assortment of marine life, the sanctuary holds important links to the past and the present. The aesthetic beauty and the richness of marine life in the area support a range of human activities from recreational to commercial. Leisure pursuits include sportfishing, consumptive and non-consumptive diving, wildlife viewing, boating, sailing, kayaking, and a smattering of surfing. The commercial industry consists of fishing, kelp harvesting, oil and gas development, shipping, and military activities. The sanctuary is also vital to scientific research endeavors. At the same time, underwater, the past is revealed and relived through the discovery of shipwrecks, aircraft wrecks, and prehistoric archeological locations.74

**Habitats and Threats**

Habitats are a cornerstone of every sanctuary environment, and their inclusion as a key component in SWiM’s ecosystem framework (Figure 1) provides confirmation. The Channel Islands NMS, with its mixture of warm and cool waters, sustains a rich array of habitats, which, in turn, support the equally rich array of marine creatures. Habitat types found within the CINMS are listed below along with their key ecosystem roles.

- **Giant kelp forests.** One of the most ecologically important habitats, this keystone species attaches to rocky substrate and can grow to lengths in excess of 100 ft.75 These massive underwater forests, with their dense tops, provide essential services such as, food, shelter from predators, nursery grounds, and attachment sites for thousands of invertebrates and fishes.76
- **Surfgrass and Eelgrass beds.** These grounds also supply food and refuge for many marine creatures. Eelgrass beds are also important for essential ecosystem processes such as primary production and nutrient cycling, and they also help to stabilize the substrate.77
- **Intertidal Zone.** Within the Sanctuary, this zone includes 94.5 miles of rocky shores mixed with about 47 miles of sandy coastline that experience alternating wet and dry conditions with the movement of the tides. These rocky and sandy environments support many creatures including algae, sedentary and mobile invertebrates, foraging seabirds, and seals and sea lions needing places to haul out of the water.78

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74 DMP 28-33.
75 DMP 18.
76 DMP 18.
77 DMP 18.
78 DMP 19.
• **Nearshore Subtidal Habitat.** This environment extends from the seaward portion of the intertidal zone to depths of approximately 99ft and includes both rocky and sandy habitats. Rocky territories are the most common in the sanctuary and are characterized by volcanic reefs that are dominated by a wide range of invertebrates and Giant kelp beds. Sandy subtidal zones are sufficiently sloped and alternate between patches of fine grained sand and coarse shelly sand with the occasional meadow of eelgrass.79

• **Deep Water Benthic Habitat.** This environment is characterized by fine sand, silt, and clay, and it extends from the edge of the nearshore intertidal zone to more than 660 ft. in depth. Although no marine plants can survive at these lightless depths, the area is inhabited by “sponges, anemones, cup corals, sea fans, bryozoans, feather stars, brittle stars, sea stars,” lamp shells and demersal fishes.80

• **Water Column Habitats.** The water column is divided vertically based on light penetration, temperature, oxygen levels and density. Beginning on the surface the zones are: microlayer, photic, mesopelagic, and bathypelagic.81

The relative distance (8-40 miles) of the CINMS from the mainland allows the area a certain modicum of protection, but the area is still threatened by human pressures both within and outside of the sanctuary’s control.

• Consumptive diving – Divers may damage habitats during collection.
• Non-consumptive diving – Divers may damage habitats by direct contact.
• Commercial fishing – Destructive fishing gear such as nets, traps, and trawls of all kinds.
• Recreational fishing – Damage resulting from vessel anchoring.
• Kelp harvesting – Damage resulting from exploitation.
• Boating – Damage may result from vessel anchoring.
• Oil and gas development – Seabed alteration resulting from the development of leases in place before March 31, 1981.82

The majority of threats presented above concentrate on the physical alteration and destruction of the seabed primarily because this threat inflicts the most direct, instantaneous, debilitating, and lasting effects on the habitat. The physical alteration of the sanctuary can be attributed to certain activities: anchoring, destructive fishing gear, exploitation, old oil and gas leases, marine debris, and direct human contact.

**Management Goals and Objectives**

79 DMP 19.
80 DMP 20.
81 DMP 20.
Realizing that the features found in this marine area were not commonplace, the sanctuary “was established to protect significant marine resources and, in doing so, ensure that visitors would continue to appreciate and enjoy the area.” Resource protection was assigned as the top management priority, followed by research, interpretation and visitor use. Because it was 1983, and early in both the program’s and the sanctuary’s development, objectives were general: coordination and collaboration with other agencies; promoting public awareness; development and coordination of enforcement; and developing emergency response plans to reduce threats to sanctuary resources.

Although these goals and objectives are still in effect despite being 25 years old, there is change on the horizon. Sanctuary officials, looking to incorporate new management techniques and advancing technologies to better address the biological and human changes taking place within the sanctuary, have embarked on a management review process. The review process began in 1998 with advisory council meetings and public scoping meetings, after which a Draft Environmental Impact Statement (DEIS) and a Draft Management Plan (DMP) were crafted. On March 14, 2008, a Supplemental Draft Environmental Impact Statement (SDEIS) that addresses more fully gray water and sewage discharges from large vessels was cleared by NOAA, but the sanctuary is still awaiting approval of its Supplemental Notice of Proposed Rulemaking. The final step is to complete the Final EIS and Final Management Plan and receive the Final Rule from NOAA.

The revised management plan presents updated and more specific goals. The primary mission of the sanctuary, while still retaining the original resource protection sentiment, now

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83 CINMS 1983 MP.
84 CINMS 1983 MP.
85 CINMS 1983 MP.
86 DMP 9.
88 SSR 2.
asserts that the sanctuary “is to conserve, protect, and enhance the biodiversity, ecological integrity, and cultural legacy of marine resources surrounding the Channel Islands for current and future generations.”

Goals designed to achieve the revised mission, specifically habitat conservation, mirror the purposes and policies presented by the NMSA:

1) Protect the natural habitats, ecological systems and biological communities of all living resources inhabiting these areas, and the area’s cultural and archaeological resources, for future generations;
2) Where appropriate, restore and enhance natural habitats, populations and ecological systems.

Other accompanying goals also reflect the NMSA in that they stress coordination and cooperation with other agencies and regulatory authorities, as well as allowing public and private uses as long as they are compatible with resource protection.

Science and Monitoring

Goals and objectives related to science and monitoring in the 1983 management plan are as general as those pertaining to habitat protection. The broad goal of ‘research’ is followed by objectives outlining activities such as framework and procedures development, effective use of results, and information exchange.

Although the revised goals presented in the DMP are not related specifically to science and monitoring and allude only to its continuation by creating models, it is reasonable to expect that the sanctuary’s current level of activity will be maintained if not expanded. First, the conservation science action plan introduced in the DMP presents a number of projects to be continued or implemented. And second, the implementation of the SWiM framework and the eventual monitoring plan will also bolster their science and monitoring activities.

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89 DMP iii.
90 DMP 7.
91 DMP 7.
92 CINMS 1983 MP.
CINMS is fortunate in that it has a number of strong partners that add significantly to its science and monitoring capabilities. For example, aerial kelp bed monitoring and eelgrass surveys have been conducted since the 1990s. Scientists at Channel Islands National Park (hereafter CINP) have been conducting long-term monitoring of the rocky intertidal zone and kelp forests since the early ‘80s, and they added beaches and coastal lagoons to their work in the mid-‘90s. In addition, the CINMS and the National Centers for Coastal Ocean Science (NCCOS) partnered a few years ago to create a Biogeographic Assessment of the CINMS. It is designed specifically to support the expansion of sanctuary boundaries but is an assessment nonetheless. And while only about 1/3 of the seafloor within the sanctuary has been adequately mapped by the USGS and other partners the remaining territory is to be mapped by the California State Waters Mapping Program within the next two years. The state marine reserves have also provided a rich environment for scientific study, and recent results indicate that in areas with more urchin predators like the California sheephead, kelp forests are more plentiful. Hamilton et al., also assert that reduction of fishing pressures on key predators leads to “more productive and stable kelp forests.”

Management Structure and Partnerships

The geographic position and composition of the CINMS determine the full range of the management structure with respect to the members involved and the combinations of partnerships. Although the sanctuary’s closest point to mainland of California is outside the state’s 3-mile jurisdictional area, the site’s proximity to the Channel Islands, which are under state jurisdiction, brings the state back into the management equation. As a result, the management structure includes the full gamut of agencies that play roles in operating the

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93 Cochrane, Guy. “The Seafloor around the Channel Islands”.
94 Hamilton et al. “Difference in marine communities in the Channel Islands marine reserves and surrounding waters”.

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sanctuary, namely all relevant federal, state, and local agencies, tribal organizations, stakeholders, and members of the public. Figure 3 lists the primary federal, state and local agencies that are integral in managing the CINMS.

Figure 3

<table>
<thead>
<tr>
<th>CINMS Partnerships</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Other NOAA Offices</strong></td>
</tr>
<tr>
<td>• NOAA Fisheries – NMFS</td>
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<tr>
<td>• NOAA Corps</td>
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<tr>
<td>• The Office of Response and Restoration (OR&amp;R)</td>
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<tr>
<td>• Sea Grant</td>
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<tr>
<td>• Damage Assessment Center (DAC)</td>
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<td>• Office of Coastal Resource Management (OCRM)</td>
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<td>• The National Estuarine Research Reserve System (NERRS)</td>
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<td>• Special Projects Office (SPO)</td>
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<tr>
<td>• The National Centers for Coastal Ocean Science (NCCOS)</td>
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<tr>
<td>• MPA Center</td>
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</tbody>
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<table>
<thead>
<tr>
<th><strong>State of California</strong></th>
<th><strong>Local Government Agencies</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>• The California Resources Agency</td>
<td>• The County of Santa Barbara</td>
</tr>
<tr>
<td>• The California Coastal Commission (CCC)</td>
<td>• The County of Ventura</td>
</tr>
<tr>
<td>• The California Department of Fish and Game (CDFG)</td>
<td>• Coastal Municipalities</td>
</tr>
<tr>
<td>• The California Fish and Game Commission</td>
<td></td>
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<tr>
<td>• The California State Lands Commission (CSLC)</td>
<td></td>
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<tr>
<td>• The California Historical Resources Commission (HRC)</td>
<td></td>
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<tr>
<td>• The California Environmental Protection Agency</td>
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</tbody>
</table>

In order to understand how all of these agencies fit together, it’s important to know over what resource(s) each agency presides and the spatial extent of their authority. At the heart of the sanctuary is the string of islands from which it takes its name. The islands have been designated as a National Park and therefore are managed by the National Park Service (NPS). The responsibility of the NPS is to “conserve scenery, national, and historic objects and wildlife and provides for the enjoyment of those resources in a manner that will leave them unimpaired
for the enjoyment of future generations.\footnote{95} The boundary of the Channel Islands National Park (hereafter CINP) extends seaward one nautical mile, over which the CINP has proprietary jurisdiction, with the exception of San Miguel Island, where their role changes to a non-proprietary status over the same distance.\footnote{96} The state of California regulates, manages, and enforces the waters and marine resources (particularly fisheries) from the mean high tide line to three nautical miles offshore. The California Fish and Game Commission is the regulatory body, while the California Department of Fish and Game actively protects habitat and manages fish and game stocks through enforcement and research activities.\footnote{97} The jurisdictional boundary of the CINMS extends from the mean high tide line to a distance of six nautical miles, and within overlapping jurisdictions the CINMS adopts a supportive and supplementary joint management role.

Things get slightly more complicated with respect to living resources. Although the CINMS is charged with protecting the full range of marine resources, there are certain resources that are also under the authority of other federal agencies with whom the sanctuary is required to coordinate and cooperate. For example, the National Marine Fisheries Service (hereafter NMFS) is responsible for the assessment, management, and enforcement of the nation’s fisheries within the Exclusive Economic Zone (waters 3-200 miles offshore). The NMFS also approves Fisheries Management Plans (FMP) written by the Pacific Fisheries Management Council (PFMC), and it shares the implementation of the MMPA and the ESA with the U.S. Fish and Wildlife Service (USFWS).\footnote{98} Aside from the management of sea otters, walruses, and brown pelicans, the NMFS is responsible for all marine mammals.\footnote{99}

\footnote{95} DMP 45.  
\footnote{96} DMP 45.  
\footnote{97} DMP 49.  
\footnote{98} DMP 41.  
\footnote{99} DMP 47.
A multitude of other agencies are involved in the management of the sanctuary in one way or another, but for the scope of this project only the major regulatory and enforcement bodies are discussed. However, one final agency is deserving of mention, the U.S. Coast Guard (USCG). While the CDFG enforces regulations within state waters, and the NMFS enforces fishing regulations, the USCG is responsible for enforcing all other federal laws and regulations, which includes assisting the sanctuary with the enforcement of their regulations.  

