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CAT ISLAND REPORT



GULF ISLANDS NATIONAL SEASHORE

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Cat Island Feasibility Report

United States Department of the Interior
National Park Service

February 1976 .

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Introduction

Cat Island rises in the Mississippi Sound approximately 8 miles south of Gulfport, Mississippi, and about 3 1/2 miles to the west of the boundary of Gulf Islands National Seashore. This report addresses the feasibility of preservation and public use of Cat Island as a part of Gulf Islands National Seashore. A study team visited the island on December 15, 1975 with the consent and cooperation of the island's principal owner, Mr. Nathan V. Boddie, and the site was also overflowed by the team. (The Act (PL 91-660) of January 8, 1971, establishing the park and amendatory legislation (PL 92-275) of April 20, 1972, are found in Appendix A).

Cat Island differs from the Mississippi Sound islands included in the National Seashore in several major respects:

1. The islands within the park trend generally east-west along a single axis, but Cat Island forms a "T" of landforms along two axes, one trending east-west for about 4.9 miles and the other north-south for about 3.1 miles. The east-west axis, hereafter cited as "the stem" of the "T" embraces the higher elevations and the bulk of the forest growth, while open beach faces and lower elevations are found along the north-south axis, described herein as "the beach area."
2. The forest community in the stem includes a proportionately significant growth of attractive, moss-hung live oaks; the islands within the park include very few live oak communities.

3. The beach faces (water-line-to-vegetation line) on the beach area of Cat Island are narrow, and are generally backed not by rolling dunes, but by low-elevation depressions of intermittent standing water and ephemeral saltwater marsh. Along the eastern face of the beach area, a visitor at mid-tide has available for beach use a space only 5-6 paces in width from the vegetation line to the water line.

In contrast, at Ship Island, a visitor to the Gulf beach crosses the island from the dock on the north shore along a boardwalk which traverses dune fields for the most part, and arrives at a relatively wide beach face. Ship, Horn, and (particularly) Petit Bois also embrace areas of low elevation depressions, but even at Petit Bois, the beach faces are relatively broad.

4. Of the approximate 2,350 acres of Cat Island, an estimated 990 acres are in marsh, most of which are the brackish marshes of Middle Spit. This marsh area more closely resembles the Chandeleurs and the Bay Boudreau marshes to the southwest than the islands within the park, since the marsh grass abuts directly on the water, with almost no enclosing beach berm.

5. The Mississippi River delta, the Chandeleurs, and Ship Island buffer Cat Island from large Gulf swells, with the exception of swells arriving from the southeast where no other landform intrudes to interrupt a long fetch.

6. The marine vegetation surrounding the island includes shoal sea-grass which is also found about the islands within the park. But Cat Island differs in the extensive benthic algae stands which are found surrounding much of the island.
7. The attractiveness of the waters to beach-oriented recreationists: local beachgoers are accustomed to seeking out the Gulf waters found on the south shores of Ship, Horn and Petit Bois Islands. Because of its orientation, the beach face of Cat Island forms one side of an inlet between Cat and Ship Islands. In such channels, there is a mixing of Gulf waters and the less saline, more polluted waters of the Mississippi Sound.
8. A large number of biting mosquitoes are found on Cat Island in comparison with all but one of the park islands.

The legislative history of the act establishing the park indicates a problem of semantics which deserves attention. Cat Island has been spoken of in terms of possible "extensive public use;" the term "intensive public use" was also employed. A 1968 Departmental report on Cat Island's possible role in the National Seashore noted that:

"Because of its elevation, only Cat Island is suitable as a location for permanent visitor facilities. It is proposed as the site for the primary visitor contact station. In addition, we propose on Cat Island intensive public use facilities for swimming, picnicking, camping, bicycling, horse-back riding, fishing, hunting, and various nature study activities. Our



East Side
North
Beach
Area

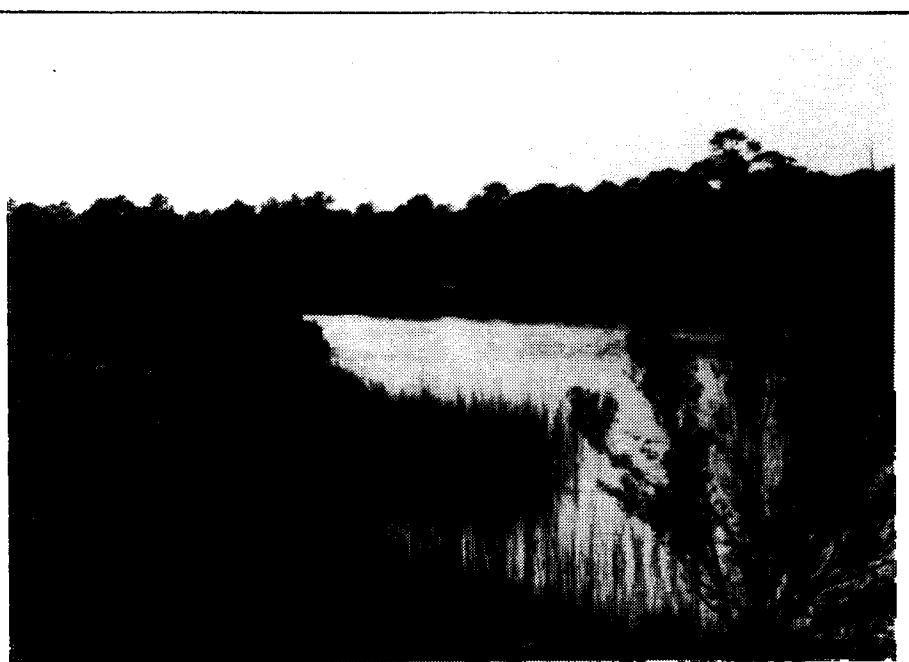


North
Beach
Area



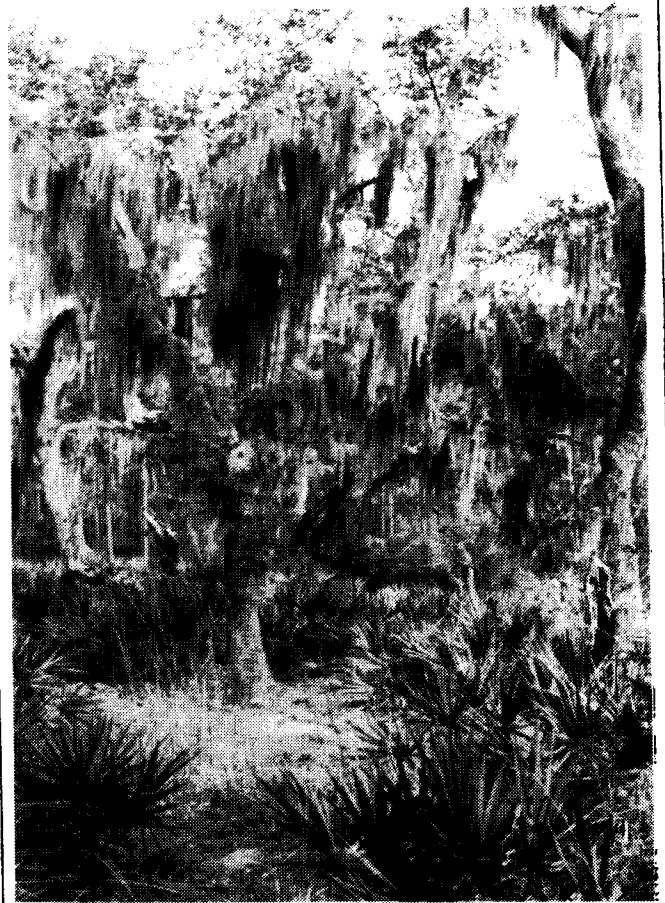
North Side
Stem of the "T" Area

Sweet Water
Stem of the
"T" Area





Pine & Oak
Stem of the
"T" Area



Oak Stand
Stem of the "T" Area



planning identifies it for a marina and overnight accommodations provided under concession contract. In addition, an airstrip and water taxi and ferry service are proposed here."

The stem of the island does lend itself to the construction of major public-use facilities insofar as its elevations are concerned. From an engineering standpoint, the elevations permit the island to be extensively (or intensively) manipulated for the construction of public use facilities. But in speaking of such facilities as an airport, concessioner horse and bicycle services and trails, and overnight accommodations, the availability... of these would not necessarily create intensive public demand and use.

Instead, the consequence might be extensive manipulation of the limited upland terrain of Cat Island to serve relatively limited public interest and use.

Since 1968, more has been learned of visitation to Ship Island as a part of Gulf Islands National Seashore, and some of that visitation data permits a sounder appreciation of the visitation potential for the area. (A section of this report specifically addresses visitation potential.) And Hurricane Camille of 1969 taught lessons easily remembered for planning in the Mississippi Gulf Coast, particularly the need for exercising caution in locating expensive improvements on the islands of the Mississippi Sound.

Geology and Topography

The geology of the Mississippi coastal region consists of Quaternary coastal deposits of loam, sand, gravel, and clay extending across the state inland in a band less than 10 miles wide except in the Pascagoula and Pearl River basins. This band also extends offshore to include the barrier islands.

The Tertiary Citronelle Formation, probably Pliocene, with some Pascagoula and Hattiesburg Clays (Miocene) make up the remainder of the coastal geologic units.

Modern geologic history of the region began with a marine transgression in late Pleistocene time. This transgression ended when the latest Pleistocene continental ice sheets started to form and sea level began to fall. However, subsidence of the area continued, and some sediments which were deposited at the retreating shoreline were preserved.

At the lowest stages of sea level fall (during the last glacial stage) the shoreline appeared to be south of the present offshore islands and the area now covered by Mississippi Sound was being actively eroded and weathered. The latest Holocene transgression advanced the shoreline landward. Formation of the barrier islands (Cat, Ship, Horn, Petit Bois, Dauphin) was initiated during this period. About 4000-3500 years ago, the worldwide sea level became stabilized near its present position.

Historic evidence indicates that the barrier islands, Ship, Horn, Petit Bois and Dauphin, and probably Cat, are migrating in a westerly direction, the direction of the predominant littoral drift and currents. Cat Island, although not constituting the end of the chain of transport of sediments from one island to the next, is close enough towards the end of the chain that some of its grains of sand must certainly once have enjoyed positions on Petit Bois, Horn or Ship Islands. The precise origin of the Cat Island sediments and dimensions is a point of speculation at this time. Studies are presently underway to obtain a data which will support or refute current hypotheses on this subject.

It has been proposed that the beach area formed from the erosion and redeposition of sand on the eastern end of Cat Island, and that much of Cat Island might, in earlier times, have consisted largely of relict accretion ridges trending in a WNW-ESE direction. These would have represented a time of island development, precipitated during a period in geologic time in which a healthy sediment budget prevailed; i.e., more sediment was being introduced into the Cat Island system (from offshore bars, riverine silt, littoral transport, and/or erosion elsewhere) than was being transported away from the island. These relict accretion ridges of the stem are truncated today by the present beach area shoreline, indicating "drastic changes in the island's outline and history" (Otvos, Ervin G. Jr., 1973, Geology of the Mississippi - Alabama Coastal Area and Nearshore Zone, A Guidebook, Gulf Coast Research Laboratory).

The island today contains a system of parallel, narrow ridges and sloughs on its stem, principally on the northern side of the stem.

The sloughs not only represent an extensive intrusion of Gulf water and wetlands into the system, they also represent barriers to visitor circulation that can be bridged for the most part only artificially. Of the 2,350 acres of Cat Island, about 990 are marsh and about 380 acres are constituted of the parallel system of natural sloughs, supplemented by about 50 acres of manmade, dredged channels. The remaining "upland" acres ("Upland" acres consist, for the purpose of this report, of those lands found more than 3-4 feet above mean high water) total about 700 acres, and they form approximately 30 % of the Cat Island area represented in the Island Base Map. These upland areas of the stem, ranging from 5 to 13 feet above mean high tide, are found down the spine of the stem, and they offer the most favorable island terrain for permanent public use facilities, protected as they are by both height and the beach area to serve as a buffer against high seas. A jeep trail of some three miles runs down the spine of the stem.

On the beach area, as noted previously, fairly narrow beach faces are surmounted by berm ridges that typically rise barely above the mean high water line, and which trend into depression areas behind the beaches. These areas are characterized by ponds of standing water (the dimensions of which are determined by a combination of rainfall and tidal influences), ephemeral saltwater marsh, and a few widely scattered dunes. Dunes are limited to the area of the confluence of the stem and the beach area, a site about 5,000 feet north of the confluence about midway between the opposing eastern and western beach faces of the beach area, and a small

segment of the North Point area. These dunes appear to rise about 3-8 feet above the surrounding flats. In general, the beach area is a low, moist area, lying behind narrow beach faces which fend off only low-energy seas in preventing overwash of the beach sands into the depressions to form overwash fans of deposited sands, several of which can be seen on the island today.

Where overwash occurs, vegetation dieoffs "inland" from the beach faces are likely, and "the beach" (open, unvegetated sand) may appear to have broadened. In actuality, if human or grazing activity does not intervene, the bare sands of the overwash fan will become covered by new vegetation above the mean high water line. This is a significant consideration, since, in terms of environmental impacts, there is little difference between creating visitor uses which erase existing vegetation and creating visitor uses which preclude revegetation on overwash fans.

