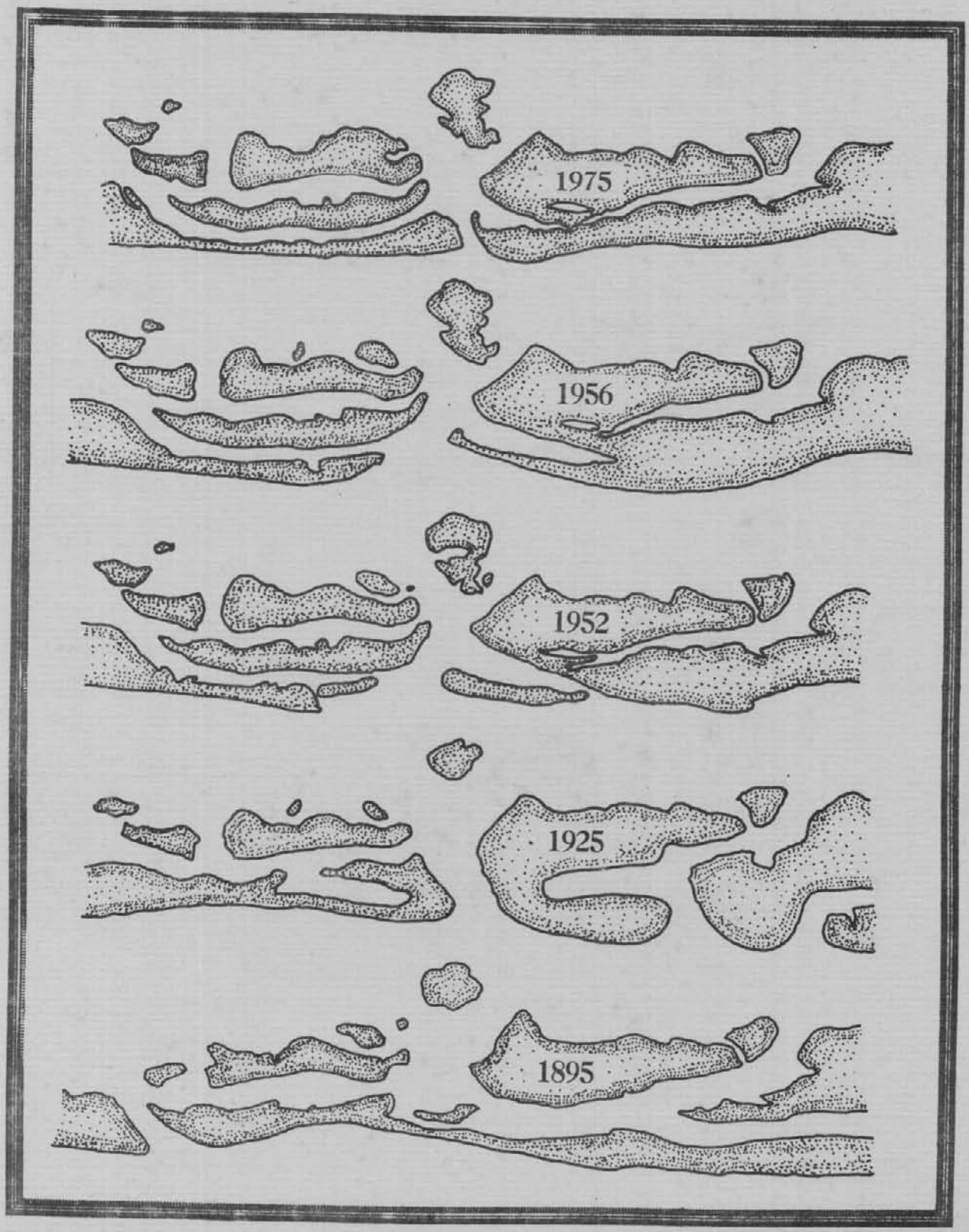
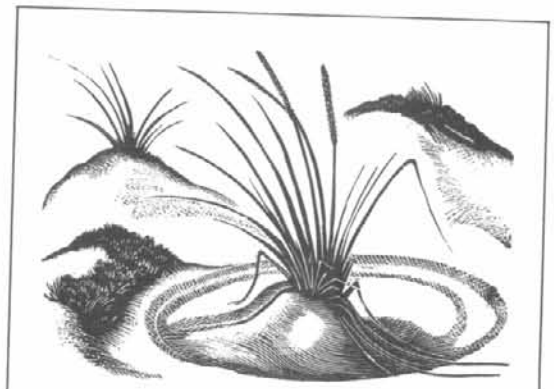
BOTANICAL, GEOLOGICAL, AND SOCIOLOGICAL FACTORS AFFECTING THE MANAGEMENT OF THE BARRIER ISLANDS ADJACENT TO STUMP PASS.



WILLIAM REYNOLDS

NEW COLLEGE OF U.S.F. ENVIORNMENTAL STUDIES PROGRAM



From the bookshelf of

JOHN B. MORRILL

BOTANICAL, GEOLOGICAL AND SOCIOLOGICAL FACTORS AFFECTING THE MANAGEMENT OF THE BARRIER ISLANDS ADJACENT TO STUMP PASS.

WILLIAM REYNOLDS

OCTOBER, 1976

NEW COLLEGE ENVIORNMENTAL STUDIES PROGRAM
5700 NORTH TRAIL
SARASOTA, FLORIDA

ABSTRACT

The purpose of this study was to survey the natural systems of the barrier islands adjacent to Stump Pass, a tidal inlet on Lemon Bay in Charlotte County, Florida, to provide a synopsis of existing and historical conditions, and to examine public use of the area in order to provide an indication of how people would like to use the area. Included are maps and descriptions of the plant communities, maps of the soils, their capabilities and water tables, and maps and discussions of the shoreline changes. The results of a questionnaire survey of the beach users indicate people's attitudes toward the area. General recommendations for the future management of the Port Charlotte Beach State Recreation Area and vicinity are included in the final section.

ACKNOWLEDGEMENTS

This project was partially funded by a Fellowship Grant in Enviornmental Studies from the Jessie Smith Noyes Foundation, and by restricted donations from Mrs. George W. Filson and Mr. and Mrs. W. T. Reynolds, Jr.

A number of people provided valuable assistance in the completion of this report. I would particularly like to thank Dr. John Morrill, Professor of Biology at New College, for his insightful advice, support and patience from the earliest stages of planning to the final publication of this report. Bob Pelham and Dave Whitman, of N.E.W. Aerial Photography, provided an invaluable service by extending the opportunity to take much needed aerial photographs. Warren Henderson, Soils Scientist, and John Pirie, District Conservationist with the U.S. Department of Agriculture, offered expertise in the field studies of the soils and soils interpretations. Dr. Richard Wunderlin, Curator of the Herbarium at the University of South Florida, assisted in the identification of the plants. Ty DuPlanitier, of AeroSpace Engineering Services, was most helpful in the extensive reprographics involved in this project. Jeff Chanton assisted in the questionnaire survey. Dana Rhinehold and Connie Short typed the final manuscript. I would also like to thank the students at New College who assisted in the extensive field studies.

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RECOMMENDATIONS

(see also pages 110 - 116)

1. Encourage the use of boats as the major means of entry to the park area. Discourage, but do not prohibit the use of automobiles as a means of entry to the park.

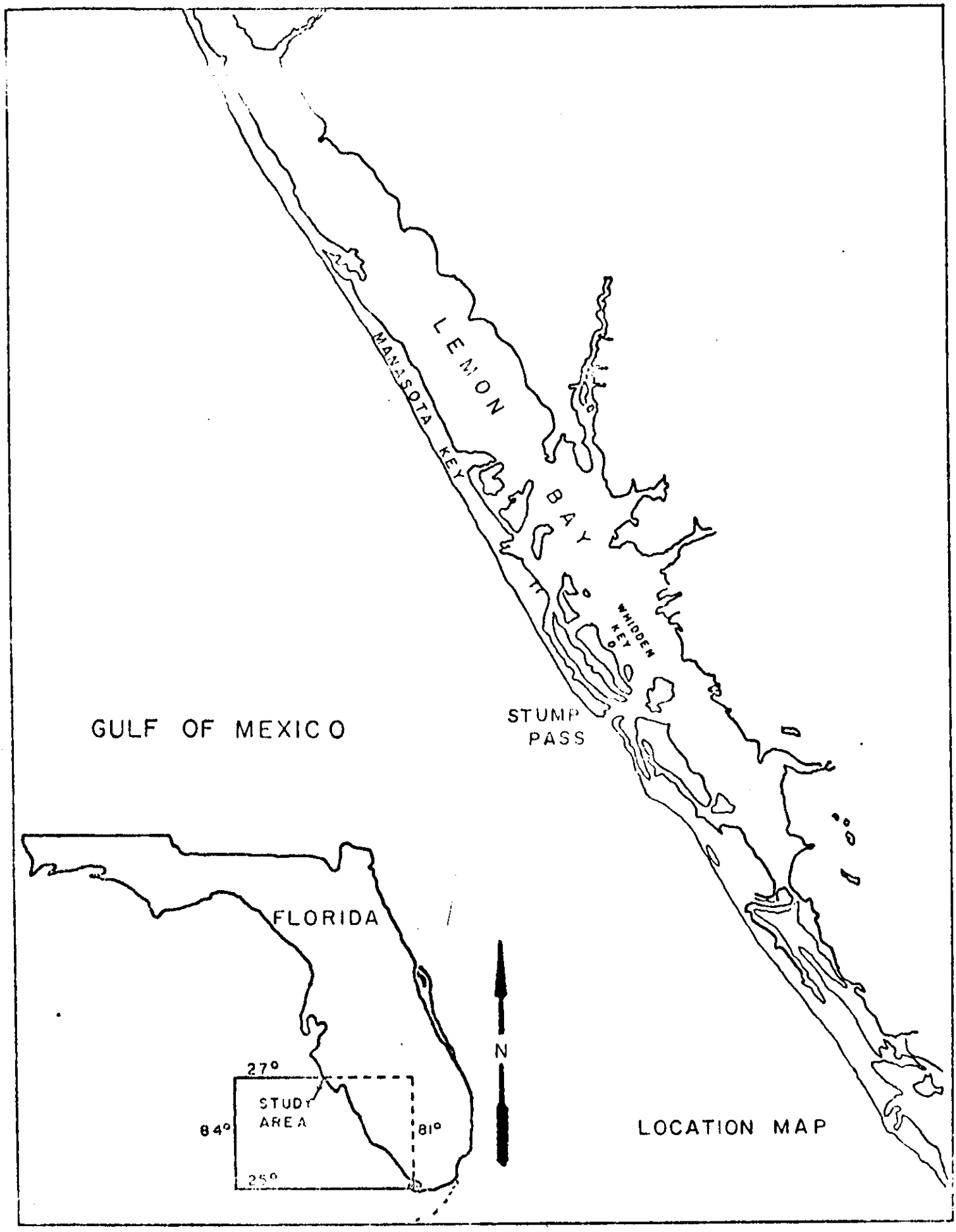
2. The recreation area should be left in an undeveloped condition, with no man-made facilities.

