Gray's Reef National Marine Sanctuary

Management Plan

U.S.DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Ocean and Coastal Resource Management
Washington, D.C.
January 1983

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LIST OF PREPARERS

Many persons participated in the preparation of this document. A major portion of the management planning process was performed by NOAA's Sanctuary Programs Division and the Coastal Resources Division of the Georgia Department of Natural Resources under Cooperative Agreements NA-80-AAH-CZ075 and NA-81-AAH-CZ098. The University of Georgia's Marine Resource Center and Marine Extension Service also made major contributions to this effort.

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GRAY'S REEF NATIONAL MARINE SANCTUARY

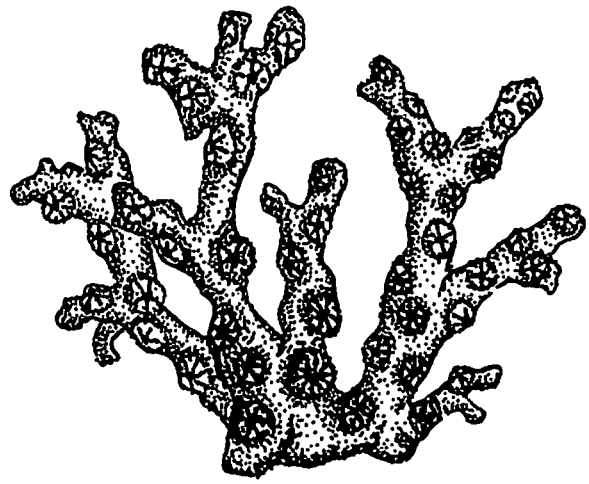
MANAGEMENT PLAN

EXECUTIVE SUMMARY

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 authorizes the Secretary of Commerce to designate ocean waters as marine sanctuaries for the purpose of preserving or restoring their conservation, recreational, ecological or esthetic values. Sanctuary designation provides for the comprehensive management of exceptional marine resources.

Gray's Reef National Marine Sanctuary, a large expanse of live bottom reef on the South Atlantic Continental Shelf, was designated in 1981. Located 17.5 nautical miles east of Sapelo Island, Georgia, the Sanctuary is a "marine oasis" providing habitat for a variety of seaweeds, corals, fishes, sea turtles, and other reef organisms on an otherwise sand-covered ocean bottom. It is a popular site for recreational fishing and diving and a natural laboratory for scientific investigations.

This Management Plan focuses on the special resource features of Gray's Reef. The Plan is designed to inform sanctuary users and the general public about the Sanctuary and the various activities that are planned for the site over time. It is forward-looking and action-oriented, describing the degree of resource protection necessary for the site, the types of research, interpretative, and recreational activities anticipated, the facilities where activities take place, and the kind of management effort necessary to implement the Plan. The Plan will be reviewed annually and updated every five years to reflect information and experience gained through sanctuary operations.

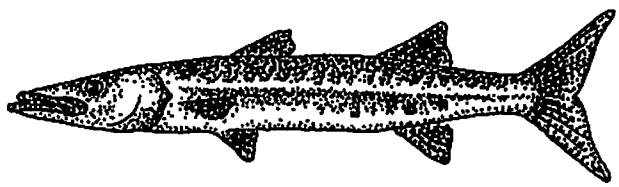


GRAY'S REEF NATIONAL MARINE SANCTUARY
MANAGEMENT PLAN

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES



I. INTRODUCTION

A. Purpose and Scope of a Sanctuary Management Plan

The management of a national marine sanctuary is based on provisions set forth in a site-specific management plan. The act of designating an area as a sanctuary emphasizes its national importance and encourages more caution with respect to activities impinging upon it. A management plan provides the mechanisms needed to direct and coordinate the various activities that may affect the sanctuary environment to ensure that the purposes of the sanctuary are met. A wide range of issues that concern a sanctuary area, its resources and its uses are addressed in the management plan.

Management planning is a continuous process that involves information gathering and analysis. Through this process management concerns are identified which in turn are translated into management goals and objectives. Specific programs for resource protection, research and monitoring, interpretation and recreation, administration and surveillance and enforcement evolve as the means for achieving the goals and objectives. The management plan ties these programs together and provides a comprehensive, but flexible, strategy for sanctuary management.

A management plan is designed to inform sanctuary users and the general public about programs that are planned for the particular sanctuary over time. It also describes programmatic policies and procedures that apply to the national program and to the individual site. A management plan is long-term in scope, yet in order to provide for continuous management planning, it is periodically reviewed and fine-tuned as appropriate experience and information are gained.

B. Legislative and Policy Context for Sanctuary Management

1. Marine Protection, Research and Sanctuaries Act

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 authorizes the Secretary of Commerce to designate ocean waters as national marine sanctuaries for the purpose of preserving or restoring their conservation, recreational, ecological, or esthetic values. Title III of the Act is a broad-based mandate that allows for comprehensive management of special marine resources. It offers a measure of protection not found under existing statutes. The Act is administered by the National Oceanic and Atmospheric Administration (NOAA) through the National Ocean Service (NOS), Office of Ocean and Coastal Resource Management (OCRM), Sanctuary Programs Division (SPD).

2. National Marine Sanctuary Program Mission and Goals

The National Marine Sanctuary Program's mission is to establish a system of national marine sanctuaries through the identification, designation and comprehensive management of special marine areas for

the long-term benefit and enjoyment of the public. Sanctuaries are designated to meet the following goals:

- Enhance resource protection through the implementation of a comprehensive, long-term management plan;
- Promote and coordinate research to expand scientific knowledge of significant marine areas and to improve management decisionmaking;
- Enhance public awareness, understanding and wise use of the marine environment through public interpretive and recreational programs; and
- Provide for optimum compatible public and private use of special marine areas.

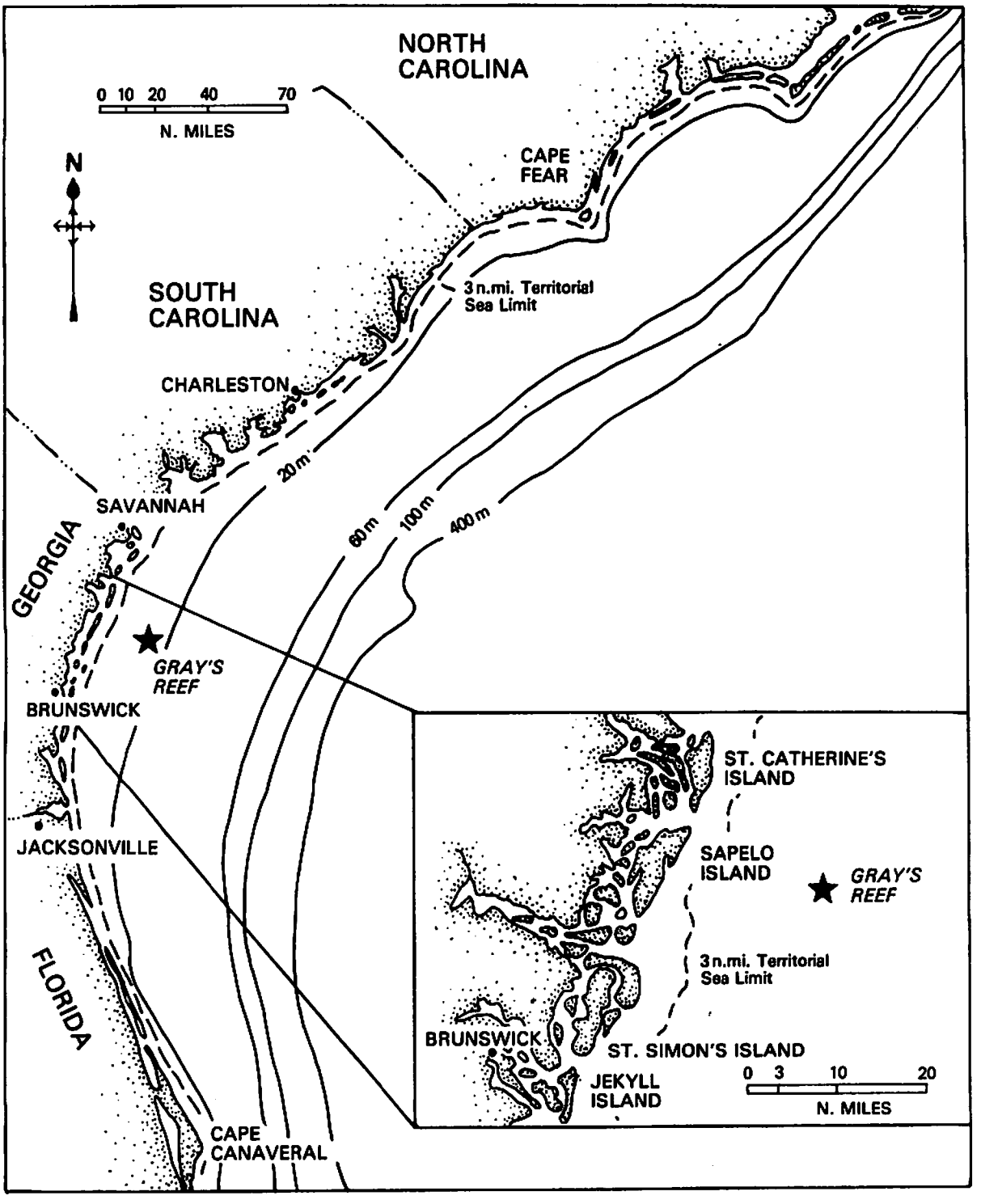
C. Gray's Reef National Marine Sanctuary

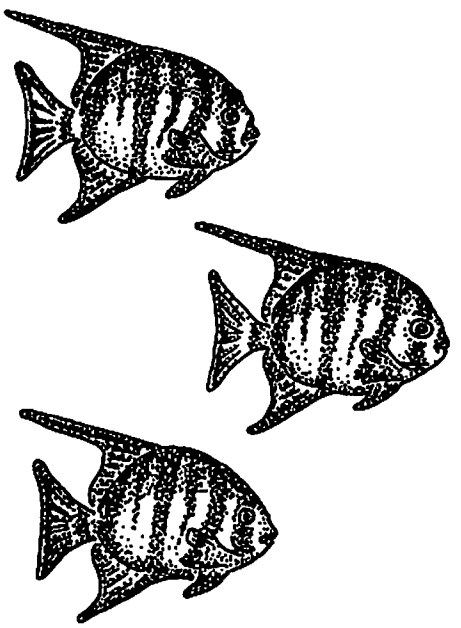
Gray's Reef National Marine Sanctuary was designated in January 1981 to provide protection and comprehensive management for one of the largest and most popular nearshore live bottom reefs on the South Atlantic Continental Shelf. Located 17.5 nautical miles east of Sapelo Island, Georgia (Fig. I-1), the site is a haven for a variety of marine plants, invertebrates, fishes, and sea turtles.

Under the direction of the National Marine Sanctuary Program, Gray's Reef National Marine Sanctuary will insure that activities related to the live bottom habitat and communities are compatible and that resource use is balanced with resource conservation. It will provide a "living laboratory" for research directed toward management issues and will offer interesting and informative interpretive and recreational programs aimed at enhancing public awareness and appreciation for the sanctuary area. The Sanctuary guarantees that Gray's Reef will remain a valuable resource for the benefit and enjoyment of future generations.

FIGURE I-1

GRAY'S REEF NATIONAL MARINE SANCTUARY
LOCATION MAP





II. MANAGEMENT CONTEXT -- THE SANCTUARY ENVIRONMENT

This section describes the major features of Gray's Reef National Marine Sanctuary that were considered in preparing the management plan. It establishes the context within which sanctuary goals and objectives were formulated and management programs are to be implemented. A detailed description of the Sanctuary is presented in the Gray's Reef National Marine Sanctuary Final Environmental Impact Statement (OCZM, 1980). Pertinent information is summarized below.

A. Sanctuary Location and Boundaries

Gray's Reef National Marine Sanctuary encompasses 16.68 square nautical miles of intermittent live bottom habitat on the South Atlantic Continental Shelf in the Georgia Bight. The Sanctuary is located in high seas waters approximately 17.5 nautical miles off the coast of Sapelo Island, Georgia. The coordinates which mark the corners of the Sanctuary are: 31°21.45'N, 80°55.17'W; 31°25.15'N, 80°55.17'W; 31°25.15'N, 80°49.42'W; and 31°21.45'N, 80°49.42'W (Fig. II-1). The Sanctuary is marked by a fish haven buoy, "GRS" ("Gray's Reef Sanctuary"), which was formerly "SLB" "Sapelo Live Bottom," at 31°24.5'N, 80°52.6'W. The buoy is a foam-filled nun buoy with tower and radar reflector. It is located in 70 feet (22 meters) of water (USCG, 1982).

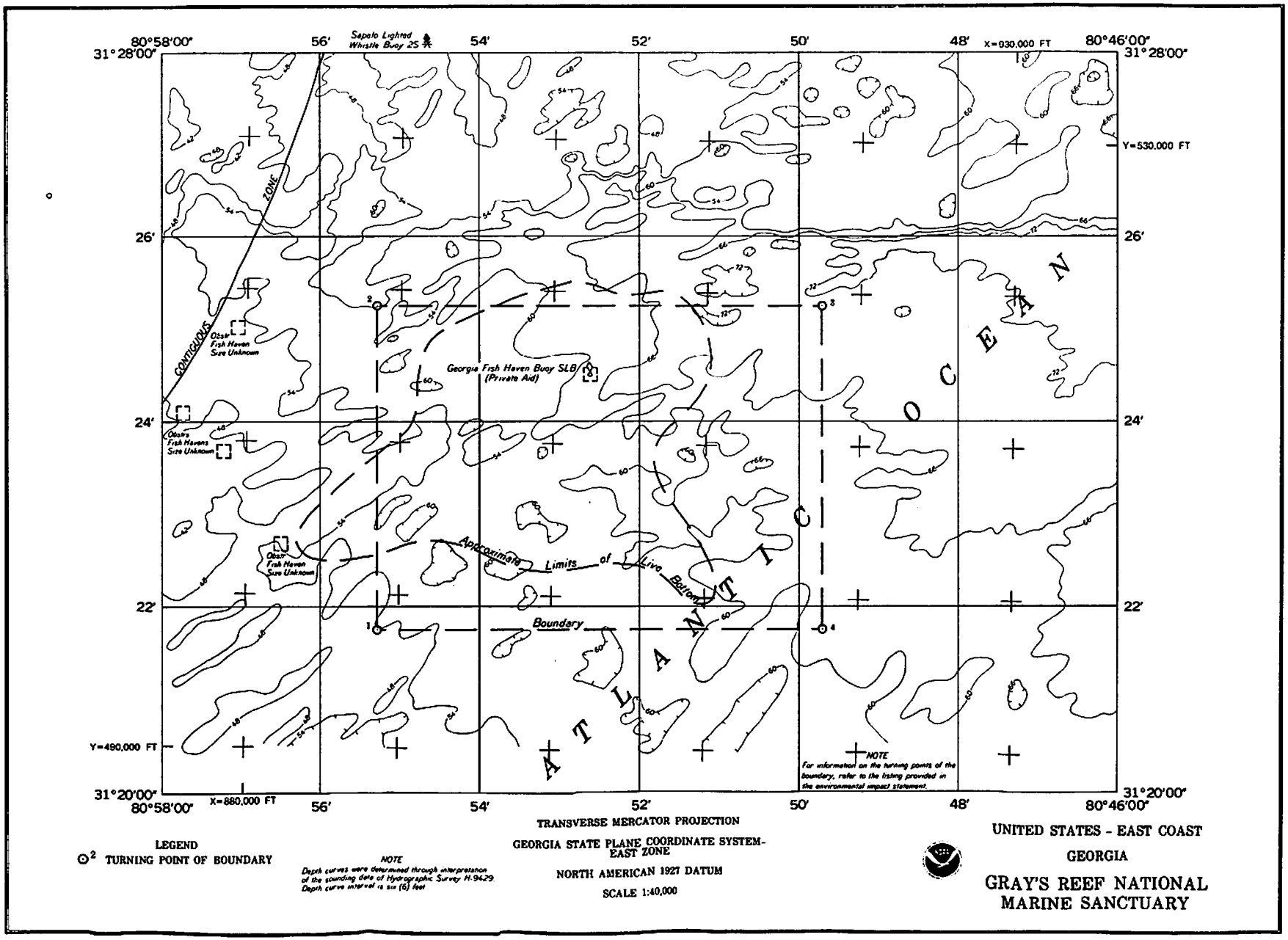
B. Geological Setting

The coastal zone of Georgia is characterized by extensive coastal marshes and water ways, maritime forests and largely undeveloped sea islands. Offshore, the continental shelf is wide, flat, shallow and primarily covered by sand except for intermittent occurrences of emergent hardbottom, presumably reminiscent of old stands of sea level (Henry, 1981). Hard bottom and rock outcrops form "reefs" that support rich invertebrate and fish communities. Reefs are less common nearshore due to weathering by river channels and deposition of sediments. Offshore, where less weathering and sediment deposition occur, reefs are more common and exhibit moderate to high relief and abundant marine life (Henry and Giles, 1979).

Although located nearshore, Gray's Reef is characteristic of live bottom reefs found further offshore in terms of relief and marine life (see Table II-1). The reason for this is uncertain. Relative to surrounding areas, Gray's Reef contains extensive but patchy and discontinuous hardbottom of moderate-relief (up to 2 meters) and moderate to abundant epibenthic and fish communities. Rock outcrops or "ledges" have formed in a northwest to southwest direction (Fig. II-2). Ledges are often separated by wide expanses of sand and are subject to weathering, shifting sands and slumping which create a complex habitat with caves, burrows, troughs and overhangs (Fig. II-3). Sandy areas between the ledges are coarse and shelly with varying amounts of "rock-like" litter (Henry and van Sant, 1982).

FIGURE II-1

GRAY'S REEF NATIONAL MARINE SANCTUARY
BOUNDARY MAP



12 5% REDUCTION

Geological records suggest that Gray's Reef was formed between 40,000 and 20,000 years ago in a shallow embayment experiencing fluctuations in sea level and wave energy. As opposed to reef substrate formed by living corals in the tropics, Gray's Reef was probably formed when heavily-ladened brines in the shallow, evaporating seas percolated through sediments changing the chemical composition and forming rock (Hunt, 1974). Fossil fragments of certain mollusks, bryozoa, echinoids and corals, along with their state of fragmentation, indicate that the rock was formed along a bar or a shoal.

C. Oceanographic Setting

Gray's Reef is located on the inner continental shelf where oceanographic conditions are more variable than those farther offshore where the Gulf Stream exerts its stabilizing influence. At Gray's Reef, wind and meteorological conditions are principal forcing mechanisms. Water temperatures follow seasonal trends and range from 14°C (57°F) in winter to 28°C (82°F) in summer. Vertical gradients are minimal.

Salinity of seawater fluctuates in response to local and seasonal events. Following spring rains, brackish waters from coastal tributaries are expelled onto the inner shelf and mix with ocean waters, which reduces salinity. Under certain wind and current conditions, and especially in summer, warm saline Gulf Stream waters meander landward causing locally increased salinities. Throughout the year, salinity at Gray's Reef ranges from 34 to 36 parts per thousand (Hunt, 1974).

Sea conditions at Gray's Reef are generally calm during late spring and throughout the summer, and except when northerners pass through the area, seas are less than 5 feet and winds are variable, less than 10 knots. During the late summer, fall and winter months, sea conditions are rougher because of more frequent storms.

Surface water circulation is generally to the south in fall and winter and to the north in spring and summer. Bottom currents show no consistent patterns but probably respond to indrafts of the northerly flowing Gulf Stream.

D. Living Marine Resources

Live bottom reefs support unique assemblages of marine algae, invertebrates, reef fish, and sea turtles. The types of organisms found at a live bottom depends on the morphology of the habitat and its geographical location. Where hardbottom is covered by sand, only sparse marine life is found; however, where hardbottom is emergent, dense and diverse communities occur. Community structure is also controlled by hydrographic factors, such as water temperature, salinity and current patterns. In response to wide thermal variations and river runoff along the coast, live bottoms close to shore support more temperate species with a minor component of tropicals. Middle and outer shelf locations support more tropical biota in response to the influence of the Gulf Stream (Henry and van Sant, 1982).

TABLE II-1

MORPHOLOGICAL CLASSIFICATION OF REEFS AND HARDGROUNDS
IN THE GEORGIA BIGHT (AFTER HENRY AND GILES, 1979)

Classification	Relief	Live Bottom Community	Location & Distribution	Method of Detection
Low-Relief Hardbottom	<0.5m	Sparse to moderate occurrence of sessile epibenthos, principally sponges and octocorals	Widely distributed across the shelf	Generally difficult to detect by sonar techniques; substrate commonly covered by a veneer of sand; verified by underwater camera or SCUBA
Moderate-Relief Hardbottom	Up to 2 m	Moderate to abundant occurrence of epibenthos, principally sponges, octocorals, and algae; moderate to abundant reef fish communities	Generally restricted occurrence, but more common off northeast Florida and the Carolinas in inner and middle shelf locations	Generally easy to detect using side-scan and fish-finding sonar; verified by by underwater camera or SCUBA
Shelf-Edge Reef	Up to 15 m	Moderate to abundant occurrence of epibenthos, principally sponges, octocorals, hard coral, and algae; abundant reef fish communities	Occur as a discontinuous ridge or ridges at or near the shelf edge	Easily detected by sonar techniques; verified by underwater camera, remote sampling or submersible

FIGURE II-2

GRAY'S REEF ROCK OUTCROP AND FAUNAL GROWTH PATTERNS
(FROM HUNT, 1974)

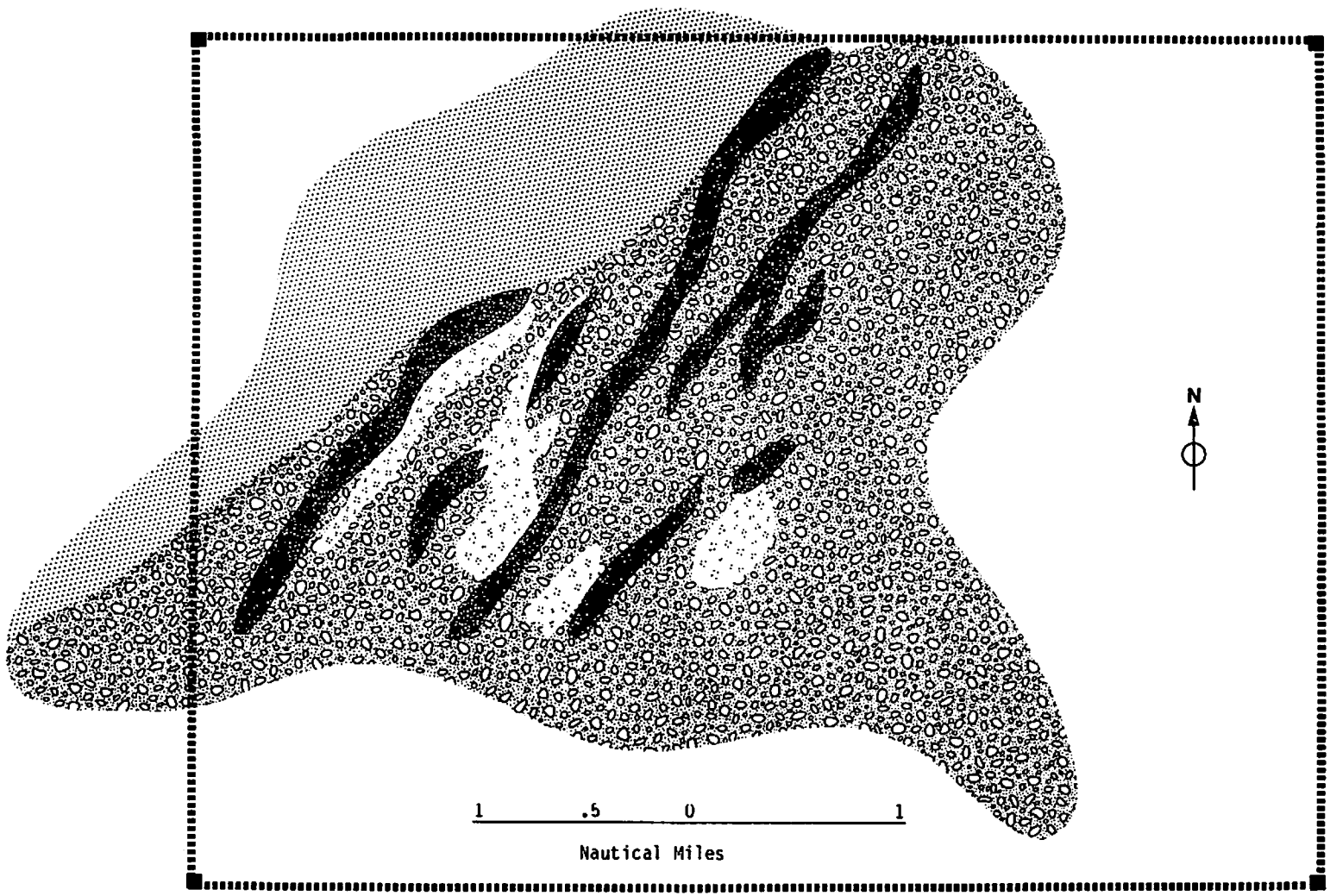
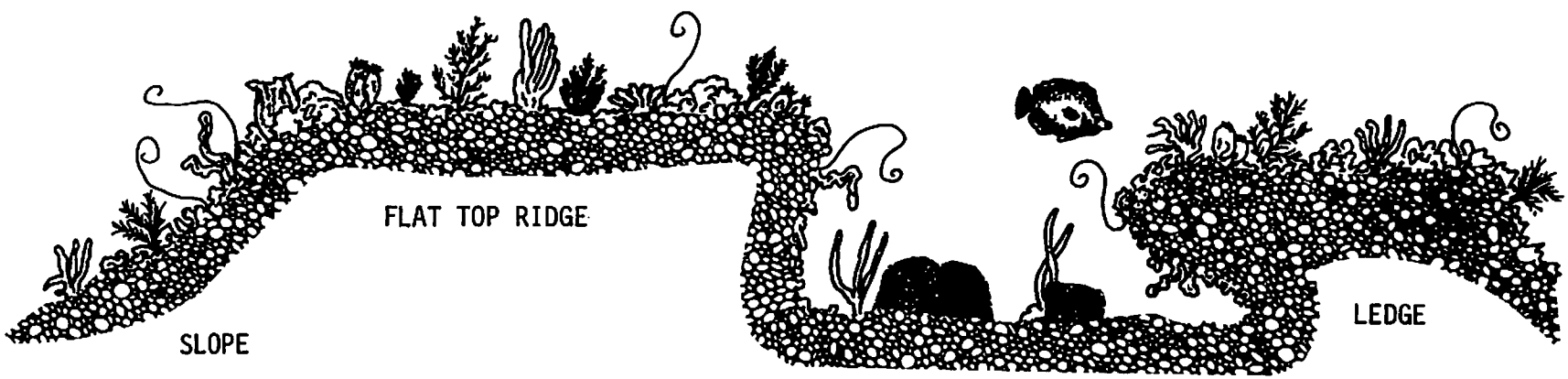


FIGURE II-3

GRAY'S REEF TOPOGRAPHY (FROM HUNT, 1974)



Gray's Reef supports a mixture of temperate and tropical species. Many species are previously unreported for this area, some are "new" species and others represent extensions in previous geographical ranges.

A variety of seaweeds and invertebrates grow on exposed rock surfaces. Bryozoans, ascidians, sponges, barnacles, and hard-tubed worms form dense encrustations. Larger sessile invertebrates, such as sea whips and fans, hard corals, and large sponges, provide refuges for many smaller, more cryptic invertebrates. Other dominant invertebrates include starfish, brittlestars, crabs, lobsters, shrimps, bivalves, and snails.

Gray's Reef is a fish haven and year-round residence for many fishes. Important recreational target species include bottom-dwelling species of snapper, grouper, sea bass, porgy and sheepshead and seasonal migratory pelagic species of bluefish, jack, cobia, mackerel and little tunny. Small tropical reef fish, including cardinalfish, damsel fish, wrasses, blennies, gobies, and angelfish live in close association with benthic substrates and form an important component of the ecosystem. Their residence at Gray's Reef is believed to be only seasonal. Moray eels and other cryptic organisms hide in caves and burrows. Other commonly seen fishes include trigger, soap and goat fish, burrfish, tomtate, cubbyu and jackknife fish, lizard and toad fish and sea horses. Small schooling "bait" fishes, primarily scad and sardines, hover above the reef surface, and mid-water fishes (e.g., Atlantic spadefish, amberjack and barracuda) are found higher in the water column.

Sand bottom areas between rock outcrops are foraging grounds for some fishes and, whereas they may not contain the rich marine life associated with hardgrounds, apparently play a significant role in the structure and function of live bottom systems. The most obvious and common organisms in sand bottom areas are sea pens and sea panseys that do not require hard substrate for attachment (Continental Shelf Associates, 1979). Sea stars are common and sea cucumbers, sea biscuits and sea urchins are occasionally encountered (Henry and van Sant, 1982). Pearly razorfish pop in and out of burrows in the sand and several large schools of small planktivorous juvenile and adult fishes are often seen swimming over sand bottom areas (Henry and van Sant, 1982). These fishes include lizard and toadfish, sparids, porgies, and snappers (Nicholson, 1982, pers. comm.).

