

Florida Keys National Marine Sanctuary Revised Management Plan



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National Ocean Service

National Marine Sanctuary Program

This document is the revised management plan for the Florida Keys National Marine Sanctuary. It replaces the management plan that was implemented in 1996 and will serve as the primary management document for the Sanctuary during the next five years.

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Note to Reader

In an effort to make this document more user-friendly, we have included references to the Florida Keys National Marine Sanctuary Web site rather than including the entire text of many bulky attachments or appendices that are traditionally included in management plans. Readers who do not have access to the Internet may call the Sanctuary office at (305) 809-4700 to request copies of any documents that are on the Sanctuary's Web site. For readers with Internet access, the Sanctuary's Web site can be found at floridakeys.noaa.gov.

ABOUT THIS DOCUMENT

This document is a report on the results of NOAA's five-year review of the strategies and activities detailed in the 1996 *Final Management Plan and Environmental Impact Statement* for the Florida Keys National Marine Sanctuary. It serves two primary purposes: 1) to update readers on the outcomes of successfully implemented strategies - in short, accomplishments that were merely plans on paper in 1996; and, 2) to disseminate useful information about the Sanctuary and its management strategies, activities and products. The hope is that this information, which charts the next 5 years of Sanctuary management, will enhance the communication and cooperation so vital to protecting important national resources.

Sanctuary Characteristics

The Florida Keys National Marine Sanctuary extends approximately 220 nautical miles southwest from the southern tip of the Florida peninsula. The Sanctuary's marine ecosystem supports over 6,000 species of plants, fishes, and invertebrates, including the nation's only living coral reef that lies adjacent to the continent. The area includes one of the largest seagrass communities in this hemisphere. Attracted by this tropical diversity, tourists spend more than thirteen million visitor days in the Florida Keys each year. In addition, the region's natural and man-made resources provide recreation and livelihoods for approximately 80,000 residents.

The Sanctuary is 2,900 square nautical miles of coastal waters, including the 2001 addition of the Tortugas Ecological Reserve. The Sanctuary overlaps four national wildlife refuges, six state parks, three state aquatic preserves and has incorporated two of the earliest national marine sanctuaries to be designated, Key Largo and Looe Key National Marine Sanctuaries. Three national parks have separate jurisdictions, and share a boundary with the Sanctuary. The region also has some of the most significant maritime heritage and historical resources of any coastal community in the nation.

The Sanctuary faces specific threats, including direct human impacts such as vessel groundings, pollution, and overfishing. Threats to the Sanctuary also include indirect human impacts, which are harder to identify but are reflected in coral declines and increases in macroalgae and turbidity. More information about the Sanctuary can be found in this document and at the Sanctuary's Web site.

Management Plan Organization

Within this document, the tools that the Sanctuary uses to achieve its goals are presented in five management divisions: 1) Science; 2) Education, Outreach & Stewardship; 3) Enforcement & Resource Protection; 4) Resource Threat Reduction; and 5) Administration, Community Relations, & Policy Coordination. Each management division contains two or more *action plans*, which are implemented through supporting *strategies* and *activities*. The strategies described in the 1996 *Management Plan* generally retain their designations in this document. As in the 1996 plan, two or more action plans may share a strategy where their goals and aims converge. The 1996 plan can be accessed on the Sanctuary's Web site floridakeys.noaa.gov

Accomplishments and Highlights

The Sanctuary's programs and projects have made significant progress since the original management plan was implemented 1996. An overview of these accomplishments is provided in the Introduction. In addition, each action plan contains bulleted lists of accomplishments since the 1996 management plan was adopted.

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Acronyms

ACHP	Advisory Council on Historic Preservation
AGRRA	Atlantic and Gulf Rapid Reef Assessment Program
ASA	Abandoned Shipwreck Act
ATBA	Areas to Be Avoided
AWT	Advanced Wastewater Treatment
CAD	Computer Automated Dispatch
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CERP	Comprehensive Everglades Restoration Plan
CFR	Code of Federal Regulations
CRCP	Coral Reef Conservation Program
DARP	Damage Assessment and Restoration Program
DEP	Florida Department of Environmental Protection
DTNP	Dry Tortugas National Park
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
F.S.	Florida Statutes
FAC	Florida Administrative Code
FDACS	Florida Department of Agriculture and Consumer Services
FDCA	Florida Department of Community Affairs
FDHR	Florida Division of Historical Resources
FDOT	Florida Department of Transportation
FKNMS	Florida Keys National Marine Sanctuary
FKNMSPA	Florida Keys National Marine Sanctuary Protection Act
FPS	Florida Park Service
FR	Federal Register
FWC	Florida Fish and Wildlife Conservation Commission
FWRI	Fish and Wildlife Research Institute
FY	Federal Fiscal Year
GIS	Geographic Information System
GMD	Growth Management Division (Monroe County)
GMFMC	Gulf of Mexico Fishery Management Council
GPS	Global Positioning System
HAZMAT	Hazardous Materials
ICS	Incident Command Structure
ICW	Intra-coastal Waterway
IMO	International Maritime Organization
MBTA	Migratory Bird Treaty Act
MEERA	Marine Ecosystem Event Response and Assessment
MHR	Maritime Heritage Resources
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding

MRD	Marine Resources Division (Monroe County)
NCCOS	National Centers for Coastal Ocean Science
NEPA	National Environmental Policy Act
NGO	Non-governmental Organization
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NMS	National Marine Sanctuary
NMSA	National Marine Sanctuary Act
NMSF	National Marine Sanctuary Foundation
NMSP	National Marine Sanctuary Program
NOAA	National Oceanic and Atmospheric Administration
NOAA/OLE	NOAA Office of Law Enforcement
NOS	National Ocean Service
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRDA	Natural Resource Damage Assessment Claims
NURC	National Undersea Research Center
OFW	Outstanding Florida Waters
OSDS	On-Site Disposal System
OSTDS	On-Site Sewage Treatment and Disposal System
PREP	National Prepared for Response Exercise Program
PSSA	Particularly Sensitive Sea Area
RECON	Reef Ecosystem Condition Program
REEF	Reef Environmental Education Foundation
RNA	Research Natural Area
RSMAS	University of Miami/Rosenstiel School of Marine and Atmospheric Science
SAFMC	South Atlantic Fishery Management Council
SAP	Science Advisory Panel
SAV	Submerged Aquatic Vegetation
SCR	Submerged Cultural Resources
SEFSC	Southeast Fisheries Science Center
SFWMD	South Florida Water Management District
SHIELDS	Sanctuary Hazardous Incident Emergency Logistics Database System
SPA	Sanctuary Preservation Area
SWIM	Surface Water Improvement and Management Act
SWM	Stormwater Management
TAC	Technical Advisory Committee
TNC	The Nature Conservancy
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USDOC	U.S. Department of Commerce
USDOI	U.S. Department of Interior
USDOS	U.S. Department of State
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAMS	Waterway Assessment and Marking System

WMA Wildlife Management Area
WQPP Water Quality Protection Program
WQSC Water Quality Steering Committee



1.0 INTRODUCTION

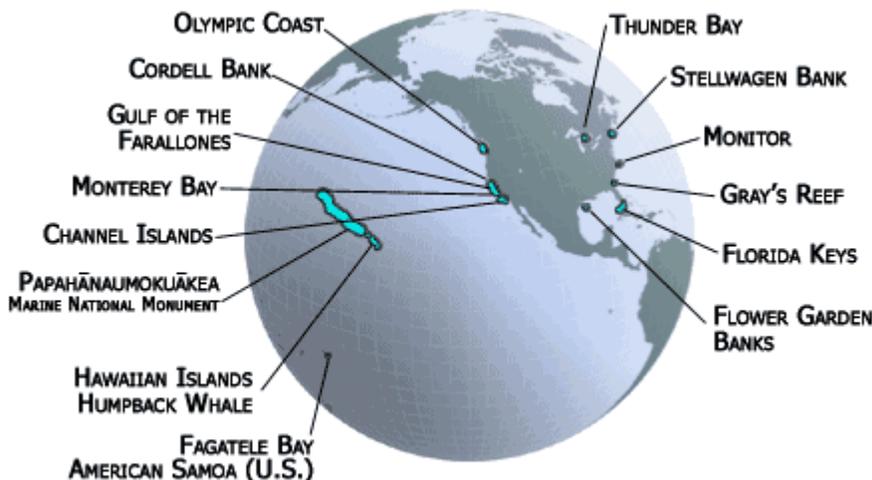
1.1 The National Marine Sanctuary Program (NMSP)

The National Marine Sanctuary Program (NMSP) is a network of 14 marine protected areas (Figure 1.1), encompassing marine resources from Washington State to the Florida Keys, and Lake Huron to American Samoa. The National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service (NOS) has managed the nation's marine sanctuary system since passage of the Marine Protection, Research and Sanctuaries Act of 1972. Title III of that Act is now called the National Marine Sanctuaries Act (NMSA), which is found in Appendix A.

Today, the national marine sanctuary system contains deep-ocean gardens, near-shore coral reefs, whale migration corridors, deep-sea canyons, and underwater archaeological sites. They range in size from one-quarter square mile in Fagatele Bay, American Samoa, to almost 138,000 square miles of Pacific Ocean including the Northwest Hawaiian Islands - the largest marine protected area in the world. Together, these sites protect nearly 150,000 square miles of coastal and open ocean waters and habitats. While some activities are managed to protect resources, certain multiple uses, such as recreation, commercial fishing, and shipping are allowed to the extent that they are consistent with each site's resource protection mandates. Research, education, outreach, and enforcement activities are major components in each site's program of resource protection.

The NMSP is recognized around the world for its commitment to management of marine protected areas within which primary emphasis is placed on the protection of living marine resources and our nation's maritime heritage resources.

Figure 1.1. The National Marine Sanctuary System



The NMSP Vision:
People value marine sanctuaries as treasured places protected for future generations.

The NMSP Mission:
To serve as the trustee for the national system of marine protected areas to conserve, protect, and enhance their biodiversity, ecological integrity and cultural legacy.

1.2 The Florida Keys National Marine Sanctuary (FKNMS)

Historical Setting

Warning signs of the fragility and finite nature of the region's marine resources have been present in the Florida Keys for years. In 1957, a group of conservationists and scientists met at Everglades National Park to discuss the demise of the coral reef resources at the hands of those attracted by its beauty and uniqueness. The conference resulted in the 1960 creation of the world's first underwater park, John Pennekamp Coral Reef State Park. However, in the following decade, public outcry continued over pollution, overfishing, physical impacts, overuse, and user conflicts. The concerns continued to be voiced by environmentalists and scientists alike throughout the 1970s and into the 1990s.

As a result, additional management efforts were instituted to protect the Keys' coral reefs. In the Upper Keys, Key Largo National Marine Sanctuary was established in 1975 to protect 103 square nautical miles of coral reef habitat from north of Carysfort Lighthouse to south of Molasses Reef. In the Lower Keys, the 5.32 square nautical mile Looe Key National Marine Sanctuary was established in 1981.

Despite these efforts, oil drilling proposals and reports of deteriorating water quality occurred throughout the 1980s. At the same time, scientists were assessing coral bleaching and diseases, long-spined urchin die-offs, loss of living coral cover, a major seagrass die-off, and declining reef fish populations. Such threats prompted Congress to act. In 1988, Congress reauthorized the National Marine Sanctuary Program and ordered a feasibility study for possible expansion of Sanctuary sites in the Florida Keys - a directive that signaled that the health of the Keys ecosystem was of national concern and an endorsement of the NMSP's management successes at Key Largo and Looe Key National Marine Sanctuaries.

The feasibility studies near Alligator Reef, Sombrero Key, and westward from American Shoal were overshadowed by several natural events and ship groundings that precipitated the designation of the Florida Keys National Marine Sanctuary (FKNMS). Three large ships ran aground on the coral reef during one 18-day period in the fall of 1989. Although people cite the ship groundings as the issue triggering Congressional action, it was, in fact, the cumulative degradation and the threat of oil drilling, along with the groundings. These multiple threats prompted the late Congressman Dante Fascell to introduce a bill into the House of Representatives in November of 1989. Congressman Fascell had long been an environmental supporter of South Florida and his action was very timely. Senator Bob Graham, also known for his support of environmental issues in Washington and as a Florida Governor, sponsored the bill in the Senate. Congress gave its bipartisan support, and on November 16, 1990, President George H.W. Bush signed the bill into law.

