

Plan Implementation: Costs and Priorities

Operations. Park headquarters, including the administrative offices, ranger station, and maintenance area, will continue to be on the mainland at Convoy Point. A ranger station and maintenance area will also be maintained at Elliott Key Harbor. A third ranger station will remain on Adams Key, and a fourth will be established at Tannehill upon expiration of the residential special use permit. Offices for the interpretive staff will be located at Convoy Point and the Elliott Key Harbor complex.

Annual operating costs for the proposed plan are shown in table 2. The presence of local law enforcement agencies such as the Coast Guard, Coast Guard Auxiliary, and Florida Marine Patrol has been considered in determining NPS staffing requirements for visitor and resource protection. The proposed plan will require a staff representing 41.2 person-years. This compares to an existing staff representing 32.6 person-years.

Table 2: Annual Operating Costs
(1982 Dollars)

Staffing requirements		\$ 732,200
Management & Administration	\$ 79,000	
Interpretation & Visitor Protection	237,900	
Resource Management	180,100	
Maintenance	235,200	
Equipment, supplies, utilities, maintenance and rehabilitation		<u>291,800</u>
Total proposed annual operating cost		\$1,024,000

Development. The priorities for development of facilities described in the proposed plan are shown in table 3. Many of the projects can be funded through the annual park operating budget and the annual cyclic maintenance budget for rehabilitation, restoration, or replacement. Those projects are identified with an asterisk (*) in table 4. Items that are not anticipated to be funded in this manner are shown along with their estimated costs in table 4.

Interpretation. Implementation of the interpretive proposals will be carried out by the NPS Harpers Ferry Center. The cost of implementing the interpretive program described in the proposed plan is estimated to be \$568,000 net, or \$852,000 gross (net plus 50%, 1982 dollars). Interpretive facilities and media costs will be described in more detail in a new interpretive prospectus, which will be written following approval of the general management plan.

Table 3: Development Priorities

1. Public tour boat system
2. Convoy Point visitor facilities: visitor contact pavilion, visitor parking, jetty walk, interpretive boardwalk, picnic tables, landscaping, temporary trailers, and associated utilities and demolition
3. Adams Key
4. Elliott Key Harbor
5. Convoy Point administration/maintenance facilities, housing, and associated utilities
6. Boca Chita
7. University Dock
8. Mangrove shoreline
9. Ragged Key 1 (removal of existing development)
10. Ragged Key 5 (removal of existing development)
11. Ragged Key 3 (removal of existing development)
12. Soldier Key (removal of existing development)
13. Reef tract and bay
14. Tannehill
15. Sands Key (channel and salt pond filling)

Table 4: Development Costs
(1982 dollars)

Public Tour Boat System (cost to be borne by concessioner)

<u>Convoy Point</u>			
visitor contact pavilion			
enclosed area (3,000 sq ft @ \$140/sq ft)	\$	420,000	
covered deck (1,440 sq ft @ \$70/sq ft)		101,000	
ramp or elevator access to 2nd floor		50,000	
		<u>50,000</u>	\$ 571,000
2 trailers for interim offices and public toilets (@ \$30,000/ea)			60,000
visitor parking (106 spaces: 76 single @ \$1,200/space and 30 double @ \$2,400/space)			163,000
*10 picnic tables with charcoal grills			
*hardened marl walkway on jetty (3,000 ft) with 3 fishing turnouts			
700-ft interpretive boardwalk (4,500 sq ft @ \$25/sq ft)			113,000
landscaping			10,000
administrative building and field lab (4,000 sq ft @ \$135/sq ft)			540,000
1 housing duplex (2,000 sq ft @ \$130/sq ft)			260,000
maintenance boat basin (300 ft @ \$1,200/ft)			360,000
maintenance building with dive locker (4,300 sq ft @ \$100/sq ft)			430,000
utility compound (1 acre)			
sheds (200 sq ft @ \$50/sq ft),		10,000	
chainlink fence (1,000 ft @ \$15/ft)		15,000	
		<u>15,000</u>	25,000
*secured storage area (½ acre) with fence			
utilities			
water line	\$	325,000	
sewer system		174,000	
power lines and equipment		200,000	
		<u>200,000</u>	\$ 699,000
*building demolition			
Subtotal			<u>\$3,231,000</u>
<u>Adams Key</u>			
*reconditioning of buildings for interpretive exhibits			
<u>Elliott Key Harbor Complex</u>			
redesign of visitor information/orientation pavilion			
ground floor (2,500 sq ft @ \$10/sq ft)	\$	25,000	
second floor (200 sq ft @ \$20/sq ft)		4,000	
handicapped access		50,000	
		<u>50,000</u>	\$ 79,000
*improvements to interpretive loop trail			
Subtotal			<u>\$ 79,000</u>

<u>Boca Chita</u>	
toilet facility	\$ 50,000
*upgrading of screened-in structure	
*small maintenance/storage building	
*rehabilitation of light tower	
*removal of other buildings	
*20 picnic tables with charcoal grills	
rehabilitation of harbor (1,300 ft @ \$1,200/ft)	1,560,000
rip-rap on 1,700 ft of bulkhead (2,500 cu yd @ \$80/cu yd)	200,000
Subtotal	<u>\$1,810,000</u>
<u>University Dock</u>	
toilet facility	\$ 50,000
*4 picnic tables with charcoal grills	
Subtotal	<u>\$ 50,000</u>
<u>Mangrove Shoreline</u>	
*20 interpretive markers for canoe trail	
<u>Ragged Keys and Soldier Key</u>	
*removal of all man-made structures	
<u>Reef Tract</u>	
*5 mooring buoys	
<u>The Bay</u>	
*150 buoys	
<u>Tannehill House</u>	
*adaptation to ranger station/residence	
*reconstructed pier	
<u>Sands Key</u>	
Channel filling	\$ 50,000
Subtotal	<u>\$ 50,000</u>
Total net cost	\$5,220,000
15% planning and design	783,000
15% construction supervision	783,000
16% contingency	835,000
Total gross cost	<u>\$7,621,000</u>

*Items that can be funded through the annual park operating budget and the annual cyclic maintenance budget for rehabilitation, restoration, or replacement.

Natural Resource Management. Natural resource management programs called for in the proposed GMP are listed below.

Monitoring programs: air quality, water quality, noise and radioactivity, fisheries, benthic communities, exotic species, insect and disease damage, species of special concern

Special studies: benthic mapping of new waters and identification of sensitive benthic sites, inventory of terrestrial communities on new lands, canal discharge water quality study, nesting turtle survey

Control programs: integrated pest control, exotic plant and animal control

Most of the costs associated with natural resource management are annual recurring costs for employees' salaries and routine equipment and supplies, which are contained in the total annual cost previously stated for park operations.

