

ORIGINAL

Key Largo

National Marine Sanctuary

Management Plan

Key Largo

U. S. Department of Commerce

**National Oceanic and
Atmospheric Administration**



Sanctuary Programs Division

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U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
Office of Ocean and Coastal Resource Management
Sanctuary Programs Division
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EXECUTIVE SUMMARY

Title III of the Marine Protection, Research and Sanctuaries Act of 1972 (Pub. L. 96-332) authorizes designation of marine areas as sanctuaries to preserve or restore conservation, recreational, ecological or esthetic values. Growing levels of human activities associated with the South Florida Coral Reef Tract and the reefs environmentally sensitive nature led to the designation of the Key Largo National Marine Sanctuary in 1975.

The Sanctuary protects approximately 100 square miles of marine resources in federal waters off the coast of Key Largo, Florida. The coral reef tract in the Sanctuary represents some of the world's northernmost living barrier reefs and the only reefs located in continental U.S. waters. A diverse array of invertebrates and fish inhabit the overhangs, crevices, sand flats, seagrass meadows and other microhabitats located in the Sanctuary.

Accessible from Miami and the upper Keys, the Sanctuary reefs are heavily used, particularly in the summer, by divers, snorkelers, research scientists and recreational and commercial fishermen. With such striking natural resources, and educational and recreational opportunities, a comprehensive management framework is essential to ensure the reef's long-term viability.

Since 1975, management efforts have focused on increasing understanding of the reefs ecology through research and on encouraging wise recreational use through interpretation. The initial programs to achieve these goals were directed by a management plan prepared in 1979. This revision of the 1979 management plan uses knowledge gained from past management experiences to formulate strategies for resource protection, interpretation, and research studies over the next five years.

The plan presents the future sanctuary management in two phases. During the first two years of implementation (Phase 1), the focus will be on resolving the current management issues and improving existing operations. Phase 2 activities will be determined based on an evaluation of the effectiveness of Phase 1 activities and identification of management needs over the longer term.

Management issues of concern during Phase 1 include: concentration of visitor activities in the southern portion of the sanctuary; inadequate facilities for visiting scientists which severely limits the scope of work conducted in the Sanctuary; level of proposed development planned for upper Key Largo adjacent to the Sanctuary; and, the increasing occurrence of coral and fish diseases. Strategies to resolve these management issues can be found in Section III. Phase 1 activities are likely to include:

- ° evaluate mooring buoys effectiveness;
- ° evaluate surveillance and enforcement effectiveness;

- develop long-term interpretive plan;
- determine the need for landbased signage, and install where appropriate;
- repair Carysfort Reef Lighthouse dock;
- study endemic lobster population cycles; and,
- determine study needs for identification of cause(s) of coral and fish diseases.

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KEY LARGO NATIONAL MARINE SANCTUARY MANAGEMENT PLAN

I. INTRODUCTION

A. Authorising Legislation

Title III of the Marine Protection, Research and Sanctuaries Act of 1972, as amended in 1980, (the Act), authorizes the Secretary of Commerce, following Presidential approval, to designate special marine areas as national marine sanctuaries (Appendix A). Such designation is intended to preserve or restore the area's conservation, recreational, ecological, or esthetic values through comprehensive management. 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).

B. Marine Sanctuary Program Goals

The National Marine Sanctuary Program's mission is to establish a system of sanctuaries based on the identification, designation, and comprehensive management of special marine areas for the long-term benefit and enjoyment of the public (NOAA, 1982). Once designated, sanctuary resources are managed to meet the following goals:

- Enhance resource protection through implementation of a comprehensive, long-term multiple use management plan tailored to the specific resources;
- Promote and coordinate research to expand scientific knowledge of significant marine resources to improve management decision-making in marine sanctuaries;
- 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. Key Largo National Marine Sanctuary

The only living coral reef tract in the waters of the continental U.S. exists in the Atlantic Ocean adjacent to the Florida Keys. This location is at the geographic limit where the proper environmental conditions necessary for coral survival exist. Natural forces such as hurricanes, storms and the intrusion of colder water change the environment from time to time, subjecting the reefs to stressful conditions. Aside from such natural forces, coral reef survival also can be affected by recreational and commercial activities. Thousands of visitors are attracted to these coral reefs annually. Many local

businesses depend directly on the existence of healthy, thriving coral reefs for their livelihood, while others are equally dependent on the tourists attracted to these luxuriant coral reefs. However, in the past, coral damage has been caused by careless boating and diving practices and coral takes many years of growth to replace broken or damaged portions.

The potential adverse effect of human activities on the environmentally sensitive South Florida Coral Reef Tract led to the designation of the Key Largo National Marine Sanctuary in 1975. Overall management responsibility rests with the Sanctuary Programs Division, while the Florida Department of Natural Resources assists with onsite management. Programmatic goals were established by the Sanctuary Programs Division to provide a framework for management of the Sanctuary. The first management plan for the Key Largo National Marine Sanctuary, published in 1979, includes a description of sanctuary resources and uses, the sanctuary administrative framework, and the types of activities planned for the Sanctuary until the early 1980's.

D. Purpose and Scope of the 1983 Key Largo National Marine Sanctuary Management Plan

The purpose of this management plan is to provide an action-oriented, forward-looking strategy to guide sanctuary management for the next five years. Management planning involves continuous information gathering and analysis in order to respond to changing conditions. This plan is based on knowledge gained from past management experiences and recently developed sanctuary program policies. It provides a comprehensive, yet flexible, management strategy which focuses all activities over the coming years. Specific programs to implement the management strategy include resource protection, research studies, interpretation and administration.

Direction for these programs is provided by the following goals and objectives for the Key Largo National Marine Sanctuary:

Resource Protection Management - Protecting the sanctuary resources and environment is an important function of the Marine Sanctuary Program.

Specific management objectives:

- provide resources necessary to enforce the sanctuary regulations;
- ensure that Federal regulations adequately protect sanctuary resources without being overburdensome; and,
- design contingency operation plans for environmental disasters such as boat groundings, oil spills, fish kills and disease epidemics.

Interpretive Management - The interpretive program goal is to enhance visitor awareness of sanctuary resources

to broaden their experiences and enhance appreciation of the resources, while encouraging wise use.

Specific management objectives:

- ° enhance public understanding of the marine environment and the programs used to protect the resources;
- ° inform a maximum number of audiences, including users and non-users; and,
- ° increase public understanding of marine issues related to and affecting the Sanctuary, including an appreciation of the need for sanctuary designation.

Research Management - The goal for sanctuary research is to encourage research directed toward understanding and managing sanctuary resources. Information gained through research will aid the other sanctuary programs.

Specific management objectives:

- ° establish a research plan that will provide maximum benefit to sanctuary management;
- ° identify those projects that should be given highest priority and funding; and,
- ° incorporate research results into the resource protection and interpretive programs.

The Sanctuary Programs Division, the Florida Department of Natural Resources and the Management Review Committee will evaluate management effectiveness annually to fine-tune management direction and incorporate newly acquired information into the decisionmaking process. After the fourth year of operations, these groups will combine efforts to produce an updated version of the Key Largo National Marine Sanctuary Management Plan.

II. KEY LARGO NATIONAL MARINE SANCTUARY

A. Regional Context

1. Sanctuary Location

The Key Largo National Marine Sanctuary, extends from the 3-mile limit of state jurisdiction off Key Largo, Florida, seaward to the 300-foot isobath. The Sanctuary encompasses 100 square miles, approximately 20 miles in length and varies from 3-6 miles in width (Figure 1).

There are two other coral preserves in the immediate area. Sharing a common boundary to the west of the Sanctuary is the John Pennekamp Coral Reef State Park, established in 1960 to protect the waters within the state's 3-mile jurisdictional limit. Directly north of the Sanctuary is the Biscayne National Park which preserves 175,000 acres of shallow bay, two offshore keys, seagrass beds, patch reefs, and the northernmost reefs of the South Florida Coral Reef Tract.

2. Sanctuary Access

Because the Sanctuary is located 3 miles offshore, visitors can reach the Sanctuary only by some type of marine transportation. Several public boat ramps and private launching facilities located along the Keys provide access points for boats trailered into the area. Boaters also may embark from private boat docks or rental concessions. Although a boat trip to the Sanctuary from the Miami area takes many hours, some boaters make it an enjoyable weekend trip.

3. Sanctuary Uses

It is estimated that thousands of visitors visit the Sanctuary annually for recreational, commercial, and research purposes which include:

- SCUBA diving
- snorkeling
- sport fishing
- commercial fishing
- scientific research
- boating
- water skiing
- swimming

B. Sanctuary Environment

1. Physical Environment

a. Climate

Subtropical climatic conditions prevail in the Key Largo area due to the southerly latitude of the area and the warm Florida Current which flows along the Atlantic coast. The Florida Current, and the occasionally

KEY LARGO NATIONAL MARINE SANCTUARY LOCATION MAP

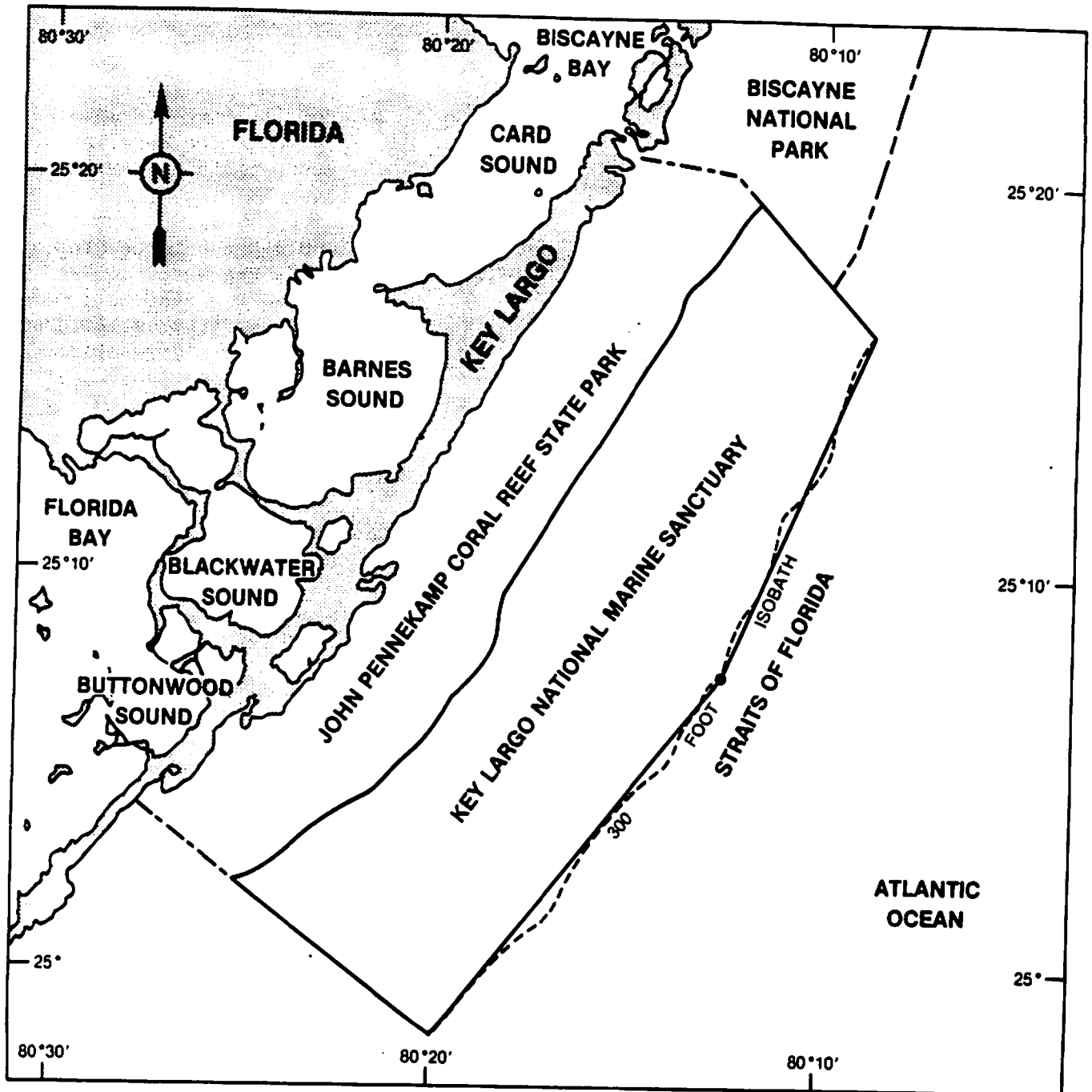


FIGURE 1

meandering current waters, known as spin-off eddies which come over the reef into nearshore areas, warm the onshore winds.

Wind speed and direction are variable throughout the year, however the prevailing winds blow easterly to southeasterly. Strong easterlies can create rough conditions on the outer reefs. Wind speed varies from 10-15 miles per hour in April, the windiest month, to 5 miles per hour in July and August, the calmest months. During winter months (November-April) cold fronts may occur on an average of one per week. At the onset of a cold front, winds blow from the south, southeast, and shift to north, northwest after its passage. The northerly winds can measure up to 25-30 knots. During the summer, winds are light and variable, primarily from the southeast direction. Summer months, however, are not without the influence of storms and occasional hurricanes.

The air temperature cycle is closely linked to meteorological conditions. The mean annual air temperature is 76.2° F (24.6°C) with the highest temperatures occurring in August and the lowest temperatures in January. The greatest number of clear days occur in winter and early spring. The number of cloudy days increases in the fall as clouds originate over the Straits of Florida and are transported via the prevailing winds.

Average yearly rainfall is 46.26" with the rainy season occurring from May to October and the dry season from November through April. During the summer, thunderstorms form over the Florida Current and move inshore during the hottest part of the day.

b. Water Masses

Seawater temperature is influenced by atmospheric forcing, the Florida Current, and its associated eddies, and cross-shelf outwelling of Biscayne Bay, Card Sound and Florida Bay waters. Seawater temperatures fluctuate around 9°F (5°C) annually over outer reefs which are under the influence of the warm, stable Florida Current. Temperature rarely exceeds 89°F (32°C) and rarely drops below 68°F (20°C). However, abrupt changes of temperature with depth do occur off deep reefs as a result of a seasonal thermocline or due to a spin-off eddy containing upwellings of deeper, cooler Florida Current water. Additionally, passage of cold fronts with attendant reduced air temperature causes a corresponding drop in surface seawater temperature.

The annual change in seawater temperature in shallower mid- and inshore shelf locations is more variable (18°F or 9.9°C). On the shallow carbonate shelf, both chilling and heating of seawater is more rapid and extreme. Some cold air fronts produce water temperatures that could be lethal to corals (15°C). Also, advection of bay and sound waters, which are highly variable in temperature, salinity and turbidity conditions, can create stressful conditions. Reefs off Key Largo are more protected from the latter situation than reefs to the north and south due to the solid Key Largo landmass which has few tidal inlets thus inhibiting passage of bay and sound waters.

Salinity remains fairly constant throughout the Sanctuary with slight temporary changes due to spin-off eddies, shifts in current direction, and heavy precipitation or evaporation during long periods of direct sunlight.

Water circulation in the Sanctuary results from the combined effects of tide, wind and the Florida Current (General Oceanics, Inc., 1982). Flow on the outer shelf is primarily controlled by the Florida Current in the form of its northward moving front and random spin-off eddies. Currents in the inner- and mid-shelf regions result mainly from tide and wind forcing, which varies seasonally. During winter months (November-April) average longshore current is toward the southwest with speeds of about one-tenth of a knot. Under the influence of prolonged northwest winds associated with cold front passage, water flow may approach or exceed one knot. During the summer, the average flow reverses to the northeast with about the same magnitude as the winter.

c. Historical Geology

The Florida Keys are a crescent chain of small limestone islands extending 150 miles from near Miami on the north to the Dry Tortugas on the southwest. This island chain curves around the southern end of the mainland to bend west of the Florida Peninsula. The shape of the Keys changes from that of a typical northeast-southwest oriented barrier island in the north, to elongated islands with a northeast-southwest orientation in the south. The Keys are bounded on the ocean side by the Florida Current and on the Gulf side by Biscayne Bay, Florida Bay, and their adjoining waters.