Loggerhead sea turtles are encountered at Gray's Reef throughout the year. It is speculated that they use live bottom areas for foraging and resting. Other marine turtles, including the kemps (Atlantic) ridley and the green, are known from the South Atlantic region but have not been encountered at Gray's Reef.

Little information exists concerning coastal or pelagic birds in the vicinity of Gray's Reef. Pelagic bird rookeries are found along the entire Georgia coast. Petrels, shearwaters, gannets, phalaropes, jaegers, and terns are seen at Gray's Reef as they pass from rookeries to offshore feeding grounds.

E. Cultural Resources

At some point during its geological history, Gray's Reef was a shallow coastal environment supporting oysters, clams and other estuarine organisms. Fossil bivalves and gastropods (Hunt, 1974) and a mastodon bone have been found at Gray's Reef (Bell and Smith, 1981, pers. comm.). It is possible that artifacts of human culture also may be uncovered at the reef.

The South Atlantic Continental Shelf also has the potential for containing many shipwrecks. Merchantmen, ships-of-war, blockaderunners and fishing vessels dating from the 18th Century to the present have been sunk, lost or run aground off the Carolinas and Georgia. The remains of many of these wrecks have not been found. It is possible that shipwrecks, armaments and other relics could be discovered in the vicinity of Gray's Reef following close examination of the area.

F. Human Activities

Gray's Reef attracts recreational fishermen and divers and serves as a natural laboratory for research and educational programs. There is currently little or no interest in the Gray's Reef area for commercial fishing, military activities, marine minerals development, ocean dumping, or dredge material disposal.

Although Gray's Reef is the closest natural reef offshore of Georgia, several factors limit its accessibility. Use of Gray's Reef is primarily limited to persons from coastal and inland Georgia who have seaworthy vessels, offshore experience and the electronic navigation equipment necessary for offshore travel.

There is no primary access point for the Sanctuary; rather, a variety of public and private boat launches and marinas from Savannah to Brunswick, Georgia, serve as staging points for sanctuary users. A boat trip to Gray's Reef takes from 1 to 3 hours depending on type of vessel, departure point and sea conditions.

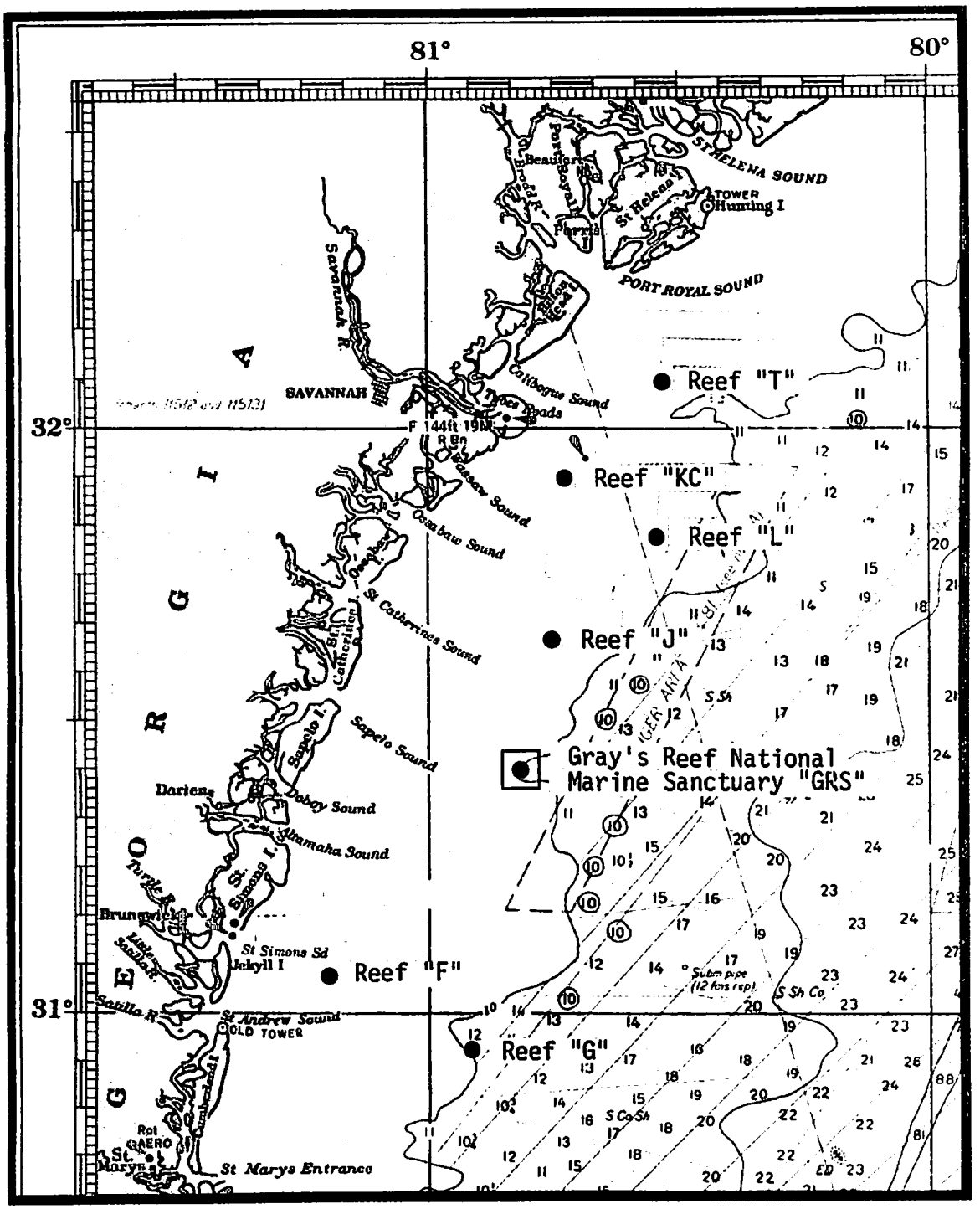
Most offshore recreational vessels which operate at Gray's Reef are privately owned, 20 to 40 feet in length and gas or diesel powered. Research vessels and commercial fishing boats are generally larger and more seaworthy. Besides distance and travel time and variable weather and sea conditions, increasing fuel prices and limited availability of charter and party boats for recreational hire further limit public access to the Sanctuary.

1. Recreational Fishing

Marine recreational fishing in the southeast is relatively undeveloped. Offshore fishing opportunities are somewhat limited by the lack of suitable natural fish havens within a reasonable distance from shore. Except for Gray's Reef and several nearshore artificial reefs established by the Georgia Department of Natural Resources (Fig. II-4), the most desirable natural live bottom in terms of seasonal availability, size and abundance of target fishes is located 40 miles offshore. In 1979, Georgia attracted an estimated 103,000 participants and South Carolina, 360,000 (UGA, 1982).

FIGURE II-4

LOCATION OF GRAY'S REEF NATIONAL MARINE SANCTUARY
RELATIVE TO ARTIFICIAL REEFS OFF GEORGIA



Recreational fishing at Gray's Reef occurs nearly year-round but at different levels of intensity. Beginning in April and May, fishing steadily increases through the summer and then tapers off in autumn. This trend correlates with favorable weather conditions and the availability of favorite target species--king and Spanish mackerel. Fishermen troll, drift fish or live line for mackerel. Snapper, grouper, black sea bass and other bottom hook-and-line fisheries are generally available all year.

The Georgia Department of Natural Resources estimates that there are approximately 215 "fishable" days at Gray's Reef per year (i.e., days with less than 5-foot seas and winds variable, less than 10 knots). The best weather days occur from May through August with an average of 22 fishable days per month (Gordon, 1981, pers. comm.). Most fishing occurs on weekends.

2. Commercial Fishing

In the Southeast, commercial fishermen have been oriented traditionally to harvesting shrimp (UGA, 1982). With recent enactment of the Fisheries Conservation and Management Act and expansion of the territorial fishing limits to 200 miles, there have been increased efforts to encourage the development of offshore fin fisheries. Gear research and development programs, exploratory fishing activities, and training programs are being conducted by the University of Georgia's Marine Extension Service in Brunswick, Georgia, in an effort to foster year-round, profitable commercial fin fisheries (UGA, 1982). Three types of gear are proving successful for offshore bottom fisheries: handlines (manual or powered reels); wire fish traps; and, to a limited extent, roller-rigged trawls. Fishing for pelagic species is primarily by hook and line, although gill nets and seine nets are also used.

Gray's Reef supports very limited commercial fishing opportunities. Fish species composition and concentration at nearshore hardbottoms, such as Gray's Reef, are generally not sufficient enough to attract large-scale fishing operations involving fish traps or roller-rigged trawls. In the past, a few off-season shrimpers occasionally fished for black sea bass with wire fish traps at Gray's Reef; however, low market prices and declining yields limited the fishery. Sanctuary regulations now prohibit trap fishing and trawling to protect fish stocks and fishery habitats (see OCZM, 1980). Hook-and-line fishing is allowed and occasional commercial catches of Spanish and king mackerel, bluefish, and cobia are taken at Gray's Reef.

3. Recreational Diving

SCUBA diving by more hardy, experienced divers occurs year-round. Because of the variable and often hazardous sea conditions, open-ocean diver training is encouraged. Most diving occurs on weekends and often in conjunction with recreational fishing activities.

Spearfishing is allowed at Gray's Reef. At current low levels of harvest, there is no apparent adverse impact. Target fishes include snapper, grouper, black sea bass, flounder, triggerfish, porgy and sheepshead. Photography and underwater nature observing are also popular activities. Underwater collecting of marine life is prohibited in the Sanctuary, except on a limited basis under special permits for scientific and educational purposes.

4. Research and Education

Gray's Reef offers unique opportunities for research, yet it has received only moderate scientific attention. This is due primarily to its relatively recent discovery and, prior to sanctuary designation, lack of any coordinated effort to stimulate and promote research in this area.

Gray's Reef was discovered by scientists in 1961 while surveying the nearshore area off the University of Georgia's Marine Institute on Sapelo Island, Georgia (Gray, 1961). The first systematic collection from Gray's Reef--the Gray Collection--is housed at the University's Athens Campus and the Marine Resource Center on Skidaway Island, Georgia. In later years, Hunt (1974) studied its geology and origin, Harris (1978) reported on resident fish populations, the South Carolina Marine Resources Research Institute and Georgia Department of Natural Resources (1981) studied living marine resources for the United States Department of the Interior, Bureau of Lands Management, and Searles (1981) made limited seaweed collections. Since designation of Gray's Reef National Marine Sanctuary in January, 1981, funded research has been directed principally toward topics with management implications, including a reconnaissance hydrographic survey (Henry and van Sant, 1982), a study on the effect of roller-rigged trawls on benthic habitats (Georgia Department of Natural Resources and South Carolina Marine Resource Research Institute, 1982, in progress), an assessment of contemporary visual fish censusing techniques in live bottom areas (Georgia Department of Natural Resources, 1982, in prep.) and the preparation of a fieldguide to the fishes of Gray's Reef (Gilligan, 1982, in prep.). These studies are described in Appendix C. Future research needs are identified in Section V, Resource Studies Plan.

Several regional colleges, universities, museums and private foundations have expressed interest in the use of Gray's Reef as a natural teaching laboratory, including the University of Georgia (Athens Campus, the Marine Resource Center on Skidaway Island and the Marine Extension Service in Brunswick), Georgia State University, Emory University, Savannah State College, Georgia Southern University, and Brunswick Junior College. Under the Marine Biology Program at Savannah State College, Gray's Reef is the site of student training in various fields of marine science (Gilligan, 1981). Programs proposed for the Sanctuary will further educational opportunites (see Section V, Resource Studies Plan and Section VI, Interpretation and Recreation Plan).

5. Tourism

Tourism in coastal Georgia is focused primarily in the Savannah and the Brunswick-Golden Isles areas. Main attractions at these locations are public beaches, historic sites and recreational activities such as golf, tennis and fishing. When compared with facilities present in Florida, however, coastal Georgia's tourism industry remains largely undeveloped. However, recent increases in visitor center use in Savannah and Brunswick, hotel and motel room rentals, and traffic flow on Interstate-95 (the main north-south corridor for tourist activities in coastal Georgia) have been noted.

The University of Georgia's Marine Resource Center trains docents to lead tourists and visiting groups on field trips, marsh and beach walks and other marine educational activities (UGA, 1982). The Georgia Department of Natural Resources' guided tours of the Sapelo Island National Marine Sanctuary attract many tourists. In addition, several local, regional and national publications (e.g., The Atlanta Journal, Brown's Guide, Outdoors in Georgia and Field and Stream) have run feature articles on recreational opportunities in coastal Georgia.

6. Military Operations

Gray's Reef lies within the western edge of U.S. Navy's Jacksonville Fleet Operating Area W-157 where operations related to national defense training and readiness are conducted (Fig. II-5). Although operational usage of Area W-157 can be heavy and can include surface and aerial gunnery, bombing, torpedo and missile firing, and air, surface ship and submarine maneuvering, few if any of these activities take place in the Sanctuary.

7. Marine Minerals Development

Explorations for oil and natural gas in the South Atlantic started in 1979. To date, no hydrocarbons have been found in the six exploratory wells that have been drilled. There are no oil and gas activities within the vicinity of the Sanctuary nor are there any natural gas or oil pipelines going through the area. The next South Atlantic Lease Sale (#78), scheduled for January 1984, covers an area of eighty-two million acres from Virginia to Florida, and extending from 3 miles offshore to as much as 230 miles out. Although some blocks lie on the continental shelf, most of them are in deep water on the continental slope or on the Blake Plateau (Fig. II-6). Gray's Reef is not in the area identified for Lease Sale #78 (DOI, 1982).

Sand is the only mineral currently mined commercially in Georgia's coastal region. Sand is mined along major tributaries for use as construction and fill material. Along the coast and immediately offshore, phosphate has a strong potential for economic development. Deposits are thought to be abundant, especially off Savannah (Georgia Department of Natural Resources, 1975). No investigations have been made in the Gray's Reef area.

8. Commercial Shipping

According to the U.S. Coast Guard, the Brunswick Pilots Association and recent sanctuary overflight surveys conducted by Georgia Department of Natural Resources (see Appendix C), there is little commercial shipping through or near the Sanctuary. As a general rule, most ship traffic servicing South Atlantic ports is found 8 to 33 miles east of Gray's Reef. Those vessels traveling north "ride" the Gulf Stream while those traveling south remain shoreward of the current.

9. Ocean Dumping and Dredge Disposal

There are currently no active dumpsites in or around Gray's Reef, nor are any being contemplated for the near future.

FIGURE II-5

LOCATION OF GRAY'S REEF NATIONAL MARINE SANCTUARY
RELATIVE TO U. S. NAVAL FLEET OPERATING AREAS

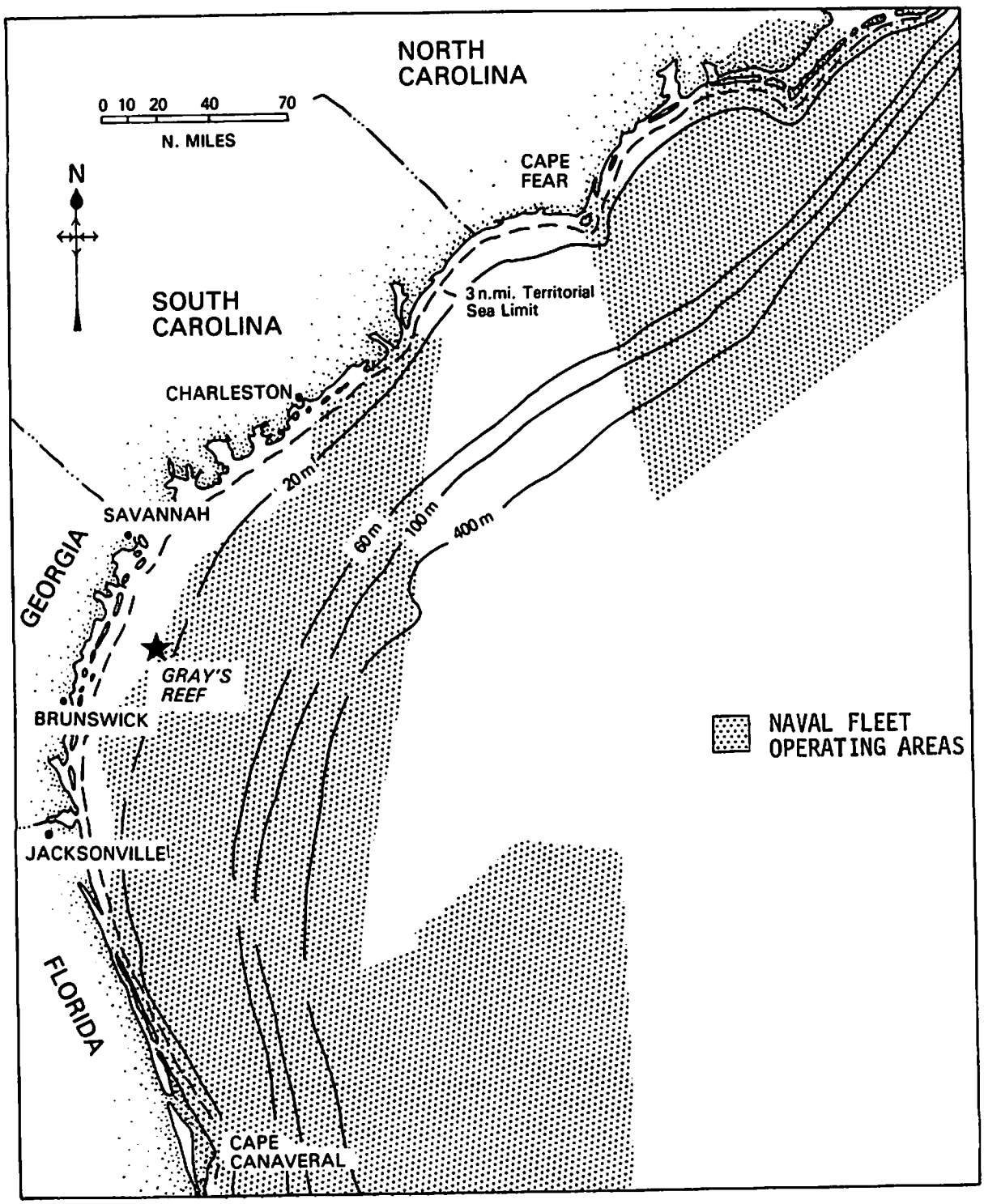
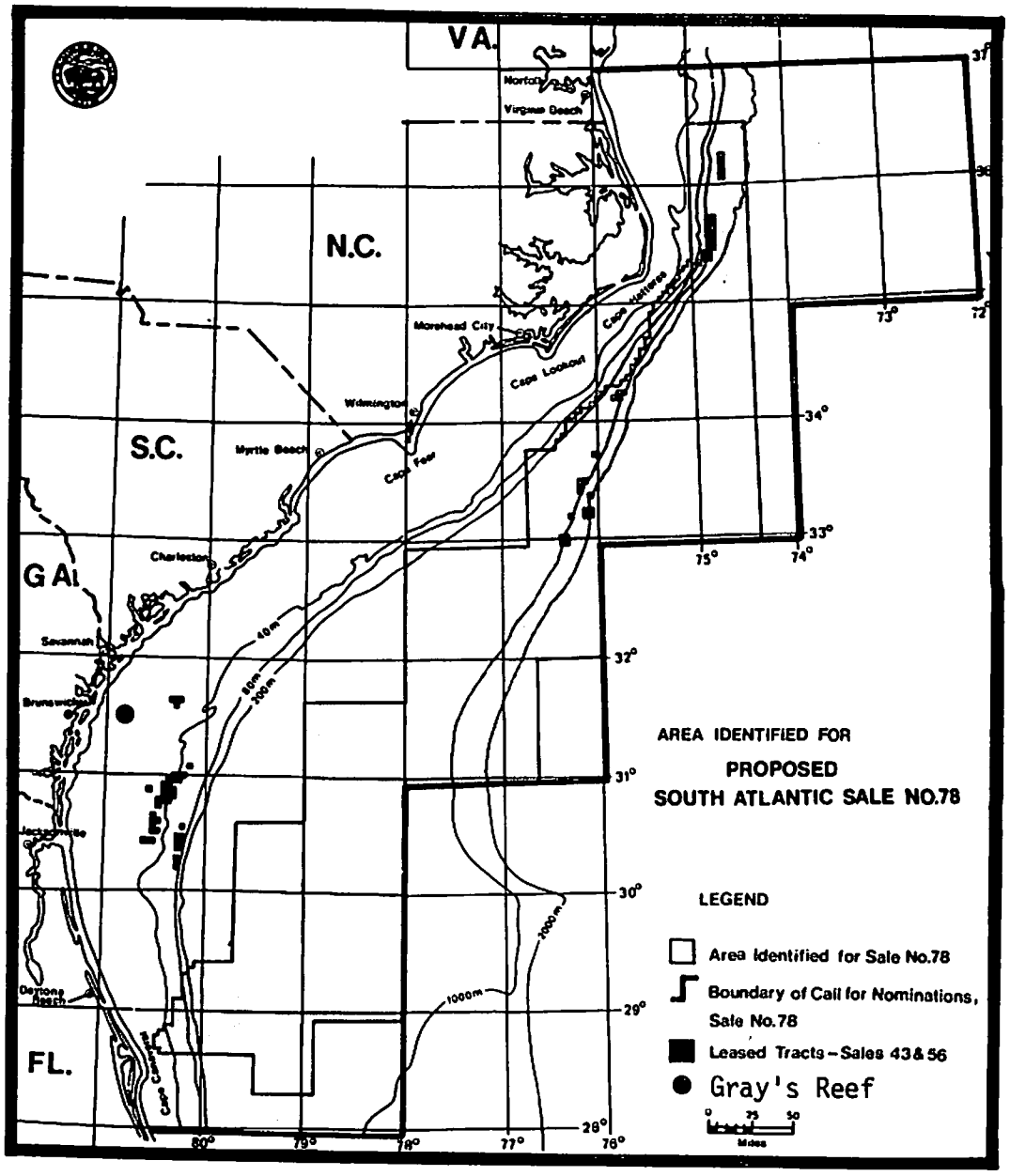


FIGURE II-6

LOCATION OF GRAY'S REEF NATIONAL MARINE SANCTUARY
RELATIVE TO PROPOSED SALE AREA FOR SOUTH ATLANTIC OCS SALE NO. 78
(FROM DOI, 1982)



III. MANAGEMENT STRATEGIES -- GOALS AND OBJECTIVES

This section describes the role that Gray's Reef National Marine Sanctuary will play and the general nature of the programs to be implemented. Sanctuary goals, objectives and management philosophy establish guidelines within which detailed programs for resource protection, research, interpretation, recreation and administration are developed.

Sanctuary goals are long-term and somewhat open-ended, focusing on desired conditions rather than specific actions. Goals are based on an analysis of background information and issues are developed in accordance with the goals, policies and aspirations of the national program. Management objectives are short-term, measurable steps taken toward fulfilling the goals. Specific management strategies and programs are the actions taken toward fulfilling the reasons for sanctuary designation.

Goals and objectives for Gray's Reef National Marine Sanctuary are listed below with a brief discussion of the information on which they are based.

Goal 1

Maintain and enhance protection of the marine environment of the Gray's Reef National Marine Sanctuary.

The Sanctuary provides habitat for a wide variety of marine plant, invertebrate and fish species including tropicals which are naturally rare in the area. It also serves as refuge for sea turtles. Sanctuary designation provides an unique opportunity to insure long-term protection for a significant national resource. The following objectives address this goal.

Objectives

a. Implement a comprehensive Resource Protection Plan tailored to sanctuary resources and uses that provides directions for resource management and protection.

b. Maintain an on-site management capability that stays informed of resource conditions and human activities over time and recommends action if problems arise.

c. Maintain the surveillance and enforcement presence needed to ensure compliance with sanctuary regulations and adequate protection of sanctuary resources.

d. Inform the public on the sensitive nature of the sanctuary resources, the purpose of sanctuary designation and the need for sanctuary regulations.

e. Establish mechanisms to foster coordination and collaboration among federal and state resource management agencies on resource protection issues.

f. Review the effectiveness of the Resource Protection Plan, activities, resource monitoring programs and public awareness programs (i.e., interpretive programs) and initiate changes as necessary.

Goal 2

Promote and coordinate research to enhance scientific understanding of the sanctuary environment and improve management decisionmaking.

Live bottoms are unique ecotypes supporting resources of ecological, recreational, commercial and esthetic importance, yet because of their recent discovery and only limited scientific attention, our understanding of these areas is poor. A comprehensive and coordinated research program is needed to promote studies that will provide information on how a live bottom system functions and help answer management questions when they arise. Management objectives addressing this goal are presented below.

Objectives

a. Implement a comprehensive Resource Studies Plan based on existing knowledge of live bottom ecosystems and evolving management issues.

b. Encourage and support research and resource monitoring projects which are compatible with other activities in the Sanctuary and which provide maximum information about the ecosystem with minimum disturbance of its components.

c. Collaborate with other organizations to enhance opportunities for research related to live bottom ecosystems and resource management.

d. Establish mechanisms for using information gained through scientific investigation in management decisionmaking and in interpretive and recreational programs.

e. Provide a means for information exchange between sanctuary managers, scientific investigators, and the general public.

f. Review the effectiveness of the Resource Studies Plan on an annual basis and initiate changes as necessary.

Goal 3

Enhance public awareness, understanding, and wise use of the Sanctuary.

Relatively few people are familiar with live bottom ecosystems, and even fewer know that Gray's Reef has been designated as a national marine

sanctuary. Although live bottoms are known locally for their importance as fish havens, there is little widespread knowledge of their ecological significance or their sensitivity to environmental disturbance. This is not surprising in view of the fact that little has been written or broadcast about them; live bottoms were not described in the scientific literature until 1969 (Struhsaker, 1969). Articles in national magazines, exercises in educational textbooks and nature films in circulation feature tropical coral reefs and their communities as the only examples of reef environments. Through a variety of interpretive and recreational programs, Gray's Reef National Marine Sanctuary provides unique opportunities to introduce live bottoms to the general public, describe their values and vulnerabilities and encourage caution concerning their use. The objectives outlined below address this goal.

Objectives

a. Develop a comprehensive Interpretation and Recreation Plan tailored to sanctuary users and extension audiences and sensitive to evolving management issues. Dedicate appropriate facilities and staffing for interpretive and recreational programs.

b. Promote the Sanctuary as a resource for educational, interpretive and recreational use consistent with conservation objectives.

c. Broaden public support for sanctuary programs by providing extension or outreach programs to audiences of diverse interests, ages and skills. Inform the general public about the Sanctuary, its location, its significant resources and the need for management and protection.

d. Provide a means for information exchange and public comment on the effectiveness of sanctuary interpretive and recreational programs.

e. Collaborate with other organizations to enhance opportunities for interpretation and recreation related to live bottom habitats.

f. Review the effectiveness of the Interpretation and Recreation Plan on an annual basis and initiate changes as necessary.

Goal 4

Provide for multiple compatible use of the Sanctuary.

Gray's Reef attracts a variety of uses, including fishing, diving, research and education. The Sanctuary was designated as a means to foster compatible uses of the area and to balance this use with resource conservation. Underlying this goal is an objective to maintain the outstanding natural quality of the environment for the benefit of future generations. The objectives outlined below address this goal.

Objectives

a. Implement a comprehensive Sanctuary Administration Plan to coordinate activities related to the Sanctuary.

b. Identify the roles and responsibilities of parties involved in sanctuary administration and specify procedures for implementing essential components of the management plan.

c. Encourage safe and enjoyable use of the Sanctuary compatible with other sanctuary objectives. Encourage compatible use of live bottom areas both within and outside of the sanctuary area.

d. Establish a means to monitor sanctuary use and resource quality over time to minimize potential user conflicts and environmental degradation.

e. Collaborate with other public and private organizations to promote communication and cooperation between sanctuary management and various sanctuary user groups.

f. Review the effectiveness of the Sanctuary Administration Plan on an annual basis and initiate changes as necessary.

IV. RESOURCE PROTECTION PLAN

One of the principal reasons for designating Gray's Reef National Marine Sanctuary is to maintain and enhance protection of the live bottom environment (Sanctuary Goal 1). No one management strategy alone can fulfill the resource protection needs of the Sanctuary; instead, a comprehensive, multiple-agency approach is needed. The recommended approach is presented below.

A. Activities and Statutes of Other Authorities

The designation of Gray's Reef National Marine Sanctuary does not affect programs or activities of other authorities in the Sanctuary except to the extent that they purport to authorize activities specifically prohibited by sanctuary regulations. Activities and programs of other authorities are described in Section II of this management plan as well as in the Gray's Reef National Marine Sanctuary Final Environmental Impact Statement (OCZM, 1980). A listing of applicable statutes and regulations in the sanctuary area is presented in Table IV-1.

All activities in the Sanctuary are monitored, including activities subject to other authorities, to: (1) ensure that all activities are consistent with sanctuary purposes; (2) determine activity impacts; and (3) ensure that existing resource protection measures are adequately fulfilling their purposes. If monitoring efforts indicate that an existing or proposed activity is inconsistent with sanctuary purposes or that an existing regulation is not adequately protecting the resources, NOAA will consider other options to ensure resource protection.