Aside from balancing jurisdictional lines, resource divisions, regulatory bodies, and enforcement territories, the sanctuary is also involved in many scientific ventures and monitoring projects a sample of which was mentioned in a previous section. In order to expand their capacity to conduct science and monitoring, the sanctuary depends on its partnerships with a suite of academic institutions, federal scientific programs, and community volunteers, without whom much of the knowledge the sanctuary needs to make informed management decisions, would not be available.

Mitigation Tools

The following section reviews the actions CINMS officials have taken directly or facilitated in an effort to conserve habitat within the sanctuary. Salafsky et al. describe four general categories into which conservation actions can be grouped: “direct protection and management, law and policy, education and awareness, and changing incentives.” Education and awareness are clearly an integral part of any conservation project and should in no way be downplayed, but for the scope of this project, only the first two groups of actions will be included. Although the last two groups are important, they do not directly effect change within

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100 DMP 47.
101 Salafsky et al. 1472.
the sanctuary, nor do they come with consequences if they are ignored. For example, a person can be educated about how his actions will affect the environment, but it is still his choice to make a lifestyle change, or not. If no change is made, the consequence to the individual is indirect, felt by the environment but not directly by the person. Consequently, attention will be centered on conservation actions that directly relate to habitat conditions, such as management plans, marine zoning (direct protection), and sanctuary regulations (law and policy).

*Management Plans*

The most common of conservation tools, management plans are in place in every NMS: in fact, a sanctuary cannot be established without one. Plans contain goals and objectives for the area, action plans that outline the projects or procedures to be followed in order to reach their targets, and, in the recently revised management plans, performance measures and metrics to gauge progress toward goals and objectives. Although plans also contain much other needed information, it is more administrative in nature and therefore not directly relevant to habitat conservation.

Goals and objectives for the CINMS, both current and proposed, were presented in a previous section, so action plans will be the primary topic of discussion here. The action plans of the 1983 management plan, although technically still current, are geared toward the initial developmental needs of a newly designated space. The resource protection action plan includes details on the planning, training, and reporting of enforcement, as well as contingency planning, compatible use, and the preparation of an operational plan.\(^\text{102}\) Twenty-five years later, these are completely out of date and out of touch with the sanctuary’s needs. Therefore, the proposed action plans, being far more relevant to current and future situations, will be focused on,

\(^{102}\) CINMS 1983 MP.
particularly since the review process is so close to completion, after which the old plan will become obsolete.

The CINMS Draft Management Plan (DMP) identifies 10 areas in which future actions will be carried out: “public awareness and understanding; conservation science; boundary evaluation; marine zoning; water quality; emergency response and enforcement; maritime heritage resources; emerging issues; operations; and performance evaluation.” Of these 10 actions, four contain a link to habitat management: conservation science; marine zoning; emerging issues; and performance evaluation. Although none of these plans directly affects the condition of habitats within the sanctuary on a day-to-day basis, they do affect how habitats will be managed in the future. For instance, scientific information can influence future actions, the development of new management techniques can increase protection, adaptive management measures can address emerging issues, and performance evaluation can determine if actions are having the desired effect.

The conservation science action plan identifies six projects designed to increase the sanctuary’s knowledge of the ecosystem’s health. The proposed projects focus on three areas, assessment, monitoring, and processes, and include aerial surveys, continued site characterization, data management, interpretation, and the monitoring of marine reserves. The information gathered through these endeavors will help the sanctuary identify information gaps, develop new protection strategies, aid restoration efforts, and mitigate threats.

The final three action plans can be taken at face value. The marine zoning action plan simply evaluates spatial data to identify areas in which general marine zoning may be beneficial. The emerging issues action plan outlines a procedure to mitigate these potential problems by

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103 DMP 58.
identifying them and formulating a response. Finally, the performance evaluation plan monitors progress over time and reports results.

Regulations

Another conservation tool that each sanctuary uses in their conservation projects, are regulations. Essentially, each sanctuary has two sets of regulations. The first includes those set by the NMSA that are in effect in all sanctuaries. In general, these rules prohibit injuring a managed resource, removing or selling a resource, interfering with the enforcement or implementation of the NMSA, and violating any provisions, regulations, or issued permits.\(^\text{104}\)

The second set of regulations includes those that are sanctuary-specific. Currently, only two regulations affect habitat. The first, providing an exception to allowed oil and gas activities prohibits,

(i) Constructing any structure other than a navigation aid,
(ii) Drilling through the seabed, or
(iii) Dredging or otherwise altering the seabed in any way, other than
    (A) To anchor vessels, or
    (B) To bottom trawl from a commercial fishing vessel.\(^\text{105}\)

The second prohibits cargo vessels from entering the waters within one nautical mile of any island. This regulation also excludes fishing vessels, and it adds recreational and research vessels to the exclusion.\(^\text{106}\) While these regulations provide a modicum of protection from industrial uses they essentially exclude all potentially harmful human activities.

Because the CINMS is in a transition state in terms of the management plan, which includes updated and expanded regulations, the proposed regulations are also presented here to illustrate potential changes. In general, the CINMS regulations prohibit activities such as:

- new hydrocarbon production,

\(^\text{104}\) NMSA 9.
\(^\text{105}\) National Marine Sanctuary Program Regulations 137.
\(^\text{106}\) National Marine Sanctuary Program Regulations 137.
• mineral projects, (new)
• discharging harmful matter within or outside of the sanctuary,
• operating cargo vessels within one nautical mile of the islands,
• flying aircraft below 1000 ft.,
• removing or injuring a historical resource,
• taking or possessing any marine mammal, sea turtle, or seabird, (new)
• damaging any sanctuary sign, (new)
• introducing an invasive species, (new) and
• operating a personal watercraft within the National Park. (new)\textsuperscript{107}

Two regulations have an effect on habitat. The first one prohibits:

“...drilling into, dredging, or otherwise altering the submerged lands of the Sanctuary; or constructing or placing any structure, material, or other matter on or in the submerged lands of the Sanctuary, except as incidental to and necessary to:

i. anchor a vessel;
ii. install an authorized navigation aid;
iii. conduct lawful fishing activity;
iv. lay pipeline pursuant to exploring for, developing, or producing hydrocarbons; or
v. explore for, develop, or produce hydrocarbons as allowed by subparagraph (a) (1) of this section.”\textsuperscript{108}

It is interesting and perhaps slightly alarming that the regulation has changed to exclude ‘lawful fishing activities’. The broadening of the language, which is meant to decrease confusion on gear allowances within the sanctuary, appears to effectively relinquish any control the sanctuary might have had on fishing practices and cedes authority to the appropriate state and federal agencies. However, in this case, it’s not as bad as it sounds. The state and federal fishing authorities in this area seem to be concerned with both conservation and extraction instead of just the latter. Only time will tell if this is a good move on the part of the sanctuary.

The second habitat-related regulation prohibits:

“Abandoning any structure, material, or other matter on or in the submerged lands of the Sanctuary.”\textsuperscript{109}

\textsuperscript{107} DEIS D-28.
\textsuperscript{108} DEIS D-28.
\textsuperscript{109} DEIS D-28.
In sum, hydrocarbon exploration and development are still happening within the sanctuary, but the active leases were grandfathered in, and the only two platforms still in use are nearing the end of their productive cycle.\footnote{DEIS 3-43.} Anchoring is still allowed within the sanctuary and with increasing visitor use has the potential to be a significant issue in terms of habitat protection. Finally, it is well documented throughout the scientific community that fishing practices utilizing certain types of gear, particularly trawlers, are destructive to habitats, and although the sanctuary could technically regulate fishing, CINMS does not. However, the CDFG, NMFS, and their councils have set up some protective regulations. For instance, bottom trawls are prohibited in state waters (0-3 NM), gill nets and trammel nets are prohibited for all species to either the 70-fathom mark or 1 NM, prawn and shrimp traps are prohibited inside 50-fathoms, and spot prawn trawls are prohibited.\footnote{DEIS 3-99—3-100.}

**Zoning**

The CINMS has used marine zoning as a management tool since its designation. In the beginning, the sanctuary created a 1 NM zone around the islands from which large cargo vessels were excluded, and a 1000 ft. zone above the sanctuary, which aircraft could not enter. In the past five years, however, CINMS has made great strides in expanding marine zones. In 2003, the state of California and the CINMS implemented a set of 10 marine reserves and 2 conservation areas covering approximately 10% of sanctuary waters.\footnote{“Alolkoy: News from the Channel Islands National Marine Sanctuary” Fall 2006, 2.} The marine reserves are strictly no-take zones, while the conservation areas allow the taking of only spiny lobster (recreational and commercial) and pelagic finfish (recreational only).\footnote{“Channel Islands MPAs Detailed Descriptions” 1-4.}

Since the introduction of the state marine reserves the CINMS has been working with NOAA Fisheries and their Councils to expand the reserves into federal waters. After years of
work, the federal marine reserves finally went into effect on July 29, 2007 (See reserves map below). 114

**Channel Islands National Marine Sanctuary Marine Reserves**

![Map of Channel Islands National Marine Sanctuary Marine Reserves](http://channelislands.noaa.gov/marineres/PDF/9-07-final.pdf)


The federal reserves are essentially an extension of the state reserves and mirror the states
reserve, conservation area configuration, and regulations. However, some small gaps between
the federal and state reserves resulting from the merger are still being resolved. The CFGC is
working to incorporate the gaps into the state reserves, and when this process is completed the

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entire system will cover 240.4 square nautical miles, encompass 22% of sanctuary waters, and consist of 11 reserves and 2 conservation areas.\(^\text{115}\)

**Performance Evaluation**

The Channel Islands NMS is evaluating its performance to some extent. On an annual basis the sanctuary must provide information to the program indicating its progress toward PPMs. The most recently published progress report shows the habitat in CINMS to be improving because of a trawling ban (implemented by the state in waters from 0-3 NM). It is interesting that the negative impact of human activities is not included in the performance rating but the positive impact from regulation of a destructive human activity is used to indicate improvement. Additionally, the site is one of the few that are assessing effectiveness within their zones by way of monitoring however, these activities, as well as their enforcement agreements, contain room for improvement. The remaining applicable measures reveal that CINMS has not published a Condition Report or monitoring plan, and has not completed its management review.

**CINMS Evaluation**

The following report indicates the overall evaluation of the CINMS and its scores. The assessment concentrates on current policies and mitigation measures despite the impending changes brought about by the management plan review process. The effectiveness of current sanctuary goals was assessed by pairing the overarching goal of agency cooperation with the primary habitat threat and then analyzing the cooperation among responsible agencies.