A review of U.S. Coast and Geodetic charts, including one of 1860, indicates that the basic outline of the island has changed very little over the past century. The two most notable exceptions are found in erosion at the west end of the stem and loss of much of South Spit; Hurricane Camille of 1969 removed about 2,500 feet of South Spit, but much of the spit has regrown since through accretion. The beach faces in the beach area appear to be receding slowly, but the rate of loss is not found in the literature. Signs of the erosion appear along the shoreline as remnants of tree trunks

found in the surf. Intermittent patches of peat in the surf, which include only partially decomposed stems of marsh grasses, suggest that major storms may account for a great deal of the loss, and the rate of recession in the absence of major storms may be quite slow. This is suggested further by the distribution of algae about all sides of Cat Island, and the absence of these species from the Ship, Horn and Petit Bois beaches that are exposed to the surf of the open Gulf.

Considerable shoaling occurs along the eastern shores of the beach area, and the submerged bottoms demonstrate gentle gradient when compared to the submerged topography in the vicinity of the park islands. The nearest major shipping channel is found about 3 miles to the east of North Point.

Climate

The temperature of the area is moderate. Data from Gulfport, Mississippi indicates that temperatures are ideal for outdoor recreation use 5 months of the year from May to October. For the 5 month period, an average minimum temperature of 61 degrees F. and average maximum temperature of 93 degrees F. is reported. At Gulfport 66 days with temperature above 90 degrees F. and 17 days with temperature below 32 degrees F. may be expected annually. The extreme high temperatures may be less at Cat Island because of its even more influential maritime micro climate. Extreme highs may be the only undesirable temperature characteristic in the 5 month period requiring consideration in development of recreation facilities.

Average total precipitation is 62.3 inches a year. 77 days of the year, 0.10 inches or more of rain is recorded at Gulfport, Mississippi. Of the 5 months (153 days) from May to October, 0.10 inches or more of rain may be expected on 37 days. Over 1 month of the 5 month recreation use period will be affected by rains. An additional unknown number of days will be affected by light drizzle. Measurable snow or sleet has fallen in Biloxi only 5 times in the past 64 years.

As recorded at Keesler AFB, Biloxi, Mississippi, the prevalent direction of surface wind is from the N, NNE, or NE 23.7 percent of the time and from the SE, SSE, S, or SSW 30.1 percent of the time. Calms are found 12.7 percent of the time. 72.2 percent of the time the velocity is 1 to 10 knots

(1.15 to 11.5 MPH) and 14.6 percent of the time the velocity is 10-27 knots (11.5 to 31.1 MPH) excluding extreme storm conditions.

Occurrence of high winds, tropical storms, and hurricanes is likely in the Mississippi Sound area. At Keesler AFB, Biloxi, Mississippi peak gusts of surface wind were reported to be 41 knots (47.2 MPH) in 1974, 46 knots (52.9 MPH) in 1973, and 37 knots (42.6 MPH) in 1972. Tropical storms and hurricanes have moved over the Mississippi Sound area 13 times in the 92 years from 1871 to 1963. In August 17, 1969, Hurricane Camille wrought severe damage on the Mississippi Gulf Coast. An average year frequency of 6-7 years for tropical storms and hurricanes should be considered as the minimum probability of occurrence.

Seasonal storms (high winds) and major storms (tropical storms and hurricanes) should be considered in recreational planning of the Gulf Islands. Seasonal storms may create at least semi-annual additional rehabilitation costs for temporary recreation facilities (picnic tables, firegrates, trash cans, etc.). The occurrence of a disastrous storm could require costly replacement and reconstruction of permanent recreation structures (visitor contact station, motel, etc.) even if designed to be storm resistant.

Prehistory and History

Little is known of the archeology of Cat Island, as no archeological work has been undertaken and documented in the literature. Based on the analogy of similar islands in this area, it may be assumed that there was aboriginal use, at least on a seasonal basis, and at least during the past two thousand years. Considering the island's proximity to the mainland and the probable food resources available (such as shellfish), the island would inevitably have received use for at least food gathering activities. To acquire any significant understanding of the archeology of Cat Island it will be necessary to conduct a thorough survey to locate and describe the cultural resources which may be found there, accompanied by limited testing which would establish the temporal placement of the sites and provide data on the nature of aboriginal use of the area. Since the island has been disturbed by violent storms, it is not likely that sites on the island will amount to more than thinly scattered and disturbed accumulations of cultural materials. However, in the absence of further surveys and investigations, it is not possible to assess the impacts on cultural resources of the public uses and developments considered in this report.

The Gulf Coast area which includes Cat Island was explored and charted in the 16th century by the Spanish, but the French influence was to predominate following LaSalle's claim to the Louisiana area in 1682. A French exploring party visited the island in 1699 and named it "Isle Aux Chats" for the racoons found on the island and out of an apparent disregard for the differences in the species. Swiss mercenaries were deployed by the French

to the island from 1754 to 1757 to maintain a watch for British naval craft. In 1763, as a consequence of the French and Indian Wars, the area came under British control and then reverted to the Spanish in 1783 following the American Revolution. Juan de Cuevas of Biloxi had received a Spanish land grant in 1781 giving him title to the western end of the island. The Cuevas family, whose descendants populated the Gulf Coast in considerable numbers, utilized the island for raising cattle. By 1810, application had been made for admission of the area into the Union under the flag of the Republic of West Florida.

Over the "holiday season" of 1814, Cat Island played a role in the Battle of New Orleans. The British, preparatory to deploying troops by barges in Lake Borgne, made use of the island as a base for their civilians, ill and wounded. In 1830's Cat Island became a stopover on the route for Seminole Indians being relocated from Florida to what is now Oklahoma. A pioneering navigational improvement was provided in 1839 with the construction of a lighthouse on the west end of the island to serve New Orleans boating traffic. The island also served as a safe harbor for pirates, bootleggers and smugglers from the early 1800's through the 1920's.

During the Civil War, a steam saw mill and kilns for making charcoal were built on the island; saw mills and turpentine camps appeared on the island sporadically until the 1920's.

From 1896 to 1898, the State of Mississippi operated a quarantine station on Cat Island for the control of yellow fever.

In the 1920's a hunting and fishing club was established on the island and it is possibly the remains of the club dock which can still be seen on the beach near Goose Point. The venture, however, did not persist for long nor did another attempt in the 1920's to promote the island as a resort. In the 1930's, the Mississippi Conservation Commission supported an attempt to raise fur-bearing animals on the island, but this venture also was short-lived.

During World War II, the island became a training ground for the Army K-9 Corps, a practice landing area for Seabees, and North Point was utilized as a bombing practice range. The attack dog training program probably represents the most extensive use of the island in historic times; 400 dogs and 200 trainers were stationed on the island, and the foundation ruins of the dog training camp are still apparent about the midpoint on the stem of the island. A docking facility on the north shore served the training camp, and aerial photographs and observation disclose that the dredged channel is still visible, although considerably silted.

The present major property owner on the island has more recently dredged a channel further east, near the confluence of the stem and the beach, and has constructed a dock and dredged additional channels of about 8,000 linear feet (constructed off the main access channel) to provide boating access for a planned homesite development; to date, one residence has been built in

the area of the planned development (another structure on the island was lost in Hurricane Camille in 1969).

Congress considered legislation to establish the National Seashore over the years 1968 through 1970; initially the inclusion of Cat Island was found in the legislative proposal, but the island was excluded in the ultimate public law creating the park. The August 10, 1970 report (No. 91-1397) of the House Committee on Interior and Insular Affairs spoke most directly to the question:

"Cat Island...was excluded by the committee, because it was felt that its acquisition would be too costly and the relative benefits too few to warrant its acquisition."

Flora and Fauna

The flora and fauna of Cat Island have not been described in detail in any of the available, contemporary literature; however, studies of Horn Island by E. Avery Richmond of the Gulf Coast Research Laboratory (studies cited in the bibliography, Appendix C) indicate a probable flora and fauna complex for Cat Island. What literature is available and the study team's orientation visit to Cat Island on December 15, 1975 permit the presentation of a broadly painted picture.

The general vegetation pattern of Cat Island can be broken down into five associations: saltwater marsh, "sweetwater" marsh, ephemeral saltwater marsh, slash pine-palmetto and live oak stands.

The saltwater marsh, and the slash pine-palmetto associations, appear to be the most common. The ephemeral saltwater marsh, and the sweetwater marsh, were next in scope of distribution. The least common association appears to be the live oak.

The saltwater marsh appeared unique in comparison with the park islands because of its direct contact with the Gulf; that is, there was virtually no beach berm. This association is most identifiable along the long axis (east by west) of Middle Spit.

The slash pine-palmetto association appears most commonly on the western end of the stem of the island. Toward the eastern end of the island the palmetto appears stunted and in some cases not present, leaving

only slash pine. In general, this association is found on the central ridge of the island; that is, areas of higher elevations.

The Live Oak association was observed only on the stem on the highest elevations. It is unique to this island (rarely found or not found at all on Ship, Horn or Petit Bois) and could represent a remnant of mainland vegetation.

The "sweetwater" association is found in depressions on either side of the ridge of the stem and probably represents a unique flora.

The ephemeral saltwater marsh association is found primarily in the beach area of the island. It is hypothesized herein to be due to storm overwash and abnormal tidal flushes in combination with precipitation.

A detailed floristic list for each of these associations is not available. In addition, the validity of the general associations as discussed could change with further field work.

Various programs of game management and the raising of domestic stock have taken place on the island since the Cuevas family first began grazing cattle there late in the 18th century, and it is not possible to determine today how the vegetation of the island might have developed in the absence of these programs. The vegetation pattern of the island also reflects the work of the severe storms to which it has been subjected in historic times; felled older pines, a profusion of younger pines and broken live oaks are the most obvious indicators.

More information is found in the literature on the marine environment about Cat Island. Extensive pure stands of shoal sea grass are found in the shallower waters of the coves or inlets on the island. In addition, extensive benthic algae stands have been found surrounding much of the island, and Cat Island differs markedly in this respect from the park islands. Hurricane Camille of 1969 destroyed most of the algae habitat on the south side of the island, but professional research publications have suggested that these stands will probably reestablish. The marshes and grass beds of Cat Island, as elsewhere, are important for their production of plant tissue for consumption by higher organisms in the food chain and as protective habitat for numerous marine animals. The Gulf Coast Research Laboratory (Ocean Springs, Mississippi) published in 1973 a Cooperative Gulf Of Mexico Estuarine Inventory and Study, Mississippi. That document notes that:

"A lagoon on the south side of Cat Island was 2 mi. long. The water depth reached 6 feet (1.8 m) with a bottom of black, organic, sandy mud. The shallow waters of the lagoon contained a thick continuous area of shoal grass. A spit of marsh and sand formed the southern border of this lagoon and provided for another protected body of water south of the lagoon called Spit Cove and protected on the north by Middle Spit and on the east by South Spit. Most of South Spit was under 1 to 2 feet of water and was

covered with extensive growths of benthic algae. These algal growths extended into Spit Cove in waters up to 8 feet (2.4 m) deep. The plants were predominantly red algae and a few brown species. The algae grew attached to shell fragments which were very abundant at Cat Island and in all the waters of eastern Mississippi Sound. The plants reached a height of 2 feet (.6m) and produced luxuriant stands not found elsewhere in Mississippi Sound. This habitat was unique because all the phylogenetically higher submerged plants were absent."

The fauna of Cat Islands has not been recently studied in any detail and a search of the literature revealed a dearth of information.

On the December 15, 1975 visit, observations of the American Bald Eagle, Canadian and Snow Geese, Coot, Common Loon, Carolina Wren and Belted Kingfisher were made. There were signs of deer (species unknown), hog, nutria and rabbit. One American alligator and one cottonmouth snake were observed on the western portion of the island. The island lends itself to wintering habitat for the Bald Eagle, an endangered species. The protected area about the northeast end of the island serves as a nursery for porpoises and a nesting area for two species of sea turtle.

Soils

Cat Island is one of the three islands where the Handsboro - St. Lucie Soil Association is found. In the Handsboro - St. Lucie Association of Cat Island, the St. Lucie series is predominant.

The beach area is primarily composed of St. Lucie sand, hummocky. This soil is an excessively drained fine sandy soil formed in hillocks or low ridges that drifted and piled up by wind action. This hummocky unit has suitable bearing capacity for construction of recreational structures, trails, and roads.

The St. Lucie sand, hummocky, is very unstable and subject to severe blowing and washing. Because of its shifting it may create a continual rehabilitation cost for recreational development. It now supports vegetative growth of only hardy grasses and brushes.

The stem of the "T" is primarily St. Lucie sand unit. The St. Lucie sand like the hummocky soil is an excessively drained fine sand soil. It also has bearing capacity suitable for construction of recreational structures, trails, and roads. The St. Lucie sand on Cat Island may support growths of slash pine and occasional live oak stands. The St. Lucie sand may be protected by tree growth and decomposing organic matter. Thus, it is less susceptible to blowing and washing.

The Handsboro series is a very poorly drained, well decomposed, organic soil on broad, wet, grass flats along the coast, adjoining saltwater or brackish water at elevations of less than 2 feet. On Cat Island, it is found adjacent to the shoreline of the stem of the "T" and it forms the Middle Spit. Because of the flooding, wetness, and very low bearing capacity of this soil, development of recreational structures, trails, and roads should not be considered. The soil is suitable habitat for wildlife.

Aquifers and Surface Water

A review of the literature indicates that the last published study of wells on Cat Island was published by the Mississippi State Geological Society in 1944. That report examined, first, a 1929 well at the head of Spit Cove; this well, 3 inches in diameter and 530 feet deep, had a reported flow of 75 gallons per minute and a static head of 8 feet when drilled and offered a small, freely running flow in the mid 1940's. This is near to or the same well as a free-flowing artesian well found today near the beach face at the head of Spit Cove.

