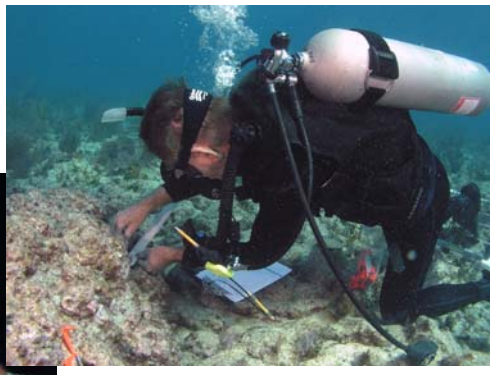
Florida Keys
National Marine Sanctuary
Revised Management Plan



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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.

Comments or questions on this management plan should be directed to:

CDR David A. Score
Superintendent
Florida Keys National Marine Sanctuary
33 East Quay Road
Key West, Florida 33040
(305) 809-4700
David.A.Score@noaa.gov

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 Statues
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

3.3 ENFORCEMENT & RESOURCE PROTECTION

This management division bundles all of the essential legal tools that are available to Sanctuary Managers to protect the natural and historical resources of the Florida Keys National Marine Sanctuary. These action plans include: the Regulatory Action Plan; the Enforcement Action Plan; Damage Assessment and Restoration Action Plan; and the Maritime Heritage Resources Action Plan. Each of these action plans serves a direct role in protecting and conserving Sanctuary resources, whether they are natural or historic resources.

Effective management requires a comprehensive set of regulations and an enforcement program to implement those regulations. The most successful marine protected areas are committed to enforcement of their regulations. The Sanctuary regulations and the interpretive approach to enforcing those regulations are described in this section.

Vessel groundings and damage to submerged Sanctuary resources are a major management issue in the Sanctuary. An average of over 500 vessel groundings occur every year in the Sanctuary and this destructive activity has resulted in the need for a separate action plan to describe the Sanctuary's approach to damage assessments and restoration.

Historical resources are also protected within the Sanctuary and the action plan that describes the Sanctuary's approach to protecting these resources is described in this management division. A rich and colorful history of exploration and discovery of submerged historical resources in the Florida Keys has necessitated the development of an action plan that integrates the State of Florida and NOAA's trustee responsibilities for these resources.

3.3.3 Damage Assessment and Restoration Action Plan

Introduction

According to FWC official dispatch records, there is an average of over 500 vessel groundings reported in the Sanctuary annually. In addition, there are many grounding incidents that damage resources but are not reported. Groundings often result in significant injury to coral, seagrass and hard-bottom resources. Although large-vessel groundings often result in immediate resource devastation with long-term impacts, the vast majority of grounding incidents are caused by small, recreational vessels. An individual, small-vessel grounding often results in minimal damage to the resources, but the cumulative detrimental effect of many such grounds can have long-lasting impacts.

FKNMS staff use a database to assess trends in vessel groundings, identify "hot spots" where education and outreach activities can be enhanced, and determine what solutions, such as waterway marking, may be appropriate. At this time it is difficult to determine if groundings are increasing or decreasing. As the public becomes more aware of the issue the number of reports has increased, making it difficult to determine in only five years if there is a real increase in groundings or merely an increase in reporting. The number of boats in operation affects this statistic as well.

FKNMS is authorized to assess civil penalties and recover the cost of response, assessment and restoration from the responsible parties. The FKNMS has Damage Assessment and Restoration Program (DARP) teams in the Upper Keys and the Lower Keys. In conjunction with FKNMS education and outreach staff, managers, and law enforcement personnel, DARP staff develop grounding prevention measures, minimize impacts, assess impacts, repair injuries where possible, and support the associated legal processes. Although this action plan is new to the management plan, many strategies and activities have been on-going since 1982.

Accomplishments

- Sanctuary staff conducted 261 biological assessments of vessel groundings that damaged greater than 10 square feet of coral or 10 square yards of seagrass from 1995 to 2005.
- Between 2002 and 2005, 145 assessments were conducted on injuries that fell beneath the 10 square feet of coral/10 square yards of seagrass threshold, resulting in the issuance of summary settlement citations in each of those instances.
- Establishment of a vessel grounding database to document grounding locations, assessment, restoration and monitoring data, and to track case phases.
- Assessment of eleven freighter anchoring injuries in the Tortugas from 1997 to 2005.
- Assessment of nine freighter groundings since 1989 including some occurring prior to that date.
- FKNMS has established two damage assessment and restoration teams in the Sanctuary whose mission is to respond to, document and report injuries to seagrass, hard ground and coral reef resources within the FKNMS. These teams also provide the information and expertise for development and implementation of restoration plans for the injured sites.
- FKNMS staff has assisted with live-aboard mooring assessment in Cow Key Channel.
- FKNMS staff continues to conduct monitoring of injured and restored sites.
- FKNMS staff helped prepare a Regional Restoration Plan for the damaged seagrass meadows in the Florida Keys.