3. Exotic plants, particularly the Australian Pine and the Brazilian Pepper, should be controlled where they are disrupting native plant communities and causing hazardous conditions.

4. Planting of native plants, particularly the Sea Oats, should be made in disturbed and barren areas along Manasota Key.

5. The land adjacent to Stump Pass on the south should remain in an undeveloped state, preferably by means of public acquisition.

6. The name "Port Charlotte Beach State Recreation Area" should be changed to "Stump Pass State Recreation Area" in order to describe more accurately its geographic location.


LEMON BAY
MANASOTA KEY
WHIDDEN KEY
STUMP PASS
GULF OF MEXICO
FLORIDA
27°
STUDY AREA
84°
81°
25°
N
LOCATION MAP

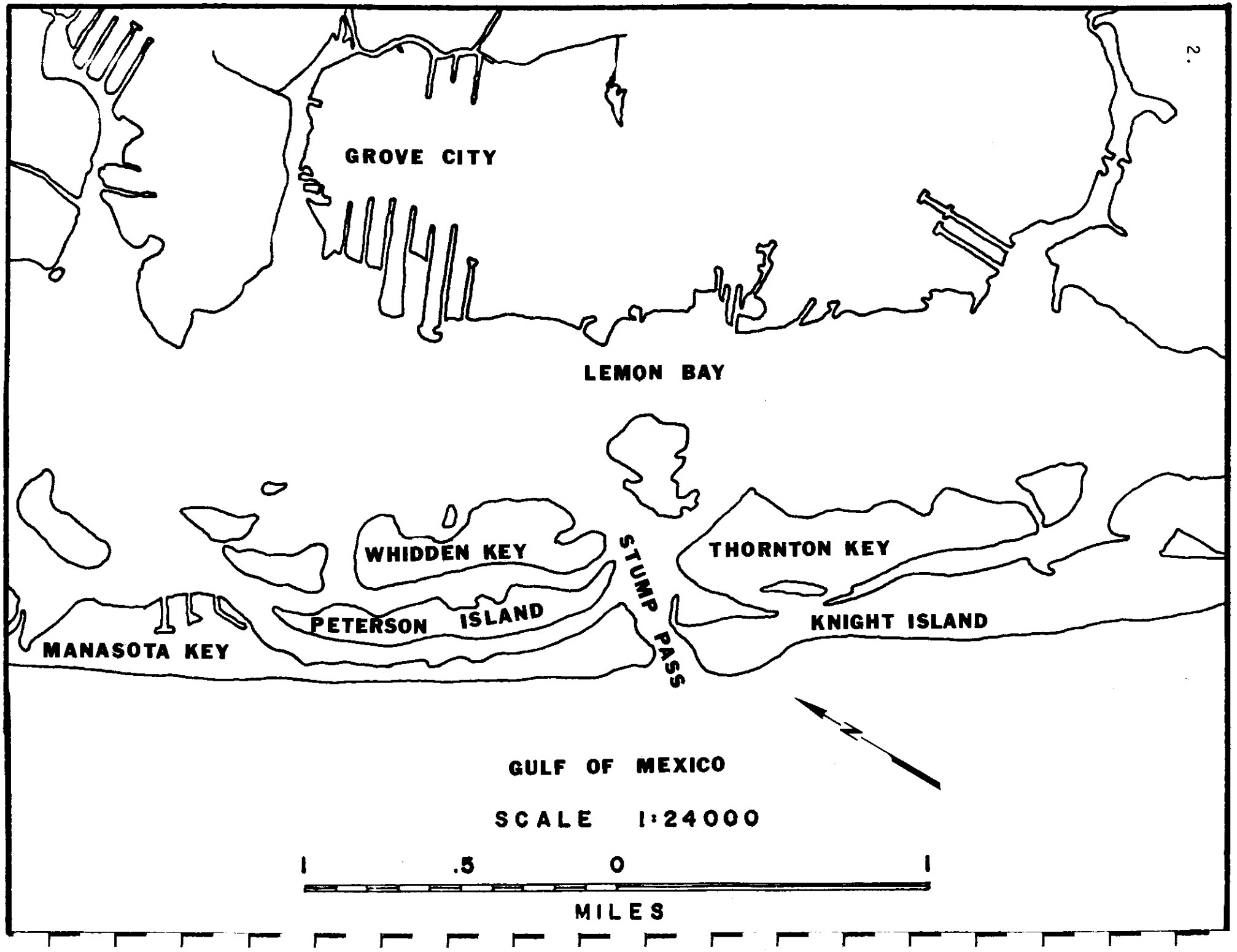
INTRODUCTION

Southwest Florida, with its chain of barrier islands along the Gulf Coast, affords an excellent opportunity for marine oriented recreational pursuits. On the Gulf side of these barrier islands are miles of white, sandy beaches, used by beachcombers, swimmers, and sunbathers. The bays, mangrove wetlands and grass flats between the barrier islands and the mainland are popular and productive areas for sport fishing, shell fishing and commercial fishing. The protected waters of the bay are ideally suited for small boat cruising, sailing, and water skiing. The desire for access to the beaches and island living resulted in the construction of bridges and causeways from the mainland to these barrier islands. The rapid rate of development along the coast during the past decade has left relatively few areas on the barrier islands open to access by the general public.

The area around Stump Pass, near Englewood in Charlotte County, is one place that has escaped the development which has occurred along most of the coast line. The land to the north of Stump Pass was acquired by the State of Florida in 1971 and is identified as Port Charlotte Beach State Park. The land south of Stump Pass is in private ownership, and, although presently undeveloped, is in the preparatory stages of development into a low density residential subdivision.

It is generally accepted that one of the factors necessary for the maintenance of a healthy human environment is open space left in a natural state to serve the dual role of conservation of natural resources and recreation for humans. This affords people the option of the availability of a variety of landscapes and is an important part of the quality of life. To be considered an available option, an open space should be accessible to a broad segment of the population, rather than to a select socio-economic class or special interest group. The area around Stump Pass well fits these conditions. Nearby roads allow access by foot to lower Manasota Key. Boat launches are located within one mile of Stump Pass and the nearby islands. People with a wide variety of interests are attracted to the area: Both commercial and sports fishermen have success fishing in the tidal flow through Stump Pass, and the grass flats found nearby; water skiers and pleasure boaters enjoy the calm waters of the bay; beachcombers and swimmers enjoy the sandy beaches and Gulf waters; and naturalists and birdwatchers find a wide variety of wildlife, plants and birds in the area.

This report focuses on those lands found adjacent to Stump Pass in Charlotte County. These included Whidden Key,


GROVE CITY
LEMON BAY
WHIDDEN KEY
STUMP PASS
THORNTON KEY
PETERSON ISLAND
KNIGHT ISLAND
MANASOTA KEY
GULF OF MEXICO
SCALE 1:24000
1 .5 0 1
MILES

Little Whidden Key, Peterson Island and the lower end of Manasota Key, all of which are located north of Stump Pass. This area is known collectively as Port Charlotte Beach State Recreation Area, and is owned by the State of Florida. South of Stump Pass the study covered Knight Island and Thornton Key, both of which are in private ownership (See Figure opposite for location).

The purpose of the study was to survey the natural systems of the area, to provide a synopsis of existing and historic conditions, to examine public use of the area and to provide an indication of how people have used the site and what they would like to see done in the future.

The natural conditions examined were the Vegetation, the Soil, and the Shoreline History. The section on Vegetation includes a general vegetation map, a description of the communities on the islands, and a taxonomic list of plants collected on the islands. The Soils section discusses the types of soils found on the islands, the depth of the water table at various sites, and the limitations and capabilities of the soils in the study area. The section on Shoreline History describes the shoreline changes that have occurred to Stump Pass since the late 1800's, and illustrates these changes graphically.

The Resource Use Questionnaire describes the results of interviews conducted with people found in the study area during January of 1976. The questionnaire covered topics referring to actual present use, preferences and desires of the people for future use, opinions on shoreline stabilization of the beach, locations of the residences of the people interviewed, and other relevant data.

The final section contains recommendations pertaining to entry to the Port Charlotte Beach Recreation Area, recreational facilities, and protection of the natural systems. The recommendations made are based on the interviews conducted with the people who use the area and the existing and historical natural conditions.

VEGETATION

The vegetation of Florida's coastal barrier islands has been described by various authors (Kurtz, 1942, Davis 1943,1975, and Harper, 1921). Typically the vegetation is classified as being mainly of the littoral formation or the strand formation. The littoral formation consists chiefly of halophytic plants. Mangrove swamps and salt flats are the two major communities of the littoral formation.

The strand formation consists of those plants found growing on the loose sand substrates above the reach of the high tide. Davis (1975) has described three zones in the strand formation.

The pioneer zone occurs along the upper beach and consists largely of grasses and herbs which start the dune-building process. The scrub zone is usually established on the dunes inland from the open beach. The plants of this zone tend to stabilize the dunes built by the pioneer zone. The forest zone is not found in narrow or young dune sites. Where it does occur this zone consists of an open canopy of Sand Pine or Cabbage Palm, with an understory of shrubs and hardwood trees.

METHODS

The plant communities of the islands around Stump Pass were mapped using a variety of techniques and sources. Students in field botany classes at New College, Sarasota, Florida, had collected specimens and mapped portions of the islands around Stump Pass in the Spring and Fall of 1974. These collections provided a basic reference for this study.

Basic community boundaries were outlined from black and white aerial photographs taken February 14, 1972 at a scale of 1 inch = 200 feet. Field surveys were made during October, November, and December of 1975, and January of 1976 for on site determination of communities and collection of plant specimens. A series of false-color infra-red aerial photographs were taken December 4, 1975. These photographs were taken at an altitude of 7,000 feet, perpendicularly focused through a floor hole in a small private airplane. The film used was standard 35 mm Kodak Ektachrome infra red, kept at 0^{o}F. until six hours prior to exposure. The camera used was a Konica single lens reflex 35 mm with a 55 mm f 1.6 Konica lens. The through the lens meter indicated the exposure of 1/500 second at f5.6, with ASA set at 125. The film was processed by Kodak Laboratories.

The mapping was completed by projecting the infra-red slides onto a flat white wall surface and adjusting the size of the image to the scale of 1 inch= 200 feet. The projected image was directly traced onto white tracing paper and inked.

The drawing was photographically reduced to the scale of 1 inch = 400 feet.

RESULTS

Eighty-nine species in 51 families were collected in the study area (Appendix I). Nine distinct plant communities and four miscellaneous areas were distinguished (Appendix II). Each of the communities was found to occur either on the Canaveral Low Soil or on the Canaveral High Soil; no community was found on both.

Communities found on Canaveral High Soils.

Open Dunelet Field - This community occurs on the northern spit of Knight Island and the southern end of Manasota Key. These are the most recently formed land areas and are open to the Gulf winds. Only eight species were found in this association on the north spit of Knight Island. The three dominant plants are Iva, Indigo Berry, and Sea Oats. These plants trap the wind blown sand forming small dunelets up to three feet high and over four feet in breadth.

Sea Oats - The Sea Oats community along with the Open Dunelet Field are the pioneering communities that first colonize the beach fronts. This community is predominately Sea Oats, with scattered Iva and Indigo Berry. It occurs along Manasota Key, and forms longitudinal dune ridges parallel to the shoreline rather than dunelet fields.