The second well, located along the south shoreline of the stem, north of the western tip of Middle Spit, was completed in 1943 with a diameter of 6 inches and a depth of 971 feet. Its reported static head when drilled was 30 feet and its flow in gallons per minute was 167. The geological formation constituting the aquifer in the case of both wells was the Graham Ferry formation, from which a large number of the artesian wells in the coastal area derive water. In the absence of a contemporary examination and test program by professionals, the potable water resources of the island cannot be established. However, a combination of deep wells and pumpage would probably yield sufficient potable water to serve large numbers of recreationists.

Because of the profuse intrusion of man-made canals and natural sloughs that cut into the island, much of the surface water inshore from the

island shores is brackish. A few perennial sweetwater ponds and sloughs occur, but their acreage would probably not exceed 90. Other intermittent ponds occur, especially in the beach area, after rain showers, abnormally high tides, or instances of storm overwash onto the lower elevations. These encourage an interesting, everchanging pattern of youthful ground cover, as plants and simple plant-like organisms attempt to survive and germinate in the face of alternating periods of fresh and salt water immersion.

The waters surrounding the island differ in such characteristics as clarity, cleanliness and salinity from the Gulf waters found on the south shores of Ship, Horn, and Petit Bois Islands. The beach area of Cat Island serves as one side of an inlet separating the Mississippi Sound from the Gulf of Mexico. The inlets separating Cat, Ship, Horn and Petit Bois both permit and limit the extent of the mixing of sound and Gulf waters. As might be expected, the Gulf waters and their surf on the south shores of the park islands better lend themselves to water-based recreation, and the local practice of recreationists is to seek beach experiences on the south shores of the park islands. The waters on the beach area of Cat Island, however, more closely resemble the Mississippi Sound waters found on the north shore of the park islands. Although no available data establishes that the waters of the beach area of Cat Island are unsafe for wading or swimming, the potential for the development of the island for such purposes is affected by the demonstrated tradition of visitors seeking Gulf waters rather than soundside or inlet waters for their beach recreation.

Arthropods

The Gulf Coast Mosquito Control Commission has conducted surveys and tests on the park islands, as well as Cat Island for a number of years. At the request of the Service, the Commission furnished the following data:

"...we have summarized the data for our landing rate counts on Cat Island. A landing rate count is a simple procedure whereby a man counts all of the mosquitoes that land on the front half of his body during a one minute period. The count is always made at the same designated spot (station). Our procedure is to make three one minute counts at each station. Landing rate counts are used universally as a method for detecting population trends of daytime biting mosquitoes. Listed below are the average yearly counts (mosquitoes per minute) for the years 1966 through 1975 for the landing rate stations on Cat Island. Also, the average yearly counts on the mainland are listed for comparison.

<u>YEAR</u>	<u>CAT ISLAND (East)</u>	<u>CAT ISLAND (West)</u>	<u>MAINLAND</u>
1966	1.29	0.85	0.37
1967	11.4	8.93	0.89
1968	9.04	10.7	2.18
1969	15.8	10.4	0.99
1970	19.4	13.9	0.82
1971	* 3.46	12.6	1.20
1972	0.56	3.59	0.79
1973	No counts made	No counts made	0.75
1974	3.64	12.04	0.64
1975	0.25	2.43	0.37

* The Station on east Cat Island was relocated in 1971 to an area more convenient to the helicopter landing site, and this would account for the decrease in mosquitoes in 1971 and the following years at Cat Island (East).

"These counts do not give an entirely true picture of the mosquito population on Cat Island because we do not count over 50 mosquitoes for any one count; at times the actual count may be several hundred."

Aedes sollicitans, the salt marsh mosquito, is by far the dominant species collected at these counts. The highest populations seem to occur in July, August, September and October, however, mosquitoes may be abundant on Cat Island during any month of the year if weather conditions are favorable. Again, these counts are sampling only mosquitoes that will bite during daylight hours. There are probably also high populations of species that bite almost exclusively at night, such as Culex salinarius and Anopheles crucians, however, we have no data to confirm this. In addition to the mosquitoes, deer flies are usually abundant in late spring and early summer."

"The mosquito problem on Cat Island could be alleviated greatly by stabilizing the water level in the many sloughs that lace the island. The salt marsh mosquito is a floodwater specie--The eggs are deposited on the mud and hatch after the area is flooded by rain or an abnormally high tide--and the alternate drying and flooding that occurs in these sloughs is ideal for the production of this mosquito."

Since the statistics are average yearly counts, the summer season counts would naturally be higher.

For purposes of comparison, the average yearly counts (mosquitoes per minute) for 1975 for the park islands are:

West Ship Island: 0.12

East Ship Island: 3.9

West Horn Island: 0.15

Middle Horn Island: 0.02

East Horn Island: 0.05

West Petit Bois Island: 0.38

East Petit Bois Island: 0.03

(West Cat Island: 2.43)

(East Cat Island: 0.25)

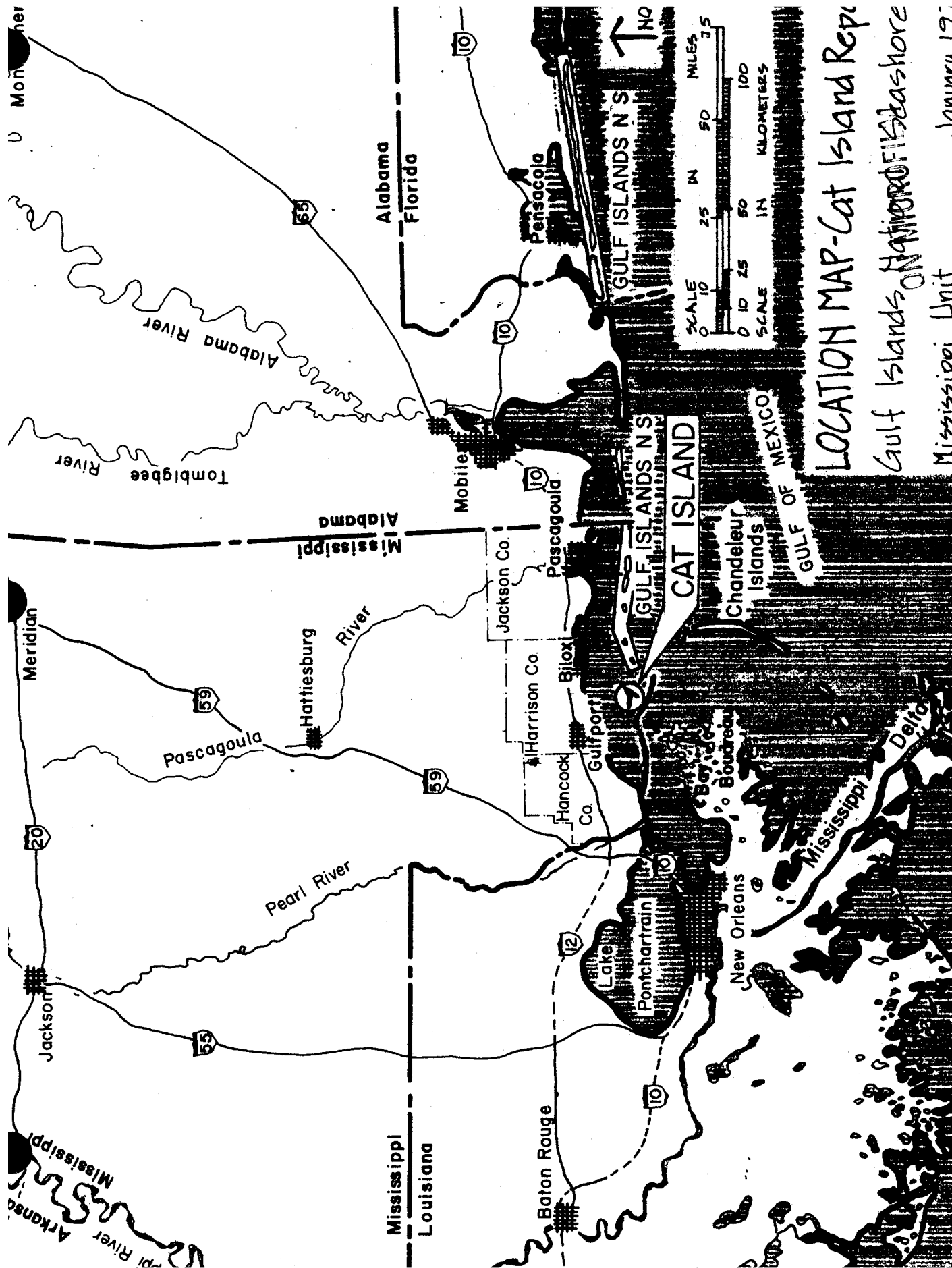
The Commission also advised that the landing rate counts are made in the interior of Cat Island and the mosquitoes are usually not a problem on the beach areas except after dusk.

Land Ownership

For purposes of analyzing land ownership, the total acreage of Cat Island is computed at 2,392.50. All land is in private ownership, and all is in Harrison County, Mississippi. One privately owned improvement, a seasonal residence, is found on the island, served by a dredged access canal and dock. The island is divided into 22 properties, classified as one improved tract and 21 unimproved tracts. The largest tract, recorded in the ownership of Boddie, et al, consists of 2,383.01 acres. The remaining 21 properties are found in the platted Bayou Marie Ridge subdivision, a site near the eastern end of the stem of the island, where manmade canals provide boating access to the subdivision properties and the island's single residential structure.

Existing Regional Uses of Cat Island

In light of this island's private ownership, no public agency has accumulated daily statistics of the uses which take place near or on Cat Island. However, fishermen of the Gulf Coast area report that the waters surrounding the island offer particularly good fishing opportunities, whether from the beach or from boats anchored off of Cat Island. Commercial shrimping takes place principally along the north shore of the stem and also off the east face of the beach area. The general practice of the commercial fisheries and individual recreationist is to assume that free access is available up to the mean low water line of the island.



LOCATION MAP-Cat Island Repu
 Gulf Islands National Seashore
 Mississippi Unit

Visitation Potential

The nearest resident population served by Gulf Islands National Seashore is principally found along the coasts of Hancock, Harrison, and Jackson Counties, Mississippi, and this three-county coastal strip includes the cities of Gulfport, Biloxi, and Pascagoula. Almost all of the population in these counties is urban or urban-supported. In 1960, the population of the coastal strip was 189,050 and by 1970 that population had grown to 239,944. A population of 553,180 has been projected for 1990.

In 1970, the population of the New Orleans standard metropolitan statistical area was 1,045,809, and an as yet unverified number of the residents of Greater New Orleans routinely make use of the Mississippi Gulf Coast for fishing, boating, swimming, and a general Gulf Coast beach experience. The beaches of Gulfport can be reached from downtown New Orleans in an 80-mile drive, largely over Interstate 10, and for many residents of Greater New Orleans, the Mississippi Gulf Coast beaches and their facilities for tourism and recreation are the nearest recreational beach complexes in contrast with the deltaic marshes which surround so much of the New Orleans area. Another urban concentration of potential visitors is found in the standard metropolitan statistical area of Mobile, Alabama, whose 376,690 residents (1970 census) are only about a 60-mile drive from Biloxi.

In addition to Mississippi Gulf Coast residents and Greater New Orleans and Mobile "regulars" who may be visitors to the park, the estimated visitor or tourist potential in the coastal strip is 339,695 annually, with most

visits concentrated during the summer months, when the average visitor may remain in the area for about 4 days.

A "5-Year Action Program" bearing on the State's Statewide Comprehensive Outdoor Recreation Plan (SCORP) was prepared under contract with the Mississippi Park System in 1969. This document reported that the six-county planning district on the Mississippi Gulf Coast had the highest needs of all the State's 12 planning districts in general public outdoor recreation areas, boating, fishing, and camping. A very high need in picnicking facilities was also noted. However, needs for swimming areas in the planning district were not reported to be severe.

The Mississippi SCORP of 1973 reported that 8,843,894 square feet of water off beaches would be needed for swimming beaches in 1975, with a projected need of 25,224,312 square feet in 1990. In 1973, the three-county Gulf Coast area was reported as offering 42,247,119 square feet of public beaches.

The 1973 SCORP also ranked the state resident demand for various forms of outdoor recreation; the ten most popular outdoor recreation activities ranged from playing outdoor games to picnicking, but did not include saltwater fishing, saltwater swimming, or saltwater motor boating. Saltwater swimming and fishing were, however, reported to be moderately popular vacation-time activities among Mississippi residents (roughly 3-6% of the residents surveyed were considered to favor these activities

on vacations, after certain weighting factors were also considered). In reporting on major factors which inhibit participation in outdoor recreation activities, the SCORP noted that lack of time and/or funds was the major inhibiting factor.

Whether access to offshore islands in the National Park System is offered by a concessioner, Government leased craft, or Government owned and operated tour boat, there is customarily a fee charged for the trip and the tour boat trip in this case would take time.

The visitation potential for Cat Island may be refined by examining visitation patterns at Ship Island. For several years prior to the establishment of the national seashore, tour boat service to Ship Island was available from both Biloxi and Gulfport. The time, one-way, from either mainland site to Ship Island is approximately 1 hour and 15 minutes, and the two boats usually make one trip a day during the spring and fall, expanding the service to two trips a day during the summer season. This scope and pattern of service to Ship Island has been continued under National Park Service administration, and the annual tour boat visitation to Ship Island in recent years has been:

1973: 123,071

1974 97,572

1975 52,453

(Some of the 1973/74 visitation may have resulted from publicity attending the establishment of the national seashore.)