Initial costs of monitoring equipment will total about \$35,000 (gross 1982 dollars).

Cultural Resource Management. Costs associated with cultural resource management for items such as research, planning, and studies are listed in table 5. The work will be done primarily by nonpark personnel. The responsible NPS units are indicated by the following codes: BISC, Biscayne National Park; SERO, Southeast Regional Office; SEAC, Southeast Archeological Center; DSC, Denver Service Center; SCRUC, Submerged Cultural Resource Unit.

Table 5: Cultural Resource Management Costs
(1982 dollars)

Recording of oral histories (BISC/SERO/DSC)	\$ 8,000
Historic research, shipwrecks (DSC)	15,000
Archeological survey of reef (SEAC)	100,000
Cultural resources preservation guide, monitoring (SEAC/SERO/DSC)	18,000
Staff training, submerged archeological resources (SEAC/SCRUC/DSC--costs may be shared)	5,000
Recording of private collections (BISC/SEAC/SERO)	5,000
Archeological survey of keys	25,000
Underwater archeological site testing and evaluation	100,000
Scope of collections statement/collections preservation guide (SERO/BISC)	5,000
Archeological testing of Legare Anchorage wreck	25,000
Archeological testing of HMS <u>Hubbard</u>	<u>25,000</u>
Total net cost	\$331,000
Total gross cost (net plus 67%)	\$553,000

Land Protection Priorities

The general management plan proposes the following priorities for acquiring sufficient interests in the 1980 park additions to ensure land/water protection and public use.

1. Keys remaining in private ownership. The seven northern keys are an integral part of the park's environmental profile and important recreational resources, yet these areas also have the greatest potential for incompatible development and use. Of all the new areas included in the 1980 park boundary, the uplands of these keys are the least protected from inappropriate development by federal, state, and local regulations, zoning, and permitting procedures. Development on all of the keys except Boca Chita is contrary to the intents of the general management plan. Also, under current private ownership the keys are not accessible to the public as proposed in the plan. The highest priority for acquisition of interests is Boca Chita, so that it can be opened as a public day use area. Of the other six keys, Ragged Keys 4 and 5 have the next highest priority, to address the potential hardships of a willing seller.
2. Mainland mangrove shoreline. The National Park Service needs to secure sufficient interests in this area to ensure the perpetuation of the existing wildlife habitat and the ecological processes that enhance water quality in the bay. The mainland shoreline has been given a lower priority than the northern keys because it is currently better protected by existing regulations, zoning, and permitting procedures and because no visitor use is proposed.
3. Submerged lands in the bay and reef tract. These lands are currently afforded the greatest protection under existing authorities of all the newly authorized areas and thus have the lowest priority for additional protection.

In addition to protection of lands and waters within the park, the plan identifies the need for the National Park Service to cooperate with the state and county in recognizing the area between the authorized western park boundary and the salinity barrier (levee 31-E) as a "Park Protection Zone" that would be managed to ensure protection of park resources. Regarding mainland properties further inland, the plan identifies the need for the Park Service to work with the county to ensure that development does not become a visual intrusion on that section of the bay nearest the mainland.

The upcoming land protection plan will outline the specific combination of authorities and interests that will most appropriately implement the above described land protection strategy.

AFFECTED ENVIRONMENT

NATURAL RESOURCES

The 1978 Final Environmental Statement (FES) for the Biscayne National Monument general management plan contains a considerable amount of detailed information--including climatic and geological data and plant and animal lists--that is incorporated by reference into this document. Other sources of information include the Biscayne Bay Management Plan (Metropolitan Dade County Departments of Environmental Resources Management and Planning 1981), Biscayne Bay: Past, Present, and Future (University of Miami 1976), and Comprehensive Development Master Plan for Metropolitan Dade County (Metropolitan Dade County Department of Planning 1979).