- FKNMS staff conducted or managed major structural restoration of coral reef areas at large-vessel damage sites at Molasses Reef, South Carysfort Reef, near American Shoal, and Looe Key Reef. Small vessel injury restoration sites include areas at Carysfort Reef, Newfound Harbor, and Western Sambo.
- Completion of multiple restoration and coral restabilization efforts at other sites.
- FKNMS staff have developed and implemented monitoring programs at many of the grounding sites.
- FKNMS staff assists in all aspects of resource management including permitting, research, vessel grounding protocol development, and grounding prevention.
- FKNMS staff has assisted in numerous seagrass restoration projects.
- FKNMS DARP Team members have assisted other NMS units and other parts of NOAA in damage assessment and restoration projects.
- DARP Team members have been so thorough in the development of their casework in conjunction with NOAA attorneys and economists that the FKNMS has yet to lose a case by legal challenge.
- FKNMS staff has implemented the Reef Medics Volunteer Coral Salvage and Restabilization Program in order to address sites where no responsible party can be identified. The program also provides a response team for small-vessel groundings where restoration costs may not be incorporated into the penalty assessed to the responsible party.
- FKNMS staff has partnered with other agencies and commercial fishermen in trap retrieval and removal following storm events.
- FKNMS staff has assisted in the development of Education and Outreach products that target user groups whose activities have the potential for causing injury to Sanctuary resources.

Goals and Objectives

The goals of this action plan are to:

- Prevent or at least minimize vessel grounding impacts
- Assess and document Sanctuary resource injuries caused by vessel groundings and other human impacts
- Restore resources
- Support Law enforcement and grounding litigation teams.

The objective of this action plan is to:

- Manage the program in a manner that protects and restores Sanctuary resources
- Manage litigation cases.

Strategies

There are six non-regulatory management strategies in this Damage Assessment and Restoration Action Plan.

- B.18 Injury Prevention
- B.19 Implementing DARP Notification And Response Protocols
- B.20 Damage Assessment and Documentation
- B.21 Case Management
- B.22 Habitat Restoration
- B.23 Data Management

Each of these strategies is detailed below. Table 3.8 provides estimated costs for implementation of these strategies over the next five years.

Table 3.8 Estimated costs of the Damage Assessment and Restoration Action Plan

Damage Assessment and Restoration Action Plan Strategies	Estimated Annual Cost (in thousands)*					Total Estimated 5 Year Cost
	YR 1	YR 2	YR 3	YR 4	YR 5	
B.18: Injury Prevention	25	26	30	32	33	*146*
B.19: Implementing DARP Notification and Response Protocols	50	53	59	62	65	*289*
B.20: Damage Assessment and Documentation	135	142	164	172	180	*793*
B.21: Case Management	105	110	115	129	135	*594*
B.22: Habitat Restoration	168	176	191	201	220	*956*
B.23: Data Management	60	63	68	71	75	*337*
Total Estimated Annual Cost	*543*	*570*	*627*	*667*	*708*	*3,115*

* Contributions from outside funding sources also anticipated.

STRATEGY B.18 INJURY PREVENTION

Strategy Summary
Prevention of resource injury is preferred to restoration. Working with the education and outreach staff, enforcement officers, volunteers, and federal, state and local agencies, the Sanctuary's damage assessment teams carry out a broad range of activities to prevent injuries to Sanctuary resources whenever possible.

Activities (6)

(1) Assist Waterway Marking/Management. The staff will continue to coordinate with appropriate agencies to mark waterways, provide input and assistance regarding regional patterns and frequency of incidents to identify "hotspots" including seagrass, coral reef and hard-bottom areas that display patterns of chronic vessel grounding, and assist the waterway marking and management working group in developing and fine tuning activities to address these issues.

> *Status:* Implemented and on-going.
> *Implementation:* Primarily Monroe County and the USCG, assisted by Waterway Management team, FKNMS/DARP staff, and cooperating agencies.

(2) Assist Education and Outreach. The program staff assists the FKNMS Education and Outreach program to produce information and educational products aimed at preventing groundings. Products and information are provided to the media, boating interest groups, periodicals and publications, and environmental education organizations that disseminate the information. Information in products includes grounding statistics, avoidance techniques, and the legal and financial consequences to insurance companies. The program seeks to provide technical support, background information, quantitative data, videos and photographs.

> *Status:* Implemented and on-going.
> *Implementation:* FKNMS staff

(3) Assist Programs Concerned with Direct Contact or Intervention. There are several existing site programs that address injury prevention, such as:

(A) Law Enforcement - Believing that that law-enforcement presence is an effective deterrent to groundings, FKNMS staff will provide technical support, data, and professional advice to assist the Sanctuary's law enforcement team.