With designation of the Florida Keys National Marine Sanctuary in 1990, several protective measures were implemented immediately, such as prohibiting oil and hydrocarbon exploration, mining or otherwise altering the seabed, and restricting large shipping traffic by establishing an Area To Be Avoided (ATBA). Additionally, protection to coral reef resources was extended by restricting anchoring on coral, touching coral, and collecting coral and live rock (a product of the aquarium

trade). Discharges from within the Sanctuary and from areas outside the Sanctuary that could potentially enter and affect local resources were also restricted in an effort to comprehensively address water quality concerns.

Administration and Legislation

The Sanctuary uses an ecosystem approach to comprehensively address the variety of impacts, pressures, and threats to the Florida Keys marine ecosystem. It is only through this inclusive approach that the complex problems facing the coral reef community can be adequately addressed.

The goal of the Sanctuary is to protect the marine resources of the Florida Keys. It also aims to interpret the Florida Keys marine environment for the public and to facilitate human uses of the Sanctuary that are consistent with the primary objective of sanctuary resource protection. The Sanctuary was created and exists under federal law, and became effective in state waters with the consent of the State of Florida. It is administered by NOAA and is jointly managed with the State of Florida under a co-trustee agreement. The Florida Governor and Cabinet, sitting as the Board of Trustees for the State of Florida, designated the Florida Department of Environmental Protection (DEP) as the state partner for Sanctuary management. The Florida Fish and Wildlife Conservation Commission (FWC), created in 1999, enforces Sanctuary regulations in partnership with Sanctuary managers and the NOAA Office of Law Enforcement. Throughout this document when the term FKNMS managers is used in reference to a responsible or responsive entity it refers to the NOAA and State of Florida co-trustees and their designated representatives from the NMSP, DEP and FWC working cooperatively to implement the strategies outlined in this plan.

NOAA, DEP and FWC are large and diverse organizations. In some cases we have identified specific organizations we work closely with within the broader agencies but are generally separate from the direct organizational chain of the staff working at the Sanctuary. For instance, FWC also houses the Fish and Wildlife Research Institute (FWRI), which conducts and coordinates scientific research and monitoring. In addition, the Sanctuary works cooperatively with multiple state and federal agencies, numerous universities and non-governmental organizations. The relationship with some, like the US Environmental Protection Agency (EPA), is based in the legislation creating the Florida Keys National Marine Sanctuary. Other relationships have evolved through cooperative agreements and information arrangements based upon shared boundaries, shared mission and goals, and/or shared interests.

National marine sanctuaries are typically designated by the Secretary of Commerce through an administrative process established by the National Marine Sanctuary Act (NMSA). However, recognizing the importance of the Florida Keys ecosystem and the degradation of the ecosystem due to direct and indirect physical impacts, Congress passed the Florida Keys National Marine Sanctuary and Protection Act (FKNMSPA) in 1990, (P.L. 101-605) (Appendix B) designating the Florida Keys National Marine Sanctuary to be managed as a national marine sanctuary under the NMSA. President George H. W. Bush signed the FKNMSPA into law on November 16, 1990.

The FKNMSPA and NMSA require the preparation of a comprehensive management plan and implementing regulations to protect Sanctuary resources. This *Revised Management Plan* responds to the requirements of the FKNMSPA and NMSA. The implementing regulations, effective as of 1 July

1997, are found at 15CFR922 and in Appendix C. The designation document¹ for the FKNMS is found in Appendix D.

Sanctuary Boundaries

The Sanctuary's enabling legislation designated 2,800-square-nautical miles of coastal waters surrounding the Florida Keys as the Florida Keys National Marine Sanctuary. The Sanctuary's boundary was amended in 2001 when the Tortugas Ecological Reserve was designated, significantly increasing the marine resources requiring protection.

Currently, the boundary encompasses approximately 2,900 square nautical miles (9,800 square kilometers) of coastal and ocean waters and submerged land (Figure 1.2). The boundary extends southward on the Atlantic Ocean side of the Keys, from the northeastern-most point of the Biscayne National Park along the approximate 300-foot isobath for over 220 nautical miles to the Dry Tortugas National Park. The boundary extends more than 10 nautical miles to the west of the Park boundary, where it turns north and east. The northern boundary of the Sanctuary extends to the east where it intersects the boundary of the Everglades National Park. The Sanctuary waters on the north side of the Keys encompass a large area of the Gulf of Mexico and western Florida Bay. The boundary follows the Everglades National Park boundary and continues along the western shore of Manatee Bay, Barnes Sound, and Card Sound. The boundary then follows the southern boundary of Biscayne National Park and up its eastern boundary along the reef tract at a depth of approximately 60 feet until its northeastern-most point.

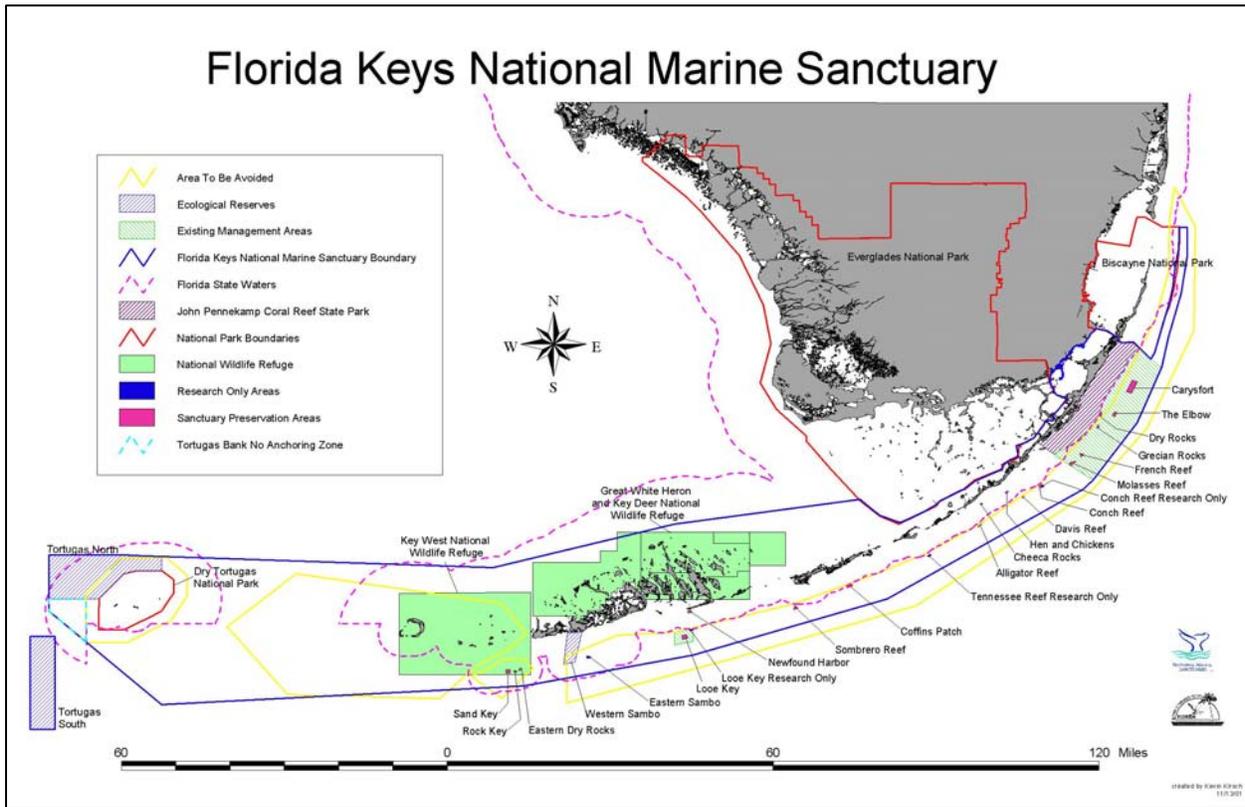
A separate, non-contiguous, 60 square nautical mile area off the westernmost portion of the Sanctuary is called the Tortugas Ecological Reserve South. The area's shallowest feature is Riley's Hump which rises to a depth of only 90 feet of water.

The Sanctuary boundary overlaps two previously existing national marine sanctuaries (Key Largo and Looe Key); four U.S. Fish and Wildlife Service (USFWS) refuges; six state parks, including John Pennekamp Coral Reef State Park; three state aquatic preserves; and other jurisdictions. Everglades National Park, Biscayne National Park and Dry Tortugas National Park are excluded from Sanctuary waters, but each shares a contiguous boundary with the Sanctuary.

The shoreward boundary of the Sanctuary is the mean high-water mark, except around the Dry Tortugas where it is the boundary of Dry Tortugas National Park. The Sanctuary boundary encompasses nearly the entire reef tract, all of the mangrove islands of the Keys, and a good portion of the region's seagrass meadows.

¹ The NMSA defines the term designation (also known as the designation document) of a sanctuary as the geographic area of the sanctuary, the characteristics of the area that give it conservation, recreational, ecological, historical, research, educational, or esthetic value, and the types of activities that will be subject to regulation to protect those characteristics.

Figure 1.2. The Florida Keys National Marine Sanctuary Boundaries



Socio-Economic Context

The environment and the economy are inextricably linked in the Florida Keys, making management and protection of existing resources and reducing impacts critical if the economy is to be sustained. Tourism is the number one industry in the Florida Keys, with over \$1.2 billion dollars being spent annually by over 3 million visitors. The majority of visitors participate in activities such as snorkeling, SCUBA diving, recreational fishing, viewing wildlife and studying nature. Recreational and commercial fishing are the next most important sectors of the local economy, annually contributing an estimated \$500 million and \$57 million respectively (marineeconomics.noaa.gov).

Because of the recreational and commercial importance of the marine resources of the Florida Keys, protecting these Sanctuary resources is valuable not only for the environment but also for the economy. The special marine resources of the region, which led to the area’s designation as a national marine sanctuary, contribute to the high quality of life for residents and visitors. Without these unique marine resources, the quality of life and the economy of the Keys would decline.

1.3 The Management Plan Review Process

What is management plan review?

In 1992, when Congress reauthorized the NMSA, it required all national marine sanctuaries to review their management plans every five years in order to monitor and evaluate the progress of the national mission to protect national resources. The Florida Governor and Cabinet, as trustees for the state, also mandated a five-year review of the Florida Keys National Marine Sanctuary Management Plan in their January 28, 1997 resolution.

The Sanctuary's management plan review creates a road map for future actions based on past experience and outcomes. The review reevaluates the goals and objectives, management techniques, strategies, and actions identified in the existing management plan. It provides the opportunity to take a close and comprehensive look at outcomes and plan for future management of the Sanctuary.

The 1996 Florida Keys National Marine Sanctuary Management Plan

After the initial six-year FKNMS planning process, a comprehensive management plan for the Sanctuary was implemented in July 1997. The management plan focused on ten action plans which were largely non-regulatory in nature and involved educating citizens and visitors, using volunteers to build stewardship for local marine resources, appropriately marking channels and waterways, installing and maintaining mooring buoys to prevent anchor damage to coral and seagrass, surveying maritime heritage resources, and protecting water quality. In addition to action plans, the 1996 management plan designated five types of marine zones to reduce pressures in heavily used areas, protect critical habitats and species, and reduce user conflicts. The efficacy of the marine zones is monitored Sanctuary-wide under the Research and Monitoring Action Plan.

The implementing regulations for the FKNMS became effective July 1, 1997. The 1996 management plan was published in three volumes: Volume I is the Sanctuary management plan itself (which this document updates); Volume II characterizes the natural and social environmental setting of the Sanctuary and describes the process used to develop the draft management alternatives, including environmental and socioeconomic impact analyses of the alternatives, and the environmental impact statement; Volume III contains appendices, including the texts of federal and state legislation that designate and implement the Sanctuary. All three volumes of the 1996 management plan are available on the Sanctuary Web site (floridakeys.noaa.gov) and from the Sanctuary's Key West office. Volume II is not being revised as part of this review. After public input, government review and final adoption of this five-year review and revised Management Plan, this document will replace Volumes I and III.