B. Agency Communication and Coordination

NOAA consults and communicates with federal, state and local government agencies as well as public, private and international organizations concerning the protection and management of marine resources. NOAA has entered into cooperative agreements with other agencies to improve administration of respective programs (see Section VII) and enforcement of regulations that affect the Sanctuary (see D below). NOAA comments on major federal marine-related actions and accompanying environmental impact statements as to their effect on the sanctuary environment. In addition, NOAA maintains on-site management and surveillance capabilities to monitor resource conditions and activities in the sanctuary and to recommend action if problems arise (see Section VII).

NOAA's Sanctuary Programs Division maintains Memoranda of Understanding with the South Atlantic Fishery Management Council (SAFMC) and the Gulf of Mexico Fishery Management Council (GMFMC) for the exchange of information and advice concerning fishery resources and management issues in their respective areas of jurisdiction. Gray's Reef is located in the SAFMC's geographic area of jurisdiction; however, several fishery management plans prepared jointly by the Councils are applicable to the sanctuary area (see Section IV.C. below).

TABLE IV-1

STATUTES APPLICABLE TO GRAY'S REEF NATIONAL MARINE SANCTUARY

Abandoned Property Act (40 U.S.C. §310)

Antiquities Act (16 U.S.C. §143 et. seq.)

Black Bass Act (16 U.S.C. §851-856)

Clean Water Act (33 U.S.C. §1251 et. seq.)

Fish and Wildlife Coordination Act (16 U.S.C. §1531 et. seq.)

Fishery Conservation and Management Act (16 U.S.C. §1801 et. seq.)

Intervention on the High Seas Act (33 U.S.C. §1471 et. seq.)

Lacey Act (Part A Transportation of Wildlife taken in Violation of State National or Foreign Laws)(18 U.S.C. §43-44)

Marine Mammal Protection Act (16 U.S.C. §1361 et. seq.)

Marine Protection Research and Sanctuaries Act (33 U.S.C. §1401 et. seq.)

National Historic Preservation Act (16 U.S.C. §470 et. seq.)

Oil Pollution Act (33 U.S.C. §1001 et. seq.)

Outer Continental Shelf and Lands Act (43 U.S.C. §1331 et. seq.)

Ports and Waterways Safety Act (33 U.S.C. §1221)

C. Sanctuary Regulations

Specific sanctuary regulations were promulgated at designation to insure long-term resource protection (see Appendix A). The determination of which activities to regulate and the type of regulation to impose was based on an assessment of environmental consequences of existing and potential activities affecting the sanctuary resources (see OCZM, 1980).

Activities that are consistent with sanctuary goals and objectives and do not purport to harm or deplete sanctuary resources or cause major user conflicts are monitored in the Sanctuary but are not regulated. Activities in this category include recreational boating, anchoring, hook-and-line fishing, recreational diving, underwater photography, nature observation, and spearfishing. If any activity is determined to have an adverse effect on the sanctuary environment, NOAA will consider alternative methods to remedy the problem.

Under the Fisheries Conservation and Management Act, several fishery management plans have been prepared that will have some bearing upon fisheries and fishing activities in the Sanctuary when they are final and implemented. These include fishery management plans for coastal migratory pelagic fishes (mackerel) (GMFMC & SAFMC, 1981), fishes in the snapper-grouper complex (SAFMC, 1982), coral and coral reef resources (GMFMC & SAFMC, 1982), and spiny lobsters (GMFMC & SAFMC). NOAA will rely upon management measures and regulations implemented pursuant to these plans to aid in protection of fisheries resources in the Sanctuary.

Through environmental impact assessment, it was determined that the following activities should be prohibited by sanctuary regulation to prevent visual and biological degradation of the sanctuary environment:

- Alteration of or construction on the seabed;
- Use of bottom trawls, specimen dredges or similar vessel-towed bottom sampling and fishing devices;
- Use of wire fish traps, poisons, electric charges, explosives or similar methods to take any marine animal or plant;
- Taking or damaging any bottom formation, marine invertebrate, marine plant, or tropical fish;
- Depositing or discharging any polluting material, except fish or fish parts, bait, chumming material, vessel cooling water, and effluent from approved sanitation devices; and
- Removing or damaging historic or cultural resources.

The rules and regulations that address these activities are presented in Appendix A (see 15 CFR Part 938, 46 FR 7942, January 26, 1981). The effectiveness of these regulations will be reviewed on an annual basis and will result in recommendations on existing or new regulations. This review

will include summaries of enforcement activities, results from monitoring activities and public response to regulations (see Section VIII, Management Plan Review).

Under special circumstances, where a prohibited activity is related to research or education needed to better understand the santuary environment or improve management decisionmaking or is necessary for salvage or recovery work, and where the activity is judged not to cause long-term or irreparable harm to the resources, a NOAA Permit may be granted to conduct the otherwise prohibited activity. Sanctuary permit criteria are specified in the regulations, and guidelines for permit application and evaluation are described in Appendix E.

D. Surveillance and Enforcement Activities

NOAA is responsible for seeing that sanctuary regulations are publicized and that sanctuary boundaries are adequately represented on nautical charts and through notices to mariners. NOAA has entered into a cooperative arrangement with the U.S. Coast Guard to enforce sanctuary regulations as part of routine surveillance activities. The Coast Guard makes occasional air and surface patrols in the sanctuary area on an operations permitting basis which is determined by the availability of resources at the time, generally "several days" per month. If the Coast Guard receives information of specific violations, every effort is made to dispatch a unit to the scene (USCG, 1981). The Coast Guard has established an informal agreement with NOAA's General Counsel, St. Petersburg, Florida, to issue citations for sanctuary regulation violation from aircraft as well as from surface patrols.

E. Sanctuary Regulation Violation Procedures

Violators of sanctuary regulations are subject to civil penalties of up to $50,000 under public law. They are to be notified of the alleged violation at the scene by the U.S. Coast Guard and are issued a Coast Guard Report of Boarding (CG Form 4100). In accordance with Coast Guard procedures, no further action against the violator will normally be taken at the time of the citation. Copies of the Report of Boarding are distributed to: (1) Violator (original); (2) NOAA Southeast Regional Office of General Counsel (GC), St. Petersburg, Florida; and (3) NOAA Sanctuary Programs Division. All relevant information is evaluated for sufficiency of the evidence and severity of the offense. A Notice of Violation specifying the precise violation involved and the proposed penalty is drawn up by the NOAA GC in St. Petersburg and sent to the violator for appropriate action.

F. Role of Research and Monitoring in Resource Protection

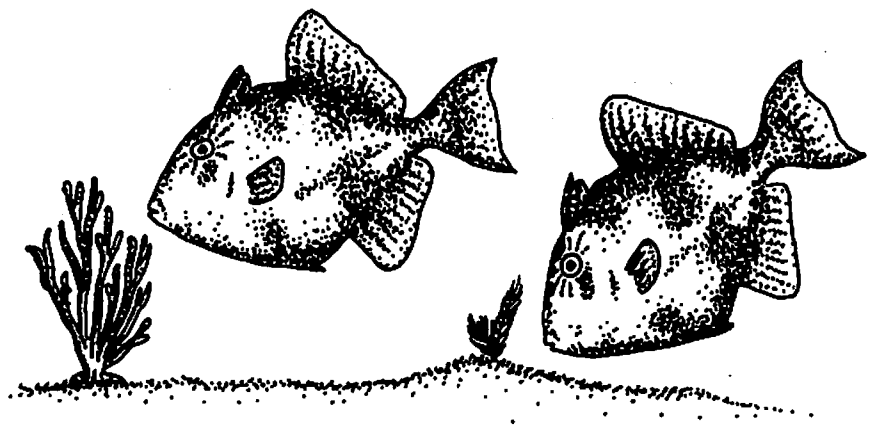
Research in areas subject to little or no human disturbance provides clues to understanding the structure and function of natural systems; long term monitoring of selected parameters in these same areas reveals information on changes or patterns of natural events. Coupled with studies on patterns and levels of human activities in selected areas and the response of the environment to these activities, research and monitoring provide

answers to resource management questions and thus play essential roles in resource protection.

Research and monitoring programs for the Sanctuary are directed toward fulfilling management objectives. In many cases, because so little is already known about sanctuary resources, initial studies will include baseline inventory components; however, based on resource information that is already available from previous or ongoing studies, it will be possible to initiate a modest resource monitoring program. Details of this program will be worked out during the early part of Phase 1 (see Section V, Resource Studies Plan). Once the program is in place, changes can be made as necessary to direct efforts toward specific management problems. In addition, emergency response procedures will be established in the event that an emergency threatens sanctuary resources.

G. Role of Interpretation in Resource Protection

Resource protection measures are only effective if people know about them, understand their purpose and willingly comply with them. In an effort to encourage compliance with sanctuary regulations, interpretive programs will be designed to enhance public understanding of the sanctuary environment and an appreciation for the need for resource protection. Interpretive programs also will provide opportunities for public feedback on sanctuary programs and a means to alert resource managers to evolving management issues. Public comment on sanctuary regulations, for example, will be one strategy used to evaluate their effectiveness (see Section VIII, Management Plan Review).



V. RESOURCE STUDIES PLAN

Gray's Reef National Marine Sanctuary provides opportunities to learn more about live bottom ecosystems and to improve management decisionmaking on issues related to them (Sanctuary Goal 2). The purpose of the Resource Studies Plan is to insure that this goal is achieved in a coordinated and structured fashion. The plan identifies the type of resource information that is needed to assess and manage the Sanctuary and proposes various approaches to acquire this information. The research proposed for the Sanctuary not only serves Gray's Reef, but also forms the basic data for answering a wide range of questions concerning South Atlantic live bottom habitats and their communities.

A. Overview

The Resource Studies Plan encompasses a broad spectrum of disciplines which provide a comprehensive approach to managing the Sanctuary. Five major areas of study have been identified: Data and Information Management (DIM); Geology (GEO); Oceanography (OCY); Ecology (ECO); and Special Projects and Studies (SPS). The fifth area of study (SPS) includes various projects that are of importance to the completeness of the plan but which cannot be adequately categorized under the other four components. Under each major area of study are several study topics (see Table V-1). Each topic is given an identification number (ID#) to facilitate review, comment and reference. Numbering, however, does not indicate priority ranking.

The major areas of study for the most part are interrelated. For example, models developed to describe the live bottom ecosystem require significant input from studies in geology, oceanography and ecology. Data and information management provides a central processing and analysis system into which all other study areas feed and from which information is readily available to potential users.

Resource information needs are discussed in the main text of the plan under each major area of study. Identification of priority studies for Phase 1 of this plan (i.e., 5 years) follows each discussion. Studies recently completed or in progress are listed on Table V-2 and described in Appendix C. Additional studies will be considered at later dates, or sooner if funding in addition to that required for priority studies becomes available or if their status changes following annual review. Selection and scheduling of priority projects during Phase 1 follows procedures summarized at the end of this section and described in more detail in Section VII and Appendix D.

B. Information Needs and Recommended Action For Phase 1

1. RESOURCE DATA AND INFORMATION MANAGEMENT (DIM)

DIM-1 Comprehensive Sanctuary Resource Data Base

The need for a comprehensive resource data base for live bottom areas has been established (Henry, 1981; Appendix B). Existing information is scattered; it is largely unpublished, retained by investigators and dif-

TABLE V-1

MAJOR AREAS OF STUDY FOR GRAY'S REEF NATIONAL MARINE SANCTUARY

DATA AND INFORMATION MANAGEMENT

- DIM-1 Comprehensive Sanctuary Resource Data Base
- DIM-2 Information Management System
- DIM-3 Systematics Collections from Gray's Reef

GEOLOGY

- GEO-1 Hydrography
- GEO-2 Geomorphology
- GEO-3 Sediment Dynamics
- GEO-4 Sedimentation
- GEO-5 Geology and Origin of South Atlantic Live Bottom Reefs

OCEANOGRAPHY

- OCY-1 Weather and Sea Conditions Monitoring
- OCY-2 Water Circulation
- OCY-3 Water Quality

ECOLOGY

- ECO-1 Biological Inventory and Community Maps
- ECO-2 Resource Monitoring
- ECO-3 Selected Studies on Seaweeds at Gray's Reef
- ECO-4 Selected Studies on Invertebrates at Gray's Reef
- ECO-5 Selected Studies on Fishes at Gray's Reef
- ECO-6 Selected Studies on Plankton at Gray's Reef
- ECO-7 Selected Studies on Sea Turtles at Gray's Reef
- ECO-8 Dynamics and Variability of Live Bottom Ecosystems

SPECIAL PROJECTS AND STUDIES

- SPS-1 Census of Sanctuary Users
- SPS-2 Environmental Impacts of Selected Activities in Live Bottom Areas
- SPS-3 Field Guides to Selected Taxa at Gray's Reef
- SPS-4 Cultural and Historic Resource Surveys

ficult to locate without specialized knowledge. Much of the available information should be compiled into a central repository where it would be easily accessible to potential users and continuously updated as new information was acquired. The repository could contain scientific as well as public education materials, including numerical and descriptive data, voucher specimens, slides, video films and other photographic media, reprints from the scientific and popular press and unpublished reports. Also included could be references to pertinent management and scientific research from other reef areas, general information about the national marine sanctuary program and information about other marine resource management programs.

Action: Compile, annotate and update over time a current and historical bibliography of published and unpublished information on live bottom ecosystems. Establish a repository to house this information.

DIM-2 Information Management System

Research and resource monitoring programs are certain to produce a large amount of varied and important information. It is critical from the onset that a comprehensive information management system be in place to process, store and make available for speedy and efficient handling the variety of information generated. A system designed for the Sanctuary should be able to provide the following services: (1) input, analysis, storage and output of data collected in the Sanctuary and selective data from other live bottom areas; (2) reference retrieval; (3) word processing and graphics production for report preparation; and (4) communication with other computers in the national marine sanctuary system. The system should insure timely availability and smooth flow of information to potential users.

Action: Design and implement an information management system to incorporate information generated by DIM-1, proposed and ongoing projects and administrative activities. Establish a mechanism to make information available to potential users.

DIM-3 Systematics Collections from Gray's Reef

Representatives of major plant, invertebrate and fish taxa have been collected at Gray's Reef in conjunction with past and present research efforts. For the most part, collections are scattered and not easily accessible for use as voucher specimens for research. This is of particular significance since further collection of sanctuary resources is prohibited by sanctuary regulations, except in special cases where limited collection is essential for identification purposes and specimens cannot be found outside of the Sanctuary. A project should be undertaken to locate existing collections, designate permanent repositories to house them and any additional specimens collected in the Sanctuary (also see DIM-1) and curate them using standard methods. A loan system should be devised to make specimens available for study by researchers, students and the interested public.

TABLE V-2

GRAY'S REEF NATIONAL MARINE SANCTUARY RESOURCE STUDIES
IN PROGRESS OR RECENTLY COMPLETED

GEOLOGY

GEO-1	Reconnaissance Hydrographic Survey of Gray's Reef National Marine Sanctuary

ECOLOGY

ECO-2	Assessment of Contemporary Visual Fish Censusing Techniques in Live Bottom Areas
ECO-4	Determination of Faunal Communities Associated with Selected Sponges and Octocorals.

SPECIAL PROJECTS AND STUDIES

SPS-1	Gray's Reef National Marine Sanctuary Visitation Study
SPS-2	Assessment of Roller-Rigged Trawl Impacts on Bunthic Habitats
SPS-3	A Field Guide to the Fishes in the Vicinity of Gray's Reef National Marine Sanctuary, Georgia

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Note: See Appendix C for details on these studies.

A project to curate systematics collection of fishes from the vicinity of Gray's Reef is in progress (see Appendix C).

Action: Complete a systematics collection of fishes from Gray's Reef. Provide curatorial services.

Locate and catalogue existing systematics collections from the vicinity of Gray's Reef. Identify missing information. Design a loan system.

2. GEOLOGY (GEO)

GEO-1 Hydrography

Henry and van Sant (1982) conducted a reconnaissance hydrographic survey of Gray's Reef using high resolution bathymetric, topographic, photographic, and sub-bottom profiling systems. The findings documented the occurrence and distribution of live bottom and pertinent biological features and conditions in an 80 square nautical mile area. The results support earlier works (Hunt, 1974) and confirm that 95% of live bottom encountered in the survey area is located in the Sanctuary.

The results of the reconnaissance survey are to be used to design a more indepth survey. Detailed and accurately located baseline maps showing rock outcrop location and distribution and possibly indicating outcrop dimensions, relief, profile, and orientation are needed for support in other research and monitoring projects. It is possible that biological maps (ECO-1) showing biotic zonation in relation to geological features could be built upon the results of this proposed effort.

Action: Design and conduct an indepth hydrographic survey to produce detailed maps suitable for use by researchers, resource managers and sanctuary visitors.

GEO-2 Geomorphology

Hunt (1974), Continental Shelf Associates (1979), South Carolina Marine Resource Research Institute and the Georgia Department of Natural Resources (1981) and Riggs, Hine and Snyder (1981) have studied, though to a limited degree, the geomorphology of selected hardgrounds on the South Atlantic Continental Shelf. Investigators in South Florida and the Caribbean have looked at the relationship between habitat complexity and community development (Risk, 1972; Talbot and Goldman, 1972; Dahl, 1973; and Luckhurst and Luckhurst, 1978. Hunt (1974) provided an initial study of live bottom geomorphology in the Sanctuary in his analysis of sedimentary rock color, structural stratigraphy, induration, surface features, and structural consituents. Additional studies are needed to further define the rock types comprising the outcrops and to determine their shear strength and fragility. The latter study would provide data for interpreting the impact of anchoring on outcrops. An analysis of habitat complexity and associated biological communities (ECO-1) would provide a more composite picture of the habitat.

Action: Studies will be recommended following analysis of findings from GEO-1.

GEO-3 Sediment Dynamics

Observations in the Sanctuary and at other live bottoms in the Georgia Bight suggest that a measurable degree of sand transport occurs along the ocean bottom seasonally. Geological records suggest that sand movement alternately covers and exposes rock outcrops, perhaps in a cyclic pattern (Henry and Giles, 1979). The effects of sand movement on live bottom habitats and their communities is unknown, yet it may affect such things as community structure, ecological succession, biological productivity and evolution. A better understanding of the dynamics of sand movement is needed. Objectives of studies addressing this subject should include determining aspects of the source and transport of sand, erosion and deposition rates of sedimentary materials, and effect of sand movement on live bottom habitat and communities.

Action: Studies will be recommended following analysis of findings from GEO-1.

GEO-4 Sedimentation

The rate that suspended particulate matter settles out of the water column onto the live bottom is suspected to be low. Some baseline measurements should be taken to provide background information in the event that development activities such as minerals mining or dredge material disposal occur near the Sanctuary and change the status quo. Information on sedimentation rates would be applicable to GEO-3, water circulation (OCY-2) and water quality (OCY-3) studies, plankton studies (ECO-3) and live bottom community metabloism studies (ECO-7).

Action: Studies will be recommended following analysis of findings from GEO-1.

GEO-5 Geology and Origin of South Atlantic Live Bottom Reefs

Several investigators have explored the geological history of the South Atlantic Continental Shelf (Pilkey and Giles, 1965; Uchupi, 1968; Hunt, 1974; Henry and Giles, 1978). Geological records indicate that prominent bottom features -- sand swells, submerged terraces, river valleys and hard bottom outcrops -- were formed many thousands of years ago during lower stands of sea level. It is proposed that Gray's Reef was formed in a shallow, possibly sheltered marine environment (Hunt, 1974). Further investigations on the age, origin and composition of Gray's Reef should be considered. Similar investigations in coastal areas and outer shelf locations for comparison to Gray's Reef would also provide excellent subjects for study.

Action: Studies will be recommended following analysis of findings from GEO-1.

3. OCEANOGRAPHY (OCY)

OCY-1 Weather and Sea Conditions Monitoring

There are currently no observation programs to provide accurate or timely information on weather and sea conditions in the Sanctuary or surrounding areas. Very limited data are available from distant monitoring stations and from on-site and regional oceanographic studies programs. During portions of the year, Navigational Light Towers off Savannah, GA, Charleston, SC, and Jacksonville, FL, monitor wind, ocean currents, ocean temperature, salinity and turbidity. These data are only remotely applicable to the Gray's Reef area due to distance from source (at least 40 km away) and differences in microclimate. Moreover, the availability of these data for sanctuary user groups is limited by lack of weather reporting stations in the vicinity and poor weather radio reception from the closest stations (i.e., Savannah and Jacksonville).

The objective of this study would be provide a means for obtaining and disseminating timely and accurate data on meteorological and oceanographic conditions in the Sanctuary and surrounding area. Some of the parameters which could be studied include: meteorological conditions (e.g., temperature, barametric pressure, humidity, illumination, cloud cover and wind speed and direction); sea surface state and wave conditions (e.g., wave height, appearance, length, period and velocity, wave pattern and shape and storm surge); water temperature and salinity; water circulation (see OCY-2); light transmission; transmissiometry; and sound. Measurements could be made with on-site recording instruments retrieved periodically or with more permanent facilities which provide a continuous outflow of real-time data, such as weather buoys.

Action: Identify essential weather and sea condition information that is currently lacking and assess alternative methods of acquiring the information. Investigate the feasibility of stationing at Gray's Reef a NOAA weather buoy or other recording and transmitting instrumentation.

OCY-2 Water Circulation

The state of knowledge of water circulation patterns in the South Atlantic Bight is probably adequate enough to describe general patterns in the Sanctuary. However, more detailed information is needed to understand the effects of small-scale events in the sanctuary area, such as outwellings from the coast, indrafts of the Gulf Stream, seasonal fluctuations in wind- and wave-induced currents, and topography-mediated events (e.g., upwellings, eddies and gyres). Information on these events is important to studies on population dynamics (e.g., dispersal, retention and recruitment of larvae), community metabolism, water quality and nutrient cycles, and sedimentation.

It may be possible to determine flow structure in and around the Sanctuary with only a few monitoring devices since non-tidal current in this mid-shelf region of the Georgia Bight is primarily wind-driven and the alongshore coherence is about 100 miles, which includes the sanctuary

area. On and offsite monitoring devices and satellite information may be utilized. Submersible current meters and tide gauges are presently being used at Key Largo National Marine Sanctuary; some may be available for use in other national marine sanctuaries in late 1984.

Action: Investigate the feasibility of deploying NOAA submersible current meters at Gray's Reef. Identify potential information gains and uses for this information.

OCY-3 Water Quality

Effective management of the Sanctuary depends in part on the ability to monitor resource conditions and to predict changes and associated impacts. Yet, field data on water quality in the Sanctuary are currently lacking, and information on ecological requirements of live bottom organisms and their response changes in required conditions is limited. Many tropical organisms are at the northern limit of their geographical range and may not tolerate even subtle changes. Porter (pers. comm.) suggests that corals at Gray's Reef are living fairly close to the lower limits of temperature and light tolerance.

Long-term objectives of this study would be to (1) design and implement a program to monitor selected parameters, such as temperature, salinity, PH, nitrate, nitrite ammonia, phosphate, chlorophylls and possibly pesticides, hydrocarbons, and heavy metals, (2) design a study to analyze community metabolism and nutrient flux in the live bottom system, and (3) incorporate evolving information into a predictive model (also see ECO-8). Efforts should use state of the art equipment which avoids labor intensive methods.

Action: Conduct a water quality feasibility study.

4. ECOLOGY (ECO)

ECO-1 Biological Inventory and Community Maps

Research efforts have only begun to accumulate the data needed to understand the structure and function of live bottom ecosystems. The relationship between living marine resources and geological features has not been fully ascertained. Additional baseline and group specific investigations are needed to describe biological communities and to document their occurrence in space and time. Detailed biological community maps built on hydrographic maps (GEO-1) and in conjunction with studies on reef geomorphology (GEO-2) will be useful in future research and resource monitoring endeavors.

Action: Verify existing species lists. Recommend additional studies during the design phase of GEO-1. If feasibile, conduct baseline mapping during GEO-1.

ECO-2 Resource Monitoring

In addition to monitoring ambient oceanographic conditions in the Sanctuary (OCY-1, OCY-2 and OCY-3), a monitoring program directed at living marine resources is also needed. Monitored resources should include those that are representative of the ecosystem and those that are most likely to indicate changes in the environment at an early state of change. Whereas data concerning live bottom ecosystems are incomplete, there should be sufficient information available to identify "indicator" species (at least initially), and to establish a reasonable monitoring program. If necessary, changes in the program could be made as more information about the system becomes available.

Monitoring programs are currently being conducted in other national marine sanctuaries (i.e., at the Channel Islands, Key Largo, and Looe Key) and in national parks and monuments (i.e., Biscayne, Everglades, Dry Tortugas, Buck Island and the Virgin Islands). Studies in progress may provide guidance for developing a monitoring program for Gray's Reef.

Action: Complete an assessment of various visual techniques for monitoring fishes at Gray's Reef (see Appendix C).

Identify indicator species and appropriate monitoring techniques. Implement a resource monitoring program coordinated with a census of sanctuary users (see SPS-1).

ECO-3 Selected Studies on Seaweeds at Gray's Reef

The ecological importance of benthic marine algae to live bottom ecosystems has not been ascertained. Recent investigations off the Carolinas and northeastern Florida have discovered suitable hardbottom to support seaweeds. Studies off Georgia are more limited. Continental Shelf Associates (1979) collected 19 species of seaweeds off Georgia and, in a limited sampling effort at Gray's Reef, Searles (1981) collected 15 species of which there are eight new records for Georgia, two extensions of the southern ranges of distribution and one new species.

Further investigation of plant species composition, abundance and distribution in the Sanctuary is needed. It is possible that selected seaweeds can serve as indicator species for resource monitoring purposes (ECO-2). Studies on community dynamics (e.g., seasonality of reproduction, colonization and metabolism) are needed to determine the role and trophic significance of seaweeds in live bottom systems and to identify species in need of special protection and study (i.e., species with limited reproductive rates and capabilities and/or limited geographic distribution (Richardson, pers. comm.).

Action: Complete the survey and identification of seaweeds from Gray's Reef (Searles, 1981). Recommend selected seaweeds and monitoring techniques for ECO-2.

ECO-4 Selected Studies on Invertebrates at Gray's Reef

Benthic invertebrate communities are an important element in live bottom ecosystems, yet these groups remain largely undescribed. Several studies on invertebrate communities of the South Atlantic Bight are in progress and should supply much invaluable data (see Appendix C); however, it is likely that many questions regarding specific invertebrate assemblages will remain. Areas in which more information is needed include: (1) species identifications and life histories; (2) biologic community mapping (ECO-1); (3) descriptive community studies; (4) trophic relationships, including the roles of predation and competition; (5) population dynamics (e.g., seasonality of reproduction, sources and rates of larval recruitment and requirements for settlement and colonization); (6) community metabolism; (7) endangered, threatened, rare or otherwise special species; and (8) identification of indicator species for resource monitoring purposes (ECO-2).

Action: Complete the study in progress to determine faunal communities associated with selected sponges and octocorals in live bottom areas (see Appendix C).

Recommend selected invertebrates and monitoring techniques for ECO-2.

Recommend additional studies following analysis of studies in progress.

ECO-5 Selected Studies on Fishes at Gray's Reef

Fishes not only constitute an important component of the live bottom communities, but also attract the major attention from sanctuary user groups (i.e., sports fishermen and divers). At the present time, the identification and description of fish species at Gray's Reef remains incomplete, especially among the small, sedentary and cryptic species which may have important ecosystem positions. Studies are needed to assess and monitor harvested and unharvested species, their life histories and their patterns of resource utilization (e.g., partitioning of food and habitat resources). Selected studies include (Note: listing does not indicate priority order):

- General purpose studies to determine the identity, abundance, distribution, seasonality, patterns of resource use and life history of selected fish species which have some degree of association or dependence upon the reef, including infaunal and cryptic species and resident and seasonal tropically-derived species.
- Studies on pelagic fishes associated with Gray's Reef.
- Descriptive reef fish community studies and mapping of fish communities in relation to physical features within the Sanctuary (ECO-1).
- Identification of indicator species and monitoring methods (ECO-2).
- Development of a field guide to the identification of fishes at Gray's Reef (In progress, see SPS-3 and Appendix C).

- A study of reef fish community ecology to examine the roles of competition, predation, and random events in determining community structure.

- An investigation of patterns of reproduction and recruitment of fishes to Gray's Reef to determine sources of fish propagules (i.e., eggs and larvae) and the reef's self-sustaining potential versus a dependence upon distant sources.

- A study of tropic dynamics to determine the feeding ecology of Gray's Reef fishes and the effect of large pelagic predators and fishing effort on the reef associated species (also see SPS-3).

- A study of reef fish species' adaptability to live bottom reefs and susceptibility to stress by examining energy budgets, including daily energy rations, metabolic and growth rates, production estimates, ecological efficiencies, and the effect of changes in environmental parameters on ecological energetics.

Action: Complete year-round observations in progress on the identity, distribution, seasonality and patterns of resource utilization of selected species of resident and tropically derived fishes at Gray's Reef (see SPS-3 and Appendix C). Augment knowledge with studies on infaunal and cryptic species.

Recommend selected fishes and monitoring techniques for ECO-2.