\(^{115}\)“News From NOAA: Marine Zones Now In Federal Waters of NOAA’s Channel Islands National Marine Sanctuary” August 9, 2007.
### Channel Islands National Marine Sanctuary

#### Habitat Conservation Evaluation

<table>
<thead>
<tr>
<th>#</th>
<th>Question/Resources</th>
<th>Rating</th>
<th>Basis for Judgment</th>
<th>Description of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the sanctuary present clear and specific habitat conservation goals and objectives?</td>
<td>▲</td>
<td>1983 Management Plan Goals and Objectives</td>
<td>Plan contains a very broad goal of 'resource protection' and includes general objectives such as collaboration, public awareness, enforcement, and emergency response.</td>
</tr>
<tr>
<td>2</td>
<td>Does the program present clear and specific science and monitoring goals and objectives?</td>
<td>▲</td>
<td>1983 Management Plan Goals and Objectives</td>
<td>Plan contains a very broad goal of &quot;research&quot; and includes general objectives such as an administration framework, result incorporation, and information sharing.</td>
</tr>
</tbody>
</table>

#### Effectiveness of Sanctuary-Specific Habitat Related Goals and Objectives

<table>
<thead>
<tr>
<th>#</th>
<th>Establish cooperative agreements and coordination between federal agencies such as NMFS and the NPS?</th>
<th>▲</th>
<th>Marine Reserves and Conservation Areas</th>
<th>CNMS works closely with the CNFS to conduct research, education and outreach activities, as well as interpretation and coordination of volunteer programs. CNMS, NMFS, and PFMC recently accomplished federal marine reserves.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Establish cooperative agreements and coordination between relevant state of California agencies?</td>
<td>▲</td>
<td>Marine Reserves and Conservation Areas</td>
<td>CNMS has worked closely with the state of California F&amp;G and its commission to establish marine reserves.</td>
</tr>
<tr>
<td>4</td>
<td>Develop an effective and coordinated enforcement program?</td>
<td>▲</td>
<td>Draft Management Plan</td>
<td>CNMS currently has active enforcement agreements with the USCG, the CDFG and the NPS.</td>
</tr>
</tbody>
</table>

#### Sanctuary Science and Monitoring

<table>
<thead>
<tr>
<th>#</th>
<th>Does the sanctuary have adequate site characterization (i.e. mapping)?</th>
<th>▲</th>
<th>&quot;The Seafloor Around the Channel Islands&quot;</th>
<th>Only about 1/3 of the sanctuary seafloor has been mapped and characterized.</th>
</tr>
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<tbody>
<tr>
<td>6</td>
<td>Does the sanctuary have adequate habitat characterization (i.e. habitat type and benthic communities)?</td>
<td>▲</td>
<td>&quot;A Biogeographic Assessment of the Channel Islands National Marine Sanctuary&quot;</td>
<td>Benthic habitat maps, bathymetry maps, SAV maps, and Kelp forest maps are included among others.</td>
</tr>
<tr>
<td>7</td>
<td>Does the sanctuary have an adequate monitoring program able to detect trends?</td>
<td>▲</td>
<td>&quot;2006 Research Summary&quot;, PISCO website, Coastal Biodiversity Survey, Rocky intertidal monitoring, SAMSAP</td>
<td>A total of 15 research and monitoring projects are underway including aerial surveys, subtidal and intertidal monitoring, rocky intertidal monitoring, marine reserve monitoring, and kelp forest monitoring.</td>
</tr>
</tbody>
</table>

#### Sanctuary Management tools

<table>
<thead>
<tr>
<th>#</th>
<th>Does the sanctuary prohibit construction of facilities such as marinas and jetties and has it been effective?</th>
<th>▲</th>
<th>15 CFR Ch. XI Subpart G §922.72 (1-1-08)</th>
<th>These activities are prohibited only within 2 NM of any island; however, research indicates that no instances of construction have occurred. MFR-proposed changes would expand regulation to include entire sanctuary.</th>
</tr>
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<tbody>
<tr>
<td>9</td>
<td>Does the sanctuary prohibit oil and gas development and the laying of pipelines needed for these activities and has it been effective?</td>
<td>▲</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08)</td>
<td>CNMS does prohibit oil and gas development and supplemental activities except on leases in effect before the designation of the sanctuary.</td>
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<td>10</td>
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<tr>
<td>11</td>
<td>Does the sanctuary prohibit dredging (including mining), drilling, filling and cable laying activities and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08) &lt;br&gt;These activities are prohibited only within 2 NM of any island; however, research indicates that no instances of construction have occurred. MPR proposed changes would expand regulation to include entire sanctuary.</td>
</tr>
<tr>
<td>12</td>
<td>Does the sanctuary prohibit vessel anchoring and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08) &lt;br&gt;Sanctuary explicitly excuses vessel anchoring from the alteration of the seabed regulation.</td>
</tr>
<tr>
<td>13</td>
<td>Does the sanctuary prohibit bottom trawling and other destructive fishing practices outside of zoned areas and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08) &lt;br&gt;Sanctuary does not directly regulate fishing activities outside of zoned areas and explicitly excludes bottom trawling from a commercial vessel.</td>
</tr>
<tr>
<td>14</td>
<td>Does the sanctuary regulate human visitation to minimize the effects of trampling and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08) &lt;br&gt;Research indicates there are no regulations or direct management measures that address this issue.</td>
</tr>
<tr>
<td>15</td>
<td>Does the sanctuary prohibit the abandoning of debris on the seabed and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08) &lt;br&gt;Research indicates there are no regulations or direct management measures that address this issue.</td>
</tr>
<tr>
<td>16</td>
<td>Does the sanctuary prohibit injuring, removing or possessing a habitat related resource?</td>
<td>15 CFR Ch. XI Subpart G §922.72 (1-1-08) &lt;br&gt;Research indicates there are no regulations or direct management measures that address this issue.</td>
</tr>
<tr>
<td>17</td>
<td>Is there zoning of any type within the sanctuary and is it effectively reducing threats to habitat?</td>
<td>15 CFR Ch. XI Subpart G §922.72 and §922.73 (1-1-08) &lt;br&gt;Sanctuary maintains a cargo vessel prohibition within 1 NM of any island but excludes fishing vessels; however, marine reserves are strictly no-take, and conservation areas are very limited in their extractive allowances.</td>
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### Sanctuary Performance Measures

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<tr>
<td>18</td>
<td>Does the sanctuary have clear and specific performance measures and measurable targets?</td>
<td>CINMS 1983 Management Plan &lt;br&gt;No measures in place currently, but with the management plan in review measures will be forthcoming.</td>
</tr>
</tbody>
</table>

### Evaluation Conclusions

CINMS appears to be achieving some success in establishing cooperative management and enforcement agreements between the major state and federal agencies despite some contention. By the same token, science and monitoring activities are, at the least, capable of providing enough information for decision-makers to make mostly informed management decisions although more data are always needed.

Management tools used to directly manage the threats facing habitats within the sanctuary rate fair as well. The regulations mitigating the alteration of the seabed from activities
such as construction, drilling, or dredging protect only the habitats within two NM of the Islands. However, the new management plan and its accompanying proposed rules modify this regulation to cover the entirety of the sanctuary. Oil and gas activities are prohibited except for those leases in effect before the designation of the sanctuary. Out of these leases, only two platforms graze the sanctuary and both are nearing the end of their production cycles. Any other threats facing CINMS habitats are not directly regulated or controlled by the sanctuary. However, the sanctuary has helped to facilitate a couple of key habitat conservation measures, namely the trawling ban in state waters and the network of primarily no-take marine reserves.

The Channel Islands case study illustrates that there are at least two ways to conserve habitat within sanctuaries, by regulation or by facilitation. The success of the sanctuary’s conservation efforts hinge on either their persuasive nature during facilitation, or their forcefulness in using all the regulatory wiggle-room the NMSA provided. Overall Channel Islands receives a mixed evaluation on its conservation techniques and success. While the sanctuary doesn’t directly regulate or manage many of the threats, the state of California with sanctuary support, has implemented a number of actions to protect habitat. Federal agencies have been persuaded to support conservation efforts as well, but these actions do not include all of the federal waters within the sanctuary, leaving a large portion of the area without strong protective habitat measures. The sanctuary is increasing its potential to effect change through facilitation by expanding its monitoring efforts that will support or counteract other agencies’ management actions and evaluating performance through program- and eventually sanctuary-specific performance measures.
**FGBNMS Background**

**Sanctuary Setting**

The Flower Garden Banks National Marine Sanctuary (FGBNMS) endured a long history of being added to and removed from the list of active designation sites before its designation by NOAA on January 17, 1992.\textsuperscript{116} Originally, the sanctuary was added to the active designation list in 1979 to regulate anchoring which was causing substantial damage to coral reefs. The intent

was that the sanctuary would fill in the gap left by the Minerals Management Service (MMS)—which had authority only over vessels engaged in oil and gas development operations—by regulating all other vessel-anchoring in the area. In 1982 the Banks were designated as a Habitat Area of Particular Concern (HAPC) under the Coral Fishery Management Plan. It was thought that “no anchoring” provisions would be included in regulations, so NOAA removed the site from the active list. In reality, HAPC regulations prohibited coral fishing, as well as fishing with bottom longlines, traps, pots, bottom trawls, or chemicals, but contained no anchoring provisions. As a result, the Banks were placed back on the active designation list in 1984 and finally achieved designation as a National Marine Sanctuary in 1992.

Flower Garden Banks became the tenth NMS, and the first to be located in the Gulf of Mexico. Originally, the sanctuary included the East and West Flower Garden Banks. The two banks lie roughly 110 to 120 NM southeast of Galveston, Texas, and encompass approximately 19 and 22 square nautical miles respectively. In 1996 Stetson Bank, located approximately 70 nautical miles southeast of Galveston and covering an area of 0.64 square nautical miles, was added to the sanctuary. In total, the sanctuary now covers 42.34 square nautical miles in three separate spaces.

Although relatively small, the sanctuary is highly unique. The Flower Garden Banks “contain the northernmost coral reefs in the continental United States” and are anywhere from 400 to 750 miles away from their nearest coral neighbors. Coral caps formed mostly by brain and star corals, some more than nine feet wide, sit atop salt domes and support a diverse community of about 23 coral species, more than 850 reef invertebrates, roughly 250 kinds of fish, and upwards of 125 species of algae. And while the coral cover is estimated at 50-70% at

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117 National Marine Sanctuary Program Regulations 138-139.
118 National Marine Sanctuary Program Regulations 138-139.
varying depths, some of the most noticeable Caribbean species of coral, such as staghorn corals and sea whips or fans, are not members of this coral community. Interestingly, only about 1/3 of coral species found in the Caribbean are found at this location.\footnote{121}

The waters below the coral reefs also contain a unique array of characteristics that include: “algal-sponge zones, ‘honeycomb’ reefs, coralline algae reefs, highly eroded outcroppings, mud flats, mounds, mud volcanoes and at least one brine seep system.”\footnote{122} The brine seep system is located on the East Flower Garden Bank and is composed of two seeps that host an entirely different assemblage of marine life, both “worthy in their own right of sanctuary protection.”\footnote{123}

The final addition to the sanctuary, Stetson Bank, has a very different ecology from those of the East and West Banks. Located slightly farther north, the environmental conditions surrounding Stetson Bank are not conducive to the growth of the reef building corals found in the other two locations. Instead, the area is characterized by a 1,500-foot-long patch of pinnacles that are surrounded by what can best be described as the “flats”. The pinnacles host at least nine species of coral but are dominated by fire corals and sponges. The flats are home to species of algae and sponges but are primarily rubble in nature. High resolution mapping activities performed after the Banks addition to the FGBNMS have identified a unique halo of claystone outcroppings that surround the Bank and are dominated by black corals, gorgonians, and sponges.\footnote{124} Having embarked on the management plan review process in 2006, the sanctuary is actively considering the expansion of the Stetson Bank boundaries (among others) to include the outcroppings now known as the Stetson Bank Ring.\footnote{125}

\footnote{121} FGB SOS 2006/2007, 5.  
\footnote{122} FGB SOS 2006/2007, 5.  
\footnote{124} FGB SOS 2006/2007, 5-6.  
\footnote{125} “Flower Garden Banks National Marine Sanctuary: Boundary Expansion” 2.
Habitats and Threats

The primary habitat within the FGBNMS is obviously the coral reef, but the area also includes coralline algae reefs, brine seeps, mud flats, and mounds. The 1991 management plan identifies vessel operations, particularly anchoring and vessel discharges, as the primary threat facing the resources of FGBNMS. The plan also asserts that commercial fishing, scientific research, and recreational activities do not present much of a threat—although the sanctuary does admit that trash disposal and specimen collecting among recreational users may have an adverse effect. However, there is mounting concern that impacts from abandoned fishing gear and diver-to-coral interactions are increasing, so the sanctuary is looking to address these issues through the management plan review process. Unfortunately, some of the threats facing coral communities are beyond the scope of sanctuary control. For example, bleaching events resulting from water temperature increases owing to climate change are likely to become more common. In addition, there is some evidence that pollution from the Mississippi River watershed—despite the sanctuary’s distance from shore—has the potential to compromise the immune systems of corals, making them less resistant to disease. Fortunately, there have been relatively few disease events to date. The final threat deserving of mention here is an indirect one, and that is simply a lack of enforcement. The site’s distance from the mainland, lack of a dedicated enforcement vessel and limited staff with no enforcement authority, makes it extremely difficult for the Sanctuary to have a management presence in the area. Again, strategies to address this issue are being considered in the management plan review process.