Protected Dunelet Field - The Protected Dunelet Field was found inland from the Open Dunelet Field on Knight Island, Peterson Island and certain areas of Manasota Key. Thirty seven species were collected on Peterson Island. The predominate plant of this association is the Seaside Ernode. Clumps of small trees consisting of Sea Grape, Florida Privet, Wax Myrtle, and Cabbage Palm occur scattered throughout this community.

Cabbage Palm Association - This association occurs only on those lands that have been in continuous existence since 1884. The Cabbage Palm is the dominant plant, forming a dense canopy over the smaller trees and shrubs that form the understory. Commonly seen in this community are the Stopper, Myrsine, Wax Myrtle, Sea Grape, Wild Coffee, and Poison Ivy.

Australian Pine - This community consists exclusively of the exotic weed the Australian Pine. It was found along the Gulf beaches and in open areas inland. The trees form a dense canopy and produce a thick layer of litter that is slow to decompose.

Mixed Australian Pine/Native Shrub - In some stands the Australian Pines grew sparsely, and native plants grew amongst Australian Pine. Native shrubs found here included Bay Cedar, Indigo Berry, and Iva.

Open Beach - This area occurred along the Gulf beaches below the pioneering communities and was void of any vascular plants.

Developed - The areas that had been heavily disturbed by construction and landscaping were on Manasota Key, north of the Port Charlotte Beach State Recreation Area.

Communities found on Canaveral Low Soils.

Mangrove - The Mangrove formation was found along the protected bay shores, in areas of regular tidal inundation. Red, Black, and White mangroves were the predominate plants of this community.

Salt Flats - One Salt Flat community was found in areas inundated only by the high high tides. Its makeup varied from barren areas of no vegetation, to exclusive stands of Saltwort or Saltgrass, to stands of mixed Saltwort and dwarfed mangroves. Also commonly found in the Salt Flats were Sea Oxeye, Glasswort, and Christmas Berry.

Buttonwood - The Buttonwood community occurred above the reach of all but most extreme high tides, yet where the ground was moist most of the year. Buttonwood was the most conspicuous plant, with a ground cover of Sea Oxeye, Sea Purslane, Water Pimpernel, or Muhly and other herbs and grasses.

Spoil - The eastern side of Whidden Key was a site of spoil deposition during the construction of the Intracoastal Waterway in 1966. This area consists mainly of opportunistic species of grasses, Brazilian Pepper, Australian Pine, and halophytes around the perimeter of the spoil.

Embayments - Inland bodies of water were found at a number of sites. These were usually highly saline (>40 parts/thousand) bodies of water, connected by limited tidal exchange to Lemon Bay. One small embayment behind the foredune at the north end of Knight Island had no tidal connection and had evidently formed as a result of a storm surge overwash. This was the only site not rimmed with mangroves, but was rimmed with Saltwort and Salt Grass.

DISCUSSION

Succession

A successional series was indicated by the nature of the plant communities on the Canaveral High Soil. The Sea Oats and the Open Dunelet Field make up the primary pioneering stage. These communities occurred only in areas adjacent to the Gulf of Mexico and exposed to the wind and salt spray. The land on which these communities occurred formed, for the most part, within the past 25 years. Diversity was low, and in the Open Dunelet Field about half of the ground has no cover.

The secondary successional stage was seen in the Protected Dunelet Field. This community was best developed on Peterson Island, on land which had been formed about 1930. The number of species formed on the Protected Dunelet Field was greater than the Open Dunelet Field by a factor of about five. The Protected Dunelet Field has some barrier, either distance, dunes, vegetation, or another island, that protects the vegetation from the direct forces of wind and salt spray. Many species of the Cabbage Palm Association are found here, particularly the small trees and shrubs that form the understory, and Cabbage Palms.

The climax of this sere was the Cabbage Palm Association. This community was found only on those areas of Canaveral High Soil which had been in existence continuously since 1884. The ecotone between the Protected Dunelet Field and the Cabbage Palm Association was very distinct; on Peterson Island the edge of the Cabbage Palm Association was like a wall of vegetation.

Exotic Plants

The Australian Pine was the predominant exotic plant found in the vicinity of Stump Pass. It had established primarily on open beaches, spoil banks, and native communities with much open ground. Once established, this plant tended to grow to the exclusion of other species, due to effects of shading, dense leaf litter, and possibly pH and chemical changes in the soil. This is particularly a problem on open beaches and dunes, where a lack of dense ground level foliage and fine net root systems makes the sand subject to erosion. Many Australian Pines have fallen on the beach front along Manasota Key, forcing people to walk inland through dune areas in order to make their way past this disturbed beach site.

The Australian Pine does have some benefits. Its roots contain nitrogen fixing nodules, which may add to the fertility of the soil. People seek the Australian Pine for its shade

and open floor as a site for picnicing and relief from the open sun. Osprey and Kingfishers have been observed using the Australian Pine as a perch while fishing. When dried, the wood of the Australian Pine makes an excellent source of firewood, and its decay resistance makes it a possible source for pilings and rough construction.

The next most conspicuous exotic observed was the Brazilian Pepper. This plant is found most commonly in the Protected Dunelet Field, the Buttonwood Association, and the Cabbage Palm Association. It appeared to establish easily in relatively open areas, but was not successful in dense areas such as the Cabbage Palm Association. However, Brazilain Pepper seedlings were very conspicuous in the pioneering vegetation of a Cabbage Palm Association that had been burned in June of 1974. The Brazilian Pepper is also tolerant of moist ground conditions and was observed growing well in the Buttonwood community and adjacent to Mangroves. Once established the Brazilian Pepper appears to out compete the native vegetation and dominate native communities.

Overwash- Manasota Key has been subject to overtopping by storm tides, particularly along its narrow southern end. Different communities were observed to withstand the erosive effects of the overwash to different degrees. The greatest movement of sand occurred at a site lacking a vegetative cover. Movement of sand through this site was calculated at 4.5 cubic yards/linear foot of beach between February 1972, and October, 1975.

Hurricane Eloise, (September 1975) produced conditions that caused an overwash in two other communities. An exclusive stand of Australian Pines at the north end of Port Charlotte Beach State Recreation Area lost 1.3 cubic yards of sand/linear foot of beach due to the effects of this one moderate storm. A mixed area of Australian Pines, open ground and Sea Oats lost about ½ cubic yards of sand/linear foot of beach during this same storm. Healthy stands of Sea Oats had not been breached. The dense foliage of the plants had interfered with the passage of the waves and caused it to dissipate and deposit sediments among the vegetation. In some places, the dune which had been built by the Sea Oats was simply too high for the waves to overwash.

Human Disturbance - Some damage has been done to the vegetation from the impact of human use. Communities with much ground level foliage are most affected by foot and vehicular traffic. These are the very communities which are the most beneficial in terms of land building processes. Again, the most heavily affected area is at the north end of the park where footpaths have been cut through existing Sea Oat

communities. Occasionally, motor vehicles are illegally driven onto the beach and up into the vegetated areas, causing severe damage in all the communities affected.

These footpaths have opened gulleys through the dunes which allow the passage of storm surge tides and cause erosion to the dunes. In areas that otherwise would be undergoing colonization by pioneering plants, heavy foot traffic inhibits the growth and germination of the plants and maintains the unvegetated state.

In summary, three problem areas exist in the present status of the vegetation of this area. First, the invasion of native plant communities by the Australian Pine and Brazilian Pepper disrupts the integrity of the native communities. This is most troublesome in those areas exposed to the Gulf of Mexico where the native communities are necessary for the stabilization of the dunes. Second, human traffic through the dunes opens footpaths and gulleys which enable the exotic plants to establish and make the dunes susceptible to washouts and erosion. Third, heavy foot traffic in open, unvegetated areas inhibits the germination and growth of pioneering plants, preventing the colonization of the open sites. Eliminating or reducing these problems would help in the stabilization of Mansota Key and be of benefit to the people who use this beach.

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APPENDIX I

CHECKLIST OF VEGETATION

Agavaceae	Agave Family	
Yucca aloifolia L.		Spanish Bayonet
Agave americana L.		Century Plant
Aizoaceae	Carpetweed Family	
Sesuvium portulacastrum (L.) L.		Sea Purslane
Amarathaceae	Amoranth Family	
Philoxerus Vermicularis (L.) R. Brown		Sampire
Alternanthera sp. Fousk		Chaff Flower
Iresiue celosia L.		Blood Leaf
Anacardiaceae	Cashew Family	
Schinus terebinthifolius Radd.		Brazilian Pepper Tree
Toxicodendron radicans (L.) Kuntze ssp. *radicans*		Poison Ivy
Apocynaceae	Oleander Family	
Catharanthus roseus (L.) G. Don		Madagascar Periwinkle
Arecacae	Palm Family	
Sabal palmetto (Walt.) Lodd ex Schultes		Cabbage Palm
Serenoa repens (Bartr.) Small		Saw Palmetto
Avicenniaceae	Black Mangrove Family	
Avicennia germinans (L.)		Black Mangrove
Asclepiadaceae	Milkweed Family	
Cynanchum palustre (Pursh) Heller		
Asteraceae	Aster Family	
Aster tenuifolius L. Var. *aphyllus* R. W. Long		Saltmarsh Aster
Baccharis halimifolia L.		Groundsel Tree
Mikania scandens (L.) Willd.		Climbing Hempweed
Coreopsis leavenworthii T & G.		Tickseed
Solidago sempervirens L. var. *Mexicana* Fern.		Seaside Goldenrod.