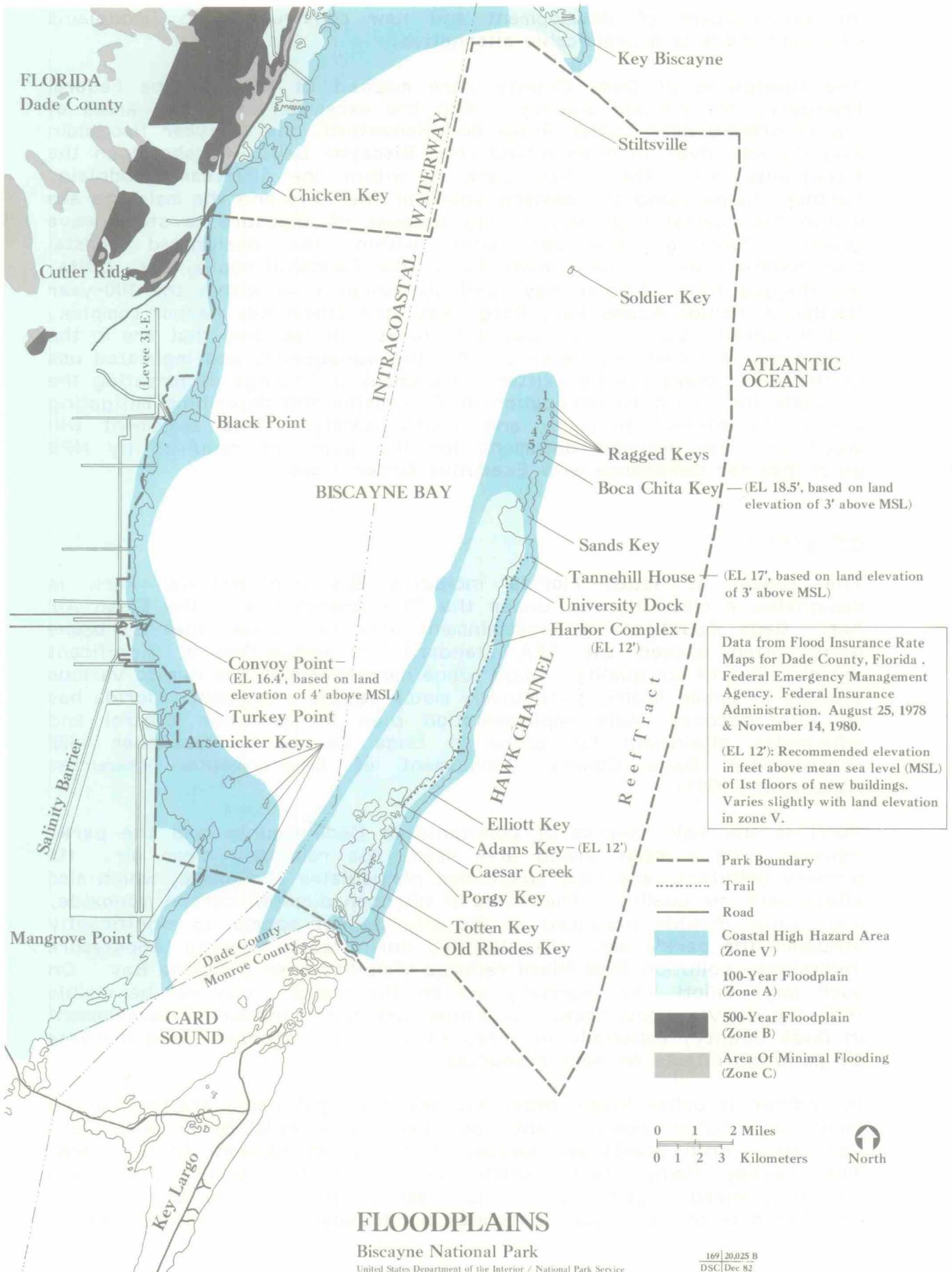
Climate

Weather data and climatic conditions at Biscayne are described in the 1978 FES. Meteorologic conditions affecting property management and human safety and comfort include wind, rain, intense sunlight, salt spray, heat, and humidity. Shelter, either a structure or landscaping, is needed at developed areas where services are offered and people congregate; it should provide relief from sunlight and rain and also from mosquitoes, which can be voracious during the summer months. Although not critical for visitor facilities, air conditioning or another mechanical cooling system is necessary for staff offices and residences. Much of the park's property must be sheltered or adapted to withstand corrosive salt spray, high humidity, and sunlight.

Hurricanes and Flooding

The most severe meteorologic constraints affecting the management and development of the park are winds and flooding accompanying hurricanes and tropical storms. South Florida has a long history of such storms (see the 1978 FES). South Dade County averages a tropical storm (winds 38-74 mph) every 6 years, a hurricane (winds 74-125 mph) every 7 years, and a great hurricane (winds in excess of 125 mph) every 22 years (USDI, Geological Survey 1973). Even more destructive than the high winds is the flooding caused by a hurricane's storm surge, which can sweep over vast areas of low-lying southern Florida. The storms and associated flooding can be anticipated several days in advance and are tracked by the National Oceanic and Atmospheric Administration.

Because of the extensive flood-prone area within the region, floodplain management is an important planning consideration. Executive Order 11988 ("Floodplain Management") requires the National Park Service and other federal agencies to evaluate the likely impacts of actions in floodplains. The objectives of the executive order are to avoid to the extent possible the long-term and short-term adverse impacts associated with occupancy, modification, or destruction of floodplains and to avoid



FLOODPLAINS

Biscayne National Park

United States Department of the Interior / National Park Service

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indirect support of development and new construction in floodplains wherever there is a practicable alternative.

The floodplains of Dade County were mapped in 1980 by the Federal Emergency Management Agency. With the exception of limited areas of higher ground near Cutler Ridge and Homestead, the 100-year floodplain extends well over 10 miles inland from Biscayne Bay. As shown on the Floodplains map, the entire park is within the 100-year floodplain. Further, lands along the eastern shore of the keys and the mainland are within the coastal high-hazard area because of exposure to storm wave action. Existing developed sites within the designated coastal high-hazard area include Convoy Point, the Tannehill house, Boca Chita, the Ragged Keys, Soldier Key, and Stiltsville; sites within the 100-year floodplain include Adams Key, Porgy Key, the Elliott Key Harbor complex, and University Dock. For those structures and facilities that are in the floodplains and that are necessary for the management and legislated use of the park, there will be written a statement of findings documenting the rationale for continued occupation of floodplains and describing mitigating actions to protect property and visitor safety. This statement will accompany the decision document for the plan, as required by NPS guidelines for compliance with Executive Order 11988.

Air Quality

The region of south Florida including Biscayne National Park is designated a class II area under the 1977 amendments to the Clean Air Act. Dade County is a nonattainment area for ozone; that is, ozone levels often exceed the EPA standard for prevention of significant deterioration of air quality. High ozone concentrations are due to various sources in urban Miami, particularly motor vehicle emissions. Florida has an EPA-approved state implementation plan for pollution control and anticipates attainment for ozone in Dade County by December 1982 (Metropolitan Dade County Department of Environmental Resources Management 1980).

Miami is the major source of pollutants in Dade County and the park. However, for a major urban area Miami has relatively clean air. Its primary pollutants are total suspended particulates and ozone, which also affect park air quality. The levels of nitrogen dioxide, carbon monoxide, and sulfur dioxide produced in the city do not appear to significantly influence the park's air. Occasionally, during early morning temperature inversions, pollution from Miami reduces visibility over Biscayne Bay. On such days Elliott Key, normally low on the horizon, may not be visible from the Convoy Point dock. Continued urban and industrial development in Dade County, especially in areas adjacent to the park, could increase air pollution effects on park resources.

In addition to urban Miami, other sources of air pollutants are the Turkey Point and Cutler power plants operated by Florida Power and Light Company. Both plants are located on the coast adjacent to the park. The Turkey Point plant, which consists of two oil-fired and two nuclear-powered generators, is monitored for sulfur dioxide, nitrogen dioxide, and total suspended particulates and is operating within

acceptable limits (Metropolitan Dade County Department of Environmental Resources Management 1981a). Although improbable, a major accident involving the release of radionuclides into the atmosphere from the nuclear generators or radioactive waste storage facilities at Turkey Point could severely affect the park. The Cutler plant was shut down for five years, but it has recently been refurbished and is back on line to provide peak power generation to supplement the Turkey Point plant. Florida Power and Light Company has applied to regulatory agencies to burn higher sulfur oil at Turkey Point and is considering switching over to coal. These fuels could increase sulfur dioxide and particulate levels in the park.

Much of the land west of the park is agricultural. Air pollution from agriculture potentially affecting the park includes low levels of toxins such as PCBs and chlorinated hydrocarbons, which are residues from aerial pesticide and fertilizer applications and burning of waste plastics. Wind drift sometimes carries aerially applied pesticides from Dade County's mosquito control program into the park. The effects on park air quality, as well as on water quality and natural systems, have not been measured.

There are no major air pollution sources within the park. Motorboat exhaust is the most common pollutant resulting from visitor use and management activities. Occasional burning of slash for exotic plant control by park resource management personnel is coordinated with Dade County air quality offices. Low-flying military aircraft using Homestead Air Force Base frequently pass over the park and may affect air quality. Of greater concern are the noise levels created by these aircraft and their possible effects on park wildlife.

Water Quality

Bay water in the park is remarkably clean compared to water quality in the northern portions of Biscayne Bay at the Miami waterfront. Even though natural flushing of the bay occurs slowly, the predominant flow of the bay currents from south to north keeps most of the pollutants from industrial Miami outside the park.