Several theories have been proposed concerning the geological formation of the Florida Keys. One theory asserts that the present Keys represent the remains of a relict coral reef from the Pleistocene Age, while another theory claims the Keys originated as lagoon patch reefs in the back reef area of a coral reef located inshore of the present position.

The Keys consist of two main formations of the Pleistocene Age -- Key Largo limestone and Miami limestone with the former being coral reef rock and the latter being an oolitic limestone. The Key Largo limestone is the surface rock of the upper Keys and lies beneath the Miami limestone in the lower Keys.

Offshore, the ocean bottom is underlain by Key Largo limestone with post-Pleistocene Key Largo limestone overlaying the older rock and increasing in thickness seaward. Covering all of this is a layer of calcium carbonate sediments. The outer reef base is post-Pleistocene Key Largo limestone formation overgrown in large areas by stands of living coral.

2. Living Marine Resources -- The Communities

A variety of tropical marine habitats and associated biological communities are found within the Sanctuary and adjacent marine parks (Figure 2). A description of biological communities is presented first, followed by a discussion of the resource locations and environmental conditions in the Sanctuary.

a. Seagrass and Sand Communities

A major portion of the State Park and portions of the Sanctuary consist of seagrass communities growing on sand substrate. Seagrasses begin at the intertidal zone along the shore and, except in the deep, silt bottom of

Hawk Channel, extend seaward to the back reef zone of the outer reefs. Of the approximately six species of marine grasses found in Florida waters, two are dominant in the Sanctuary. Turtle grass (Thalassia testudinum) is the dominant seed-bearing plant (angiosperm) of shallow waters. It is found wherever the sediment is sufficiently thick and stable for the grass to develop a root system, which may penetrate to 18 inches or more. Manatee grass (Syringodium filiforme) grows in deeper parts of the Sanctuary and is either mixed with turtle grass or forms sparse beds of its own.

The seagrass and sand communities are rich and diverse. Characteristically, many species of algae and encrusting invertebrates such as sponges, hydrozoans, flatworms and tunicates are found growing attached to blades of turtle grass, as well as to rocks and rubble in sand bottom areas. Other bottom-dwelling invertebrate groups associated with seagrass and sand communities include sea stars, sea cucumbers, sea urchins, sea snails, pen shells, clams, sea slugs, octopods and squids. Small outcroppings of finger coral and isolated heads of massive corals also occur. Seagrass meadows also serve as nurseries for a wide variety of juvenile fishes and invertebrates, including shrimp and lobster.

In seagrass beds, as elsewhere in the reef complex, fish and invertebrates exhibit patterns of nocturnal and diurnal behavior related to feeding activities, sheltering, and hiding. Seagrass and sand communities support both resident inhabitants and transient, coral reef-dependent animals which migrate there at night. By day, damselfish, wrasses and juvenile white grunt are found near sparse coral outcroppings and parrotfish, goatfish and other browsers move in and out of the area. At night an entirely different cast is encountered, including snappers, groupers, squirrelfish and various grunts. Most nocturnal foragers retreat to the coral reef as dawn approaches.

b. Patch Reef Communities

Patch reefs are formed by loose aggregations of massive head corals growing on top of a rubble matrix. Dominate coral species include star corals (Montastraea annularis, M. cavernosa, Siderastraea sidera, and Dichocoenia stokesii), brain corals (Colpophyllia natans, Diploria labyrinthiformis, and D. stigosa) and finger coral (Porites astreoides). Patch reefs are characteristically surrounded by a halo of coarse sand and rubble kept free from encroaching turtle grass by browsing parrotfish and sea urchins.

Most non-sessile invertebrates on patch reefs (e.g., crabs, lobsters, snails, octopus, sea stars) are nocturnal; mobile species hide by day in reef caves and crevices and emerge at dusk to begin their nighttime foraging activities. Large predators tend to feed at any time, but are especially active at dawn and dusk. Fishes that are active at night tend to be drably colored (e.g. grays and browns). On patch reefs, these include french angel-fish, black grouper, blue tangs, bluestriped grunt, and some parrotfish species. During the day, the brilliant yellow, blue and green fishes dominate. On patch reefs, these include sergeant major, bluehead wrasse, queen and rainbow parrotfish, and juvenile white grunt.

c. Hardbottom Communities

Hardbottoms are bedrock areas veneered by encrusting and small head corals, numerous octocorals, and their associated communities. Small knobs of coral less than 3 feet in diameter are common including starlet coral (Siderastrea siderea), elliptical star coral (Dichocoenia stokesii), golf ball star coral (Favia fragum), lobed star coral (Solenastrea hyades), finger coral (Porites astreoides), and knobby brain coral (Diploria clivosa). Various species of green and brown algae and a variety of sponges, soft corals, and other invertebrates also are associated with hardgrounds. Hardgrounds differ from coral reef areas in that they occur on a substrate that was not formed from the recent reproduction and growth of their associated fauna. Habitat diversity is lower in the hardground than coral reef communities, resulting in lower diversity of fish and invertebrates.

d. Outer Coral Reef Communities

Coral reef communities reach their maximum diversity on outer shelf coral reefs. The luxuriant outer coral reefs in the Sanctuary, result from open-ocean circulation of warm, clear Florida Current waters and the absence of colder, turbid, less saline Florida Bay waters. The nearly continuous landmass of Key Largo restricts mixing of bay and ocean waters and contributes to a more stable offshore environment.

Coral reef areas are those communities that show active vertical and lateral coral growth in association with dead coral still in a growth position. As they die, the coral's hard skeletons contribute to reef development. In Sanctuary waters, bank reefs located at the shelf edge or just landward on the mid-shelf reef platform form the foundation for these reef communities.

A common environmental characteristic of a bank reef is open circulation and relatively high energy current conditions, where temperature and salinity regimes are more stable. There are approximately 14 miles of bank reefs within the Sanctuary with, reef height typically on the order of 10-15 feet.

Bank reef areas are highly diversified with many showing distinctive zonation. Elkhorn coral (Acropora palmata), a massive, branching scleractinian coral, is the chief builder of bank reefs. Because it is able to withstand strong currents, its presence is an indication of open circulation. Its optimum depth range is from the surface to 25 feet.

In less turbulent areas behind elkhorn coral, thickets of staghorn coral (A. cervicornis) and clubbed finger coral (Porites porites) are found in varying abundance. These species indicate back reef zones with less turbulent energy conditions. In certain areas, the zonation continues and massive coral heads are seen. These corals tend to grow in shallow sheltered parts of bank reefs and in deeper areas in front of the reef slope. Their bases can be extensively undercut by boring sponges, worms, and mollusks, making them top

heavy and especially vulnerable to wave action as they grow. The star coral (Montastrea annularis) is the most abundant head coral in the Sanctuary bank reefs. Other less abundant corals include the brain corals (Diploria strigosa, D. labyrinthiformis, Colpophyllia natans) and the other star corals (M. cavernosa and Siderastrea siderea).

Less abundant hard corals grow among the framework of bank corals and include lettuce coral (Agaricia agaricites), finger coral (Porites astreoides), fungus coral (Mycetophyllia lamarckiana), elliptical star coral (D. stokesii), flower coral (Eusmilia fastigiata), brain corals (Colpophyllia spp. and Meandrina meandrites) and solitary disk coral (Mussa angulosa). Fire coral (Millepora complanata) is important on certain bank reefs. It also secretes a hard calcareous skeleton and requires a hard substrate for growth. Calcareous algae, sponges, sea fans, and other invertebrates are important components of the coral reef ecosystem and are quite varied throughout the reef areas of the Key Largo National Marine Sanctuary.

The associated fish life also is abundant and diverse. The structural complexity of the outer bank reefs provides many hiding places and its productivity provides an abundance of plant and animal food. Encountered by day, hovering in mid-water above the fore reef, are amberjacks, barracudas, blue chromis, rainbow and creole wrasses and triggerfish. Found in close association with the coral reef surface are blue tangs; bluehead wrasses; small mouth, bluestripe and French grunts; yellowtail and threespot damselfish; and, gray snappers. Occasionally, found perched on top of a coral head or rock are lizardfish, scorpionfish, blennies and gobies, and near the protection of a cave or under a ledge are found moray eels, Spanish grunts, porkfish, squirrelfish, glass sweepers, cardinalfish, drums and bicolor damselfish. Sand perch, sand tilefish, goatfish, flounders and rays are associated in sand bottom areas, such as in the sand channels or grooves between coral spurs on the fore reef slope. At night, many of the fishes that hide in caves or under ledges by day roam the reef or nearby grassbeds until dawn.

Fishes in the Key Largo National Marine Sanctuary have been protected from spearfishing and trapping for almost a decade, and as a result, the community structure and the behavior of fishes towards divers are different from that encountered in nonprotected areas. Large snappers, groupers, mackerels, moray eels, barracudas, jacks and sharks are more abundant and larger in the Sanctuary relative to spearfished reefs. Also, fishes are more approachable and less afraid of divers in the Sanctuary (Bohnsack, 1982).

e. Deep Water Reef Communities

Roughly one-half of the Sanctuary lies in 100-300 ft. of water. Deep water reef communities extend down to 130 ft. beyond which the bottom is covered with sand and algal rubble. There are several possible explanations for why reefs don't extend beyond this depth: (1) water depth in the Sanctuary is too great for corals to become established; (2) lack of a hard substrate for coral attachment; (3) reefs grew in the deep water areas in the past, but more recently have been covered by sediment accumulation; or (4) sea level has been rising too rapidly for reef establishment until the past 5,000 years, when the rise slowed enough to permit coral growth (NOAA, 1981).

Reduced light, water movement, temperature and availability of food are also regarded as barriers which exclude certain reef flora and fauna from extending their range from shallower reef areas to the deep reef tract. To accommodate reduced light conditions, dominant corals such as the star coral (Montastraea cavernosa), lettuce coral (Agarcia lamarcki) and branching coral (Matracis mirabilis) assume a flattened, plate-like form which maximizes interception of solar radiation. Common shallow water fish species are replaced by deep water forms. For example, the brown chromis which occurs with the blue chromis as dominant mid-water plankton feeders on the fore-reef slope is replaced by the sunshine fish on the deep reef, and the harlequin bass is replaced by the tobacconfish of the same genus (NOAA, 1981).

3. Living Marine Resources -- The Habitats

Distribution of habitats in the Sanctuary reflects the local and regional geomorphology of the Florida reef tract. Trending seaward from the shoreline, bottom topography is characterized by a series of low shelf banks or ridges alternating with shallow channels or valleys that parallel the Keys and the outer edge of the shelf (Hoffmeister, 1974). Reefs are best developed on the outer edge of the shelf.

The reef tract in the Sanctuary can be divided into five major zones (beginning from the Keys and moving seaward, see Figure 2):

- (1) Hawk Channel;
- (2) mid-shelf reef platform;
- (3) sand channel;
- (4) offshore reefs; and,
- (5) deep reefs.

These major reef habitats and their associated biological communities are discussed in the following section.

a. Hawk Channel

The prominent channel adjacent to the Keys is Hawk Channel. Three miles wide on the average and up to 15 feet deep, Hawk Channel extends from Biscayne National Park south to well into the lower Keys. The bottom of Hawk Channel is covered with soft fine sediments with sparse patches of sea-grasses, and is flanked by sand bottom areas and seagrass beds mixed with scattered inshore hardgrounds and patch reefs in the east. Ocean Reef, Turtle Harbor and Rock Harbor are sand bottom areas dominated by turtle grass, and North Channel, South Channel and Port Elizabeth are sand bottom areas with turtle grass and hardground with octocorals, sponges and small head corals (Voss, 1982). Angelfish Creek is an isolated patch reef surrounded by turtle grass; Basin Hill Shoals and Mosquito Bank are large, shallow banks of turtle grass dotted with patches of mixed hard and soft corals. Water depths over

inshore patch reefs range from less than 1 meter to just over 4 meters. Water clarity, controlled by local wind conditions that stir up shallow, fine-grained bottom sediments, is highly variable (Hudson, 1981). John Pennekamp Coral Reef State Park protects most of the Hawk Channel region with the exception of Basin Hill Shoals and Mosquito Bank which extend into the inner boundary of the Sanctuary.

b. Mid-shelf Reef Platform

The mid-shelf reef platform is a mosaic of habitats including patch reefs, hardgrounds, barrier-type reef formations, sand bottom areas, and sea grass beds. This region of the Sanctuary is sometimes referred to as intermediate or midshore reefs because the environmental conditions are intermediate to those at inshore reefs and to those further offshore. Water clarity is improved over that found inshore due to the influx of offshore water from the Florida Straits as well as the coarse-grained sediments that resist resuspension during periods of turbulence and to turtle grass beds that trap and bind unconsolidated bottom sediments (Hudson, 1981).

Size and complexity of coral formations at the intermediate reef sites are less than that found at offshore reef sites. Key Largo Dry Rocks and Grecian Rocks are the most similar to offshore sites of the group. Grecian Rocks has a back reef, well-defined reef crest consisting primarily of densely packed elkhorn coral, and a short fore reef slope ending in a flat, sandy plateau. Key Largo Dry Rocks lacks a well-defined reef crest, but does have a back reef-rubble zone area and large hard coral development that approximates spur-and-groove formation.

White Bank Dry Rocks and Turtle Rocks, unlike Key Largo Dry Rocks and Grecian Rocks, lack any morphological similarity to offshore reefs. Turtle Rocks is a loose aggregation of patch reefs consisting of a variety of hard corals. Patch reefs are separated by patches of turtle grass beds and sand bottom. Patch reefs at White Bank Dry Rocks are shallower and more consolidated than those at Turtle Rocks (Voss, 1982).

c. Sand Channel

The Sand Channel is more clearly defined in the northern region of the Sanctuary and in Biscayne National Park. The lack of definition of the Channel in the middle and southern portion of the Sanctuary results from long breaks in the fore reef (Curry, 1983, pers. comm.).

d. Offshore Reefs

Offshore reefs include Molasses, French, and Carysfort Reefs and The Elbow. Jones and Thompson (1978) and Voss (1982) provide a general habitat description of these reefs.

Molasses Reef is a barrier-type coral reef with a lagoon community on its shoreward side. It is one of the most complex and productive reefs in the Sanctuary with a well-developed spur-and-groove system on the outer face of the reef. Molasses Reef differs from Caribbean barrier reefs by having an

extensive back reef rubble zone separated by a slightly deeper barren zone from a poorly defined elkhorn coral (Acropora palmata) reef crest.

The Elbow is similar to Molasses Reef in having a spur-and-groove structure on the outer face and extensive back reef rubble zone. There is an old shipwreck on the reef as indicated by parts of the hull, boilers and engine.

French Reef, also has a spur-and-groove formation on the outer face, although it is not as well-defined as at The Elbow, and the zone of active coral growth extends farther seaward than at Molasses Reef. The spurs are dominated by massive star corals (Montastrea annularis) and are often inter-laced with caves and passages. French Reef also has extensive back reef rubble.

Carysfort Reef shows a zonation and structure typically described for Caribbean barrier reefs (Goreau, 1959). There is a well-developed back reef zone and elkhorn coral (Acropora palmata) reef crest, which may be exposed at low tide. A fore reef slope gives way to a narrow gently sloping soft coral community that ends abruptly in extensive staghorn coral (Acropora cervicornis) thickets that, at approximately 14 meter water depths, are not found on any other offshore reefs. Further offshore, a barren zone grades into a deep reef slope that ends in a sand terrace at approximately 21 meter water depths.

e. Deep Reefs

A deep reef zone occupies an area of 50 square nautical miles (130 square kilometers) on the slope of the continental shelf in water depths greater than 100 feet (30.4 meters) (NOAA, 1981). Off French Reef, the deep reef is a continuous extension of the shallow reef, and off The Elbow, the two reefs are separated by a sand bottom and soft coral community. The deep reef off South Carysfort Reef is completely isolated from the shallow reef, and is unique because the common shallow-water staghorn coral is present.