> *Status:* Implemented and on-going
> *Implementation:* FKNMS and FWC.

(B) Team OCEAN - The Team OCEAN program is a body of trained volunteers who spend time on the water disseminating information about the environment, boating practices, regulations, and local navigation. Team members have prevented numerous vessel groundings through direct intervention by hailing operators, for example. Team OCEAN has the full support of the damage prevention program, including sharing vessel and equipment resources.

Status: Implemented and on-going; schedule is as requested.
Implementation: FKNMS and cooperating agencies.

(C) Professional Guides Association - The damage assessment program lends its full support to the Florida Keys Professional Guides Association's "Guides Educating Guides" initiative. The initiative enlists the services of professional backcountry fishing guides to instruct others in their profession on the ecological and economic value of seagrasses and how they and the public can better preserve and protect them. A by-product of this activity is that with increased awareness of the value of the seagrass habitat to their livelihoods, fishing guides become community leaders in protecting resources and preventing vessel groundings.

Status: Implemented and on-going.
Implementation: FKNMS and professional organizations.

(4) Operating Permits for Towing and Salvage Professionals. Staff will assist with the review for the need of a permitting system that would require towing and salvage operators in Sanctuary waters to notify injury response personnel about groundings to which they respond and to use minimal-impact gear and procedures when removing a grounded vessel. Should such a need be determined staff will coordinate with other Florida Keys and South Florida marine protected areas to develop best management practices for grounded vessel salvage. FKNMS management, education and outreach, and law-enforcement personnel would develop procedural requirements and guidelines, assist in developing training materials, and administer a mandatory operators' permitting course.

Status: Awaiting implementation.
Implementation: FKNMS with assistance from law-enforcement.

(5) Minimize or Eliminate Impacts from Live-aboard, Derelict or Sunken vessels. In an effort to reduce vessel impacts, staff will assist Sanctuary management and other state and local water quality and regulatory programs to create mooring fields, install pump-out stations, etc., and provide technical and logistical support for the removal of derelict vessels when requested.

Status: Implemented and on-going.
Implementation: FKNMS and other agencies.

(6) Assist with Development of Oil and Hazardous Spill Response. DARP staff coordinates with the USCG's Area Committee and other South Florida marine management and enforcement agencies to develop unified response protocols to deal with containment and cleanup of spills to prevent and minimize impacts on the ecosystem. This activity will include participation in the development of best management practices that can be implemented in the instance of an oil- or hazardous-material spill to protect mangroves, coral reefs and seagrasses and minimize the adverse impacts. Additionally, all FKNMS staff participated in Sanctuary's Hazardous Incident Emergency Logistics Database System (SHIELDS) training as well in the Safe Sanctuaries 2005 drill conducted at the FKNMS in April 2005.

Status: Implemented and on-going.
Implementation: Primarily USCG; FKNMS participates as needed.

STRATEGY B.19 IMPLEMENTING DARP NOTIFICATION AND RESPONSE PROTOCOLS

Strategy Summary

The first step in a damage assessment action is incident notification from Sanctuary enforcement personnel, the USCG, other agencies and the general public. Once notification has been received, DARP personnel implement an appropriate response. This strategy addresses the technological and legal requirements of damage assessment and restoration by establishing injury assessment protocols. Detailed and repeatable procedures for assessing injury to natural resources must be adaptable, yet conform to accepted industry standards and advancements. Developing advanced methodologies will provide scientifically sound and legally defensible Natural Resource Damage Assessment (NRDA) claims and subsequent restoration planning efforts.

Activities (5)

(1) Further Develop and Fine Tune the Chain of Notification for Grounding Incidents. This will be accomplished by coordinating with FWC, Sanctuary law enforcement, NOAA administrators and state partners to determine the level of notification following a vessel grounding, establish criteria and thresholds to determine degree of response by the Sanctuary, and determine criteria and thresholds for notification above the Sanctuary and FWC level such as NOAA, state attorneys, economists, litigation case team members or marine protected area managers based on the scale and nature of each incident.

Status: In progress.
Implementation: NOAA, FWC, the State of Florida, and other cooperating agencies.

(2) Coordinate with Other Management and Enforcement Agencies to Develop Standardized Vessel Grounding and Spill-Response Protocols. DARP coordinates with other management and enforcement agencies to develop standardized, uniform vessel grounding and spill response protocols that are adopted and followed within and among the various agencies managing South Florida's marine protected areas. This on-going activity is shared with FWC, enforcement managers and includes discussion, planning and cooperative implementation with South Florida marine safety, resource management and environmental protection agencies. Agencies include, but are not limited to, USCG, EPA, USFWS, NPS, FWC, FPS, DEP, and Monroe County.