Management Goals and Objectives

126 FGB MP 7.
Originally, the goals and objectives of the sanctuary were relatively simple. The primary goal was resource protection, followed by research, interpretation, and visitor use. Objectives associated with achieving habitat protection included policy and procedure coordination, outer agency participation and memoranda of agreement, development of an enforcement program and actual enforcement, and threat reduction.\textsuperscript{129} As recently as July 10, 2006, however, the Sanctuary Advisory Council, in cooperation with sanctuary staff, released an updated version of the sanctuary’s goals and objectives. The newly revised habitat-specific goals mirror more closely the purposes of the NMSA, mimicking the kinds of changes the CINMS made to its goals and objectives. The FGBNMS’s primary goal is still to,

\begin{quote}
“protect, maintain and, where appropriate, restore and enhance the characteristics of the Flower Garden Banks National Marine Sanctuary including, but not limited to, the natural living and geological resources, ecological processes, and water quality.”\textsuperscript{130}
\end{quote}

The objectives given to attain this goal are tailored to Flower Garden Banks’ circumstances.

- 1A: Develop and integrate best practices, available science, and innovative management techniques.
- 1B: Manage in favor of resource protection when the potential impacts of an activity are unknown.
- 1C: Identify and reduce threats to Sanctuary resources.
- 1D: Ensure compliance with and enforcement of Sanctuary and other federal regulations.
- 1E: Ensure a management presence in the Sanctuary.
- 1F: Maintain and enhance assets for reef protection, including but not limited to mooring buoys and underwater monitoring stations.
- 1G: Evaluate and implement methods for monitoring usage rates and patterns of the Sanctuary by the public.\textsuperscript{131}

The second and final goal pertaining to resource protection addresses the sanctuary dichotomy of facilitating multiple uses without compromising resource protection. To reach this goal, the sanctuary has identified seven objectives:

\textsuperscript{129} FGB MP 11.
\textsuperscript{130} “Flower Garden Banks National Marine Sanctuary Goals and Objectives” July 10, 2006.
\textsuperscript{131} “Flower Garden Banks National Marine Sanctuary Goals and Objectives” July 10, 2006.
• 4A: Educate users to minimize impacts to sensitive Sanctuary resources and how these impacts can be avoided.
• 4B: Minimize potential user conflicts and environmental degradation.
• 4C: Evaluate the potential effectiveness of a marine zoning system to achieve the mission of protecting Sanctuary resources for current and future generations.
• 4D: Study and monitor human activities and impacts at the FGBNMS over time to identify problems and facilitate management and protection of Sanctuary resources.
• 4E: Determine the limits to visitor use that are compatible with resource protection and user needs.
• 4F: Evaluate and predict the cumulative effects of multiple uses.
• 4G: Engage stakeholder communities and the public when exploring new approaches to managing human activities and enforcing Sanctuary regulations.¹³²

The remaining goals and objectives address issues such as, public awareness, partnerships, external ecosystem-based management, and infrastructure needs.

*Science and Monitoring*

The original goal of ‘research’ and its subsequent objectives identified by the 1991 management plan are similar to those of the CINMS yet slightly more expansive because of its primary designation purpose, which is to protect the coral reefs, and because a decade passed between designation dates. Activities include scientific framework and procedure development, collection of baseline data, monitoring and assessment of change, identification of effects resulting from human activity, research incorporation into management decisions, and information exchange.¹³³

The revised goals and objectives do indicate a goal specific to expanding and guiding the science and monitoring activities currently progressing within FGBNMS. The sanctuary’s dedication to the scientific assessment and monitoring of its resources is evident in the 11 objectives presented. Some of the objectives simply mirror the original ones, however, there have been a number of additions. Expansions include socioeconomic research, rapid assessment development, research collaboration and coordination improvement, surveillance and

¹³³ FGB MP 12.
enforcement assessments, artificial structure utilization and use plans, integration of gas platforms into research resources, and assessment of biodiversity maintenance role.\textsuperscript{134}

FGBNMS is fortunate in that it has a long history of research and monitoring projects that provide sanctuary managers with the information they need to make good decisions. As of January 2007, 55 research projects were underway within and around the FGBNMS. Research on corals focused on aspects such as disease, spawning and reproduction, genetics, toxicology, baseline health, and predation. In recent years the sanctuary and its partners have mapped more than 1,428 square miles of the seafloor with “high-resolution multibeam echo sounding systems.”\textsuperscript{135} Mapped areas have included sites both within and outside of the sanctuary and have added 12 additional features and the area between the East and West Banks to an accessible database. The sanctuary and its partners are also working on the characterization and assessment of deepwater habitats, topographic features, and communities. Habitat characterization by submersible survey of both shallow- and deep-water areas has captured more than 8,000 high-resolution images over the course of 187 expeditions. Data from these surveys indicate that the sanctuary is “an important location for potential spawning aggregations of grouper, as well as habitat for juvenile and subadult red snapper.”\textsuperscript{136} The area is also fortunate enough to have long-term monitoring projects of all three Banks in place, some originating even before the sanctuary itself. Additionally, a fish and benthic habitat characterization project is underway with NCCOS, as well as numerous other projects involving other marine critters, geology, oceanography, and socioeconomics.\textsuperscript{137} Overall, the sanctuary is quickly “becoming a standard for a healthy coral reef system in the Caribbean and Gulf of Mexico.”\textsuperscript{138}

\textsuperscript{134} “Flower Garden Banks National Marine Sanctuary Goals and Objectives” July 10, 2006.
\textsuperscript{135} FGB SOS 2006/2007, 11.
\textsuperscript{136} FGB SOS 2006/2007, 11.
\textsuperscript{137} “Current and Recent Science at the Flower Garden Banks NMS” January 10, 2007.
\textsuperscript{138} FGB SOS 2006/2007, 9.
Management Structure and Partnerships

The distance of the FGBNMS from the mainland of Texas affects both the management structure and the composition of partnerships at work within the sanctuary. With the nearest sanctuary location, Stetson Bank, being 70 miles offshore, the sanctuary lies entirely in federal waters. On one hand, this feature simplifies management a touch by decreasing the number of agencies that the FGBNMS must coordinate with and involve in management decisions. On the other hand, the pool of resources available to properly manage the site shrinks without the contributions and support of the state.

The FGBNMS relies on four major alliances with other responsible agencies to effectively manage the Banks resources. The first partnership, and these are in no particular order, is with the Minerals Management Service (MMS). Oil and gas exploration and development is a long-standing activity in the Gulf of Mexico. Currently, about 150 production platforms exist within 25 miles of the Flower Garden Banks. Only one, however, is located within the sanctuary’s boundaries. Constructed in 1981, before the sanctuary was designated, the platform is still actively drilling and transporting natural gas. The MMS is responsible for regulating and monitoring the development platforms and activities associated with their operation and maintenance. In addition, the MMS collaborates with FGBNMS in research and monitoring activities and assists with enforcement by alerting the sanctuary of potential violations.

The second association involves NOAA Fisheries which, together with the Gulf of Mexico Fisheries Management Council and the sanctuary, regulate and manage fishing activities within the sanctuary. NOAA Fisheries also contributes resources and staff for enforcement. The third cooperative centers on research and involves “academic institutions, international

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139 FGB SOS 2006/2007, 8.
conservation organizations, state and federal government agencies, and private organizations.\textsuperscript{140}

Although FGBNMS generally does not possess the funds to contribute to research efforts, the sanctuary is able to help facilitate site access by conducting research cruises on different occasions throughout the year.\textsuperscript{141} Finally, enforcement is a group effort involving the U.S. Coast Guard, NOAA Fisheries, volunteer informers from the dive and oil and gas industries, and the Texas and Louisiana state enforcement agencies.\textsuperscript{142}

\textit{Mitigation Tools}

\textit{Management Plans}

The management plan operating within the FGBNMS is fairly simple. With the site’s distance from the mainland and the potential for rough seas, the ability of visitors, researchers, educators, and enforcement personnel to actually reach and use the sanctuary is limited. As a result of these constraints, staffing needs were deemed minimal and the scope of the action plan was general and broadly defined. The resource protection portion of the action plan, again reflecting the developmental status of the sanctuary at the time, provides only slightly expanded details for actions pertaining to contingency plans for emergencies, compatible use, and surveillance and enforcement.\textsuperscript{143}

As previously mentioned, the management plan for Flower Garden Banks is in the midst of its first review since the site’s designation. Three public scoping meetings were held in 2006 to identify important topics, and from these topics the Sanctuary Advisory Council (SAC) identified six key issues: fishing impacts, visitor use impacts, boundary expansion, enforcement, education and outreach, and impacts resulting from pollutant discharge. Working groups were

\textsuperscript{140} FGB SOS 2006/2007, 9.
\textsuperscript{141} FGB SOS 2006/2007, 9.
\textsuperscript{142} FGB SOS 2006/2007, 14.
\textsuperscript{143} FGB MP 49-52.
assigned to each issue to develop solution strategies, and when their recommendations are made
to, and approved by, the SAC, the sanctuary staff will begin writing their draft management plan
and environmental impact statement. Following an additional set of public meetings, the draft’s
approval by NOAA and the making of any recommended changes, the final documents will be
crafted for NOAA’s approval. At this time, there is not an estimated timeline for completion of
the review process.

_Regulations_

The regulations governing the FGBNMS are unique in that their primary focus is to
protect the coral habitat. In general, the sanctuary prohibits:

- Oil and gas exploration and development inside the “no-activity” zones;
- Anchoring of any vessel;
- Mooring any vessel (except that those less than 100 ft. in length may use a mooring
  buoy);
- Discharging matter from within or beyond the sanctuary that may harm sanctuary
  resources;
- Alteration of the seabed by drilling, dredging, or any other method;
- Injuring, removing, or possessing any coral, algae, plant, invertebrate, rock or brine-seep
  biota from the sanctuary;
- Taking any marine mammal or turtle; and
- Possession of explosives or electrical charges. 144

What is interesting is that Flower Garden Banks is one of the few sanctuaries actually regulating
fishing activities within its borders, despite the fact that theoretically, all sanctuaries could. The
sanctuary clearly prohibits,

“Injuring, catching, harvesting, collecting or feeding, or attempting to injure, catch,
harvest, collect or feed, any fish within the Sanctuary by use of bottom longlines, traps,
nets, bottom trawls or any other gear, device, equipment or means except by use of
conventional hook and line gear.” 145

In order to strengthen the regulation, a further step was taken to prohibit even the possession of
any of the specified fishing gear within the sanctuary unless they were properly stowed, and the

144 National Marine Sanctuary Program Regulations 150-151.
145 National Marine Sanctuary Program Regulations 150-151.
vessel was simply passing through the area without interruption.\textsuperscript{146} Perhaps even more interesting, the sanctuary went one step further and declared that,

“if any valid regulation issued by any Federal authority of competent jurisdiction, regardless of when issued, conflicts with a Sanctuary regulation, the regulation deemed by the Director as more protective of Sanctuary resources and qualities shall govern.”\textsuperscript{147}

Essentially, this stipulates that no matter the agency, if there are conflicting regulations, the Director has the autonomy to choose the regulation more protective of sanctuary resources – and to make this choice binding. The level of authority awarded to the Sanctuary to solve conflicts among agencies and competing regulations, in favor of the sound stewardship of the resources under their protection, is unprecedented and unique to FGBNMS.