Implement additional studies following analysis of studies in progress.

ECO-6 Selected Studies on Plankton at Gray's Reef

Plankton communities associated with live bottom habitats have not been described. Areas in which information is needed include: (1) species identifications and life histories; (2) distribution in time and space; (3) population dynamics and community relationships; (4) trophic and ecological significance; and (5) identification of "indicator" species.

Action: Identify studies as more information becomes available.

ECO-7 Selected Studies on Sea Turtles at Gray's Reef

The Atlantic loggerhead sea turtle (Caretta caretta) is listed as threatened under the Endangered Species Act of 1973. It is common in Georgia's coastal and offshore waters. Although much is known about the nesting behavior of the loggerhead on Georgia's beaches, little is known about other aspects of its life history. During the last decade, divers have observed loggerhead sea turtles at artificial and natural reefs off Georgia. It is not known what role these reefs play for the sea turtles, but it is suspected that they provide refuge for overwintering, resting and feeding.

Action: Investigate the feasibility of monitoring spatial and temporal movements and activities of Atlantic loggerhead sea turtles associated with natural and artificial reefs off Georgia. Determine the significance of these reefs to sea turtles.

ECO-8 Dynamics and Variability of Live Bottom Ecosystems

The information needs described thus far are directed primarily at the major components of the live bottom ecosystem (i.e., plants, invertebrates, fishes) and their relationship to the surrounding environment (i.e., geological structures and processes, oceanographic conditions). As this information becomes available, it should be synthesized, analyzed and incorporated into a conceptual ecosystems model that describes the dynamics and variability of the live bottom ecosystem. Conceptual ecosystem models graphically describe in words and symbols, rather than numbers, ecological relationships. As management tools, conceptual models help identify information gaps and direct multidisciplined research, and provide the framework for developing mathematical models (Dahl et al, 1974).

Action: Incorporate information on live bottom areas into a conceptual ecosystems model. Use the model to identify information needs and to direct multidisciplined research. Investigate the feasibility of developing a mathematical model to describe live bottom ecosystems.

5. Special Projects and Studies (SPS)

SPS-1 Census of Sanctuary Users

There is much emphasis in this plan on geological, oceanographic and ecological studies that will provide resource information for future management needs. Of equal importance is a comprehensive picture of the magnitude and the spatial and seasonal patterns of sanctuary use. Information on user group activities should be collected using a variety of methods including intercept interviews of boaters at various launch sites, on-site interviews with boaters in the Sanctuary, over-flight surveys (in progress, see Appendix C) and socio-economic questionnaires. The type of information collected on field surveys should include date and time of day, weather and sea conditions, type and estimated size of vessels observed, type of activity engaged in and number of visitors per boat. In addition, interviews and questionaires should obtain various sociological characteristics of the participants (i.e., age, sex, income, education, tourist or resident, single or multi-purpose trip, number of previous trips, distance travelled and cost of trip to launch site, rental cost of gear, boat cost per trip, etc.).

Action: Evaluate existing methods of obtaining information on sanctuary users. Recommend and implement modified strategies as necessary to acquire needed information. Use information to define relationship between sanctuary resource conditions and harvest sectors (ECO-2), to

identify target audiences for interpretive and recreational programs and to better apportion law enforcement personnel.

SPS-2 Environmental Impact of Selected Activities on Live Bottom Habitats and Communities

To date, research at Gray's Reef has been directed largely at natural resources and processes in the Sanctuary. Studies under SPS-1 will ascertain the type and extent of activities occurring in the Sanctuary. For management purposes, it may be necessary to study the effects of exisiting or changed levels of activities on the natural environment. Areas of interest include the impact of anchoring, hook-and-line fishing, spearfishing, and selected research gears. Many activities that are known or suspected to have adverse impact on live bottom areas are prohibited by sanctuary regulations.

Environmental impact assessments often involve manipulative research. It is recommended that potentially damaging studies be conducted outside of the Sanctuary. A study in progress -- environmental impact of roller-rigged trawls in live bottom areas -- is sponsored by NOAA but is being conducted at live bottom locations outside of the Sanctuary for this reason. (see Appendix C).

Action: Complete a study on the environmental impact of roller-rigged trawls in live bottom areas.

Recommend additional studies as needs arise.

SPS-3 Illustrated Field Guides to Selected Taxa at Gray's Reef

Illustrated guidebooks to the major taxonomic groups associated with live bottom reefs are lacking. Most of the guides available for use by fishermen, divers and students are for tropical coral reef organisms and therefore have only minor application to Gray's Reef. Because live bottom areas such as Gray's Reef are rapidly coming under increasing use, information on the marine life that inhabit them is of interest to user groups and is paramount to resource management. For maximum resourcefulness, guidebooks should aid in the identification and classification of selected taxa, describe key aspects of their life history and preferred habitat and provide reference to additional literature on the group. Guidebooks which are concise, well-illustrated and easily understood by both technical and non-technical persons will fill a noticeable void in scientific and popular literature related to live bottom habitats and communities. A guidebook to the fishes in the vicinity of Gray's Reef is in preparation (see Appendix C).

Action: Complete and distribute a field guide to the fishes in the vicinity of Gray's Reef. Evaluate its usefulness.

Identify other taxonomic groups for future possible field guides.

long term, interpretation serves to generate concern for [illegible] resources and promotes a conservation ethic.

CDC A Cultural and Historical Resource Surveys

1. Sanctuary Visitors

Sanctuary visitors are defined as those people who are actually present within the sanctuary at a given time (Dobbin, 1982). Although there is often overlap between categories, sanctuary visitors include:

- Individual sport fishermen (usually coastal residents)
- Organized sport fishing club members (e.g., Golden Isles Sport Fishing Club)
- Charter boat fishermen (often residents of inland Georgia or tourists from outside Georgia)
- Commercial fishermen (infrequent long liners, hook-and-line fishermen and illegal trap fishermen)
- Individual sport divers (usually coastal residents)
- Organized sport diving club members (e.g., Golden Isles Sport Diving Club and Savannah Area Sport Diving Club)
- Charter boat sport divers (local residents and tourists on scheduled dive trips or special charters)
- Research scientists (usually local but also visiting scientists from the South Atlantic region)
- Resource Managers (usually local but also visiting managers from the South Atlantic region)
- Educators with school groups for "hands on" demonstrations (usually from coastal and inland Georgia)
- Interpreters who visit the sanctuary to obtain information for interpretive programs or to lead field trips (usually local)
- Surveillance and enforcement agents (U.S. Coast Guard)
- Transient vessel crew members.

Sanctuary visitors characteristically have specialized interests in the sanctuary environment. They are also the group that is most informed about the resources and the most directly affected by management programs. Better defined profiles on sanctuary visitors are needed to insure that sanctuary programs are geared to the needs and expectations of this group.

2. Extension Audience

Extension audiences include both potential sanctuary visitors and those people who may never visit the Sanctuary. This audience category can be further subdivided into those who are already aware of the sanctuary and have demonstrated an interest in learning more about it and those who are unaware of the sanctuary and may or may not develop an interest in it when they discover that the sanctuary exists. The extension audience represents

very diverse groups and presents a different challenge in interpretive and recreational planning from that experienced with sanctuary visitors. Extension audiences include:

- The general public
- The local community
- Special interest groups (local and national)
- Government agencies

D. The Sanctuary Story

The sanctuary story can be told in many different ways. Selecting the appropriate method depends to a large degree on the needs of the audience that will receive it. Themes or principal story headings are relate to special sanctuary features and key management issues, and messages or storylines are what interpretation attempts to convey. A wide variety of media can be used to convey the messages.

The following are examples of the themes and messages that could be used to tell the story of Gray's Reef.

Theme: Gray's Reef National Marine Sanctuary -- Reasons for Designation

Messages: What is a marine sanctuary? What is its purpose? Why is this site special? What activities take place in a sanctuary? Are there special rules of conduct? How do you avoid conflict between those who want to protect the resource and those who want to use the resource? Are there other marine sanctuaries in the U.S.? In the world?

Theme: Orientation to the Sanctuary

Messages: What is a live bottom? Where is the Sanctuary located? How do you get there? Do I want to go there? What would I expect to see or do? Would I recognize any familiar sights or would it be a brand new experience?

Theme: Sanctuary Research Program

Messages: What type of research is conducted in the Sanctuary? What will these studies tell us? What are the values and vulnerabilities of research?

Theme: Geology and Origin of Gray's Reef

Messages: What is the reef made of? How was it created? When was it created? Were any people around at that time? What types of plants and animals lived there then? What types of climate did they experience? Is Gray's Reef one-of-a-kind or are there other reefs like it? Is the geology static, or are current events changing the appearance of the reef? What factors contribute to this change?

Theme: Live Bottom Reef Communities

Messages: What types of plants and animals are found at the live bottom? Would these organisims be there if the reef did not exist? What factors determine what their occurrence? How are the species distributed on the reef? Does this distribution change by day/night or by season? What sort of feeding relationships exist? How does the food web at Gray's Reef compare to that at tropical coral reefs? What is man's relationship to the live bottom community?

Theme: Sand Bottom Communities

Messages: What plants and animals are found in sand bottom areas. How do they compare or contrast with those found on hard bottom areas? What is the relationship between sand bottom and hard bottom areas?

Theme: Visitor Safety

Messages: What are the potential hazards of a sanctuary visit? How can one enjoy the Sanctuary and avoid endangering oneself? What should be done in an emergency situation?

E. Interpretive and Recreational Facilities and Programs

A variety of facilities and techniques are available for interpreting the sanctuary and for providing recreational services and opportunities. Selection of the type of facilities and programs that are necessary and appropriate to fulfill Sanctuary Goal 3 is based on a consideration of several factors, including interpretive quality, information content, audience benefit, environmental impact, staffing and materials requirements and capital investment. A preliminary analysis has been conducted and the strategies presented below are the result of this analysis. Facilities and programs will be improved, and perhaps expanded, over time

1. On-Site Programs

Unlike shallow coral reefs located close to shore that lend themselves to on-site "hands on" interpretive and recreational activities, such as guided snorkle or scuba tours, glass bottom boat observations, or submerged manned habitats, Gray's Reef is located in the open ocean where weather and sea conditions are highly variable, often hazardous and require specific boat sizes and navigational skills. Access to Gray's Reef is limited by a lack of public ferries, charter boats and party boats in the area, distance from shore (at least 18 nautical miles), travel time requirement for trip (1-3 hours, one way), and capital investment for trip ($35 and up). Opportunities for first hand encounter with sanctuary environment is limited because of the inability to observe the reef from the water's surface and the environmental hazards that necessitate specialized open-ocean diver training and preclude novice divers. These reasons plus vulnerability of the resources to increased user pressure limit opportunities for on-site programs.

2. Off-Site Facilities

The factors listed above create the need for land-based facilities. Several existing facilities in coastal Georgia will be used to present sanctuary programs and exhibits. These are described below. Other local sites, such as area libraries, museums, schools, parks and recreation areas, dive shops and sporting goods centers, as well as facilities in other areas across the State and within the region might be appropriate and will be considered during Phase 1.

° University of Georgia's Marine Resource Center, Skidaway Island, Georgia.

The University of Georgia's Marine Resource Center on Skidaway Island near Savannah, Georgia will serve as the primary site for sanctuary interpretive and recreational programs. It is where visitors can receive information about the sanctuary, where exhibits will be displayed, and where a central repository of publications and visual media will be maintained. Educational materials will be available for inhouse use and for loan to community groups and other educational facilities.

The Center is headquarters for the University's Marine Extension Service, and its main function is as a marine resources educational facility. The Center not only accommodates science class groups, but provides marine educational opportunities for teachers, members of the business and industrial community, State and Federal agencies, and the general public. A variety of methods, techniques, and approaches are used to meet the scholastic level and need of the target audience. These include lectures, short courses, workshops, field trips, and displays (UGA, 1982).

The Center is a 19,000 sq. ft. facility with a 10,000 gallon aquarium containing live specimens in simulated natural habitats. The Center also has educational exhibit areas, seminar and lecture rooms, teaching laboratories, and a dormitory, with a dining room and kitchen (see Fig. VI-1). The research laboratories and marine science library of the Skidaway Institute of Oceanography are adjacent to the Center. The Center's 43-ft SEA DAWG, a fiberglas lobster boat, is used in marine education programs.

° Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia

The Coastal Resources Division (CRD) facilities are located in Brunswick, Georgia, and consist of office space, docks, and a small information/exhibit center. The office of the coordinator for the Gray's Reef National Marine Sanctuary is at the CRD. The CRD center has aquaria containing marine and coastal organisms, a "petting" aquarium, underwater photographs, and mounted finfish and shellfish specimens. Information on the Sanctuary can be acquired at the CRD center. Also available are guides to inshore and offshore fishing, fishing maps, and a "how to" series on various fishing methods. Coastlines Georgia, CRD's bi-monthly publication, contains feature articles on coastal resources and local activities. CRD staff are frequently involved in local fishing tournaments and sponsor a variety of public service oriented programs such as bait-rigging demonstrations, boat safety and SCUBA diving courses, and slide presentations.

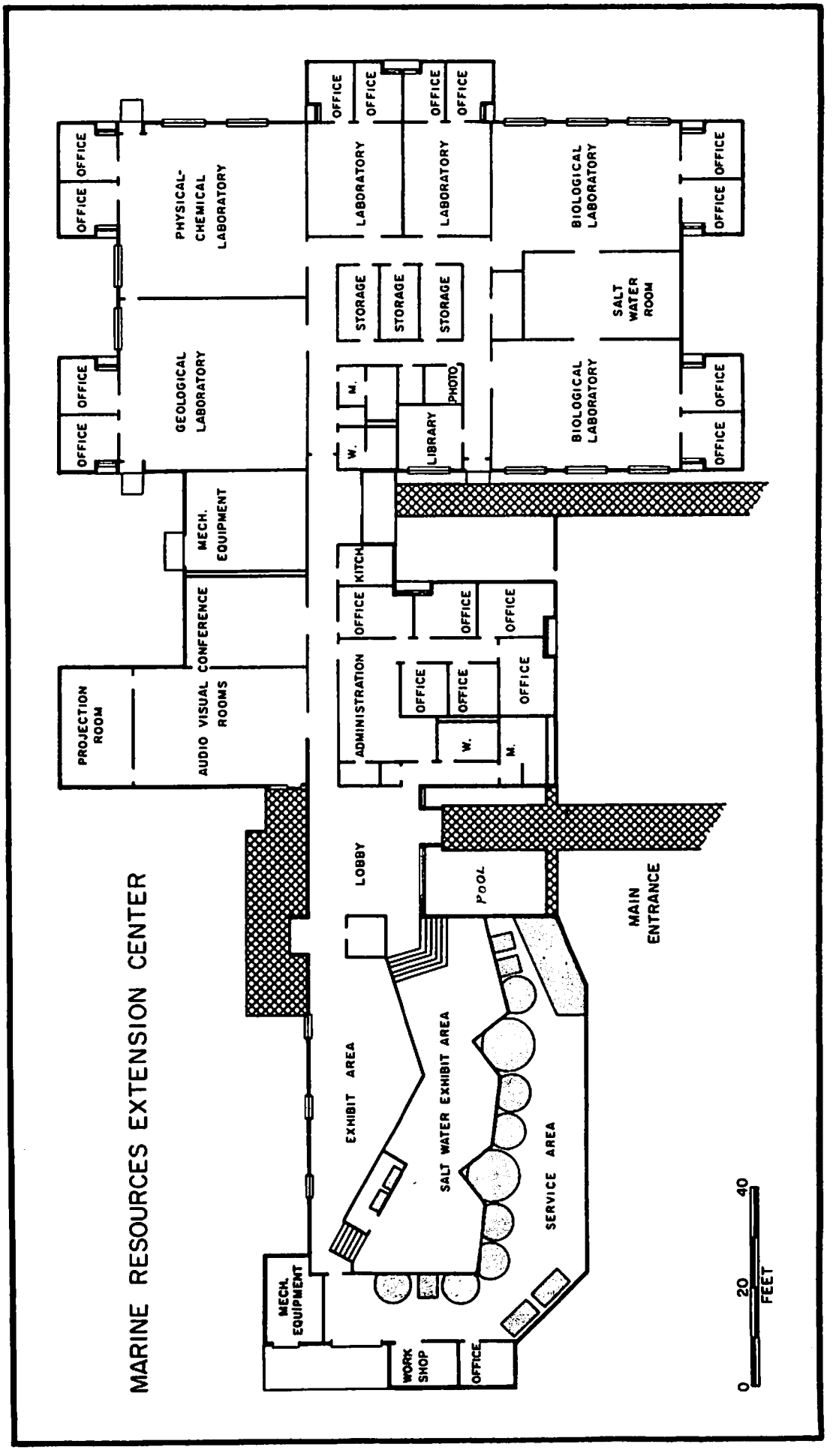

MARINE RESOURCES EXTENSION CENTER
PHYSICAL-CHEMICAL LABORATORY
GEOLOGICAL LABORATORY
LABORATORY
LABORATORY
BIOLOGICAL LABORATORY
BIOLOGICAL LABORATORY
SALT WATER ROOM
STORAGE
STORAGE
STORAGE
OFFICE
LIBRARY
PHOTO
M.
W.
MECH. EQUIPMENT
KITCH
PROJECTION ROOM
AUDIO VISUAL CONFERENCE ROOMS
ADMINISTRATION
LOBBY
POOL
MAIN ENTRANCE
EXHIBIT AREA
SALT WATER EXHIBIT AREA
SERVICE AREA
WORK SHOP
0
20
40
FEET

FIGURE VI-1

CRD staff also conduct interpretive programs for the Sapelo Island National Estuarine Sanctuary.

° Visitor Center at Meridian Dock, Darien, Georgia

The Meridian Dock is the principal departure/arrival point for the public ferry SAPELO QUEEN and other boats that service Sapelo Island, Georgia. Participants on the Sapelo Island National Estuarine Sanctuary tour ride the ferry. A small visitor center located on the dock contains exhibits on marine and estuarine ecosystems, specific information on the Sapelo Island National Estuarine Sanctuary, and a slide presentation room. Interpretive materials on the Gray's Reef National Marine Sanctuary will be available at the visitor center.

° University of Georgia Marine Institute, Sapelo Island, Georgia

The primary focus of the Marine Institute's activities is on saltmarsh ecology and nearshore processes. Although primarily a research laboratory, the Institute supplements educational activities originating at the University's Marine Resources Center on Skidaway Island. A modest visitor center was established by the Institute in support of the Sapelo Island National Marine Sanctuary tours carried out by the CRD. Information on the Gray's Reef National Marine Sanctuary will be disseminated at the visitor center.

° University of Georgia's Marine Extension Center, Brunswick, Georgia

The Marine Extension Center in Brunswick serves as the operating base for activities designed to help the seafood industry increase its efficiency and productivity. The current facility was completed in 1980 and is located on East River. The Brunswick Center operates a 73-ft. shrimp boat, the GEORGIA BULLDOG, to carry out exploratory fisheries research and gear development.

The Brunswick Center has become a focal point for addressing industry problems. Gear research and development programs, exploratory fishing activities, and service and training programs have contributed significantly to the close rapport between the University and the seafood industry. Appropriate programs and interpretive materials on Gray's Reef will be developed for presentation at the Brunswick Center.

° Chamber of Commerce Visitor and Welcome Centers at St. Mary's, Brunswick, Darien, and Savannah, Georgia

Visitor and welcome centers in Georgia's coastal counties provide excellent opportunities for disseminating information to travellers as well as to local residents. Brochures and other interpretive materials pertaining to the marine sanctuary will be displayed and mobile programs will be rotated between the centers.

3. Off-Site Programs

The following programs are proposed for Phase 1 based on a consideration of interpretive and recreational program needs, availability of the facilities described above and fiscal constraints.

° Sanctuary Audience Profile

A master mailing list and profile on sanctuary audiences will be developed to assist sanctuary interpreters reach interested parties and structure programs to meet special interests and needs. Some target audiences have already been identified through existing interpretive programs, local fishing and sportdiving clubs, area educational institutes, and environmental organizations. Each of these groups will have unique interests and will present a different challenge for interpretive and recreational planning.

° Live exhibits

Several aquaria at the Marine Resource Center on Skidaway Island will be redesigned and restocked with examples of the habitat and fauna of Gray's Reef. These aquaria will be identified as "typical" ecological niches of Gray's Reef. Several field trips to live bottoms will be required each year to collect live specimens for the aquaria.

° Fixed exhibits

Exhibits will be assembled to depict various aspects of the Gray's Reef National Marine Sanctuary and placed in the public exhibit area of the Marine Resource Center on Skidaway Island. These will include such items as a three-dimensional model of Gray's Reef and dried specimens of more striking organisms.

Sets of backlighted color transparency displays will be developed to provide graphic information on the Marine Sanctuary Program in general and on Gray's Reef in particular. These displays will be placed at the Marine Resources Center on Skidaway Island, the Marine Institute on Sapelo Island, and the Marine Extension Center at Brunswick. In addition, depending on permission from the appropriate agency, similar displays will be rotated among the Coastal Resources Division headquarters in Brunswick, Visitor's Centers at St. Mary's, Brunswick, Darien, and Savannah, the Cumberland Island National Seashore, and the Meridian Visitor Center.

° Audio-Visual Media

A slide series will be developed to present the history and rationale for the development of the National Marine Sanctuary Program. Description of the Gray's Reef program will be incorporated in the materials presented to the various groups that avail themselves of the educational opportunities at both the Skidaway and Brunswick Centers.

Other appropriate material will be inventoried and considered for inclusion in the interpretive program. This includes videotape records made by Jesse Hunt and V. J. Henry through the Skidaway Institute of Oceanography, a television documentary prepared by WXIA TV in Atlanta, Georgia, and underwater photography catalogues of the Georgia Department of Natural Resources and other scientific investigators

° Brochures

Illustrated brochures describing Gray's Reef National Marine Sanctuary have been prepared by the Georgia Department of Natural Resources and by the Office of Coastal Zone Management. At this time, there does not appear to be a need to duplicate these. Brochures are relatively inexpensive to distribute; however, they have only minimal impact in creating public awareness because most people tend to discard them. Interpretive materials which create lasting impressions are desired for GRNMS.

° Educational Posters

To supplement the existing brochures, a series of posters which are sufficiently attractive to be retained for display on an office wall or classroom bulletin board will be prepared. The posters would have general information material on the backside regarding the history and philosophy of the National Marine Sanctuary Program and specific information regarding the special topic areas highlighted on the front side. Examples for poster themes include:

- GRAY'S REEF - NATIONAL MARINE SANCTUARY

  The front side would be a quasi-three-dimensional map showing the general configuration and bottom topography of Gray's Reef.

- THE GEOLOGY OF GRAY'S REEF, A NATIONAL MARINE SANCTUARY

  The front side would be graphic illustrations of various geological features of Gray's Reef.

- SPORT FISHES OF GRAY'S REEF, A NATIONAL MARINE SANCTUARY

  The front side would be illustrations and life history notes of common fishes of interest to recreational fishermen.

- MAJOR INVERTEBRATE GROUPS OF GRAY'S REEF, A NATIONAL MARINE SANCTUARY

  The front side would have illustrations and life history notes of various invertebrate groups (e.g., sponges, starfish).

The potential impact of such posters can be gauged by the success of a series of inshore fishing guides issued by the University of Georgia's Sea Grant College Program to meet the needs of recreational fishermen. Although the primary target for the fishing guides were recreational fishermen, educators are using them as teaching aids. Accordingly, the Marine Sanctuary posters will be distributed to science teachers in the public school system for similar use.

° Sanctuary Maps

NOAA/SPO will see that the Sanctuary is adequately charted on nautical charts issued by NOAA/National Ocean Survey. In addition, as information becomes available from hydrographic and biological assessments

in the Sanctuary, site specific maps showing significant habitat and community features will be produced and made available to sanctuary audiences.

° Sanctuary Newsletter

Sanctuary newsletters will be used to announce sanctuary developments or upcoming events. Topics of interest could include reports on research, interpretive programs, sportfishing, and sportdiving events as well as feature articles and news on other national marine and estuarine sanctuaries. For the present time, the National Marine Sanctuary Program Status Report and the Georgia Department of Natural Resources' Coastlines Georgia will be used to inform the public of sanctuary events and discoveries. Other publications will be encouraged to do feature articles on the Sanctuary.

° Coastal Interpreter's Workshop

A Coastal Interpretor's Workshop is being contemplated to provide a forum to educate the various people who are actively engaged in interpretation of Gray's Reef and the marine environment. The workshop would be geared primarily to educators (K-12, college, and university), interpretors, naturalists, and public relations or media types. Through a combination of "classroom" and "on site" instruction, participants would gain first-hand expert knowledge of the reef, its benefits, and its vulnerabilities.

° Speaker's Bureau

A Coastal Interpretor's Workshop (above) would help generate a bureau of persons who are knowledgeable about the sanctuary resources and who are geared to talk informatively to various audiences. The Sanctuary Interpreter will coordinate activities of the Speaker's Bureau if it is formed.

° Sanctuary Information Clearinghouse

Resource collections from various research expeditions to Gray's Reef, published and unpublished documents, and other descriptive or visual documentation of resources at Gray's Reef will be located, inventoried, catalogued, and made available or put on display in an easily accessible location. A "loan system" will be considered to enable students, scientists, educators, and other interested parties to borrow materials as needs arise (see Section V, Resource Studies Plan).

F. Implementation Strategies

This Plan is designed to provide a long term agenda for interpretation and recreation related to Gray's Reef National Marine Sanctuary. It is anticipated that the programs proposed herein, or at least parts of them, can be funded by NOAA during Phase 1 as funds are available. Collaboration with other agencies and organizations will be encouraged to enhance funding opportunities.

The roles and responsibilities of the Sanctuary Interpreter and other parties involved in sanctuary interpretive and recreational programs are presented in Section VII, Administration Plan. The Interpretive and Recreational Plan will be reviewed annually and updated every five years following the procedures outlined in Section VIII, Management Plan Review.

VII. ADMINISTRATION PLAN

This section of the management plan identifies the major parties that are responsible for managing Gray's Reef National Marine Sanctuary: NOAA's Sanctuary Programs Division; U. S. Coast Guard; Georgia Department of Natural Resources; University of Georgia; and Sanctuary Steering Committees. Primary roles and responsibilities for each party during Phase I of this plan are identified.

A. Overview: Identification of Responsible Parties

1. Sanctuary Programs Division

The National Marine Sanctuary Program is administered through the Sanctuary Programs Division (SPD) within the Office of Ocean and Coastal Resource Management of the National Oceanic and Atmospheric Administration (NOAA), U. S. Department of Commerce. Headquarters for the National Marine Sanctuary Program are at 3300 Whitehaven Street, N.W., Washington, DC 20235 (202/634-4236).

NOAA's Sanctuary Programs Division has overall responsibility for managing Gray's Reef National Marine Sanctuary, but delegates certain on-site management and surveillance/enforcement responsibilities to State and other Federal agencies.

2. U. S. Coast Guard

The U. S. Coast Guard enforces all applicable Federal laws on or under the high seas, and is responsible for enforcing regulations in Gray's Reef National Marine Sanctuary. The Sanctuary is located in the 7th Coast District with headquarters in Miami, Florida. For report and contact purposes, the 7th District Group Commander at Charleston, SC, has been designated as the primary point of contact. All reports or contacts can be processed through this Command by calling a 24-hour telephone number (803/724-4382). It is possible that from time to time the Coast Guard Stations on Tybee Island off Savannah, Georgia, and St. Simons Island off Brunswick, Georgia, will be involved in surveillance and enforcement activities.

3. Georgia Department of Natural Resources

NOAA's Sanctuary Programs Division has entered into a cooperative agreement with the Georgia Department of Natural Resources, Coastal Resources Division. The terms of this agreement provide for on-site coordination of research activities. Specific responsibilities of a Sanctuary Coordinator are highlighted later in this section.

The Sanctuary Coordinator's office is located at the Coastal Resources Division headquarters at 1200 Glynn Avenue, Brunswick, Georgia 31523 (912/264-7218). Coastal Resources Division facilities consist of 10,000 square feet of office and laboratory space, parking facilities, storage sheds, computer terminal, and working library. Three research vessels are available for use in the Sanctuary: the R/V BAGBY, a 52-foot Harkers Island offshore vessel; the R/V ANNA, a 60-foot trawler; and the R/V

COBIA, a 45-foot trawler. Several smaller boats are also available. It is possible that the Department's Law Enforcement vessel, the R/V RANGER, may also be available for use in sanctuary programs. Dock space consists of a large stationary dock and floating dock facility. The dock facility is equipped with an air compressor unit, ice house, dive lockers and storage sheds. Additional temporary dock space is available at Meridian Dock and the Sapelo Island docks.

4. University of Georgia

The University of Georgia's Marine Resource Center on Skidaway Island near Savannah, Georgia will serve as the primary site for interpretation and recreation programs related to Gray's Reef National Marine Sanctuary. The Center is open to the public. Contact can be made by visiting the Center, writing to P.O. Box 13687, Savannah, Georgia 31406 or calling 912/356-2496.

5. Sanctuary Steering Committees

Public involvement is an integral part of sanctuary program planning. An extensive process of public consultation was conducted prior to the designation of Gray's Reef National Marine Sanctuary and during the development of the management plan (see Appendix B). Continued public involvement in sanctuary operations is desired.