At 30 meters, coral and other epibenthic organisms grow on top of outcroppings or isolated carbonate structures that appear to be spurs from antecedent spur-and-groove systems that developed when sea level was at a lower stand (Jaap, 1981). The deep reef formations are surrounded by algal covered sediments and extend seaward to 40 meter depths. Seaward of this depth, the bottom is algal covered cobble with other sedimentary deposits, rose and finger corals, occasional large sponges and tilefish burrows. Beyond 55 meters (181 feet), the algal cobble disappears and a fine sand plain extends to 300 feet (91.4 meters). Except for numerous inconspicuous algae and occasional tilefish, sea biscuits, sea urchins and starfish, this deep zone appears to be barren bottom.

4. Cultural and Historical Resources

a. Carysfort Reef Lighthouse

The most prominent cultural resource of the Sanctuary is Carysfort Reef Lighthouse, located at the north end of the Sanctuary. It was the first

lighthouse built by the U.S. Lighthouse Service on the Florida reef tract and served as a prototype for the other lighthouses in the Florida Keys built on severely exposed areas. Construction began in 1848 by Captain Howard Stansburg of the U.S. Topographical Corps of Engineers. Its light was first ignited on March 10, 1852, replacing a lightship that had been stationed on Carysfort Reef since 1825. Situated in approximately 6 feet (1.8 m) of water, the lighthouse is an iron skeleton tower on a pile foundation rising 100 feet (32.3 m) above mean low water. NOAA is currently conducting a structural analysis of the lighthouse as the first step in making some necessary improvements to the dock and living quarters so that it can be used to a limited extent as a base of operations for visiting scientists.

b. Shipwrecks

In 1733 almost an entire fleet of a 21-ship Spanish flotilla was lost off Key Largo. Of these ships, two galleons, El Infante and San Jose y los Amenas, have been located outside the southern boundary of the Sanctuary. Apparently the fleet was hit by a hurricane while returning to Spain. A hurricane may also have played the dominant role in the groundings of the Plata flotilla fleet of 13 galleons near Carysfort Reef in 1755, although the number of ships lost is unknown and no ship of this fleet has ever been located.

Today several wreck sites exist in the Sanctuary, providing exciting dives for visitors. One of the best known wrecks is the 60-gun British frigate, HMS Winchester. Thrown on the reef by a storm in 1695, the wreck lies in 30 feet (9.1 m) of water 1.5 miles (2.5 km) southwest of Carysfort Reef Lighthouse, in direct line with Elbow Light. The Winchester was 44.5 meters long, but is now badly broken and scattered throughout the area. Two of the Winchester's cannons, recovered in 1940, are on display at the John Pennekamp Coral Reef State Park headquarters.

Another well-known wreck in the Sanctuary is the Benwood, an 87 meter World War II freighter. In 1942, it was torpedoed by a German submarine and as the ship headed to shallow water it was accidentally rammed by another vessel. The hull was subsequently used for bombing practice until it was dynamited and sunk in 50 feet (15.2 m) of water. This maze of steel wreckage is one of the most popular diving spots in the Florida Keys.

Lesser known wrecks also are located in the Sanctuary. The steamer Towanda, lost in 1866, can be found just north of Elbow Light. Near Elbow Reef Tower in 30 feet (9 m) of water lie the remains of a wooden ship encrusted with corals, seaweeds, and sea fans. Heavy wooden beams are half buried but bronze fastening pins are still visible. The original name and nationality of the ship is unknown but local guides call it either "No Name Wreck", "Civil War Wreck", or "Old Wild Wreck". Ninety feet (27.4 m) due east of Molasses Reef tower, the schooner Windlass lies in 25 feet (7.6 m) of water. Its broken remnants are scattered around the coral heads and add to the excitement of diving at Molasses Reef.

The schooner Thiorva went aground and sank at the north end of Turtle Reef on some unknown date.

In shallow water on White Bank, seaward of Basin Hill Shoals, sits the wreck of the Charles W. Baird. The hull of this ocean-going barge served as a shelter to wreckers and fishermen until it burned in the 1940's. All that remains is the hull superstructure, heavily encrusted with hard and soft corals, and serving as a haven for a myriad of fishes.

Cannons of unknown origin also can be found in the Sanctuary. Approximately 300 feet (91.4 m) west of the wreck of the Towanda (at The Elbow) lies a very old cannon. Its 6 foot (1.8 m) length is encrusted with corals and is reputed to be from a 17th or 18th century Spanish galleon. Another Spanish cannon is located 75 feet (23 m) south of the white buoy at Grecian Rocks.

c. Christ of the Deep

A unique aspect of the Sanctuary that draws thousands of visitors annually is the 9 foot (2.7 m) bronze statue, Christ of the Deep. It is at Key Largo Dry Rocks standing in approximately 25 feet (7.6 m) of water, 6 miles (9.6 km) east-northeast of the south cut of Largo Sound. Marked by an orange and white surface buoy, the 4,000 lb. statue rests upon a 21-ton concrete base. The statue, created by Guido Galletti of Italy, is an exact replica of the Christ of the Abysses statue placed in 50 feet (15 m) of water in the Mediterranean Sea near Genoa in 1954. Duplicated for Egidi Cressi, an internationally known industrialist and undersea sportsman, it was donated to the Undersea Society of America in 1961 and placed at Key Largo Dry Rocks by the Florida Park Service for diving enthusiasts to enjoy.

III. MANAGEMENT ISSUES, ANALYSIS, STRATEGY

A. Introduction

This section highlights issues which warrant the special attention of sanctuary managers during the first two years of operation under this plan (Phase 1). Details of the strategies listed here are found under the guidelines section for the appropriate program. To ensure these issues and strategies are up-to-date, the Sanctuary Programs Division, the Florida Department of Natural Resources and the Management Review Committee will review this section annually.

B. Phase 1 Management Issues, Analysis and Strategy

ISSUES

1. Although the Sanctuary encompasses 100 square miles of area, visitor use is not proportioned evenly. As proposed in the 1979 Management Plan, mooring buoys have been installed at the reefs receiving the most intense use in order to eliminate anchor damage and to help locate unmarked reefs.

ANALYSIS

◦ The mooring buoys have helped reduce anchor damage but have not completely solved the problem of disproportionate use. Visitor use continues to be concentrated at Molasses and French Reefs in the southern portion of the Sanctuary.

STRATEGY*

- Design and distribute a brochure with a map describing location and proper use of mooring buoys.
- Initiate a mooring buoy effectiveness study.
- Concentrate surveillance in areas receiving the most use.
- Provide information to user groups on diver and boat safety problems inherent with concentrated use.
- Continue to communicate with the Keys Association of Dive Operators (KADO) about reef health and usage.

* Educational programs will be designed to address each of these issues.

ISSUES	ANALYSIS	STRATEGY*
<p>2. Considerable research is conducted on the coral reefs within the Sanctuary. There are no landbased laboratory facilities in the area for visiting scientists. One unique feature of the Sanctuary is the Carysfort Reef Lighthouse which has provided rustic accommodations for scientists needing a research platform at sea. However, the lighthouse dock and ladder to the living quarters are presently unsafe to use. Internally, the lighthouse is subject to water seepage. If repairs were made, the living quarters could accommodate visiting scientists. The Army Corps of Engineers is doing a structural analysis of the lighthouse for the Sanctuary Programs Division. A report is due in May 1983.</p>	<ul style="list-style-type: none"> ◦ 12 research permits were issued in 1982. ◦ 3 permits were issued to use the Carysfort Reef Lighthouse. ◦ Because analysis of data from projects is not made onsite, any additional data collection to correct errors or answer new questions would require another trip to the Sanctuary. 	<ul style="list-style-type: none"> ◦ Study engineering report on the lighthouse structure and decide to what extent to do any repairs or renovations should be undertaken. ◦ Obtain a lease for use of the lighthouse from the U.S. Coast Guard. ◦ Advertise for bids to repair and improve dock and ladder at Carysfort Reef Lighthouse. ◦ Get cost estimate for weather proofing the living quarters of the Carysfort Reef Lighthouse. ◦ Conduct a feasibility study on establishing a research support facility at John Pennekamp Coral Reef State Park.

* Educational programs will be designed to address each of these issues.

ISSUES	ANALYSIS	STRATEGY*
<p>3. Natural factors limiting coral growth and distribution are wave action, currents, temperature, light, sedimentation, oxygen, predation, salinity and nutrients. The reef building corals within the Sanctuary are near the northern limit of their environmental range. Coastal developments at Key Largo could alter environmental conditions and thereby possibly increase stress to species already existing under less than optimum conditions.</p>	<ul style="list-style-type: none"> ◦ Seventeen developments are currently proposed for areas adjacent to the Sanctuary in North Key Largo. ◦ Information on the effects of coastal developments on the offshore coral reefs is available only from other areas of the world. ◦ A water quality model for the Sanctuary and surrounding areas is being developed based on long-term measurement of ambient water quality and hydrodynamic conditions. The model will have predictive capabilities. 	<ul style="list-style-type: none"> ◦ Participate with county, state and federal agencies in consultations with contractors and developers to keep them informed of current and newly developed information about Sanctuary reefs and the effect of manmade stresses. ◦ Monitor planning process to keep record of simultaneous dredging projects for future proposed developments. ◦ Develop environmental scenarios related to coastal development, using the water quality model to predict the effect of coastal development on the Sanctuary reefs.
<p>4. Research has been conducted on the environmental factors causing coral diseases; however, it is not known how to determine to what extent man contributes to the initiation and/or progress of such diseases.</p>	<ul style="list-style-type: none"> ◦ Black land disease, white line diseases and coral tumors and fish tumors have been documented in the Sanctuary. 	<ul style="list-style-type: none"> ◦ Establish monitoring program for any diseased areas - record type, size, rate of spreading, quantify degree of stress. ◦ Determine study needs regarding these diseases. ◦ Monitor progress being made in studies underway.

* Educational programs will be designed to address each of these issues.

IV. GUIDELINES FOR CONTINUING PROGRAM MANAGEMENT

A. Introduction

This section introduces the administrative framework and programs designed to attain programmatic and site-specific goals.

B. Administration

Management of sanctuary programs and activities is carried out by a tripartite administrative framework consisting of the Sanctuary Programs Division, the Florida Department of Natural Resources, and the Management Review Committee. Coordination and cooperation of these entities is essential for successful management and resource protection. An overview of administrative responsibilities and the relationships between these groups is presented below. Following the overview, management roles for each program are presented in detail.

Sanctuary Programs Division

Ultimate responsibility for the legislative mandate presented in Title III of the Act rests with the Sanctuary Programs Division (SPD) within the Office of Ocean and Coastal Resource Management, National Ocean Service (NOS) of the National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Commerce. SPD administers the program and provides all funding for the Sanctuary. Headquarters for the National Marine Sanctuary Program is at 3300 Whitehaven Street, N.W., Washington, D.C. 20235 (202/634-4236).

Florida Department of Natural Resources

SPD delegates certain onsite responsibilities to the Florida Department of Natural Resources (FDNR) through Cooperative Agreements. Administrative support is provided by the Bureau of Environmental Land Management, FDNR, located at 3900 Commonwealth Boulevard, Tallahassee, Florida 32303 (904/488-6242).

The Sanctuary Manager and Sanctuary Biologist representing NOAA and FDNR onsite have offices at the John Pennekamp Coral Reef State Park, US #1, Key Largo, Florida 33037 (305/451-2770). Through these positions, NOAA and FDNR implement sanctuary research, education and enforcement programs, and evaluate the effectiveness of these programs and sanctuary regulations.

Management Review Committee

A method of selecting members of the Management Review Committee and terms of reference for its operation will be developed within the next year. The criteria for establishing membership should be in place within six months of the adoption of this plan. As many groups as possible which have indicated an interest in Key Largo before, during, and after designation as a marine sanctuary will be contacted by the Sanctuary Manager during the process of establishing the Management Review Committee. NOAA's Sanctuary Programs Division will make the final decision on membership. The Management Review Committee will not perform

a management role in a direct manner but will provide for effective continuing public participation and ensure communication among all users and interest groups involved with the Sanctuary. Membership on the Management Review Committee will be drawn from research and educational institutions, government agencies, and local citizen groups which express an interest in participating. Typical of the kinds of interest that might be represented on the Committee are: Sea Grant Advisory Council, South Atlantic Fishery Management Council, Keys Association of Dive Operators, National Park Service, National Marine Fisheries Service, Marine Research Laboratory (FDNR), Sierra Club, National Audubon Society, and universities which are carrying out research in the Sanctuary.

1. Administration: Roles and Responsibilities

Sanctuary Programs Division

- a. Reviews activities and needs of sanctuaries to determine how program resources can best be allocated among existing sanctuaries.
- b. Advises and assists the state in the preparation and administration of the Sanctuary's budget, and provides funding for sanctuary programs.
- c. Negotiates yearly Cooperative Agreements with FDNR.
- d. Informs FDNR, manager and biologist when SPD adopts new policies and program changes.
- e. Reviews periodic reports of resource health, resource protection, administration, research and interpretation to assess progress toward management objectives.
- f. Assists in developing an operational plan to guide Federal and state program administration.

Florida Department of Natural Resources

- a. Determines Sanctuary budget requirements annually and submits proposal to SPD.
- b. Monitors sanctuary's performance in meeting management and administrative objectives.
- c. Assists in developing an operational plan to guide Federal and state program administration.

Sanctuary Manager

- a. Informs FDNR of needs and budget priorities for the upcoming year.
- b. Assists in developing an operational plan to guide Federal and state program administrative responsibilities.

Sanctuary Biologist

- a. Informs FDNR of needs and budget priorities for the upcoming year.
- b. Assists in developing an operational plan to guide Federal and state program administrative responsibilities.

2. Resource Protection: Roles and Responsibilities

Sanctuary Programs Division

- a. Provides legal support for enforcement of Federal Regulations and prosecution of violations.
- b. Reviews summaries of surveillance and enforcement activities periodically, and updates Federal Regulations and resource protection program as necessary to meet management objectives.
- c. Ensures that each sanctuary is operated in a manner consistent with established national program policies, and with applicable Federal, international, state and local laws.
- d. Coordinates with Federal, state, and local government agencies, as well as public, private, and international entities concerning protection and management of marine resources.
- e. Coordinates development of enforcement and surveillance reporting form.

Florida Department of Natural Resources

- a. Coordinates enforcement and surveillance presence through FDNR Rangers, maintains surveillance vessels, and reports violations to NOAA.
- b. Provides enforcement training for rangers.

- c. Assists in developing the surveillance and enforcement reporting form.

Sanctuary Manager

- a. Supervises the rangers and enforcement program.
- b. Reports violations to NOAA.
- c. Assists in developing the surveillance and enforcement reporting form.

Sanctuary Biologist

- a. Informs the Rangers when and where scientific activities will be conducted in the Sanctuary.
- b. Notifies Rangers of any violation of sanctuary regulations.
- c. Monitors user damage.

3. Research Management: Roles and Responsibilities

Sanctuary Programs Division

- a. Determines research priorities with the assistance of the Sanctuary Biologist.
- b. Issues request for proposals (RFP) for selected studies and evaluates unsolicited proposals.
- c. Coordinates the peer review process for evaluation and selection of research proposals for funding.
- d. Provides funding for priority research projects.
- e. Issues research permits consistent with sanctuary regulations and guidelines for research in national marine sanctuaries.
- f. Contributes to development of an operational plan to guide the research program.

Florida Department of Natural Resources

- a. Approves support for Sanctuary Biologist's activities.

- b. Reviews and provides written comments on research proposals and permit requests.
- c. Participates in the peer review process for evaluation and selection of research proposals for funding.
- d. Contributes to development of an operational plan to guide the research program.

Sanctuary Manager

- a. Provides administrative support for Sanctuary Biologist's activities.
- b. Participates in the peer review process for evaluation and selection of research proposals for funding.
- c. Contributes to development of operation plan to guide the research program.

Sanctuary Biologist

- a. Identifies research needs annually and reports these to FDNR and NOAA.
- b. Reviews and provides written comments on research proposals and permit requests.
- c. Provides coordination and support services, when feasible, for scientists conducting research.
- d. Monitors performance of scientists under contract to NOAA and reports periodically to SPD.
- e. Informs Sanctuary Manager and enforcement rangers when and where scientists will be working.
- f. Issues and collects research permit flags.
- g. Coordinates a monitoring program, approved by NOAA, to obtain information on natural resources health and impact of human activities.
- h. Maintains current list of all publications on topics relevant to Sanctuary resources.
- i. Contributes to development of an operational plan to guide the research program.