The record of weekend visitation to Ship Island during July of 1975 is outlined below:

July 1975	Trips	Total (both trips) from Biloxi	Total (both trips) from Gulfport
4th	2	249	202
5th	2	300	289
6th	2	92	119
12th	2	142	217
13th	2	184	218
19th	2	125	194
20th	2	166	227
26th	2	185	231
27th	2	159	169

Both of the tour boats providing this access to Ship Island have a capacity of 200, and the data demonstrates that the boats are rarely filled to capacity.

Ship Island has the elements of attractiveness of natural values, historic Fort Massachusetts, and broad beaches. Cat Island, with interesting natural values, narrow beaches, water of a lesser attractiveness, higher mosquito counts and no major historic remains, may serve visitors insofar as it might "siphon off" a portion of a high one-time-use total of 589 visitors daily to Ship Island who have "voted with their feet" and proven an interest in a visit to an offshore island of Mississippi Sound. That is, the visitation statistics do not indicate that a substantial net increase in visitation to the park islands would occur if Cat Island was included in the national seashore boundaries. This report considers the alternative of developing overnight accommodations on Cat Island, accommodations which are

minimal at this time on the park islands (limited, undesignated primitive camping). This alternative might induce additional visitation oriented to overnight stays. The magnitude of this potential is problematical, since it would involve separating the non-boating visitor from his/her automobile, it would reflect in user fees the higher development and operating costs of offering accommodations on an island, and it unavoidably would constitute a form of competition with the tourist-oriented facilities of the Mississippi Gulf Coast where entertainment and other amenities would be present in greater variety. Those who own or rent boats and utilize them for visits to any of the park islands (Mississippi Unit) contribute additional visitation, of course, and represent additional visitation potential; these visitors annually total about 72,000.

Alternatives for Public Use

Three possible roles for Cat Island as a part of Gulf Islands National Seashore have been examined:

- preservation, minimal development, and limited public use of the island or in terms of the Service's land classification system, the island as a natural zone - environmental protection subzone, managed in a manner generally similar to park lands enjoying Congressional designation as wilderness. (A discussion of the Service's land classification system is enclosed as Appendix B.) However, a wilderness concept is modified herein to provide for easy tour boat access, a treated artesian water supply, and improved trails.

- a moderately used, moderately developed recreation area, with some portions of the island preserved as environmental protection subzones.

- an intensive manipulation of the island for development and heavy public use, little preservation of the natural topography and flora of the island and still fewer opportunities for an uncrowded experience of the island.

In discussing these concepts, this report sets forth, first, what would be done with the island; second, what the development and operating costs would be; and third, what environmental consequences and cost efficiencies would probably follow.

1. Environmental Protection Concept. Cat Island is, without question, an interesting resource. Its uniqueness in comparison with the park islands stands out in the form of its unusual configuration, its mazes of sloughs and ridges, its live oak associations, its Middle Spit marshes and its unique benthic algae habitat at Spit Cove and the other waters of this island.

Under this concept, the island could be preserved as a part of the National Park System and visitation would be limited to low levels which would tend neither to appreciably harm the vegetation and wildlife of the island nor to pose any possibilities of a sense of congestion among those who do visit. Visitation would be limited by the carrying capacity standard of 8 parties per mile of trail, at 4 persons per party, or 32 persons per mile. The jeep trail in the stem and the west and east beach faces of the beach area offer about 8 linear miles for trail-like island exploration, so about 250 persons at one time on days of peak use (such as July 4 and Labor Day weekends) might be accommodated under this concept, with total daily visitations of 50-200 considered acceptable and adequately served during other days of the season and off-season.

The existing dredged access canal would be deepened and widened to accommodate the general dimensions of tour boats similar to those now serving Ship Island, and visitors would disembark at the dock nearby the existing seasonal cottage, which would be converted into a ranger residence/ranger station. A portion of the manmade canals would be plugged to restore a part of the natural ridge-and-slough system.

A 30-site primitive campground in the beach area would be designated for those interested in an overnight stay. Facilities provided would be limited

to tent sites, unobtrusive fire rings, and a vault or self-contained chemical treatment toilet.

Defense from biting insects would be limited to application of personal insect repellent lotions. No motorized vehicle would be found on the island with the exception of a light all-terrain vehicle for emergency movement of the ill or injured to sites where they could be evacuated by boat or helicopter.

Visitors would be asked to carry in their own food and would also be asked to carry out all litter.

The principal cost under this concept would be found in the cost of land acquisition, a figure that has not been established by professional appraisers under contract. The State-owned submerged lands in this alternative, as in the others, could presumably be acquired only by donation.

Development costs would total \$1,063,000 consisting of:

Canal Dredging and Plug	\$993,000
Chemical/vault Toilet	3,000
Conversion of existing seasonal residence to ranger station/residence	10,000
Remove debris from WW II dog training camp	4,000
Improve potable water supply	53,000
TOTAL	1,063,000

(The substantial dredging costs could be avoided if visitor access was provided via smaller boats operating on a shuttle circuit from Ship Island. Of course, the overall length of the trip to Cat Island would be extended, and the attractiveness of the island to the casual visitor would be correspondingly diminished. Adverse environmental impacts attend dredging; a major such impact is increased water turbidity. Tour boat use of dredged channels can perpetuate that turbidity, through action of the boat wake and propellor wash. Initial or occasional maintenance dredging are essentially "one-shot" disturbances. Once tour boats begin using dredged channels, their impacts can be minimized if the channels are wide enough and deep enough that they "sense" wake and propellor turbulence only slightly and if the frequency of tour boat use is minimized. The small shuttle craft concept does not demonstrably contribute to the overall mitigation of these impacts.)

Sufficient staffing to serve the public could be provided by offering the services of two permanent rangers on the island, whose services would be supplemented by seasonal rangers or the part-time services of other national seashore permanent rangers to cover lieu days and periods of training and leave for the Cat Island incumbents. Total staffing and related operational costs would be about \$50,000 annually.

With regard to environmental consequences, this concept would serve the needs of preservation interests and "back-country" visitors. The environment of Cat Island as found today and the natural processes taking place on this island would be preserved with minimal contrary human influence.

In terms of meeting the known demand for recreational opportunities on Mississippi Sound islands, the alternative serves a reasonable proportion of the visitors to the park islands (for example, 50-250 of the 500-600 daily visitors to Ship Island on peak weekends) and does so economically in that costly development to serve a possibly disinterested market is avoided. Loss of developments to major storms would be negligible.

Visitors would be able to enjoy a key wilderness amenity: opportunities for solitude. At any one moment, visitors would probably be widely distributed; some visitors might be walking the beaches or the stem, and some might be enjoying fishing in the coves or on the beaches. Some visitors also might be found sunbathing on the beaches; although these are narrow beach faces and other passing visitors may intrude on the "territory" a beach party may "stake out" on a narrow beach face, so few passing visitors would be encountered that sunbathers would probably be rarely disturbed by others.

The limited visitor use under this concept would present minimal risks of jeopardizing habitat for rare and endangered species. However, South Spit, also known as Goose Point, is extensively populated during the off-season by geese and shore birds, and these fowl are easily disturbed by the proximity of a single visitor.

improvements offered under the environmental protection concept, a number of facilities to serve a peak one-time-use level of 800 visitors would be offered. In the beach area, the face of the beach in the area of the eastern end of the stem would be widened by pumping in sand and regrading to provide a recreational beach 200 feet in depth. Behind the beach, a snack bar, camping equipment rental shop, and shaded rest area would be provided, and a boardwalk would extend from this facility to the beach and along the beach. Lifeguard service would be provided. To the north and west of the snack bar/rest area and the protected swimming area, a 50-site picnic area would be provided. Three comfort stations would serve visitors to the snack bar/rest area, the protected swimming beach, and the picnic area. Comfort stations on the beach would include change rooms and showers. North of this complex, a 50-site campground with picnic tables and firegrates would be provided. Depositing dredged fill and regrading in the campground area would be necessary to raise the elevations generally and eliminate the many low spots. This fill would extend to the present beach berm, and campers could enjoy the beach in less crowded conditions than may be found at the protected swimming area - which would most likely serve concentrations of day-users. The remaining portions of the beach face would be left narrow and untouched by fill or boardwalks for beach nature walks.

In the stem, 6 1/2 miles of improved hiking trails with bridges would route hikers through the parallel ridges and sloughs of the stem. Along the trail, a seasonal interpretive center and two sheltered rest areas (all with comfort facilities) would be provided.

South Spit, Middle Spit, and the western half of the stem would be maintained as environmental protection subzones.

Sewage treatment facilities would be adjacent to the comfort stations and other waste water sources where soil and drainage conditions are suitable. Artesian wells would provide water for visitor use. Power would be necessary for operation of some sewage treatment facilities and the water distribution systems.

In the area of the existing residence, a small maintenance area and cottage for a ranger residence would be added.

Light motorized vehicles would patrol the developed hiking trail and offer access to the various improvements for their maintenance. In addition, mosquito fogging of the improved hiking trail, picnic area, and the campground would require a vehicle.

Development costs, as compared to the \$1,063,000 required for the environmental protection concept would be:

Dock Improvements	\$ 26,000
Canal Dredging and Plugs; Beachfill	\$1,650,000
Snack Bar/Camping Equipment Rental Shop	(Concessioner cost)
Rest Area, with Comfort Station	\$ 59,000
Boardwalks to and along protected swimming beach (.7 mile)	\$ 216,000
Picnic Area	\$ 36,000
Comfort Stations (2) for protected swimming beach and picnic area	\$ 87,000
Campground with comfort Station and picnic tables and firegrates for each site	\$ 131,000

Developed hiking and maintenance access trails with bridges (6 1/2 miles)	\$ 518,000
Remove debris and foundation ruins from WW II dog training camp	\$ 15,000
Clear and grade beach	\$ 13,000
Seasonal interpretive center with comfort facilities	\$ 41,000
Rest areas (2) on hiking trail, with comfort facilities	\$ 47,000
Water supply and sewage treatment; power generation and distribution	\$1,266,000
Maintenance area and structure	\$ 57,000
Convert existing residence to ranger station/residence and construct ranger cottage	\$ 67,000
TOTAL	\$4,229,000

In addition to the two permanent, year-round rangers considered under the environmental protection concept, a permanent maintenance employee, three seasonal rangers, two seasonal interpreters, three seasonal lifeguards, and three seasonal maintenance personnel would be required to provide resource and visitor services and protection at the visitor contact station, the campground, the protected swimming beach, the picnic area, the seasonal interpretive center, and the beaches and trails throughout the island. Most of these personnel would return to the mainland at the end of each work day. Total staffing and other operational costs would total about \$115,000 annually.

Under this concept, the facilities could be developed to meet an uncertain visitor interest, insofar as changes in the landscape, developments, and staffing are offered to serve more visitors than make use of Ship Island

on peak weekends. However, if visitation should develop to a level that makes efficient use of the facilities and services, the Mississippi Sound area would have gained a new public park which offers opportunities for beach exploration, swimming, sunbathing, nature hikes and natural history interpretation, camping, picnicking, and the overall recreational values of an encounter with the outdoors. The amenities are designed to make a visit "comfortable:" that is, beach showers, change rooms, refreshments, lifeguard service, flush toilets, visitor orientation and interpretation centers, sheltered rest areas, limited mosquito control, tables and grates at campgrounds, improved trails, and the like.

However, 125 acres or about 6% of the natural ecosystem would be lost in providing developments and concentrating visitor uses in and about them.

Opportunities for solitude would be severely restricted, and any sort of "back-country" experience would come to be in increasingly short supply.

Mosquito fogging programs would have limited effectiveness, since substantial areas of the island would not be fogged, and mosquitos there would soon migrate again into the major public use areas.

Because insecticides are not species specific, chemical controls will not only kill the target pest species but other invertebrates as well. As a part of the food chain, each insect species has a role in the entire

island system. Subtle relationships which have evolved in a coastal island ecosystem may be disrupted by removal of some insect species. Indirect local damage to vegetation can be expected if plant pollinating populations are disturbed.

Wildlife species that depend on insect populations for a food supply will be affected when insects are removed from some areas.

Dibrom and malathion would be used and are organic phosphates that break down within a matter of days following a single application; diazinon, if used, takes up to a month to break down. These insecticides are not persistent in soil, water, and plants. Therefore, permanent effects on the natural environment and the danger of pesticide accumulation can be largely eliminated. Continual application on a daily or weekly basis will, however, create abnormally high levels of pesticide in systems of animals that live their entire lives in the area of pesticide application. Consistently high levels will also be present in the plants, the soil, and water because frequent applications will replenish the level as the chemicals break down.

The pesticides mentioned here are toxic to fish and wildlife. Small animals such as birds and small mammals, feeding on directly treated areas may be effected or possibly killed. If concentrations are within allowable levels and only small areas are treated, the effect on small vertebrate populations should be localized.

Most insects have a genetic ability to produce increasingly resistant strains when continually confronted with similar chemical controls. If insects on the island do develop resistance, an alternative control strategy would be required.

Losses of developments to major storms would be significant in magnitude under this concept.

Rehabilitation expenses after normal seasonal storms would be high, but generally acceptable in comparison with development risks taken at other national seashores.