Many groups and individuals in coastal Georgia have expressed an interest in participating on Sanctuary Steering Committees (see Fig. VII-1 for listing). It is possible that committees will be structured as follows:

Committees will be limited to between 10 and 15 members to assure a workable, productive body. Committee members will serve three-year terms with the initial appointments staggered to ensure continued action and expertise. Criteria for membership requires selection of individuals whose judgment would be objective and not subject to a conflict of interest due to a particular affiliation. Initially, only two Committees will be formed: a Resource Studies Steering Committee and an Interpretation and Recreation Steering Committee. Since the sanctuary is offshore Georgia and most users are from Georgia, most members of the teams are likely to be from Georgia. However, since it is a national sanctuary, membership will not be limited to citizens of Georgia. Applications, resumes and letters of intent to serve will be solicited from organizations listed on Table VII-1 and from the general public. NOAA's Sanctuary Programs Division will have final decision on committee membership. The roles of the Sanctuary Steering Committees are highlighted below and described in Section VIII, Management Plan Review.

B. Management Roles and Responsibilities

1. Resource Protection: Roles and Responsibilities

a. Sanctuary Programs Division

° Provides legal support as needed for enforcement of regulations and prosecution of violations.

° Reviews quarterly and annual reports on surveillance, enforcement, monitoring, and visitor activities and evaluates the effectiveness of resource protection programs and regulatory regimes. Initiates procedures for changes, where necessary.

° Coordinates national program activities with those of individual sanctuaries. Ensures that each sanctuary is operated in a manner consistent with established national program policies, and with applicable national, international, state, and local laws.

° Coordinates with Federal, State and local government agencies, as well as public, private and international entities concerning protection and management of marine resources.

- Coordinates Program efforts with other projects and programs, such as estuarine sanctuaries, national seashores, regional fishery management councils and State CZM plans.

- Comments on major federal marine-related actions and accompanying environmental impact statements as to their effect on proposed and designated sanctuaries.

- Consults with individual members of Congress and with Congressional committees.

b. U. S. Coast Guard

° Provides active enforcement presence in the Sanctuary (see Section IV, Resource Protection Plan).

° Communicates with Sanctuary Coordinator, Sanctuary Interpreter, and NOAA's Sanctuary Programs Office on matters related to surveillance and enforcement.

° Maintain records of surveillance and enforcement activities related to the Sanctuary and submits annual reports. Participates in Resource Protection Plan review (see Section VIII, Management Plan Review).

TABLE VI-1

SANCTUARY STEERING COMMITTEE MAKEUP

The interests of the following organizations will be covered through Steering Committee membership.

- The University System of Georgia, including:
  - Marine Institute, Sapelo Island, GA
  - Skidaway Institute of Oceanography, Skidaway Island, GA
  - Institute of Ecology, Athens, GA
  - Dept. of Zoology, Athens, GA
  - Marine Extension Service, Brunswick, GA
  - Marine Resources Center, Skidaway Island, GA
- Emory University, Atlanta, GA
- Savannah State College, Savannah, GA
- Georgia Southern College, Statesboro, GA
- Brunswick Jr. College, Brunswick, GA
- Golden Isles Dive Club
- Golden Isles Sport Fishing Club
- Savannah Area Sportdiving Club
- Commercial Fishing Community
- McIntosh County Marina
- Coastal Georgia Environmental Organizations
  - The Georgia Conservancy
  - Coastal Georgia Audubon Society
- Chamber of Commerce for Coastal Counties
- U. S. Coast Guard
- South Atlantic Fishery Management Council
- NOAA/National Marine Fisheries Service
- Department of the Interior, Bureau of Land Management and U. S. Geological Survey
- Industry (oil and gas, minerals, fisheries, etc.)
- Other interested groups (to be identified)
- Interested individuals

c. Sanctuary Coordinator

- Discusses with NOAA's Sanctuary Programs Division and the U. S. Coast Guard on visitor use patterns, potential and observed regulation violations, and other information as needed to ensure adequate protection of the sanctuary resources.

- Reviews reports on surveillance and enforcement and participates in Resource Protection Plan review (see Section VIII, Management Plan Review).

- Ensures that the sanctuary buoy is maintained at its present location (see Section II, Management Context). Schedules and participates in buoy maintenance activities.

- Provides, as needed, training programs to orient surveillance and enforcement personnel to sanctuary environment.

- Coordinates sanctuary response in the event of an environmental emergency threatening sanctuary resources.

- Coordinates a resource monitoring program (see Section V, Resource Studies Plan). Advises NOAA's Sanctuary Program Division on resource quality and recommends changes as needed in the monitoring program or sanctuary regulations.

- Coordinates with the Sanctuary Interpreter on studies to monitor visitor usage of the Sanctuary (see Section V, Resource Studies Plan). Participates in visitor use surveys as needed to ascertain patterns and levels of use. Records visitor activities when in the Sanctuary area.

- Reports to NOAA's Sanctuary Programs Division on a regular basis (as soon as practical in the event of environmental emergency or major violation; quarterly reports on surveillance and monitoring activities and annually on the effectiveness of sanctuary regulations and resource protection plan).

d. Sanctuary Interpreter

- Designs and initiates interpretive programs, exhibits and materials that will enhance public understanding and appreciation for sanctuary values and the purpose and need for regulations.

- Maintains close communication with sanctuary visitors and extension audiences. Advises NOAA's Sanctuary Programs Division and the Sanctuary Coordinator on potential user conflicts or controversies arising from sanctuary-sponsored activities. Recommends appropriate action.

- Participates in Resource Protection Plan review (see Section VIII, Management Plan Review).

2. Resource Studies: Roles and Responsibilities

a. Sanctuary Programs Division

- Approves an annual budget and provides funds to support sanctuary research and monitoring programs. Encourages cost-sharing by other funding sources to enhance research opportunities.

- Approves members of Resource Studies Steering Committees.

- Approves annual research topics and priorities and individual research projects recommended by Sanctuary Coordinator and Resource Studies Steering Committees. Approves permits for research.

- Maintains a registry of scientists and resource managers who have indicated a willingness to review sanctuary research proposals. (Note that because reviewers are selected as needed on the basis of the subject area of the proposal, they need not be members of the Resource Studies Steering Committee).

- Reviews annual progress under the Resource Studies Plan and updates the Plan every 5 years.

b. Sanctuary Coordinator

- Maintains close communication with members of the academic and scientific communities and other parties that have intimate knowledge of the Sanctuary, the resources, the user groups, and the resource studies needs.

- Coordinates Resource Studies Plan review process (see Section VIII, Management Plan Review).

- Solicits applications for Resource Studies Steering Committee membership. Forwards resumes with recommendations to NOAA's Sanctuary Programs Division for final decision on appointments.

- Serves on Resource Studies Steering Committee. Coordinates Committee activities and provides support to its Chair (while the Sanctuary Coordinator serves on the Committee, it is recommended that an individual scientist serve as chair).

- As member of the Resource Studies Steering Committee, assists in the evaluation and selection of annual research

priorities and individual research projects. Reports to NOAA's Sanctuary Program Division on the Committee's recommendations.

° Coordinates research proposal review process. Upon receipt of proposals from NOAA's Sanctuary Programs Division, recommends persons to review research proposals and decides whether a meeting of reviewers is needed or whether written comments will suffice. Forwards comments to NOAA's Sanctuary Programs Division for final decision.

° Coordinates permit application review process. Upon receipt from NOAA's Sanctuary Programs Division, recommends persons to review permit applications if necessary. Forwards recommendation to NOAA's Sanctuary Program Division for final decision.

° Monitors activities of permit holders. Advises NOAA's Sanctuary Programs Division of any potential irregularities in performance under permits. Distributes research flag to permit holders and advises permit holder of sanctuary policies regarding displaying the flag while conducting permitted activities in the Sanctuary. Retrieves flag at termination of research activities covered under the permit.

° Cooperates with persons conducting research in the Sanctuary (research funded by NOAA and other sources). Maintains an inventory of sanctuary vessels, equipment and facilities available for use in research. Arranges logistic support where feasible.

° Advises the Sanctuary Interpreter and the U. S. Coast Guard of research in progress.

° Maintains a sanctuary resource data base and bibliography and provides for access by individual scientists, educators, students and the interested public.

° Reports to NOAA's Sanctuary Programs Division on a regular basis on activities related to fulfilling management objectives (as soon as practical in the event of management problems, quarterly reports on resource studies activities, and annually on progress toward management objectives).

c. Sanctuary Interpreter

- Integrates information acquired through resource studies into interpretive and recreational programs.
- Participates in review of research at Gray's Reef National Marine Sanctuary as a member of the Resource Studies Steering Committee. Advises members on potential user conflicts or controversies that may arise over a particular project or research approach.
- Designs and initiates interpretive programs, exhibits and materials that advise sanctuary visitors and extension audiences on the research in progress and the values of that research.

3. Interpretation and Recreation: Roles and Responsibilities

a. Sanctuary Programs Division

- Reviews development of interpretive and recreational planning and provides advice on interpretive themes, messages, and priority audiences.
- Approves an annual budget and provides funds for interpretive and recreational programs. Encourages cost-sharing by other funding sources to enhance overall effort.
- Reviews annual progress toward management objectives of the Interpretation and Recreation Plan.

b. Sanctuary Interpreter

- Oversees planning, development and coordination of interpretive and recreational programs, exhibits and materials in accordance with recommendations of the management plan. Advises on interpretive approach, methods and material, in light of experience of the Marine Resource Center.
- Coordinates Interpretation and Recreation Plan review process. Solicits applications for members of an Interpretation and Recreation Steering Committee and forwards resumes to NOAA's Sanctuary Programs Division for a decision on appointments.
- Serves on Interpretation and Recreation Steering Committee Coordinates Committee activities and provides support to its Chair (while the Sanctuary Interpreter serves on the Committee, it is recommended that another interpreter/educator/recreationist serve as Chair). Advises Committee of outstanding management problems that could be addressed by specific interpretive or recreational projects.

- As member of Interpretation and Recreation Steering Committee, assists in the evaluation and selection of annual interpretive and recreational priorities and individual projects. Reports to NOAA's Sanctuary Programs Division.

- Reviews current scientific and socioeconomic information related to the Sanctuary to assure that interpretive products are factual and accurate.

- Assures that interpretive and recreational programs meet Sanctuary management objectives, are of high quality and audience benefit, and are effective, pragmatic and within budget constraints. Sees that interpretive materials associated with research-based information avoid the tendency to be overly detailed or technical which limits their effectiveness.

- Carries out studies to establish sanctuary audience profiles, preferences and aspirations. This information will be used in program planning, development and evaluation.

- Provides the primary location for sanctuary interpretive programs, exhibits and materials. Recommends additional locations and coordinates set-up and upkeep of sanctuary-related projects.

- Ensures that sanctuary visitors and extension audiences have adequate opportunity to comment on sanctuary programs.

- Cooperates with other educators and interpreters developing materials on Gray's Reef National Marine Sanctuary.

- Reports to NOAA's Sanctuary Programs Division on a regular basis (as soon as practical in the event of management problems, quarterly reports on interpretive and recreational activities and annually on progress toward management objectives).

c. Sanctuary Coordinator

- Responds to requests for information on the Sanctuary and provides access to sanctuary resource data base. Advises Sanctuary Interpreter on type and frequency of requests received. Solicits Sanctuary Interpreter's assistance as needed.

- Reviews draft designs for interpretive and recreational programs.

- ° Coordinates with Sanctuary Interpreter on studies to monitor visitor usage of the Sanctuary.

- ° Represents the Resource Studies Program at special events, such as workshops, society meetings, etc.

- ° Cooperates with persons designing interpretive programs or conducting educational programs related to the Sanctuary.

- ° Participates in Interpretation and Recreation Plan review.

4. Sanctuary Administration: Roles and Responsibilities

a. Sanctuary Programs Division

- ° Approves budgets and provides funding for on-site sanctuary operations. Encourages cost-sharing by other agencies to enhance overall efforts.

  - Makes final decisions on how new or existing resources are to be used;

  - Advises and assists on-site managers in the preparation and administration of the sanctuary's budget;

  - Monitors financial performance, including transferred funds, contracted studies, and management grants and contracts.

- ° Establishes a data management capability for information collected on nominated sanctuary sites and in designated sanctuaries.

- ° Encourages and assists in information exchange between sanctuaries and interested parties.

- ° Encourages public involvement in sanctuary management through information exchange and steering committees where appropriate.

- ° Reviews quarterly and annual reports on sanctuary administration. Reviews proposals for new cooperative agreements. Develops special award conditions. Monitors performance under cooperative agreements.

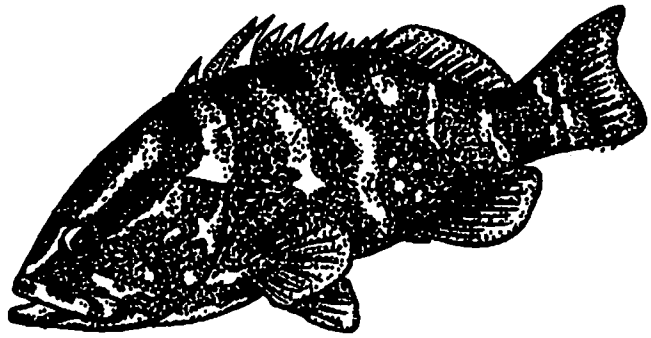
b. Sanctuary Coordinator

- ° Advises NOAA's Sanctuary Programs Division on facilities, staffing and budget required for annual and long-term sanctuary operations. Upon approval from NOAA's Sanctuary Programs Division, initiates

procedures needed to fullfill requirements (e.g., hiring personnel, building facilities, purchasing research vessels and equipment, etc.).

c. Sanctuary Interpreter

° Advises NOAA's Sanctuary Programs Division on facilities, staffing and budget required for annual and long-term sanctuary operations. Upon approval from NOAA's Sanctuary Programs Division, initiates procedures needed to fullfill requirements (e.g., hiring personnel, building facilities, purchasing interpretive and recreational equipment, etc.).



VIII. MANAGEMENT PLAN REVIEW

Management planning is a continuous process. Throughout this management plan are references to annual plan review and five-year revision. Procedures for carrying out plan review and revision are presented below. An indication of scheduling is also provided. Procedures will be further refined during the first phase of sanctuary management.

A. Annual Review

1. Resource Protection Plan Review

Annual review of the Resource Protection Plan involves the participation of NOAA's Sanctuary Programs Division, NOAA's General Counsel in St. Petersburg, Florida, the U. S. Coast Guard, the Sanctuary Coordinator and the Sanctuary Interpreter. NOAA's Sanctuary Programs Division assembles an evaluation package that contains, in addition to the latest version of the Resource Protection Plan, the following: (1) an annual report prepared by the Coast Guard that describes surveillance and enforcement activities; (2) an annual report prepared by NOAA's General Counsel in St. Petersburg, Florida, that describes the outcome of any legal proceedings resulting from violation of sanctuary regulations; (3) quarterly reports prepared by the Sanctuary Coordinator that describe (a) activities related to surveillance, resource monitoring, visitor use studies, buoy maintenance and any environmental emergencies and (b) evolving management issues related to resource protection; (4) quarterly reports prepared by the Sanctuary Interpreter that describe (a) public response to sanctuary programs and (b) visitor conflicts or controversies. Evaluation packages are mailed to participants. Participants are requested to evaluate (1) whether existing resource protection measures are adequate; (2) whether resource protection strategies are fulfilling management objectives, and (3) whether changes are needed in the existing regime. Participants prepare brief evaluation reports that include recommendations and submit them to NOAA's Sanctuary Program Division for appropriate action. An indication of scheduling is presented in Fig. VIII-1.

2. Resource Studies Plan Review

Annual review of the Resource Studies Plan involves the participation of NOAA's Sanctuary Programs Division, the Sanctuary Coordinator, the Sanctuary Interpreter, and the Resource Studies Steering Committee. NOAA's Sanctuary Program Division assembles an evaluation package that contains, in addition to the latest version of the Resource Studies Plan, the following: (1) quarterly reports prepared by the Sanctuary Coordinator that (a) highlight achievements of research and monitoring projects in progress or recently completed (both Sanctuary-sponsored and other), (b) summarize progress toward management objectives in the Resource Studies Plan and (c) identify immediate and evolving management issues that could be addressed by resource studies; (2) quarterly reports prepared by the Sanctuary Interpreter that (a) describe interpretive and recreational programs, exhibits and materials that have used information from resource studies and the value of that information, (b) identify new information that is needed to augment interpretive and recreational programs and

(c) describe public response to sanctuary sponsored resource studies; and (3) any additional information which would prove useful in the review process. Evaluation packages are mailed to participants and a meeting is scheduled in the sanctuary area. At the meeting, participants are requested to undertake the following tasks: (1) discuss resource studies in progress or recently completed to evaluate the usefulness of the information acquired; (2) evaluate progress toward management objectives; (3) discuss immediate and evolving management issues that could be addressed by resource studies; and (4) recommend priority study areas for inclusion in the next version of the Resource Studies Plan. The Sanctuary Coordinator prepares a report which contains committee recommendations and forwards it to NOAA's Sanctuary Programs Division for appropriate action. An indication of scheduling is presented in Fig. VIII-2.

3. Interpretation and Recreation Plan Review

Annual review of the Interpretation and Recreation Plan involves the participation of NOAA's Sanctuary Programs Division, the Sanctuary Interpreter, the Sanctuary Coordinator and the Interpretation and Recreation Steering Committee. NOAA's Sanctuary Programs Division assembles an evaluation package that contains, in addition to the latest version of the Interpretation and Recreation Plan, the following: (1) quarterly reports prepared by the Sanctuary Interpreter that (a) highlight major achievements of interpretive and recreational programs in progress or recently completed, (b) summarize progress toward management objectives in the Interpretation and Recreation Plan, (c) highlight special public events or educational programs that the Sanctuary Interpreter took part in, (d) summarize public response to sanctuary interpretive and recreational programs and (e) identify immediate or evolving management issues that could be addressed by interpretive and recreational programs; (2) quarterly reports prepared by the Sanctuary Coordinator that (a) categorize requests received for information on the Sanctuary or for access to sanctuary resource data base, (b) summarize activities related to visitor use monitoring programs and (c) highlight special public events or educational programs that the Sanctuary Coordinator took part in; and (3) any additional information that would prove useful in the review process. Evaluation packages are mailed to participants and a meeting is scheduled in the sanctuary area. At the meeting, participants are requested to undertake the following tasks: (1) discuss interpretive and recreational programs in progress or recently completed to evaluate their usefulness; (2) evaluate progress toward management objectives; (3) discuss immediate and evolving management issues that could be addressed through interpretive and recreational programs; and (4) recommend priority programs for inclusion in the next version of the Interpretation and Recreation Plan. The Sanctuary Interpreter prepares a report that contains committee recommendations and forwards it to NOAA's Sanctuary Programs Division for appropriate action. An indication of scheduling is presented in Fig. VIII-3.

4. Administrative Plan Review

The effectiveness of the Administrative Plan is reviewed annually by NOAA's Sanctuary Programs Office prior to negotiating the terms of new cooperative agreements with the agencies/parties responsible for on-site sanctuary activities. To this end, NOAA reviews (1) required quarterly

performance reports under existing cooperative agreements; (2) the outcome of management plan review; and (3) proposals for new cooperative agreements. Proposals for new cooperative agreements should reflect recommendations from steering committees and the public, and should specify objectives, tasks, staffing, facilities, and budget. An indication of scheduling is presented in Fig. VIII-4.

B. Five-Year Review

The five-year review proceeds in much the same manner as that described above, except that it is based on cumulative reports. It may be appropriate at this time to hold public meetings in the sanctuary area to discuss progress toward management objectives. The management plan is revised following the five-year review.

C. Research Proposal Review

Proposals to conduct research at Gray's Reef National Marine Sanctuary are submitted to NOAA's Sanctuary Programs Division for evaluation and selection following the procedures outlined in Appendix D. Indications of scheduling are presented in Fig. VIII-5 and Fig. VIII-6.

D. Review of Requests for Research Permits

NOAA Research Permits are required when research involves activities that are otherwise prohibited by sanctuary regulations. Applications for permits are submitted to NOAA's Sanctuary Programs Division according to guidelines in Appendix D. The Sanctuary Coordinator and members of the scientific community review and comment on permit requests. NOAA makes final decisions on permit application approvals.

TABLE VIII-1

LIST OF ABBREVIATIONS, ACRONYMS AND SYMBOLS USED IN MANAGEMENT PLAN REVIEW FIGURES VIII-1 through VIII-6

Abbreviations

O, N, D ...	Months of Year

Acronyms

CY	Calendar Year
FY	(Federal) Fiscal Year
RFP	Request For Proposals
CBD	Commerce Business Daily
PRB	Proposal Review Board
NOAA	National Oceanic and Atmospheric Administration
SPD	NOAA's Sanctuary Programs Division
GC	NOAA's General Counsel in St. Petersburg, Florida
USCG	U. S. Coast Guard
SC	Sanctuary Coordinator
SI	Sanctuary Interpreter
RSSC	Resource Studies Steering Committee
IRSC	Interpretation and Recreation Steering Committee

Symbols

○	Mailings
■	Possible Meetings
◆	Submitting Products
★	Major Decisions
●	Publications