Bataceae	Saltwort Family	
Batis maritima L.		Saltwort
Burseraceae	Touchwood Family	
Bursera simaruba (L.) Sarg.		Gumbo Limbo
Cactaceae	Cactus Family	
Opuntia compressa (Salisb.) MacBride var. *austrina* Saml1 (L. Benson)		Prickly Pear
Casuarinaceae	Beefwood Family	
Casuarina equisetifolia Foust.		Australian Pine
Chenopodiaceae	Goosefoot Family	
Salicornia virginica L.		Glasswort
Suaeda linearis (Ell.) Moq.		Sea Blite
Combretaceae	Combretum Family	
Conocarpus erectus L.		Buttonwood
Laguncularia racemosa Gaertn.		White Mangrove

Commelinaceae	Spiderwort Family	
Commelina erecta L. var. augustifolia (Mich.) Fern.		Day Flower
Convolvulaceae	Morning Glory Family	
Ipomoea pes caprae (L.) R. Brown var. *emarginata* Hall		Railroad Vine
Crassulaceae	Orpine Family	
Bryophyllum pinnatum (Larn.) Kurz		Life Plant
Cucurbitaceae	Gourd Family	
Momordica charantia L.		Wild Balsam Apple
Cupressaceae	Cypress Family	
Juniperus silicicola (Saml1) Bailey		Southern Red Cedar

Cycadaceae	Cycad Family	
Zamia pumila L.		Coontie
Davalliaceae		
Nephrolepsis sp.		Boston Fern
Euphorbiaceae	Spurge Family	
Poinsettia heterophylla (L.) Kl. & Gke.		Painted Leaf
Cuoton punctatus Jacq.		Coastal Croton
Phyllanthus urinaria L.		
Chamaesyce mesembryanthemifolia (Jacq.) Dugand		
Chamaesyce pouteviana Small		
Fabaceae	Pea Family	
Sophora tomentosa L.		Necklace Pod
Vigna luteola (Jacq.) Benth.		Cow Pea
Dalbergia ecastophyllum (L.) Benth.		Coin Vine
Gentianaceae	Gentian Family	
Eustoma exaltum (L.) Grigeb.		
Goodeniaceae	Goodenia Family	
Scaevola plumieri (L.) Vahl		Indigo Berry
Lamiaceae	Mint Family	
Trichostema suffrutesceus Kearney		Blue Curls
Salvia coccinea Bochuz		Sage
Moraceae		
Ficus aurea Nutt.		
Myricaceae	Bayberry Family	
Myrica cerifera L.		Wax Myrtle
Myusinaceae	Myrsine Family	
Myrsine guianensis (Anbl.) Kuntze		Myrsine
Ardisia escallonioides Schlecht. & Cham.		Marlberry
Myrtaceae		
Eugenia axillaris (Sw.) Willd.		White Stopper

Oleaceae		
	Foresteria segregata (Jacq.) Krug & Urban	Florida Privet
Onagraceae		
	Oenothera numifusa Nutt.	Seaside Evening Primrose
Phytolaccaceae	Pokeweed Family	
	Phytolacca americana L.	Pokeweed
Pinaceae	Pine Family	
	Pinus elliotti Engelm.	Slash Pine
Plumbaginaceae		
	Limonium cardinianum (Walt.) Britt	Sea Lavender
Poaceae	Grass Family	
	Distichlis spicata (L.) Greene	Salt Grass
	Cenchrus L. sp.	Sandspur
	Chloris neglecta Nash	Finger Grass
	Muhlenbergia capillaris (Larn.) Trin.	Muhly
	Paspalum vaginatum Swartz	Salt Jointgrass
	Setaria geniculata (Larn.) Beauv.	Foxtail
	Spartina alterniflora Loisl.	Smooth Cordgrass
	Sporobolus virginicus (L.) Kunth	Virginia Dropseed
	Uniola paniculata L.	Sea Oats
Polygalaceae	Milkwort Family	
	Polygala balwinii Nutt.	White Bachelor's Button
	Polygala grandiflora Walt. var. *augustifolia* T & G.	
	Polygala grandiflora Walt. var. *leiodes* Blake	
Polygonaceae	Buckwheat Family	
	Coccoloba uvifera (L.) L.	Sea grape
Portulacaceae		
	Portulaca phaeosperma Urban	Purslane
Primulaceae		
	Samolus ebracteatus HBK	Water Pimpernel

Rhizophoraceae	Red Mangrove Family	
Rhizophora mangle L.		Red Mangrove
Rubiaceae	Madder Family	
Chiococca alba (L.) Hitchc.		Snowberry
Ernodea littoralis Sw. var. *augusta* (Samll) R. W. Long		Seaside Ernode
Psychotria undata Jacq.		Wild Coffee
Randia aculeata L.		White Indigo Berry
Rutaceae	Rue Family	
Zanthoxylum clava-herculis L.		Hercules Club
Sapotaceae	Sapodilla Family	
Bumelia celastrina HBK		Saffron Plum
Smilacaceae	Smilax Family	
Smilax auriculata Walt.		Greenbriar
Solanaceae	Nightshade Family	
Lycium carolinianum Walt.		Christmas Berry
Physalis viscosa L.		Ground Cherry
Solanum americanum Mill.		Common Nightshade
Surianaceae	Bay Cedar Family	
Suriana maritima L.		Bay Cedar
Verbenaceae	Verbena Family	
Lantana involucrata L.		Lantana
Vittariaceae		
Vittaria lineata (L.) Sm		Shoestring Fern

COMMON PLANTS OF THE NATIVE COMMUNITIES

CABBAGE PALM

Sabal palmetto
Coccoloba uvifera
Myrsine guianensis
Yucca aloifolia
Chiococca alba
Myrsine guianensis
Psychotria undata
Toxicodendron radicans
Lantana involucrata
Schinus terebinthifolius
Bumelia celastrina
Randia aculeata
Sophora tomentosa
Forestiera segregata
Smilax sp.
Uniola paniculata
Caesalpina crista

OPEN DUNELET FIELD

Iva imbricata
Uniola paniculata
Scaevola plumieri
Chloris petraea
Sporobolis virginicus
Oenothera humifusa
Portulaca phaeosperma

PROTECTED DUNELET FIELD

Ernodea littoralis
Uniola paniculata
Coccoloba uvifera
Opuntia commpressa
Lantana involucrata
Chloris petraea
Oenothera humifusa
Portulaca phaeosperma
Forestiera segregata
Sabal palmetto
Yucca aloifolia
Smilax sp.
Muhlenbergia sp.
Physalis viscosa
Monarda punctata
Philoxerus vermicularis

SEA OATS

Uniola paniculata
Iva imbricata
Scaevola plumieri

MANGROVE

Rhizophora mangle
Avicennia germinans
Laguncularia racemosa
Suadea linearis

BUTTONWOOD

Conocarpus erectus
Muhlenbergia sp.
Spartina patens
Eustoma exalta
Baccharis halimifolia
Samolus ebracteatus

SALT FLATS

Batis maritima
Sesuvium portulacastrum
Salicornia virginica
Distichlis spicata
Paspalum vaginatum
Sporobolus virginicus

APPENDIX II

Map of the Vegetation Communities Described in the Vicinity of Stump Pass.

SCALE 1:4800

KEY TO THE VEGETATION MAP

Those communities found predominately on Canaveral High soils:

 ..... Cabbage Palm

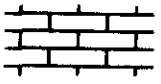
 ..... Open Dunelet Field

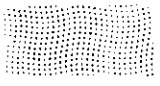
 .....Protected Dunelet Field

 ..... Australian Pine

 ..... Mixed Australian Pine/Native Shrubs

 ..... Sea Oats

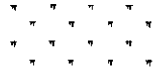
 ..... Developed

 ..... Open Beach

Those communities found predominately on Canaveral Low soils:

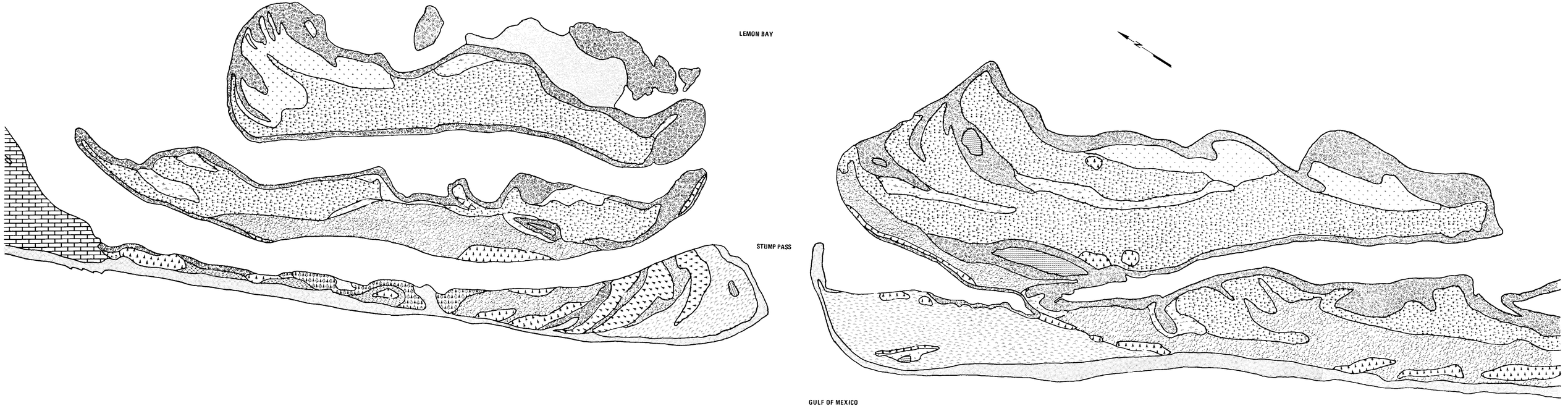
 ..... Mangrove

 ..... Buttonwood

 ..... Salt Flats

 ..... Spoil Deposition

 ..... Embayments


LEMON BAY
STUMP PASS
GULF OF MEXICO

SOILS

The soils of the coastal barrier islands of Southwest Florida are relatively young soils, lacking well developed horizons. The coastal beach soils are composed predominately of fine quartz sand and calcareous shell material deposited by wind and wave action. The proportionof sand and shell in coastal soils varies. Most are mixtures of shells, shell fragments, and fine sand; however, pure sediments of both shell material and sand are common. Little organic matter occurs in these young sandy soils.

The interpretations of soils by the Soil Conservation Service of the U.S. Department of Agriculture point out the general capabilities of the soils and their potential for development under various management practices. Since the soil survey for Charlotte County is not yet published, on site field inspections were required to determine the specific soil speciesof the study area.

METHODS

Field sampling was conducted on January 15 and 16, 1976, with the assistance of Warren Henderson, Soils Scientist, and John Pirie, District Conservationist, both of the Soils Conservation Service, U.S. Department of Agriculture, in Charlotte County. Rainfall for the 45 day period prior to the sample dates was 0.81 inches at the United States Weather Station, Page Field, in Fort Myers. This is 1.29 inches below normal rainfall for this time of year. As the major source of recharge for the fresh water lens is precipitation, this below normal rainfall would result in a lowered water table. The indicated seasonal high water table was determined by Mr. Henderson's analysis of the streaking and mottling in the soil, which indicate the presence of a water table.

Fourty-one three inch diameter cores were drilled to the depth of the existing water table. Sites were selected on Peterson Island, Manasota Key, Thornton Key and Knight Island (see Appendix III and Table1) in order to obtain adequate representation of conditions under the different plant communities.

RESULTS

All of the samples were of the Canaveral Series, a sandy soil mixed with shell fragments and little organic material. The texture ranged from fine sand to coarse sand; the shell particles were stratified or homogeneously mixed through the soil. The Canaveral Series is mildly alkaline and moderately well drained, although drainage is limited by the shallow water table.

Two types of the Canaveral Series were found. The Canaveral Series (Low) has a seasonally high water table within 10 inches of the surface, while the Canaveral Series (High) has a seasonally high water table from 10 to 40 inches deep.

The boundaries of the Canaveral Series (Low) were found to be the same as the boundaries of those plant communities that are tolerant of excessively wet or flooded conditions. These communities were the Mangrove, Buttonwood, and Salt Flat communities which are described in the Vegetation section.

The boundaries of the Canaveral Series (High) were the same as the vegetation communities that cannot withstand the flooding or saline conditions of the Canaveral Series (Low) in this area. The communities found in association with the Canaveral Series (High) were the Cabbage Palm, Sea Oats, Open Dunelet Field, Protected Dunelet Field, Australian Pine, Mixed Australian Pine/Native Shrub, and Open Beach communities.