\textit{Zoning}

Marine zones do exist within the FGBNMS but not in quite the same capacity as they do in the CINMS. Within Flower Garden Banks, zones exist to regulate activities not define jurisdictional boundaries. For example, the MMS has set in place two zones to protect the Banks’ natural resources from development operations. The “no-activity” zone is an area that surrounds each Bank and encompasses almost the entire sanctuary, in which all development activities are prohibited.\textsuperscript{148} Surrounding the “no-activity” zones are 4-mile buffer zones around the East and West Banks and a 3-mile buffer zone around Stetson Bank. If there is any potential for development activity within the buffer zones, the sanctuary facilitates direct consultation with the MMS to ensure that resource protection concerns are addressed.\textsuperscript{149}

The Banks and their surrounding areas are also designated as Habitat Areas of Particular Concern, within which, as noted earlier, fishing by bottom longlines, traps, pots, or bottom trawls

\begin{footnotesize}
\textsuperscript{146} National Marine Sanctuary Program Regulations 150-151.
\textsuperscript{147} National Marine Sanctuary Program Regulations 150-151.
\textsuperscript{148} Weiss, Michael I.  “An Overview of the National Marine Sanctuary Program and Update on Activities in the Gulf of Mexico” slide 15.
\textsuperscript{149} FGB SOS 2006/2007, 14.
\end{footnotesize}
is prohibited. The last zone represents yet another first for the FGBNMS. Sanctuary staff, working closely with the International Maritime Organization (IMO), established in 2000 the world’s first international no-anchor zone for the purpose of protecting coral reefs. The designation, which took effect in June 2001, places the sanctuary on the international shipping radar. 150

Performance Evaluation

Flower Garden Banks finds itself in a unique and advantageous position. Because of its proximity to oil and gas activities and the required studies the MMS conducts, the sanctuary found itself on relatively solid ground in terms of baseline information and monitoring studies at its inception. The foundation provided by the MMS allowed sanctuary managers to evaluate its performance at an early stage. With a monitoring history such as this, it is quite an accomplishment that habitat conditions have indicated no change according to the PPM. It will be interesting to view the results of the FGBNMS condition report, recently submitted for comments, to see what role human activity has played in the health of this fragile habitat. Of the remaining PPMs, there is an enforcement agreement in place, but it has been ineffective because of logistical difficulties and resource shortages.

FGBNMS Evaluation

The following report presents the habitat conservation evaluation for the Flower Garden Banks NMS. The assessment is based on current policies and actions surrounding the four conservation components. Scores are given based on the best available information and value judgments.

<table>
<thead>
<tr>
<th>#</th>
<th>Question/Resources</th>
<th>Rating</th>
<th>Basis for Judgment</th>
<th>Description of Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Does the program present clear and specific habitat conservation goals and objectives?</td>
<td>▲</td>
<td>1991 Management Plan</td>
<td>Plan indicates a broad goal of &quot;resource protection,&quot; and general objectives include agency coordination, agency inclusion, interagency agreements, enforcement, public awareness, emergency planning, and threat reduction.</td>
</tr>
<tr>
<td>2</td>
<td>Does the program present clear and specific science and monitoring goals and objectives?</td>
<td>▲</td>
<td>1991 Management Plan</td>
<td>Plan indicates a broad goal of &quot;research,&quot; and objectives include administration framework, baseline data compilation, monitoring environmental changes, monitoring changes in human activity incorporation, and information exchange.</td>
</tr>
<tr>
<td>3</td>
<td>Establish cooperative agreements and coordination between NOAA Fisheries and MMS?</td>
<td>▼</td>
<td>State of the Sanctuary Report</td>
<td>FGBNMS coordinates closely and consults directly with MMS regarding oil and gas activities, and works closely with NOAA Fisheries on fishing issues.</td>
</tr>
<tr>
<td>4</td>
<td>Develop an effective and coordinated enforcement program?</td>
<td>▲</td>
<td>State of the Sanctuary Report, Law enforcement fact sheet</td>
<td>Has established a coordinated agreement among USCG, NOAA Fisheries, State agencies, and volunteer groups; however, agreements are inconsistent and enforcement is logistically difficult because of distance and required resources, so there is little enforcement.</td>
</tr>
<tr>
<td>5</td>
<td>Does the sanctuary have adequate site characterization (i.e. mapping)?</td>
<td>▲</td>
<td>FGBNMS website</td>
<td>3700 sq. km at locations both in and out of the sanctuary have been mapped using high-resolution multibeam systems.</td>
</tr>
<tr>
<td>6</td>
<td>Does the sanctuary have adequate habitat characterization (i.e. habitat type and benthic communities)?</td>
<td>▲</td>
<td>FGBNMS website</td>
<td>Adequate habitat characterization of the coral caps, and ROVs are currently characterizing the deeper water habitats inside and outside the sanctuary.</td>
</tr>
<tr>
<td>7</td>
<td>Does the sanctuary have an adequate monitoring program able to detect trends?</td>
<td>▲</td>
<td>FGBNMS website</td>
<td>Long-term monitoring of the East and West banks from 1978-83 and from 1988-present, as well as long-term monitoring project on Stetson since 1993.</td>
</tr>
<tr>
<td>8</td>
<td>Does the sanctuary prohibit construction of facilities such as marinas and jetties and has it been effective?</td>
<td>▼</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td>Sanctuary does prohibit construction or the abandoning of a structure on the seabed, and research suggests no evidence to the contrary.</td>
</tr>
<tr>
<td>9</td>
<td>Does the sanctuary prohibit oil and gas development and the laying of pipelines needed for these activities and has it been effective?</td>
<td>▼</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td>Sanctuary does allow oil and gas development activities outside of the no-activity zones, which leaves very small portions of the sanctuary vulnerable but includes restrictions on waste disposal relative to these activities unless discharge injures a resource.</td>
</tr>
</tbody>
</table>
### Sanctuary Performance Measures

<table>
<thead>
<tr>
<th>Question</th>
<th>Reference</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the sanctuary prohibit dredging (including mining), drilling, filling and cable laying activities and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td></td>
</tr>
<tr>
<td>Does the sanctuary prohibit vessel anchoring and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td></td>
</tr>
<tr>
<td>Does the sanctuary prohibit bottom trawling and other destructive fishing practices outside of zoned areas and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td></td>
</tr>
<tr>
<td>Does the sanctuary regulate human visitation to minimize the effects of trampling and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td></td>
</tr>
<tr>
<td>Does the sanctuary prohibit the abandoning of debris on the seabed and has it been effective?</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td></td>
</tr>
<tr>
<td>Does the sanctuary prohibit injuring, removing or possessing a habitat related resource?</td>
<td>15 CFR Ch. XI Subpart G §922.122 (1-1-08)</td>
<td></td>
</tr>
<tr>
<td>Is there zoning of any type within the sanctuary and is it effectively reducing threats to habitat?</td>
<td>MMS website, MMS long-term monitoring final report, presentation by Michael Weiss</td>
<td></td>
</tr>
</tbody>
</table>

### Evaluation Conclusions

Flower Garden Banks NMS represents a comparatively shining example of habitat conservation even though there is always room for improvement in any conservation project.

Despite a few weak spots, the sanctuary has been able to achieve relative success in almost all of the four conservation components. Improvements are needed in the areas of enforcement,
human visitation, and sanctuary-specific performance measures, but overall the sanctuary is
doing well both facilitating and regulating the activities that affect habitat health.

There are a number of reasons behind the success of FGBNMS. The area is small and remote, and the resources contained within sanctuary boundaries are fairly specific. This limits the variety of habitats needing protection, and therefore, the breadth of management strategies needed in comparison with other sanctuaries. The sanctuary has also formed effective partnerships with other managing agencies, which are naturally limited because of its location and its being under purely federal jurisdiction. The most important factor, although it may be incidental, is the fact that the sanctuary has the authority to make stewardship of the area the top priority among all regulatory agencies. A regulation such as this, added to all sanctuaries, would go a long way in resource protection by forcing other agencies to make stewardship their top priority, without stripping them of their regulatory power, while allowing the sanctuary the authority to make the final decision in the interest of habitat and ocean resource conservation.
Stellwagen Bank National Marine Sanctuary

SBNMS Background

Sanctuary Setting

Stellwagen Bank was placed on the Site Evaluation List (SEL) in 1983, and it languished there, lost in bureaucracy until the 1988 Amendments to Title III of the MPRSA (or NMSA) specifically required the publication of a prospectus on the Stellwagen Bank proposal by September 30, 1990. In order to meet this congressional demand the site was elevated to the status of an active candidate in 1989. Following a series of public scoping meetings and the
crafting of the initial required documents, the prospectus was published on February 8, 1991. This publication launched a 60-day public comment period followed by a 45-day congressional review period during which, a series of public hearings were administered. Before the final documents could be prepared, congress passed and the President approved the 1992 amendments to the NMSA which included the designation of Stellwagen Bank as the 12th National Marine Sanctuary.151

The Gerry E. Studds Stellwagen Bank NMS (hereinafter SBNMS) is located in the southwestern portion of the Gulf of Maine, at the mouth of the Massachusetts Bay between Cape Ann and Cape Cod. Almost the size of Rhode Island, the sanctuary covers 842 square miles of ocean waters and submerged lands.152 Within the boundary of the sanctuary are three topographical features, the entirety of Stellwagen Bank and portions of Tillies Bank and Jeffreys Ledge.153 Geologists estimate that these features were created approximately 14,000 years ago as the Ice Age ended and the glaciers melted.154 Stellwagen Bank is characterized as a “shallow, glacially-deposited, primarily sandy underwater bank, curving in a southeast to northwest direction for 19 miles.”155 The Bank is roughly six miles across at its widest point, and the water ranges from 65 to more than 600 feet deep.156

The sanctuary’s unique combination of geological features, current circulation patterns, wind patterns, twice-daily tidal fluctuations, and freshwater river flows create conditions favorable for upwelling.157 Two seasonal periods of upwelling each year provide the foundation for a rich marine environment. The sanctuary is most recognized for its seasonal populations of

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154 CR 2.
155 CR 2.
156 CR 2.
157 CR 3.
cetaceans most notably the humpback, the fin, and the critically-endangered northern right whales, which come to the area to feed and nurse their young. In addition to the 17 species of cetaceans, the site also hosts harbor and gray seals, 43 species of seabirds, two species of sea turtles, 72 species of fish, and “every major taxonomic group of invertebrates that occurs in the global marine environment.”

The site is rich in maritime history and contains numerous uncounted shipwrecks documenting hundreds of years of fishing history. The amount of history underwater indicates how important the area was to humans in the past. Today, the human dependence is just as great, but it’s amplified exponentially by technological advances and population growth. Traditional uses of the area, such as commercial fishing and shipping, are still the primary contributors to the human use portfolio. However, technology and expanding human interests have added some new pressures on sanctuary resources that include wastewater treatment outfalls, dumpsites for clean dredge material, fiber-optic cable installation, recreational fishing and boating, and commercial whale watching.

**Habitats and Threats**

The unique habitats that form the basis of the Stellwagen environment include both geologic and biologic elements. Geologic components encompass five major seafloor types: rocky outcrops, piled boulders, gravel, sand, and mud. Gravel habitats (including piled boulders) dominate the seafloor, covering 37.6% of the sanctuary, followed closely by sand at 34.2%, and mud at 28.2%, while rocky outcrops come in at less than 1%. Biological elements span the taxonomic spectrum, but four major groups have been identified: annelids, crustaceans,
mollusks, and echinoderms.\textsuperscript{162} Together, these two interconnected components comprise habitats that provide shelter from predators and currents, capture and concentrate microscopic prey, and facilitate spawning activities.\textsuperscript{163}

The condition report produced by SBNMS in 2007 identifies several key activities that currently affect habitat conditions within the sanctuary. Pressures include: “the laying of cables and pipelines, the use of mobile fishing gear, removal of key forage species and bycatch due to fishing activities, ocean dumping, and the disposal of dredged materials.”\textsuperscript{164} It is clear from the report, however, that impacts from fishing practices are certainly the most destructive of the pressures in terms of habitat health and vitality. (See Appendix IV)

\textit{Management Goals and Objectives}

As with CINMS and FGBNMS, the goals and objectives currently in use within the SBNMS are outdated because they have not been reviewed or revised since the original management plan was issued. Unlike the previous two sites, however, Stellwagen Bank has not published or presented an updated version despite the fact that the sanctuary is, conceivably, in the advanced stages of the management plan review process. The goal with the highest management priority is the “protection of the marine environment and resources.”\textsuperscript{165} The objectives identified for resource protection include:

- Establish cooperative agreements and other mechanisms for coordination among all the agencies participating in Sanctuary management;
- Develop an effective and coordinated program for the enforcement of Sanctuary regulations;
- Promote public awareness of and voluntary user compliance with regulations through an interpretation/education program stressing resource sensitivity and wise use; and
- Reduce threats to Sanctuary resources posed by major emergencies through contingency and emergency response planning.\textsuperscript{166}

\textsuperscript{162} SBNMS MP, Benthic Organisms.
\textsuperscript{163} CR 3.
\textsuperscript{164} CR 11.
\textsuperscript{165} SBNMS MP, Part 2, Sec. 1.
\textsuperscript{166} SBNMS MP, Part 2, Sec. 1.
The remaining goals cover issues such as interpretation, education, and visitor use.