The level of public use anticipated in this concept would probably preclude successful sea turtle nesting on the beaches, it may close out a site which otherwise would serve as wintering habitat for the American Bald Eagle, and the geese of Goose Point and shorebirds might react to substantial off-season visitation by largely abandoning their use of the island.

offered in the moderate-use concept, a number of additional facilities to serve a peak one-time-use level of 4,800 visitors would be offered.

By dredge-and-fill, an east face recreational beach 1 1/2 miles long and 200 feet deep would be created. In addition, fill would be pumped in to create a west-face beach below North Point about 1/2 mile long and 200 feet deep. A 175-site campground with three comfort stations and picnic tables and firegrates for each campsite would be constructed on hydraulic-fill-created elevations in the area of North Point. Below the campground and between the eastern and western faces of the beach area, hydraulic fill would also provide higher elevations for the construction of a snack bar/camping equipment rental shop, rest area, and comfort station, as well as a 400-site picnic area. Three additional comfort stations with showers and changing rooms would serve the picnic area/recreational beach complex, as would four sheltered rest areas, each with comfort facilities. 16,000 feet of beach boardwalk would be provided. In the area of South Spit, an observation deck and sheltered rest area with comfort facilities would be constructed.

To serve arriving visitors, the access canal would be deepened and a new dock would be constructed to accommodate multiple arrivals and departures of tour boats. Dredging to extend the manmade canal system by 2,000 feet would be accomplished. The existing residence would be converted to a ranger station and administration facility. A new visitor-contact/orientation facility would be built, and housing for three permanent employees and six seasonal employees would be built in the area of the dock landing. A maintenance area would be constructed nearby.

At the confluence of the stem and the beach area, a 50-unit motel, a bike rental facility, a 40-table restaurant, and a 25-berth marina for small boats would be provided. To the west of this complex and the visitor landing site, a concessioner-operated horse rental facility and corral would be provided.

In the eastern half of the stem, a number of generally parallel trails would be provided. In the vicinity of the island landing site and the concessioner motel and marina, a mini-bus shuttle service would offer scheduled trips to the center of the stem for visitors who would like to quickly reach a point from which they could easily walk to the live oaks, sloughs, marshes, and beaches of the stem. A seasonal interpretive center emphasizing natural history interpretation would be situated at the terminus of the shuttle route and nearby other stem trails, such as hiking and biking trails.

A 6-mile-long improved hike/bike trail would be provided from the confluence of the stem and the beach area, extending almost all the way to the western end of the stem.

A 3.6-mile-long horse trail, with five trail bridges would also be provided in the eastern half of the stem.

Along the course of this complex of mini-bus shuttle, hike/bike and horse trails in the stem, seven sheltered rest areas would be situated, each with comfort facilities.

Six miles of manmade diking would sever the natural movement of Gulf waters into and out of the sloughs of the stem and Middle Spit for purposes of mosquito control. Island-wide fogging to supplement this mosquito control measure would also take place.

Development costs would be:

175-site campground with three comfort stations and picnic tables and firegrates for each campsite	\$1,091,000
Snack bar/camping equipment rental shop/rest area/comfort station	(Concessioner Cost)
400-site picnic area	\$1,902,000
Three comfort stations with showers and changing rooms to serve picnic area recreation beaches	\$ 131,000
Four sheltered rest areas, with comfort facilities (beach area)	\$ 146,000
Three miles of boardwalk to and along beach protected swimming area	\$ 934,000
South Spit observation deck	\$ 36,000
South Spit sheltered rest area with comfort facilities	\$ 23,000
Extension of existing access canal	\$1,869,000
Enlargement of existing docking facilities	\$ 58,000
Canal dredging	\$1,650,000
Converting existing residence to ranger/administration station	\$ 15,000
New visitor contact/orientation facility	\$ 584,000
Housing for three permanent, year-round employees	\$ 135,000
Dormitory-housing for six seasonal employees	\$ 132,000

Remove debris and foundation ruins from WW II dog training camp	\$ 15,000
Maintenance Area	\$ 187,000
Motel, bike rental facility, restaurant, and marina	(Concessioner Cost)
Horse rental facility and corral	(Concessioner Cost)
Beach clearing and grading	\$ 85,000
Bike trail, surfaced (1.6 miles)	\$ 140,000
Mini-bus shuttle road (4.5 miles)	\$ 526,000
Seasonal Interpretive Center with comfort facilities	\$ 41,000
Improved hiking trails (6 miles)	\$ 87,000
Improved horse trails (3.6 miles) (with trail bridges over sloughs)	\$ 423,000
Six sheltered rest areas, each with comfort facilities situated along various trails in the stem	\$ 140,000
Six miles of diking	\$11,037,000
Power supply and distribution	\$3,263,000
Water supply	\$2,802,000
Tertiary sewage treatment	\$3,581,000
TOTAL	\$31,033,000

Although the estimates above include the cost of dredge-and-fill operations, no costs are anticipated for adding sand fill to the swimming beaches, camping area, picnic site, and other sites of improvements if further dredging activities in the shipping channel east of Cat Island can result in deposit of some of the dredged fill on the island. The area surrounding Fort Massachusetts on Ship Island has been enlarged by such a dredge-and-fill operation at no cost to the National Park Service. If fill for Cat Island

could be obtained on this basis the overall development costs could be reduced by about \$1,600,000.

Three permanent, year-round employees would be required; two rangers and a maintenance employee. Six seasonal rangers, three seasonal interpreters, 12 seasonal lifeguards, and nine seasonal maintenance personnel would also be required. Total staffing and other operational costs would total approximately \$197,000 annually.

Under this concept almost all of the island would be subjected to human influence which is contrary to preservation of the natural environment.

Changes in the landscape, developments, and staffing would be provided for far in excess of the demonstrated visitor interest in the islands of the Mississippi Sound.

Opportunities for an uncrowded experience on Cat Island would be limited to the off-season, if not nonexistent.

All faunal species of the island would be significantly affected by the combination of diking and mosquito fogging, and suitable habitat for rare and endangered faunal and floral species would be virtually extinguished. Conversely, migratory wildfowl are finding increasingly fewer areas of freshwater marsh environment for wintering in the area of Mississippi Sound, and diking off the Gulf water access to the sloughs of Cat Island would increase the extent of a habitat suitable for use by these fowl, if they would tolerate the human presence.

Losses of developments to major storms would be as catastrophic as the storms.

Rehabilitation expenses after normal seasonal storms would be substantial.

Maintaining a stock of riding horses on the island may invite instances of visitor exposure to those forms of equine encephalitis and other diseases communicable to man for which horse stock serves as an alternate host.

Consideration was also given to the alternative of partial Federal ownership of the island for park purposes, primarily in terms of private ownership of the stem of the island and public ownership and use of the beach area. However, the additional diversity of habitat which could be gained for the national seashore by acquisition of the island is primarily represented in the stem of Cat Island. With over 50 miles of Gulf and Soundside beaches already found on Ship, Horn and Petit Bois Islands, the park is not in great need of another 3-4 miles of beach in the Mississippi Sound. The existing channel entrances to landing sites (the World War II army landing and the presently used landing) are logically located on the north shore of the stem, and a continuing mix of residents and visitors would follow, with a considerable potential for conflicts and irritations.

Where village enclaves are found within national seashores, unique management problems are also found that need not be created again at Cat Island: demands for Federal control of beach erosion and structures to prevent overwash for the benefit of the private properties lying behind the beaches, requests for mosquito control action in the park to benefit

neighboring residents, requests for zoning and other controls of particular beach activities to benefit the villagers, and demands for tight, if not oppressive controls on the circulation of park visitors to prevent their becoming nuisances to the residents--to note a few. In time, the "public beach" may come to be a "publicly subsidized beach" for the most contiguous private property owners.

Feasibility Summary

A summary of the comparative costs of development and operation and the related levels of visitation served under each concept are noted below:

Environmental Protection Concept

Development Costs	\$ 1,063,000
Staffing and other operational cost annually	\$ 50,000
Visitation Served Daily	50-250

Moderate Use Concept

Development Costs	\$ 4,229,000
Staffing and other operational cost annually	\$ 115,000
Visitation Served Daily	600-800

Intensive Use Concept

Development Costs	\$31,033,000
Staffing and other operational cost annually	\$ 197,000
Visitation Served Daily	4,000-4,800
(Possible reduction of development cost by Corps of Engineers placement of fill in the course of maintenance dredging of navigation channels.	\$ 1,600,000)

Appendix A

17. Gulf Islands

An Act to provide for the establishment of the Gulf Islands National Seashore, in the States of Florida and Mississippi, for the recognition of certain historic values at Fort San Carlos, Fort Redoubt, Fort Barrancas, and Fort Pickens in Florida, and Fort Massachusetts in Mississippi, and for other purposes. (84 Stat. 1967)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That, in order to preserve for public use and enjoyment certain areas possessing outstanding natural, historic, and recreational values, the Secretary of the Interior (hereinafter referred to as the "Secretary") may establish and administer the Gulf Islands National Seashore (hereinafter referred to as the "seashore"). The seashore shall comprise the following gulf coast islands and mainland areas, together with adjacent water areas as generally depicted on the drawing entitled "Proposed Boundary Plan, Proposed Gulf Islands National Seashore," numbered NS-GI-7100J, and dated December 1970:

(1) Ship, Petit Bois, and Horn Islands in Mississippi;

(2) the eastern portion of Perdido Key in Florida;

(3) Santa Rosa Island in Florida;

(4) the Naval Live Oaks Reservation in Florida;

(5) Fort Pickens and the Fort Pickens State Park in Florida; and

(6) a tract of land in the Pensacola Naval Air Station in Florida that includes the Coast Guard Station and Lighthouse, Fort San Carlos, Fort Barrancas, and Fort Redoubt and sufficient surrounding land for proper administration and protection of the historic resources.

SEC. 2. (a) Within the boundaries of the seashore, the Secretary may acquire lands, waters, and interests therein by donation, purchase with donated or appropriated funds, or exchange, except that property owned by a State or any political subdivision thereof may be acquired only with the consent of the owner. The Secretary may acquire by any of the above methods not more than one hundred thirty-five acres of land or interests therein outside of the seashore boundaries on the mainland in the vicinity of Biloxi-Gulfport, Mississippi, for an administrative site and related facilities for access to the seashore. With the concurrence of the agency having custody thereof, any Federal property within the seashore and mainland site may be transferred without consideration to the administrative jurisdiction of the Secretary for the purposes of the seashore.

(b) With respect to improved residential property acquired for the purposes of this Act, which is beneficially owned by a natural person and which the Secretary of the Interior determines can be continued in that use for a limited period of time without undue interference with the administration, development, or public use of the seashore, the owner thereof may on the date of its acquisition by the Secretary retain a right of use and occupancy of the property for noncommercial residential purposes for a term, as the owner may elect, ending either (1) at the death of the owner or his spouse, whichever occurs later, or (2) not more than twenty-five years from the date of acquisition. Any right so retained may during its existence be transferred or assigned. The Secretary shall pay to the owner the fair market value of the property on the date of such acquisition, less their fair market value on such date of the right retained by the owner.

(c) As used in this Act, "improved residential property" means a single-family year-round dwelling, the construction of which began before January 1, 1967, and which serves as the owner's permanent place of abode at the time of its acquisition by the United States, together with not more than three acres of land on which the dwelling and appurtenant buildings are located that the Secretary finds is reasonably necessary for the owner's continued use and occupancy of the dwelling: *Provided*, That the Secretary may exclude from improved residential property any marsh, beach, or waters and adjoining land that the Secretary deems is necessary for public access to such marsh, beach, or waters.

(d) The Secretary may terminate a right of use and occupancy retained pursuant to this section upon his determination that such use and occupancy is being exercised in a manner not consistent with the purposes of this Act, and upon tender to the holder of the right an amount equal to the fair market value of that portion of the right which remains unexpired on the date of termination.

SEC. 3. The Secretary shall permit hunting and fishing on lands and waters within the seashore in accordance with applicable Federal and States laws: *Provided*, That he may designate zones where, and establish periods when no hunting or fishing will be permitted for reasons of public safety, administration, fish or wildlife management, or public use and enjoyment. Except in emergencies, any regulations issued by the Secretary pursuant to this section shall be put into effect only after consultation with the appropriate State agencies responsible for hunting and fishing activities.

SEC. 4. Any acquisition of lands, waters, or interests therein shall not diminish any existing rights-of-way or easements which are necessary for the transportation of oil and gas minerals through the seashore which oil and

gas minerals are removed from outside the boundaries thereof; and, the Secretary, subject to appropriate regulations for the protection of the natural and recreational values for which the seashore is established, shall permit such additional rights-of-way or easements as he deems necessary and proper.

SEC. 5. Except as otherwise provided in this Act, the Secretary shall administer the seashore in accordance with the Act of August 25, 1916 (30 Stat. 535), as amended and supplemented (16 U.S.C. 1 et seq.). In the administration of the seashore the Secretary may utilize such statutory authorities available to him for the conservation and management of wildlife and natural resources as he deems appropriate to carry out the purposes of this Act. With respect to Fort Redoubt, Fort San Carlos, Fort Barrancas at Pensacola Naval Air Station, Fort Pickens on Santa Rosa Island, and Fort McRae on Perdido Key, Florida, and Fort Massachusetts on Ship Island, Mississippi, together with such adjacent lands as the Secretary may designate, the Secretary shall administer such lands so as to recognize, preserve, and interpret their national historical significance in accordance with the Act of August 21, 1935 (49 Stat. 666; 16 U.S.C. 461-467), and he may designate them as national historic sites. The Act of July 2, 1948 (62 Stat. 1220), which provided for the establishment of the Pensacola National Monument, is hereby repealed.