The major pathways for water pollution entering the bay near the park are Black Creek and four canals (Moody, Military, Mowry, and C-100) operated by the South Florida Water Management District, which drain interior agricultural and urban lands. (Gould, North, and Florida City canals are diked at the salinity barrier and no longer flow directly into the bay, but rather through the above mentioned canals.) Pollution sources influencing bay water quality include contaminated stormwater runoff, septic tank seepage, agricultural pesticides and fertilizers, and industrial wastes (Metropolitan Dade County Department of Planning 1979). These pollutants accumulate behind the salinity control dams located near the mouth of each canal. During high water conditions, the salinity control dams are opened, and the contaminated canal water is discharged into the bay. The sudden surge of canal freshwater not only introduces contaminants but also alters the natural gradient of saltwater concentrations in the bay. Limited research has been conducted on the

biological effects of canal discharges, and little baseline data are currently available. A 1980 study of a discharge from Snapper Creek Canal just north of the park boundary showed that the freshwater plume created by the discharge extended 2,750 feet into the bay and was still well defined six hours after the salinity control dam was closed. The discharge raised fecal coliform levels within the affected portion of the bay above Dade County standards and may have raised heavy metal concentrations also (Metropolitan Dade County Department of Environmental Resources Management 1981b).

Other lesser pollution problems affecting the bay include turbidity (which is caused by prop wash from large boats on the Intracoastal Waterway, prop-scarring in turtle grass beds from recreational boats, and dredge and fill projects in the developing lands just south of the park), petroleum leakage from boats and marinas, and illegal discharges of untreated sewage from recreational boats. Potential threats to the bay include oil spills from barges serving Turkey Point, radionuclide contamination of groundwater from Turkey Point nuclear generators and waste storage facilities, and leachate contamination from the south Dade County sanitary landfill and sewage treatment plants.

The National Park Service monitors 31 water quality stations in the bay and adjoining canals, and Dade County monitors 11 stations within the park. Parameters measured include turbidity, salinity, temperature, dissolved oxygen, pH, conductivity, and the nutrients ammonium, nitrate, nitrite, and ortho-phosphate. As might be expected, monitoring indicates a gradation of pollution across the bay, with higher concentrations occurring along the mainland shoreline (Metropolitan Dade County Departments of Environmental Resources Management and Planning 1981). Future monitoring of pesticides and heavy metals is proposed. Little is known about the distribution of chemical and metal pollutants in the bay or their effect on nursery fish, game and commercial species, and bay-bottom communities.

With the reopening of the Cutler power plant, the potential for thermal pollution of bay waters is increased. At the time of the plant's closure in 1976, approximately 100 acres of benthic vegetation were significantly altered within the Cutler embayment, apparently by thermal pollution (Applied Biology, Inc. 1979). The area affected is approximately a mile north of the new park boundary near Chicken Key. A park water quality monitoring station will be located in this vicinity.

Preliminary NPS monitoring shows the water quality of the reef tract is good, apparently due to constant flushing by currents. Pollutants come mainly from offshore oceangoing vessels and, to a lesser extent, smaller barges using Hawk Channel. Many ships illegally flush their bilges when they get beyond the 12-mile international limit, discharging globs of tarlike petroleum wastes that wash ashore on the eastern edges of the keys. Similarly, plastic containers and other solid wastes dumped from offshore vessels wash up on the keys, creating an eyesore and a threat to public health and wildlife. NPS monitoring indicates the flotsam has little impact on water chemistry and does not appear to affect the reefs. However, if a major oil spill occurred, the reefs as well as other resources at Biscayne could be significantly affected. A plan of action

for oil spill emergencies has been developed by the U.S. Coast Guard and involves the National Park Service.

Substrate

The geology and soils of the park are described in the 1978 FES. In accordance with a memorandum (issued August 11, 1980) from the Council on Environmental Quality, the Soil Conservation Service was consulted to assess the potential impacts of the general management plan alternatives on prime or unique farmland soils. The service reported that none of the soils in the park are classed as prime or unique farmland.

Aquatic Communities

Biscayne Bay has been recognized as a valuable resource by three levels of government. It has been designated a national park by the federal government, an aquatic preserve by the state of Florida, and an aquatic park and conservation area by Dade County. In addition, Biscayne Bay south of Black Point is a lobster sanctuary under Florida law. The overlapping legislative protection that has been afforded the bay is due to its importance as a commercial and sport fishery, a recreational area, and a remnant example of an undeveloped estuary.

The reef tract is notable as being the northernmost extension of living coral in the United States.

Between the bay and the reef tract is an area of interest known as the Safety Valve. It is a shoal which is part of the barrier system between the Ragged Keys and Key Biscayne. The Safety Valve is not only the transition between the bay and the reef tract but is also the transition from the southern coral keys to the northern sandy barrier islands.

Detailed descriptions of the turtle grass beds, hard-bottom communities, algal communities, patch and bank reefs, and intertidal flats typical of the bay and reef tract are contained in the 1978 FES. The newly authorized waters, which were added to the park by the 1980 legislation, are extensions of the bay and reef tract and have a similar natural history as described in the 1978 FES.

Terrestrial Communities

The 1978 FES contains a detailed description of the mangrove and hardwood hammock forests and wildlife on the keys. Boca Chita, the Ragged Keys, and Soldier Key, which were added to the park by the 1980 legislation, are extensions of the same island chain and have a similar natural history as described in the 1978 FES. The new keys differ from the keys within the former national monument in their smaller size and greater extent of human disturbance. Boca Chita, Soldier Key, and Ragged Keys 3 and 5 currently contain private developments which are seasonally occupied. Ragged Key 1 contains ruins of former development, and Ragged Keys 2 and 4 are undisturbed.

One purpose of the 1980 park expansion was to protect the mainland mangrove shoreline. The functions of mangrove in shore building, nutrient cycling, and natural filtration of pollutants are well known (Florida Department of Natural Resources 1972). These functions make mangrove an important ecologic and economic resource--one which affects all other park communities. The new boundary on the mainland was drawn to include the coastal band of mature red mangrove (Rhizophora mangle), which had been shown to contribute approximately 80 percent of the organic material entering the bay from coastal wetlands (University of Miami, Teas et al. 1976). The following floodplain and wetland values are those that must be protected:

- nutrient source for the bay
- nursery for many fish and invertebrate species, including commercial and sport fisheries
- filtration of polluted runoff from the mainland and tidal waters in the bay
- building up of fast land and coastal erosion control
- roosting habitat for brown pelicans and nesting habitat for cormorants and other shorebirds
- buffering of inland sites from storm wave damage, potential American crocodile feeding habitat
- manatee habitat
- open space