How does management plan review work?

Review of the 1996 management plan began in early 2001 with a meeting in Tallahassee, Florida, among federal and state partners responsible for Sanctuary management and various FKNMS and NMSP staff. The review included the FKNMS Sanctuary Advisory Council and the general public in every step of the process.

In the late spring and summer of 2001, FKNMS staff, working closely with the Sanctuary Advisory Council, held scoping meetings and re-convened action plan working groups that had been created during development of the 1996 plan. The scoping meetings were held in Marathon, Key Largo, and

Key West, and gave the public the opportunity to meet with Sanctuary Advisory Council members, Sanctuary managers, and FKNMS staff. The meetings included round-table discussions on every action plan, and participants had the opportunity to move freely between the various topics being discussed at each table.

The scoping period for the revised management plan lasted from June 8 through July 20, 2001. Approximately 30 comments were received - a sharp contrast to the more than 6000 public comments received during the comment period for the 1996 plan. In addition, the working groups held more than three dozen meetings between June and September 2001 to discuss, evaluate, revise and update action plans. Sanctuary Advisory Council members and FKNMS staff who had served on the working groups presented the proposed revisions to the Sanctuary Advisory Council at three meetings in October 2001. The full advisory council recommended minor changes and approved each action plan in this document. The Sanctuary Advisory Council membership and Action Plan Working Group membership lists are included in Appendix E.

Between 2001 - 2004, numerous drafts of each action plan and strategy were prepared and reviewed by the FKNMS Management Team, Action Plan Leads and National Marine Sanctuary Program Headquarters staff. In February 2005 the *Draft Revised Management Plan* was published and distributed for public review and comment. A notice was placed in the Federal Register. A series of three public meetings were held in the Florida Keys including a meeting in each of Key Largo, Marathon and Key West. This formal comment period extended from February 15, 2005 to April 15, 2005. Responses were received from approximately 20 commenters. Between May 2005 and February 2006 the comments were reviewed, consolidated into a single document and distributed for review and response to the FKNMS Management Team and Action Plan Leads. The responses to the comments were incorporated into the *Draft Revised Management Plan*, as appropriate. Between August 2006 and May 2007 FKNMS staff and staff in the NMSP and the FL Department of Environmental Protection headquarters units worked together to review, refine and ensure the *Draft Revised Management Plan* reflected the most recent and up-to-date information and management practices and policies.

The Role of Sanctuary Management as Facilitators

A sanctuary management plan is designed to identify the best and most practical strategies to achieve common goals, while getting the most out of public investment. Achieving this aim cannot be accomplished solely through the authorities and resources of an individual sanctuary management authority. It requires a broad partnership of programs, authorities, and resources, coordinated to meet the needs of both the sanctuary site and the broader region of which it is a part.

Consequently, the management plan review process first focuses on finding the most effective strategies to accomplish common goals. These strategies are the product of a process that brings together constituents, institutions, and interested parties in directed working groups to address specified problem areas. How these strategies are to be implemented – with whose authorities, investments, and personnel – is determined subsequent to developing the best strategies. While the Sanctuary program commits to carrying out specific strategies as budgets allow, in many cases implementation becomes the responsibility of other institutions such as state, federal, or local partners, that have the authorities, the appropriate program, and/or the resources required. The intent of identifying these responsibilities is not to create unfunded mandates for other agencies, but rather to integrate management actions so as to maximize protection of Sanctuary resources.

In this process, the sanctuary management plan becomes a framework in which the role of all partners is clarified. The sanctuary assumes the role of facilitator and integrator of a far larger body of activities and outcomes than are within the scope of its immediate authorities, programs, and resources. This facilitation role provides the mechanism for continued implementation, evaluation, and adaptation of the partnership activities documented by the plan, ensuring its continuity and overall success.

1.4 Accomplishments

There have been many accomplishments in the sanctuary beginning with the authority established under the Florida Keys National Marine Sanctuary and Protection Act of 1990 and the implementation of the management plan in 1997. An overview of the Sanctuary’s accomplishments is given here, and more details are provided within each Action Plan.

1. Area To Be Avoided. The “Area To Be Avoided” (ATBA) designation in 1990 has resulted in a significant decrease in the number of major ship groundings on the coral reefs. As Figure 1.3 illustrates, prior to 1990 there was a major ship grounding involving vessels greater than 50 m in length, nearly every year, while only two have occurred since the implementation of the ATBA. The United Nations International Maritime Organization (IMO) agreed that the ATBA should be given additional strength as a Particularly Sensitive Sea Area (PSSA) in 2002 (see Accomplishment 5 below). The ATBA regulations are at 15 CFR Part 922, Subpart P, Appendix VII. Figure 1.4 shows the ATBA, the PSSA and the Sanctuary boundary.

Figure 1.3. Reef groundings of vessels greater than 50m before & after ATBA designation.

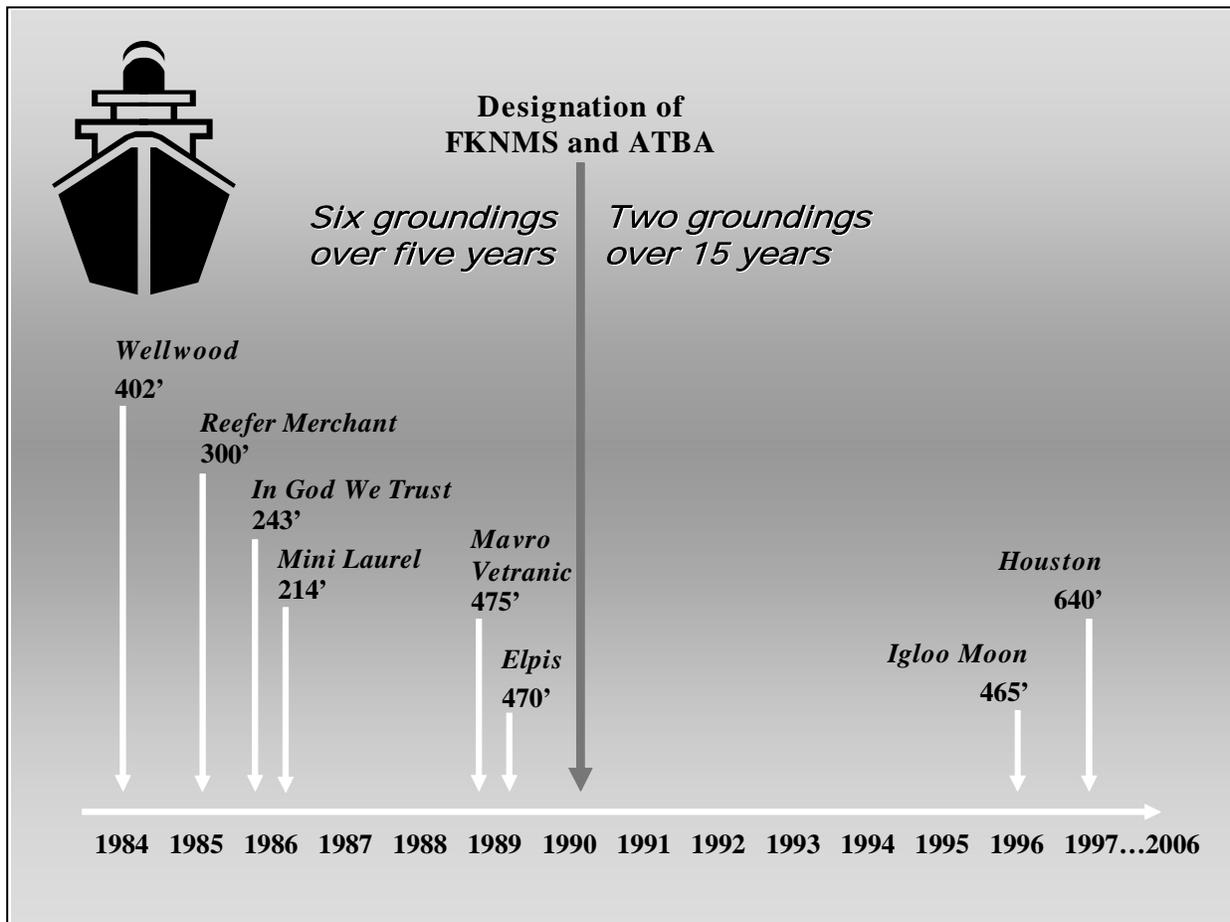
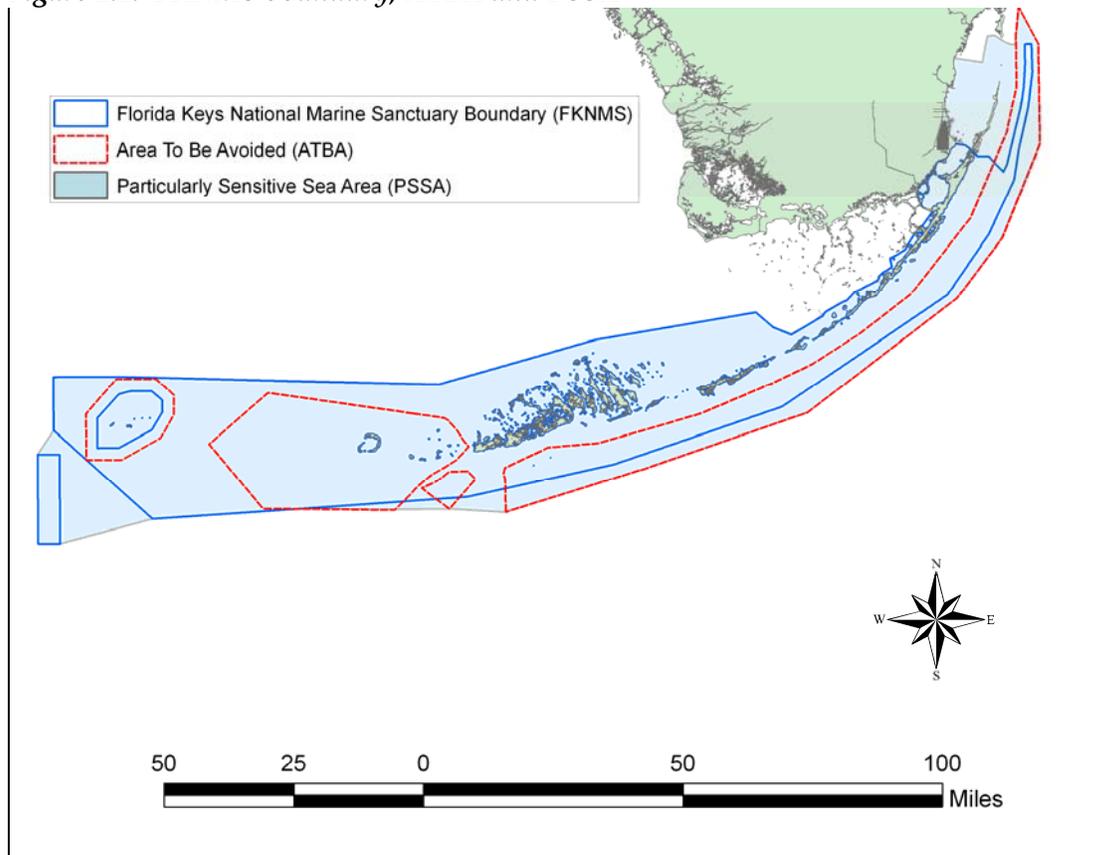


Figure 1.4. FKNMS boundary, ATBA and PSSA



2. Oil Drilling and Hard Mineral Mining Ban. A ban on these activities was established when the Sanctuary was created, and has prevented these activities from occurring in the Sanctuary.

3. The Water Quality Protection Program. This program has produced the first Water Quality Protection Program for a national marine sanctuary and has fully implemented 26 of 49 high-priority activities, many of which are carried out in cooperation with other action plans.

4. The Comprehensive Everglades Restoration Plan. The Sanctuary continues to participate in the implementation of the Comprehensive Everglades Restoration Plan (CERP). Sanctuary staff have been active on this project since 1993, including chairing a working group for the South Florida Ecosystem Restoration Task Force and staffing its science and education committees. The Sanctuary's participation seeks to protect the ecosystem's water quality by eliminating catastrophic releases of freshwater along the coastal waters of South Florida including Florida Bay following rain events. One of the goals of the CERP is to restore the water quality, quantity, timing and distribution to the South Florida ecosystem.