SEC. 6. The Secretary of the Interior and the Secretary of the Army may cooperate in the study and formulation of plans for beach erosion control and hurricane protection of the seashore. Any such protective works or spoil deposit activities undertaken by the Chief of Engineers, Department of the Army, shall be carried out within the seashore in accordance with a plan that is acceptable to the Secretary of the Interior and that is consistent with the purposes of this Act.

SEC. 7. There are hereby transferred from the National Wildlife Refuge System to the seashore the Horn Island and Petit Bois National Wildlife Refuges to be administered in accordance with the provisions of this Act.

SEC. 8. Within four years from the date of the enactment of this Act, the Secretary of the Interior shall review the area within the Gulf Islands National Seashore and shall report to the President, in accordance with subsections 3 (c) and 3 (d) of the Wilderness Act (78 Stat. 890; 16 U.S.C. 1132 (c) and (d)), and recommended as to the suitability or nonsuitability of any area within the seashore for preservation as wilderness, and any designation of any such area as a wilderness shall be accomplished in accordance with said subsections of the Wilderness Act.

SEC. 9. No provision of this Act, or of any other Act made applicable thereby, shall be construed to affect, supersede, or modify any authority of the Department of the Army or the Chief of Engineers, with respect to navigation or related matters as specifically provided in section 6 of this Act.

SEC. 10. There is hereby established a Gulf Islands National Seashore Advisory Commission. The Commission shall terminate ten years after the date the seashore is established pursuant to this Act. The Commission shall be composed of three members from each county in which the seashore is located, each appointed for a term of two years by the Secretary as follows:

(1) one member to be appointed from recommendations made by the county commissioners in the respective counties;

(2) one member to be appointed from recommendations made by the Governor of the State from each county; and

(3) one member to be designated by the Secretary from each county.

Provided, That two members shall be appointed to the Advisory Commission in each instance in counties whose population exceeds one hundred thousand.

The Secretary shall designate one member to be Chairman. Any vacancy in the Commission shall be filled in the same manner in which the original appointment was made.

Members of the Commission shall serve without compensation as such. The Secretary is authorized to pay the expenses reasonably incurred by the Commission in carrying out its responsibilities under this Act on vouchers signed by the Chairman.

The Secretary or his designee shall, from time to time, consult with the Commission with respect to the matters relating to the development of the Gulf Islands National Seashore.

SEC. 11. There are authorized to be appropriated not more than \$3,120,000 for the acquisition of lands and interests in lands and not more than \$14,779,000 (1970 prices) for development, plus or minus such amounts, if any, as may be justified by reason of ordinary fluctuations in construction costs as indicated by engineering cost indices applicable to the types of construction involved herein.

Approved January 8, 1971.

Legislative History

House Report No. 91-1397 (Committee on Interior and Insular Affairs).

Senate Report No. 91-1514 (Committee on Interior and Insular Affairs).

Congressional Record, Vol. 116 (1970):

Sept. 10, considered and passed House.

Dec. 28, considered and passed Senate, amended.

Dec. 29, House concurred in Senate amendment.

An Act to amend the Act of January 8, 1971 (Public Law 91-660; 84 Stat. 1967), an Act to provide for the establishment of the Gulf Islands National Seashore, in the States of Florida and Mississippi, for the recognition of certain historic values at Fort San Carlos, Fort Redoubt, Fort Barrancas, and Fort Pickens in Florida, and Fort Massachusetts in Mississippi, and for other purposes. (86 Stat. 123)

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That the Act of January 8, 1971 (Public Law 91-660; 84 Stat. 1967) is amended as follows:

(1) In section 2(a) revise the second sentence by deleting "one hundred thirty-five" and inserting in lieu thereof "four hundred" and

(2) In section 11 delete "\$3,120,000" and insert in lieu thereof "\$3,462,000" and delete "\$14,779,000 (1970 prices)" and insert "\$17,774,000 (June 1970 prices)".

Approved April 20, 1972.

Legislative History

House Report No. 92-986 accompanying H.R. 11839 (Committee on Interior and Insular Affairs).

Senate Report No. 92-703 (Committee on Interior and Insular Affairs). Congressional Record, Vol. 118 (1972):

Mar. 23, considered and passed Senate.

Apr. 17, considered and passed House, amended, in lieu of H.R. 11839.

Apr. 19, Senate concurred in House amendment.

Appendix B

Land Classification

Park lands shall be classified to designate where various strategies for management and use will best fulfill management objectives and achieve the purpose of the park. Such classification will be based on the inherent nature of park resources and the suitability of the land for the proposed uses and management.

Four general zones will be recognized--natural, historic, development and special use. Within this framework, special subzones may be designated for any park where desirable to indicate in greater detail how the land or water will be managed.

Land classifications in existing master plans shall remain valid until revised or superseded.

Natural Zone - The natural zone is composed of one or more subzones. In these subzones, natural resources and processes remain largely unaltered by human activity except for approved developments essential for management, use and appreciation of the park. Developments will be minimal or absent in certain subzones (wilderness--or wilderness study--subzone); in others (natural environment subzone) park roads, dispersed recreation facilities such as picnic areas and interpretive facilities are permissible. Natural zones and identical subzones in different parks will be managed under the same policies regardless of management category except where legal requirements and valid existing rights require exceptions.

Examples of natural subzones include:

Wilderness (or wilderness study) subzone. Lands and waters legislatively designated as wilderness, or those which are being

Environmental protection subzone. Lands and waters possessing particular value as wildlife habitat and/or for research. They are managed to perpetuate ecological values without, or with minimal, human intrusion in accordance with the park's resources management plan.

Outstanding natural feature subzone. Geological and biological features possessing unusual intrinsic value or uniqueness. These features often are the park's principal attractions and are managed to provide for visitor enjoyment without impairing their quality.

Natural environment subzone. Natural environments not suitable or desirable for classification in other subzones. They are lands that may be managed to provide for environmentally compatible recreational activities based upon and protective of the natural environment.

Historic Zone - This zone includes all lands containing resources listed on or eligible for the National Register of Historic Places. Designation of historic zones shall occur not later than the date the resources are nominated to the National Register and shall be reflected in the park's land classification plan. In most cases, boundaries of historic zones shall be identical with the boundaries of properties nominated to the National Register and shall include sufficient land for the protection and public appreciation of cultural resources and their settings. Any reclassification or partial reclassification of existing historic zones to other zones (or alienation of historic zone land) shall require compliance with the Procedures for the Protection of Historic and Cultural Properties promulgated by the Advisory Council on Historic Preservation under the National Historic Preservation Act of 1966 and Executive Order 11593 (36 C.F.R. Pt. 800).

Certain lands not meeting the criteria for listing on the National Register may be designated as historic zones. Such cases would include local cemeteries and other minor historic sites worthy of protection and interpretation.

Physical development in historic zones shall be the minimum needed to preserve, protect, and interpret historical, cultural, or archeological values. It shall not detract from or adversely affect these values, except as determined to be unavoidable, through compliance with the Advisory Council's Procedures for the Protection of Historic and Cultural Properties. Activities in historic zones generally shall be limited to sightseeing and the study of the cultural features. However, this limitation shall not preclude appropriate adaptive use of historic structures for utilitarian purposes or other uses permitted in these policies.

park development and intensive use, existing and proposed, do or may substantially alter the natural environment. This zone is managed to provide and maintain development that serves the needs of park management and relatively large numbers of visitors. Aggregations of buildings, parking lots, service roads, and utilities will be included in this zone. Park roads extending beyond a development center will be included in the natural, historic, or special use zone through which they pass. Developments permitted in other zones do not constitute a development zone. Development zones shall be restricted to the smallest area necessary to accommodate existing or proposed development and use. Development zones are designated only after considering alternative sites (including out of the park) and alternative levels of use, management facilities, and services necessary to achieve park objectives.

Special Use Zone - Special uses of lands and waters not permitted in natural, historic or development zones are included in this category, mostly in recreation areas. Examples of possible subzones include the following.

Reservoir subzone - Major reservoirs and adjacent lands to the high water mark where the National Park Service does not have exclusive management authority. Minor developments, such as launching ramps and beaches, will be included. Minor impoundments not subject to drawdown may be classified in other zones.

Landscape management subzone - Nonhistoric lands where artificial manipulation creates a managed landscape that must be maintained through intensive management.

Private development subzone - Non-Federal lands and waters within park boundaries, including inholdings subject to fee acquisition; lands in certain recreation areas that are exempt from fee acquisition so long as they are developed according to Federal zoning standards exempt from fee acquisition; and lands affected by federally owned scenic easements. This subzone does not apply to lands that are legally exempt from acquisition such as the private communities at Cape Hatteras.

Resource utilization subzone - Lands and waters where utilization or removal of nonrenewable environmental resources is legally sanctioned. Mining is an example. Lands supporting consumptive use of renewable resources, as in grazing operations, should be classified in other appropriate zones.

Appendix C

Acknowledgements

The National Park Service appreciates the cooperation and assistance of Mr. Nathan V. Boddie of Gulfport, Mississippi in offering access to Cat Island and providing information about the island.

The National Park Service appreciates the assistance of Mr. James Stevens of Gulfport, Mississippi, who offered the Service the benefits of his extensive knowledge of the history of the Mississippi Gulf Coast, as well as selected documents on Cat Island.

The National Park Service appreciates the assistance of the staff of the Gulf Coast Research Laboratory, Ocean Springs, Mississippi, in offering natural resources data.

The National Park Service appreciates the assistance of the Gulf Coast Mosquito Control Commission, Mr. Cary B. Crosby, Director, in developing data on arthropods.