Table I shows the depth of water table as measured on January 15 and 16, 1976, and the depth of the Seasonal High water table for each sample as indicated by the streaking of the soil. The lowest areas of the Canaveral Series (Low) were found in the Mangrove and Salt Flat communities, and were flooded by the high tides during the two days of on site inspection. Higher elevations in the Buttonwood community showed evidence of tidal flooding or standing water which probably occur during the highest high tides in the Spring and the Summer rainy season. No evidence of recent flooding or tidal inundation was found in the area of Canaveral Series (High).

Definite ecotones marked the boundaries between the Canaveral Series (Low) and Canaveral Series (High) soils. This was particularly evident in those areas where old shorelines had formed alternating lines of ridges and swales, such as on the north end of Thornton Key. The Canaveral Series (Low) occurred in those areas low in elevation which were subject to tidal flooding or accumulation of rainwater runoff during the rainy season. The Canaveral Series (High) occurred in those areas of higher elevation, above the reach of the tides and where water could not accumulate during heavy rains.

DISCUSSION

The Soil Interpretation Sheets for this soil prepared by the Soil Conservation Service are included in the Soils Appendix. Soil limitations for various purposes are rated as slight, moderate, or severe, according to the degree of limitation. A rating of severe indicates that the properties of the soil are so unfavorable for the intended use as to require major soil reclamation, special designs or intensive maintenance. The Canaveral Series is rated severe in many catagories of concern in the vicinity of Stump Pass.

Flooding is a particular concern for this soil. Under adverse weather conditions both the Canaveral High and Low would be subject to flooding. Tides do not normally affect the Canaveral High except on open beaches; however, much of the Canaveral Low soil is flooded during periods of high tide.

Septic tank absorption fields and trench-type sanitary landfills are rated as severe due primarily to the shallow depth of the water table, the susceptibility of flooding, and excessive seepage of effluents through this highly permeable soil. Shallow excavations and small buildings are also rated severe due to susceptibility to flooding and wetness, which affect the ability of the soil to support a load.

All of the catagories of Recreation are rated as severe according to the Soil Conservation Service. The best soils for Camping Areas have a good vegetative cover that can be maintained, are free from flooding, have a firm surface texture, and can support heavy foot traffic and parking. The Canaveral soil fills none of these requirements. Picnic Areas and Paths and Trails have somewhat similar requirements as Camping Areas. In addition the sandy nature of the soil affects the ease of walking on this soil.

The ratings provided in the Interpretation Sheets are of a general nature and may not apply in specific cases. Under proper conditions severe limitations can be overcome and the soil engineered to withstand a use for which it is not naturally suited. Much construction has taken place on Canaveral Series soils on sites such as Lido Key in Sarasota County, where high rise condominiums are found immediately adjacent to the beaches. At Englewood Public Beach picnic tables, showers and parking lots were constructed on the Canaveral Series soils. However, these areas are still subject to damaging affects of conditions beyond human control. Flooding, particularly during storms, and severe shoreline changes have an adverse effect on the study area (see the section on Shoreline History). The use of septic tanks in the Canaveral Series soil is questionable. The rapid permeability of this soil combined with its susceptibility to flooding indicates the likelihood of failure of this type of sewage treatment. Manasota Key is especially vulnerable to these adverse natural forces, and any construction which

would harm the dunes or vegetation there would make the key even more susceptible to storm damage. Other sites on Peterson Island and Whidden Key are better suited for limited construction of facilities such as primitive campsites, however the need for facilities there is questionable (See the section on Survey of Beach Users).

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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE P.O. Box 687, Punta Gorda, Florida 33950
A.C. 813 - 639-6233

January 23, 1976

Mr. Chip Reynolds
New College Environmental Studies Program
Post Office Box 1898
Sarasota, Florida 33578

Dear Chip,

Under the section on flooding (X) on the interpretation sheet, these soils were rated as having "none". It should be noted that under adverse weather conditions, both the Canaveral fine sand (high) and (low) would probably be flooded. Much of the Canaveral fine sand (low) is submerged during periods of high tide. The high tide does not normally affect the Canaveral fine sand (high) except on beaches immediately adjacent to the Gulf and In-lets.

Sincerely,

Warren G. Henderson
Soil Scientist

WGH:jas

Enclosures

USE AND EXPLANATION OF SOIL INTERPRETATION SHEETS

INTRODUCTION

The interpretation sheets provide information about the physical and chemical properties of soils, the suitability and major features affecting soils as resource material, the capability, soil loss factors, and potential yields of soils, and where applicable, information on the use of soils for range. Ratings as to the soils degree of limitations for selected uses and the major soil features affecting each of these uses are provided, and in addition the soils are rated as to their suitability for wildlife and suitability for woodland.

The interpretations will not eliminate the need for on-site sampling, testing, and study of specific sites for design and construction of engineering works and various uses. The interpretation sheets should be used primarily to plan more detailed field investigations to determine the conditions of the soil at the proposed site for the intended use.

The interpretation sheets should be used only with soil surveys of medium or detailed intensity, that have been prepared according to standard procedures of the National Cooperative Soil Survey. It is not intended that they be used with "Land-Type Surveys", low intensity surveys, or general soil maps. The interpretations are for soils in their natural state and not for disturbed areas that are altered by cut or fill operations.

When the interpretation sheets are used in connection with delineated soil areas on soil maps, the information pertains to the dominant soil for which the soil area is named. Other soils, too small in area to map out, may occur within the soil map area. The interpretations ordinarily do not apply to the included soils. More detailed studies are required if small, specific sites are to be developed or used within a given soil area. For example, a soil map bearing the name Lakeland sand, 5 to 12 percent slopes, also can include small, unmappable areas of other soils, such as Lucy and Troup. The interpretations apply only to the Lakeland part of the delineated soil area, and not to the entire soil area.

ESTIMATED PHYSICAL AND CHEMICAL PROPERTIES

INTRODUCTION

The interpretation sheets start with a brief description of the soil. This description is designed to give the user a mental picture of the soil. Following this the measured and estimated physical and chemical properties are shown in table form. These properties are given for specific soil series. Although the soils bearing the same name are similar between counties and States, the physical and chemical properties of these soils may vary somewhat from one county to another and one State to another, but the properties should still be within the range shown in the table. For some soils some of the physical and chemical properties are based on test data; in others these properties are estimates using the best available data.

EXPLANATION OF ITEMS

Major Soil Horizons - The depth in inches of the major soil horizons that have similar properties are given in this column.

USDA Texture - The USDA texture is based on the relative amounts of sand, silt, and clay in a soil, giving rise to textural classes such as sand, sandy loam, loam, clay loam, and clay. (USDA Handbook No. 18, SOIL SURVEY MANUAL).

Unified Classification - In the Unified system soils are classified according to particle size distribution, plasticity, liquid limit, and organic matter. Soils are grouped in 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes are designated by symbols for both classes; for example, SP-SM.

AASHO Classification - The AASHO system is used to classify soils according to those properties that affect use in highway construction and maintenance. In this system, a soil is placed in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. In group A-1 are gravelly soils of high bearing strength, or the best soils for subgrade (foundation). At the other extreme, in group A-7, are clay soils that have low strength when wet and that are the poorest soils for subgrade. The A-1, A-2, and A-7

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groups can be further divided as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6.

Coarse Fraction, Percentage of Material Greater than 3 Inches - Most soils in Florida do not have material this coarse. Soils that have a high content of shell may have a small percentage of shells larger than 3 inches. Soils in Florida that contain pebbles larger than 3 inches are rare.

Percentage Less Than 3 Inches Passing Sieve No. - The measured or estimated percentages of materials passing the numbers 4, 10, 40, and 200 sieves are given for each major horizon. The percent passing the 200 sieve approximates the amount of silt and clay, but does include some very fine sand. A range is listed because of the variability for a given soil.

Liquid Limit and Plasticity Index - These indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to a plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from the semisolid to plastic state; and the liquid limit from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

Permeability - That quality of a soil that enables it to transmit water or air. Values listed are estimates of the range in rate and time it takes for downward movement of water in the major soil layers when saturated, but allowed to drain freely. The estimates are based on soil texture, soil structure, available data on permeability and infiltration tests, and drainage observations of the water movement through soils. On a given soil, percolation through the surface layer varies according to land use and management as well as with initial moisture content.

Available Water Capacity - the ability of soils to hold water for use by most plants. The available water capacity is given in inches per inch of soil for the major horizons. It is commonly defined as the difference between field capacity (1/3 atmosphere) and the wilting percentage (15 atmospheres) times bulk density times the thickness in inches of the soil. The water retention by soil is related to the particle size and to the arrangement and size of soil pores. Fine-textured soils tend to have higher water retention due to small pores than do sandy soils with large pores. Estimates of the available water capacity for soils with normally high water tables may appear meaningless until one considers the possibility of artificial drainage or the natural lowering of the water table during dry seasons, or late summer or fall. Soils of the same series vary from place to place. Therefore, values can deviate considerably from those listed.

Soil Reaction - is the degree of acidity or alkalinity of a soil. It is expressed in pH -- the logarithm of the reciprocal of the H-ion concentration. A soil that tests to pH 7.0 is precisely neutral in reaction because it is neither acid nor alkaline. In words, the degrees of acidity or alkalinity are expressed thus:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Shrink-swell Potential - is the relative change in volume to be expected of soil material with changes in moisture content; that is, the extent to which the soil shrinks as it dries out or swells when it gets wet. Extent of shrinking and swelling is influenced by the amount and kind of clay in the soil. Shrinking and swelling of soils cause much damage to building foundations, roads, and other structures. A high shrink-swell potential indicates a hazard to maintenance of structures built in, on, or with material having this rating.

Depth to Rock - Unless otherwise specified, this refers to the depth to hard bedrock. Many soils in Florida are designated as being rock free; in these soils the bedrock is so deep that reasonably accurate estimates of actual depth cannot be made.

Flood Hazard - This refers to water standing above the soil surface for some length of time. In Florida this is most common in depressions or low areas without outlets. Soils next to or near streams that overflow also have a flood hazard. Soils that have a water table at the surface and standing water on the surface only 2 or 3 inches deep for short periods are not described as having a flood hazard.

Wetness - The wetness is described in terms of the depth to seasonal high water table. This is the highest level that ground water reaches in the soil in most years.

Hydrologic Group - Soils are grouped into four hydrologic soil groups, A through D. These groups are used mostly in watershed planning to estimate runoff from rainfall. Soil properties were considered that influence the minimum rate of infiltration obtained for a bare soil after prolonged wetting. These properties are: depth to seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a layer or layers that slow or impede water movement.

Dual hydrologic groups are given for wet soils rated D in their natural condition that can be adequately drained. It is considered that drainage is feasible and practical and that drainage improves the hydrologic group by at least two classes (from D to A or B). The first letter applies to the drained condition.

Hydrologic group A - (Low runoff potential) Soils that have high infiltration rates even when thoroughly wetted and a high rate of water transmission.

Hydrologic group B - (Moderately low runoff potential) Soils that have moderate infiltration rates when thoroughly wetted and a moderate rate of water transmission.