Status: Implemented and on-going.
Implementation: FKNMS, FWC and other agencies as appropriate.

(3) Implement "Eyes on the Water." FWC's law enforcement dispatch records indicate that more than 500 reported groundings occur annually in the Florida Keys. It is suspected that hundreds more undoubtedly go undetected or unreported. To effectively document injuries, allocate funds and distribute resources, DARP has joined with volunteer and education staff to develop and implement a volunteer training program for those who spend a significant amount of time on and around Keys waters. Training includes incident recognition, documentation, and notification. The volunteers include, but are not limited to Team OCEAN, Reef Medics, and Mote Marine Laboratory volunteers, area charter-boat personnel, professional fishing guides, and other volunteers.

Status: Implemented and on-going.
Implementation: FKNMS and FWC

(4) Gain public involvement in grounding notification. DARP will assist the Education and Outreach and Enforcement programs to develop and implement public notification campaigns. Staff will promote use of FWC law enforcement dispatch as the clearinghouse for reporting groundings, in short, the creation of a "grounding hotline." This activity is being instituted in an effort to reinforce with the general public the vital role it plays in notification and to eliminate confusion as to which agency needs to be contacted.

Status: Awaiting implementation by FWC.
Implementation: FKNMS and FWC

(5) Gain towing and salvage operator cooperation in grounding notification. This is an on-going activity that seeks to establish rapport with local operators and includes regular meetings and training sessions to emphasize the importance of an operator's cooperation in the vessel grounding notification network.

Status: Awaiting full implementation.
Implementation: FKNMS.

STRATEGY B.20 DAMAGE ASSESSMENT AND DOCUMENTATION

Strategy Summary
This strategy addresses the technological and the legal requirements of damage assessment and restoration by establishing assessment protocols, methodology and documentation necessary support for case management.

Activities (6)

(1) ***Respond to and assess injuries to natural resources within the FKNMS resulting from vessel groundings; further develop and fine-tune associated protocols and methodologies for these kinds of injuries.*** Various methodologies and protocols are recognized, including:

(a) *Damage to live coral dominated substrate* - FWC law enforcement is authorized to issue summary settlement citations to vessel operators responsible for groundings that result in injury of 10 square feet or less to live coral substrate. The fines issued do not require involvement of DARP staff, NOAA, or state legal counsel. Coral injuries of greater than 10 square feet require a biological assessment by the Sanctuary through DARP staff, using a variety of assessment techniques to quantify, describe, illustrate, and document the injury. Depending upon the size and extent of the injury, the assessment is forwarded to either NOAA's Office of General Counsel for Law Enforcement to be processed as a simple civil penalty or NOAA's Office of General Counsel for Natural Resources for processing as a Natural Resources Damage Action (NRDA) claim. The latter may include response and assessment cost recovery, restoration, monitoring, and compensatory components.

Status: Implemented and on-going
Implementation: FKNMS and FWC law enforcement

(b) *Damage to seagrass dominated substrate* - FWC law enforcement is authorized to issue summary settlement citations to operators responsible for groundings that cause 10 square yards or less of injury to seagrass dominated substrate. Seagrass injuries of greater than 10 square yards require a biological assessment by DARP staff, using a variety of assessment techniques to quantify, describe, illustrate, and document the injury. Depending upon the size and extent of the injury, the assessment is forwarded to either NOAA's Office of General Counsel for Law Enforcement to be processed as a simple civil penalty or NOAA's Office of General Counsel for Natural Resources for processing as a NRDA claim. The latter may include response and assessment cost recovery, restoration, monitoring, and compensatory components.

Status: Implemented and on-going
Implementation: FKNMS and FWC law enforcement

(c) *Damage to mixed substrate* - The DARP team provides technical input to NOAA and state legal counsel and the litigation team, which is composed of attorneys, economists, research biologists and FKNMS administrators, in order to determine appropriate legal action under Section 307 (civil penalty action) or 312 (natural resource damage assessment action) of the NMSA for vessel grounding injuries to mixed seagrass and hard-bottom communities or mixed *Thallassia* (turtle grass) and *Porites* (finger coral) shoals and banks. Current assessment is based largely on protocols used in coral and seagrass injury assessment. The DARP team, in conjunction with the litigation team, determines if special or modified assessment techniques are needed.

Status: Implemented and on-going
Implementation: FKNMS and FWC law enforcement

d) *Damage to non-living coral reef framework* - The DARP team provides technical input to NOAA and state legal counsel and the litigation team to determine appropriate legal action under Section 307 (civil penalty action) or 312 (natural resource damage assessment action) of the NMSA for vessel grounding damage to the non-living skeletal remains of reef-building corals that comprise the structural framework and attachment places for living reef components. The DARP team, in conjunction with the litigation team determines if special or modified assessment techniques are needed.