5. Designation of the Florida Keys as a Particularly Sensitive Sea Area. In November 2002, the United Nations International Maritime Organization approved designation of the Florida Keys as a PSSA. The designation is not accompanied by additional rules and regulations, but seeks to elevate public awareness of the threat of oil spills and hazardous materials to sensitive marine environments

and will ensure that the previously mentioned ATBA is noted not only on U.S. charts but also on nautical charts worldwide.

6. Long-term and continuing progress in the Research and Monitoring and Zoning action plans.

Research and monitoring has produced significant scientific data, hypothesis testing, mapping, trend documentation, and wide dissemination of these findings. Especially notable is the Keys-wide benthic map which provides valuable information for Sanctuary managers. In addition to the new protected zone in the Tortugas Ecological Reserve, the Sanctuary's zoning programs continue to provide invaluable data that demonstrate the success of the marine zoning program.

7. Education, Public Outreach, Sanctuary Stewardship, and Volunteerism. Through these inter-related efforts, information is flowing from scientists to managers and then to educators, who reach the next generation. More than 180,000 volunteer hours, an estimated \$2.9 million value, were donated to the Sanctuary between 1996 and 2006. Even more valuable than the dollar worth of the program is the stewardship created through volunteerism, which uniquely contributes to the long-term effectiveness of the Sanctuary.

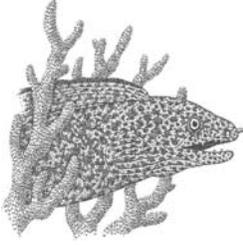
8. Enforcement and Regulations. Both the city of Key West and the State of Florida have declared Florida Keys waters under their jurisdictions as "no-discharge" zones. Additional accomplishments in implementing the Enforcement and Regulatory Action Plans are largely a tribute to the cooperative efforts among the Florida Fish and Wildlife Conservation Commission, the Florida Park Service, the U.S. Coast Guard (USCG), and NOAA. Notable among these is the cross-deputization of state-certified law enforcement officers, which allows them to enforce numerous federal laws, including fisheries regulations, the Endangered Species Act, the National Marine Mammal Act, the Lacey Act, etc.

9. Damage Assessment and Restoration. The Damage Assessment and Restoration Action Plan is new to this document but is based on accumulated data and lessons learned since 1982. The cross-disciplinary strategies will prove useful in reducing the number of vessel groundings in Sanctuary waters as well as restoring Sanctuary resources damaged by vessels.

10. Maritime Heritage Resources. The Maritime Heritage Resources Action Plan includes a close partnership of the state, NOAA, and the Florida Advisory Council on Historic Preservation described in a programmatic agreement for resource management that was originally signed in 1998 and then renewed in 2004 (see Appendix F for more information and a Web site link for the full document). Additionally, the 2002 discovery of a previously unknown wreck within the Sanctuary has brought about a community-endorsed research and interpretation plan for the site. Overall, the Action Plan represents excellent progress in balancing resource protection, investigation and interpretation.

11. Mooring Buoys and Waterway Management (formerly Channel Marking). The Mooring Buoy and Waterway Management Action Plans have implemented simple but effective strategies for reducing vessel damage to the coral reef and to seagrass beds. The long-term success of these programs – mooring buoy strategies have been used in local Sanctuary waters since 1981 when they were introduced at the Key Largo National Marine Sanctuary – has largely been due to a unique interface of education, outreach, enforcement and research and monitoring activities.

12. Operations. Since 1997, the Sanctuary has integrated the administrative functions of two former sanctuaries – at Key Largo and Looe Key – into a single headquarters umbrella with two regional offices. This integration streamlined delivery of human resources, community relations, and policy development. It also resulted in a series of accomplishments, ranging from an updated electronic financial reporting system to the 180+-episode television series, *Waterways*.



3.4 RESOURCE THREAT REDUCTION

Resource protection and conservation can be achieved with a variety of management tools such as those action plans bundled in this management division. Those action plans include: the Marine Zoning Action Plan; the Mooring Buoy Action Plan; the Waterway Management Action Plan; and the Water Quality Action Plan. Each of these action plans contains tools that allow managers to directly protect and conserve Sanctuary resources through the implementation of various management strategies. These action plans, when implemented, provide very targeted means of protecting resources whether it is by establishing marine zones to conserve Sanctuary resources, balancing user conflicts or by providing mooring buoys to eliminate anchor damage to corals in high-use areas. The marking of channels and waterways to aid in the prevention of vessel groundings is an effective non-regulatory approach to protecting Sanctuary resources while boundary buoys help Sanctuary users comply with the regulations.

Water quality degradation is the primary issue that is affecting the health and vitality of Sanctuary resources. This management division includes the Water Quality Action Plan designed to identify the sources of water quality decline and to outline the various corrective management actions that need to be implemented to improve water quality.

3.4.4 Water Quality Action Plan

Introduction

Overview

Declining water quality continues to be a major concern for the Sanctuary. The Water Quality Protection Plan, mandated by Congress and developed jointly by EPA, NOAA, the State of Florida, and Monroe County, has been an evolving and effective model for identifying water-quality problems and solutions. The model has also been productive in providing the extensive monitoring and research needed to implement science-based management. However, the model has been of less help in resolving some local concerns regarding implementation.

Each activity in the Water Quality Action Plan is derived from the management strategies described in the 1996 final management plan. The strategies address sources of pollution, priority corrective actions and compliance schedules. The strategies seek to restore and maintain a balanced, indigenous population of corals, shellfish, fish and wildlife, and recreation in and on the water. The strategies include a water-quality monitoring program and opportunities for public participation in all aspects of development and implementation. This action plan is an abbreviated version of Strategies and Activities described in the *Water Quality Protection Program Document*. The Water Quality Protection Program's *Progress Report on Implementation* (March 1997) was revised and updated in May 1998, January 1999, and June 2001. The details of research and monitoring strategies related to water quality are published in the FKNMS's *Comprehensive Science Plan*.

Relationship to Other Action Plans

Many water quality strategies appear in other action plans because of the need to establish separate components for common goals. For example, in addition to addressing water quality, a strategy may have research, education, or volunteer components. If a strategy appears in more than one action plan, this is noted.

Goals and Objectives

The goal of the Water Quality Action Plan is to work with federal, state and local governments to better understand water quality problems and actively implement solutions to reverse trends and restore "healthy" water quality.

The objectives of this action plan are to work with relevant agencies and the public to increase understanding of water quality issues and address the issues through research, monitoring and the development and implementation of wastewater and stormwater master plans, as well as development of wastewater treatment facilities.

Implementation

Strategies are typically implemented by a combination of federal, state, and local effort. The U.S. EPA and the DEP lead the implementation of most strategies in this plan. Other entities, including Monroe County, the South Florida Water Management District, the Florida Department of Health, and the U.S. Coast Guard, have also led major efforts.

Costs

Based upon 1997 estimates in the *Water Quality Protection Program Document*, the cost to implement all strategies was initially estimated to be between \$290 million and \$510 million. Two expensive strategies, stormwater system retrofitting (\$200 million) and wastewater infrastructure (\$57 million to \$257 million) accounted for most of that. Excluding stormwater and wastewater strategies, the cost was estimated between \$34 million and \$55 million.

Since those estimates were made, Monroe County has updated its *Sanitary Wastewater Master Plan* and *Stormwater Master Plan*. The estimates in those documents for complete implementation of recommendations are, in the *Wastewater Master Plan*, \$520 million, and in the *Stormwater Master Plan*, \$500 million. Costs of the remaining activities have not been re-estimated, but can be assumed to be somewhat higher than original estimates. Funding comes from a combination of public (federal, state and local) and private sources. Eighteen government institutions have been identified as potential participants. Table 3.14 lists estimated costs to implement each strategy and its component activities.

Contingency Planning for Changing Budgets

The Water Quality Action Plan includes a wide variety of strategies and activities that will be implemented by various agencies and funded through various mechanisms. A separate study of potential funding sources was conducted by the EPA, and is included in the Water Quality Protection Program Phase II Report. The EPA and DEP, with guidance from the Technical Advisory Committee (established under strategy W.32, found in the Science Management and Administration Action Plan), will be responsible for reprioritizing strategies and activities depending on the available funds.

Accomplishments

Since the final management plan went into effect in 1997, the Sanctuary and its partners in water quality protection have accomplished many of its initial goals. Highlights of the accomplishments include:

- Developed the first Water Quality Protection Program for a National Marine Sanctuary, including a comprehensive Action Plan and Implementation Plan at a cost of \$1.3 million.
- Established a high-level Water Quality Steering Committee and Technical Advisory Committee.
- Fully implemented 26 of 49 high-priority activities and 37 of 95 total activities in the initial Water Quality Action Plan.
- Completed ten years of comprehensive monitoring throughout the Sanctuary related to water quality, seagrasses, and coral reef/hard-bottom communities at a total cost of \$10 million.
- Developed and implemented a Data Management Program for the Sanctuary at a cumulative cost of \$695,000.
- Funded and implemented 15 special studies and research projects designed to identify cause-and-effect relationships between pollutants and ecological impacts at a total cost of \$1.8 million.
- Assisted Monroe County to develop comprehensive wastewater and stormwater master plans.
- Assisted Monroe County to develop a Wastewater Facilities Plan for the Marathon service area.
- Constructed an advanced wastewater treatment facility and collection system for the Little Venice area of Marathon through a Title II Construction Grant in the amount of \$4,326,000 awarded by the Florida Keys Aqueduct Authority.
- Provided more than \$290,000 to the Sanctuary for public education and outreach.

- Provided a \$500,000 grant to Florida Department of Health to identify and test innovative and alternative on-site wastewater systems to reduce nutrient loading in ground and surface waters.
- Worked with the City of Key West to designate the waters surrounding the city as a no-discharge zone.
- Designated all state waters in the FKNMS as a no-discharge zone in 2002. Mobile pump-out facilities were established to support compliance with the new designation.
- Provided a \$400,000 grant to the Florida Audubon Society/Florida Keys Environmental Restoration Trust Fund for restoration projects.
- Prepared and widely distributed the *Report to Congress (1996)* on the Water Quality Protection Program, a white paper entitled “Water Quality Concerns in the Florida Keys: Sources, Effects, and Solutions,” and several annual “Progress Reports on Implementation,” describing the status of the Water Quality Protection Program.
- Implemented a half-million dollar demonstration project for Onsite Sewage Treatment & Disposal Systems (OSTDS) that compared five systems. A final report comparing the nutrient-removal capabilities, costs, and limitations of these systems is available at www.doh.state.fl.us/environment/ostds/research/researchreports.htm. The results have been used to design and install new and replacement systems with combinations of technologies that meet Florida Keys effluent-disposal standards.
- Completed the *Sanitary Wastewater Master Plan*, which is currently being implemented as a high priority.
- Improved interagency coordination has reduced wastewater pollution by refining and simplifying OSTDS permitting and increasing funds for compliance monitoring and enforcement.
- Improved stormwater management through local government implementation of stormwater management ordinances.

Strategies

The Water Quality Action Plan consists of the 18 strategies listed below. Fifteen of these strategies are included here, grouped under 8 categories, and the remaining 3 strategies are presented in other action plans.

Florida Bay/External Influence Strategies

- W.19 Florida Bay Freshwater Flow
- W.24 Researching Florida Bay Influences (see the Research & Monitoring Action Plan)

Domestic Wastewater Strategies

- W.3 Addressing Wastewater Management Systems
- W.5 Developing and Implementing Water Quality Standards
- W.7 Resource Monitoring of Surface Discharges

Stormwater Strategies

- W.11 Stormwater Retrofitting
- W.14 Instituting Best Management Practices

Marina and Live-Aboard Strategies

- B.7 Reducing Pollution Discharges
- Z.5 Special-use Areas (see Marine Zoning Action Plan)
- L.1 Elimination of Wastewater Discharge From Vessels
- L.3 Reducing Pollution From Marina Operations

- E.4 Developing Training, Workshops, and School Programs (see Education and Outreach Action Plan)

Landfill Strategy

- L.7 Assessing Solid Waste Disposal Problem Sites

Hazardous Materials Strategies

- W.15 Hazardous Materials (HAZMAT) Response
- W.16 Spill Reporting
- L.10 HAZMAT Handling

Mosquito Spraying Strategy

- W.17 Refining the Mosquito Spraying Program

Canal Strategy

- W.10 Addressing Canal Water Quality

Each of these strategies is detailed below. Table 3.14 provides estimated costs for implementation of these strategies over the next five years.