FIGURE VIII-1

SCHEDULE FOR RESOURCE PROTECTION PLAN REVIEW

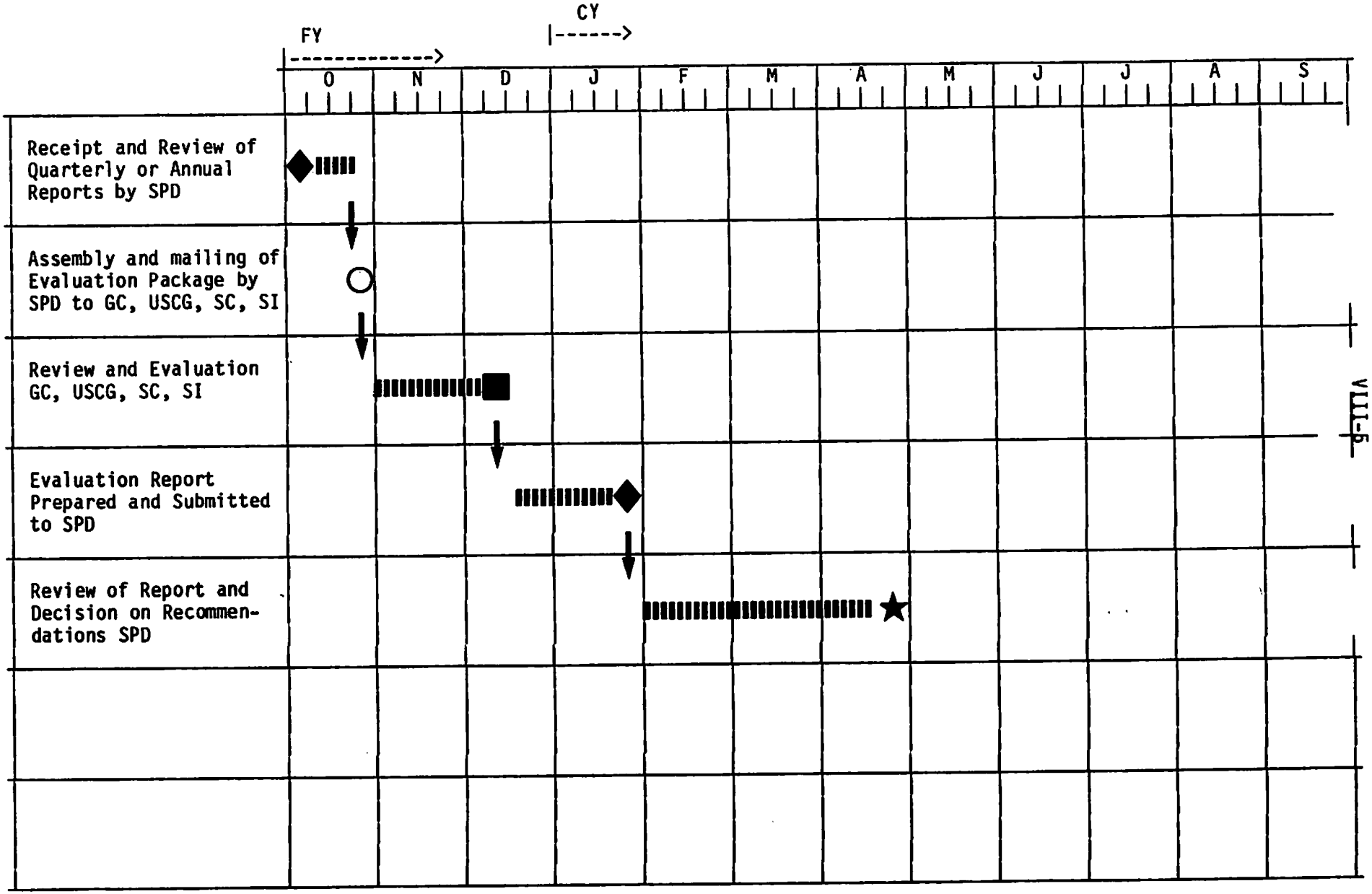


FIGURE VIII-2

SCHEDULE FOR RESOURCE STUDIES PLAN REVIEW

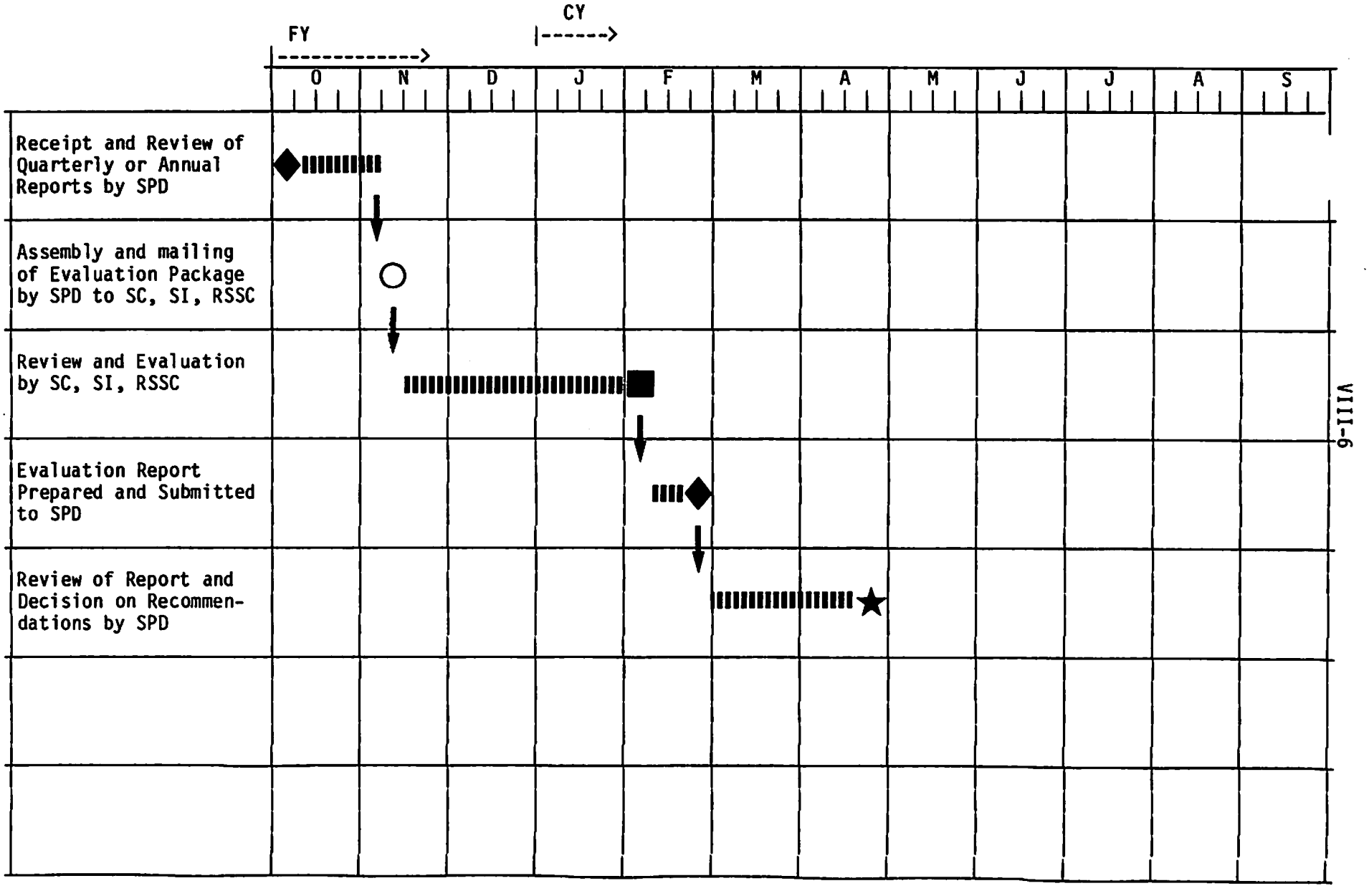


FIGURE VIII-3

SCHEDULE FOR INTERPRETATION AND RECREATION PLAN REVIEW

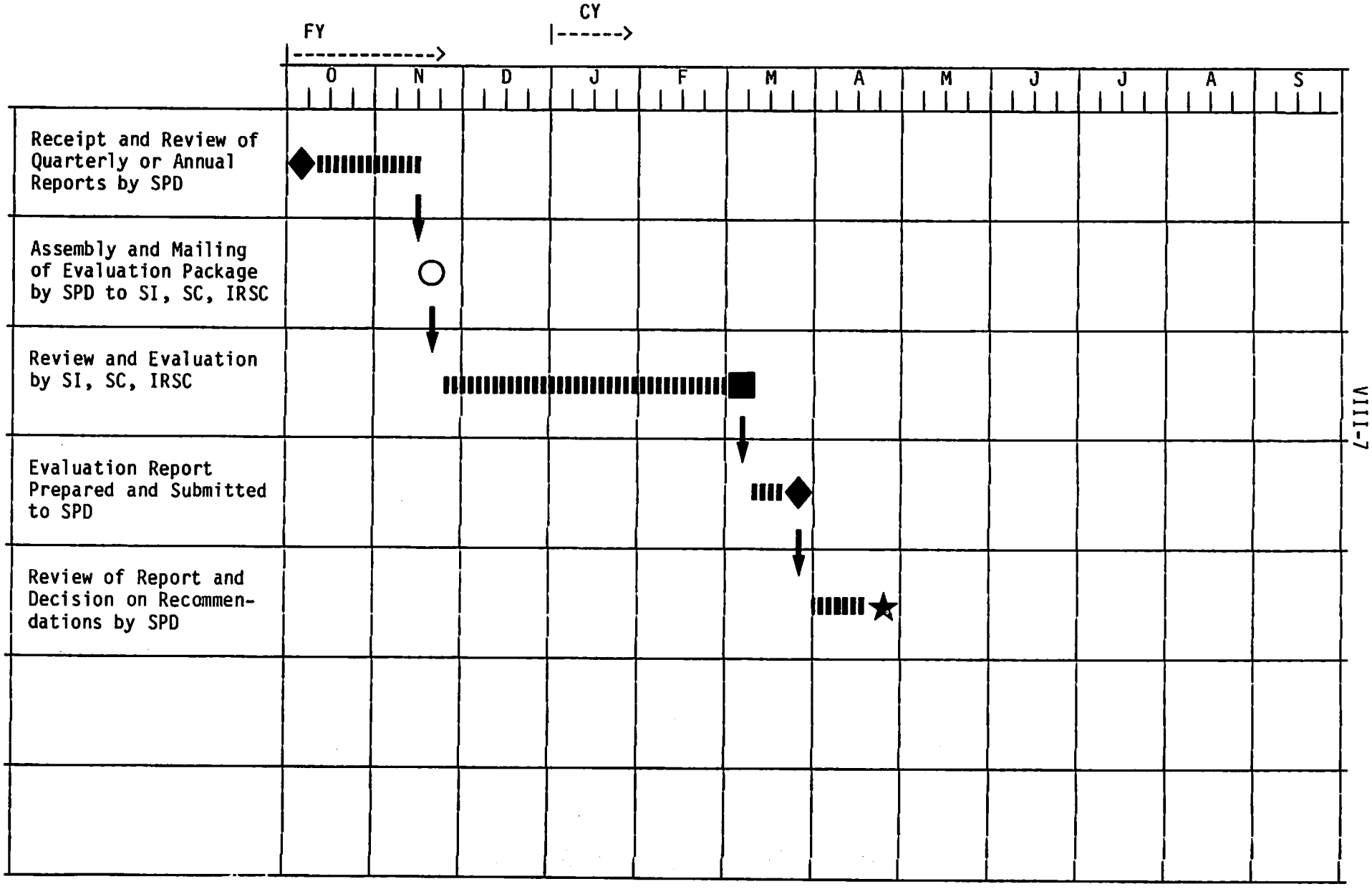


FIGURE VIII-4

SCHEDULE FOR ADMINISTRATION PLAN REVIEW

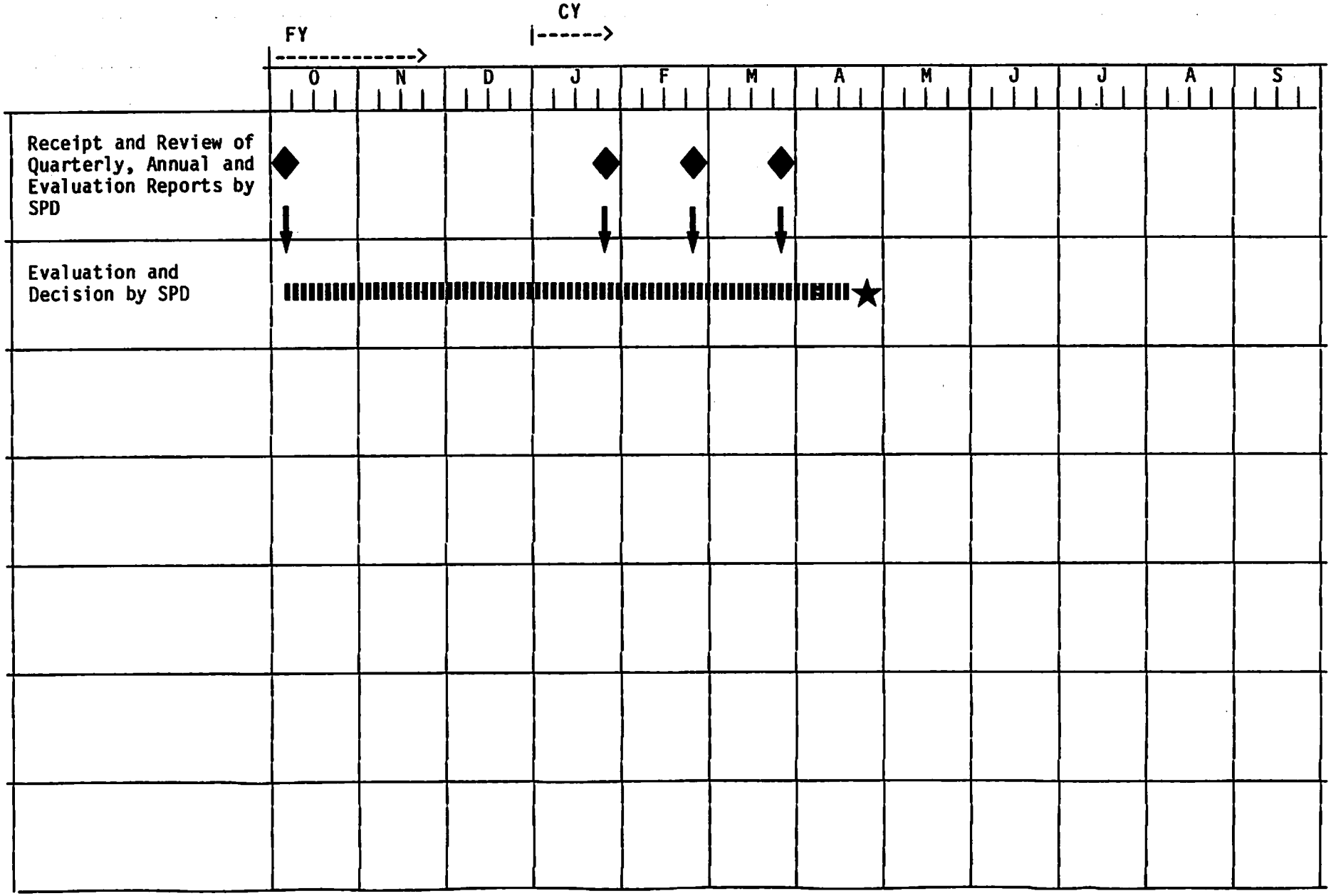


FIGURE VIII-5

TENTATIVE SCHEDULE FOR SOLICITATION AND SELECTION OF RESOURCE STUDIES FOR FUNDING BY NOAA

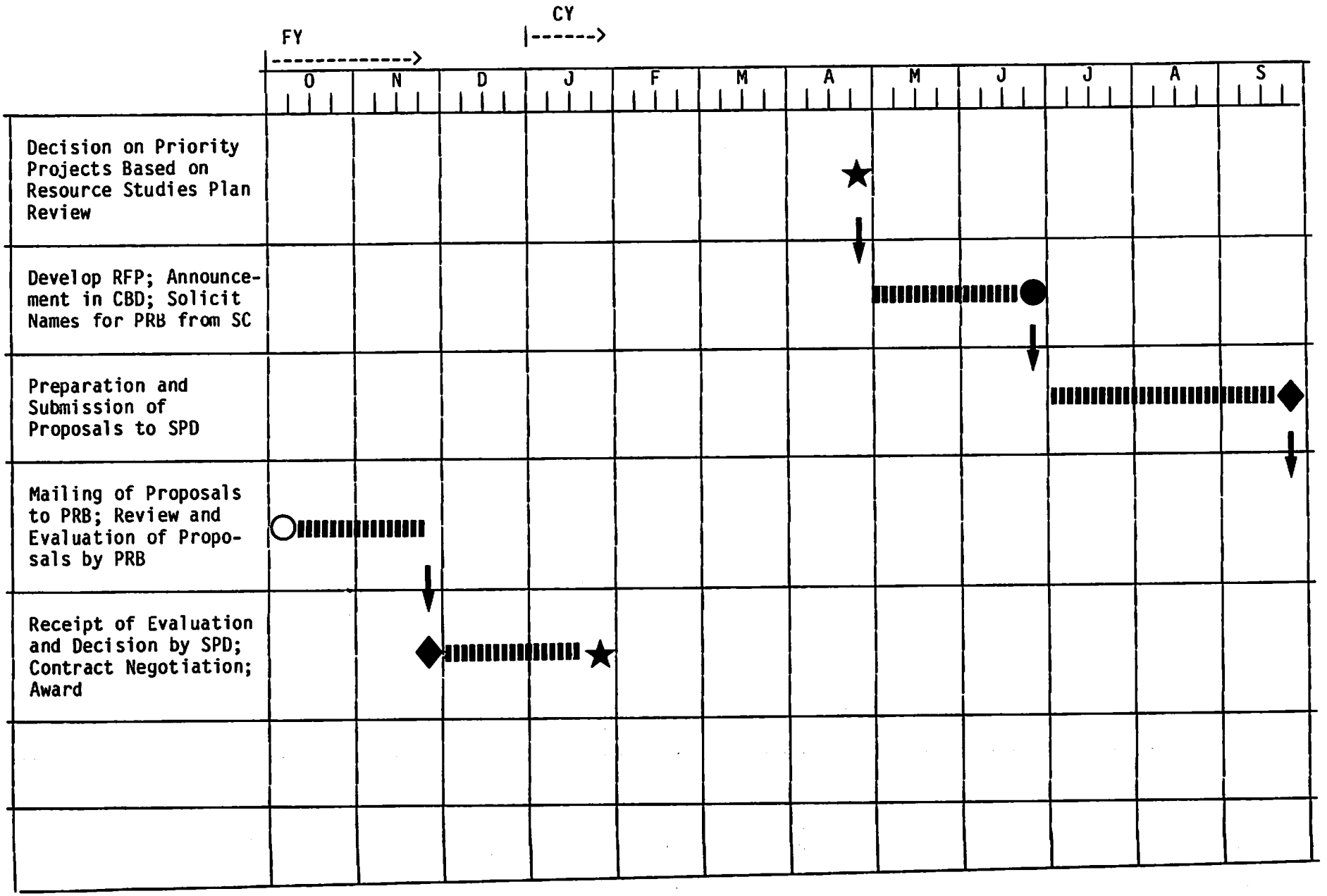
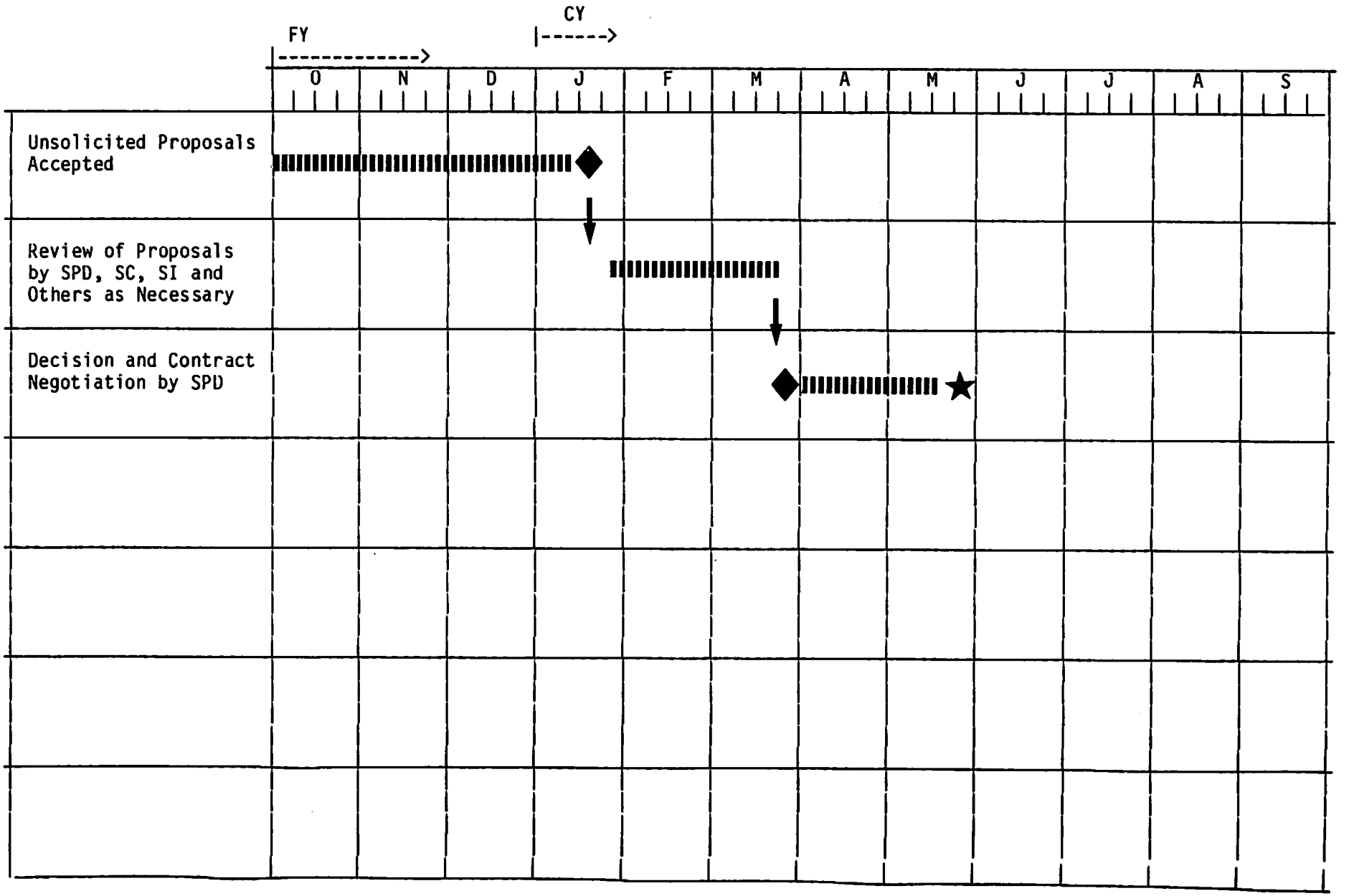
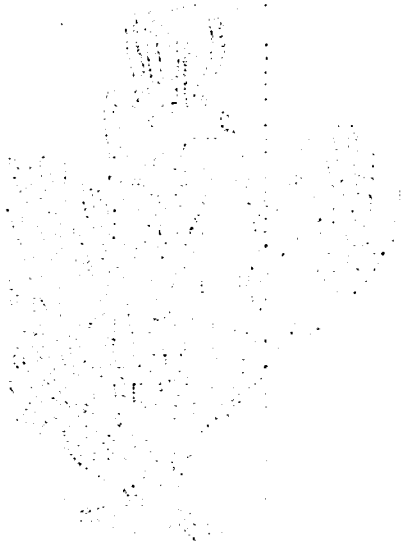


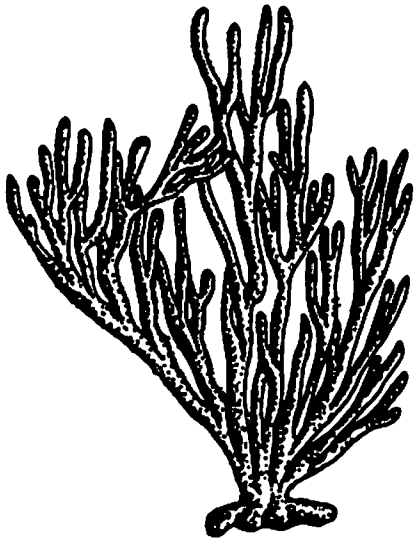
FIGURE VIII-6

TENTATIVE SCHEDULE FOR RECEIPT AND DECISION ON UNSOLICITED PROPOSALS FOR FUNDING BY NOAA



IX. APPENDICES





APPENDIX A

GRAY'S REEF NATIONAL MARINE SANCTUARY REGULATIONS

15 CFR Part 938

Gray's Reef National Marine Sanctuary

AGENCY: National Oceanic and Atmospheric Administration (NOAA), Department of Commerce.

ACTION: Final rule.

SUMMARY: The Office of Coastal Zone Management within NOAA is issuing the Designation and final regulations for the Gray's Reef National Marine Sanctuary, 17.5 nmi east of Sapelo Island, Georgia (the Sanctuary). The Sanctuary was designated on January 16, 1981, after receiving Presidential approval on January 16, 1981. The Designation Document (the Designation) acts as a constitution for the Sanctuary, establishing its boundaries, purposes, and the activities subject to regulation. The regulations establish, in accordance with the terms of the Designation, the limitations and prohibitions on activities regulated within the Sanctuary, the procedures by which persons may obtain permits for otherwise prohibited activities, and the penalties for committing prohibited actions.

DATE: These implementing regulations are expected to become effective upon the expiration of a period of 60 calendar days of continuous session of Congress after their transmittal to Congress, concurrent with publication. This 60-day period is interrupted if Congress takes certain adjournments and the continuity of session is broken by an adjournment *sine die*. Therefore, the effective date can be determined by calling or writing the contact identified below. However, notification will be published in the **Federal Register** when the regulations become effective.

ADDRESS: NOAA invites public review and comment on these final regulations. Written comments should be submitted to: Director, Sanctuary Programs Office, Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, 3300 Whitehaven Street, N.W., Washington, D.C. 20235.

FOR FURTHER INFORMATION CONTACT: Dr. Nancy Foster, Deputy Director, Sanctuary Programs Office, Office of Coastal Zone Management, 3300 Whitehaven Street, N.W., Washington, D.C. 20235, (202) 634-4236.

SUPPLEMENTARY INFORMATION: Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, 16 USC 1431-1434 (the Act) authorizes the Secretary of Commerce, with Presidential approval, to designate ocean waters as far seaward as the outer edge of the Continental Shelf as marine sanctuaries to preserve or restore distinctive conservational, recreational, ecological, or aesthetic values. Section 302(f)(1) of the Act directs the Secretary to issue necessary and reasonable regulations to control activities permitted within a designated marine sanctuary. The authority of the Secretary to administer the provisions of the Act has been delegated to the Assistant Administrator for Coastal Zone Management within the National Oceanic and Atmospheric Administration, U. S. Department of Commerce (the Assistant Administrator).

On January 16, 1981, the Assistant Administrator received the President's approval to designate as a marine sanctuary a 16.68 square nautical mile (sq nmi) area located 17.5 nmi east of Sapelo Island, Georgia. The area was so designated on January 16, 1981.

The Act, as amended by Public Law 96-332, provides that the Designation becomes effective unless Congress disapproves it or any of its terms by a concurrent resolution adopted by both Houses "before the end of the first period of sixty calendar days of continuous session" after transmittal of the Designation to Congress (Sections 302(b)(1) and 302(h)). As noted by the President in his statement of August 29, 1980, when signing Public Law 96-332, this provision raises constitutional questions but will be treated as a "report-and-wait" provision in accordance with that statement. Consequently, the regulations will not become effective until after the 60-day period described in Section 302(h). This period does not include those days on which either House is adjourned for more than 3 days to a day certain and is broken by an adjournment *sine die*. It is unlikely that these regulations will become effective before April 1981. Notification of the effective date will be published in the Federal Register at that time.

The proposed area is a biologically productive live bottom reef on the South Atlantic Continental Shelf which supports representatives of Virginian, Carolinian, and West Indian Biota, including an array of seaweeds, invertebrates, fish, and turtles. The primary purpose of the regulations is to protect and to preserve the live bottom reef ecosystem, including many reef dwelling organisms. Accordingly, all activities which would adversely impact live bottom resources are prohibited, except those permitted by the Assistant Administrator in accordance with § 938.8. Such activities include: alteration of or construction on the seabed (§ 938.6(a)(1)); wire trap fishing (§ 938.6(a)(4)); bottom trawling and specimen dredging (§ 938.6)(5)); and marine specimen collecting (§ 938.6(a)(6)). Similarly, activities harming cultural or historical artifacts in the area are prohibited, except by permit (§ 938.6(a)(7)). Finally, discharge and dumping of polluting materials which could damage the natural values of the area are prohibited (§ 938.6(a)(2)). Spearfishing and anchoring are listed in the Designation as activities potentially subject to regulation, but no regulations are proposed at this time. Vessels will be required to be operated in accordance with Federal rules and regulations (§ 938.6(a)(3)). Except with respect to the deliberate damage to seabed formation, anchoring, the use of certain fishing methods, and discharges, fishing activities at the live bottom are not subject to sanctuary regulation.

On June 11, 1980, NOAA published proposed regulations for the Sanctuary in the **Federal Register** (45 FR 39507) and issued a Draft Environmental Impact Statement (DEIS) which described in detail the proposed regulatory regime and alternatives to it. After consideration of the comments, an FEIS was issued in September 1980. In response to comments on the DEIS, the proposed regulatory regime was revised in the FEIS to list anchoring in the Designation Document but exempt it from regulation at this time. Some additional comments were received on the FEIS, but the regulations discussed in the FEIS and those published here are substantially identical. The more significant comments on the proposed regulations and the regulatory elements of the impact statements and NOAA's responses to them follow:

(1) *Comment:* NOAA's proposal in the DEIS to prohibit anchoring on hard bottom outcrops and to restrict anchoring to sand bottom areas was considered inappropriate by several reviewers who stated that (1) field data showing negative impacts from current anchoring activity was lacking; (2) boaters cannot visually differentiate between hard and soft bottom substrate due to water depth and turbidity; and (3) the regulation would discriminate against user groups which do not have the skill or equipment to locate appropriate anchoring areas.

Response: NOAA reevaluated information concerning anchoring at Gray's Reef and decided that anchoring need not be regulated at this time. NOAA has listed anchoring in the Designation and will undertake various management tasks: (1) monitor anchoring practices at Gray's Reef to determine activity levels, gear types,

and environmental impacts; (2) conduct a thorough underwater resource survey to determine the exact nature and extent of hard bottom and soft bottom coverage in the sanctuary; (3) prepare nautical maps for public use showing the bathymetry and geomorphology depicted by the survey mentioned above; (4) study the feasibility of designating anchorage areas with mooring buoys; and (5) educate the user public concerning safe anchoring practices as this information becomes available through environmental impact analysis.

(2) *Comment:* Because knowledge of the extent of live bottom coverage at Gray's Reef is incomplete at this time, a few reviewers recommended that NOAA consider the largest reasonable boundary area or at least an adjustable boundary.

Response: The current proposal opts for a conservative 16.68 sq nmi sanctuary area, which includes a previously mapped 12 sq nmi area of intense concentration of live bottom and a quarter nmi extension from the periphery to provide for the inclusion of previously unidentified live bottom. As discussed in the FEIS, the ocean floor of the sanctuary and its immediate surroundings will be surveyed following designation. In the event that the survey reveals significant amounts of additional live bottom habitat that would be suitable for inclusion in the sanctuary, boundary adjustments can be made in accordance with sanctuary program regulations.

(3) *Comment:* Some local fishermen and SCUBA divers took issue with the possible regulation of spearfishing at Gray's Reef, arguing that this activity presently does not threaten resources at the live bottom.

Response: Evidence gathered by NOAA through consultation with persons in the field supported the claim that spearfishing does not pose an immediate threat to sanctuary resources. As a result, NOAA determined that spearfishing should not be subject to regulation in the Sanctuary at this time. Spearfishing is listed in the Designation and will be monitored, rather than regulated.

(4) *Comment:* Some reviewers commented that NOAA was giving preferential treatment to hook and line fishing by exempting it from the Designation and potential sanctuary regulation. Similarly, several thought that NOAA was forfeiting its mandate to manage the sanctuary in a comprehensive manner by exempting this activity.

Response: NOAA proposes to rely on the South Atlantic Fishery Management Council (SAFMC) to control hook and line fishing in the sanctuary pursuant to Fishery Management Plans (FMPs). NOAA reviewed draft FMPs and determined that proposed management measures should be adequate to manage hook and line fishing. Fishing by this method is likely to affect sanctuary resources only if the catch level is too high. Setting this level is the responsibility of the SAFMC whose objectives should be consistent with NOAA's. NOAA will monitor all fishing activities at Gray's Reef and will continue to work closely with the SAFMC to ensure that compatible management measures are implemented to maintain and protect fishery resources in the Sanctuary.

(5) *Comment:* A few commentors felt that marine sanctuary status for Gray's Reef was unnecessary, stating that (1) the status quo already provides enough protection and a marine sanctuary would only add an unnecessary and expensive layer of Federal bureaucracy and (2) because Gray's Reef is located 17.5 nmi from shore, factors of distance, weather, sea conditions, and fuel costs limit use of the reef.

Response: (1) The many Federal agencies which exercise authority in the proposed area provide a considerable degree of regulatory protection for the resources of the area. However, the extraordinary diversity of natural resources concentrated in the proposed sanctuary deserves additional attention beyond that provided by the present institutional structure.

The marine sanctuary program, unlike other programs which have jurisdiction in the area of the proposed sanctuary, includes a mechanism to focus on this particular geographically defined marine area and to provide comprehensive research and monitoring of the condition of the resources to assure long-term protection and maximum safe use and enjoyment; other statutes do not provide in most cases the same geographically focused, comprehensive research and monitoring effort. An educational element of the program heightens public awareness of the value of the resources and thereby reduces the potential for harm; again, this aspect of the marine sanctuary program is unavailable under the present system.

Although certain uses of the area do not now seriously threaten resource quality, they could have more significant impact when activities increase. The current multitude of regulatory authorities, many of which have different objectives and jurisdictions, may not be able to respond to future activities on the basis of ecosystem issues. Because these waters contain so many beneficial uses, the special planning and study possible in a marine sanctuary is necessary to ensure that they are used and preserved in the future as effectively as possible.

(2) Gray's Reef is both one of the largest naturally occurring live bottoms in the South Atlantic and the closest known live bottom off Georgia. The average Georgia offshore recreational fishing boat (22 feet and 150–175 horsepower) on an average day (2 to 4 foot seas) departing from Sapelo Sound makes the trip to Gray's Reef in one hour or less.

Unlike tropical reefs farther south, Gray's Reef has been isolated from many human impacts. The availability of nearshore artificial reefs and some natural reefs farther offshore Georgia, the environmental constraints posed by unpredictable weather conditions and distance from shore, and the rural character of coastal Georgia tend to limit use of Gray's Reef. However, use of this area is expected to increase in the future in direct relation to increased demand for marine-related recreation, vessel fuel expenses, and development of domestic energy and fishery resources. Whether coastal Georgia's generally rural composition will act as a deterrent so increased use is not known. With or without sanctuary status, Gray's Reef will remain a favored recreational, educational, and research site.

The Designation Document

NOAA's marine sanctuary program regulations (15 CFR Part 922, 44 FR 44831, July 31, 1979) provide that the management regime for a marine sanctuary will be established by two documents, the Designation document (the Designation) and the regulations issued pursuant to Section 302(f) of the Act. The Designation serves as a constitution for the sanctuary, establishing among other things the purpose of the sanctuary, the types of activities that may be subject to regulation within it, and the extent to which other regulatory programs will continue to be effective.

The Gray's Reef National Marine Sanctuary Designation Document is as follows:

Final Designation Document—Designation of The Gray's Reef National Marine Sanctuary

Preamble

Under the authority of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, (the Act), the waters at Gray's Reef in the South Atlantic Bight off the coast of Georgia are hereby designated a National

Marine Sanctuary for the purposes of: (1) protecting the quality of this unique and fragile ecological community; (2) promoting scientific understanding of this live bottom ecosystem; and (3) enhancing public awareness and wise use of this significant regional resource.

Article 1. Effect of Designation

Within the area designated as The Gray's Reef National Marine Sanctuary (the Sanctuary) described in Article 2, the Act authorizes the promulgation of such regulations as are reasonable and necessary to protect the values of the Sanctuary. Article 4 of the Designation lists those activities which may require regulation, but the listing of any activity does not by itself prohibit or restrict it. Restrictions or prohibitions may be accomplished only through regulation, and additional activities may be regulated only by amending Article 4.

Article 2. Description of the Area

The Sanctuary consists of an area of high seas waters covering the live botton which is located 17.5 nmi due east of Sapelo Island, Georgia. Exact coordinates are defined by regulation (§ 938.3).