Hydrologic group C - (Moderately high runoff potential) Soils that have slow infiltration rates when thoroughly wetted and a slow rate of water transmission.

Hydrologic group D - (High runoff potential) Soils having very slow infiltration rates when thoroughly wetted and a very slow rate of water transmission.

SUITABILITY AND MAJOR FEATURES AFFECTING SOIL AS RESOURCE MATERIAL

EXPLANATION OF ITEMS

Topsoil - as used here refers to soil material to spread over barren surfaces, usually made barren by construction, so as to improve soil conditions for re-establishment and maintenance of adopted vegetation; and to improve soil conditions on lawns, gardens, and flower beds where vegetation already may exist. Good topsoil has physical, chemical, and biological characteristics favorable for the establishment and growth of adopted plants. It is friable and easy to handle and spread. A high content of plant nutrients in good balance is desirable, but it is less important than responsiveness to fertilization, and to liming, too, if pH adjustments are necessary. Usually only the surface layer is rated, but if the subsoil is better than the surface soil it is rated. The reclaimability of the remaining soil is considered in the rating. The rating terms used are: GOOD, FAIR, and POOR.

Sand and Gravel - The ratings provide guidance about where to look for probable sources. A soil rated as a good or fair source of sand or gravel generally has a layer at least 3 feet thick, the top of which is within a depth of 6 feet. The ratings do not take into account thickness of overburden, location of the water table, or other factors that affect mining of the materials, and neither do they indicate quality of the deposit. The soils are rated good or fair if they are considered a probable source, and they are rated poor or unsuited if considered an improbable source.

Roadfill - is soil material used in embankments for roads. The suitability ratings reflect (1) the predicted performance of soil after it has been placed in an embankment that has been properly compacted and provided with adequate drainage, and (2) the relative ease of excavating the material at borrow areas. In Florida depth to the water table is not considered in rating the soils for roadfill. This would eliminate too many soils that make good roadfill and that are commonly used for this purpose. It is noted, however, that a high water table may be a hazard to its use. The rating terms used are: GOOD, FAIR, and POOR.

DEGREE OF LIMITATIONS AND MAJOR SOIL FEATURES AFFECTING SELECTED USE

INTRODUCTION

This part of the soil interpretation sheet lists the degree of limitations and factors affecting use of the soil for some selected uses. The evaluation of the soils, expressed in terms of degree of limitation, are predictions of the behavior of soils under defined conditions. The interpretations apply to the soils in their natural state and not for areas that are altered by cut or fill operations.

Soil limitations are indicated by the ratings slight, moderate, and severe.

Slight - soil properties generally favorable for the rated use, or in other words, limitations that are minor and easily overcome or modified by special planning and design.

Moderate - soil properties are moderately favorable for the rated use; limitations can be overcome by careful planning and design or by special maintenance.

Severe - soil properties so unfavorable and so difficult to correct or overcome as to require major soil reclamation, special designs, or intensive maintenance. For some uses, the rating of severe is divided to obtain ratings of severe and very severe.

Very severe - properties so unfavorable for a particular use that overcoming the limitations is most difficult and costly.

The interpretations will not eliminate the need for on-site study, testing, and planning of specific sites for the design and construction for specific uses. The interpretations can be used as a guide to planning more detailed investigations and for avoiding undesirable sites for an intended use. By using the soil map and interpretations, it is possible to select sites that have the least limitations for an intended use.

Many soils that have a high water table have severe or very severe limitations in their natural condition. These same soils, when drained artificially, may only have a slight limitation. Modern equipment and knowledge make it possible to overcome most of the limitations of soils for many urban and recreational uses. The degree of the limitation and the location of the soil will determine the practicability of developing the soil for the intended use. No consideration was given in these interpretations to the size and shape of soil areas, nor to the pattern they form with other soils on the landscape. For example, some very desirable soil areas are too small in size or too irregular in shape, or their occurrence with less desirable soils forms a pattern too complex to be utilized for the intended use. Although not considered in the interpretations these items should influence the final selection of a site.

EXPLANATION OF SPECIFIC USES

Pond Reservoir Areas - hold water behind a dam or embankment. Soils suitable for pond reservoir areas have low seepage, which is related to their permeability and depth to fractured or permeable bedrock or other permeable material.

Pond Embankments - are raised structures of soil material constructed across drainageways in order to impond water. These embankments are generally less than 20 feet high, are constructed of "homogeneous" soil material and compacted to medium density. Embankments having core and shell type construction are not rated in this table. Embankment foundation, reservoir area and slope are assumed to be suitable for pond construction. Soil properties are considered that affect the embankment and the availability of borrow material. The best soils have good slope stability, low permeability, slight compressibility under load, and good resistance to piping and erosion. The best borrow material is free of stones or rocks and thick enough for easy excavation.

Excavated Ponds (aquifer fed) - a body of water created by excavating a pit or dugout into a groundwater aquifer. Excluded are ponds fed by runoff and also embankment-type ponds where the depth of water impounded against the embankment exceeds three feet. The assumption is made that the pond is properly designed, located and constructed, and that the water is of good quality. Properties affecting aquifer-fed ponds are the existence of a permanent water table, permeability of the aquifer, and properties that interfere with excavation--stoniness and rockiness.

Corrosivity - Uncoated steel - This refers to the potential for corrosion of uncoated steel pipe buried in the soil. The soils are rated as follows: VERY LOW (noncorrosive), LOW (slightly corrosive), MODERATE (moderately corrosive), HIGH (severely corrosive), and VERY HIGH (very severely corrosive). Corrosion of uncoated steel pipe is a physical-biochemical process converting iron into its ions. Soil moisture is needed to form solutions with soluble salts before the process can operate. The corrosivity is estimated by electrical resistivity or resistance to flow of current, total acidity, soil drainage, and soil texture.

Corrosivity - Concrete - This refers to the potential for deterioration of concrete placed in soil materials. Deterioration is caused by a chemical reaction between the concrete (a base) and the soil solution (potential weak acid). Special cements and methods of manufacturing may be used to reduce rate of deterioration in soils of high corrosivity. Some of the soil properties that affect the rate of deterioration are soil texture and acidity, the amount of sodium or magnesium present in the soil singly or in combination, and amount of sodium chloride in the soil. The presence of sodium chloride in the soil indicates the presence of sea water. Sea water contains sulphates which is one of the principal corrosive agents.

Dwellings - as rated in the interpretation sheet, are not more than three stories high and are supported by foundation footings placed in undisturbed soil. The features that affect the rating of a soil for dwellings are those that relate to capacity to support load and resist settlement under

load, and those that relate to ease of excavation. Soil properties that affect capacity to support load are wetness, susceptibility to flooding, density, plasticity, texture, and shrink-swell potential. Those that affect excavation are wetness, slope, depth to bedrock, and content of stones and rocks. Unless otherwise stated, the soils are rated for dwellings without basements.

Septic tank filter fields - are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into natural soil. The soil material from a depth of 18 inches to 6 feet is evaluated. The soil properties considered are those that affect both absorption of effluent and construction and operation of the system. Properties that affect absorption are permeability, depth to water table or rock, and susceptibility to flooding. Slope is a soil property that affects difficulty of layout and construction and also the risk of soil erosion, laterial seepage, and downslope flow of effluent. Large rocks or boulders increase construction costs.

Sewage lagoons - are shallow ponds constructed to hold seepage within a depth of 2 to 5 feet long enough for bacteria to decompose the solids. A lagoon has a nearly level floor, and sides, or embankments, of compacted soil material. The assumption is made that the embankment is compacted to medium density and the pond is protected from flooding. Properties are considered that affect the pond floor and the embankment. Those that affect the pond floor are permeability, organic matter, and slope; and if the floor needs to be leveled, depth to bedrock becomes important. The soil properties that affect the embankment are the engineering properties of the embankment material as interpreted from the Unified Soil Classification and the amounts of stones, if any, that influence the ease of excavation and compaction of the embankment material.

Local roads and streets - as rated in the interpretation sheet, have an all-weather surface expected to carry automobile traffic all year. They have a subgrade of underlying soil material; a base consisting of gravel, crushed rock, or soil material stabilized with lime or cement; and a flexible or rigid surface, commonly asphalt or concrete. These roads are graded to shed water and have ordinary provisions for drainage. They are built mainly from soil at hand, and most cuts and fills are less than 6 feet deep.

Soil properties that most affect design and construction of roads and streets are load supporting capacity and stability of the subgrade, and the workability and quantity of cut and fill material available. The AASHO and Unified classifications of the soil material, and also the shrink-swell potential, indicate load supporting capacity. Wetness and flooding affect stability of the material. Slope, depth to hard rock, content of stones and rocks, and wetness affect ease of excavation and amount of cut and fill needed to reach an even grade.

Light industries - ratings are for the undisturbed soils that are used to support building foundations. Emphasis is on foundations, ease of excavation for underground utilities, and corrosion potential of uncoated steel pipe. The undisturbed soil is rated for spread footing foundations for buildings less than three stories high or foundation loads not in excess of that weight. Properties affecting load-supporting dapacity and settlement under load are wetness, flooding, texture, plasticity, density, and shrink-swell behavior. Properties affecting excavation are wetness, flooding, slope, and depth to bedrock. Properties affecting corrosion of buried uncoated steel pipe are wetness, texture, total acidity, and electrical resistivity.

Sanitary landfill (trench type) - is a method of disposing of refuse in dug trenches. The waste is spread in thin layers, compacted, and covered with soil throughout the disposal period. Landfill areas are subject to heavy vehicular traffic. Some soil properties that affect suitability for landfill are ease of excavation, hazard of polluting ground water, and trafficability. The best soils have moderately slow permeability, withstand heavy traffic, and are friable and easy to excavate. The ratings apply only to a depth of about 6 feet, and therefore limitation ratings of slight or moderate may not be valid if trenches are to be much deeper than that. For some soils, reliable predictions can be made to a depth of 10 or 15 feet, but regardless of that, every site should be investigated before it is selected.

Sanitary landfill (area type) - in this method of landfill operations, refuse is placed in successive layers on the surface of the soil. Daily and final cover material must be imported because no trenches are dug unless it is for the purpose of obtaining cover material. A final cover of soil material at least two feet thick is placed over the fill when it is completed. Some of the soil properties that affect the suitability are wetness and depth to seasonal high water table, flood hazard, permeability, and slope.

Camp areas - ratings apply to areas for tent and camp trailer sites and the accompanying activities for outdoor living. Desirable areas should require little site preparation and should be suitable for unsurfaced parking for cars and camp trailers and heavy foot traffic. The assumption is made that good vegetative cover can be established and maintained. The best soils have mild slopes, good drainage, a surface free of rocks and coarse fragments, freedom of flooding during heavy periods of use, and a surface texture that is firm even after rains, but not dusty when dry. Information regarding limitations of access roads, septic tank disposal fields, and artificial drainage can be obtained from the front side of the soil interpretation sheet.

Picnic areas - ratings apply to areas to be used for picnic areas and extensive play areas. Ratings are based on soil features only and do not include other features such as presence of trees or ponds, which affect the desirability of a site. The most desirable soils have nearly level to gently sloping topography, good drainage, freedom from flooding, a texture and consistence that

provide a firm surface when wet, and ability to support good vegetative cover. They also should be free of coarse fragments and rock outcrops.