*Science and Monitoring*

Stellwagen’s science goal is simple, “research”, and the objectives listed to achieve this goal are remarkably similar to those for the FGBNMS. The activities outlined within the objectives consist of:

- Establish a framework and procedures for administering research projects to ensure that they are responsive to management concerns, and that research results contribute to improved management of the Sanctuary;
- Gather necessary baseline data on the physical, chemical, and biological characteristics of the Sanctuary;
- Gather necessary baseline data on cultural and historical resources of the Sanctuary;
- Monitor and assess environmental changes as they occur;
- Identify the range of effects on the Sanctuary environment resulting from changes in human activities;
- Incorporate research results into the interpretation/education program in a format useful for resource users and the general public; and
- Encourage information exchange among all agencies and organizations conducting management-related research in the Sanctuary, to promote informed management.\(^{167}\)

A substantial amount of scientific information on the Gulf of Maine and Georges Bank areas exist largely because of a long history of human activities and man’s dependence on the area’s resources. However, while much of this information is still relevant to SBNMS, it is not specific to the sanctuary and the resources within. Nevertheless, there is still a sufficient amount of scientific information specific to the sanctuary to make informed management decisions on major issues. Partnerships with the USGS and NCCOS have produced extensive maps of the area, and an ecological characterization offers extensive information on the physical and oceanographic setting, characterization of chemical contaminants, marine fishes, seabird distribution and diversity, and cetacean distribution and diversity. In addition, there is spatial

\(^{167}\) SBNMS MP, Part 2, Sec. 1.
data available to the sanctuary on structure-forming invertebrates. However, while these projects have provided a great deal of useful information sanctuary staff does acknowledge some potential data gaps. For example, the ecological characterization identifies benthic substrates but provides limited information on benthic community composition and distribution, and the sanctuary site characterization working group does acknowledge the need for better habitat data.

Monitoring projects within the SBNMS, while not totally non-existent, could certainly use some expansion. Presently, research has identified one habitat-related monitoring project, the aptly named SHRMP, which stands for Seafloor Habitat Recovery Monitoring Program.168 The project, while helpful, covers only a small portion of the sanctuary by focusing their sample sites on areas surrounding, or within, a cable laying project, and the NMFS’s Western Gulf of Maine Area Closure. The site characterization working group also acknowledged “the lack of a comprehensive monitoring program to determine baselines and/or to recognize changes in the SBNMS ecosystem.”169 It is concerning, in light of the small and limited amount of monitoring under way, that no working group was convened and tasked with finding solutions to this problem. However, the sanctuary is reported to be engaged in the SWiM process, and to this end was the first to publish a condition report, in 2007. It is possible, then, that the monitoring issue is being addressed through this process, even though no plan has been published to date.

Management Structure and Partnerships

The management structure and partnerships that define SBNMS are similar to those of FGBNMS in that the sanctuary lies completely in federal waters. As a result, many of the partners and their responsibilities are also similar. For instance, the NMFS, the New England Regional Fisheries Management Council, and in certain situations the Mid-Atlantic Fisheries

Management Council and the Atlantic States Marine Fisheries Commission, are responsible for the regulation and implementation of fisheries management. The Environmental Protection Agency has the regulatory authority to regulate sewage outfalls and ocean dumping through the National Pollutant Discharge Elimination System (NPDES) under the Clean Water Act. And finally, the U.S. Coast Guard, NMFS, and the Massachusetts Environmental Police (MEP) are collectively responsible for enforcement.\textsuperscript{170} There is an interesting little twist to the management composition in this case study. Although technically its waters are strictly federal, the sanctuary does have a relationship with the Commonwealth of Massachusetts. The reason is that portions of the sanctuary closely border three Ocean Sanctuaries designated by the Commonwealth of Massachusetts.\textsuperscript{171} The proximity of the sanctuary to state waters means that any activity subject to sanctuary management, will presumably affect the uses of water and natural resources within the state’s jurisdiction. As a result, such activities are subject to review by the Massachusetts Coastal Zone Management Program under the consistency provision.\textsuperscript{172}

\textit{Mitigation Tools}

\textit{Management Plans}

Stellwagen’s management plan follows the pattern set by both CINMS and FGBNMS case studies in that its current action plan is old and therefore developmentally oriented. Categories outlined by the plan to work toward resource protection appear to be standard: contingency planning for emergencies; encouraging compatible uses; and surveillance and enforcement. Actions presented for these elements are not highly detailed and are centered on planning, methods, and agency coordination.

\textsuperscript{170} SOS 2002, 27.
\textsuperscript{171} SBNMS MP, Appendix A: Designation Document.
\textsuperscript{172} SBNMS MP, Part 2, Sec. 4A.
Management plans, as mandated by the NMSA, are to be reviewed “not more than five years after the date of designation...and thereafter at intervals not exceeding five years.”\(^{173}\) Within the context of the three case studies included in this project, SBNMS is the only sanctuary to enter the review process five years after its original plan was initiated. Unfortunately, it has now been ten years since the process began in 1998, and the review is still incomplete. The most current information available on the SBNMS website still indicates a release of a draft management plan and environmental impact statement in the spring of 2007. Now almost a year later, there is no indication that these documents are even near release so the process can continue. In fact, it is puzzling that the most current information on the website is dated back to the spring of 2007, and most of the webpages either present the same page, or are under construction.

*Regulations*

Regulations specific to SBNMS prohibit activities such as discharging from within or beyond the sanctuary; injuring or removing historical resources; taking or possessing reptiles, seabirds, or marine mammals; lightering; and interfering with law enforcement.\(^{174}\) Two of the sanctuary’s regulations concern the physical alteration of seabed and its habitats. The first prohibits “exploring for, developing or producing industrial materials within the Sanctuary.”\(^{175}\) “Industrial materials” as defined by the sanctuary designation document, include “…oil, gas or minerals (e.g. clay, stone, sand, gravel, metalliferous ores and nonmetalliferous ores or any other solid material or other matter of commercial value).”\(^{176}\) The second regulation applicable to habitat conservation prohibits

\(^{173}\) NMSA 8.
\(^{174}\) National Marine Sanctuary Program Regulations 161.
\(^{175}\) National Marine Sanctuary Program Regulations 161.
\(^{176}\) SBNMS MP, Appendix A: Designation Document.
“Drilling into, dredging or otherwise altering the seabed of the Sanctuary; or constructing, placing or abandoning any structure, material or other matter on the seabed of the Sanctuary, except as an incidental result of:

(i) Anchoring vessels;
(ii) Traditional fishing operations; or
(iii) Installation of navigation aids.”

The above restrictions are especially important within this sanctuary because of the area’s unusually high industrial and commercial activity. The first rule has seen some limited success in that plans to mine sand and gravel at the bank were halted, as were plans to build entertainment facilities (hotels and casinos) on offshore platforms. Unfortunately, the latter of the two rules seems to exclude those activities that harbor the most potential to alter the seabed (i.e. fishing). In addition, the prohibitions that are included can be circumvented by permit, as in the case of the fiber-optic company that was allowed to alter the seabed by laying cable across 12.1 miles of the sanctuary.

Zoning

A marine zone does exist within SBNMS in the form of the Western Gulf of Maine Area Closure. Unlike Channel Islands however, research indicates that Stellwagen played little or no part in the creation of the zone, nor does it currently play a management role except occasionally to voice an opinion. The closure was initiated by the NEFMC in 1998 to protect cod and groundfish stocks and just happens to include almost 22% of sanctuary waters. While the area is now off limits to bottom-tending gill nets, otter and bottom trawls, and scallop dredges, it continues to allow the use of shrimp trawls, lobster pots, and other fishing gear and practices.

It appears that the only activity the sanctuary is involved with in conjunction with the closure zone is research, in the form of the SHRMP project described in a previous section.

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177 National Marine Sanctuary Program Regulations 161.
180 SOS 2002, 22.
Performance Evaluation

Stellwagen Bank represents a unique case with respect to performance evaluation in that it was the first sanctuary to publish a condition report, and is the only one of the three studied here to do so. The report presents a rather sobering but truthful view of habitat protection within the sanctuary (see Appendix IV). To briefly summarize: distribution and abundance of habitat types are rated as fair, because of bottom dragging and dredging activities; biologically structured habitats exhibit fair to poor conditions resulting from fishing gear impacts; contaminant concentrations are good/fair, but monitoring results are limited; and human activities and their effects on habitat quality were given a fair to poor and declining rating based on fishing gear impacts and shipping.\textsuperscript{181} Obviously, impacts from human related fishing practices and methods are a pervasive problem throughout the sanctuary, particularly since three out of the four scores are attributed to some sort of fishing activity that contacts the seabed.

Stellwagen is also not faring well in terms of the PPMs. According to the progress report, a comprehensive monitoring plan is not in place within the sanctuary, there is no plan that monitors the effectiveness of closure zone, and, as mentioned before, the management plan is still incomplete. The sanctuary does, however, have an enforcement agreement in place that has a 97% compliance rate.

The sanctuary has completed its condition report, containing a rating on the status of habitat health. The condition report does indicate a fair/poor score with a declining trend as a result of human activities. Theoretically, the sanctuary should be receiving a declining program rating. The PPM rating on habitat health, however, shows no indication of a change in habitat within SBNMS because the human activity factor is dismissed from the program’s rating scheme. Stellwagen, therefore, represents a perfect example of the inconsistencies between PPM

\textsuperscript{181} CR iii.
ratings and condition report scores that ultimately form misconceptions about the conditions within a sanctuary. According to the report, in this case, human-related fishing activities are profoundly affecting habitat conditions in most categories, but this trend is not evident in the any of the program ratings. In the broader picture, while one report at least acknowledges that human activity is worthy of assessment, the other rating seems to implicitly absolve humans of any wrongdoing or responsibility for habitat’s compromised health by omitting their role in the current conditions.