Article 3. Characteristics of the Area

The Sanctuary consists of submerged limestone rock reefs with contiguous shallow-buried hardlayer and soft sedimentary regime which support rich and diverse marine plants, invertebrates, finfish, turtles, and occasional marine mammals in an otherwise sparsely populated expanse of ocean seabed. The area attracts multiple human use, including recreational fishing and diving, scientific research, and educational demonstrations.

Article 4. Scope of Regulation

Section 1. *Activities Subject to Regulation.* To ensure the protection and preservation of the Sanctuary's marine features and the ecological, recreational, and aesthetic value of the area, the following activities within the Sanctuary may be regulated to the extent necessary:

a. Dredging or alteration of, or construction on, the seabed;
b. Discharging or depositing any substance or object;
c. Vessel operations, including anchoring;
d. Wire trap fishing;
e. Bottom trawling and specimen dredging;
f. Spearfishing;
g. Marine specimen collecting; and
h. Removal of historic or cultural resources.

Section 2. *Consistency With International Law.* The regulations governing the activities listed in Section 1 of this Article will apply to foreign flag vessels and persons not citizens of the United States only to the extent consistent with recognized principles of international law, including treaties and international agreements to which the United States is signatory.

Section 3. *Emergency Regulations.* Where essential to prevent immediate, serious, and irreversible damage to the ecosystem of the area, activities other than those listed in Section 1 may be regulated within the limits of the Act on an emergency basis for an interim period not to exceed 120 days, during which an appropriate amendment of this Article will be proposed in accordance with the procedures specified in Article 6.

Article 5. Relation to Other Regulatory Programs

Section 1. *Defense Activities.* The regulation of activities listed in Article 4 shall not prohibit any Department of Defense activity that is essential for national defense or because of emergency. Such activities shall be consistent with the regulations to the maximum extent practical.

Section 2. *Other Programs.* All applicable regulatory programs will remain in effect, and all permits, licenses and other authorizations issued pursuant thereto shall be valid within the Sanctuary unless authorizing any activity prohibited by any regulation implementing Article 4. The Sanctuary regulations will set forth any necessary certification procedures.

Article 6. Alterations to This Designation

This Designation can be altered only in accordance with the same procedures by which it has been made, including public hearings, consultation with interested Federal and State agencies and the South Atlantic Regional Fishery Management Council, and approval by the President of the United States.

[End of Designation]

Only those activities listed in Article 4 are subject to regulation in the Sanctuary. Before any additional activities may be regulated, the Designation must be amended through the entire designation procedure including public hearing and approval by the President. Spearfishing and anchoring are listed in Article 4 because of the potential for damage; however, no additional regulation of these activities is proposed at this time.

Public Review and Comment

NOAA invites public review and comment on these final regulations. Written comments should be submitted to: Director, Sanctuary Programs Office, Office of Coastal Zone Management, National Oceanic and Atmospheric Administration, 3300 Whitehaven Street, N.W., Washington, D.C. 20235.

Dated: January 19, 1981.

Donald W. Fowler,

Deputy Assistant Administrator for Coastal Zone Management.

Accordingly, Part 938 is added as follows:

PART 938—THE GRAY'S REEF NATIONAL MARINE SANCTUARY REGULATIONS

Sec.
938.1 Authority.
938.2 Purpose.
938.3 Boundaries.
938.4 Definitions.
938.5 Allowed activities.
938.6 Prohibited activities.
938.7 Penalties for commission of prohibited acts.
938.8 Permit procedures and criteria.
938.9 Certification of other permits.
938.10 Appeals of administrative action.
938.11 Amendments.

Authority: Sec. 302(a), (f), (g) and 303 of Title III, Marine Protection, Research and Sanctuaries Act of 1972, as amended, 16 U.S.C. 1431–1434.

§ 938.1 Authority.

The Sanctuary has been designated pursuant to the authority of Section 302(a) of Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended, 16 U.S.C. 1431–1434 (the Act). The following regulations are issued pursuant to the authorities of Sections 302(f), 302(g), and 303 of the Act.

§ 938.2 Purpose.

The purpose of designating the Sanctuary is to protect and preserve the live bottom ecosystem and other natural resources of the waters of Gray's Reef and to ensure the continued availability of the area as an ecological, research, and recreational resource.

§ 938.3 Boundaries.

The sanctuary consists of 16.68 square nautical miles of high sea waters off the coast of Georgia. The sanctuary boundary includes all waters within a rectangle starting at coordinate 31° 21' 45" N, 80° 55' 17" W, commencing to coordinate 31° 25' 15" N, 80° 55' 17" W, thence to coordinate 31° 25' 15" N, 80° 49' 42" W, thence to coordinate 31° 21' 45" N, 80° 49' 42" W, thence back to the point of origin.

§ 938.4 Definitions.

(a) "Administrator" refers to the Administrator of the National Oceanic and Atmospheric Administration.

(b) "Assistant Administrator" refers to the Assistant Administrator for Coastal Zone Management, National Oceanic and Atmospheric Administration.

(c) "Person" is any private individual, partnership, corporation, or other entity; or any officer, employee, agent, department, agency or instrumentality of the Federal government or any State or local unit of government.

§ 938.5 Allowed activities.

All activities except those specifically prohibited by Section 938.6 may be carried out within the Sanctuary subject to all prohibitions, restrictions, and conditions imposed by any other authority.

§ 938.6 Prohibited activities.

(a) Except as may be necessary for national defense in accordance with Article 5, Section 2 of the Designation or as may be necessary to respond to an emergency threatening life, property, or the environment, the following activities are prohibited within the Sanctuary unless permitted by the Assistant Administrator in accordance with Section 938.8. All prohibitions will be applied consistently with international law.

(1) *Alteration of or construction on the seabed.*

No person shall dredge, drill, or otherwise alter the seabed in any way nor construct any structure other than a navigation aid without a permit.

(2) *Discharge of substances.*

No person shall deposit or discharge any materials or substances of any kind except:

(i) Fish or parts, bait, and chumming materials;

(ii) Effluent from marine sanitation devices; and

(iii) Vessel cooling waters.

(3) *Operation of watercraft.*

All watercraft shall be operated in accordance with Federal rules and regulations that would apply if there were no Sanctuary.

(4) *Wire trap fishing.*

No person shall use, place, or possess wire fish traps within the Sanctuary without a permit.

(5) *Bottom trawling and specimen dredging.*

No person shall use a bottom trawl, specimen dredge, or similar vessel-towed bottom sampling device within the Sanctuary without a permit.

(6) *Marine specimen collecting.*

(i) No person shall break, cut, or similarly damage, take, or remove any bottom formation, any marine invertebrate, or any marine plant without a permit.

(ii) No person shall take without a permit any tropical fish, which is a fish of minimal sport and food value, usually brightly colored, often used for aquaria purposes, and which lives in a direct relationship with the live bottom community.

(iii) There shall be a rebuttable presumption that any items listed in this paragraph found in the possession of a person within the Sanctuary have been collected or removed from the Sanctuary.

(iv) No person shall use poisons, electric charges, explosives, or similar methods to take any marine animal or plant.

(7) *Removing or damaging historic or cultural resources.*

No person shall tamper with, damage, or remove any historic or cultural resources without a permit.

(b) All activities currently carried out by the Department of Defense within the Sanctuary are essential for the national defense and, therefore, not subject to these prohibitions. The exemption of additional activities having significant impacts shall be determined in consultation between the Assistant Administrator and the Department of Defense.

(c) The prohibitions in this section are not based on any claim of territoriality and will be applied to foreign persons and vessels only in accordance with recognized priniciples of international law, including treaties, conventions, and other international agreements to which the United States is signatory.

§ 938.7 Penalties for commission of prohibited acts.

Section 303 of the Act authorizes the assessment of a civil penalty of not more than $50,000 against any person subject to the jurisdiction of the United States for each violation of any regulation issued pursuant to the Act, and further authorizes a proceeding in rem against any vessel used in violation of any such regulation.

§ 938.8 Permit procedures and criteria.

(a) Any person in possession of a valid permit issued by the Assistant Administrator in accordance with this section may conduct the specific activity in the Sanctuary including any activity specifically prohibited under Section 938.6, if such activity is (1) research related to the resources of the Sanctuary, (2) to further the educational value of the Sanctuary, or (3) for salvage or recovery operations.

(b) Permit applications shall be addressed to the Assistant Administrator for Coastal Zone Management, Attn: Office of Sanctuary Programs, National Oceanic and Atmospheric Administration, 3300 Whitehaven Street, N.W., Washington, D.C. 20235. An application shall provide sufficient information to enable the Assistant Administrator to make the determination called for in paragraph (c) below and shall include a description of all activities proposed, the equipment, methods, and personnel (particularly describing relevant experience) involved, and a timetable for completion of the proposed activity. Copies of all other required licenses or permits shall be attached.

(c) In considering whether to grant a permit, the Assistant Administrator shall evaluate (1) the general professional and financial responsibility of the applicant, (2) the appropriateness of the methods envisioned to the purpose(s) of the activity, (3) the extent to which the conduct of any permitted activity may diminish or enhance the value of the Sanctuary, (4) the end value of the activity, and (5) other matters as deemed appropriate.

(d) In considering any application submitted pursuant to this section, the Assistant Administrator may seek and consider the views of any person or entity, within or outside of the Federal Government, and may hold a public hearing, as deemed appropriate.

(e) The Assistant Administrator may, at his or her discretion, grant a permit which has been applied for pursuant to this section, in whole or in part, and subject to such condition(s) as deemed appropriate. The Assistant Administrator or a designated representative may observe any permitted activity and/or require the submission of one or more reports of the status or progress of such activity. Any information obtained will be made available to the public.

(f) The Assistant Administrator may amend, suspend or revoke a permit granted pursuant to this section, in whole or in part, temporarily or indefinitely, if the permit holder has violated the terms of the permit or applicable regulations. Any such action will set forth in writing to the permit holder and will include the reason(s) for the action taken. The permit holder may appeal the action as provided for in § 938.10.

§ 938.9 Certification of other permits.

(a) All permits, licenses and other authorizations issued pursuant to any

other authority are hereby certified and shall remain valid if they do not authorize any activity prohibited by Section 938.6. Any interested person may request that the Assistant Administrator offer an opinion on whether an activity is prohibited by these regulations.

(b) The Assistant Administrator may amend, suspend, or revoke the certification made under this section whenever continued operation would violate any term or conditions of the certification. Any such action shall be forwarded in writing to both the holder of the certified permit and the issuing agency and shall set forth reason(s) for the action taken. Either the permit holder or the issuing agency may appeal the action as provided for in Section 938.10.

§ 938.10 Appeals of administrative action.

(a) Any interested person (the Appellant) may appeal the granting, denial, or conditioning of any permit under § 938.8 to the Administrator or NOAA. In order to be considered by the Administrator, such appeal must be in writing, must state the action(s) appealed, and the reason(s) therefore, and must be submitted within 30 days of the action(s) by the Assistant Administrator. The Appellant may request an informal hearing on the appeal.

(b) Upon receipt of an appeal authorized by this section, the Administrator will notify the permit applicant, if other than the Appellant, and may request such additional information and in such form as will allow action upon the appeal. Upon receipt of sufficient information, the Administrator will decide the appeal in accordance with the criteria defined in § 938.8(c) as appropriate, based upon information relative to the application on file at OCZM and any additional information, the summary record kept of any hearing, the Hearing Office's recommended decision, if any, as provided in paragraph (c), and such other considerations as deemed appropriate. The Administrator will notify all interested persons of the decision and the reason(s) for the decision, in writing, within 30 days of receipt of sufficient information, unless additional time is needed for a hearing.

(c) If a hearing is requested or if the Administrator determines one is appropriate, the Administrator may grant an informal hearing before a designated Hearing Officer after first giving notice of the time, place, and subject matter of the hearing in the **Federal Register**. Such hearing must normally be held no later than 30 days following publication of the notice in the **Federal Register** unless the Hearing Officer extends the time for reasons deemed equitable. The Appellant, the Applicant (if different) and other interested persons (at the discretion of the Hearing Officer) may appear personally or by counsel at the hearing and submit such material and present such arguments as determined appropriate by the Hearing Officer. Within 30 days of the last day of the hearing, the Hearing Officer shall recommend in writing a decision to the Administrator.

(d) The Administrator may adopt the Hearing Officer's recommended decision, in whole or in part, or may reject or modify it. In any event, the Administrator shall notify interested persons of the decision and the reason(s) for the decision, in writing, within 30 days of receipt of the recommended decision of the Hearing Officer. The Administrator's action will constitute final action for the Agency for the purposes of the Administrative Procedures Act.

(e) Any time limit prescribed in this section may be extended for a period not to exceed 30 days by the Administrator for good cause upon written request from the Appellant or Applicant stating the reason(s) for the extension.

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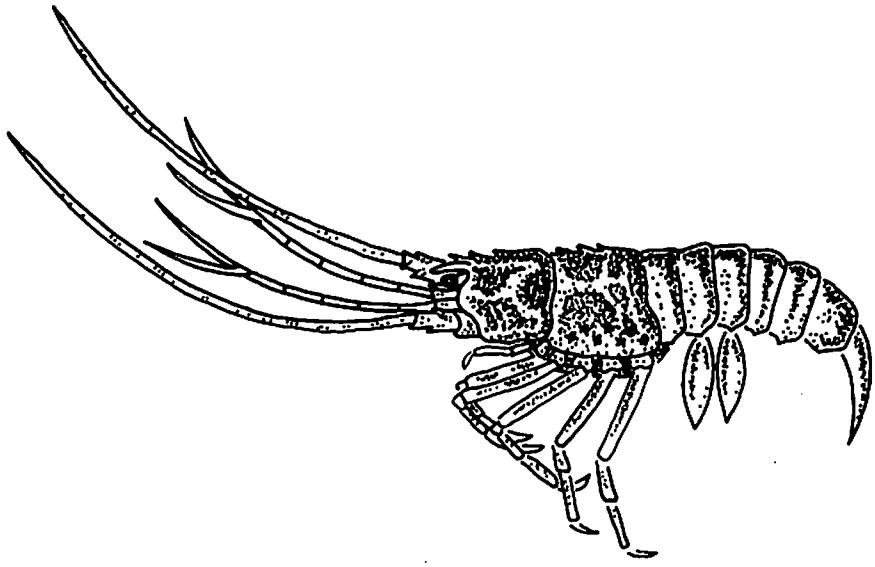

APPENDIX B

DESCRIPTION OF THE GRAY'S REEF NATIONAL MARINE SANCTUARY DESIGNATION PROCESS

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 (16 U.S.C. 1431-1434) authorizes the Secretary of Commerce, with Presidential approval, to designate ocean waters as marine sanctuaries to preserve or restore their conservation, recreational, ecological or aesthetic values. Title III is administered through the Sanctuary Programs Division in the Office of Ocean and Coastal Resource Management (OCRM) of the National Oceanic and Atmospheric Administration (NOAA). The National Marine Sanctuary Program provides for comprehensive management of special marine areas.

Gray's Reef, a nearshore live bottom reef on the South Atlantic Continental Shelf off Georgia, was nominated for consideration as a marine sanctuary in June 1978 by the Coastal Resources Division of the Georgia Department of Natural Resources (DNR). The Gray's Reef nomination was distributed by NOAA among Federal and State authorities, regional fishery management councils, environmental and special interest groups and interested individuals for review and comment in July 1979. In response to favorable comments, and after evaluating the site in accordance with program criteria, NOAA selected Gray's Reef as an Active Candidate for sanctuary designation and announced in the Federal Register (4 Fed. Reg. 58938) its intent to prepare an Issue Paper and to schedule public workshops in areas affected by the proposed designation. The Issue Paper, which described the resources of the proposed sanctuary major management issues, and alternative actions on the issues, was circulated in late October, 1979, for public review and comment. Public workshops were held in Brunswick and Savannah, Georgia, in November 1979 and comments were received.

Response to the Gray's Reef National Marine Sanctuary proposal was generally favorable. Stated as advantages of a sanctuary were coordination of uses and promotion of conservation of live bottom resources and habitats, development of research and education programs and implementation of appropriate regulations that would have beneficial effects. Scientists and resource managers, for example, emphasized the need to expand the current understanding of the nature and role of live bottom ecosystems, especially in light of planned energy development in the South Atlantic and the apparent importance of live bottoms to marine fishery resources. Educators emphasized the value of Gray's Reef as a "living laboratory" and the sanctuary as a vehicle to promote academic and public awareness and understanding of regionally significant live bottom ecosystems. Several commentors stressed the significance of a comprehensive management framework for multiple-use marine resource areas.

On the other hand, some local fishermen and divers took issue with the possible regulation of spearfishing. Explaining that SCUBA diving at the reef is limited by environmental conditions (e.g., sea conditions, depth, and visibility) and that divers observe self-imposed spearfishing policies (e.g., target species type, size and numbers speared), divers contended that spearfishing was less consumptive than hook-and-line

fishing and did not represent a threat of arm to Gray's Reef. Divers expressed an interest in assisting NOAA in the formulation of management and regulatory policies for Gray's Reef.

A few commentors, while not opposing the proposed action, questioned the purpose and need for a marine sanctuary at Gray's Reef. Some felt that the objectives might be pursued through existing regulatory authorities, such as through the regional fishery management councils. Others expressed the reservation that, as a marine sanctuary, Gray's Reef would be subject to increased visibility and perhaps increased human usage, which could detract from existing ecological, recreational and aesthetic values. One commentor contended that a marine sanctuary would impede commercial fisheries potential.

NOAA carefully evaluated all comments, issues and available information and decided to prepare a Draft Environmental Impact Statement (DEIS) for a proposed marine sanctuary at Gray's Reef. The DEIS was circulated for public review in May 1980 (45 FR 39507) and public hearings were held in Brunswick and Savannah in July 1980 (45 FR 41407). Overall, comments received at the public hearings were similar to those voiced at the workshop.

Many persons testified on the benefits of a sanctuary, including conservation of live bottom resources for future generations, protection of fishery habitats for recreational, education and research purposes, and promotion of the scientific understanding of the live bottom and public appreciation of natural marine resources, and that as a control area, Gray's Reef would serve as a biological baseline for comparison with other live bottoms on the South Atlantic Outer Shelf where energy was imminent. Most agreed with the regulatory alternatives to control by permit: the use of wire fish traps, bottom trawls and dredges and other sampling equipment in order to reduce the future risk of harm to live bottom resources, whereas others recommended reconsideration of a proposed regulation to require vessels to anchor in sand channels. Some members of the diving community of coastal Georgia did not fully understand that NOAA would only monitor diving and spearfishing activities, not regulate them, and took issue with the possible regulation of spearfishing.

The Final Environmental Impact Statement (FEIS) responded to all comments received. The proposed regulation on anchoring was dropped and instead anchoring is listed in the Designation Document and will be monitored. The Secretary of Commerce obtained Presidential approval for designating the Gray's Reef National Marine Sanctuary on January 16, 1981. The final rule was published in the Federal Register on January 26, 1981, and became effective April 5, 1981, after a 60-day review period during a concurrent session of Congress.

Following sanctuary designation, NOAA with the assistance of the Coastal Resources Division of the Georgia Department of Natural Resources conducted a management planning workshop on Jekyl Island, Georgia, in December, 1981, to identify management issues and develop strategies to deal with these issues. Three working groups were convened: (1) Sanctuary Administration; (2) Resource Studies, and (3) Interpretation and Recreation. Participants included people from coastal Georgia as well as from elsewhere in the South Atlantic region. Major recommendations from each working group were incorporated into the Gray's Reef National Marine Sanctaury Management Plan.

APPENDIX C

SUMMARY OF RESOURCE STUDIES IN PROGRESS OR RECENTLY COMPLETED

I. PLAN COMPONENT: GEOLOGY ID# GEO-1

II. TOPIC: Hydrography

A. Study Title: Reconnaissance Hydrographic Survey of the Gray's Reef National Marine Sanctuary

B. Information Needs and Study Objectives:

The actual extent of live bottom within and adjacent to the Sanctuary remains undetermined. It has been proposed that live bottom areas lie outside of the 12 sq. nmi. area originally mapped by Hunt (1974) and perhaps outside of the 16 sq. nmi. Sanctuary. Hydrographic survey maps and descriptions of outcrop features are needed.

The objectives of the study are to:

° Obtain continuous and simultaneous regional bathymetric, topographic, and shallow subbottom information on an 80 sq. nmi. area centered around the Sanctuary;

° Document the occurrence and distribution of reef/live bottoms in the survey area as well as other pertinent biological conditions and features;

° Report the results of the survey in such a manner as to facilitate planning/evaluation of any further detailed and accurately located baseline mapping, monitoring, and biogeological studies of the Sanctuary.

C. Study Description:

1. Status: COMPLETED

2. Contract Number: NA-81-AA-H-CZ098

3. Principal Investigator:

Dr. Vernon J. Henry, Jr.
Marine Geology Program
Skidaway Institute of Oceanography
Savannah, GA 31406

4. Methods:

A field survey was carried out by Dr. Vernon J. Henry, Jr. on the Skidaway Institute of Oceanography research vessel, BLUE FIN, in the fall of 1981 and spring of 1982, using high

resolution bathymetric, topographic and sub-bottom profiling systems. An EdoWestern precision depth recorder was used to obtain continuous depth profiles over the survey track lines. An EG&G sidescan sonar was used to map the occurrence and distribution of reefs, hardgrounds, sand waves, and other bottom morphology beneath and 150 meters on each side of the survey track lines. An ORE 3.5 kHz tuned transducer and EG&E UNIBOOM high resolution profiling system was used to obtain shallow (-50 m) sub-bottom stratigraphic information. These data were used to determine the thickness of sand cover over the hard substrate and to help answer questions concerning reef location and time and mode of origin. A sled-mounted close circuit underwater television was towed on the bottom along the track lines. The bottom was continuously viewed on the monitor and recorded on videotape. On the basis of notes taken during CCTV monitoring, supplemented by videotape review and sidescan sonar data, several stations were selected for SCUBA observations, photography, and limited sampling. Station keeping and track line course were maintained by LORAN C and RADAR. In the latter case, reflector buoys were dropped at selected locations to aid in adherence to pre-plot track lines.

5. Study Area:

Within an 80 sq. nmi. area centered around the Sanctuary.

6. Products:

Maps, bathymetric, topographic and sub-bottom profiles, video tapes, still photographs and a final report (Henry and Van Sant, 1982)

D. Continuing or Related Studies:

Hunt (1974) described the live bottom hydrography in his Masters thesis "The Geology and Origin of Gray's Reef." Rock specimens collected as part of the BLM Living Marine Resources of the South Atlantic OCS (Studies 1 and 2) provide additional information on the geomorphology of the Sanctuary. Several regional hydrographic surveys are being or have been conducted using the same or similar survey techniques, including Henry and Giles (1978), Continental Shelf Associates (1979), Henry (1981), Riggs, Hine, and Synder (1981).

III. REMARKS/RECOMMENDATIONS:

The results of this study should be used to design an indepth survey of the Sanctuary to produce detailed hydrographic maps for future research and monitoring purposes.

I. PLAN COMPONENT: ECOLOGY ID# ECO-2

II. TOPIC: Resources Monitoring

A. Study Title: Assessment of Contemporary Visual Fish Censusing Techniques in Live Bottom Areas

B. Information Needs and Study Objectives:

A variety of visual methods have been developed and are being used in coral reef areas to measure the abundance of fish species abundance and to determine aspects of community structure. Some methods utilize direct human sighting (Thompson and Schmidt, 1977; Jones and Thompson, 1978; Bohnsack, 1979; Tilmant, Schmahl and Morrison, 1979; Parker et. al., 1979; Stone et. al., 1979) and others rely on photography (Smith and Tyler, 1973; Alevision and Brooks, 1975). Visual fish censuses are recommended because they (1) provide reliable data; (2) are simple, non-destructive, and highly portable; (3) have low equipment and time requirements; and (4) provide data for comparing different reef fish assemblages in different habitat areas.

The objectives of this study are to analyze, modify as necessary, and field test at Gray's Reef the various fish count techniques currently used in coral reef fish assessment and monitoring programs.

C. Study Description

1. Status: IN PROGRESS

2. Contract Number: NA-81-AA-H-CZ098

3. Principal Investigator/Coordinator:

Georgia Department of Natural Resources
Coastal Resources Division
1200 Glynn Avenue
Brunswick, Georgia 31523-9990

4. Methods:

Modified Jones and Thompson (1978) species-time visual fish count technique.

5. Study Area:

Ledge break and plateau zones within selected live bottom areas of the Sanctuary.

D. Continuing or Related Studies:

Visual fish count techniques, such as the species/time random count technique, have been used in reefal areas for a variety of purposes, including: (1) monitoring reef fish assemblages

in Key Largo Coral Reef National Marine Sanctuary and Fort Jefferson National Monument at the Dry Tortugas (Thompson and Schmidt, 1977; Jones and Thompson, 1978); (2) assessing the impact of recreational activities on reef fish at Biscayne National Park (Tilmant, Schmahl and Morrison, 1979); and (3) studying the role of predation in determining the community structure of coral reef fishes in Key Largo and Looe Key National Marine Sancturies (Bohnsack, unpublished data, 1981).

III. REMARKS/RECOMMENDATIONS:

After an appropriate technique has been agreed upon, reef fishes at Gray's Reef could be monitored using a visual census. Periodic sampling of cryptic fish species, which are often missed using visual techniques, should be conducted. Voucher specimens for all fish species identified should be maintained in a central repository (Ross, 1982, pers. comm.).

I. PLAN COMPONENT: ECOLOGY ID# ECO-4

II. TOPIC: Selected Studies on Invertebrates at Gray's Reef

A. Study Title: Determination of Faunal Communities Associated with Selected Sponges and Octocorals

B. Information Needs and Study Objectives:

South Atlantic sponges and octocorals support epifaunal and infaunal invertebrate assemblages which are thought to be food items for major demersal fisheries and sea turtles. Little information is available to describe these associations. McCloskey (1970) studied the flora and fauna associated with isolated Oculina coral heads off North Carolina and found over 70 species of invertebrates living in or on a single coral head. Information is needed on the type and abundance of invertebrates associated with sponges and octocorals at Gray's Reef and other Georgia Bight live bottoms and the value of their contribution to the maintenance of these ecosystems.

The objective of this study is to describe and quantify the invertebrate communities supported by selected sponge and octocoral species. Comparison of these data with an on-going assessment of the diets of important fish species associated with the live bottom area will help evaluate whether disturbance of sponge and octocoral communities has serious consequences on the stability of fish populations which feed in these areas (SCMRRI & GADNR, 1981).

C. Study Description:

1. Status: IN PROGRESS

2. Contract Number: NA-81-AA-H-CZ098

3. Principal Investigators:

Georgia Department of Natural Resources (GADNR)
Coastal Resources Division
1200 Glynn Avenue
Brunswick, Georgia 31523-9900

South Carolina Wildlife and Marine Resources Department
Marine Resources Research Institute (SCMRRI)
P.O. Box 12559
Charleston, SC 29412

4. Methods:

Selected sponge and octocoral species will be bagged and removed intact by divers. Each sample will be analyzed in the laboratory to identify and quantify associated fauna. Sampling will be performed in conjunction with roller trawl assessment study (ID# SPS-2).

5. Study Area:

Live bottom near Artificial Reef J (see Fig. II-4, p. II-9).

6. Products:

Analysis of sponge and octocoral communities. Final report incorporated into roller trawl assessment report.

D. Continuing or Related Studies:

Information on invertebrate communities of live bottom areas exists as a result of the South Atlantic OCS Area Living Marine Resources Study, Years 1 and 2 (SCMRRI & GADNR, 1981). The diets of important fish species associated with live bottom areas are also being assessed under this study. These data will be available for comparison. Also see ID# SPS-2 and McCloskey (1970).

III. REMARKS/RECOMMENDATIONS:

Some damage will occur as a result of selected sampling, although it is expected to be minimal. Because of this, the principal investigators decided to use an off-sanctuary sampling location.

I. PLAN COMPONENT: SPECIAL PROJECTS AND STUDIES ID# SPS-1

II. TOPIC: Census of Sanctuary Visitors

A. Study Title: Gray's Reef National Marine Sanctuary Visitation Study

B. Information Needs and Study Objectives:

Sanctuary visitors are defined as those people actually present within the sanctuary at any given time (Dobbin, 1982). People visit Gray's Reef for a variety of purposes, including recreation, research, and education. For management purposes, it is important to know the magnitude and the spatial and seasonal patterns of sanctuary use.

The objective of this study is to monitor visitor activities at Gray's Reef by conducting overflight surveys.

C. Study Description:

1. Status: IN PROGRESS

2. Contract Number: NA-82-AA-H-CZ030

3. Principal Investigator:

Nick Nicholson, Sanctuary Coordinator
Gray's Reef National Marine Sanctuary
Georgia Department of Natural Resources
Coastal Resources Division
3300 Glynn Avenue
Brunswick, Georgia 31523-9990

4. Methods:

Aerial overflights are conducted on a random basis as determined by a random numbers table. At an elevation of <3,000 feet AGL, the following information is recorded: date/time of day; weather conditions (wind speed and direction, wave height and condition); number of vessels observed under categories of commerical, recreation and other; type of activity (e.g., anchored, drifting, trolling, bottom fishing, diving, in transit, research activities); and any additional observations or remarks. Similar observations are made by on-site sanctuary personnel when in the Sanctuary conducting research or checking sanctuary buoy conditions. Observations by volunteer aviators and boat captains are encouraged and are reported to the Sanctuary Coordinator.