4. Interpretation: Roles and Responsibilities

Sanctuary Programs Division

- a. Oversees development and implementation of long-term interpretive plan.
- b. Develops interpretive themes, messages and priority audiences.

Florida Department of Natural Resources

- a. Provides advice on interpretive themes, messages and priority audiences.

Sanctuary Manager

- a. Oversees planning, development and coordination of interpretive and recreational programs, exhibits and materials approved by NOAA.
- b. Coordinates interpretive plan review process.
- c. Assists in selection of annual interpretive priorities and individual projects.
- d. Reviews current socio-economic information and visitor statistics to ensure interpretive programs will meet long-term goals.
- e. Ensures that interpretive programs are beneficial to a variety of audiences, and effective, pragmatic and within budget constraints.
- f. Sees that interpretive materials based on scientific research avoid the tendency to be overly detailed or technical.
- g. Ensures that sanctuary visitors and extension audiences have adequate opportunity to comment on sanctuary programs.
- h. Report on program effectiveness to SPD and FDNR in performance reports.

Sanctuary Biologist

- a. Responds to requests for scientific information for the interpretive programs.
- b. Provides access to sanctuary resource data base.

- c. Participates in interpretation plan review.

C. Resource Protection

1. Sanctuary Regulations

Final regulations published in June 1983 govern the management of the Key Largo National Marine Sanctuary (Appendix C). In summary, specific activities prohibited by these regulations include:

- ° handling or standing on coral formations, or destruction of natural features and marine life, or the removal of natural features or marine life with the exception of lobster, crawfish and stone crabs;
- ° tampering with archaeological or historical resources;
- ° tropical fish collecting;
- ° use of spearguns, guns, harpoons, poison, electric charges or similar methods for taking fish is banned; and,
- ° operating vessels in a manner which may cause damage to natural features or other boats or divers.

Some activities are allowed but controlled by the regulations. For example:

- ° vessels must use mooring buoys when available and anchors must not be cast or dragged in a way that would damage coral; and,
- ° dredging, filling, excavating and building activities, and discharge of refuse and polluting substances.

The commercial and recreational harvest of spiny lobster, stone crab, shrimp and mackerel found in the Sanctuary is regulated by management plans and regulations published by the Gulf of Mexico and South Atlantic Fishery Management Councils.

Sanctuary regulations are enforced by the Coast Guard during their routine operational patrols. In addition, FDNR and NOAA have a Memorandum of Agreement whereby FDNR Rangers with law enforcement training may be deputized as Federal law enforcement agents to enforce the Sanctuary regulations (Appendix D). Violators will be notified of the alleged violation at the scene. Evidentiary materials found in possession of a violator (e.g., corals, fish, spearguns, etc.) will be seized by the enforcement agents and statements taken. Statements and evidentiary material are transferred with a copy of the citation to the Sanctuary Manager. Upon evaluation of all relevant information for sufficiency of the evidence and severity of the offense, a complete report of the violation

along with a recommended penalty to be collected from the violator is sent to the NOAA Office of General Counsel. The Office of General Counsel then sends a Notice of Violation and Assessment specifying the precise violation and subsequent penalty to the violator. Violators are subject to civil penalties of up to \$50,000 under Public Law 92-532.

2. Future Activities

The enforcement of sanctuary regulations was carried out by Coast Guard personnel who accompanied a State Park Ranger on regular patrols. After June 30, 1983, this arrangement will be changed and the Coast Guard will only enforce the sanctuary regulations during their routine patrols. State Park Rangers, deputized to enforce the sanctuary regulations in July 1982, will begin enforcement activities in the Sanctuary during the summer of 1983. To determine the effectiveness of this program:

- FDNR will develop and articulate a program philosophy tailored to previous Sanctuary and State Park enforcement programs;
- Sanctuary Manager and Sanctuary Biologist will identify areas and times of intense visitor use and report to SPD and FDNR;
- SPD and FDNR will use this information to design a surveillance and reporting form that will provide statistically valid information on visitor usage and regulation violations; and,
- FDNR will provide information on the training, assignments and duty hours of the enforcement rangers.

Another activity planned, is the evaluation of the mooring buoys installed in 1982 (Figure 3). Mooring buoys have been installed in several locations throughout the Sanctuary to distribute heavily concentrated use and help alleviate anchor damage to the coral reefs. Sanctuary managers need to evaluate the effectiveness of this program to determine what changes, if any, are necessary to meet resource protection objectives.

This study, conducted by the Sanctuary Biologist, should at a minimum cover these points:

- existing design (limitations, if any, previous designs found inadequate and why);
- effect of buoys on the study area, if this cannot be determined initially, determine how this information could be obtained;
- identify possible new locations for buoys; and,
- recommend future activities.

Upon completion of this study, a report should be forwarded to SPD and FDNR.

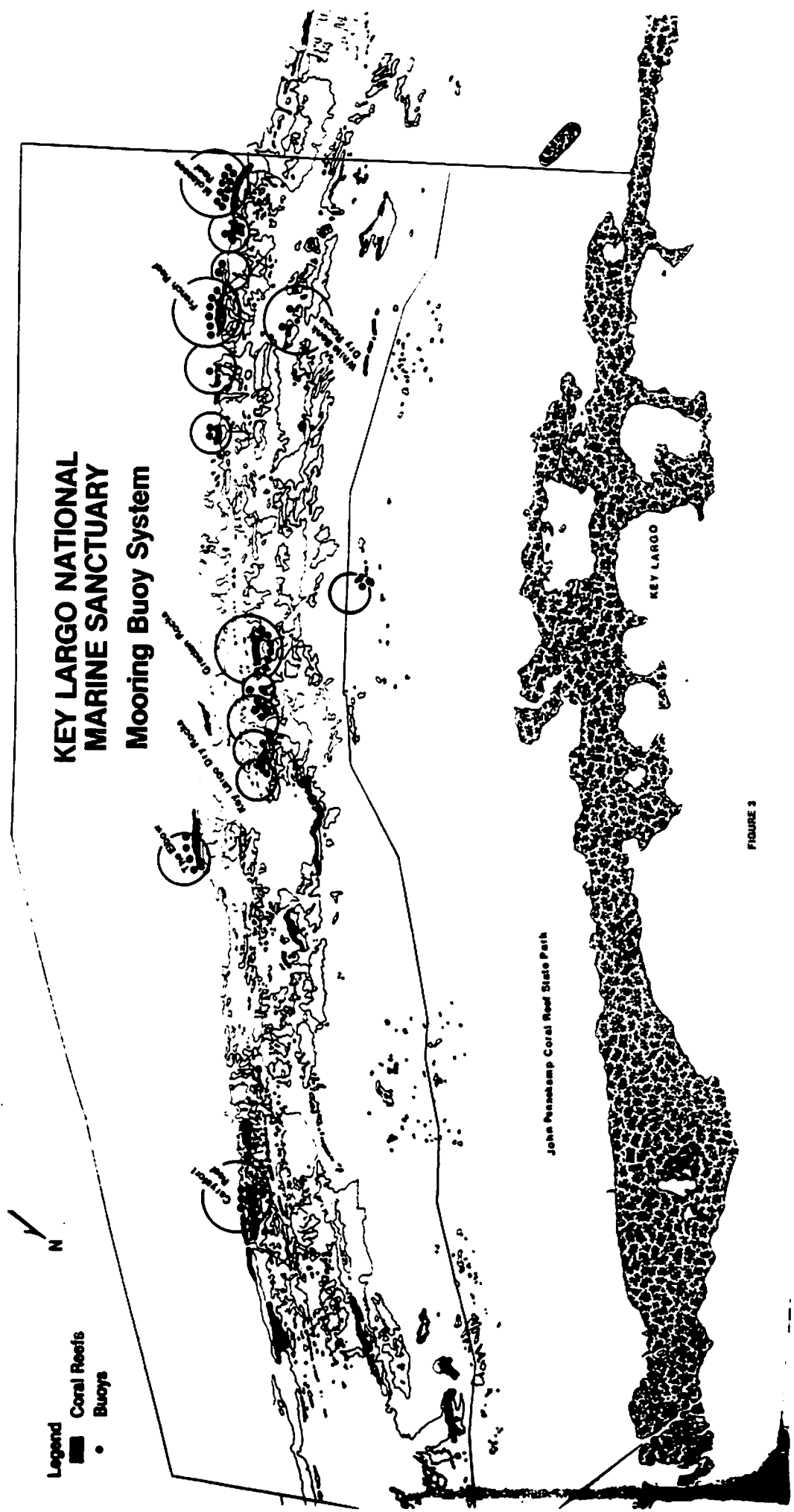


FIGURE 3

D. Research Management

1. General Context for Management

As a National Marine Sanctuary, Key Largo is recognized as a marine resource of national significance. The distinctive character of Key Largo and its special features outlined in earlier chapters clearly establish it as an environmental benchmark for scientific research related to the coral reef ecosystem.

As a general policy, research at Key Largo will be coordinated with research in other nearby protected coral reef marine areas such as John Pennekamp Coral Reef State Park, Biscayne National Park, Looe Key National Marine Sanctuary, and Fort Jefferson National Monument. This does not mean that similar studies will not be undertaken in these areas, because often there is value in replicating research to confirm results and/or differences and similarities among reef systems. Yet there may be some research projects undertaken elsewhere that need not be repeated at the Key Largo National Marine Sanctuary.

Research projects at the Sanctuary will be designed to make effective use of the most current research being undertaken on similar systems internationally.

A third general policy is that research at the Key Largo National Marine Sanctuary will continue to focus on management issues, particularly as they relate to the protection of significant resources. Studies to resolve immediate problems will be initiated during Phase 1, the first two years, and will continue to take priority until completed.

2. A Framework for Research

The potential to carry out interesting sanctuary research projects is almost limitless. The number of requests to conduct research in the Key Largo National Marine Sanctuary increases each year. Research emphasis will be on applied biophysical and applied social research.

Applied biophysical research is directed toward analyzing the resources of the reefs to better understand their capacity to sustain use. In the course of undertaking this research, resources are used and sometimes subject to impact depending on the nature of the field procedures. Applied social research, on the other hand, is oriented to visitors and potential visitors. It does not usually relate to the resources directly, but it can affect the quality of the visitor experience. Guidelines for managing research are therefore required to ensure that research activity is compatible with all sanctuary goals and objectives.

3. Priorities for Research and Future Activities

Any presentation of the research program must be flexible since it will require frequent updating as new projects are added, others are completed, and those in progress proceed from phase to phase.

Within the broad concept of having research relate directly to current sanctuary management issues, four basic directions for research are suggested:

- ° establish a comprehensive baseline picture of the Sanctuary.
- ° develop an effective monitoring program for the Sanctuary.
- ° establishing an effective research management program for the Sanctuary.
- ° conducting feasibility studies on research support programs.

Undoubtedly many of these projects will extend beyond Phase 1 and will retain a high priority until completed.

Future research projects will continue to build upon the foundations set down by the previously conducted studies. The following four groups of research projects are considered as high priority:

- a. Establish a comprehensive baseline picture of the Sanctuary.

For applied biophysical research:

- ° Evaluate the baseline resource information available on the Sanctuary including that made available through the research projects in progress (Appendix F), to determine to what extent the broad biological structure of the reef system and processes are understood and to identify basic gaps in knowledge;
- ° Based on the gaps identified above, plan for future studies on important sanctuary resources for which more detailed information on distribution, abundance, and life history is needed for effective sanctuary management;
- ° Produce small scale maps of selected habitats within the sanctuary and locate resource features that will be of interest to scientists, resource managers and recreationists; and,
- ° Develop an ecological model which describes, at first conceptually and later mathematically, the dynamics of the coral reef ecosystem.

For applied socio-economic research:

- ° Conduct a baseline user survey and compile available information on visitor activities to help establish the visitor use parameters for monitoring; and,
- ° Conduct a baseline study on the socio-economic role and impact of the Sanctuary, determining economic and employment impacts of various activities (e.g., fishing, SCUBA diving, snorkeling, research).

b: Develop an effective monitoring program for the Sanctuary.

For applied biophysical research:

- Study the effectiveness of the Sanctuary mooring buoy system;
- Study the ecological effects of physical damage and disease or the causes and effects of coral disease in terms of prevalence and frequency;
- Continue to monitor coral reef fish populations (Appendix F);
- Develop environmental scenarios to run on the Key Largo water quality model and analyze the predicted rates and directions of water movement and effects;
- Recommend environmental parameters and study site locations for an environmental impact assessment of potential coastal development projects on North Key Largo.
- Study the feasibility of monitoring spiny lobster population trends; and,
- Study the effect of hook and line fishing on community structure of reef fishes.

For applied socio-economic research:

- Design a quantitative visitor monitoring program; and,
- Initiate a study to identify audiences for interpretive programs.

c. Establish an effective research management program for the Sanctuary.

For both applied biophysical and socio-economic research:

- Establish a Management Review Committee to assist in annual review and evaluation of the sanctuary research program;
- Establish an ad hoc peer review process and automate a listing of specialists; and
- Establish an Emergency Response Team to respond to environmental emergencies (e.g., oil spills, fish kills, disease epidemics, boat groundings).

d. Conduct feasibility studies on research support facilities.

For biophysical research:

- Study the feasibility of establishing an access-controlled research area at north Carysfort Reef for studies which require minimal human intervention or disturbance.

For applied socio-economic research:

- Conduct an onshore recreational tourist survey to determine information needs and interests of the different groups using the Sanctuary and the John Pennekamp Coral Reef State Park Visitor Center.

As for the other management functions, an operational plan for research will be prepared which presents in detail the sequence and phasing of research projects, complete terms of reference, funding, and reporting requirements.

4. Annual Review of Research Program

Annual review of sanctuary research needs begins with recommendations from the Management Review Committee to SPD and the Sanctuary Biologist. Final identification of priority research studies involves consideration of the following factors:

- immediate and evolving management issues that could benefit or be resolved through directed research;
- achievements of research in progress or recently completed;
- immediacy of need and environmental consequences (i.e., is Key Largo the best place to conduct the study? Will it result in user conflicts?); and,
- funding considerations.

5. Proposals for Research

The Sanctuary Programs Division supports research that addresses management issues. Research priorities are identified in sanctuary management plans. Instructions for preparing and submitting proposals is presented in Appendix E.

Funding for studies is normally provided through a competitive process whereby requests for proposals are announced in the Commerce Business Daily. However, unsolicited proposals of outstanding merit are also considered. In addition, SPD also conducts research inhouse through the Sanctuary

Biologist as well as through Cooperative Arrangements with other Federal Agencies and with state governments.

The Sanctuary Programs Division also receives proposals requesting research permits. When proposals include activities that are prohibited by sanctuary regulations, NOAA may determine that all or part of the activity should be conducted outside of the Sanctuary, or that activities within the Sanctuary need to be limited.

6. Proposal Processing and Evaluation

Proposals are reviewed by recognized scientists and resource managers. A method for evaluating proposals, including the criteria used, is described in Appendix E. Briefly, the criteria considered include:

- ° relevance or importance of the research to sanctuary management;
- ° scientific or educational merits of the research;
- ° research performance competence;
- ° technical approach; and,
- ° environmental consequences.

The Sanctuary Programs Division has final approval of projects. Awards are provided through grants, contracts and cooperative agreements.

7. Project Tracking and Product Evaluation

The Sanctuary Programs Division and the Sanctuary Biologist monitor performance of the contractor. Progress reports and final reports are required; schedules are outlined under the terms of the contract. Final reports are reviewed anonymously by recognized scientists and resource managers. Outstanding projects are published by the Sanctuary Programs Division in its Technical Report Series. The Sanctuary Programs Division is implementing a computerized project tracking system to facilitate management of research programs. The Sanctuary Manager also will keep records of research underway. As for other management functions, an operational plan for research will be prepared which presents in detail the sequence phasing of research projects, complete terms of reference, funding and reporting requirements.

E. Interpretation

Interpretation plays a major role in all aspects of sanctuary management. By addressing visitor safety, resource protection, public relations and overall management, the interpretive program may be utilized to help accomplish management goals. In addition, this program provides a mechanism for developing

strategies to avoid management problems, as well as being of key importance for planning an enjoyable, safe and memorable recreational experience.