**SBNMS Evaluation**

The following report presents the habitat conservation evaluation for the Stellwagen Bank NMS. The assessment is based on current policies and actions surrounding the four conservation components. Scores are given based on the best available information and value judgments. (See Appendix I for evaluation key and scoring criteria.)
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<td>1</td>
<td>Does the program present clear and specific habitat conservation goals and objectives?</td>
<td>✷</td>
<td>SBNMS 1993 Management Plan Goals and Objectives</td>
<td>Broad goal of resource protection - objectives include cooperative agreements with all management agencies, enforcement, public awareness emergency planning.</td>
</tr>
<tr>
<td>2</td>
<td>Does the program present clear and specific science and monitoring goals and objectives?</td>
<td>✷</td>
<td>SBNMS 1993 Management Plan Goals and Objectives</td>
<td>Broad goal of research - objectives include research administration, baseline data collection, monitor environmental changes, human effects, research incorporation into education, and information exchange.</td>
</tr>
<tr>
<td>3</td>
<td>Does the sanctuary have cooperative agreements and coordination between NMFS and appropriate FMOs?</td>
<td>✷</td>
<td>SBNMS 1993 Management Plan Goals and Objectives, Working Group Ecosystem Alteration Action Plan, Condition Report</td>
<td>Condition report indicates that use of fishing gear is causing habitat health decline by perturbation and benthic simplification. Action plan indicates that much coordination and cooperation still needed with these agencies to protect resources.</td>
</tr>
<tr>
<td>4</td>
<td>Does the sanctuary have a coordinated enforcement program, and is it effective?</td>
<td></td>
<td>SBNMS 1993 Management Plan Goals and Objectives, State of the Sanctuary Report 2002, Interagency Cooperation Action Plan</td>
<td>Reports indicate a coordinated and cooperative agreement is in place involving several agencies with a compliance rate of 97%.</td>
</tr>
<tr>
<td>5</td>
<td>Does the sanctuary have adequate site characterization (i.e. mapping)?</td>
<td>✷</td>
<td>State of the Sanctuary Report, Biogeographic Assessment, Site Characterization Working Group Summary</td>
<td>Initial mapping collected in 1997, enhanced in 2001, and has added additional backscatter and sediment characterization since that time.</td>
</tr>
<tr>
<td>6</td>
<td>Does the sanctuary have adequate habitat characterization (i.e. habitat type and benthic communities)?</td>
<td>✷</td>
<td>Site Characterization Working Group Summary, State of the Sanctuary Report</td>
<td>Working group indicates a good deal of information available on fishes, invertebrates and marine mammals, but not all @ sanctuary scale or needs. Potential gap in habitat types, including fish behavior across types.</td>
</tr>
<tr>
<td>7</td>
<td>Does the sanctuary have an adequate monitoring program able to detect trends?</td>
<td></td>
<td>State of the Sanctuary Report, Site Characterization Working Group Summary</td>
<td>Working group indicates comprehensive monitoring program for baseline and trend information lacking. Seafloor Habitat Recovery Monitoring Program only habitat specific monitoring mentioned.</td>
</tr>
<tr>
<td>8</td>
<td>Does the sanctuary prohibit construction of facilities such as marinas and jetties, and has it been effective?</td>
<td></td>
<td>15 CFR. 922 Subpart N §922.142 (1-1-08)</td>
<td>Sanctuary does prohibit construction of structures except navigation aids, and research suggests there has been no activity of this kind.</td>
</tr>
<tr>
<td>9</td>
<td>Does the sanctuary prohibit oil and gas development and the laying of pipelines needed for these activities and has it been effective?</td>
<td></td>
<td>16 CFR. 922 Subpart N §922.142 (1-1-08), and Designation Document</td>
<td>Sanctuary prohibits exploring for or developing industrial materials, including oil and gas development, and research indicates there has been no such activity.</td>
</tr>
<tr>
<td>10</td>
<td>Does the sanctuary prohibit dredging (including mining), drilling, filling and cable laying activities and has it been effective?</td>
<td>Red</td>
<td>17 CFR. 922 Subpart N §922.142 (1-1-08), Condition report</td>
<td>Sanctuary does prohibit drilling into, dredging, or otherwise altering the seabed and developing industrial materials minerals; however, in 2000, a permit was given to a fiber-optic cable company to lay cable across 12.1 miles of the sanctuary.</td>
</tr>
<tr>
<td>11</td>
<td>Does the sanctuary prohibit vessel anchoring and has it been effective?</td>
<td>Red</td>
<td>18 CFR. 922 Subpart N §922.142 (1-1-08)</td>
<td>Research indicates there are no regulations or direct management measures that address this issue.</td>
</tr>
<tr>
<td>12</td>
<td>Does the sanctuary prohibit bottom trawling and other destructive fishing practices outside of zoned areas and has it been effective?</td>
<td>Red</td>
<td>19 CFR. 922 Subpart N §922.142 (1-1-08)</td>
<td>Sanctuary does not regulate fishing in any way and explicitly excludes traditional fishing practices from the seabed alteration regulation, leaving 88% of the sanctuary vulnerable to these activities.</td>
</tr>
<tr>
<td>13</td>
<td>Does the sanctuary regulate human visitation to minimize the effects of trampling and has it been effective?</td>
<td>Red</td>
<td>20 CFR. 922 Subpart N §922.142 (1-1-08)</td>
<td>Research indicates there are no regulations or direct management measures that address this issue.</td>
</tr>
<tr>
<td>14</td>
<td>Does the sanctuary prohibit the abandoning of debris on the seabed and has it been effective?</td>
<td>Red</td>
<td>21 CFR. 922 Subpart N §922.142 (1-1-08)</td>
<td>Sanctuary does prohibit abandoning of material or matter on the seabed but again excludes effects from traditional fishing practices.</td>
</tr>
<tr>
<td>15</td>
<td>Does the sanctuary prohibit injuring, removing or possessing a habitat related resource?</td>
<td>Red</td>
<td>22 CFR. 922 Subpart N §922.142 (1-1-08)</td>
<td>Research indicates there are no regulations or direct management measures that address this issue.</td>
</tr>
<tr>
<td>16</td>
<td>Is there zoning of any type within the sanctuary and is it effectively reducing threats to habitat?</td>
<td>Green</td>
<td>Western Gulf of Maine Area Closure</td>
<td>Area closure does include 22% of sanctuary waters and is closed to bottom trawling while allowing other fishing practices and gear. Closure was also implemented and is regulated by NOAA fisheries and the appropriate FMCs.</td>
</tr>
<tr>
<td>17</td>
<td>Does the sanctuary have clear and specific performance measures and measurable targets?</td>
<td>Red</td>
<td>SBNMS 1993 Management Plan</td>
<td>No measures in place currently, but with the management plan in review measures will be forthcoming.</td>
</tr>
</tbody>
</table>

**Evaluation Conclusions**

Stellwagen Bank NMS clearly represents a situation in which the balance between human use and resource protection has not been reached. The evaluation indicates this imbalance has been detrimental to habitat conservation.

The sanctuary began essentially the same way as CINMS and FGBNMS in terms of the specificity of goals and objectives relating to both habitat conservation and science and monitoring. However, Stellwagen’s success in achieving these goals has been far less glamorous. For example, the primary objective applicable to habitat conservation is the
facilitation of cooperation and coordination among other regulatory agencies that have jurisdiction over certain resources within the area. The agency with the most influence on activities that affect habitat within the SBNMS is the NMFS and its various councils dealing with certain species. Unfortunately, aside from limited communication on enforcement and research issues, the sanctuary essentially does not communicate with these agencies, and there is no evidence of any collaboration among them on projects beneficial to habitat or resources in general. In this area, it appears that the tremendous need for and dependence on commercial uses still overshadow the need to protect resources for future generations.

Science and monitoring activities specific to habitat, while not completely ignored, seem to suffer from an imbalance in priorities. Mapping of the area is in good shape, but when it comes down to details, sanctuary staff invest their limited resources in the study of the commercially important resources such as fish and marine mammals rather than concentrating on habitat issues. Monitoring for changes in habitat is simply not sufficient.

A sanctuary’s staff has two ways to manage the resources under its protection. Either they can facilitate changes that protect resources, or they can regulate activities to protect resources. Facilitation has not produced any positive changes for habitat conservation—although some very positive changes in marine mammal management have taken place—and unfortunately, regulation has fared only slightly better. There have been successes in conserving habitat from the effects of construction and oil and gas development, but for all intents and purposes, excluding traditional fishing practices from the seabed alteration and abandoning material regulations have left habitats vulnerable to their most destructive threats.

Overall, SBNMS has not done an exemplary job conserving habitat within its boundaries. However, the performance review has identified pervasive problems throughout the sanctuary,
particularly with respect to habitat, and there is at least hope that conditions can improve from here.
CHAPTER 6. Conclusions

Conclusions

The National Marine Sanctuary Program began its endeavor to protect areas and ecosystems of importance under a cloud of conflicting purposes, jurisdictions, and interests, with only a skeletal staff and limited funding. Today, under its first solid leader since its inception, the program has shown real progress toward a working goal of habitat conservation. The strategic plan is providing individual sanctuaries with unified goals and objectives that include habitat protection. The SWiM framework is assisting sanctuaries in creating monitoring programs that will eventually be able to track environmental changes effectively, as well as providing a reporting system that will allow the program and sanctuaries, to isolate areas in which improvements are needed. And finally, Program Performance Measures are requiring sanctuaries not only to be aware of their progress toward their goals, but also to be responsible for it.

It is important to keep in mind, however, that this endeavor is both a work in progress and a learning process. On the positive side, the program is place-based and is working toward improving ecosystem-based management. In addition, its staff is learning how to do effective civic ocean governance by including all relevant agencies and interest groups in the management process to foster better ocean stewardship on all levels. Most important, strides are being made toward learning to balance human use and resource protection through every success and every failure. Considering the plight of our ocean resources and the fact that humans depend on these resources for survival, this kind of ocean governance could very well be the way of the future.

There are still some critical issues however. The lack of support from the top down, in terms of funding and decision making, have the potential to undermine the positive work
happening from the bottom up. The continued lack of guidance on inter-agency cooperation in
the face of conflicting and competing mandates involving the same resource will continue to
cause problems, and ultimately undermine the success of the NMSP. Programmatic loopholes
such as the discrepancy between the condition reports and the PPM ratings will continue to
disguise the true effect humans have on our ocean resources, and perpetuate the “out of sight out
of mind” mentality humans have applied to the ocean for decades. The one solid
recommendation I could make for the program is to resolve the performance discrepancy. It is
important to recognize that human activities affect all manner of resources within sanctuaries and
to make this an integral part of the performance rating.

The case studies presented in this project represent three entirely different situations and
levels of success. CINMS has reached some level of habitat conservation through the facilitation
of a network of marine reserves in both state and federal waters, but its success with regulation is
more limited. The sanctuary’s protection of the seabed from industrial activities and subsidiary
oil and gas activities covers only the first two NM, and no other regulations are in place to
mitigate the physical alteration of the seabed. FGBNMS, on the other hand, has seen success on
both the facilitation and regulation fronts although there is always room for improvement. The
accomplishments in Flower Garden Banks result largely from its remote location, the limited
number of managing agencies, small size, and its central focus on habitat protection.
Conversely, SBNMS has made minimal progress in both facilitation and regulation efforts to the
detriment of habitats in the area. A multitude of factors most likely influenced this sanctuary’s
relative inability to conserve habitat, but of those one stands out: the sanctuary’s dysfunctional
relationship with NMFS and its councils.
One of the difficulties with civic ocean governance and the NMSP is that there are many agencies with authority but there is no clearly defined decision chain. Often, agencies attempting to resolve an issue take one of two actions. Either they make enormous compromises in the interest of making a decision instead of accomplishing a task, or they decide not to become involved in the controversial issue at all. FGBNMS, however, has found a unique way to circumvent this inevitable conflict. Included in the site’s regulations is a stipulation that states that in the case of a regulatory conflict, the director has the authority to choose the regulation that best protects the sanctuary’s resources. The stipulation manages to accomplish two things: it provides someone with the authority to break a tie or stalemate, and it quietly pushes all managing agencies to place conservation as a top priority in order to maintain their regulatory power. For all the remaining NMSs I would recommend placing a stipulation of this sort in their regulations that, at the very least, identifies the final decision-makers.

In conclusion, the strides the program is making in refining their management practices, although encouraging, will take some time to trickle down to the individual sites, become effective, and produce changes. At the site level, the simple truth is that a site is only as good as the sum of its many diverse parts.
## Appendix I.

### Evaluation Key and Scoring Criteria

#### Trends:

<table>
<thead>
<tr>
<th>▲</th>
<th>Evidence suggests progression or improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>▼</td>
<td>Evidence suggests lack of progression or decline</td>
</tr>
<tr>
<td>?</td>
<td>Undetermined trend</td>
</tr>
</tbody>
</table>

#### Goals and Objectives

<table>
<thead>
<tr>
<th>Good</th>
<th>Very clear goal and very specific objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good/Fair</td>
<td>General goal and specific objectives</td>
</tr>
<tr>
<td>Fair</td>
<td>Broad goal and general objectives</td>
</tr>
<tr>
<td>Fair/Poor</td>
<td>General goal and no objectives OR no goal and general objectives</td>
</tr>
<tr>
<td>Poor</td>
<td>No goal and no objectives</td>
</tr>
<tr>
<td>Undet.</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>

#### Program Performance Measures

<table>
<thead>
<tr>
<th>Good</th>
<th>Surpassed performance target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good/Fair</td>
<td>Reached performance target</td>
</tr>
<tr>
<td>Fair</td>
<td>Missed performance target but not by much</td>
</tr>
<tr>
<td>Fair/Poor</td>
<td>Missed performance target by a good amount</td>
</tr>
<tr>
<td>Poor</td>
<td>Missed performance target by a substantial amount if not all together</td>
</tr>
<tr>
<td>Undet.</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>

#### Effectiveness of Sanctuary-specific Habitat Related Goals and Objectives

<table>
<thead>
<tr>
<th>Good</th>
<th>Goal or objective has been reached and can demonstrate overall effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good/Fair</td>
<td>Goal or objective has progressed and can demonstrate instances of effectiveness</td>
</tr>
<tr>
<td>Fair</td>
<td>Goal or objective has progressed but results are minimal</td>
</tr>
<tr>
<td>Fair/Poor</td>
<td>Goal or objective has been implemented but shows no signs of effectiveness</td>
</tr>
<tr>
<td>Poor</td>
<td>Goal or objective has not been implemented and therefore has produced no results</td>
</tr>
<tr>
<td>Undet.</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>

#### Sanctuary Science and Monitoring

<table>
<thead>
<tr>
<th>Good</th>
<th>Science and/or monitoring exist to adaptively manage sanctuary resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good/Fair</td>
<td>Adequate science and/or monitoring exist to guide management decisions</td>
</tr>
<tr>
<td>Fair</td>
<td>Science and/or monitoring exist but slightly deficient for management</td>
</tr>
<tr>
<td>Fair/Poor</td>
<td>Science and/or monitoring exist but don't provide key management information</td>
</tr>
<tr>
<td>Poor</td>
<td>Science and/or monitoring are not sufficient to guide management decisions</td>
</tr>
<tr>
<td>Undet.</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>

#### Sanctuary Management Tools

<table>
<thead>
<tr>
<th>Good</th>
<th>Management tool is utilized and can demonstrate overall effectiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good/Fair</td>
<td>Management tool is utilized and can produce instances of effectiveness</td>
</tr>
<tr>
<td>Fair</td>
<td>Management tool utilized but can show no signs of effectiveness</td>
</tr>
<tr>
<td>Fair/Poor</td>
<td>Management tool utilized but shows signs of ineffectiveness</td>
</tr>
<tr>
<td>Poor</td>
<td>Management tool not utilized and therefore not effective</td>
</tr>
<tr>
<td>Undet.</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>

#### Sanctuary Performance Measures

<table>
<thead>
<tr>
<th>Good</th>
<th>Performance measures in place with metrics measurable by target and time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good/Fair</td>
<td>Performance measures in place with metrics measurable by target</td>
</tr>
<tr>
<td>Fair</td>
<td>Performance measures in place with general metrics</td>
</tr>
<tr>
<td>Fair/Poor</td>
<td>Performance measures in place with no measurable metrics</td>
</tr>
<tr>
<td>Poor</td>
<td>No performance measures or measurable metrics</td>
</tr>
<tr>
<td>Undet.</td>
<td>Undetermined</td>
</tr>
</tbody>
</table>
Appendix II.