There is some question, however, whether or not protecting the coastal fringe of mangrove will adequately protect park resources. Historically, the mainland vegetation consisted of three wetland communities that occurred in consecutive bands paralleling the coastline. The first two narrow bands were dependent on brackish water: a 600-foot-wide band of mature red mangrove followed inland by a band of open salt marsh dominated by rushes. Farther inland, where brackish water became freshwater, the salt marsh gave way to a wide band of sawgrass marsh. The marshes and mangroves were dotted with hardwood hammocks on slight rises in the landscape. This historic mainland vegetation has been greatly changed by the development of south Florida. Small-scale farming and lumbering in the early part of this century removed many of the hammocks and drained some of the marshes. Alteration of the natural coastal wetlands began in earnest in the 1930s with the start of the large-scale drainage canal and salinity barrier system, which was completed in the 1960s. Elimination of natural freshwater sheetflow, and subsequent saltwater intrusion inland to the salinity barrier, have resulted in hypersaline (i.e., more salty than seawater) soils in the coastal wetlands. Sawgrass marsh has been greatly reduced or completely replaced east of the salinity barrier by salt marsh plants tolerant of higher salt levels. Adjacent to the coastal band of mature mangroves, the salt marsh has been invaded by young stands of scrub red mangroves stunted by hypersalinity (University of Miami, Teas et al. 1976).

Although it has been significantly altered by saltwater intrusion, the salt marsh/scrub mangrove wetland between the authorized park boundary and the salinity barrier system may be as valuable as the coastal mangroves in protecting park resources. Ecosystem analysis indicates that the remaining wetlands east of the salinity barrier may contribute organic

material and freshwater important to maintaining the health of the coastal mangrove band (University of Miami, Burns 1976). The salt marsh also provides an early, perhaps critical, feeding area during the dry winter season for a large breeding colony of wading birds that nest on the Arsenicker Keys (University of Miami, Owre 1976). Loss of the wetlands adjacent to the park could have significant adverse impacts on wildlife and fisheries within the park as well as on bay water quality.

With the exception of the hammocks and the built-up land on Elliott Key, Adams Key, Convoy Point, Boca Chita, and other scattered sites, almost all the emergent land in the park is classified as wetlands (USDI, Fish and Wildlife Service 1981a). Executive Order 11990 ("Protection of Wetlands") requires federal agencies to evaluate the likely impacts of their actions on wetlands, with the objective of avoiding their occupancy, modification, or destruction to the extent possible. The NPS guidelines for complying with the executive order were published in the Federal Register, May 28, 1980.

Endangered or Threatened Species

Section 7 of the Endangered Species Act of 1973, as amended, requires federal agencies to ensure that their actions do not jeopardize the continued existence of endangered or threatened species or result in the destruction or modification of critical habitat of such species. The U.S. Fish and Wildlife Service and National Marine Fisheries Service have been consulted regarding the occurrence of endangered or threatened species. They advised that twelve species that are federally listed as endangered are found in the vicinity of the park:

Florida manatee (Trichechus manatus)
brown pelican (Pelecanus occidentalis)
bald eagle (Haliaeetus leucocephalus)
peregrine falcon (Falco peregrinus tundris)
Atlantic ridley turtle (Lepidochelys kempii)
hawksbill turtle (Eretmochelys imbricata)
leatherback turtle (Dermochelys coriacea)
American crocodile (Crocodylus acutus)
finback whale (Balaenoptera physalus)
humpback whale (Megaptera novaeanglinae)
right whale (Eubaleana glacialis)
sei whale (Balaenoptera borealis)

Five species that are federally listed as threatened have been reported within the park:

eastern indigo snake (Drymarchon corais couperi)
loggerhead turtle (Caretta caretta)
green turtle (Chelonia mydas)
Schaus swallowtail butterfly (Papilio aristodemus ponceanus)
Bahaman swallowtail butterfly (Papilio andraemon bonhottei)

In addition portions of Biscayne are included in designated critical habitat for the Florida manatee and American crocodile. The occurrences and

habitats of endangered or threatened species are described in the biological assessment (appendix F).

CULTURAL RESOURCES

Biscayne has a rich history of Spanish explorers, pirates, shipwrecks, buried treasures, rum running, alien smuggling, secret military training, Indians, mahogany logging, sponging, turtling, pineapple and lime plantations, hide-away clubs, plumbing, and hurricanes (see USDI, NPS, Newman 1975; Kennedy 1942). Unfortunately, the latter, together with tropical vegetation and insects, have obliterated most historic remains.

Goggin (1944) found some indications of prehistoric occupation on Elliott Key, but none on Sands or Old Rhodes keys. A more recent archeological survey partially covering Sands, Elliott, and Old Rhodes keys identified eleven aboriginal sites, three of them on Sands Key and eight on Elliott Key (Sears and McGregor 1973). The sites apparently represent seasonal occupancy by peoples of the Glades culture (500 B.C. to A.D. 1700). The historic Native American inhabitants of the park vicinity were the Tequesta (Milanich and Fairbanks 1980, pp. 232-38; Goggin 1944, p. 13). They maintained a major village at the mouth of the Miami River, from which they regularly made trips to the nearby keys (Tebeau 1968, p. 44). The Calusa, who inhabited the coastal regions of southwestern Florida, apparently had intermittent political control over the east coast Tequesta. Both groups were decimated by European diseases in the early 1700s. The few survivors blended into the Seminole groups who were pushed south from Georgia and arrived in south Florida in the mid 1700s.

The two archeological sites tested by Sears and McGregor (1973) showed disturbance and transposition of cultural materials by sea action. There is a comparatively small amount of data available on Glades seasonal utilization of the upper keys, and most mainland Glades sites have been destroyed by modern construction (USDI, NPS, Fischer 1975). No known terrestrial archeological sites appear eligible for the National Register of Historic Places.

Because heavy vegetation has precluded complete survey coverage, the presence of additional Indian sites cannot be ruled out. Goggin (1944) reported an Indian mound on Sands Key, mentioning that the key was called Las Tetas in the late 1700s because of two such mounds. A similar mound on Totten Key has also been reported (USDI, NPS, Fischer 1975).

Archeological resources from the historic period are also likely on the keys (USDI, NPS, Newman 1975 and Fischer 1975). From the early 1500s Spanish explorers were active in the area, perhaps leaving some campsite remains. By the end of the century the Spanish fleets were sailing twice yearly from Havana, passing through the Straits of Florida, skirting Bermuda, then setting course for the Azores and Seville. Spanish shipwreck salvage operations were intensified in the early 1700s, when the bulks of the 1715 and 1733 fleets were lost in hurricanes. Sizable salvage camps were established, but none is known within the park. Salvage camps from the later American period may also be present.