Status: Implemented and on-going
Implementation: FKNMS and FWC law enforcement

(2) Respond to and assess injuries to natural resources within the FKNMS resulting from large vessel (primarily freighter) anchoring activity; further develop and fine tune assessment protocols and methodologies for these kinds of injuries. This is a problem that has only recently received close scrutiny by Sanctuary management and DARP personnel and is almost exclusively confined to the remote reaches of the Tortugas region, usually in greater than 25 meters of water. Freighter anchors weigh tons and are secured by extremely large chain. When freighters drop anchor, the heavy chain can drag along the bottom causing extensive, catastrophic damage to corals and other sessile benthic

organisms. As anchored vessels swing with the wind and wave action, continuing damage can occur. Current methodologies borrow largely from coral reef injury assessment procedures and valuation formulae. Likewise, restoration and monitoring methodologies and protocols will closely follow those currently used in shallow reef situations, while incorporating special planning for diving and working at greater depths.

> *Status:* A no-anchor zone was established in the Tortugas region in 1998; assessment protocols and methodologies implemented and on-going.
> *Implementation:* FKNMS, State of Florida legal counsel, FWC law enforcement

(3) Respond to and assess injuries to natural resources within the FKNMS resulting from live-aboard and derelict vessels; further develop and fine tune assessment protocols and methodologies for these kinds of injuries. The DARP team will provide technical input to NOAA and state legal counsel and litigation team to determine appropriate penalty schedules for injuries to seagrasses, corals and hard-bottom habitat due to the shading effects or direct contact by permanently or semi-permanently moored live-aboard vessels and derelict vessels.

> *Status:* Implemented and on-going.
> *Implementation:* FKNMS, in conjunction with the litigation case team, will determine if special or modified assessment techniques need to be developed established for addressing injuries to these types of habitat.

(4) Respond to and assess injuries to natural resources within the FKNMS resulting from near-shore construction and repairs or modifications to existing structures, such as public utility structures, bridge pilings, and seawalls; further develop and fine tune assessment protocols and methodologies for these kinds of injuries. As a result of the permitting of improvements or alterations to existing coastal structures or features, or the construction of new structures or features, the DARP team will be called upon to assess coral, seagrass, or hard-bottom resources that may be impacted during the construction, repair or alteration phase of the project. The data and documentation gathered from such assessments may be used in the permit decision-making process, and in planning for possible mitigation or restoration. The current methods and procedures for coral and seagrass site characterization or assessment will be used, but the over-all process will differ significantly from grounding assessments in that an initial assessment is conducted before construction or alternation, followed by a post-project evaluation.

Many of these permitted construction projects result in the removal and relocation of sessile organisms to a suitable substrate by FKNMS staff or the permittee, as required.

> *Status:* Implemented and on-going.
> *Implementation:* FKNMS will be requested by the permitting agency to make an assessment of the marine resource impacted during construction, repair or alteration phase of the project.

(5) *Respond to and assess injuries to natural resources within the FKNMS resulting from fishing gear; further develop and fine tune assessment protocols and methodologies for these kinds of injuries.* The DARP team will collect data and conduct assessments of injuries to various substrate types resulting from fishing gear. The information will be provided to federal and state fisheries management and law enforcement personnel. DARP staff will also provide technical support to the Sanctuary litigation team cases involving illegally placed artificial finfish or shellfish aggregating structures. The

frequency of this type of assessment may increase over time in support of increased enforcement efforts.

Status: Implemented and on-going.
Implementation: FKNMS will collect data and conduct assessments of injuries to various substrate types resulting from the placement of fishing gear. Technical support will be provided to the Sanctuary litigation case team as requested.

(6) Respond to and assess injuries to natural resources within the FKNMS resulting from natural events; further develop and fine tune assessment protocols and methodologies for these kinds of injuries. Current assessment techniques are borrowed from coral reef and seagrass methodology, but no uniform or standardized protocols have been developed. Infrequency of injury by catastrophic natural events (primarily hurricanes) has provided little momentum to establish assessment protocols. Rapid assessment methodologies developed by other agencies or private institutions for coral reef observations may be utilized to assess large-scale catastrophic events.

Status: Implemented as needed
Implementation: FKNMS.

STRATEGY B.21 CASE MANAGEMENT

Strategy Summary
Case management involves sharing information and documentation regarding an injury incident so that the litigation team may proceed with legal action against the responsible party. This strategy identifies the activities necessary to carry out case management.