The goals of the Key Largo National Marine Sanctuary interpretive program include:

- ° enhance resource protection through increased visitor awareness; and,
- ° facilitate an appreciation for the reasons underlying sanctuary designation.

Objectives include:

- ° inform visitors about sanctuary ecosystems and their sensitivities;
- ° enhance understanding and appreciation of sanctuary regulations and why they are needed; and,
- ° direct and orient visitors to the Sanctuary and its services.

1. Existing Facilities and Programs

Since 1975, the sanctuary interpretive program has primarily focused on reaching visitors through John Pennekamp Coral Reef State Park programs and working closely with the commercial dive boat operators.

a. Visitor Center

Normally, the John Pennekamp Coral Reef State Park Visitor Center is in operation seven days a week. It houses a 6,000 gallon aquarium, various marine displays, and an auditorium that seats 80 people. The Center also includes a display and distribution booth which is attended by one or two Park employees who distribute free literature and answer questions.

The aquarium may be viewed from all sides. The tank displays a simulated patch reef that includes all the corals and most of the fish found in the Sanctuary. Surrounding the big tank are several smaller aquaria and dry displays that describe the inner and outer reef, grass beds, mangroves, the geology and history of the Keys, and a cross-section of the reef.

The auditorium is a separate room in the Visitor Center where a slide show on the Sanctuary and Park resources is shown hourly. This show gives an excellent overview of the relationships between all the ecosystems in the area.

b. Glass Bottom Boat Tour

For a fee, sanctuary visitors may view the coral reefs from a glass bottom boat departing from the marina adjacent to the Visitor

Center. Weather and sea conditions permitting, the boat makes three two-hour trips daily. On board, a guide describes what is below the water and makes references to the Key Largo National Marine Sanctuary.

2. Future Activities

Educational materials will be used to help resolve each of the management issues. To inform visitors entering the Sanctuary from the water, a brochure describing sanctuary regulations, diver boat safety problems and location and proper use of mooring buoys will be designed by the sanctuary managers for dissemination at boat licensing locations. Boat ramp signs informing visitors entering from John Pennekamp State Park will discuss these topics. In addition, a report written by the Sanctuary Biologist on research in progress will be displayed on boat ramp signs and in the Visitor Center.

The above activities provide short-term measures for reaching the management objectives. However, there is a need for a long-term plan to direct the sanctuary interpretation program. This plan, developed during Phase 1, should identify:

- ° all potential audiences;
- ° sanctuary interpretive program needs;
- ° gaps in interpretive programs at John Pennekamp Coral Reef State Park; and,
- ° recommendations for future programs.

APPENDIX A

**Marine Protection, Research and
Sanctuaries Act
Title III
P.L. 92-532**

MARINE SANCTUARIES LEGISLATION

MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT
AMENDMENTS OF 1980 TO TITLE III (P.L. 96-332)
INCORPORATED INTO
TITLE III OF THE MARINE PROTECTION, RESEARCH AND SANCTUARIES ACT
of 1972 (P.L. 92-532)

AN ACT

To regulate the transportation for dumping, and the dumping, of material into ocean waters, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that this Act may be cited as the "Marine Protection, Research, and Sanctuaries Act of 1972."

For the purposes of this document Title I (Ocean Dumping) and Title II (Comprehensive Research on Ocean Dumping) have been deleted.

TITLE III - MARINE SANCTUARIES

SEC. 301. Notwithstanding the provisions of subsection (h) of section 3 of this Act, the term "Secretary," when used in this title, means Secretary of Commerce. The term 'State', when used in this title, means any of the several States or any territory or possession of the United States which has a popularly elected Governor.

SEC. 302. (a) The Secretary, after consultation with the Secretaries of State, Defense, the Interior, and Transportation, the Administrator, and the heads of other interested Federal agencies, and with the approval of the President, may designate as marine sanctuaries those areas of the ocean waters, as far seaward as the outer edge of the Continental Shelf, as defined in the Convention of the Continental Shelf (15 U.S.T. 74; TIAS 5578), of other coastal waters where the tide ebbs and flows, or of the Great Lakes and their connecting waters, which he determines necessary for the purpose of preserving or restoring such areas for their conservation, recreational, ecological, or esthetic values. The consultation shall include an opportunity to review and comment on a specific proposed designation.

(b)(1) Prior to designating a marine sanctuary which includes waters lying within the territorial limits of any State or superjacent to the subsoil and seabed within the seaward boundary of a coastal State, as that boundary is defined in section 2 of title I of the Act of May 22, 1953 (67 Stat. 29), the Secretary shall consult with, and give due consideration to the views of, the responsible officials of the State involved.

(2) A designation under this section shall become effective unless --

(A) the Governor of any State described in paragraph (1) certifies to the Secretary, before the end of the sixty-day period beginning on the date of the publication of the designation, that the designation or any of its terms described in subsection (f)(1), are unacceptable to his State, in which case those terms certified as unacceptable will not be effective in the waters described in paragraph (1) in such State until the Governor withdraws his certification of unacceptability; or

(B) both Houses of Congress adopt a concurrent resolution in accordance with subsection (h) which disapproves the designation or any of its terms described in subsection (f)(1).

The Secretary may withdraw the designation after any such certification or resolution of disapproval. If the Secretary does not withdraw the designation, only those portions of the designation not certified as unacceptable under subparagraph (A) or not disapproved under subparagraph (B) shall take effect.

(c) When a marine sanctuary is designated, pursuant to this section, which includes an area of ocean waters outside the territorial jurisdiction of the United States, the Secretary of State shall take such actions as may be appropriate to enter into negotiations with other Governments for the purpose of arriving at necessary agreements with those Governments, in order to protect such sanctuary and to promote the purposes for which it was established.

(d) The Secretary shall submit an annual report to the Congress, on or before November 1 of each year, setting forth a comprehensive review of his actions during the previous fiscal year undertaken pursuant to the authority of this section, together with appropriate recommendation for legislation considered necessary for the designation and protection of marine sanctuaries.

(e) Before a marine sanctuary is designated under this section, the Secretary shall hold public hearings in the coastal areas which would be most directly affected by such designation, for the purpose of receiving and giving proper consideration to the views of any interested party. Such hearings shall be held no earlier than thirty days after the publication of a public notice thereof.

(f)(1) The terms of the designation shall include the geographic area included within the sanctuary; the characteristics of the area that give it conservation, recreational, ecological or esthetic value; and the types of activities that will be subject to regulation by the Secretary in order to protect those characteristics. The terms of the designation may be modified only by the same procedures through which an original designation is made.

(2) The Secretary, after consultation with other interested Federal and State agencies, shall issue necessary and reasonable regulations to implement the terms of the designation and control the activities described in it, except that all permits, licenses, and other authorizations issued pursuant to any other authority shall be valid unless such regulations otherwise provide.

(3) The Secretary shall conduct such research as is necessary and reasonable to carry out the purposes of this title.

(4) The Secretary and the Secretary of the department in which the Coast Guard is operating shall conduct such enforcement activities as are necessary and reasonable to carry out the purposes of this title. The Secretary shall, whenever appropriate and in consultation with the Secretary of the department in which the Coast Guard is operating, utilize by agreement the personnel, services, and facilities of other Federal departments, agencies, and instrumentalities, or State agencies or instrumentalities, whether on a reimbursable or a non-reimbursable basis in carrying out his responsibilities under this title.

(g) The regulations issued pursuant to subsection (f) shall be applied in accordance with recognized principles of international law, including treaties, conventions, and other agreements to which the United States is signatory. Unless the application of the regulations is in accordance with such principles or is otherwise authorized by an agreement between the United States and the foreign State of which the affected person is a citizen or, in the case of the crew of a foreign vessel, between the United States and flag state of the vessel, no regulation applicable to ocean waters outside the territorial jurisdiction of the United States shall be applied to a person not a citizen of the United States.

(h)(1) For purposes of subsection (b)(2)(B), the Secretary shall transmit to the Congress a designation of a marine sanctuary at the time of its publication. The concurrent resolution described in subsection (b)(2)(B) is a concurrent resolution which is adopted by both Houses of Congress before the end of the first period of sixty calendar days of continuous session of Congress after the date on which the designation is transmitted, the matter after the resolving clause of which is as follows: 'That the Congress does not favor the taking of effect of the following terms of the marine sanctuary designation numbered : transmitted to Congress by the Secretary of Commerce on : .', the blank space being filled with the number of the designation, the second blank space being filled with the date of transmittal, and the third blank space being filled with the terms of the designation which are disapproved (or the phrase 'the entire designation' if the entire designation is disapproved).

(2) For the purpose of paragraph (1) of this subsection

(A) continuity of session is broken only by an adjournment of Congress sine die; and

(B) the days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of the sixty-day period.

(3) A designation which becomes effective, or that portion of a designation which takes effect under subsection (b), shall be printed in the Federal Register. SEC. 303. (a) Any person subject to the jurisdiction of the United States who violates any regulation issued pursuant to this title shall be liable to a civil penalty of not more than \$50,000 for each such violation, to be assessed by the Secretary. Each day of a continuing violation shall constitute a separate violation.

(b) No penalty shall be assessed under this section until the person charged has been given notice and an opportunity to be heard. Upon failure of the offending party to pay an assessed penalty, the Attorney General, at

the request of the Secretary, shall commence action in the appropriate district court of the United States to collect the penalty and to seek such other relief as may be appropriate.

(c) A vessel used in the violation of a regulation issued pursuant to this title shall be liable in rem for any civil penalty assessed for such violation and may be proceeded against in any district court of the United States having jurisdiction thereof.

(d) The district courts of the United States shall have jurisdiction to restrain a violation of the regulations issued pursuant to this title, and to grant such other relief as may be appropriate. Actions shall be brought by the Attorney General in the name of the United States, either on his own initiative or at the request of the Secretary.

SEC. 304. (Appropriations not to exceed \$2,235,000 per year have been authorized for fiscal years 1982 and 1983.)

APPENDIX B

Sanctuary Coordinates

The Key Largo National Marine Sanctuary Coordinates are: the point of beginning (POB) is at geographic coordinates 25° (degrees), 19.45' (minutes) north latitude, 80° (degrees), 12.0' (minutes) west longitude, said point being the northeast boundary corner of John Pennekamp Coral Reef State Park. From said POB run thence southeasterly to geographic coordinates 25° (degrees), 16.2' (minutes) north latitude 80° (degrees), 8.7' (minutes) west longitude, said point also being on the 300-foot Isobath, thence in a southwesterly direction to geographic coordinates 25° (degrees), 07.5' (minutes) north latitude 80° (degrees), 12.5' (minutes) west longitude, thence again run in a southwesterly direction to geographic coordinates 24° (degrees), 58.3' (minutes) north latitude, 80° (degrees), 19.8 (minutes) west longitude, thence leaving said 300-foot Isobath run northwesterly to geographic coordinates 25° (degrees), 2.2' (minutes) north longitude, 80° (degrees), 25.25' (minutes) west longitude, said point being the southeast boundary corner of John Pennekamp Coral Reef State Park, thence in a northeasterly direction along said easterly boundary of said state park to the POB.

APPENDIX C

**Key Largo National Marine Sanctuary
Final Regulations**

• • • *Effective November 18, 1983*

Fort Myers, FL—Southwest Florida Regl. ILS RWY 6, Amdt. 1

• • • *Effective November 17, 1983*

Burlington, IA—Burlington Muni. ILS RWY 28, Amdt. 6

The FAA published an Amendment in Docket No. 23811, Amdt. No. 1254 to Part 97 of the Federal Aviation Regulations (VOL 48 FR No. 213, Page 50312, dated November 2, 1983) under Section 97.29 effective January 19, 1984, which is hereby amended as follows:
Alexandria, LA—Esler Regional, ILS RWY 28, Amdt. 11

Effective date changed to March 15, 1984.

5. By amending § 97.31 RADAR SIAPs identified as follows:

• • • *Effective January 19, 1984*

Gulfport, MS—Gulfport-Biloxi Rgnl. RADAR-1, Amdt. 3

• • • *Effective November 23, 1983*

Duluth, MN—Duluth Intl. RADAR-1, Amdt. 18

• • • *Effective November 18, 1983*

Fort Myers, FL—Southwest Florida Regl. RADAR-1, Amdt. 1

6. By amending § 97.33 RNAV SIAPs identified as follows:

• • • *Effective January 19, 1984*

McCook, NE—McCook Muni. RNAV RWY 12, Amdt. 3

Roswell, NM—Roswell Industrial Air Center, RNAV RWY 35, Amdt. 1

Columbia, SC—Columbia Metropolitan, RNAV RWY 5, Amdt. 5, Cancelled

Bristol/Johnson/Kingsport, TN—Tri-City, RNAV RWY 5, Amdt. 4

• • • *Effective November 24, 1983*

Brunswick, GA—Glynco Jetport, RNAV RWY 7, Amdt. 3

Brunswick, GA—Glynco Jetport, RNAV RWY 23, Amdt. 3

Brunswick, GA—Glynco Jetport, RNAV RWY 22, Amdt. 2

(Secs. 307, 313(a), 801, and 1110, Federal Aviation Act of 1958 (49 U.S.C. 1348, 1354(a), 1421, and 1510); 49 U.S.C. 106(g) (Revised, Pub. L. 97-42, January 12, 1983); and 14 CFR 11.49(b)(3))

Note.—The FAA has determined that this regulation only involves an established body of technical regulations for which frequent and routine amendments are necessary to keep them operationally current. It, therefore—(1) is not a "major rule" under Executive Order 12291; (2) is not a "significant rule" under DOT Regulatory Policies and Procedures (44 FR 11034; February 26, 1979); and (3) does not warrant preparation of a regulatory evaluation as the anticipated impact is so minimal. For the same reason, the FAA certifies that this amendment will not have a significant economic impact on a substantial number of

small entities under the criteria of the Regulatory Flexibility Act.

Issued in Washington, D.C. on December 9, 1983.

Kenneth S. Hunt,

Director of Flight Operations.

Note.—The incorporation by reference in the preceding document was approved by the Director of the Federal Register on December 21, 1980, and reapproved as of January 1, 1982.

(FR Doc. 83-12731 Filed 12-9-83; 8:48 am)
BILLING CODE 4810-13-4

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

15 CFR Part 929

(Docket No. 31028-213)

Key Largo National Marine Sanctuary Regulations

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

ACTION: Final rule.

SUMMARY: These regulations make minor revisions and clarifications to the present interim-final regulations defining which activities are allowed and which are prohibited within the Key Largo National Marine Sanctuary, the procedures by which persons may obtain permits for research or activities normally prohibited, and the penalties for committing prohibited acts without a permit. These final regulations also revise the format of the existing regulations to make them more consistent with regulations in more recently designated national marine sanctuaries.

EFFECTIVE DATE: These regulations are effective January 9, 1984.

FOR FURTHER INFORMATION CONTACT: Dr. Nancy Foster, Chief, Sanctuary Programs Division, Office of Ocean and Coastal Resource Management, NOS, NOAA, 3300 Whitehaven St., N.W., Washington, D.C. 20235, telephone (202) 634-1236.

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. Title III of the Act authorizes 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 Ocean Services and Coastal Zone Management within the National Oceanic and Atmospheric Administration, U.S. Department of Commerce (the Assistant Administrator).

On December 18, 1975, the Key Largo National Marine Sanctuary (the Sanctuary) was designated, and on January 13, 1976, NOAA published interim-final regulations. Since final rules were never issued, NOAA published proposed rules in the Federal Register on December 17, 1982 (47 FR 36508). The significant comments on the proposed regulations and NOAA's responses to them follow:

(1) *Comment:* One reviewer commented that NOAA should not rely on the Regional Fishery Management Council to implement regulations that specifically address the issue of the spiny lobster populations within the Sanctuary. The reviewer cited the following as relevant inadequacies of the fishery management planning process: (a) Data on which the Fishery Management Plans are based, are typically outdated; (b) Fishery Management Plans are generalized for the entire area under jurisdiction of the Council with no special consideration given to local resources; (c) the Councils are not politically capable of making emergency decisions regarding protection of a depleted resource; and (d) Fishery Management Plans are based on data that doesn't always take into account natural population fluctuations.