The coral reefs of this section of Florida are one of the principal ship graveyards in the Americas. Ajax, Triumph, Long, and Pacific reefs off Elliott Key are known to contain the remains of several dozen ships dating from the early Spanish period, through English colonization, to the late 19th century of the American period (USDI, NPS, Fischer 1975). Limited underwater archeological efforts have recorded 16 significant wrecks, and several treasure-hunting guides list over 40 shipwrecks on the offshore reefs. It is highly likely that the English Hubbard (1772) and Fowey (1748) and the Spanish Nuestra Senora del Populo (1733) and El Aviso del Consulado (1733) are in park waters.

Although the archeological value of many wrecks has been diminished by recent vandalism, they can still be expected to yield significant information. Most are at least partially buried and coated with coral concretions which have arrested deterioration. The information to be gained from these wrecks pertains not only to the design, construction, navigational ability, and outfitting of the ships in question, but also to the study of U.S. trade and commerce, economics, technology, military history, etc., based on the ships' cargoes and other precisely datable artifacts. The archeological values of the wrecks were formally recognized by their placement as a district (the offshore reefs from Sands Cut to the southern park boundary) on the National Register of Historic Places. The reef tract to the north may also be eligible for the National Register.

Terrestrial archeological sites related to pirate occupations may be present on the keys--perhaps including remains associated with the Black Caesar(s) for whom Caesar Creek was named. There are undoubtedly some sites related to mahogany logging and to the agricultural period that began in the mid 1800s, when settlers (principally emancipated slaves from the Bahamas and Conchs from Key West) cultivated pineapples, cane, key limes, tomatoes, grapefruit, and other crops on the larger keys. Some lime groves still compete with the rank vegetation, and a few decayed outbuildings and privies from this period remain on the keys. The most significant resources from this era, however, are the few remaining informants who can provide first-hand accounts (USDI, NPS, Newman 1975, pp. 79-80).

Few structures have survived the ravages of the local climate and vegetation; none appear eligible for the National Register of Historic Places. The best known are the structures associated with the Cocolobo Club, which was established in 1917 as a retreat for the wealthy. The club hosted industrial leaders such as Harvey Firestone and T. Coleman DuPont and numerous political figures, including presidents Harding, Johnson, and Nixon. The two-story, ten-bedroom clubhouse burned in December 1974. The caretaker's house, servants' quarters, "casino" (or recreation building), cistern, and dock remain. The two residences currently house park employees, and the recreation building is adaptively used for park research and school group interpretive programs.

The park currently has no formal collection of prehistoric or historic artifacts, objects, or documents. Shipwreck cannon gateposts, which are ubiquitous in south Florida, can be found at Elliott Key Harbor and Adams Key. The Tannehill family of Elliott Key possesses an extensive

private collection of bottles, drift pins, wooden statuary, pottery, and other artifacts. Mr. C. G. Rebozo possesses guestbooks and photographic scrapbooks from the Cocolobo Club (USDI, NPS, Newman 1975). Goggin's (1944) collections cannot be located, but the artifacts recovered by Sears and McGregor (1973) are at Florida Atlantic University, and access for research is guaranteed. Material collected during NPS underwater archeological research is at the NPS Southeast Archeological Center in Tallahassee.

VISITOR USE DATA

Regional Trends

Florida hosts over 30 million visitors each year, and despite recent high gasoline costs, inflation, and periods of recession, tourism in Florida has continued to increase. Typical Florida summer vacationers are young (35 or under), family-oriented, and traveling by auto. Winter visitors are usually older, not traveling with children, and are repeat trailer-campers familiar with south Florida. Recently there has been an increase in foreign visitors, who now comprise over 15 percent of all Florida tourists. (This increase may be accounted for by the fact that the dollar has recently been weaker against foreign currencies.) Foreign visitors tend to prefer packaged tours (Florida Department of Natural Resources, Division of Recreation and Parks 1981).

Growing fuel costs and inflation have apparently caused traditional family outings to be closer to home (USDI, NPS, Hornback 1981). Moreover, the increase in dual-income families has often reduced available family leisure time. As a result, a greater percentage of regional travelers are Florida residents. The population of Florida--and particularly of Dade County--continues to expand and change. Dade County's Hispanic population has grown from 4 percent in 1950 to about 40 percent in 1980. The large number of retirees moving to Florida has significantly raised the median age. Soon one-fifth of Florida's population will be 65 or older.

Urbanization in southeast Florida has progressed to the point where recreational open space is at a premium. Public demand for access to marine areas is currently outrunning availability. Most Dade County residents do not want to see expenditures for recreation or park services reduced; about half are willing to pay more taxes for parks. There is also a clear preference for spending money on existing parks in the region rather than acquiring new ones (Metropolitan Dade County Department of Parks and Recreation 1980).

Biscayne National Park

Because Biscayne is a relatively new NPS area and has numerous access points, trends in visitor use data must be viewed somewhat critically. Initiation of regularly scheduled public transportation to the bay, keys, and reef may significantly alter present trends.

Annual park recreation visits for the last ten years are summarized in figure 1, and overnight stays are summarized in figure 2.

As shown in figure 3 the 1981 month of highest visitation was October (43,507), followed by May (35,701) and July (33,116). This pattern differs from previous years, when the month of highest visitation was July, and the summer months of June, July, and August had more visitors than any other months. The high visitation figure in October 1981 was due primarily to the large turnout for the Columbus Day weekend regatta on October 11, when 5,308 people visited the park, more than on any other day that year. The second heaviest visitation occurred on Sunday, July 6, when 3,935 people visited the park as part of their Fourth of July weekend.

The weekend accounts for more than half the typical weekly visits, a reflection of the heavy use by local residents. A survey of auto license tags (July 1981) at Convoy Point indicated that about 90 percent of the park's visitors were from Dade County, with the remainder split between other nearby counties and outside Florida.

The recent trend of increasing visitation at Biscayne National Park is paralleled at Cape Florida State Recreation Area and adjacent John Pennekamp Coral Reef State Park (see figure 4). Visitor use at Biscayne is more closely associated with use at John Pennekamp than any other state or county park. However, whereas Biscayne National Park's marine resources are used almost exclusively by private boat owners, Pennekamp is nationally known for its public snorkeling, scuba diving, and glass-bottomed boat tours.

Visitation at the three adjacent Dade County parks--Crandon, Matheson Hammock, and Homestead Bayfront--has decreased somewhat over the last few years. In 1979 and 1980 Crandon Park had over 4 million visitors annually, Matheson Hammock over 2 million, and Homestead Bayfront approximately half a million. Visits to Homestead Bayfront decreased in 1981 to less than 300,000, apparently due to a new \$1 visitor parking fee.