Activities (3)

(1) Provide vessel grounding litigation case management participation. Vessel grounding case management involves processing the information and documentation gathered during the assessment phase of an injury to Sanctuary resources into a legal action against the responsible party. In instances where the size of the injury does not exceed the threshold of a summary settlement, DARP involvement will be minimal (an occasional verification of an FWC Officer's evaluation of the injury), if required at all. Cases that fall under NMSA Section 307 (civil penalty action) categorization will require at a minimum the production of an injury assessment report by a DARP biologist, and some processing by NOAA's Office of General Counsel for Law Enforcement. Grounding cases that will be handled as NMSA Section 312 (natural resource damage assessment action) cases require the most DARP staff involvement, necessitating considerable coordination and information sharing NOAA's Office of General Counsel for Natural Resources and other members of the designated case team.

Status: Implemented and on-going.
Implementation: This is a joint FKNMS and litigation team activity that occurs with most cases.

(2) Provide vessel grounding litigation case management support. This is an on-going activity. DARP team is involved in the on-going task of providing reports, documentation, site reconnaissance, depositions, expert witness testimony, etc. in support of vessel grounding case litigation.

Status: Implemented and on-going.
Implementation: Depending on the severity of the incident, each case requires various portions of this activity. In addition a contract position was created in 2006 to provide overall specific case management support and coordination.

(3) Document Costs. In conjunction with administrative staff, the DARP team tracks expenditures associated with response, field assessment work, reporting, etc. for each case. Recently developed procedures for more accurate and efficient cost documentation are being implemented. Future activity in this area includes development of a cost documentation reporting sheet for Sanctuary law enforcement.

Status: Implemented and on-going.
Implementation: FKNMS and case administrator are developing additional procedures and reporting requirements.

STRATEGY B.22 HABITAT RESTORATION

Strategy Summary
The National Marine Sanctuaries Act permits NOAA to recover the cost of restoring resources that are damaged by human activities. Restoration may involve re-stabilization of damaged but viable corals, seagrasses or hard-bottom components, and/or the replacement of substrate, structure and habitat. This strategy describes the on-going efforts of the DARP teams to restore Sanctuary resources damaged by human activity. In this Strategy when reef restoration techniques are discussed, the FKNMS means restoration to the reef framework that is already there, although damaged. It does not mean the usage of any artificial structures that were not already located at the injury site.

Activities (8)

(1) Salvage, restabilize and repair living hard corals and octocorals, seagrasses, and the non-living reef framework injured by groundings or other non-natural impacts. FKNMS uses several resources to salvage and/or repair Sanctuary resources, including:

(a) *Salvage, maintenance and restabilization of injured Sanctuary resources by DARP staff and private contractors* - DARP team members, FKNMS staff, and private contractors can be mobilized to take part in "rescue" and "first aid" activities following a grounding. Efforts will focus on the salvage and restabilization of large, viable fragments or entire colonies of stony corals *in situ*, or as closely as possible to the injury site on uncompromised stable substrate. If the substrate within the immediate vicinity of the injury site is deemed too heavily fractured or otherwise unstable, the dislodged fragments and/or intact colonies may be relocated temporarily to protected "nursery" areas for holding until the original substrate is restabilized, reconstructed or replaced.

Alternatively, if it is deemed impractical or unfeasible to restore the original substrate to a degree that would adequately support the dislodged colonies or fragments, or if the time required to restore the original substrate would surpass the expected survivability horizon of

the salvaged material, then a Sanctuary restoration biologist may choose to transplant this material elsewhere. One such alternative can be a nearby site from a previous vessel grounding that did not receive restorative measures and has a suitable substrate for reattachment.

The DARP team participates in developing strategies for streamlining the acquisition of funds from litigation case settlements to implement restoration as swiftly as possible, especially when emergency salvage and restabilization is necessary. Improved materials/methods and other innovations are continually being developed, evaluated and incorporated into the program. Among these will be a Programmatic Environmental Impact Statement that will expedite the NEPA process for restoration planning and implementation.

(b) *Salvage, maintenance and restabilization of injured Sanctuary resources by Reef Medics Program and Other Volunteer Groups* - Reef Medics is an innovative, hands-on program designed to use volunteers to assist in Sanctuary restoration efforts. Volunteers have experience in vessel navigation and operation, snorkeling, and SCUBA diving. The DARP staff trains the volunteers in salvage and restabilization techniques. Currently, SCUBA certification is required for restoration efforts and DARP staff assists with the necessary approvals for diving through the NOAA Dive Program, The Nature Conservancy, Mote Marine Lab and other agencies. Reef Medics primarily assist DARP staff if the injury size falls below the threshold of a Natural Resources Damage Action claim or the responsible party is determined to be unviable or unknown, as in "hit and run" or "orphan" sites. Salvage and restabilization efforts of smaller viable fragments can be conducted by Reef Medics and trained volunteer divers using hand tools and cement or adhesives appropriate for use with living organisms in marine applications.

Reef Medics support comes from compensatory funds from vessel grounding settlements, grants, and Sanctuary Friends of the Florida Keys, including contributions to purchase equipment and supplies, and vessel support.