Table 3.14 Estimated Costs of the Water Quality Action Plan

Water Quality Action Plan Strategies	Estimated Annual Cost (in thousands)*					Total Estimated 5 Year Cost
	YR 1	YR 2	YR 3	YR 4	YR 5	
W.19: Florida Bay Freshwater Flow	5	5	5	5	5	25
W.3: Addressing Wastewater Management Systems	50,000	125,000	125,000	100,000	100,000	500,000
W.5: Developing and Implementing Water Quality Standards	-	-	-	-	-	0
W.7: Resource Monitoring of Surface Discharges	5	5	5	5	5	25
W.11: Stormwater Retrofitting	1,500	1,500	1,000	1,000	1,000	6,000
W.14: Instituting Best Management Practices	50	50	25	25	25	175
B.7: Pollution Discharges	200	200	200	200	200	1,000
L.1: Elimination of Wastewater Discharge from Vessels	550	200	750	350	350	2,200
L.3: Marina Operations	25	25	25	25	25	125
L.7: Assessing Solid Waste Disposal Problem Sites	20	20	20	20	20	100
W.15: HAZMAT Response	250	250	250	250	250	1,250

W.16: Spill Reporting	10	10	10	10	10	50
L.10: HAZMAT Handling	10	10	10	10	10	50
W.17: Refining the Mosquito Spraying Program	5	5	5	5	5	25
W.10: Addressing Canal Water Quality	1,000	100	100	500	100	1,800
Total Estimated Annual Cost	<i>53,630</i>	<i>127,380</i>	<i>127,405</i>	<i>102,405</i>	<i>102,005</i>	512,825

* Contributions from outside funding sources also anticipated.

Florida Bay/External Influence Strategies

Severe water quality and ecological problems have developed in Florida Bay in recent years, and the Bay has undergone rapid changes in community structure. Problems have included a massive seagrass die-off; phytoplankton blooms; sponge die-offs; mangrove die-backs; and a localized overgrazing of seagrass by dense aggregations of variegated sea urchins. All of these phenomena have the potential to cause catastrophic, cascading ecological effects throughout the ecosystem. Since 1987, much of Florida Bay has been affected by a massive, unprecedented seagrass die-off that has left tens of thousands of acres of denuded sediments. The resulting sediment suspension and nutrient release may have contributed to massive phytoplankton blooms that have affected the Bay during recent years. Sponge die-offs caused by phytoplankton blooms have resulted in reduced numbers of juvenile spiny lobsters, which reside by day under sponges for protection from predation.

Most scientists believe that recent ecological problems in Florida Bay are the result of long-term reduction in freshwater flow from the Everglades. The mechanism has not been documented, but high salinities and a long-term change from an estuarine to a marine system may be contributing factors.

These conditions in Florida Bay are a potential threat to water quality and resources in the Sanctuary. The need to deal with water-delivery problems in Florida Bay has been strongly stressed by workshop participants and other scientists throughout the development of the Water Quality Protection Program. The Florida Bay and Adjacent Coastal Ecosystems Program Management Committee is keenly aware of the role that Everglades restoration plays in future water-quality conditions in the Sanctuary. The *Comprehensive Everglades Restoration Plan* acknowledges that downstream impacts are an important concern in planning restoration activities.

Two strategies have been developed to address this issue:

- *Strategy W.19* recommends that the Steering Committee for the Water Quality Protection Program take a leading role in working to restore historical freshwater flow to Florida Bay.
- *Strategy W.24*, included in the Research and Monitoring Action Plan, supports research that will further document and quantify the influence of Florida Bay on the Sanctuary's water quality and biological resources.

STRATEGY W.19 **FLORIDA BAY FRESHWATER FLOW**

Strategy Summary

One role of the Water Quality Protection Program's Steering Committee is to ensure that restoring historical freshwater flow from South Florida and the Everglades into Florida Bay will not detrimentally impact Sanctuary resources. Sanctuary representatives work with appropriate federal, state, and local agencies to ensure that restoration plans and surface-water improvement and management plans for South Florida and the Everglades are compatible with efforts to maintain water quality within the Sanctuary. The interagency Florida Bay and Adjacent Coastal Ecosystems Program Management Committee is charged with developing restoration goals and performance

measures for Florida Bay in the *Comprehensive Everglades Restoration Plan*. Goals include restoring the quality, quantity, timing and distribution of freshwater through the Everglades and into Florida Bay.

The *Strategic Science Plan for Florida Bay*, prepared by the Florida Bay and Adjacent Marine Ecosystem Program Management Committee, focuses on science information needs for Florida Bay ecosystem restoration, including restoring more natural freshwater inflow patterns.

Activities (2)

(1) Establish a Leading Role for the Steering Committee. The Water Quality Protection Program's Steering Committee includes high-level representatives of all relevant agencies. The Steering Committee has taken a lead role in water-management issues affecting Florida Bay and Sanctuary resources.

Status: Implemented and on-going. The Steering Committee was established in 1991 and expanded in 1992 and 1995 in order to initiate activities and generate support for the recommendations in the Water Quality Protection Program. Its leading role in ecosystem restoration activities continues.

Implementation: The responsible agencies are EPA and DEP, which jointly administer the Water Quality Protection Program. All other agencies represented on the Steering Committee have a primary role, including NOAA, NPS, USFWS, USACE, Florida Department of Community Affairs (FDCA), Florida Department of Health (FDOH), SFWMD, Monroe County, municipalities, and the Florida Keys Aqueduct Authority.

(2) Participate in a Review/Revision of Water-management Strategies. Sanctuary representatives shall participate in the review and revision of restoration plans and water-management plans for Florida Bay and adjacent areas to ensure that the proposals and actions enhance and complement water-quality improvement in the Sanctuary. These plans include but are not limited to the *Comprehensive Everglades Restoration Plan*, the West Dade Wellfield, U.S. 1 widening, and the Lower East Coast Water Supply Plan.

Status: Implemented and on-going. The members of the Management Committee or their staff regularly participate in activities associated with planning and implementation of the *Comprehensive Everglades Restoration Plan*, including the Florida Bay and Adjacent Coastal Ecosystems Program Management Committee, the South Florida Environmental Restoration Task Force Working Group, Science Coordination Team, and Project Coordination Team.

Implementation: The Water Quality Protection Program Management Committee coordinates and administers water-management activities in the Sanctuary. The responsible agencies are EPA and DEP. NOAA has a primary role. The main agencies involved in water management decisions for the Everglades and Florida Bay are the NPS, SFWMD, and USACE. As the state land-planning agency for a designated Area of Critical State Concern, the FDCA is also involved. Other primary agencies are the USFWS and Monroe County.

Domestic Wastewater Strategies

The purpose of these strategies is to reduce pollution from land-based sources of domestic wastewater in the Florida Keys. Sources include cesspits, on-site treatment and disposal systems, package plants, and municipal treatment plants. Wastewater pollution from live-aboard boaters is discussed in Marina and Live-Aboard Strategies.

The first two domestic wastewater strategies (W.1 and W.2) are demonstration projects that would provide information to assist in deciding among options for the main engineering strategy (W.3) for wastewater management systems (exclusive of the City of Key West). Strategy W.4 is also an engineering strategy, but is applicable only to Key West. The remaining domestic wastewater strategies (W.5, W.7, and W.8) involve management activities designed to reduce pollution by developing water quality standards (including biocriteria) specific to the Florida Keys, and making the regulatory/management system work more efficiently.

STRATEGY W.3 ADDRESSING WASTEWATER MANAGEMENT SYSTEMS

Strategy Summary

This strategy will reduce the amount of pollutants entering groundwater by enforcing existing standards. On-site inspection programs would be implemented to identify and eliminate all cesspits and ensure that On-Site Disposal Systems (OSDSs) and package plants are in compliance with existing standards. Penalties would be imposed for non-complying systems. Cesspits are illegal and provide no sewage treatment. OSDSs provide adequate sanitary treatment and limited nutrient reduction; however, there is no routine inspection and enforcement program to ensure that these systems are operating properly. Package plants provide secondary treatment and are inspected routinely (although not frequently). The elimination of cesspits and replacement with approved OSDSs would reduce nutrient loading to groundwater and eliminate health hazards from untreated sewage. Aggressive inspection/enforcement programs for OSDSs and package plants could be expected to further reduce nutrient loadings to groundwater. In addition, this strategy would involve research to estimate the level of reduction in wastewater nutrient loading necessary to restore and maintain water quality and Sanctuary resources. Based on these nutrient reduction targets and the results of the wastewater demonstration projects (strategies W.1 and W.2), a Sanitary Wastewater Master Plan would be developed that would evaluate options for further treatment (e.g., construction of community wastewater plants, upgrading package plants to Advanced Wastewater Treatment (AWT), or the use of alternate, nutrient-removing OSDSs. The Sanitary Wastewater Master Plan would also specify details of costs, schedules, service areas, etc. for implementation.

Activities (4)

(1) Establish Inspection and Compliance Programs for Cesspits, OSTDS, and Package Plants. This activity seeks to establish on-site inspection programs to identify all cesspits and ensure that OSTDS and package plants comply with existing standards. Inspection and enforcement programs for OSTDS and package plants would ensure that these systems operate properly and reduce nutrient loading to groundwater. DEP has an on-going inspection and compliance program for package

plants. Cesspits identified would eventually be replaced with an approved OSTDS or a connection to a community wastewater-treatment plant, as recommended by the *Monroe County Sanitary Wastewater Master Plan* (described in Activity 3). Because development and implementation of the *Sanitary Wastewater Master Plan* was a long-term process, Monroe County developed an interim policy to address non-compliant wastewater-treatment systems. This activity includes a public education and outreach component that informs the public of ways to assess and improve existing wastewater treatment systems.

Status: Initiated and on-going. The OSTDS inspection and compliance program has been initiated in compliance with the Governor's Executive Order 96-108, which requires elimination of all cesspits and issuance of an operating permit for each onsite disposal system in Monroe County. A 1997 county ordinance specifies timeframes and procedures for implementing the cesspit replacement. The county ordinance served as an interim response to address non-compliant onsite wastewater systems until the June 2000 *Sanitary Wastewater Master Plan* recommended a change to central collection and treatment systems for large or multiple islands. Onsite systems or small clustered systems were recommended for less-dense areas. As a result, the focus of the cesspit identification and elimination program shifted to only the areas identified for onsite wastewater systems. Grant money is available to assist qualified property owners in replacing onsite systems. In addition, \$4 million in congressional appropriations through EPA is available to initiate an onsite wastewater utility demonstration project. A grant was made to Florida Keys Aqueduct Authority (FKAA), which administers this project.

Implementation: DEP and FDOH are the responsible agencies. Other primary agencies involved are the EPA, Monroe County, and local municipalities.

(2) Evaluate Development of Nutrient-Reduction Targets. The goal of this activity was to identify and evaluate strategies for developing nutrient reduction targets for wastewater and stormwater in the Sanctuary. The information helped the EPA and the State of Florida to determine if nutrient reduction targets should be developed and if so, how development should proceed.¹²

Status: Completed. Further review may be required based upon State of Florida requirements.

Implementation: A 1995 workshop concluded that the best short-term approach to reduce nutrient loading from wastewater is a technology-based approach, rather than establishment of nutrient-reduction targets. It was generally agreed that nutrient sources for canals and nearshore waters are known and that these problems can and should be addressed quickly with best-available technology. Workshop participants generally agreed that over the long-term it may be appropriate to develop resource-based, nutrient-reduction targets. The Water Quality Protection Program Steering

¹² In 1999, the Florida Legislature adopted treatment and disposal standards for the Florida Keys. New and existing or expanding facilities with design capacities of 100,000 gallons per day or greater, must meet AWT standards (5 mg/l CBOD, 5 mg/l TSS, 3 mg/l TN, 1 mg/l TP). New and expanding facilities with design capacities of less than 100,000 gpd must achieve 10 mg/l CBOD, 10 mg/l TSS, 10 mg/l TN, and 1 mg/l TP no later than 2010. Additionally, design specifications were adopted into legislation for Class V injection wells. Facilities with a capacity of greater than 1,000,000 gpd are required to case disposal wells to a minimum depth of 2,000 feet. Facilities with a capacity of less than 1,000,000 gpd are required to case disposal wells to 60 feet. Surface water discharges are prohibited.