FACILITY ANALYSIS

Public Transportation

A 45-foot boat owned and operated by the National Park Service doubles as a maintenance boat on weekdays and a passenger ferryboat on weekends. It carries up to 30 passengers from Convoy Point to Elliott Key Harbor. However, it is relatively deep drafted for the entrances to these two areas, and trips must be coordinated with high tide. Therefore, no more than one trip per day can be scheduled, and occasionally no trips can be made. No passenger fee is charged. This ferry service is experimental and is scheduled to continue only until July 4, 1983.

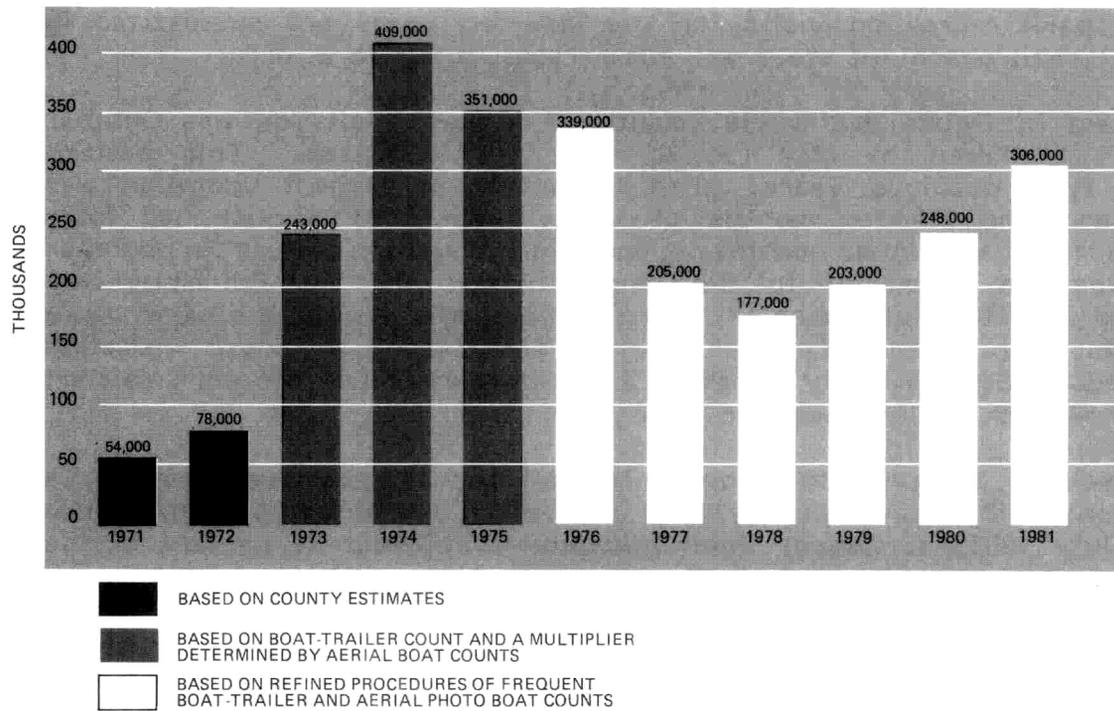


Figure 1 - Annual Recreational Visits For Biscayne National Park, 1971-1981

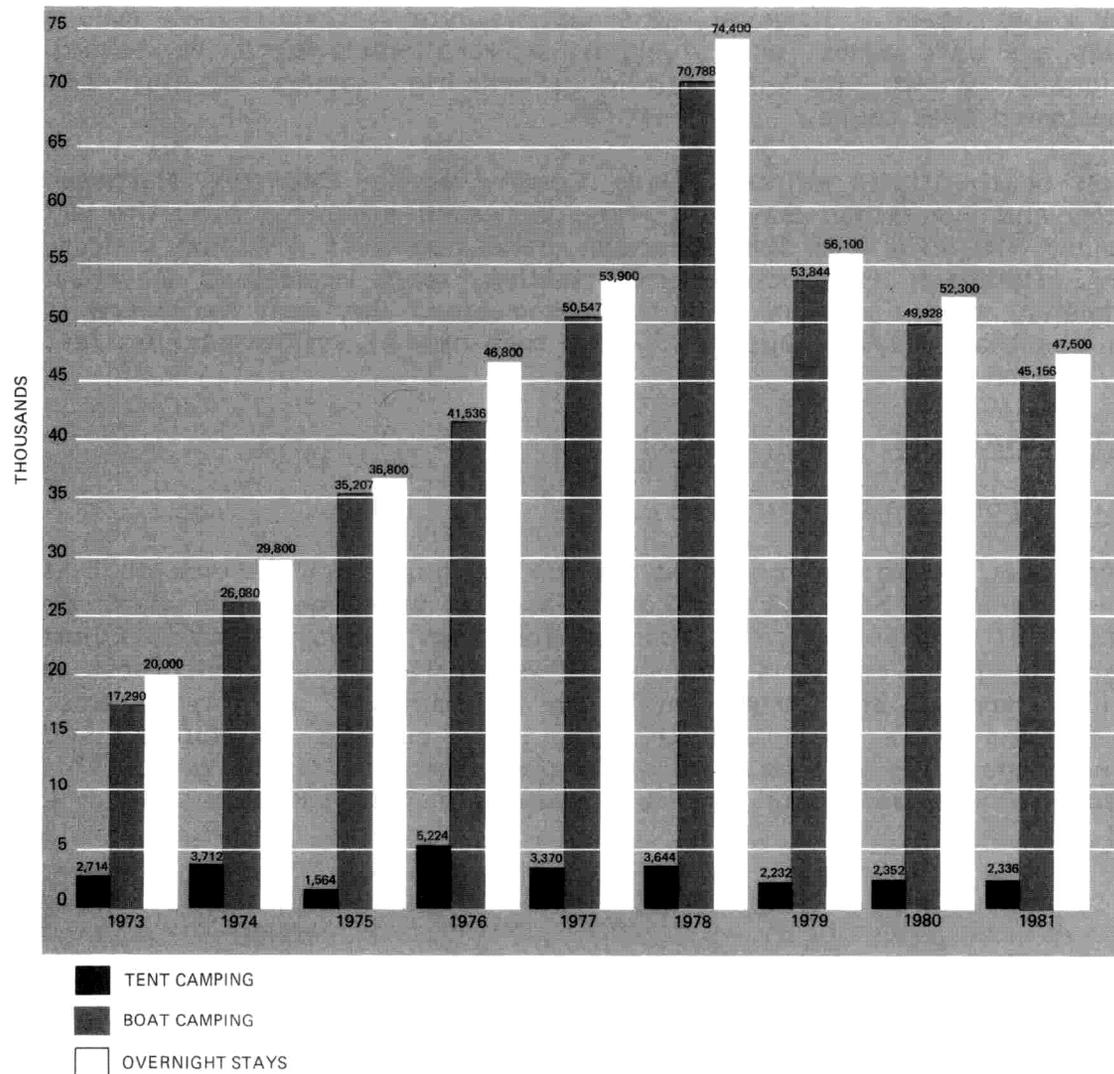


Figure 2 - Annual Overnight Stays For Biscayne National Park, 1973-1981

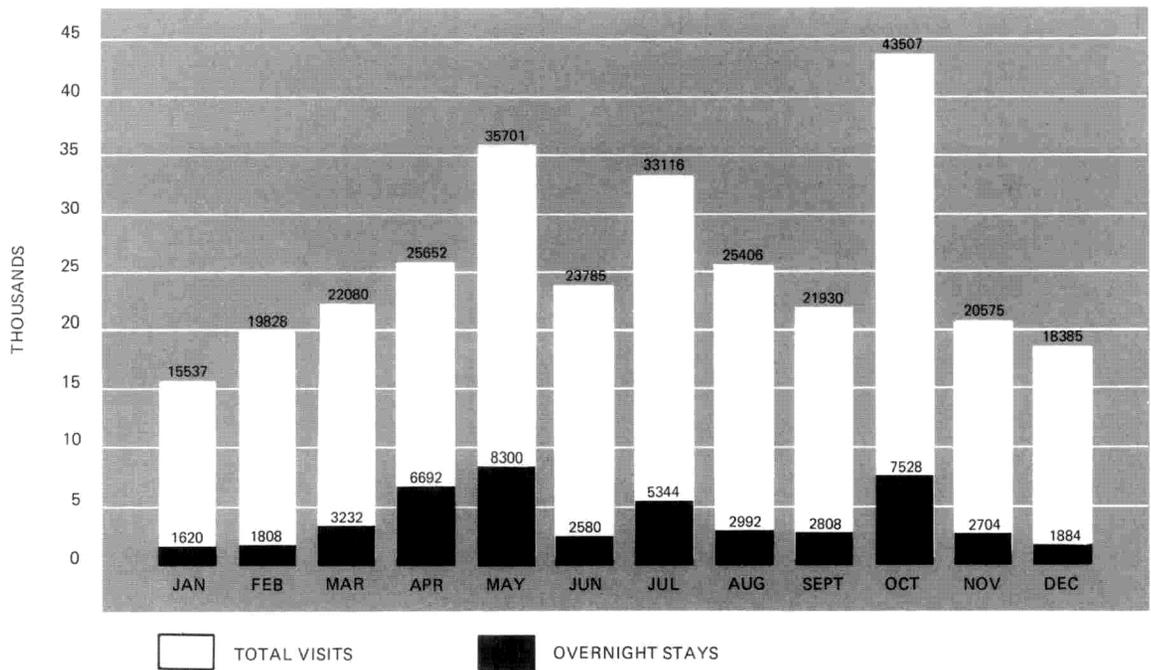


Figure 3 – Monthly Visitation and Overnight Stays For Biscayne National Park, 1981

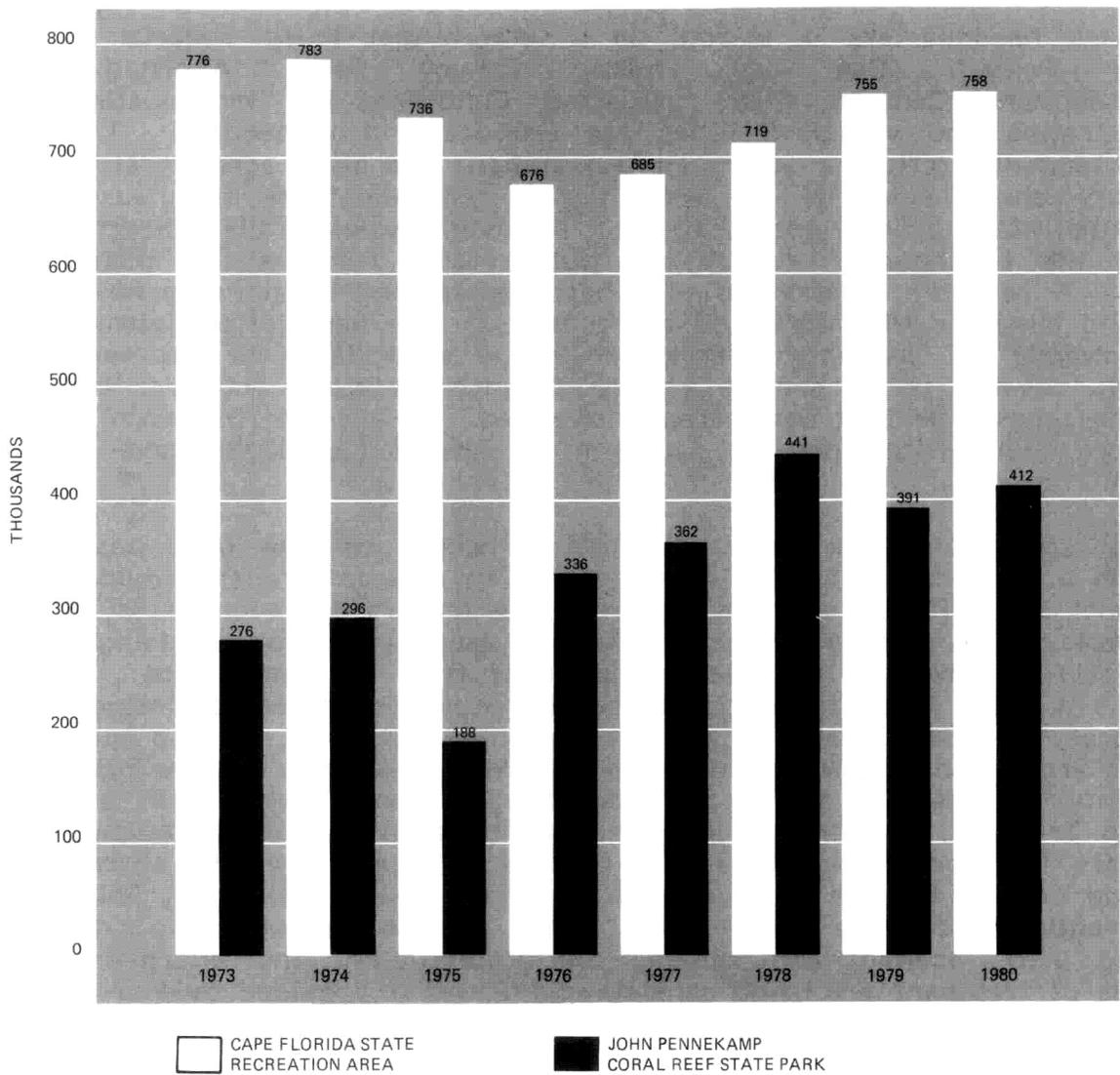


Figure 4 – Annual Visitation at Nearby State Parks, 1973-1980