National Marine Sanctuary Management Structure

President of the United States

Congress

Secretary of Commerce

NOAA

NOS

NMSP

Sanctuary Director

Regional Superintendents

Support Staff

Program Divisions

Sanctuary Managers & Staff

Federal

(Enforcement)

State

Local / Tribal

Federal Agencies

RFMCs

NMFS

USFWS

NWRs

MMS

EPA

NPS

NERRs

USCG

Legislation

ESA

MMPA

MBTA

CZMA

MSA

NEPA

OCSLA

State Departments

State Agencies

Cities

Counties

Districts

Tribal Councils

Stakeholders

Academic Institutions

Researchers / Scientists

Industry & Local Businesses

NGOs

Other NOAA Programs

Non-profit Organizations

Environmental Groups

Zoos / Aquariums / Nature Centers

Local Communities

General Public

Future Generations
### Table 2: Integration of NMSP Goals and Program Performance Measures

<table>
<thead>
<tr>
<th>Performance Measure</th>
<th>Goal 1</th>
<th>Goal 2</th>
<th>Goal 3</th>
<th>Goal 4</th>
<th>Goal 5</th>
<th>Goal 6</th>
<th>Goal 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of sites in which water quality, based on long-term monitoring data, is</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>being maintained or improved.*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sites in which habitat, based on long-term monitoring data, is being</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>maintained or improved.*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of sites in which select living marine resources, based on long-term</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>monitoring data, are being maintained or improved.*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2010, 100% of the System is adequately characterized.*</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2015, 1200 additional shipwrecks identified and evaluated within national</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>marine sanctuaries demonstrating historic potential for the existence of shipwrecks.*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2007, 100% of NMSP permits are handled timely and correctly.*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2010, 100% of sites with marine zones in place have implemented a methodology</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>for assessing their effectiveness.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2010, all sites have implemented a cooperative enforcement program and are</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>able to demonstrate results based on stated goals and objectives.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2010, increase by 25% the number of volunteer hours dedicated to NMSP science,</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>public awareness and resource protection activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>By 2010, all education programs implemented in national marine sanctuaries will</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>be assessed for effectiveness against stated program goals and objectives and</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>National Science Education Standards.</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>By 2007, the NMSP is assessing the effectiveness of all significant partnerships</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>across the sanctuary system.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Performance Measure</td>
<td>Goal 1</td>
<td>Goal 2</td>
<td>Goal 3</td>
<td>Goal 4</td>
<td>Goal 5</td>
<td>Goal 6</td>
<td>Goal 7</td>
</tr>
<tr>
<td>------------------------------------------------------------------------------------</td>
<td>--------</td>
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<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>12 By 2015, increase by 20% public awareness of national marine sanctuaries and the sanctuary system.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Complete final management plans for all sites currently in management plan review by 2008.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 By 2010, decrease the average length of time to complete a draft revised management plan to 24 months.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 By 2010, Sanctuary Advisory Councils will provide significant input on 150 priority projects across the NMSP.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 By 2015, all infrastructure needs are funded to adequately support safe and effective operations.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 By 2010, five new collaborative projects with either new or existing international partnerships will be initiated and demonstrating protection of the marine environment.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 By 2006, all national marine sanctuaries (excluding Monitor NMS) will be trained in the use of Sanctuaries Hazardous Incident Emergency Logistics Database System SHIELDS and its components.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tr>
<tr>
<td>19 By 2010, 100% of sanctuaries will have an ocean observing system component within their site monitoring program.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
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</tbody>
</table>

## Appendix IV. Stellwagen Bank National Marine Sanctuary Condition Summary Table

The following table summarizes the condition of the Stellwagen Bank National Marine Sanctuary based on the criteria outlined in Section IV of the report. Each entry includes a description of the condition, the reason for the condition, and the potential response by the sanctuary.

### WATER

<table>
<thead>
<tr>
<th>#</th>
<th>Questions/Resources</th>
<th>Rating</th>
<th>Basis for Judgement</th>
<th>Description of Findings</th>
<th>Sanctuary Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Are specific or multiple-stressors, including changing oceanographic and atmospheric conditions, affecting water quality?</td>
<td>—</td>
<td>Numerous contaminants at low levels</td>
<td>Selected conditions may preclude full development of fishing resource assemblages and habitats, but are not likely to cause substantial or persistent declines.</td>
<td>Regulations specify allowable discharges and prohibit light plume discharges; draft management plan increases focus on water quality monitoring, ballast water management, and contingency planning. (Pages 10-20).</td>
</tr>
<tr>
<td>2</td>
<td>What is the hydrographic condition of sanctuary waters and how is it changing?</td>
<td>—</td>
<td>Specific aspects of ongoing monitoring</td>
<td>Conditions do not appear to have the potential to negatively affect fishing resources or habitat quality.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>3</td>
<td>Do sanitary waters pose risks to human health?</td>
<td>—</td>
<td>Specific aspects of ongoing monitoring</td>
<td>Conditions do not appear to have the potential to negatively affect human health.</td>
<td>Regulations specify allowable discharges and prohibit light plume discharges; draft management plan increases focus on water quality monitoring, ballast water management, and contingency planning. (Pages 10-20).</td>
</tr>
<tr>
<td>4</td>
<td>What are the levels of human activities that may influence water quality and how are they changing?</td>
<td>▼</td>
<td>Water discharges and outfall discharge</td>
<td>Some potentially harmful activities exist, but they do not appear to have a negative effect on water quality.</td>
<td>Regulations specify allowable discharges and prohibit light plume discharges; draft management plan increases focus on water quality monitoring, ballast water management, and contingency planning. (Pages 10-20).</td>
</tr>
</tbody>
</table>

### HABITAT

<table>
<thead>
<tr>
<th>#</th>
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<th>Sanctuary Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>What are the abundance and distributions of major habitat types and how are they changing?</td>
<td>—</td>
<td>Alteration of microhabitats due to bottom dragging and trawling</td>
<td>Selected habitat loss or alteration may inhibit the development of assemblages, and may cause measurable but not severe declines in fishing resource or water quality.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>6</td>
<td>What is the condition of biologically structured habitats and how is it changing?</td>
<td>—</td>
<td>Fishing gear impacts</td>
<td>Selected habitat loss or alteration has caused or is likely to cause severe declines in some but not all ecosystem components and reduce ecosystem integrity.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>7</td>
<td>What are the contaminant concentrations in sanctuary habitats and how are they changing?</td>
<td>—</td>
<td>Limited monitoring results</td>
<td>Selected contaminants may inhibit the development of fishing resource assemblages, and are not likely to cause substantial or persistent degradation.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>8</td>
<td>What are the levels of human activities that may influence habitat quality and how are they changing?</td>
<td>▼</td>
<td>Fishing gear impacts, shipping</td>
<td>Selected activities have caused or are likely to cause severe impacts, and cases to date suggest a pervasive problem.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
</tbody>
</table>

### LIVING RESOURCES

<table>
<thead>
<tr>
<th>#</th>
<th>Questions/Resources</th>
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<th>Sanctuary Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>What is the status of biodiversity and how is it changing?</td>
<td>▲</td>
<td>Long-term changes in fish diversity</td>
<td>Selected biodiversity loss has caused or is likely to cause severe declines in some but not all ecosystem components and reduce ecosystem integrity.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>10</td>
<td>What is the status of environmentally sustainable fishing and how is it changing?</td>
<td>▲</td>
<td>Published and unpublished literature on regional and local groundfish populations</td>
<td>Extraction has caused or is likely to cause severe declines in some but not all ecosystem components and reduce ecosystem integrity.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>11</td>
<td>What is the status of non-native species and how is it changing?</td>
<td>▼</td>
<td>Recent invasions discovered</td>
<td>Non-native species exist, predating full ecosystem development and function, but are unlikely to cause substantial or persistent degradation of ecosystem integrity.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>12</td>
<td>What is the status of key species and how is it changing?</td>
<td>▼</td>
<td>Cod (Boreas species), Sand lance (key species)</td>
<td>The reduced abundance of selected key species has caused or is likely to cause severe declines in some but not all ecosystem components and reduce ecosystem integrity or selected key species are at substantially reduced levels, and prospects for recovery are uncertain.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>13</td>
<td>What is the condition or health of key species and how is it changing?</td>
<td>—</td>
<td>Whole stock and entanglements</td>
<td>The diminished condition of selected key resources may cause a measurable but not severe reduction in ecological function, but recovery is possible.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
</tr>
<tr>
<td>14</td>
<td>What are the levels of human activities that may influence fishing resource quality and how are they changing?</td>
<td>▼</td>
<td>Stable levels of activity</td>
<td>Selected activities have caused or are likely to cause severe impacts, and cases to date suggest a pervasive problem.</td>
<td>Regulations address habitat disturbance from ocean dumping, dredge spoil, construction, and marine debris, and are intended to address impacts of cable and pipeline laying, ocean dumping, and mariculture, and to reduce impacts of mobile fishing gear, shipping, and bottom removal. (Pages 20-21).</td>
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</table>

### MARITIME ARCHAEOLOGICAL RESOURCES

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<th>Description of Findings</th>
<th>Sanctuary Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>What is the integrity of known maritime archaeological resources and how is it changing?</td>
<td>▼</td>
<td>Fishing gear impacts</td>
<td>The diminished condition of selected archaeological resources has reduced, to some extent, their historical, scientific, or educational value, and may affect the eligibility of some sites for listing in the National Register of Historic Places.</td>
<td>Regulations restrict seabed alteration, construction, disposal, and historical resource removal; enhanced protection will require additional staff, resource inventory and assessment, and outreach (Page 21).</td>
</tr>
<tr>
<td>16</td>
<td>Do known maritime archaeological resources pose an environmental hazard and is this threat changing?</td>
<td>—</td>
<td>Lack of hazardous cargo</td>
<td>Known maritime archaeological resources pose few or no environmental threats.</td>
<td>Regulations restrict seabed alteration, construction, disposal, and historical resource removal; enhanced protection will require additional staff, resource inventory and assessment, and outreach (Page 21).</td>
</tr>
<tr>
<td>17</td>
<td>What are the levels of human activities that may influence maritime archaeological resource quality and how are they changing?</td>
<td>▼</td>
<td>Fishing gear impacts</td>
<td>Selected activities warrant widespread concern and action, as large-scale, persistent, and/or repeated severe impacts have occurred or are likely to occur.</td>
<td>Regulations restrict seabed alteration, construction, disposal, and historical resource removal; enhanced protection will require additional staff, resource inventory and assessment, and outreach (Page 21).</td>
</tr>
</tbody>
</table>

Works Cited


“Flower Garden Banks National Marine Sanctuary: Boundary Expansion.”


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