Committee (WQSC) approved these recommendations in May 1996. The EPA and FDOH led this activity.

(3) Implement a Master Plan. Completion of this activity would result in the implementation of the preferred wastewater-treatment option specified in the *Sanitary Wastewater Master Plan*. The plan recommends that regional wastewater treatment plants be built in Key Largo, Islamorada, Marathon, Big Pine Key, Cudjoe Key, Big Coppitt, and Stock Island. This would provide a high level of treatment for approximately 95 percent of the wastewater flows outside Key West. In addition, the plan recommends that 17 existing package plants be upgraded and expanded to serve local areas.

Status: The City of Key West upgraded its treatment facility to meet AWT standards and retrofitted collection systems to significantly reduce infiltration and inflow. In addition, the City retired the ocean outfall and disposes of treated wastewater to a deep well (approximately 3,000 feet). The ocean outfall is retained for emergency use. The City of Key Colony Beach upgraded its treatment facility to meet AWT standards. Key Colony Beach is also addressing infiltration problems. The City of Islamorada began the selection process for treatment facilities for each of its four islands and a Technical Review Committee has made recommendations to its City Council. The committee reviewed the selected treatment and disposal methods and found them consistent with recommendations in the *Monroe County Wastewater Master Plan*.

Key Largo Wastewater Treatment District was formed with the election of inaugural commissioners in November 2002. The District's mission includes the introduction of advanced wastewater treatment and disposal infrastructure to serve all residents and commercial operations on the unincorporated island of Key Largo by 2010. In 2003, contracts to design and build a 0.183 million gallon per day wastewater treatment plant and to install collection systems in Key Largo Trailer Village and Key Largo Park were awarded. Those two communities were identified as hotspots in the Monroe County Wastewater Master Plan. In 2005, the District's activities focused on administration of the engineering design of these projects. The District expects to complete construction of these initial projects and begin the operation of the treatment plant by mid 2006. The District is also planning to construct a main collection line for the northern half of the island, install collection systems in additional communities along the new main, and expand the treatment plant to accommodate the increased flow that these new projects will generate. Engineering design of the new projects was initiated in April 2005.

Implementation: The primary agencies are Monroe County, Key Largo Wastewater Treatment District, and FKAA within the unincorporated areas of the County. Other primary agencies involved are EPA, DEP, FDCA, the municipalities, and FDOH. The City of Islamorada has taken primary responsibility for its wastewater improvements and is progressing along lines similar to those recommended in the Monroe County plan. The City of Marathon has adopted the FKAA as its wastewater authority. The FKAA has completed construction of the Little Venice (Marathon) facility, which was dedicated in June 2004, and is preparing a request for proposals for sewage collection and treatment system for greater Marathon. The FKAA is also in the early planning phases for wastewater improvements at Conch Key, Hawks Cay and Bay Point Subdivision on Saddlebunch Key.

Strategy Summary

This strategy will reduce the impacts of pollution on Sanctuary resources by determining water quality conditions to ensure resource protection. The intent is to implement water quality standards as guidance in determining permitted discharge limitations. Outstanding Florida Water (OFW) standards will be used until research indicates that new, more-stringent regulations are necessary.

Activities (2)

(1) Develop and Evaluate Indicators. This activity will identify and evaluate indicators (biochemical and ecological measures to provide early warning of widespread ecological problems) in each type of ecosystem. Examples are tissue C:N:P ratios, alkaline phosphatase activity, and shifts in community structure by habitat. These measures could be incorporated into the Sanctuary's Water Quality Monitoring Program and provide the basis for resource-oriented water-quality standards.

Status: The DEP has initiated a process to develop appropriate bioassessment methods and criteria for various water body types. Field tests and data analysis have been initiated in streams, lakes, and wetlands throughout the state. At present, there are no plans to incorporate biocriteria in Water Quality Standards for marine waters. Florida, in response to draft numeric nutrient criteria published by EPA, is initiating efforts to develop new water quality standards for nutrients. This strategy is also included in the Research and Monitoring Action Plan.

Implementation: The EPA and DEP are the responsible agencies through the Sanctuary Management Plan's Research/Special Studies Program. NOAA and NMFS may have a research role. FKNMS research staff will monitor any developments in this area.

(2) Develop Water Quality Standards. This activity will develop water quality standards, including nitrogen and phosphorus standards and biocriteria, appropriate to Sanctuary resources. The intent is to implement water quality standards as guidance in determining permitted discharge limits. Outstanding Florida Waters (OFW) standards will be used until research indicates that new, more stringent regulations are necessary.

Status: The existing water quality standards for marine waters are published in Rule 62-302.530 of the Florida Administrative Code (FAC). Chapter 62-302 FAC. also designates the Keys' ambient waters as OFWs, subject to special protection. The intent of the designation is to maintain existing ambient water quality and provide authority to regulate activities that may cause pollution of those waters. Existing water-quality standards already prohibit discharges that may cause biological imbalance in the receiving waters. There are no current plans to develop new water quality standards for nutrients specific to waters of the Keys however on-going research or emergent information may require action in this area.

Implementation: The lead agency for any revisions to the state's water quality standards will be DEP, which would initiate formal rule-making procedures. Once enacted, the new standards would be implemented at the time new permits are issued or existing permits reissued. Other primary agencies will be EPA and FDOH.

Strategy Summary

This strategy will help to evaluate environmental impacts of point-source discharges by requiring all National Pollutant Discharge Elimination System (NPDES)-permitted surface dischargers to develop resource monitoring programs. This could be accomplished in one of two ways: 1) EPA could eliminate the baseline exemption for resource monitoring under the Ocean Discharge Program as it applies to the Keys. All surface dischargers, except the City of Key West sewage treatment plant, are currently exempted from developing resource monitoring programs because the end of their discharge pipe does not extend beyond the baseline (the mean low-tide line); or 2) DEP, through the State of Florida's permitting authority, could require resource monitoring when individual NPDES permits come up for renewal. This approach would probably be easier because it can be accomplished under existing rules, whereas eliminating EPA's baseline exemption would require a federal rule change.

Activity

(1) Require Resource Monitoring. This activity seeks to evaluate environmental impacts of discharges by requiring all NPDES-permitted surface dischargers to develop monitoring programs.

Status: On-going. Monitoring of the City Electric cooling-water outfall on Stock Island continues. In October 2001, Key West began using a deep well for disposal of wastewater effluent, retaining the ocean outfall for emergency use only. This change eliminated the other major surface water point discharge in the region. It is not anticipated that any new surface water discharges will be permitted in the future.

Implementation: EPA and DEP are the responsible agencies.

Stormwater Strategies

Since the 1996 management plan, two of the strategies developed to reduce pollution from stormwater runoff in the Keys have been completed. Strategies W.12 and W.13 worked together to require enactment of stormwater management ordinances and master plans that would cover the entire Keys. These plans are now being implemented through strategy W.11 that involves engineering modifications at hot spots to control pollutants in stormwater runoff. Another strategy, W.14, involves the development and implementation of widely used Best Management Practices and public education to reduce pollutants entering stormwater runoff.

STRATEGY W.11 STORMWATER RETROFITTING

Strategy Summary

This strategy will reduce loadings of sediment, toxics, and nutrients to Sanctuary waters through engineering methods applied to stormwater hot spots (e.g., commercial and industrial facilities) and limited sections of U.S. 1.

Activity

(1) Retrofit Hot Spots and Portions of U.S. 1. This activity involves using grass parking, swales, pollution-control structures, and detention/retention facilities to control pollutants in stormwater runoff. Swales and detention facilities are being installed along portions of U.S. 1. Engineering actions are underway to control stormwater runoff in areas handling toxic and hazardous materials.

Status: Implemented and on-going. This activity has a high priority in Monroe County's and Islamorada's Stormwater Management Master Plans and implementation began in 2002. It is estimated that it will take approximately five years to completely retrofit hot spots. The City of Key Colony Beach is addressing stormwater runoff by creating swales and retention basins. The City of Key West has an inadequate stormwater-management system with many outfalls discharging untreated stormwater. The City has begun construction of new stormwater control and treatment structures.

Implementation: Monroe County is the responsible agency for stormwater retrofitting. Other primary agencies involved are the DEP, Florida Department of Transportation (FDOT), and SFWMD.

STRATEGY W.14 INSTITUTING BEST MANAGEMENT PRACTICES

Strategy Summary

This strategy will reduce pollution by instituting a series of "Best Management Practices" and a public education program to prevent pollutants from entering stormwater runoff.

Activity

(1) Develop and Implement Best Management Practices and a Public Education Program. This activity seeks to reduce pollution from stormwater runoff through a variety of programs, including

street sweeping; ordinances to control fertilizer application on landscaping; collection locations and public education regarding the proper use and disposal of fertilizers, pesticides, motor oil, and other hazardous chemicals; and strenuous litter-control programs.

Status: On-going. DEP provides public information on proper disposal of oil and is currently preparing information on proper disposal of boater wastes. DEP has several stormwater public education materials available on its Web site. Local governments have provided some information on best management practices for residential stormwater. Local ordinances require use of best management practices for stormwater on residential construction projects.

Implementation: The responsible agencies are local governments. Other primary agencies are the DEP, FDCA, SFWMD and FDACS. Educational aspects are coordinated with the Sanctuary's educational staff.

Marina and Live-Aboard Strategies

These five strategies and activities aim to reduce pollution from marinas and live-aboard boaters. Strategy B.7 seeks to reduce pollution by restricting discharges and educating the public. Strategy Z.5, found in the Marine Zoning Action Plan, concentrates live-aboards in areas where wastewater-treatment facilities can be provided. Strategy L.1 (expanded to include previous strategy L.6) increases the availability of pump-out facilities. Strategy L.3 will reduce pollution from marina operations. Finally, strategy E.4, included in the Education and Outreach Action Plan, will reduce pollution from boaters and marinas in general by expanding an existing education and environmental-awareness program.

STRATEGY B.7 REDUCING POLLUTION DISCHARGES

Strategy Summary

This summary aims to strengthen implementation and enforcement of existing regulations to reduce pollution discharges and the impact of discharges on the marine environment.

Activities (3)

(1) Implement the 1994 Florida Clean Vessel Act. The Florida Clean Vessel Act prohibits boaters from discharging raw sewage into state waters, effective October 1, 1994. In addition, all vessels 26 feet or more in length with an enclosed cabin and berthing facilities are required to have a toilet on board. Houseboats and floating structures must, by October 1, 1996, have permanently installed toilets attached to Type III marine sanitation devices (a holding tank), or directly connect their toilets to shore-side plumbing. Full implementation and enforcement of the Clean Vessel Act is expected to reduce sewage in Sanctuary waters.

Status: On-going.

Implementation: The FWC enforces the Clean Vessel Act. FKNMS works with EPA and the state to phase in implementation in federal waters after public review of the draft rules and public hearings, prior to issuance of final regulations. Sanctuary regulations prohibit discharge from all marine sanitation discharges in the Ecological Reserves and SPAs.

(2) Enforce No-discharge Zones. At the request of the City of Key West, EPA was asked to designate no-discharge zones in accordance with provisions of marine-sanitation devices where live-aboard vessels congregate, and where there is a history of water-quality violations. In 2000, EPA designated all waters within the city's 600-foot jurisdiction as a no-discharge zone. The Steering Committee passed a resolution recommending that Monroe County pursue designation of a no-discharge zone for state waters in the Keys. In turn, the Monroe County Board of County Commissioners passed a resolution requesting that the Governor petition EPA to declare all state waters in the Sanctuary as a no-discharge zone. EPA published the proposed rule in the Federal Register and the comment period expired on October 26, 2001. EPA responded to all public comments and announced a final determination in the Federal Register, effective June 19, 2002.

Status: On-going.