Playgrounds - ratings apply to areas to be used for playgrounds, athletic fields, and organized games such as badminton and volleyball. All areas are subject to heavy foot traffic. The assumption is made that good vegetative cover can be established and maintained. The best soils for playgrounds have a nearly level surface free of coarse fragments and rock outcrops, good drainage, freedom from flooding, and a surface texture that is firm even after rains and is not dusty when dry. Areas should be free of coarse fragments and rock outcrops.

Paths and trails - ratings apply to areas that are to be used for trails, cross-country hiking, bridle paths, and other intensive uses that require the movement of people. It is assumed that these areas will be used as they occur in nature and that little soil will be moved to provide this use. Consideration should be given to placement of paths and trails on sloping relief on the contour to reduce the erosion hazard. Soil properties considered in making the ratings are those that affect foot-traffic such as wetness, surface texture, and coarse fragments and those that affect design, construction, and maintenance such as slope, rockiness, or stoniness.

CAPABILITY, SOIL LOSS FACTORS, AND POTENTIAL YIELDS

INTRODUCTION

In this part of the interpretation sheet the different phases of the soil series are rated into capability classes and subclasses, the potential yields under high level of management are estimated for important crops that the soil is suited for, and the soil loss factors are given for the soil series.

EXPLANATION AND DISCUSSION OF ITEMS

Phase of series - Soil series are divided into phases on the basis of difference in slope, texture of the surface layer, or some other characteristic that affects use of the soils by man.

Capability - in this column the different phases of the soil series are grouped according to capability classes and subclasses. Capability grouping shows, in a general way, the suitability of soils for most kinds of field crops. The groups are made according to the limitations of the soils when used for field crops, the risk of damage when they are used, and the way they respond to treatment. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils; does not take into consideration possible but unlikely major reclamation projects; and does not apply to rice, cranberries, horticultural crops, or other crops requiring special management.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I soils have few limitations that restrict their use.
Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.
Class III soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.
Class IV soils have very severe limitations that reduce the choice of plants, require very careful management, or both.
Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use largely to pasture, range, woodland, or wildlife.
Class VI soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture, range, woodland, or wildlife.
Class VII soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to pasture, range, woodland, or wildlife.
Class VIII soils and landforms have limitations that preclude their use for commercial plants and restrict their use to recreation, wildlife, water supply, or to esthetic purposes.

Capability subclasses are soil groups within one class; they are designated by adding a small letter, e, w, or s to the class numeral, for example, IIe. The letter e shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; w shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); s shows that the soil is limited mainly because it is shallow, droughty, or stony.

7

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only the subclasses indicated by w and s because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife or recreation.

Soil loss (K and T) - A soil erodibility factor (K) and the soil-loss tolerance (T) are used in an equation that predicts the amount of soil loss resulting from rainfall erosion of cropland. The soil erodibility factor "K" is measure of the rate at which a soil will erode. Values are expressed as tons of soil loss per acre per unit of R (rainfall factor) from continuous follow (three years or more) on a 9 percent slope, 73 feet long. Thus, the K factor reflects the rate that soil erodes when other factors affecting erosion are constant. Soil properties that influence erodibility by water are: those that affect infiltration rate, movement of water through the soil, and water storage capacity; and those that resist dispersion, splashing, abrasion, and transporting forces from rainfall and runoff. Some of the soil properties that are most important are texture and organic matter of the surface layer, size and stability of structural aggregates in the surface layer, permeability of the subsoil, and depth to slowly permeable layers.

The soil-loss tolerance "T", sometimes called permissible soil loss, is the maximum rate of soil erosion that will permit a high level of crop productivity to be sustained economically and indefinitely. These rates are expressed in tons of soil loss per acre per year. Rates of 1 through 5 tons are used in the south, depending upon soil properties, soil depth, and prior erosion.

Potential yields - predicted yields are for principal crops grown on the soil. The predictions are based on estimates made by farmers, soil scientists, and others who have knowledge of yields in the county and on information taken from research data. The predicted yields are average yields per acre that can be expected by good commercial farmers at the level of management which tends to produce the highest economic returns.

WILDLIFE SUITABILITY

INTRODUCTION

Soils directly influence kinds and amounts of vegetation and amounts of water available, and in this way indirectly influence the kinds of wildlife that can live in an area. Soil properties that affect the growth of wildlife habitat are: (1) thickness of soil useful to crops, (2) surface texture, (3) available water capacity to a 40 inch depth, (4) wetness, (5) surface stoniness or rockiness, (6) flood hazard, (7) slope, and (8) permeability of the soil to air and water.

On the interpretation sheet soils are rated for producing eight elements of wildlife habitat and for three groups, or kinds, of wildlife. The ratings indicate relative suitability for various elements. A rating of well suited means the element of wildlife habitat and habitats generally are easily created, improved, and maintained. Few or no limitations affect management in this category and satisfactory results are expected when the soil is used for the prescribed purpose.

A rating of suited means the element of wildlife habitat, and habitats can be created, improved, or maintained in most places. Moderate intensity of management and fairly frequent attention may be required for satisfactory results, however.

A rating of poorly suited means the element of wildlife and limitations for the designated use are rather severe. Habitats can be created, improved, or maintained in most places, but management is difficult and requires intensive effort.

A rating of unsuited means the elements of wildlife habitat are very severe and that unsatisfactory results are to be expected. It is either impossible or impractical to create, improve, or maintain habitats on soils in this category.

EXPLANATION OF ITEMS

Potential for Habitat Elements - Each soil is rated according to its suitability for producing various kinds of plants and other elements that make up wildlife habitats. The ratings take into account mainly the characteristics of the soils and closely related natural factors of the environment. They do not take into account climate, present use of soils, or present distribution of wildlife and people. For this reason, selection of a site for development as a habitat for wildlife requires inspection at the site.

Grain and seed crops - These crops are annual grain-producing plants, such as corn, sorghum, millet, and soybeans.

Grasses and legumes - Making up the group are domestic grasses and legumes that are established by planting. They provide food and cover for wildlife. Grasses include bahiagrass, ryegrass, and panicgrass; legumes include annual lespedeza, shrub lespedeza, and other clovers.

Wild herbaceous plants - This group consists of native or introduced perennial grasses, forbs, and weeds that provide food and cover for upland wildlife. Beggarweed, perennial lespedeza, wild bean, pokeweed, and cheatgrass are typical examples. On rangeland, typical plants are bluestem, grama, perennial forbs and legumes.

Hardwood trees and shrubs - These plants are nonconiferous trees, shrubs, and woody vines that produce wildlife food in the form of fruits, nuts, buds, catkins, or browse. Such plants commonly grow in their natural environment, but they may be planted and developed through wildlife management programs. Typical species in this category are oak, beech, cherry, dogwood, maple, viburnum, grape, honeysuckle, greenbrier, and silverberry.

Coniferous plants - These plants are cone-bearing trees and shrubs that provide cover and frequently furnish food in the form of browse, seeds, or fruitlike cones. They commonly grow in their natural environment, but they may be planted and managed. Typical plants in this category are pines, cedars, and ornamental trees and shrubs.

Wetland food and cover - In this group are annual and perennial herbaceous plants that grow wild on moist and wet sites. They furnish food and cover mostly for wetland wildlife. Typical examples of plants are smartweed, wild millet, spikerush and other rushes, sedges, burreed, tearthumb, and aneilema. Submerged and floating aquatics are not included in this category.

Shallow water developments - These developments are impoundments or exacavations for controlling water, generally not more than five feet deep, to create habitats that are suitable for waterfowl. Some are designed to be drained, planted, and then flooded; others are permanent impoundments that grow submerged aquatics.

Potential as Habitat For - The soils are rated according to their suitability as habitat for openland wildlife, woodland wildlife, and wetland wildlife. These ratings are related to ratings made for the elements of habitat. For example, soils rated unsuited for shallow water developments are rated unsuited for wetland wildlife.

Openland wildlife are birds and mammals that normally live in meadows, pastures, and open areas where grasses, herbs, and shrubby plants grow. Quail, doves, meadowlarks, field sparrows, cottontail rabbits, and foxes are typical examples of openland wildlife.

Woodland wildlife are birds and mammals that normally live in wooded areas of hardwood trees, coniferous trees, and shrubs. Woodcocks, thrushes, wild turkeys, vireos, deer, squirrels, and raccoons are typical examples of woodland wildlife.

Wetland wildlife are birds and mammals that normally live in wet areas, marshes, and swamps. Ducks, geese, rails, shore birds, herons, minks, and muskrats are typical examples of wetland wildlife.

WOODLAND SUITABILITY

INTRODUCTION

On this part of the soil interpretation sheet the soils are evaluated for their suitability for woodland. Each soil is placed in a woodland ordination group. The soils are evaluated for their potential productivity and woodland management problems. Trees to plant are also given.

EXPLANATION OF ITEMS

Ordination - The woodland ordination group is made up of soils that are suited to the same kinds of trees, that need about the same kind of management to produce these trees, and that have about the same potential productivity.

Each woodland ordination group is identified by a 3 part symbol. The first part of the symbol indicates the relative productivity of the soils: 1 = very high; 2 = high; 3 = moderately high; 4 = moderate; and 5 = low. The second part of the symbol, a letter, indicates the important soil property that imposes a moderate or severe hazard or limitation in managing the soils for wood production. The letter x shows that the main limitation is stoniness or rockiness; w shows that excessive water in or on the soil is the chief limitation; t shows that toxic substances in the soil are the chief limitation; d shows that the rooting depth is restricted; c shows that clay in

the upper part of the soil is a limitation; s shows the soils are sandy; f shows that the soils have large amounts of coarse fragments; r shows the soils have steep slopes; and o shows the soils have no significant restrictions or limitations for woodland use or management. The third element in the symbol indicates the degree of management problems and the general suitability of the soils for certain kinds of trees.

Important Trees - This is a list of some of the commercially important trees which are adopted to the soil. These are the trees which woodland managers will generally favor in intermediate or improvement cuttings.

Site Index - is the average height of dominant trees at age 50.

Important Understory Vegetation (medium canopy) - This item is for the potential productivity of understory grasses, forbs or low shrubs for a medium tree canopy class (36 to 55 percent canopy). Productivity is expressed in pounds of air dry forage per acre. This item has been left blank on most interpretation sheets due to lack of yield data.

Woodland management problems evaluated are erosion hazard, equipment limitations, and seedling mortality.

Erosion hazard measures the risk of soil losses in well-managed woodland. Erosion hazard is slight if expected soil loss is small, moderate if some measures to control erosion are needed in logging and construction, and severe if intensive treatment or special equipment and methods are needed to prevent excessive soil losses.

Equipment limitation ratings reflect the soil conditions that restrict the use of equipment normally used in woodland management or harvesting. Slight ratings indicate equipment use is not limited to kind or time of year. A rating of moderate indicates a seasonal limitation or need for modification in methods or equipment. Severe limitations indicate the need for specialized equipment or operations.