Response: NOAA has considered the reviewer's comment and decided not to change the proposed rule at this time. The Fishery Management Plan represents the state of the art for current information on the spiny lobster. Regulations governing all aspects of spiny lobster management have only been in effect since July 1982. Prior to this, an emergency interim rule, implementing only the closed season portion of the Spiny Lobster Management Plan was in effect from March 1982. To issue additional regulations governing the Sanctuary spiny lobster populations, new data would have to be generated and close consultations undertaken with the South Atlantic Fishery Management Council.

Since implementation of the final rules, no comprehensive study of the Sanctuary spiny lobster populations has been conducted. Therefore, NOAA intends to rely upon the existing Fishery Management Plan regulations.

(2) *Comment:* A reviewer noted that the criteria used in issuing permits for taking tropical fish and invertebrates for scientific and educational purposes should be carefully worded so as not to allow fish collectors to claim their use of Sanctuary resources is for "public display".

Response: After reviewing the language in § 929.10, NOAA has determined that criteria for permits provide adequate standards by which to judge all permit applications and will prevent fish collectors from obtaining permits.

(3) *Comment:* One commenter suggested that "chumming materials" be defined clearly.

Response: At this time NOAA believes that it is not necessary to specify the substances which can and cannot be used as chumming materials.

(4) *Comment:* One reviewer requested that if and when weapons are being transported through the Sanctuary they should not be loaded, cocked or otherwise in a mode in which they could be accidentally discharged.

Response: The language of § 929.7(b) has been reviewed and NOAA has determined that it provides adequate protection for Sanctuary resources.

(5) *Comment:* With respect to § 929.10(d), one reviewer suggested that the entity who is responsible for monitoring permits issued for prohibited actions be named in the regulations.

Response: The wording of § 929.10(d) has been changed to reflect that NOAA is responsible for monitoring permits issued for prohibited activities.

(6) *Comment:* One commenter questioned the omission of Spanish lobster harvest in the regulations.

Response: At this time NOAA is not convinced that regulations are needed to protect the Spanish lobster. However, if evidence were provided to demonstrate the need for rules governing harvest of Spanish lobsters, NOAA would reevaluate the situation.

(7) *Comment:* A reviewer requested that navigation aids, such as lighthouse, mooring buoys and scientific equipment be added to § 929.7(5).

Response: The regulations have been changed to reflect this.

Other Actions Associated with the Final Rulemaking

(A) Classification Under Executive Order 12291

NOAA has concluded that these regulations are not major because they will not result in:

(1) An annual effect on the economy of \$100 million or more;

(2) A major increase in costs or prices for consumers, individual industries, Federal, State or local government agencies, or geographic regions; or,

(3) Significant adverse effects on competition, employment, investment, productivity, innovation or on the ability of United States-based enterprises to compete with foreign-based enterprises in domestic or export markets.

These final rules make minor revisions and clarifications to the present interim-final regulations. They will not result in any direct economic or environmental effects nor will they lead to any major indirect economic or environmental impacts.

(B) Regulatory Flexibility Act Analysis

A Regulatory Flexibility Analysis is not required for this notice of final rulemaking. These regulations set forth which activities are allowed and which are prohibited within the Key Largo National Marine Sanctuary, the procedures by which persons may obtain permits for research or activities normally prohibited, and the penalties for committing prohibited acts without a permit. These rules do not directly affect "small government jurisdictions" as defined by Public Law 96-354, the Regulatory Flexibility Act, and the rules will have no effect on small business.

(C) Paper Work Reduction Act of 1980 (Pub. L. 96-511)

These regulations will impose no information collection requirements of the type covered by Public Law 96-511 other than those already approved by the Office of Management and Budget (approval number 0648-0138) for use through October 31, 1986.

(D) National Environmental Policy Act

NOAA has concluded that publication of these final rules does not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement is not required.

List of Subjects in 15 CFR Part 929

Administrative practice and procedure. Environmental protection. Marine resources. Natural resources.

(Federal Domestic Assistance Catalog No. 11.419 Coastal Zone Management Program Administration)

Dated: October 21, 1983.

K. E. Taggart,

Acting Assistant Administrator for Ocean Services and Coastal Zone Management.

Accordingly, it is proposed that 15 CFR Part 929 be revised as follows:

PART 929—KEY LARGO NATIONAL MARINE SANCTUARY FINAL REGULATIONS

Sec.

929.1 Authority.

929.2 Purpose.

929.3 Boundaries.

929.4 Definitions.

929.5 Management and enforcement.

929.6 Allowed activities.

929.7 Activities prohibited or controlled.

929.8 Other authorities.

929.9 Penalties for commission of prohibited acts.

929.10 Permit procedures and criteria.

929.11 Appeals of administrative action.

Authority: Title III of Pub. L. 92-332, 86 Stat. 1061, 1062 (16 U.S.C. 1431-1434).

§ 929.1 Authority

The Sanctuary has been designated by the Secretary of Commerce pursuant to the authority of Section 302(a) of the Marine Protection, Research and Sanctuaries Act of 1972 as amended (the Act). The following regulations are issued pursuant to Title III of the Act.

§ 929.2 Purpose

The purpose of designating the Key Largo National Marine Sanctuary is to protect and preserve the coral reef ecosystem in its natural state and to regulate uses within the Sanctuary to ensure the health and well-being of the coral and associated flora and fauna.

§ 929.3 Boundaries

The Sanctuary consists of a portion of the Atlantic Ocean beginning at approximately three miles east of Key Largo, Florida, adjacent to the John Pennekamp Coral Reef State Park. The coordinates for the Sanctuary are: the point of beginning (POB) is at geographic coordinates 25° (degrees), 19.45' (minutes) north latitude, 80° 12.0' west longitude, said point being the northeast boundary corner of John Pennekamp Coral Reef State Park. From said POB run thence southeasterly to geographic coordinates 25° 18.2' north latitude 80° 8.7' west longitude, said point also being on the 300 foot isolath, thence in a southwesterly direction to geographic coordinates 25° 07.5' north latitude, 80° 12.5' west longitude, thence again run in a southwesterly direction to geographic coordinates 24° 38.3' north

latitude, 80°, 19.8' west longitude, thence leaving said 300 foot isobath run northwesterly to geographic coordinates 25°, 2.2' north latitude, 80°, 25.25' west longitude, said point being the southeast boundary corner of John Pennekamp Coral Reef State Park, thence in a northeasterly direction along said easterly boundary of said State Park to the POB.

§ 929.4 Definitions

(a) "Administrator" means the Administrator of the National Oceanic and Atmospheric Administration (NOAA).

(b) "Assistant Administrator" means the Assistant Administrator for Ocean Services and Coastal Zone Management, National Oceanic and Atmospheric Administration, or his/her successor, or designee.

(c) "Persons" means 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 the government.

(d) "The Sanctuary" means the Key Largo National Marine Sanctuary.

(e) "Tropical fish" means fish and invertebrates of minimal sport and food value, usually brightly colored, often used for aquaria purposes and which live in a close interrelationship with corals and coral reef substrates.

§ 929.5 Management and enforcement

The National Oceanic and Atmospheric Administration (NOAA) has primary responsibility for the management of the Sanctuary pursuant to the Act. NOAA's responsibilities under the Act require that the Sanctuary Programs Division review, consider, and approve any activities that take place in the Sanctuary in accordance with these rules and regulations. The U.S. Coast Guard and the Florida Department of Natural Resources, Division of Recreation and Parks (FDNR) shall conduct surveillance and enforcement of these regulations pursuant to 14 U.S.C. 39, 18 U.S.C. 1432 (f)(4), 18 U.S.C. 7421 (b), 18 U.S.C. 3375 (a), or other appropriate legal authority.

§ 929.6 Allowed activities

All activities except those specifically prohibited by § 929.7 or other applicable authority may be undertaken within the Sanctuary subject to the restrictions and conditions imposed by other authorities.

§ 929.7 Activities prohibited or controlled

(a) Unless permitted by the Assistant Administrator in accordance with

§ 929.10, or as may be necessary for the national defense, or to respond to an emergency threatening life, property or the environment, the following activities are prohibited or controlled within the Sanctuary. All prohibitions and controls must be applied consistently with international law. Refer to § 929.9 for penalties for commission of prohibited acts.

(1) *Removal or damage of natural features, marine life and archaeological and historical resources.* (i) No person shall destroy, injure, harmfully disturb, break, cut or similarly damage or remove any coral or other marine invertebrate, or any plant, soil, rock, or other material, except that commercial taking of spiny lobster and stone crab by trap and recreational taking of spiny lobster by hand which is consistent with both the applicable regulations under the appropriate Fishery Management Plan and these regulations is allowed. Divers are prohibited from handling coral formations, standing on coral formations, or otherwise disturbing the corals.

(ii) No person shall catch or collect any tropical fish.

(iii) No person shall remove, deface, damage, or tamper with archaeological or historical resources or the cargo of any submerged wrecks or other historical resources within the boundaries of the Sanctuary.

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

(2) *Dredging, filling, excavating and building activities.* No person shall dredge, excavate, fill or otherwise alter the seabed in any way nor construct any structure of any kind, whether permanent or temporary, with the exception of navigation aids.

(3) *Discharges.* No person shall deposit or discharge any materials or substance of any kind into the waters of the Sanctuary. The only exceptions are:

(i) Fish or fish parts and chumming materials;

(ii) Cooling waters from vessels; and

(iii) Effluent from marine sanitation devices approved by the United States Coast Guard.

(4) *Tampering with markers.* No person shall mark, deface or damage in any way whatsoever, or displace, remove or tamper with any signs, notices or placards, whether temporary of permanent, or with any navigational aids, monuments, stakes, posts, mooring buoys, scientific equipment or other boundary markers installed by the

Sanctuary Manager, or trap floats placed for the purpose of lobster fishing.

(5) *Use of harmful fishing methods.* No person shall use within the Sanctuary, or shall carry or possess, except while passing without interruption through the Sanctuary or for law enforcement purposes, the following firearms or weapons: Pole spears, air rifles, bows and arrows, slings, Hawaiian slings, rubber powered arbaletes, pneumatic and spring loaded guns, explosive powered guns or similar devices known as spearguns. No person shall use within the Sanctuary:

(i) Wire-fish-traps;

(ii) Bottom trawls, dredges, fish sleds, or similar vessel-towed or anchored bottom fishing gear or net; or

(iii) Poisons, electric charges, explosives or similar devices.

(6) *Operation of watercraft and anchoring.* All watercraft shall be operated in accordance with applicable Federal rules and regulations. The following additional regulations apply within the boundaries of the Sanctuary.

(i) Watercraft shall be operated to avoid striking or otherwise causing damage to the natural features of the Sanctuary.

(ii) Watercraft must use mooring buoys, stations or anchoring arms when such facilities have been provided.

(iii) No anchor shall be cast or dragged in such a way as to damage any coral reef formations. Anchors shall be dropped only on sand flats off the reefs and be placed to avoid dragging into the coral formations.

(iv) Within 100 yards of divers, sightseeing boats or fishermen, no watercraft shall be operated at a speed greater than 4 knots or in any manner to create a wake, except by law enforcement officials while in the performance of their official duties.

(v) All watercraft from which diving operations are being conducted shall fly in a conspicuous manner the red and white "divers down" flag. Divers shall stay within 100 yards of their diving flag.

(7) *Use of dangerous weapons.* Except for law enforcement purposes, no person shall use or discharge explosives or weapons of any description within the Sanctuary boundaries. Distress signaling devices, necessary and proper for safe vessel operation, and knives generally used by fishermen and swimmers are not considered weapons for purposes of this subsection.

(b) The Sanctuary may be closed to public use in the event of emergency conditions endangering life or property. The Assistant Administrator or his/her designee may also close certain areas in order to permit recovery of the living

resources from overuse, or provide for scientific research relating to protection and management. However, the total closed area shall not exceed a size necessary to accomplish these purposes. Public notice of closures will be provided through the local news media and posting of placards at the John Pennekamp Coral Reef State Park, if deemed necessary.

(c) The regulation of activities within the Sanctuary shall not prohibit any activity conducted by the Department of Defense that is essential for national defense or because of emergency. Such activities shall be conducted consistently with all regulations to the maximum extent possible.

(d) 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 principles of international law, including treaties, conventions and other international agreements to which the United States is signatory.

§ 929.8 Other authorities.

No license, permit or other authorization issued pursuant to any other authority may validly authorize any activity prohibited by § 929.7 unless such activity meets the criteria stated in § 929.10 (a), (c) and (d), and is specifically authorized by the Assistant Administrator.

§ 929.9 Penalties for commission of prohibited acts.

Section 303 of the Act authorizes the assessment of a civil penalty of not more than \$50,000 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. NOAA will apply the consolidated civil procedure regulations set forth at 48 FR 61643 (1981) (to be codified at 15 CFR 904.100 through 904.243), and the seizure, forfeiture, and disposal procedure regulations set forth at 48 FR 31648 (1981) (to be codified at 50 CFR Part 219) to all enforcement matters under the Act.

§ 929.10 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 in the Sanctuary activities specified in the permit including any activity specifically prohibited under § 929.7, 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, Attn: Sanctuary Programs Division, National Oceanic and Atmospheric Administration, 3300 Whitehaven Street, N.W., Washington, D.C. 20235. An application 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.

This information collection has been approved by the Office of Management and Budget (approval number 0540-0138) for use through October 31, 1986.

(c) In considering whether to grant a permit, the Assistant Administrator shall evaluate such matters as: (1) The general professional and financial responsibility of the applicant; (2) the appropriateness of the methods being proposed 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 as a source of recreation, education, or scientific information; and (4) the end value of the activity.

(d) In addition to meeting the criteria in § 929.10 (a) and (c), the applicant must also satisfactorily demonstrate to the Assistant Administrator:

(1) That adequate safeguards shall be provided to protect the environment; and (2) that the environment shall be returned to the condition which existed before the activity occurred.

Permits shall be appropriately conditioned, and monitored by NOAA to ensure compliance.

(e) In considering an application submitted pursuant to this Section, the Assistant Administrator may seek and consider the views of Regional Fishery Management Councils and any other person or entity, within or outside of the Federal government, and may hold a public hearing, as he/she deems appropriate.

(f) The Assistant Administrator may 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 necessary, and may attach to any permit granted for research related to the Sanctuary stipulations requiring that: (1) The Assistant Administrator or a designated representative may observe and monitor any activity permitted by this section; (2) any information obtained in the research site shall be made available to the public; (3) periodic reports of the status of progress of such activity be submitted; and (4) the Permittee shall fly the Sanctuary

research flag while working in the Sanctuary.

(g) A permit granted pursuant to this section is nontransferrable.

(h) The Assistant Administrator may amend, suspend or revoke a permit granted pursuant to this section, in whole or in part, if it is determined that the Permittee has acted in violation of the terms of the permit or of these regulations or for other good cause shown. Any such action shall be communicated in writing to the Permittee, and shall set forth the reason(s) for the action taken. Such action may be appealed as provided for in § 929.11.

§ 929.11 Appeals of administrative action

(a) The applicant for a permit or the Permittee, or any other interested person (hereafter Appellant) may appeal the granting, denial, conditioning or suspension of any permit under § 929.10 to the Administrator of NOAA. In order to be considered by the Administrator, such appeal shall be in writing, shall state the action(s) appealed and the reason(s) therefor, and shall 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 may request the Appellant, and the permit applicant or Permittee if other than the Appellant, to submit such additional information and in such form as will allow action upon the appeal. The Administrator shall decide the appeal using the criteria set out in § 929.10 (a), (c) and (d) and any information relative to the application on file, any information provided by the Appellant, and such other consideration as is deemed appropriate. The Administrator shall notify the Appellant of the final decision and the reason(s) therefor, in writing, normally within 30 days of the date of the receipt of adequate information required to make the decision.

(c) If a hearing is requested or, if the Administrator determines that one is appropriate, the Administrator may grant an informal hearing before a Hearing Officer designated for that purpose, after first giving notice of the time, place, and subject matter of the hearing in the Federal Register. Such hearing shall 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 or Permittee if different, and other interested persons

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 a decision in writing 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 the interested persons of his/her decision, and the reason(s) therefor in writing within 30 days of receipt of the recommended decision of the Hearing Officer. The Administrator's decision shall constitute final action for the Agency for the purposes of the Administrative Procedure Act.