Implementation: The EPA is the responsible agency. Enforcement procedures and responsibilities are being coordinated through an interagency management committee. DEP and Monroe County have assisting roles.

(3) Develop and Implement a Public Education Program. This activity would create a program to educate the boating public about ways to reduce pollution from vessels. The program would include providing information about the Clean Vessel Act and other regulations affecting discharges from vessels. This activity is also included in the Education and Outreach Action Plan.

Status: FKNMS has worked with the City of Key West and Reef Relief to develop and implement a "Pump it, Don't Dump it!" boater-education program. Marina and pump-out locations have been incorporated in *The Upper Keys Boater Guide*, published by Florida Fish and Wildlife Research Institute and Monroe County. This information and a detailed fact sheet are posted on Monroe County's Web site. An intergovernmental task force will prepare an implementation plan for the designation of all state waters within the Sanctuary as a no-discharge zone. The plan includes a public education and outreach component. An interagency committee has developed a management plan for the Keys-wide no-discharge zone.

Implementation: FWC is the lead agency, with assistance from EPA and NOAA.

STRATEGY L.1 ELIMINATION OF WASTEWATER DISCHARGE FROM VESSELS

Strategy Summary

This strategy will work to eliminate discharge of wastewater, whether treated or not, from all vessels into Sanctuary waters. Although sewage discharges from vessels may be a relatively minor contributor to the total pollutant load, vessels are normally moored or anchored in confined waters that may be more susceptible to the impacts of such loading. By requiring marinas to provide pump-out facilities, two problems will be resolved: 1) boats in marinas that do not currently pump out will be provided the means to do so; and 2) boats that moor outside of marinas can take advantage of the increased number and availability of pump-out facilities.

Activities (5)

(1) Develop a Plan to Eliminate Vessel Sewage Discharge. This activity has resulted in the development of a comprehensive plan to address problems associated with sewage discharges from live-aboards and other vessels. The plan includes elements such as requiring all marinas to install pump-out facilities; enforcing pump-out use; establishing mobile pump-out services; establishing mooring fields; and evaluating the treatment and disposal of pumped out wastewater.

Status: EPA published in the Federal Register the intent to declare all state waters in the Sanctuary as a no-discharge zone. The deadline for public comments expired on October 26, 2001. EPA responded to the public comments and published them and its decision in the Federal Register, effective June 19, 2002. An interagency task force developed an implementation plan that will recommend the number of pump-out facilities to adequately serve the boating public. Additional financial assistance for marinas currently without pump-

out facilities is being pursued. The implementation plan also includes education and enforcement components.

Implementation: EPA has designated all state waters in the Sanctuary as a no-discharge zone. Implementation is by Monroe County and the municipalities. The DEP and FDCA have a primary role. The EPA, USCG and NOAA continue to assist.

(2) Require Marinas to Install Pump-out Facilities. This activity seeks to require all marinas (10 or more slips, as defined by the state) to provide pump-out services, greatly increasing their number and accessibility.

Status: In progress. Monroe County and several municipalities have prepared ordinances; adoptions are anticipated throughout 2002.

Implementation: This activity is implemented by local ordinances requiring marinas offering overnight docking to boats over a given length to have stationary or mobile equipment to pump holding tanks. Monroe County has actively sought funding and plans to coordinate with marinas to facilitate compliance.

(3) Establish Mobile Pump-out Services. Establish mobile pump-out services through local governments or franchises with private contractors to pump out live-aboard vessels and other anchored or moored vessels located outside of marinas.

Status: On-going. Key West's Garrison Bight Marina provides mobile pump-out facilities for vessels using the local mooring field. A mobile pump-out facility is also in place in Boot Key Harbor.

Implementation: Local governments are responsible to assure that pump-out facilities are available for vessels located outside of marinas.

(4) Establish Mooring Field. Establish mooring fields at congested anchorages throughout the Keys as a means of managing transient and live-aboard boaters and ensuring compliance with sewage disposal regulations.

Status: On-going. Monroe County is increasing the number of moorings at existing mooring fields as well as planning for the implementation of moorings at least three other locations in the Keys. Studies are being conducted to look at the feasibility of installing moorings at Blackwater Sound, Community Harbor and Pine Channel.

Implementation: The Monroe County GMD will be responsible for the planning, permitting, funding, and implementation of additional mooring fields. The County will likely partner with privately owned marinas to manage the mooring fields.

(5) Enforce Pump-out Use. This activity seeks to enforce use of pump-out facilities. Coordinated enforcement procedures are being developed as part of the implementation plan. Historically, pump-out usage had been low, in part because there was no law requiring it. Also, more pump-out facilities are needed in areas identified in the implementation plan. One enforcement tool considered is the issuance of a sticker for boats anchored in or passing through the Sanctuary. Each time a vessel's holding tanks are pumped, the sticker could be date stamped. If the vessel does not have its tanks pumped within a given length of time based on its size and occupancy, a citation would be issued.

Status: An interagency committee is developing an enforcement strategy for the no-discharge zone. Coordination is expected to be formalized through memoranda of understanding and inter-local agreements.

Implementation: FWC, USCG, Monroe County Sheriff's Department, and local governments to coordinate enforcement.

STRATEGY L.3 REDUCING POLLUTION FROM MARINA OPERATIONS

Strategy Summary

This strategy aims to reduce pollution from marina operations by establishing appropriate infrastructure and information resources.

Activities (2)

(1) Prevent Discharge of Pollutants from Marinas. This activity would establish paved and curbed containment areas for boat-maintenance activities, such as hull scraping and repainting, mechanical repairs, fueling, and lubrication. It would create secondary containment, generally in the form of curbing or synthetic liners, for areas where significant quantities of hazardous or toxic materials are stored. Procedures to avoid or reduce fuel spillage during refueling operations would be evaluated.

Status: The voluntary Florida Clean Marina Program is being implemented and periodic workshops encourage non-participating marinas to join. DEP has been conducting compliance inspections and audits of marinas and boat yards. Inspections target marinas that are the subject of complaints or which have large, full-service marinas. Marinas are encouraged to limit boat-maintenance areas. Waste containment is required. DEP has suggested that EPA provide an overview of the NPDES permitting requirements and a list of marinas that have applied for or received permits.

Implementation: The responsible agency is the DEP. Local governments (Monroe County and the municipalities) may have an assisting role. The NPDES stormwater discharge rule is the mechanism to implement this activity. In 1990, the EPA enacted rules to control stormwater discharges from a variety of uses, known as the NPDES Permit Application Regulations for Stormwater Discharges. The rules require applicants to describe plans to eliminate pollutants generated by marina activities. Applicants must identify the Best Management Practices used. Marina owners are encouraged to participate in environmentally oriented organizations, such as the Marine Industry Association and the Florida Clean Marina Program.

(2) Encourage Marina Owners to Provide a User Manual with Local Environmental Information.

The information could include locations of pump-out facilities and trash receptacles, as well as sensitive habitats.

Status: Implemented and on-going. Yearly discharge prevention and response certificate inspections are conducted at marinas with diesel-fuel operations. During inspections, marinas receive educational materials, information about approved clean-up methods, proper handling of used oils, and local hazardous-waste collection locations. DEP's draft Best Management Practices for marinas is also distributed. The Florida Clean Marina Program's

booklet, "Clean Boating Habits," is available to boaters through local marinas, Marine Industries Association, and Florida Sea Grant agents.

Implementation: The responsible agencies are Monroe County and municipalities working with DEP.

Landfill Strategy

This strategy addresses potential pollution problems due to leaching from landfills. All landfill sites in the Florida Keys, with the exception of the Cudjoe Key expansion, were developed prior to current regulations that require bottom liners and leachate collection. At many sites, filling with solid waste probably occurred below the water table in the early stages. Consistent with common practice at the time, there was probably little or no control over materials deposited in the landfills. These conditions result in a significant potential for ground- and surface-water contamination.

Although the potential exists for problems, monitoring data do not indicate leaching or water quality degradation due to landfills; therefore, no corrective actions are currently proposed. However, two investigative activities are proposed under strategy L.7, Sanitary Waste Disposal Problem Sites. These activities involve searching for and assessing abandoned landfills and dumps, and intensifying existing monitoring programs around landfills to ensure that no leaching into marine waters is occurring, and implementing remedial actions if problems are discovered.

STRATEGY L.7 ASSESSING SOLID WASTE DISPOSAL PROBLEM SITES

Strategy Summary

This strategy aims to address contamination of marine waters from landfills through assessment, monitoring, and, when required, remedial action.

Activities (3)

(1) Conduct a Historical Landfill Search and Assessment. Conduct a comprehensive search for abandoned landfills and dumps. Evaluate sites to determine if they contain hazardous materials or cause environmental problems. Knowledgeable state and local government personnel believe there are a number of abandoned landfills and dumps, many on private property, within the Florida Keys. A comprehensive program needs to be set up to locate, map, and evaluate these historic, casual dumps.

Status: Implemented and on-going. The locations of landfills have been identified; however, illegal dumping is a continuing problem, and DEP continues to identify abandoned, unlined, and unmonitored sites. Funds are lacking for cleanup and disposal of illegally dumped wastes. The U.S. Navy is assessing and conducting remedial action at former solid waste disposal sites on Navy properties.

Implementation: Monroe County, working with the DEP, is the responsible agency. The U.S. Navy has a primary role in dealing with landfills on its properties. The EPA has an assisting role.

(2) Intensify Landfill Monitoring. Intensify existing monitoring around landfills to ensure that no leaching is occurring into marine waters. Identify and monitor old landfills that were never permitted, and therefore have no closure plans or closure permits. This activity seeks to ensure that existing monitoring programs are adequate to detect leaching from landfills. Current data from landfills do not indicate a leaching problem; however, the number of monitored locations is small and

should be increased. In addition, this strategy seeks monitoring of older landfills that are not now monitored. Monroe County is currently complying with all state and federal monitoring guidelines.

Status: Fully implemented and on-going. All permitted landfills in Monroe County are closed. Landfills at Key Largo, Long Key, Cudjoe Key, and Stock Island have been properly closed with a top liner and a permit requirement includes quarterly monitoring.

Implementation: The responsible agency is DEP. The U.S. Navy has a primary role in dealing with landfills on its properties. EPA has an assisting role.

(3) Evaluate and Implement Remedial Actions. If problems are discovered, evaluate and implement appropriate remedial action, such as boring or mining, upgrading, closure, collecting and treating leachate, constructing slurry walls, or hauling.

Status: On-going. To date, no need for remedial action has been determined.

Implementation: The responsible agency is Monroe County, working with DEP. The U.S. Navy has a primary role for landfills on its properties. EPA has an assisting role.

Hazardous Materials Strategies

These strategies and activities aim to reduce the likelihood of pollution from spills of hazardous materials in and near the Keys. The current management strategy appears to be functioning adequately; however, some actions could be taken to further reduce the potential for accidental spills. These management strategies would enhance HAZMAT response (W.15), improve spill reporting (W.16), and develop an inventory of hazardous materials handling and use in the Keys (L.10).

STRATEGY W.15 HAZMAT RESPONSE

Strategy Summary

This strategy seeks to reduce the chances that a spill of oil or other hazardous materials will have a significant negative impact on Sanctuary resources. This will be accomplished by improving coordination and cooperation among the federal, state, and local agencies responding to spills; by encouraging improvements in response and containment technologies appropriate to the Keys and by creating a spill contingency plan for the Sanctuary that includes crew and equipment staged in the Keys. The strategy recognizes that hazardous materials spills are handled independently of marine spills and improvement measures will be developed for both response programs.

Activities (3)

(1) Develop and Periodically Revise Sanctuary Spill Contingency Plan. This activity would involve creating and periodically revising the spill contingency plan for the Sanctuary that includes crew and equipment staged in the Keys (possibly including skimmers). The plan should cover spills of a size not responded to by the USCG and should include training and education of a local response team. The USCG Marine Safety Office in Miami will coordinate marine HAZMAT response. Because spills of hazardous materials are handled independent of marine spills, improvement measures will be developed for both response programs.