Reef Medics are involved in follow-up documentation and monitoring of repaired sites for up to two years after repairs. Expansion of the Reef Medics program will include activities not requiring SCUBA diving, with opportunities for participation by non-divers and volunteers. Mote Marine Laboratory has conducted a pilot Reef Medics "Base Camp" project and further development is underway. The content and materials for a new volunteer training course has been developed.

(c) *Salvage or removal of living corals by researchers and public aquaria*. Vessel groundings on coral reef substrate often produce fragments of living coral colonies too small or too compromised to be viable in the natural environment. Likewise, permitted repair or replacement of submerged or partially submerged structures sometimes sacrifices encrusting corals and other sessile marine organisms. The removal of un-permitted or deleterious structures, such as illegally placed fishing gear and derelict vessels, also may result in the loss of hard corals and gorgonians. In such cases, the preferred alternative is to transplant the material to a suitable substrate within the reef ecosystem. However, if size, fragility or other factors make successful relocation and restabilization unlikely or impossible, then the FKNMS

superintendent may allow the material to be collected by researchers and public aquaria with permits to procure coral specimens from Sanctuary waters.

DARP works with permit personnel to include language that requires utilization of "sacrificial" material as primary source, removal of intact specimens from manmade structures as a secondary source, and using natural reef sources only if the target species cannot be found on artificial structures. DARP investigates lab or aquarium propagation for subsequent return to the ecosystem.

Status: Implemented and on-going.
Implementation: FKNMS management, DARP, private contractors, and volunteer groups. Sub activities are currently in various stages of implementation.

(2*) Restore injured or destroyed coral reef framework.* The DARP team uses funds from case settlements to reconstruct or replace coral reef framework structures that have been compromised or destroyed. The goal of this activity is to restore the ecological and structural functionality of the injured reef framework and to reestablish lost aesthetic aspects. The DARP team participates in developing strategies for streamlining the acquisition of funds from litigation case settlements to effect restorative efforts as swiftly as possible, especially when emergency salvage and re-stabilization is required.

In cooperative situations, private contractors may also be engaged to restore or replace impacted or destroyed coral reef framework.

Status: Implemented and on-going within the limitations of funding, human resources, and technology.
Implementation: DARP, FKNMS managers, litigation case managers, private contractors

(3) Restore grounding-impacted seagrass meadows. FKNMS DARP personnel participate or facilitate seagrass restoration in damaged areas. These cases are handled on a case-by-case basis and involve coordination among seagrass scientists, DARP personnel, DEP personnel, and other resource managers. Other seagrass restoration efforts occur by:

(a) *Use of Sanctuary Staff and Private Contractors*. The DARP team participates in on-going projects utilizing settlement funds to restore seagrass dominated substrate injured in vessel groundings. Activities by staff or contractors includes backfilling prop scars, trenches and excavation craters ("blowholes"), installing seabird attracting roosts (bird stakes) placed to promote the concentration of natural fertilizer; replanting pioneer seagrasses in denuded areas, sodding with nursery-grown and mechanically planted shoal-grass plugs, and the development, evaluation and implementation of other innovative methods and technologies.

(b) *Use of Volunteer Groups.* DARP personnel direct trained volunteers to begin "first aid" measures following grounding damage to seagrass meadows using hand tools to return unnaturally banked or piled sediments back into scars, trenches and excavation craters created by grounded vessels.

(c) *Use of Regional Restoration Programs.* The DARP team uses various funding sources to identify seagrass areas in need of restoration, and to implement restoration efforts, especially of orphan sites that would otherwise not receive treatment. Other members of this regional restoration group include representatives from the NOAA Beaufort Lab/Seagrass Research Team, the NOAA Damage Assessment Center, and DEP

Status: Related sub-activities are currently in various stages of implementation.
Implementation: NOAA Damage Assessment Center, NMFS Beaufort Lab, FKNMS, DEP, private contractors, and volunteers.

(4) Monitor restoration. DARP staff schedules regular field visits to monitor restoration sites. The monitoring data gathered is used for the scientific evaluation of methodologies. Based on the evaluations, mid-course corrections can be made at existing restoration sites and future restoration planning will reflect the knowledge gained.

Status: Currently established for many existing incident locations.
Implementation: FKNMS and cooperating agencies.

(5) Acquire blanket permits for DARP activities. DARP staff will work with other restoration team members, including NOAA's Beaufort Lab/Seagrass Research Team, NOAA's Damage Assessment Center, and DEP to obtain blanket permits from regulating agencies (USACE, DEP, and others as appropriate) for damage assessment and restoration projects.

Status: Applications are under review by issuing agencies.
Implementation: A joint activity requiring various agency (e.g. USACE, DEP, etc) approvals.