(e) Any time limit prescribed in this section may be extended by the Administrator for good cause for a period not to exceed 30 days, either upon his/her own motion or upon written request from the Appellant, permit applicant or Permittee, stating the reason(s) therefor.

FR Doc. 83-3239 Filed 12-6-83; 8:45 am
BILLING CODE 3510-08-M

DEPARTMENT OF ENERGY

Federal Energy Regulatory Commission

18 CFR Parts 125, 225, and 356

(Docket No. RM83-40-000)

Retention of Records by Natural Gas Companies, Public Utilities, Licensees, and Oil Pipeline Companies

Issued: December 3, 1983.

AGENCY: Federal Energy Regulatory Commission, DOE.

ACTION: Final rules; notice of effective date and corrections.

SUMMARY: This document gives notice of the effective date of a final rule in Docket No. RM83-40-000 (Order No. 335), issued September 27, 1983, amending regulations on the retention of records. The Commission is also correcting an error made in the final rule.

DATE: Order No. 335 is effective on December 9, 1983.

FOR FURTHER INFORMATION CONTACT: Kenneth J. Malloy, Office of the General Counsel, 825 North Capitol Street, NE, Washington, D.C. 20426; (202) 357-8033.

SUPPLEMENTARY INFORMATION: The Paperwork Reduction Act, 44 U.S.C.

3301-3520 (Supp. V 1981) and the Office of Management and Budget's (OMB) regulations, 5 CFR Part 1320 (1983), require that OMB review certain information collection requirements imposed by agency rule. Upon approval, OMB issues a control number.

On September 27, 1983, the Federal Energy Regulatory Commission (Commission) issued a final rule in Docket No. RM83-40-000 (Order No. 335) amending its regulations on retention of records by public utilities, licensees, natural gas companies, and oil pipeline companies. Revisions to Regulations on Retention of Records by Natural Gas Companies, Public Utilities, Licensees and Oil Pipeline Companies, 48 FR 44477 (September 29, 1983). The Commission therein stated that the rule would be effective on November 28, 1983, unless the Commission did not receive OMB's approval by that time, in which case the Commission would temporarily suspend the effective date of the rule.

The Commission did not receive OMB's approval sufficiently prior to the effective date of the rule to avoid the necessity of publishing a suspension notice. The Commission, therefore, suspended the effective date of this rule until it received notice of OMB's approval. 48 FR 53694 (November 29, 1983).

The Commission has received notice that OMB approved this rule and assigned it OMB control number 1902-0098. Accordingly, this rule will now become effective on the date that this notice is published in the Federal Register.

In addition, the following corrections are made in FR Doc 83-7868, appearing on page 44484 of the September 29, 1983 issue of the Federal Register (Mimeo page 33).

1. Ordering paragraph 11 should read as follows:

11. Section 356.11 (Schedules of Records and Periods of Retention) is amended by removing entirely the following categories of records and their retention periods: A.3, A.4(e), A.5, A.6(d)-A.6(f), B.1, B.2(b)-B.2(g), B.3-B.7, C.3, C.4(c), C.4(d), C.5(b)-C.5(d), D, note, D.1(g), D.1(j), D.2(b), E.1, E.2(c)-E.2(j), F.2, G.3, H.1(b), H.2(b), H.2(c), H.3, H.4, L.1-1.11, K.2, K.6, L.1(b), L.1(c), L.2-L.5, and M.

2. A new ordering paragraph 14 should be added on page 44485 to read as follows:

12. The OMB control number is added parenthetically after each of the table of contents to Parts 125, 225, and 356, to read as follows:

(OMB Control Number 1902-0098)

Kenneth F. Plumb,

Secretary.

FR Doc. 83-3239 Filed 12-6-83; 8:45 am
BILLING CODE 3717-01-M

18 CFR Part 282

(Docket No. RM80-10-001)

Incremental Pricing Program; Order Extending Stay of Effective Date of Order No. 80

Issued December 1, 1983.

AGENCY: Federal Energy Regulatory Commission, DOE.

ACTION: Order extending stay of effective date of Order No. 80.

SUMMARY: On May 6, 1980, the Federal Energy Regulatory Commission (Commission) issued a final rule (Order No. 80, 45 FR 31,622 (May 13, 1980)) to implement Phase II of the incremental pricing program. That rule, which expands the scope of incremental pricing in accordance with section 202 of the Natural Gas Policy Act of 1978, was due to become effective October 5, 1983. On October 5, 1983, the Commission issued an order to stay the effective date for sixty days and proposed to extend the stay for an additional 120 days or until the Commission completes its reconsideration of Order No. 80, whichever is earlier. (48 FR 45,738 and 45,787 (Oct. 7, 1983).) After consideration of comments received, the Commission adopts its proposal and extends the stay of Order No. 80 until April 12, 1984, or until the Commission completes reconsideration of Order No. 80 whichever is earlier.

EFFECTIVE DATE: This order is effective December 1, 1983.

FOR FURTHER INFORMATION CONTACT: Barbara K. Christin, Federal Energy Regulatory Commission, Office of the General Counsel, 825 North Capitol Street NE, Washington, D.C. 20426, (202) 357-8033.

SUPPLEMENTARY INFORMATION:

I. Introduction

The Federal Energy Regulatory Commission (Commission) is issuing this order to extend the stay of the effective date of the final regulations in Order No. 80 for 120 days or until the Commission completes reconsideration of the regulations in Order No. 80, whichever is earlier. Those regulations expand the scope of the incremental pricing program in accordance with section 202

* Final Rule, Docket No. RM80-10, issued May 6, 1980, 45 FR 31,622 (May 13, 1980).

APPENDIX D
Surveillance and Enforcement
Memorandum of Agreement

This Agreement is entered in by and between the Secretary of Commerce for the United States of America (the Secretary), and the State of Florida Department of Natural Resources, Division of Recreation and Parks (the State).

WITNESSETH :

Whereas, Title III of the Marine Protection, Research and Sanctuaries Act, Public law 92-532 (as amended), 16 U.S.C. 1431 et seq., (the Act), authorized the designation of ocean waters as marine sanctuaries to preserve or restore their conservation, recreational, ecological or esthetic values; and

Whereas, under section 302(f)(4) (16 U.S.C. 1432(f)(4)) of the Act, the Secretary is charged with the responsibility for enforcing the provisions of the Act and is authorized to enter into, among other things, agreements with state agencies to utilize such personnel, services, equipment, and other facilities of such State agencies as may be necessary to carry out the enforcement responsibilities of the Act; and

Whereas, such agreements with State agencies are also authorized by Section 3(b) of the Fish and Wildlife Improvement Act of 1978 (16 U.S.C. 7421(b)) and by Section 6(a) of the Lacey Act (16 U.S.C. 3375(a)) both of which enhance the Secretary's ability to enforce the Act insofar as it relates to the protection of fish and wildlife; and

Whereas, on December 18, 1975 the Secretary designated the Key Largo National Marine Sanctuary adjacent to the John Pennekamp Coral Reef State Park and on January 16, 1981 the Secretary designated the Looe Key National Marine Sanctuary located five miles south-southwest of Big Pine Key (the Sanctuaries);

Whereas, the State possesses law enforcement personnel, vessels, aircraft, vehicles and other equipment and capabilities presently engaged in enforcing state conservation laws which could be utilized in assisting the Secretary in carrying out the law enforcement responsibilities mandated by the Act for the Sanctuaries;

NOW THEREFORE, it is mutually agreed:

I. DEPUTIZATION OF STATE OFFICERS AS FEDERAL ENFORCEMENT

AGENTS

A. Those law enforcement officers (hereinafter referred to as Rangers) who are members of the Division of Recreation and Parks are hereby deputized and authorized as federal law enforcement agents to enforce the Act and the regulations promulgated thereunder, utilizing the powers and authorities of the Lacey Act as appropriate. Enforcement shall be under the direction of the Secretary or his or her designee and in accordance with any guidelines or limitations the Secretary or his or her designee may, from time to time, impose.

B. All Rangers, while acting as federal law enforcement agents, shall possess the powers and authorities as set forth above but shall not be held or considered as employees of the United States for the purposes of any laws administered by the United States Office of Personnel Management. Such Rangers, while acting as federal law enforcement agents, shall not be compensated, salaried or otherwise reimbursed by the United States for any services performed or expenses incurred in performance of such duties except as provided by memoranda of understanding, contracts, or cooperative agreements in accordance with this Agreement.

C. Except as provided in this Agreement, the Rangers shall not have the authority to carry out any functions or responsibilities of the U.S. Government under the Act.

D. Those Rangers who for any reason leave or are removed from service as members of the Division of Recreation and Parks will be simultaneously divested of authority herein conferred. A newly appointed member will automatically be vested with authority under this Agreement as of the date of his or her appointment.

E. All Rangers exercising authority under this Agreement shall, as soon as possible but not later than 15 days following the event, submit written documentation of any action taken pursuant to this Agreement. Such documents shall include, but not be limited to, case investigation reports, a copy of any written warning or documentation of violation issued, and any supporting exhibits, affidavits, photographs, or other evidence gathered, and shall be submitted to the Southeast Regional Counsel, National Oceanic and Atmospheric Administration, 9450 Roger Blvd., Suite 127, St. Petersburg, Florida 33702. Any arrest of persons or seizure of vessels made as a result of action taken by any Ranger under this agreement shall be reported immediately to the NOAA Regional Counsel in St. Petersburg, Florida

F. Rangers will be made available, upon request by the appropriate Federal authority, to appear as witnesses in connection with any action brought under the Act with which they have an involvement.

G. Any vessel, fish, or cargo seized by a Ranger under the Act may be delivered to a U.S. Government official designated by the Secretary or other appropriate Federal authority. If such official is unable properly to provide for the care, handling, and preservation as evidence of such seized property, employees of the State will be expected to make reasonable arrangements for such care, handling, and preservation as evidence. Costs to third parties with whom arrangements for the care, handling, and preservation of seized property are made under this paragraph shall be considered as separate items for payment by the Secretary and will not be the responsibility of the State.

H. The State shall prepare a monthly report with respect to the activities under this Agreement and submit this report within 15 days of the close of the reporting month to the Director, Sanctuary Programs Office, National Oceanic and Atmospheric Administration. Such report shall contain, but not be limited to, a summary of the types of contacts made,

the frequency of specific violations, locations and times (dates and hours) of patrols, and such other actions as may have been taken pursuant to the Act. In addition, the State shall make recommendations, as appropriate, for improving the enforcement of marine sanctuary violations.

II. CONDITIONS AND TERM OF AGREEMENT

A. This Agreement shall be effective as of the date it is signed by the parties and shall remain in effect until 30 days after either party has given the other written notice of termination. This Agreement may be amended with the mutual consent of the parties in writing.

B. In no event shall this Agreement be interpreted to conflict with any directives, specific operating policies or procedures promulgated by the Secretary or the State, without the express oral or written consent of an appropriate official of the United States or the Florida Division of Recreation and Parks respectively. If the terms of this agreement are inconsistent with any such existing directives, policies or procedures then those inconsistent terms shall be invalid, but the remaining terms and conditions shall remain in full force and effect.

C. This agreement shall be construed to be consistent with the Act, and regulations promulgated under that Act.

UNITED STATES DEPARTMENT OF COMMERCE
FOR THE SECRETARY OF COMMERCE

BY: 

TITLE: Acting Assistant Administrator

DATE: JUL 27 1982

FLORIDA DEPARTMENT OF NATURAL RESOURCES
FOR THE STATE OF FLORIDA

BY: 

TITLE: Executive Director

DATE: July 30, 1982

APPROVED AS TO
FORM & LEGALITY


DEPARTMENT ATTORNEY

APPENDIX E

Sanctuary Research Guidelines

DRAFT

GUIDELINES FOR RESEARCH IN NATIONAL MARINE SANCTUARIES

I. GUIDELINES FOR RESEARCH PROPOSALS

A. Sanctuary-Sponsored Research

The Sanctuary Programs Division (SPD) of the Office of Ocean and Coastal Resource Management in the National Oceanic and Atmospheric Administration (NOAA) provides support for research which addresses management issues in national marine sanctuaries. Research priorities are identified in sanctuary management plans.

B. Types of Proposals

The SPD provides financial support for research through grants, contracts, and cooperative agreements. Cost-sharing and coordination of projects with other government agencies, universities and private institutions is encouraged.

The SPD considers proposals from universities and colleges; nonacademic research institutions (e.g., research laboratories, independent museums, professional societies); private organizations; local, state or other Federal government agencies; and unaffiliated qualified individuals.

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 capability and/or experience; (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 procured by another source.

3. Unsolicited Proposals. Any formal written offer to perform a proposed task or effort that is initiated and submitted by a qualified prospective 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 sanctuary management capabilities through unique or innovative methods or approaches.

C. 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 reviewed by SPD officials, and experts knowledgeable on the subject matter.

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 sanctuary management. 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 applying for Sanctuary 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 to 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, and no contingency plan was in place to respond to the crisis or assess its impact in an organized and timely fashion.

D. Proposal Content

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 is to be conducted
- ° Title of proposed project

- Name and address of organization to which the award would be made
- Type of organization
- Name, address and phone number of principal investigator and additional key project representatives
- Requested amount
- Proposed start date
- Proposed Project duration
- 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.

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

A proposal must be signed by the organizational official authorized to contractually obligate the submitting organization. The principal investigator is also signatory.

2. Table of Content.

3. Lists of Figures and Tables.

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

5. Project Description. The main body of the proposal should be concise, but detailed. It should include:

a. Description of Current State of Knowledge. Discuss the problem in light of significant previous work in the area.

b. Project Objectives. State the objectives of the study.

c. Project Significance. Discuss how the proposed effort will enhance or contribute to improving the state of knowledge. Discuss any relevant management issues and how the proposed effort will contribute to sanctuary management decisionmaking, future sanctuary research, and/or other works in progress.

d. Methods. Describe the tasks required to accomplish the project's objectives. Provide adequate description of field and laboratory methods and procedures. Provide a map to study location(s). Indicate habitat areas of particular concern. Indicate where laboratory analyses will be conducted, if applicable. Describe the rationale for selecting the proposed methods and study locations over any alternatives. Identify any environmental consequences. List and describe facilities and equipment to be used. Collaborative arrangements and cost-sharing should be documented in the proposal.

e. Analysis of Results. Discuss how the results will be analyzed. Reference relevant statistical analyses.

f. Deliverables. Discuss anticipated final products -- see IV. Report Preparation. Provide sample graphics or illustrations and layout design. If color photographs or graphics are to be used, provide justification for use and estimate total number. Indicate how results will be treated -- published in reference journal, published in the public press, incorporated into academic curriculum, submitted to SPD's Technical Report Series, etc. (Note the SPD prints and publishes a limited number of outstanding reports in its Technical Report Series).

6. Personnel. Describe the research team and the specific task assignments of team members. Indicate the percentage of time, based on the offeror's regular work week, that personnel are expected to devote to the proposed work. Provide resumes listing qualifications and details relating professional and technical personnel. In an appendix, list each investigator's publications during the past 5 years. Describe and explain any portion of work expected to be subcontracted and identify probable sources.

Submit evidence of ability to perform. Such evidence shall be in reference to similar efforts performed.

7. References. Cite only those used in the text of the proposal.

8. 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 fulltime 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 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 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 analyses 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 disclosed in the proposal for approval by SPD.

f. Indirect Costs. Appropriate or established indirect cost rate; e.g., fees.

7. Other Sources of Financial Support. List all current or pending research to which the principal investigator or other key personnel have committed their time during the period of the proposed work, regardless of the source of support. Indicate the level of effort or percentage of time devoted to these projects.

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 jeopardize chances for SPD funding.

8. Application for Sanctuary Permit. Removal or manipulation of sanctuary resources or activities prohibited by sanctuary regulations requires a sanctuary permit. Proposals should discuss the environmental consequence of conducting an otherwise prohibited activity and indicate whether the activity could be conducted outside the sanctuary and accomplish the project's objectives. If collecting is required, indicate the type and quantity and where specimens will be deposited. Indicate what organisms might be collected incidentally to those specifically sought and identify specialists who might be interested in incidental groups.