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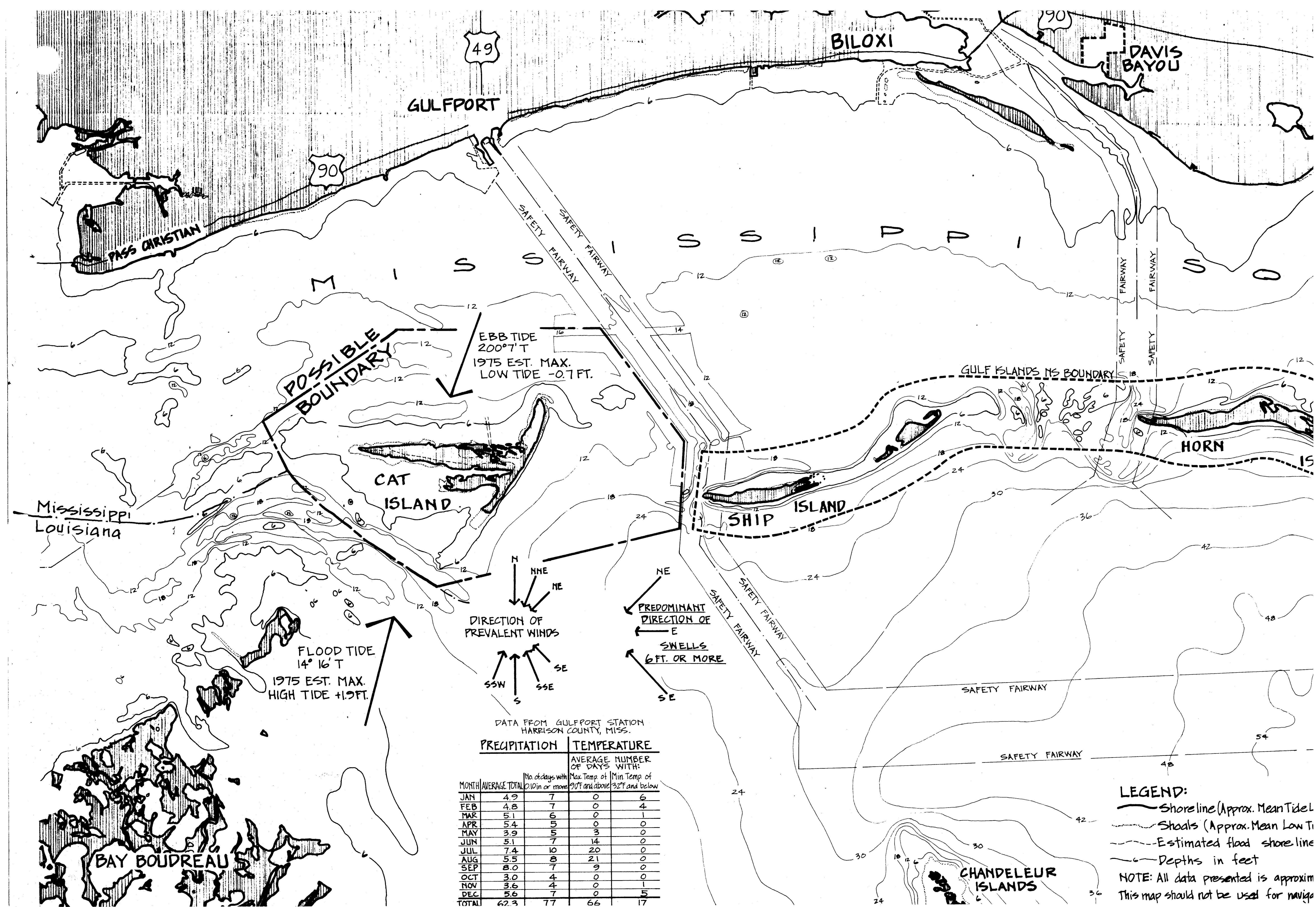
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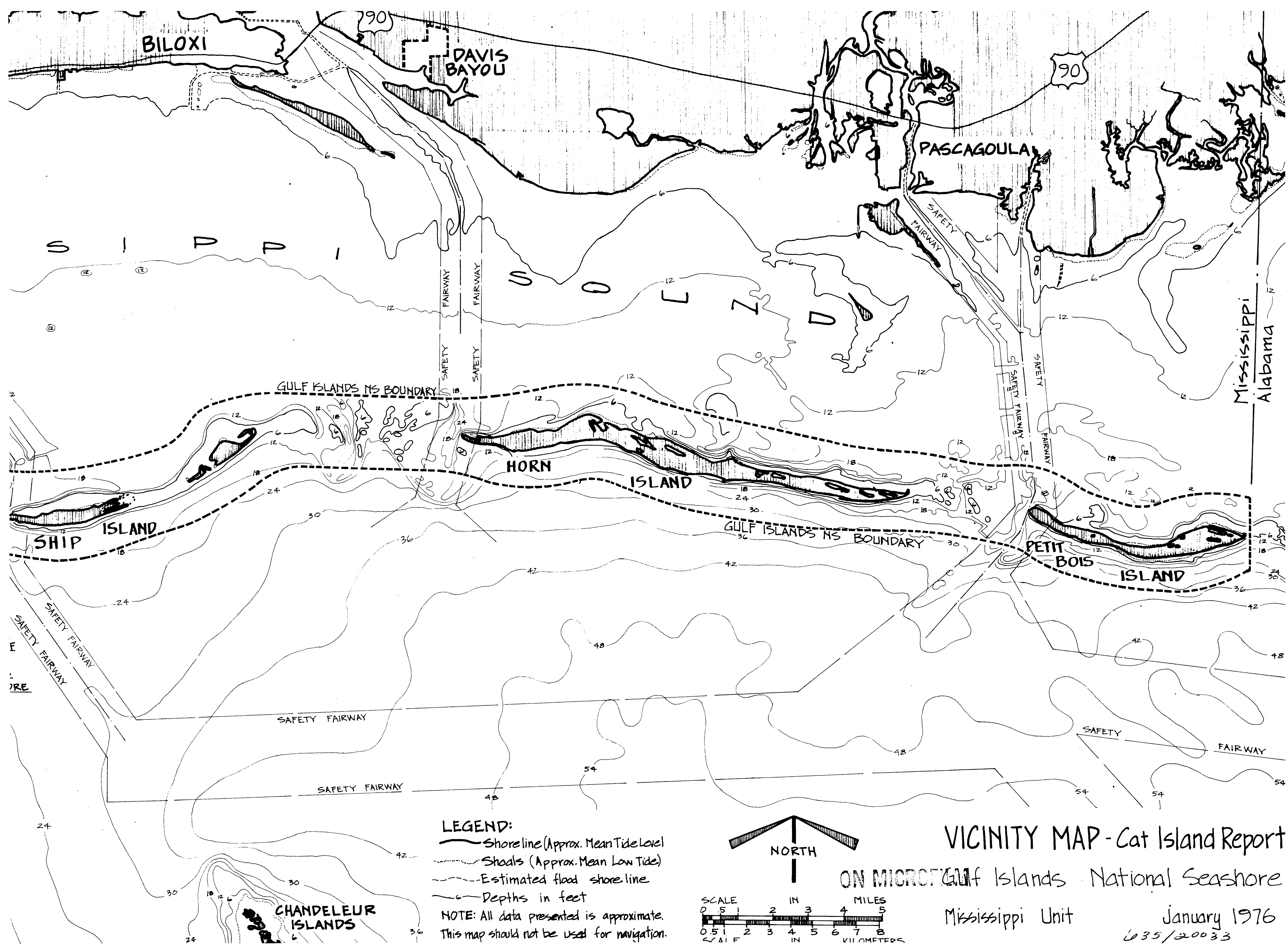
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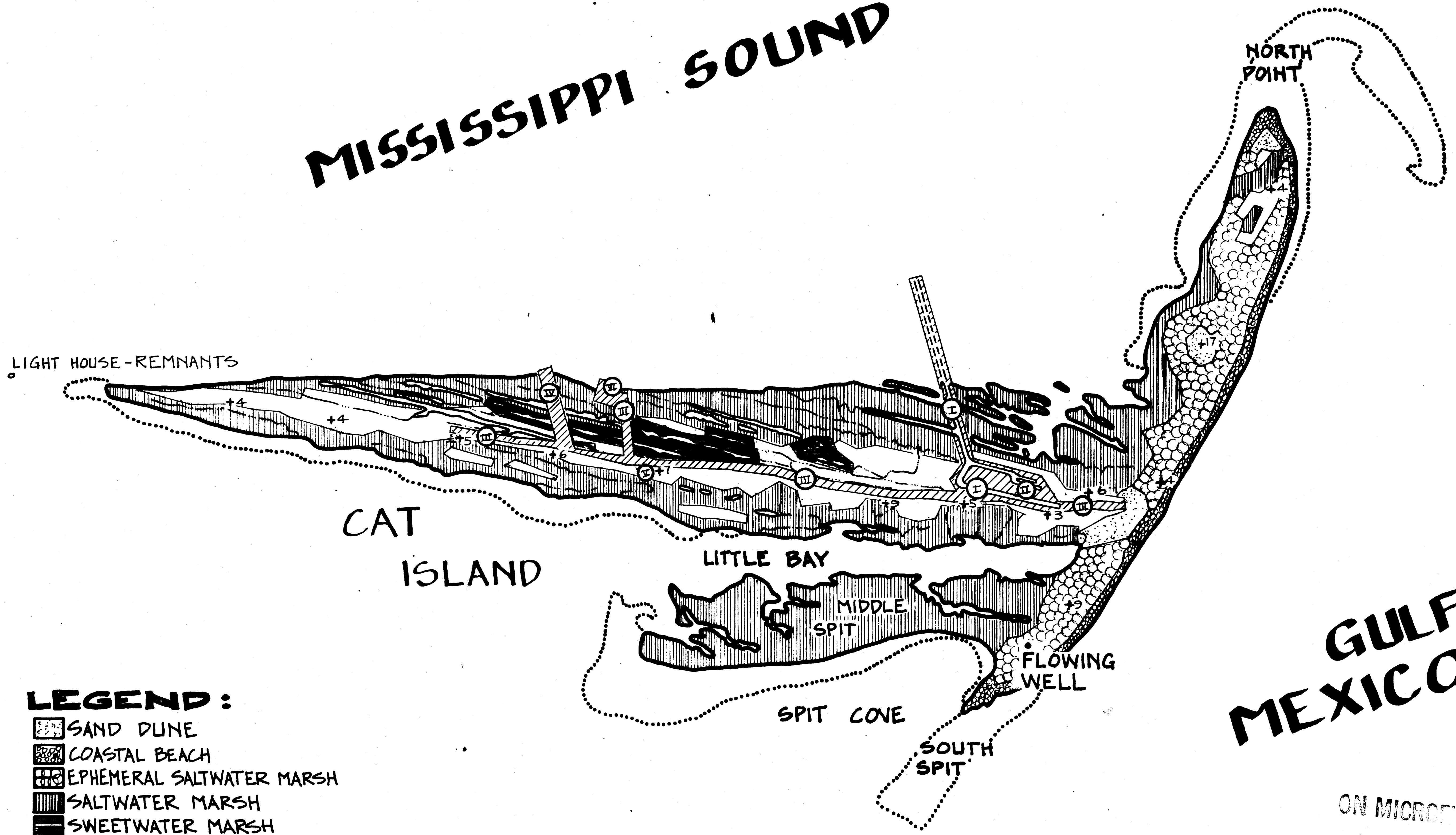
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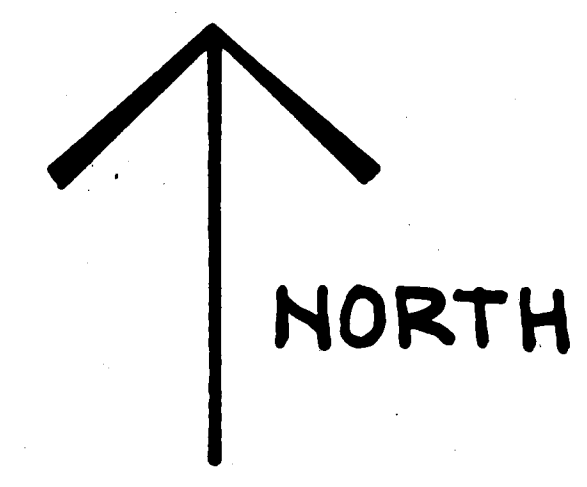
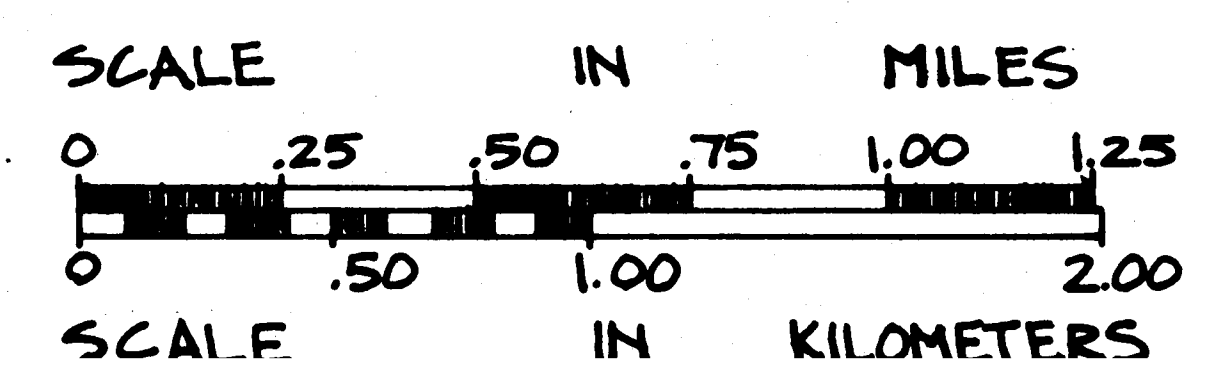


MISSISSIPPI SOUND



LEGEND:

- SAND DUNE
- COASTAL BEACH
- EPHEMERAL SALTWATER MARSH
- SALTWATER MARSH
- SWEETWATER MARSH
- SLASH PINE/PALMETTO WITH LIVE OAK STANDS
- AREAS AFFECTED BY DEVELOPMENT OR USE
- CANAL
- HOUSE
- TRAIL
- CLEARING FOR AIRPORT RUNWAY
- REMNANTS OF DOG TRAINING CAMP
- OLD PARKING LOT



GULF OF MEXICO

ON MICROFILM

ISLAND BASE MAP- Cat Island Report
 Gulf Islands National Seashore
 Mississippi Unit January 1976

MISSISSIPPI SOUND

LIGHT HOUSE-REMNANTS

CAT ISLAND

LITTLE BAY

MIDDLE SPIT

SPIT COVE

SOUTH SPIT

NORTH POINT

DESIGNATED PRIMITIVE CAMPING

GULF OF MEXICO

ON MICROFILM

ENVIRONMENTAL PROTECTION CONCEPT-ALT. I

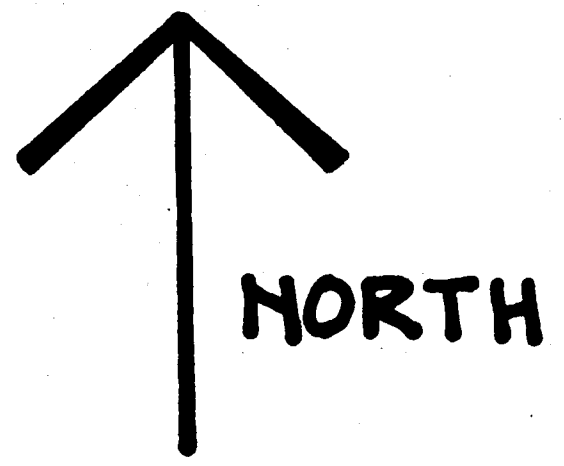
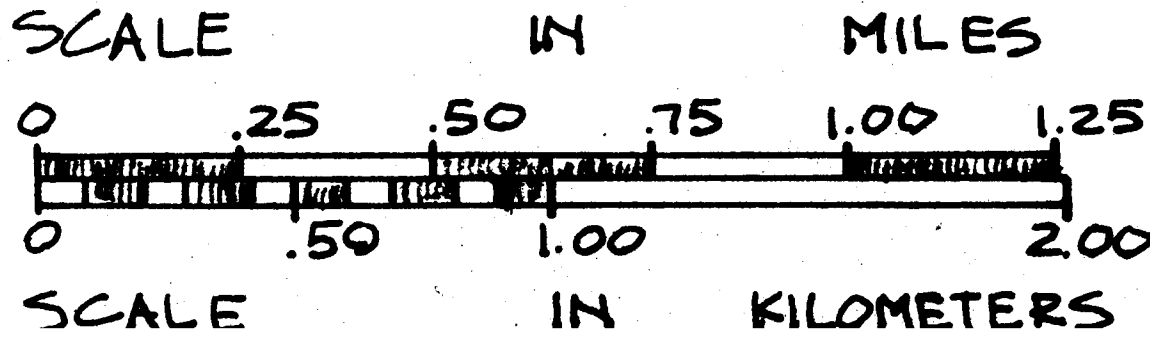
Cat Island Report