Status: On-going. DEP has personnel on-call 24 hours a day for initial response to environmental emergencies. Oil spill equipment is available at the Port of Key West. The USCG has a Marine Safety Office located in Marathon. The USCG has the responsibility to develop a HAZMAT protocol and has officially adopted the National Interagency Incident Command System as its response management system when responding to oil and hazardous substance spills. That system unifies the efforts of industry, and federal, state, and local government agencies and the entity responsible for the pollution incident. The USCG has designated response regions. The Sanctuary is part of the South Florida Oil Spill Contingency Plan Area Committee. An "Area Contingency Plan" includes area contacts.

Implementation: USCG and DEP are responsible. NOAA, Monroe County and FDCA assist.

(2) Improve Coordination and Cooperation. This activity seeks to improve coordination and cooperation between federal, state, and local agencies responding to spills.

Status: Initiated and on-going. The National Preparedness for Response Exercise Program (PREP) was developed in conjunction with the Oil Pollution Act of 1990 to provide a workable

exercise program. PREP is a unified federal effort and satisfies the exercise requirements of USCP, EPA, Research and Special Programs Administration, Office of Pipeline Safety, and the Minerals Management Service. PREP exercises are an opportunity to improve the response plan and response system. Participation in PREP exercises allows agencies to work together and facilitates response in the event of a pollution incident. The Florida Coastal Management Program has hosted a series of Florida Summits, attended by DEP Bureau of Emergency Response, NOAA, USCG, and FWRI staff. In addition, regional coordination is conducted at contingency plan meetings, regularly held by USCG in Miami.

Implementation: The responsible agencies are USCG, DEP, NOAA, Monroe County, and the FDCA assist.

(3) Improve Response/Containment Technologies. This activity encourages improvements in response and containment technologies appropriate to the Keys.

Status: Initiated and on-going. FWRI has compiled an environmental sensitivity atlas and developed a computerized spill-analysis system. The USCG's Area Contingency Plan is updated annually. Sanctuary personnel participate as observers in the National Preparedness for Response Program field exercises. NOAA conducts training workshops in Key West and Key Largo on spill response.

Implementation: USCG and DEP are the responsible agencies. NOAA, FWRI, Monroe County, and FDCA assist.

STRATEGY W.16 SPILL REPORTING

Strategy Summary

This strategy will ensure that Sanctuary managers are informed of all spills (e.g., of petroleum products) in and near the Sanctuary.

Activities (2)

(1) Establish a spill-reporting system. This activity establishes a reporting system to ensure that all spills documented by various agencies are reported to Sanctuary managers. In particular, small spills occur frequently, are under-reported, and may have a significant cumulative effect on water quality.

Status: Implemented and on-going. A reporting system is in place. Education is required to increase awareness of the reporting program.

Implementation: The responsible agency is the USCG. Other primary agencies involved are NOAA and DEP. DEP assists in reporting land-based spills that might affect FKNMS waters. The National Response Center is notified of all spills.

(2) Establish and Maintain a Sanctuary Spills Database. This activity establishes and maintains a geo-referenced database for the Sanctuary to track spill information (locations, quantities, types of material, environmental impacts).

Status: Implemented and on-going. DEP has established and maintains a database that includes marine and upland spills and coastal emergency response incidents. It is DEP's

responsibility, in conjunction with USCG, to initially determine the severity of a coastal discharge or pollution incident within its jurisdiction. The Bureau of Emergency Response maintains a spill database, seeks reimbursement for expenses, and assesses natural resource damage. Education is required to increase reporting of all spills.

Implementation: USCG is the responsible agency with assistance from DEP and NOAA.

STRATEGY L.10 HAZMAT HANDLING

Strategy Summary

This strategy supports the importance of inventorying and assessing the handling of hazardous materials in the Florida Keys. Such oversight is a preventative measure increasing protection of the marine environment from potential spills or mishandling.

Activity

(1) Conduct a HAZMAT Assessment/Inventory. This activity involves conducting an assessment and inventory of hazardous materials handling and use in the region, including facilities, types and quantities of materials, and transportation. Information is added to GIS databases.

Status: Monroe County Emergency Management Authority has a *Hazardous Materials Plan* that is revised annually. The plan includes a list of facilities with reportable quantities of hazardous materials. DEP regulates hazardous wastes, but not materials.

Implementation: The responsible agency is DEP. Other primary agencies involved are DEP, Monroe County Emergency Management Authority, and Monroe County Health Department, which maintains a database on hazardous materials. FDCA has an assisting role.

Mosquito Spraying Strategy

This strategy seeks to reduce pollution from pesticides used in mosquito control. Currently, there is little information on environmental concentrations and effects of pesticides in the Sanctuary. Additional data concerning pesticide concentrations in sediments and biological tissues throughout the Sanctuary will be collected through the Water Quality Research Program. Strategies for major changes to the Mosquito Control Program are not appropriate at this time. Additional data from the Water Quality Research and Monitoring Program will help to determine if major changes are warranted.

STRATEGY W.17 REFINING THE MOSQUITO SPRAYING PROGRAM

Strategy Summary

This strategy seeks to reduce the amount of pesticides entering Sanctuary waters by refining the existing aerial spraying program. Ground spraying by truck is the current method of choice for controlling the adult mosquito population. However, aerial spraying is initiated when the mosquito population reaches a certain threshold, as determined by mosquito landing counts at test sites. Although the Monroe County Mosquito Control District attempts to avoid marine areas during aerial spraying, the potential for pesticides to reach marine waters could be further reduced.

Activities (2)

(1) Review the Aerial Spraying Threshold. The threshold for initiating aerial spraying will be reviewed to determine whether it can be raised.

Status: No action has been taken on this activity at this time. EPA funded a special study in 1997 to assess potential impacts of mosquito spray chemicals and their breakdown products. Although the study was not conclusive, it did determine that sprayed chemicals reach surface waters in concentrations that are of concern. The study raises continuing concerns about the impacts of the chemicals on non-target organisms. More research is required.

Implementation: The responsible agency will be the Florida Department of Agriculture and Consumer Services (FDACS) and FDCA will have an assisting role.

(2) Review Flight Plans and Equipment. The aerial spraying program should be reviewed to determine whether refining flight lines, alternative spray technologies, or the use of improved equipment could reduce the amount of pesticide released over water.

Status: Ultra low-volume aerial spray has been adopted. Use of ultra low-volume spray has significantly reduced the volume of pesticide applied and has eliminated the use of fogging oil contamination. However, the area being sprayed is now harder to define because the spray is not visible. The drift of finer particles released in ultra low-volume spray needs further definition. No other actions have been taken on this activity at this time.

Implementation: FDACS is the responsible agency. FDCA has an assisting role.

Canal Strategy

This canal strategy strives to reduce water-quality problems in canals. Although many water quality problems are linked to wastewater discharges from cesspits and septic tanks of homes along canals and stormwater discharges, others may be due to a canal's structure and orientation. These physical factors can lead to low flushing and the buildup of weed wrack, which consumes oxygen and releases nutrients as it decays. The strategy described here would inventory and characterize canals and investigate technologies to determine whether it would be worthwhile to implement corrective actions, such as weed gates and aeration systems, to improve water quality. Any plan for implementing such improvements in canal circulation and flushing would have to be developed in coordination with plans for dealing with stormwater and wastewater pollution from cesspits and septic tanks, which contribute to water quality problems in many canal systems. The goal is to reduce nutrient loading to other surface waters from canal systems.

STRATEGY W.10 ADDRESSING CANAL WATER QUALITY

Strategy Summary

This strategy will improve water quality in nearshore, confined areas, with emphasis on dead-end canals and basins where reduced circulation increases the risk of reduced dissolved oxygen, retention of both dissolved and particulate pollutants, and potential impacts on benthic and pelagic environments. A comprehensive management plan will be developed for improving water quality in nearshore confined basins and canals. Improvement strategies will be implemented in all canals and basins identified as hot spots throughout the Sanctuary.

Activities (7)

(1) Evaluate and Revise Hot Spot List. A priority list of areas of degraded water is required to effectively focus needs for remedial action and efficiently utilize available resources.

Status: Initial list development was completed. Period review and revisions to the list are ongoing. A hot spot list was developed as part of Phase I of the Water Quality Protection Program. That list was revised by the SFWMD as a result of a workshop held in early 1996. The SFWMD list includes recommended actions to improve water quality at priority hot spots. The list has been updated for the Monroe County Sanitary Wastewater Master Plan and Stormwater Master Plan.

Implementation: The responsible agency is South Florida Water Management District. Other agencies with primary roles are EPA, DEP, Monroe County, and the City of Key West.

(2) Inventory and Characterize Canals. An inventory of dead-end canals and other confined water bodies will be conducted to identify areas where reduced circulation increases the risk of depressed dissolved oxygen, retention of both dissolved and particulate pollutants and potential impacts on benthic and pelagic environments. Canals with water quality problems attributable mainly to their physical structure, flushing rates, and orientation (e.g., allowing weed wrack buildup), would be targeted for improvements.

Status: On-going. In 2001, a contract was granted to inventory canals in the Keys and prioritize potential canal improvement projects. The inventory is expected by Fall 2002.

Implementation: The responsible agency is Monroe County and FDCA. Other agencies with primary roles are EPA, DEP, and the municipalities.

(3) Develop and Evaluate Improvement Strategies. A comprehensive management plan will be developed for improving water quality in nearshore confined basins and canals. Potential methods of improving water quality (e.g., aeration, weed gates, and air curtains) will be tested in limited areas to determine whether widespread application is appropriate.

Status: On-going. In 2001, a contract was granted to conduct an inventory of canals in the Keys and prioritize potential canal-improvement projects. This project is underway.

Implementation: The responsible agencies will be Monroe County and FDCA. Other agencies with primary roles will be EPA, DEP, and the municipalities.

(4) Identify and Compile Technologies. This activity seeks to identify and compile a list of technologies for improving water quality in canals.

Status: On-going. In 2001, a contract was granted to conduct an inventory of canals in the Keys and prioritize potential canal improvement projects. This project is underway.

Implementation: The responsible agency is Monroe County and FDCA. Other agencies with primary roles are EPA, DEP and the municipalities.

(5) Develop Community Education and Involvement Program. This activity involves developing a community education program, including citizen monitoring.

Status: A volunteer citizen monitoring program (Florida Bay Watch) was established by The Nature Conservancy, which published quarterly and annual reports on the weekly analyses of canal and nearshore water quality provided by Florida International University. Florida Bay Watch was terminated in 2002. Florida Keys Watch was initiated in 2002 and provides information on bacteria and virus concentrations in canals. This activity is also included in the Education and Outreach action plan.

Implementation: The responsible agency is DEP and EPA. Other agencies with primary roles are Monroe County and the municipalities.

(6) Conduct Canal System Restoration Pilot Project.

Status: On-going. Residential canals at Sunset Acres (Key Largo) have been opened to tidal flushing. Permits for opening the canals included shallowing, implementing a stormwater collection system, eliminating onsite sewage treatment systems, and monitoring. Pre- and post-project monitoring have been performed. In May 2001, a multi-year monitoring project was initiated in canals and nearshore waters of Little Venice (Marathon). Water-quality data was collected weekly from ten stations for approximately two years before completion of the central wastewater collection and treatment systems. Monitoring will continue for approximately two years after all homes and businesses are connected. This project is expected to demonstrate changes to water quality in canals and nearshore waters with improved sewage treatment practices.

Implementation: The responsible agency is Monroe County and FDCA. Other agencies with primary roles are EPA, DEP and the municipalities.

(7) Implement Improvement Strategies. Effective improvement strategies identified through previous activities will be implemented in all canals and basins identified as hot spots.

Status: On-going. Physical improvements have been made at two canal systems (Cudjoe Gardens and Jolly Roger Estates) by local homeowner associations. Both projects include monitoring before and after improvements. The on-going canal inventory study cited above will develop a prioritized list of canal improvement projects and cost estimates.

Implementation: The responsible agency is Monroe County and FDCA. Other agencies with primary roles are EPA, DEP, and the municipalities.

PREVIOUS STRATEGIES

The following strategies from the 1996 management plan are not included in this action plan because they have been completed and do not require further action:

- W.1 OSTDS Demonstration Project
- W.2 WT Demonstration Project
- W.4 Evaluating Wastewater Disposal, City of Key West
- W.8 OSTDS Permitting
- W.12 Stormwater Permitting
- W.13 Stormwater Management
- L.2 Assessing Marina Siting and Design