9. Requests 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.

10. Coordination with Other Research In Progress or Proposed. SPD encourages coordination, collaboration and cost-sharing with other investigators to enhance scientific capabilities and avoid unnecessary duplication of effort. Proposals should include a description of these efforts.

E. Submission of Proposals

Dates for submission of solicited proposals are announced 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 December 15 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
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
(202)634-4236
Washington, D.C. 20235
(202)634-4236

GUIDELINES FOR SANCTUARY PERMITS*

A. Introduction

Permits may be issued by the Assistant Administrator for National Ocean Services or his/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 reviewed by SPD program officials.

B. Application Content

1. Cover Sheet. The cover sheet should identify: (1) name of the national marine sanctuary in which the proposed activity would take place; (2) title of project; (3) name, address, telephone number, and affiliation of applicant; (4) name, affiliation, and relationship of colleagues to be covered by the permit; (5) project duration; (6) funding source; (7) key words; and (8) signature of applicant on letterhead stationary.

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

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

a. Objectives. State the objectives of the study.

b. Project Significance. Discuss significant previous work in the area of interest and how the proposed effort would 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 the sanctuary.

c. Methods. Describe the tasks required to accomplish the project's objectives. Provide adequate description of field and laboratory methods and procedures. Describe the rationale for selecting the proposed methods over any alternative methods. If collecting is required, indicate the type and quantity and where specimens would be deposited. Indicate what organisms might be collected incidentally to those specifically sought and identify specialists who might be interested in incidental groups.

*Note: Applicants submitting proposals for financial support should include permit requests in proposals following SPD's Guidelines for Research Proposals. Investigators conducting non-SPD-sponsored research should follow guidelines discussed herein.

Provide a map to field study location(s). Describe habitat areas of particular concern. Indicate where the laboratory analyses will be conducted, if applicable.

d. Environmental Consequences. Discuss the environmental consequence of conducting an otherwise prohibited activity and indicate whether the activity could be conducted outside the Sanctuary and accomplish the projects objectives.

e. Personnel. Describe the research team and specific task assignments of team members. Provide evidence of ability to perform (i.e., qualifications and reference to similar efforts performed). Note that only those persons specifically listed on the permit will be allowed to participate in permitted activities.

f. 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).

g. References. Cite only those used in the text of the proposal.

4. Supporting Information

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

b. Coordination with Research in Progress or Proposed. SPD encourages coordination and cost-sharing with other investigators to enhance scientific capabilities and avoid unnecessary duplication of effort. Applications should include a description of these efforts, where applicable.

C. Requests for Sanctuary Support Services

SPD has limited on-site sanctuary personnel, facilities and equipment that may be used on loan or lease to support research under special circumstances. 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.

D. Requests for Amendments to Active Permits

Requests for extension of a permit period, change in study design or other form of amendment to active permits should 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 the request for an amendment.

E. 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 requested effective date 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:

Dr. Nancy Foster, Chief
Sanctuary Programs Division
Office of Ocean and Coastal Resource Management
3300 Whitehaven Street, N.W.
Washington, D.C. 20235
(202)634-4236

F. Evaluation of Permit Requests

Permit applications are checked for completeness and adherence to these guidelines. Complete applications are assigned tracking numbers. Incomplete applications are returned to applicant for clarification. Complete applications reviewed by SPD program officials and outside experts. Applications are judged on the basis of (1) relevance or importance to sanctuary; (2) scientific or educational merits; (3) appropriateness and environmental consequences of technical approach; and (4) whether the proposed effort should be conducted outside of the sanctuary.

G. 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 or his/her designee issues the permit.

Permit holders must counter-sign the permit and return copies to SPD and on-site sanctuary personnel prior to conducting permitted activities in the sanctuary. A NOAA/SPD research flag will be issued to the permit holder by on-site sanctuary personnel. 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 aboard research vessels and made available upon request for inspection by sanctuary personnel or law enforcement officials.

Only persons named on the permit may participate in permitted activities. Permits and NOAA/SPD flags are non-transferrable. Permit holders must abide by all provisions set forth in the permit as well as applicable sanctuary regulations. Applications for sanctuary permits are incorporated into the

conditions of the permit. Permitted activities 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.

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.

H. Monitoring of Performance

Permitted activities will be monitored to ensure compliance with the conditions of the permit. SPD and on-site sanctuary personnel may periodically assess work in progress by visiting the study location and observing any activity permitted by the permit or by reviewing any required 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 F

Summary of Sanctuary-sponsored Research

Summary of Sanctuary-Sponsored Research Related to
Key Largo National Marine Sanctuary

Project	Principal Investigator	Objective	Status & Reference
Key Largo Coral Reef Marine Sanctuary Deep Water Resource Survey	S. C. Jameson, ed. Office of Coastal Zone Management 3300 Whitehaven St., N.W. Washington, DC 20235	To fill some of the significant gaps in baseline data on the sanctuary deep water resources through an extensive side scan sonar and bathymetric survey and a qualitative submersible reconnaissance and resource inventory	Completed NOAA Technical Report CZ/SP-1, Washington, DC, July 1981
Key Largo Coral Reef Marine Sanctuary Literature Survey and Water Quality Monitoring Program	Connell Metcalf & Eddy, Inc. 1320 South Dixie Highway P.O. Box 341939 Coral Gables, FL 33134	To examine existing literature and locate historical data suitable for use as a baseline against which new data can be evaluated	Completed Report to the Office of Coastal Zone Management, Washington, DC, September 1980
Geologic History of Grecian Rocks Key Largo Coral Reef Marine Sanctuary	E. A. Shinn United States Geological Survey Fisher Island Station Miami, FL 33139	To study the three-dimensional geological aspects of Grecian Rocks, including zonation at depth and thickness and accumulation rate of the reef and to determine what controls the location of Grecian Rocks	Completed Bull. Mar. Sci., 30(3): 646-656, 1980
Growth Rates in <u>Montastraea annularis</u> : A Record of Environmental Change in Key Largo Coral Reef Marine Sanctuary	J. H. Hudson United States Geological Survey Fisher Island Station Miami, FL 33139	To obtain data on past environmental conditions in Key Largo Coral Reef Marine Sanctuary and to determine if changes in coral growth rates during the past 50 years could be detected using sclerochronology method	Completed Bull. Mar. Sci., 31(2): 444-459, 1981

Project	Principal Investigator	Objective	Status & Reference
Key Largo Coral Reef Marine Sanctuary Current Study (Year 1)	General Oceanics, Inc. 1295 N.W. 163rd Street Miami, FL 33169	To obtain information on the current and temperature variability within the Sanctuary on hourly and seasonally scales that can be used with water quality data and models to evaluate present and predict future environmental status of the Sanctuary	Completed (Year 1) Report to the Sanctuary Programs Division, July 1982
An Environmental Assessment of Key Largo National Marine Sanctuary	G. L. Voss Rosenstiel School of Marine Science University of Miami 4600 Rickenbacker Causeway Miami, FL 33149	To provide analyses of reef structure, biological zonation and diversity, and reef-health	In Progress Draft Final Report to the Sanctuary Programs Division, September 1982
Key Largo National Marine Sanctuary Current Study (Year 2)	General Oceanics, Inc. 1295 N.W. 163rd Street Miami, FL 33169	To expand the current and temperature data collection programs to year-round and to include waters surrounding the Sanctuary	In Progress
Key Largo National Marine Sanctuary Water Quality Monitoring Program	Biscayne National Park P.O. Box 1369 Homestead, FL 33030	To collect and analyze water samples from the Sanctuary and surrounding areas for use in a water quality model	In Progress
Key Largo National Marine Sanctuary Water Quality Assessment and Modeling Program	Applied Biology, Inc. 641 DeKalb Industrial Way Decatur, GA 30033	To develop a mathematical model which describes the hydrodynamics and water quality conditions of the Sanctuary and surrounding areas and permits simulation of the behavior of the environment and predictive capabilities	In Progress

Project	Principal Investigator	Objective	Status & Reference
Effects of Piscivorous Predator Removal on Coral Reef Fish Community Structure	J. A. Bohnsack, Ph.D. Cooperative Institute for Marine and Atmospheric Studies University of Miami 4600 Rickenbacker Causeway Miami, FL 33149	To elucidate the role of piscivorous predation in determining the community structure of coral reef fishes by comparing control reefs in the Sanctuary which have been protected from spearfishing with experimental reefs at Looe Key Reef which have received heavy spearfishing pressure	Completed In Press 1981 Gutshop; Third Pacific Technical Workshop on Food Fish Habits Studies
Epizootiology of Malignant Tumors of Bicolor Damselfish (<u>Eupomacentrus partitus</u>) from Reefs Within the Key Largo Reef and Looe Key National Marine Sanctuaries	L. Udey and M. Schmale University of Miami Department of Microbiology P.O. Box 016960 Miami, FL 33101	To document the distribution of a malignant disease tumor in the bicolor damselfish (<u>Eupomacentrus partitus</u>) among the reefs in Key Largo and Looe Key National Marine Sanctuaries and to investigate the origin, behavior and mode of disease transmission	Completed Final Report to the Sanctuary Programs Division, Washington, DC, January 1983
Resiliency of Coral Reef Fish Community Structure in Response to Reduced Harvesting Pressure	J. A. Bohnsack, Ph.D. Cooperative Institute for Marine and Atmospheric Studies University of Miami 4600 Rickenbacker Causeway Miami, FL 33149	To monitor changes in reef fish community structure at Looe Key that occur as a result of sanctuary protection and to compare with control reefs in KLNMS	In Progress Report to the Director of University Affairs, Office of the Administrator, National Oceanic and Atmospheric Administration, Washington, DC February 1982
Prevalence and Development Rates of a Disease in One Species of Reef Fish on South Florida Reefs, with an emphasis on Looe Key and Key Largo National Marine Sanctuary	L. Udey and M. Schmale University of Miami Department of Microbiology P.O. Box 016960 Miami, FL 33101	To investigate temporal factors relative to the progress of a disease in individual bicolor damselfish (<u>Eupomacentrus partitus</u>) over a wide area of the south Florida reef tract	In Progress

Project	Principal Investigator	Objective	Status & Reference
A biogeological investigation of Stromatolites off French Reef, Key Largo, Florida	George M. Simmons, Jr. Ph.D. Department of Biology Virginia Polytechnic Institute and State University Blacksburg, VA 24061	To investigate the biogeological properties of the first reported deep water marine stromatolite formations (organo-sedimentary structures produced by the growth of blue-green algae [cyanobacteria]) and to determine the environmental properties under which they grow. To compare the properties of these deep water marine formations with those in Antarctica	Completed Final Report to the Sanctuary Programs Division May 1983
Resurvey of Carysfort Reef and Study of the Feasibility of Using Remote Sensing with Satellites to Monitor Coral Reefs	Phillip Dustan College of the Charleston Grice Marine Biological Laboratory 205 Fort Johnson Charleston, SC 29412	To resurvey the coral reef community on Carysfort Reef, Key Largo surveyed in 1974 under the auspices of the Smithsonian Institution, Fort Pierce, and the Harbor Branch Foundation. To establish a historical Landsat image file to study temporal changes in the coral reef community of Key Largo, to gather necessary surface validation data for the further development of the use of satellite imagery in studying the coral reef ecosystem of the Florida Keys. To further the development of image processing techniques used in the study of coral reefs using remote sensing. When taken as a whole, these projects will provide the data for a direct comparison of changes in the reef community between 1974 and 1982 and allow comparison of these baseline data with a temporal sequence of satellite imagery spanning the same time period.	In Progress

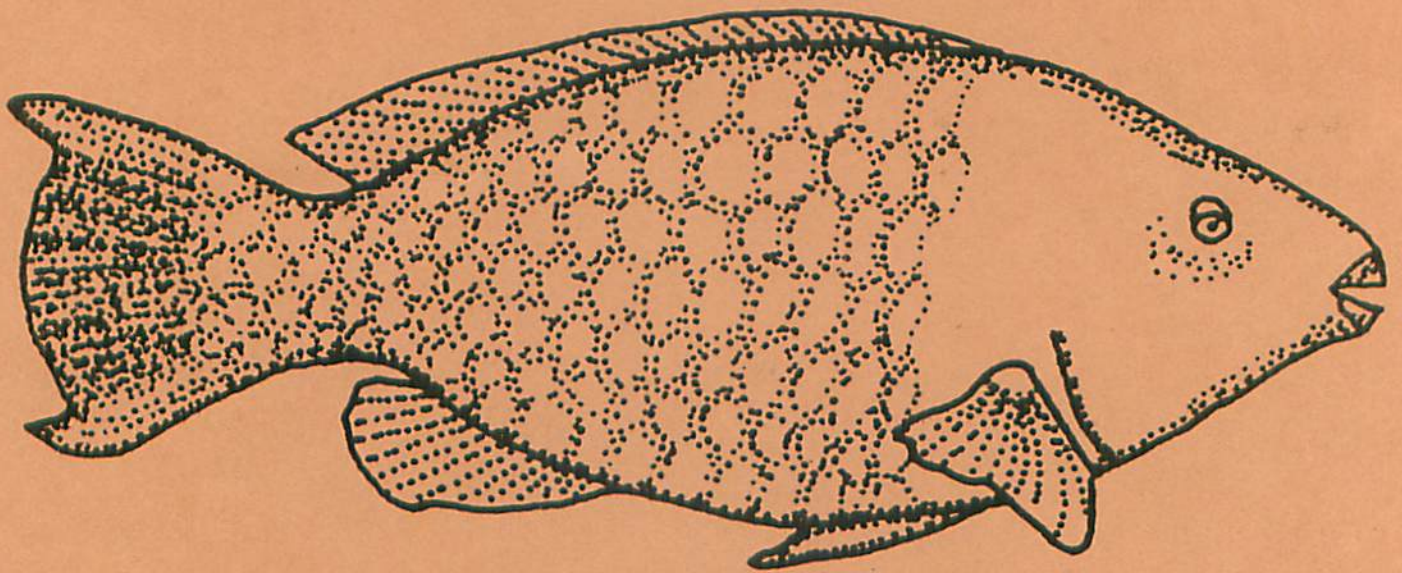
Project	Principal Investigator	Objective	Status & Reference
An Experimental Mooring Buoy Pilot Study at French Reef, Key Largo National Marine Sanctuary	John C. Halas Sanctuary Biologist Key Largo National Marine Sanctuary U.S. Highway 1, M.M. 102.5 (oceanside) P.O. Box 487 Key Largo, FL 33037	To provide safe and convenient anchorages and to minimize anchor damage to prime coral beds in Key Largo National Marine Sanctuary. To evaluate various materials, that could be used as permanent moorings. To obtain Dive operator's assistance in study site selection and evaluation results	Completed Report to the Sanctuary Programs Division, July, 1982

APPENDIX G
Literature Cited

Literature Cited
(See Appendix F for additional references)

- Bohnsack, J. A., Resiliency of coral reef fish community structure in response to reduced harvesting pressure. A preliminary report to the Director of University Affairs, Office of the Administrator, National Oceanic and Atmospheric Administration, Washington, DC, February 1982
- Curry, R., Personal Communication
Biscayne National Park, Homestead, FL, 1983
- Hoffmeister, J. H., Land from the Sea: The Geologic Story of South Florida, University of Miami Press, Coral Gables, FL, 1974
- Hudson, J. H., Growth rates in *Montastraea annularis*: A record of environmental change in Key Largo Coral Reef Marine Sanctuary. *Bull. Mar. Sci.* 31(2): 444-459, 1981
- Jaap, W. C., Stony Corals (*Milleporina* and *Scleractinia*). In: Key Largo Coral Reef Marine Sanctuary Deep Water Resource Survey, National Oceanic and Atmospheric Administration, CZ/SP-1, pp 7-14, July 1981
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- National Oceanic and Atmospheric Administration. Department of Commerce, Program Development Plan, 1982
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- Voss, G. L., An Environmental Assessment of Key Largo National Marine Sanctuary. Draft Final Report to the Sanctuary Programs Division, Office of Ocean and Coastal Resources, National Ocean Service under Contract number NA-79-SAC-00813.

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