Gulf Islands National Seashore

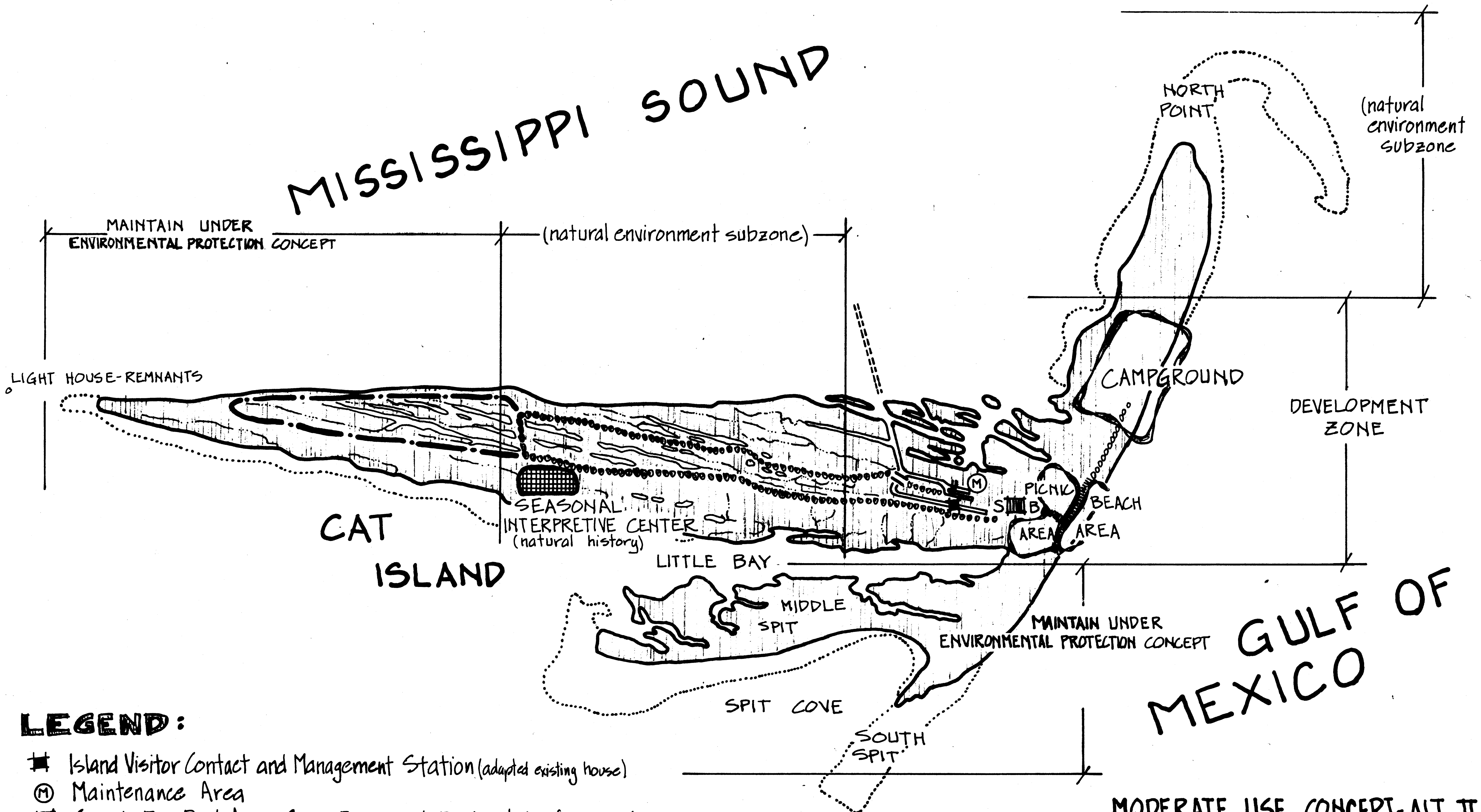
Mississippi Unit January 1976

LEGEND:

- || Canal Plug
- T Toilet
- Existing house to be Ranger station
- Designated Hiking Trail

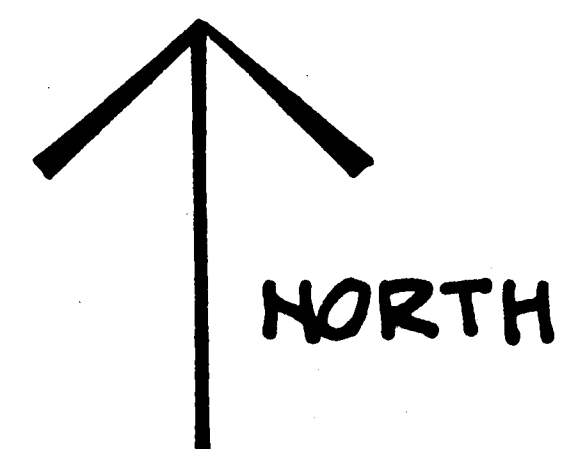
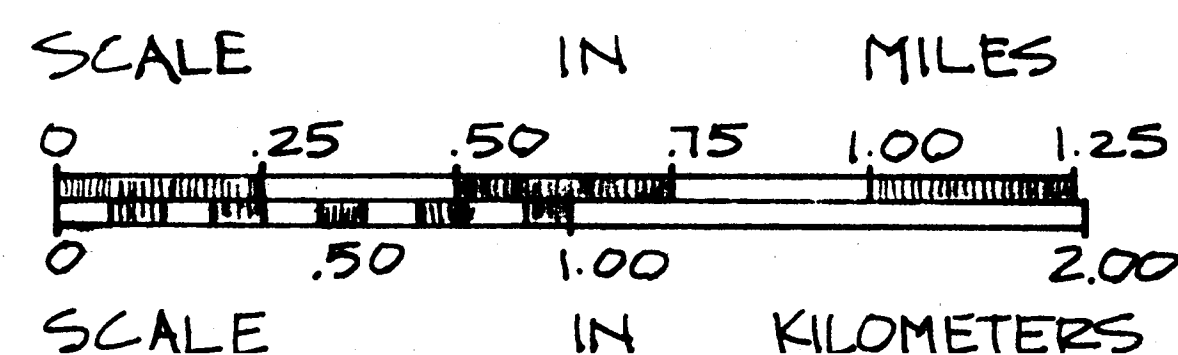


MISSISSIPPI SOUND



LEGEND:

- ★ Island Visitor Contact and Management Station (adapted existing house)
- Ⓜ Maintenance Area
- SB Snack Bar, Rest Area, Camp Equipment Rental, & Comfort Station
- \\ Canal Plugs
- Developed Hiking Trail
- Boardwalk
- Designated Hiking Trail



MODERATE USE CONCEPT-ALT. II

Cat Island Report

Gulf Islands National Seashore

Mississippi Unit January 1976

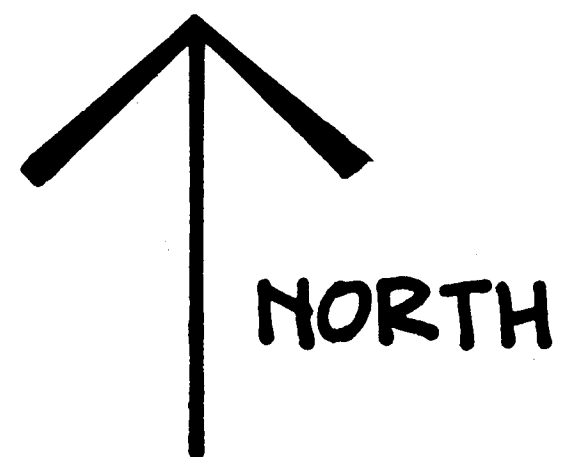
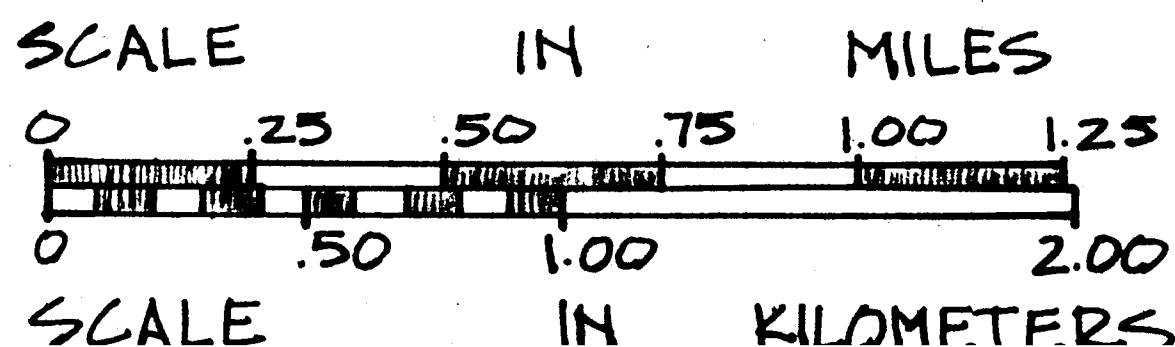
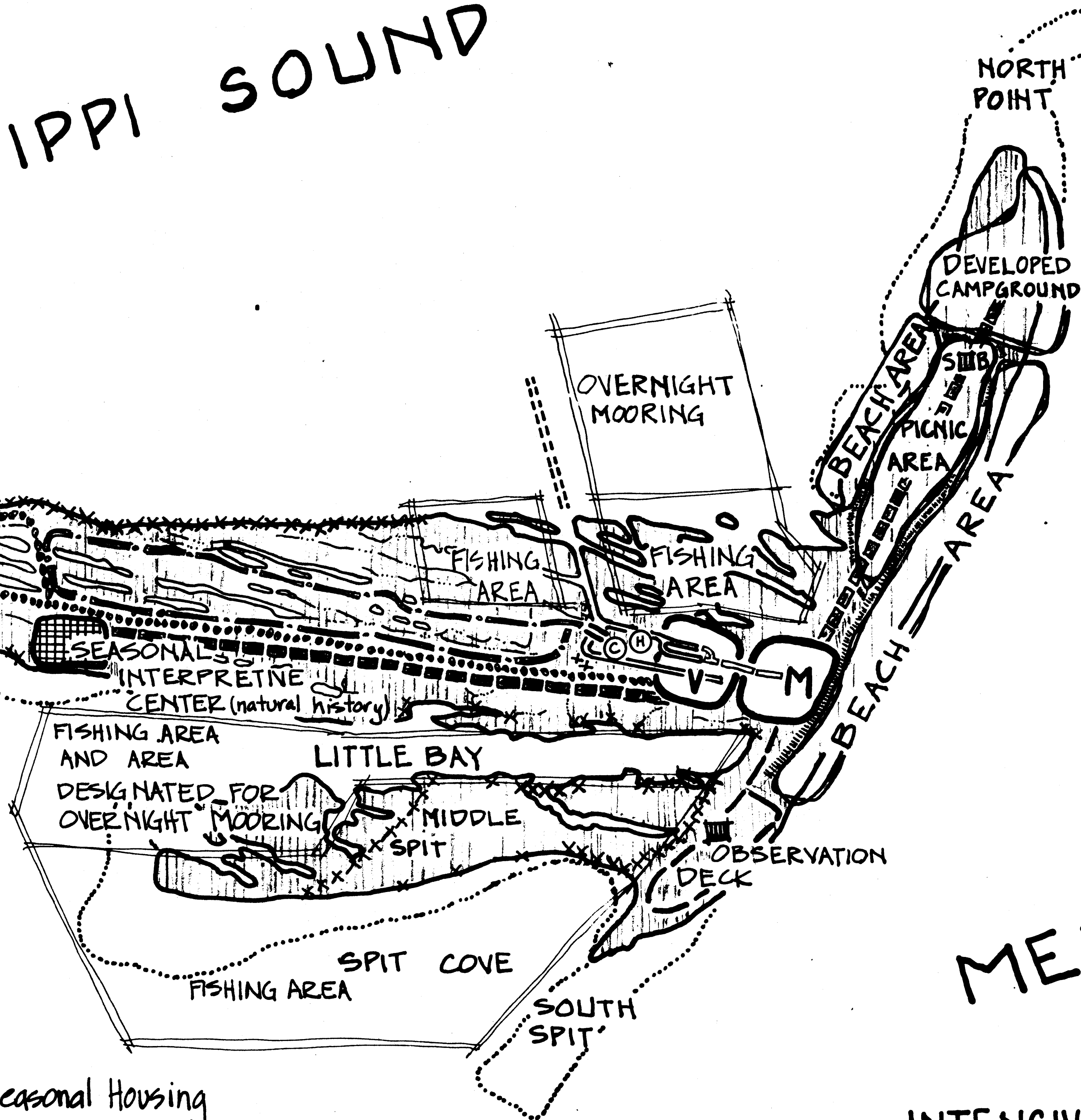
MISSISSIPPI SOUND

LIGHT HOUSE - REMNANTS

CAT ISLAND

LEGEND:

- = Canal Plug
- xxxx Dikes (Mosquito Control)
- ⓂⓈ Horse loading dock - Corral
- = Canal Extension
- M** Motel, Bike Rental, Restaurant, & Marina (small boats)
- Mini-Shuttle Service
- V** Visitor Contact, Maintenance Area, Administrative Area, & Seasonal Housing
- Snack Bar, Rest Area, Comfort Station, & Camp Equipment Rental
- Developed Hiking
- Bike Trail
- Horse Trail
- Boardwalk



GULF OF MEXICO

ON MICROFILM

INTENSIVE USE CONCEPT-ALT. III
Cat Island Report
Gulf Islands National Seashore
Mississippi Unit January 1976
1-35 / 20030