(6) Reintroduce indigenous living corals and seagrass. DARP staff participate in the review of policies and regulations regarding the re-introduction of living corals and seagrasses indigenous to the Florida Keys, which were held or propagated in laboratories, aquaria, or nurseries. Concerns exist about the possibility of introducing exotic or foreign strains of diseases or parasites, and/or the possibility of reintroducing corals or seagrass with weakened immune and defense mechanisms, or defective genetic material.

Status: This activity is currently under development. A workshop on the reintroduction of organisms from enclosed systems is targeted for mid to late 2007.
Implementation: Multi-agency DARP personnel are making preparations to convene a workshop of experts to assess the biological and ecological ramifications of reintroducing corals and seagrasses and to develop criteria regulating these and related activities. A research project has been permitted by the FKNMS to define health certification and reintroduction protocols. However, due to setbacks resulting from problems with coral aquaculture techniques and recipient partners, the project was delayed until just recently. The project partners have been re-established and research is underway, with a field re-introduction activity initiated in 2006. It will be critical to conduct the proposed workshop with all coral nursery partners involved in handling FKNMS corals, and ideal to hold it after this initial research is completed in 2007.

(7) Development of seagrass donor beds. The DARP team will determine appropriate sites for developing, maintaining and enhancing donor beds of shoal grass for transplanting into restoration sites.

> *Status:* This activity is currently under development. Donor site identification is on-going.
> *Implementation:* Donor site identification has evolved through discussions with FKNMS permitting staff working on reviews of US Army Corps of Engineers (USACE) permits. Seagrass beds subject to destruction due to small maintenance dredge projects in access channels to sub-divisions and public access waterways are appropriate donor sites available for beneficial use projects, such as seagrass restorations. USACE is developing permitting language that will require their applicants to coordinate with FKNMS for the rescue of seagrass imperiled by maintenance dredging projects.

(8) Work with public outreach coordinator to inform the public about habitat restoration activities. This is an on-going DARP team activity in which DARP personnel regularly provide the Sanctuary Communications Manager with information, photos, videos, and other materials for use in press releases, TV and radio spots, and magazine articles to inform the public about restoration projects and successes.

> *Status:* Implemented and on-going.
> *Implementation:* FKNMS will provide information for media output to keep the public informed on restoration projects.

STRATEGY B.23 DATA MANAGEMENT

Strategy Summary
This strategy describes the DARP efforts to document groundings in the Florida Keys National Marine Sanctuary in order to determine trends and implement prevention strategies. Additionally, this information is used to track restoration, repairs and monitoring in the Sanctuary to determine the success of restoration efforts.

Activities (3)

(1) Create and maintain vessel grounding database. There are several tasks associated with this activity, including:

(a) *Refine and Maintain Vessel Grounding Database and provide adequate staffing for on-going management*. FKNMS and FWC data are archived in a multitude of formats gathered with varying degrees of detail. Archived data needs to be reevaluated and reprocessed to allow queries to fields and subcategories. DARP staff developed a consistent format, document parameters, and standardized reporting. Once the data are reprocessed, they are shared with other Sanctuary programs such as Mooring Buoy, Waterway Marking/Management, and Regulatory. This data is incorporated as an element of the SHIELDS database.

(b) *GIS component development and maintenance.* DARP staff assigned to database development and management has received ArcView Geographic Information System (GIS) training and the

processing of archived data has begun. The DARP team will investigate new databases and geospatial analysis technology to evaluate the feasibility of incorporation into DARP data management.

(c) *Products for management, case tracking, outreach and research application.* Full implementation is pending the complete development of a new database. Original data has limited value. DARP personnel will work with other FKNMS program staff to create a database that is both useful and user-friendly.

Status: Partially implemented and on-going. Sub-activities are currently in various stages of implementation and most DARP personnel have received basic GIS training. In 2006 a case administrator contract position was created to facilitate this activity.
Implementation: FKNMS, FWC, law enforcement, cooperating agencies, and reporting sources, including the public and volunteers.

(2) Develop GIS and database for tracking restoration, repairs and monitoring. NOAA Damage Assessment Center's seagrass injury assessment team has implemented this data management component. This technology is currently being adapted to other FKNMS and DARP applications.

Status: This activity is in progress. Most DARP personnel have basic GIS training.
Implementation: FKNMS and related agencies.

(3) Acquire and incorporate satellite and aerial photo images into GIS databases. The DARP team participates in the acquisition of high-resolution, low-altitude aerial photographs of all special management areas and known grounding "hotspots" as baseline documentation in support of natural resource injury litigation, basic research, and managerial decision-making. These images are shared with all Sanctuary program staff to facilitate and enhance Sanctuary-sponsored projects.

Status: Implementation will commence upon acquisition of funds
Implementation: Funding is being sought and site planning is underway.