5. Study Area:

Within the Sanctuary.

7. Products:

Analysis of sanctuary visitation patterns reported in required quarterly reports.

D. Continuing or Related Studies:

Visitation studies are being conducted in other national marine sanctuaries.

III. REMARKS/RECOMMENDATIONS:

Data accumulated to date confirms that Gray's Reef does not receive a high level of use.

I. PLAN COMPONENT: SPECIAL PROJECTS AND STUDIES ID# SPS-2

II. TOPIC: Environmental Impact of Selected Activities in Live Bottom Areas

A. Study Title: Assessment of Roller-Rig Trawl Impacts on Benthic Habitats

B. Information Needs and Study Objectives:

The use of roller trawls in live bottom areas has caused considerable recent controversy over the possible adverse impacts on sessile benthos, fish stocks, and the recreational value of the affected areas. In recent years, use of fish trawls has increased in the South Atlantic, due in part to development of new gears, the high value of target species, and an increasing need to diversify the current fishing industry. Several research programs are using standardized, roller-rigged, high fly trawls to investigate the groundfish communities of live bottom habitats. The effects of using this type of gear on live bottom communities are unknown.

The objectives of the study are to:

° Determine the number and species of large benthic invertebrates damaged or removed from an inshore live bottom habitat by trawling with a standard research trawl; and

° Determine the rate at which large sessile invertebrate populations grow, recover and recolonize after a research trawl has been pulled across a live bottom area.

C. Study Description:

1. Status: IN PROGRESS

2. Contract Number: NA-81-AA-H-CZ098

3. Principal Investigators:

Georgia Department of Natural Resources
Coastal Resources Division
1200 Glynn Avenue
Brunswick, GA 31523-9990

South Carolina Wildlife and Marine Resources Department
Marine Resources Research Institute
P.O. Box 12559
Charleston, SC 29412

4. Methods:

Because of the potential for damage to the sanctuary resources, a study site was chosen outside of the sanctuary boundary. During late summer 1982, Georgia Department of Natural Resources (DNR) divers conducted in situ quantitative assessment of selected sponges and octocorals inhabiting a predesignated area of the study site. Afterwards, the South Carolina Wildlife and Marine Resource Department's research vessel OREGON towed a modified URI roller-rigged fish trawl through the area. Divers made an immediate visual assessment of damage and will return to the same area six months and one year after trawling to assess recovery. An assessment of trawl entrapment will also be conducted.

5. Study Area:

Live bottom near Artificial Reef J (see Fig II-4, p. II-9).

6. Products:

Documentation of the impact to and recovery of live bottom areas in response to roller-rigged trawling. Final Report expected fall, 1983.

D. Continuing or Related Studies:

This study will be conducted in conjunction with ID# ECO-4 "Determination of Faunal Communities Associated with Selected Sponges and Octocorals." Much information on the invertebrate community of Gray's Reef and other live bottom areas exists as a result of the South Atlantic OCS Area Living Marine Resources Study, Years 1 and 2 (SCMRRI & GADNR, 1981). This information will be available for comparison with results of this study. In addition, SCMRRI is assessing the diets of important fish species associated with live bottom areas. Comparison of this data with the faunal composition associated with sponges and octocorals will help evaluate whether repeated trawling may have serious consequences on the stability of fish populations associated with these areas.

APPENDIX D

DRAFT GUIDELINES FOR RESEARCH IN NATIONAL MARINE SANCTUARIES

I. GUIDELINES FOR PREPARING AND SUBMITTING PROPOSALS FOR RESEARCH IN NATIONAL MARINE SANCTUARIES

Types of Research Supported

Management of national marine sanctuaries is based upon information acquired through basic and applied research. The Sanctuary Programs Division (SPD) of the Office of Ocean and Coastal Resource Management in the National Oceanic and Atmospheric Administration (NOAA) provides limited support for outstanding projects which will enhance scientific understanding of sanctuary environments, improve management decisionmaking, or enhance public awareness, understanding or wise use of the sanctuary areas. The SPD considers proposals for support of research in any field of science or resource management. To determine the appropriateness of a project for potential sanctuary support, applicants are encouraged to consult sanctuary management plans, sanctuary regulations, and proposal evaluation criteria (see Guidelines for Evaluating Proposals).

Types of Proposals

The SPD provides limited financial support through grants, contracts, and cooperative agreements. Cost-sharing and coordination with other government agencies, universities and private institutions are encouraged.

The SPO considers proposals from U.S. universities and colleges acting on behalf of their faculty members; nonprofit, nonacademic research institutions (e.g., research laboratories, independent museums, professional societies); private profit organizations; local, state or other Federal government agencies; and unaffiliated scientists who have the capability and facilities needed to perform the work and otherwise meet conditions described in these guidelines.

Proposals for research in national marine sanctuaries fall under one of several categories as defined below:

1. Competitive Proposals

Any procurement for which bids, quotations, or proposals are solicited or requested from several qualified sources for competitive evaluation. Requests for proposals (RFP) and scope of work are published in the Commerce Business Daily.

2. Noncompetitive Proposals

Any procurement for which bids, quotations or proposals are solicited or requested from only one source or for which only one bid, proposal or quotation is received. Noncompetitive proposals are considered when: (1) no other source has the capabililities and/or experiences; (2) efforts to find other firms are unsuccessful; (3) only the one proposed contractor can meet the required delivery schedule; or (4) it would be less than economic if the requirement was not procured by the specified source.

3. Unsolicited Proposals

Any formal written offer to perform a proposed task or effort that is initiated and submitted by a qualified perspective contractor without a solicitation by SPD. SPD encourages the submission of ideas, concepts or suggestions that may help to improve or enhance its mission or activities through unique or innovative methods or approaches.

General Policies

Proposals for research in national marine sanctuaries are evaluated in accordance with stated evaluation criteria (see Guidelines for Evaluating Proposals). All proposals are carefully reviewed by appropriate NOAA and SPD officials, on-site sanctuary officials, and outside experts in the particular field(s) represented by the proposal.

SPD does not normally support open-ended projects, projects with vague goals, projects with untested and unproven methods, or projects that will have adverse impacts on the sanctuary environment. New methods should be field tested and evaluated in small projects before use in major projects supported by SPD in order to ensure a high probability of successful project completion.

SPD will consider providing support for research conducted outside of the sanctuary if the proposed effort is of importance to the sanctuary. When proposals include activities prohibited by sanctuary regulations, it may be determined that all or part of the research should be conducted outside the sanctuary boundary. Sanctuary regulations and Guidelines for Research/Education Permits should be consulted to determine the appropriateness of the research approach considered before a proposal is submitted to SPD. Under special circumstances, activities otherwise prohibited by sanctuary regulations may be permitted under NOAA permit or otherwise conditioned to reduce the threat of harm to the environment.

When research supported by other sources is to be conducted in the sanctuary, SPD and on-site sanctuary personnel should be notified in advance by the principal investigator to help assure that responsible program personnel are aware of all research activities in a particular sanctuary.

Provisions for emergency response and funding in crisis situations that may affect the sanctuary are being considered. During the past, several potential emergency situations have occurred, including oil spills, massive fish kills, apparent epidemics of disease, and boat groundings for which no contingency plan was in place to respond to the crisis and assess its impact in an organized and timely fashion.

Proposal Content

The information contained herein should provide sufficient guidance for the preparation and submission of proposals suitable for evaluation by SPD and qualified reviewers. Proposals should cover the points described below, where applicable, in the order indicated.

1. Cover Sheet. The cover sheet should identify the following, where applicable:

- Announcement or solicitation number and closing date (if any) or identify as unsolicited
- Name of national marine sanctuary where proposed project would be conducted
- Title of proposed project
- Name and address of organization to which the award should be made
- Type of organization
- Name, address and phone number of principal investigator and additional key project representatives
- Requested amount
- Proposed project duration
- Desired start date
- Other funding sources (actual or potential)
- Previous award numbers for renewal or continued support

The title of the proposed research project should be brief, informative and intelligible to the general public. The SPD may edit the title or recommend changes before making an award.

Specification of a desired starting date does not guarantee award by that date (see pagae D-6). Work on the project should not begin before the effective date designated on the official notification of the award.

A proposal should be cleared through and signed by the organizational official authorized to contractually obligate the organization. The principal investigator is also signatory.

2. Project Summary

A 250-word project summary should include a brief statement of research objectives, scientific methods and significance of the proposed work to a particular sanctuary or to the national marine sanctuary system. The summary should be informative and suitable for use in the public press.

3. Project Description

The main body of the proposal should be concise, but detailed. The project description normally should not exceed 10 single-spaced pages. It should include:

a. Description of Current State of Knowledge

Discuss significant previous work in the area and how the proposed effort will enhance or contribute to improving the state of knowledge.

b. Project Objectives

State the objectives of the study and expected significance. Describe how the anticipated results relate to sanctuary and national information needs and to other works in progress.

c. Methods

Describe the tasks which must be performed to accomplish the objectives described above. Provide adequate description of experimental methods and procedures. Describe the rationale for selecting the proposed methods over any alternative methods. Identify any environmental consequences. Cite references. If approach involves removal or manipulation of sanctuary resources or activities prohibited by sanctuary regulations, a request for a sanctuary permit is required -- see Guidelines to Research/Education Permits. It should be noted that this request may be denied.

List and describe use of equipment to be purchased, leased or rented. List and describe facilities and equipment to be used by principal investigator at no additional cost to the government. Collaborative arrangements and cost-sharing are encouraged and should be documented in the proposal.

4. Research Team

Describe the research team and the assignment of team members to specific tasks. Provide a brief resume of each participant. Include the highest degree, experience and qualifications related to the proposed program. In an appendix, list each investigator's publications during the past 5 years.

5. References

Cite only those used in the text.

6. Budget

The applicant may request funds under any of the categories listed below as long as the item is considered necessary to perform the research. The applicant should provide justification for major items requested.

a. Salaries and wages. Salaries and wages of the principal investigator and other members of the project team constitute direct costs in proportion to the effort devoted to the project. The number of full-time person months or days and the rate of pay (hourly, monthly or annual) should be indicated. Salaries requested must be consistent with the institution's regular practices. The submitting organization may request that salary data remain proprietary information.

b. Fringe Benefits. Fringe benefits (i.e., social security, insurance, retirement) may be treated as direct costs so long as this is consistent with the institution's regular practices.

c. Equipment. Itemize equipment to be purchased, leased or rented by model number and manufacturer, where known. Describe purpose of use. SPD defines equipment as an item of property that has an acquisition cost of $300 or more and an expected service life of 2 years or more. Equipment becomes the property of SPD at the termination of the contract. Where possible and economically advantageous, equipment should be rented or leased for the duration of the project.

d. Travel. Describe the type and extent of travel and relation to the proposed research. Travel expense should not exceed 40 percent of total direct costs. Funds may be requested for field work and subsistence and for consultant's travel.

e. Other Direct Costs. The budget should itemize other anticipated costs under the following categories:

(1) Materials and Supplies. The budget should indicate in general terms the types of expendable materials and supplies required and with their estimated costs.

(2) Research Vessel or Aircraft Rental. Include unit cost and duration of use.

(3) Laboratory Space Rental. Funds may be requested for use of laboratory space at research establishments away from the grantee institution while conducting studies specifically related to the proposed effort.

(4) Reference Books and Periodicals. Funds may be requested for reference books and periodicals only if they are specifically required for the research project.

(5) Publication and Reproduction Costs. This includes costs of preparing written text and illustrations and publishing results.

(6) Consultant Services. Consultant services should be justified and information furnished on consultant's expertise, primary organizational affiliation, daily compensation rate (not to exceed $193 per day), and number of days of expected service. (Travel should be listed under travel in the budget).

(7) Computer Services. The cost of computer services, including data analysis and storage, word processing for report preparation and computer-based retrieval of scientific and technical information, may be requested and must be justified.

(8) Subcontracts. Subcontracts must be be disclosed in the proposal for approval by SPD.

f. Indirect Costs. Appropriate or established indirect cost rate.

7. Other Sources of Financial Support

List all current, pending, and soon to be submitted research to which the principal investigator or other key personnel have committed their time during the same period as the proposed work, regardless of the source of support. Indicate the number of person-months or percentage of time devoted.

If the proposal submitted to SPD is being submitted to other possible sponsors, list them and describe the extent of support sought. Disclosure of this information will not jeoparadize chances for SPD funding.

8. Request for Sanctuary Support Services

SPD has limited on-site sanctuary personnel, facilities and equipment which may be used on loan or lease to support research under special circumstances. Requests should include the following information: (1) type of support requested; (2) justification; (3) dates and duration of use; and (4) alternative plans if support is not available.

9. Coordination with Other Research In Progress or Proposed

Collaboratiave field work and data interpretation is encouraged. If plans are being made to coordinate aspects of the proposed effort with ongoing or proposed research in the sanctuary, describe the nature and extent of the coordination effort.

Submission of Proposals

Dates for submission of solicited proposals are announced in solicitations in the Commerce Business Daily. Unsolicited research proposals may be submitted at any time but in order to be funded in a particular fiscal year (ending September 30), proposals should be received no later than January 31 of that year. Applicants should allow at least three (3) months for review.

Five (5) copies of the proposal should be submitted to:

Dr. Nancy Foster
Deputy Chief
Sanctuary Programs Division
Office of Ocean and Coastal Resources Management
National Oceanic and Atmospheric Administration
3300 Whitehaven Street, N.W.
Washington, D.C. 20235

II. GUIDELINES FOR PROCESSING AN EVALUATING RESEARCH PROPOSALS

Receipt and Acknowledgement of Proposals

Receipt of research proposals is acknowledged by the Deputy Director of SPD. Proposals are checked for completeness and adherence to the stated guidelines. Complete proposals are recorded and assigned tracking numbers. Incomplete proposals are returned to sender for clarification. NOAA and Department of Commerce criteria and guidelines for consideration of proposals are followed.

Selecting Review Boards for Evaluating Proposals

SPD has assembled a registry of recognized scientists and resource managers who have indicated a willingness, or who have been recommended by their peers, to serve on proposal review boards in their particular fields. After a proposal has been screened, SPD selects a review board of 3 to 10 persons including, but not limited to, inhouse staff, on-site sanctuary personnel, and persons on the registry. Review board members must have a demonstrated understanding of the particular sanctuary and the problem represented by the proposal and a lack of bias to enable performance in a meaningful evaluation.

Criteria for Evaluating Proposals

The criteria presented below are applied to all proposals in a balanced and judicious manner in order to select the most meritorious proposals for support by SPD.

- Relevance or Importance of the Research to Sanctuary Management -- this criterion is used to assess the relevance or importance of the research to site-specific, regional, or national marine resource management issues and the likelihood that the research will contribute to improved sanctuary management decisionmaking. Also considered under this criterion is the proposal's demonstrated grasp of the problem (i.e., does the proposal demonstrate a clear understanding of the problem, the total research requirement, the mission of the national marine sanctuary program, the goals and objectives of the site-specific sanctuary, and other integral factors which are germane to achieving the objectives of the proposal?). Also considered here are factors such as the project's uniqueness, innovation, or meritorious approach.

- Scientific or Educational Merits of the Research -- this criterion is used to assess the likelihood that the research will contribute to improving scientific understanding of the sanctuary environment, and thus improve management capabilities, or contribute to promoting public awareness, understanding and wise use of the sanctuary environment. The value of the particular contribution is also considered.

° Research Quality -- this criterion is used to assess the following:

(1) Qualifications, Capabilities, and Experience of the Principal Investigator and Key Personnel (i.e., experience related to the procedures, methodologies and techniques to be employed; education and experience in the general technical field; and publishing record);

(2) Technical Approach (i.e., the degree to which the offeror states clear objectives, assumptions and possible solutions; the soundness of approach--the degree to which the offeror's proposed methods, techniques and procedures are suited to the program objectives and the affected environment; the degree to which the proposal demonstrates an understanding of those methods, techniques, and procedures; the adequacy in satisfying project requirements and tasks; the probability of success; the degree to which the proposed program scheduling is realistic and comprehensive; the degree to which the offeror demonstrates an understanding of past and on-going research programs; the adequacy to which the offeror will utilize other resources; and the degree to which the proposed technical program plans to integrate, interpret, and synthesize specialized and interdisciplinary data).

(3) Available Support (i.e., facilities, equipment, and degree of support available to the proposed effort at no additional cost to the government; program management support; accountability).

In addition to the criteria listed above, proposals are evaluated to determine:

(1) environmental consequences of conducting or not conducting the research (2) whether or not the research should be conducted in the national marine sanctuary or outside of its boundary; (3) if it is germane to the interests of the National Marine Sanctuary Program; (4) whether or not the material contained in the proposal is already available to the Government from other sources; and (5) if any other local, private, state, or Federal program would have an interest in the proposed project.

During the evaluation period, proposals and any other relevant materials are closely safeguarded. Proposals can only be duplicated by SPD. If additional copies are required for evaluation, they must be obtained from SPD.

Proposal Acceptance and Declination

Review board members will provide final recommendations to NOAA/SPD within 30 working days after receipt of proposals for review. All copies of proposals will be returned to SPD.

SPD is responsible for making the final award decision. Declined proposals are returned. Applicants may request and receive the reasons for the action.

Proposals that are selected for support are forwarded to the NOAA Grants Office for negotiation with the organization to which the award is to be made. SPD recommends any special award conditions at that time. The award is signed by the NOAA Grants Officer and sent to the organization and principal investigator for acceptance. The award period begins on the day of acceptance by the organization unless otherwise stated in the award. A signed copy of the award is returned to NOAA.

III. GUIDELINES FOR REQUESTS FOR SANCTUARY PERMITS

Introduction

Permits may be issued by the Assistant Administrator for National Ocean Service or his or her designee under special circumstances for activities otherwise prohibited by sanctuary regulations when related to (1) research to enhance scientific understanding of the sanctuary environment or to improve management decisionmaking; (2) education to further public awareness, understanding, and wise use of the sanctuary environment; or (3) salvage and recovery operations. Requests for permits are carefully reviewed by SPD program officials, on-site sanctuary officials, and outside experts where necessary. A person in possession of a valid permit must abide by all provisions set forth in the permit and sanctuary regulations.

Application for a Permit

1. Title Page. This includes (1) name of the national marine sanctuary in which the proposed activity will take place; (2) title of project; (3) name, address, telephone number, and affiliation of application; (4) name, affiliation, and relationship of colleagues to be covered by the permit; (5) dates of proposed work; (6) key words; and (7) signature of applicant on letterhead stationary.

2. Abstract. This includes a clear and concise description of the proposed effort in approximately 250 words. The abstract should include a brief statement of research objectives, scientific methods and significance of the proposed work to a particular sanctuary or to the national marine sanctuary system. The abstract should be informative and suitable for use in the public press.

3. Technical Information. This includes clear, concise and complete statements of the following:

a. Need. Establish need. Discuss significant previous work in the area of interest and how the proposed effort will enhance or contribute to improving the state of knowledge. Explain why the proposed effort should be performed in the sanctuary and the potential benefits of the proposed effort to: (1) further scientific understanding of the sanctuary environment; (2) improve management decisionmaking; (3) further the

educational value of the sanctuary; or (4) aid in necessary salvage or recovery operations.

b. Objectives. State the objectives of the study and expected significance. Describe how the anticipated results relate to sanctuary or national information needs and to other works in progress.

c. Methods. Describe what is to be studied, measured, observed, collected, assessed, modified, and/or constructed. Describe prime apparatus, equipment, systems, and approach to be used. State how each will be used and the rationale of selecting proposed approach over alternative methods. Indicate the type and quantity of collections to be made. Indicate whether these collections could be made outside of the sanctuary.

d. Study Location. Provide a map and indicate study location. Describe habitat areas of particular concern. Indicate where the laboratory procedures will be conducted, if applicable.

e. Project Team. Describe the research team composition and the assignment of team members to specific tasks. Note that only those persons specifically listed on the permit will be allowed to participate in permitted activities.

f. Environmental Consequences. Indicate the environmental consequences of conducting an otherwise prohibited activity.

g. Treatment of Results. Describe the nature and extent of anticipated results. Indicate how the results will be treated (e.g., published in a reference journal, incorporated into academic curriculum, used in management decisionmaking, published in the public press). If specimens are to be collected, indicate where they will be deposited (e.g., in a museum, sanctuary repository, herbarium, etc). Note that NOAA/SPD reserves the right to designate repositories for specimens removed from national marine sanctuaries.

4. Supporting Information

a. Financial Support. Provide contact number, performance period, and name of sponsoring agency.

b. Sanctuary Support Services. Personnel and facilities at most sanctuary sites are extremely limited. However, depending on need and availability of sanctuary support services (i.e., personnel, boats, or equipment), some support may be provided. Requests for support should accompany the permit application and include the following information: (1) type of support requested; (2) justification; (3) dates and length of use; and (4) alternative plans if support is not available.

c. Coordination with Studies in Progress. SPD encourages coordination and cost-sharing among investigators to enhance scientific capabilities and avoid unnecessary duplication of effort. Applications should include a description of these efforts, if applicabale.

Submission of Requests for Permits

Requests for permits should be submitted in five (5) duplicate copies at least three (3) months in advance of the effective date requested to allow sufficient time for evaluation and processing. In proven emergency situations, exceptions to this requirement may be considered.

Requests for permits should be addressed as follows:

Assistant Administrator for National Ocean Service
ATT: Sanctuary Programs Division
Office of Ocean and Coastal Resources Management
3300 Whitehaven St., N.W.
Washington, D.C. 20235

Requests for Amendments to Active Permits

Requests for extension of permit period, change in study design or other form of amendment to active permits should also conform to these guidelines. All pertinent information needed to make an objective evaluation of the amendment should be included in the request. The applicant may reference the original application in his or her request. Unless otherwise indicated, the terms of the original permit will remain in effect.

Evaluation of Permit Requests

Permit requests are checked for completeness and adherence to these guidelines. Complete requests are forwarded to the appropriate NOAA/SPD program officials, on-site sanctuary personnel, and outside experts, where necessary, for review and evaluation. Requests are judged on the basis of (1) relevance or importance to fulfilling sanctuary goals and objectives; (2) scientific or educational merits; (3) appropriateness and environmental consequences of technical approach; (4) experience and expertise of applicant and team members; (5) proposed treatment of results; and (6) whether the proposed effort could or should be conducted outside of the sanctuary. Reviewers are requested to provide their recommendations within 30 working days after receipt of the application.

Conditions of Permits

Based on the findings of the evaluation, SPD recommends an appropriate action to the Assistant Administrator. If denied, applicants are notified of the reason for denial. If approved, the Assistant Administrator signs and issues the permit. The applicant must counter-sign the permit and return a copy to SPD.

As instructed in the permit, Permit holders must contact on-site sanctuary personnel prior to conducting permitted activities in the sanctuary. NOAA/SPD Research Flag will be issued to the permit holder. The flag must be displayed by the permit holder while conducting the permitted activity and returned to on-site personnel upon completion of the permitted activity. This requirement not only assures that sanctuary personnel are aware of permitted activities, but also alerts other sanctuary users that research is in progress.

Permits must be carried on the research vessel and made available upon request for inspection by sanctuary personnel or law enforcement officials.

Only persons specifically listed as colleagues on the permit may participate in permitted activities. Permits and NOAA/SPD flags are non-transferrable.

Permitted activites must be conducted with adequate safeguards for the environment. Insofar as possible, the environment shall be returned to the condition which existed before the activity occurred.

Permitted activities will be monitored to ensure compliance with the conditions of the permit.

Any information obtained pursuant to the permitted activity shall be made available to the public. Submission of one or more reports to SPD on the permitted activity may be required.

The Assistant Administrator may amend, suspend, or revoke a permit granted pursuant to these guidelines and sanctuary regulations, in whole or in part, temporarily or indefinitely, if in his/her view the permit holder(s) acted in violation of the terms of the permit or of applicable sanctuary regulations, or for any good cause shown. Any such action shall be communicated in writing to the permit holder, and shall set forth the reason for the action taken. The permit holder in relation to whom the action is taken may appeal the action as provided for in sanctuary regulations.

Monitoring of Performance

NOAA/SPD and on-site sanctuary personnel have established a recording and tracking system for sanctuary permits. Officials review performance in relation to the conditions of the permit and may also periodically assess work in progress by visiting the study location and observing any activity permitted by the permit or by reviewing any required oral or written progress reports. The discovery of any potential irregularities in performance under the permit shall be promptly reported and appropriate action taken. Permitted activities will be evaluated and the findings will be used to evaluate future applications.

APPENDIX E

A comprehensive bibliography accompanies the Gray's Reef National Marine Sanctuary Final Environmental Impact Statement (DOC, 1980). Listed below are references cited in the management plan and does not represent an exhaustive listing.

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Bell, B. and A. B. Smith. 1981. Personal Communication. Adventure Bound Sports. Savannah, GA.

Bohnsack, J. A. 1982. Resiliency of coral reef fish community structure in response to reduced harvesting pressure. A proposal to the Office of University Affairs of the National Oceanic and Atmospheric Administration. January 1, 1982. 16 pp. + Appendices

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Dobbin, James, Associates Limited. 1981. A Proposal National Marine Sanctuaries Management Plans and Guidelines. Submitted to Marine Sanctuaries Program Office of Coastal Zone Management, NOAA, Washington, D.C.

Dobbin, James, Associates Limited. 1982. Final Draft Looe Key National Marine Sanctuary Management Plan. Funded by the Sanctuary Programs Division of the National Oceanic and Atmospheric Administration under Contract No.

Georgia Department of Natural Resources, Coastal Resources Division. 1981. Coast Cards: Gray's Reef National Marine Sanctuary. Brunswick, GA.

Georgia Department of Natural Resources, Coastal Resources Division and South Carolina Wildlife and Marine Resources Department, Marine Resources Research Institute. 1981. A proposal for an assessment of Contemporary visual fish censusing techniques for use in live bottom areas. Funded by the Sanctuary Programs Division of the National Oceanic and Atmospheric Administration under Cooperative Agreement NA81AAHCZ098, Amendment 1.

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Gilligan, M. R. 1981. A proposal for a field guide to the fishes in the vicinity of the Gray's Reef National Marine Sanctuary. Funded by the Sanctuary Programs Division of the National Oceanic and Atmospheric Administration under Contract No. NA82AAA02924.

Gordon, W. 1981. Personal communication. Georgia Department of Natural Resources. Coastal Resources Division. Brunswick, GA.

Gray, M. B. 1961. Unpublished notes and species lists from stations in the vicinity of Sapelo Whistle Buoy. Univ. Georgia Mar. Inst., Sapelo Island, GA.

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Gulf of Mexico Fishery Management Council and South Atlantic Fishery Management Council. 1981. Fishery Management Plan, Environmental Impact Statement and Regulatory Impact Review for Spiny Lobsters in the Gulf of Mexico and South Atlantic. April, 1981.

Harris, C. D. 1978. The fisheries resources on selected artificial and live bottom reefs on Georgia's Continental Shelf. Coastal Resources Division, Georgia Department of Natural Resources, Brunswick, GA.

Henry, V. J., Jr. 1981. Summary of Results of Reefs and Hardgrounds Workshop Held at the Duke University Marine Laboratory, Beaufort, NC. September 23-24, 1981. Sponsored by the U. S. Department of the Interior, Bureau of Land Management, New Orleans Outer Continental Shelf Office, New Orleans, LA. Coordinated by: Science Applications, Inc., Raleigh, NC. 44 pp.

Henry, V. J., Jr. and R. T. Giles. 1979. Distribution and occurrence of reefs and hardgrounds in the Georgia Bight. A draft final report to U. S. Geological Survey, Office of Marine Geology, Woods Hole, MA. 55 pp.

Henry, V. J., Jr. and S. B. Van Sant. 1982. Results of reconnaissance mapping of the Gray's Reef National Marine Sanctuary. A report prepared for the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Ga, under cooperative agreement with Sanctuary Programs Division of the National Oceanic and Atmospheric Administration (No. NA81AAHCZ098, Amendment 1).

Hunt, J. L., Jr. 1974. The geology and origin of Gray's Reef, Georgia Continental Shelf. M. S. Thesis. Univer. of Georgia. Athens, GA. 83 pp.

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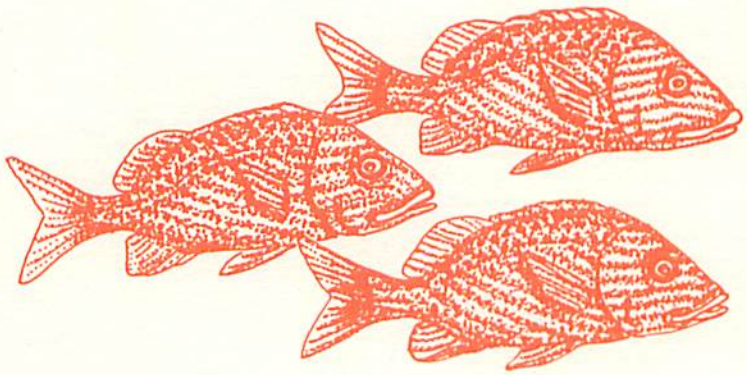

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