Seedling mortality ratings indicate the degree of expected mortality of planted seedlings when plant competition is not a limiting factor. Normal rainfall, good planting stock and proper planting are assumed. A slight rating indicates expected mortality is less than 25 percent. Moderate rating indicates a 25 to 50 percent loss; and severe indicates over 50 percent loss of seedling.

Trees to Plant - This is a list of trees suitable to plant for commercial wood production.

RANGE

INTRODUCTION

In some parts of Florida soils are used for range. Soils that are commonly used for range are given a range site name and the potential productivity (climax) of important species. Different kinds of soil vary in their capacity to produce grass and other plants for grazing. Soils that produce about the same kinds and amounts of forage, if the range is in similar condition, make up a range site.

EXPLANATION OF ITEMS

Range Site Name - Range sites are kinds of rangeland that differ in their ability to produce vegetation. The soils of any one range site produce about the same kind of climax vegetation. Climax vegetation is the stabilized plant community; it reproduces itself and does not change as long as the environment remains unchanged. The climax vegetation consists of the plants that were growing there when the region was first settled. If cultivated crops are not grown, the most productive combination of forage plants on a range site is generally the climax vegetation. In Florida on many soils the climax vegetation includes trees; these areas are sometimes referred to as grazeable woodland instead of range.

Potential Productivity (Climax) of Important Species - The important species of plants that produce some forage are listed and the estimated production in pounds per acre for dry years and wet years.

Established Series
Rev. HFH
6/74

CANAVERAL SERIES

The Canaveral series is a member of the mixed, hyperthermic family of Aquic Udipsamments. These sandy soils have very dark grayish brown A horizons and pale brown C horizons that are mixed with shell fragments.

Typifying Pedon: Canaveral sand - forested.
(Colors are for moist soil unless otherwise stated.)

A11 -- 0-6 inches, very dark grayish brown (10YR 3/2) sand; single grained; loose; many fine roots, common medium and large roots; about 5 percent pale brown fine shell fragments; calcareous; gradual wavy boundary. (4 to 9 inches thick)

A12 -- 6-12 inches, dark grayish brown (10YR 4/2) sand; few medium faint very dark grayish brown (10YR 3/2) streaks along root channels; single grained; loose; common fine roots; few medium and large roots; about 10 percent by volume sand size shell fragments, few pale brown shell to 1 cm.; calcareous; clear smooth boundary. (2 to 6 inches thick)

C1 -- 12-32 inches, pale brown (10YR 6/3) sand; few medium faint dark grayish brown (10YR 4/2) streaks; about 30 percent by volume multicolored sand size to 0.5 cm. shell fragments; single grained; loose; calcareous; clear wavy boundary. (15 to 25 inches thick)

C2 -- 32-33 inches, pale brown (10YR 6/3) coarse sand mixed with multicolored shell fragments; few medium distinct very dark grayish brown (10YR 3/2) streaks and yellowish brown (10YR 5/6) mottles; single grained; loose; about 55 percent by volume shell fragments of sand size to 1 cm.; yellowish brown color is mostly shell fragments; calcareous; clear wavy boundary. (6 to 20 inches thick)

C3 -- 38-80 inches, gray (10YR 6/1) coarse sand mixed with multicolored shell fragments; single grained; loose; few fine and medium decaying roots; few coarse distinct light olive brown (2.5Y 5/4) mottles in upper 3 inches, few medium distinct dark gray (10YR 4/1) streaks along old root channels; about 35 to 45 percent by volume, sand size to 1 cm. shell fragments; calcareous.

Type Location: Brevard County, Florida; in Floridana Beach, 0.25 mile west of State Highway A1A on Carman Street and 50 feet south of north turn in road.

Range in Characteristics: Reaction ranges from neutral to moderately alkaline. Shell fragments are calcareous. Texture is coarse sand, sand, or fine sand to depths of 80 inches or more.

The A or Ap horizon is black (10YR 2/1; N 2/), very dark gray (10YR 3/1; N 3/), dark gray (10YR 4/1; N 4/), very dark grayish brown (10YR 3/2), dark grayish brown (10YR 4/2; 2.5Y 4/2), or dark brown (10YR 3/3). Content of shell fragments ranges from 5 to 15 percent in this horizon.

The C horizon is pale brown (10YR 6/3), very pale brown (10YR 7/3, 7/4), brown (10YR 5/3, 4/3), or grayish brown (10YR 5/2; 2.5Y 5/2) with streaks and mottles of brown, gray, and yellow. In some pedons gray (10YR 5/1, 6/1) or light gray (10YR 7/1, 7/2) horizons are within depths of 15 to 40 inches. The C horizon is a mixture of sand and multicolored shell fragments, but in some pedons sand and shell fragments are stratified. Content of shell fragments in the C horizon ranges from 10 to 60 percent.

Competing Series and Their Differentias: These are the Catano, Palm Beach, St. Lucie, and Seewee series. Catano soils are warmer than 72° F. at depths of 20 inches and have less than 9° F. difference between mean summer and winter soil temperature. The water table in the Palm Beach soils is below depths of 60 inches. St. Lucie and Seewee soils lack shell fragments within depths of 10 to 40 inches. In addition, St. Lucie soils are more acid.

Setting: Canaveral soils are on nearly level to gentle side slopes on low dune-like ridges bordering depressions and sloughs along the coast in the lower Coastal Plain. Slopes are dominantly 0 to 3 percent but range to 5 percent. The soil formed in a thick marine deposit of sand and shell fragments. Average annual precipitation is about 55 inches and mean annual air temperature is about 73° F. near the type location.

Principal Associated Soils: These are the competing Palm Beach and St. Lucie series and the Anclote, Delray, and Pompano soils. Anclote and Delray soils have black A horizons 10 to 24 inches thick and lack shell fragments within the control section. Pompano soils are sandy to depths of 80 inches or more and lack shell fragments.

Drainage and Permeability: Moderately well to somewhat poorly drained; slow runoff; very rapid permeability. Internal drainage is impeded by a shallow water table. The water table is at depths of 10 to 40 inches for periods of 2 to 6 months or more.

Use and Vegetation: Most areas are in native vegetation consisting of cabbage palmettos, scattered saw palmettos, magnolias, bays, and scattered slash pine with an understory of gallberry and pineland threeawn. A few areas are used for building sites.

Distribution and Extent: Central and southern part of Peninsular Florida along Atlantic and Gulf Coasts. The series is of small extent.

Series Established: Brevard County, Florida; 1970.

Remarks: These soils were formerly classified in the Regosol great soil group and were formerly a part of the Palm Beach series.

FL006C

SOIL SURVEY INTERPRETATIONS

MLRA(S): 155
SHM,HFH, 4-74
AQUIC UDIPSAMMENTS, MIXED, HYPERTHERMIC

CANAVERAL SERIES

THESE ARE SOMEWHAT POORLY AND MODERATELY WELL DRAINED DEEP SANDY SOILS MIXED WITH SHELL FRAGMENTS. THEY HAVE A VERY DARK GRAYISH BROWN SAND SURFACE AND DARK GRAYISH BROWN SUBSURFACE LAYERS OVER PALE BROWN AND VERY PALE BROWN LAYERS THAT HAVE FEW TO MANY SHELL FRAGMENTS AND EXTEND TO DEPTHS OF 80 INCHES OR MORE. THESE SOILS OCCUR IN COASTAL AREAS AND HAVE SLOPES OF 0 TO 5 PERCENT.

ESTIMATED SOIL PROPERTIES

DEPTH (IN.)	USDA TEXTURE	UNIFIED	AASHO	FRACT >3 IN (PCT)	PERCENT OF MATERIAL LESS THAN 3" PASSING SIEVE NO. 4	10	40	200	LIQUID LIMIT	PLASTICITY INDEX
0-12	FS, S, CCS	SP	A-3	0	100	100	90-100	1-4	-	NP
12-80	FS, S, COS	SP	A-3	0	70-100	70-95	65-90	1-3	-	NP

DEPTH (IN.)	PERMEABILITY (IN/HR)	AVAILABLE WATER CAPACITY (IN/IN)	SOIL REACTION (PH)	SALINITY (MMHOS/CM)	SHRINK-SWELL POTENTIAL	CORROSIVITY STEEL	CORROSIVITY CONCRETE	EROSION FACTORS K	EROSION FACTORS T	WIND ERODIBILITY GROUP
0-12	>20	0.02-0.05	6.6-8.4	-	VERY LOW	MODERATE	LOW	.15	5	2
12-80	>20	0.02-0.05	6.6-8.4	-	VERY LOW	MODERATE	LOW	.15		

FLOODING FREQUENCY	FLOODING DURATION	FLOODING MONTHS	HIGH WATER TABLE DEPTH (FT)	HIGH WATER TABLE KIND	HIGH WATER TABLE MONTHS	CEMENTED PAN DEPTH (IN)	CEMENTED PAN HARDNESS	BEDROCK DEPTH (IN)	BEDROCK HARDNESS	SUBSIDENCE INIT. (IN)	SUBSIDENCE TOTAL (IN)	HYDROLOGIC GROUP	POTENTIAL FROST ACTION
NONE			1.0-3.0	APPARENT	JUN-NOV	-		>60		-		C	-

SANITARY FACILITIES (A)

SEPTIC TANK ABSORPTION FIELDS	SEVERE-WETNESS
SEWAGE LAGOON AREAS	SEVERE-SEEPAGE,WETNESS
SANITARY LANDFILL (TRENCH)	SEVERE-TOO SANDY,SEEPAGE,WETNESS
SANITARY LANDFILL (AREA)	SEVERE-SEEPAGE
DAILY COVER FOR LANDFILL	POOR-TOO SANDY,SEEPAGE

COMMUNITY DEVELOPMENT (A)

SHALLOW EXCAVATIONS	SEVERE-CUTBANKS CAVE,WETNESS
DWELLINGS WITHOUT BASEMENTS	SEVERE-WETNESS
DWELLINGS WITH BASEMENTS	SEVERE-WETNESS
SMALL COMMERCIAL BUILDINGS	0-4%: SEVERE-WETNESS 4-5%: SEVERE-WETNESS,SLOPE
LOCAL ROADS AND STREETS	MODERATE-WETNESS

REGIONAL INTERPRETATIONS

SOURCE MATERIAL (A)

ROADFILL	FAIR-WETNESS
SAND	GOOD
GRAVEL	UNSUITED
TOPSOIL	POOR-TOO SANDY

WATER MANAGEMENT

POND RESERVOIR AREA 2	SEVERE-SEEPAGE
EMBANKMENTS DIKES AND LEVEES 2	SEVERE-SEEPAGE,PIPING,UNSTABLE FILL
EXCAVATED PONDS AQUIFER FED 2	MODERATE-DEEP TO WATER
DRAINAGE	CUTBANKS CAVE,WETNESS
IRRIGATION	DROUGHTY,FAST INTAKE
TERRACES AND DIVERSIONS	NOT NEEDED
GRASSED WATERWAYS	NOT NEEDED

CANAVERAL SERIES

FL0060

RECREATION (B)

CAMP AREAS	SEVERE-TOO SANDY	PLAYGROUNDS	0-2%: SEVERE-TOO SANDY 2-5%: SEVERE-TOO SANDY,SLOPE
PICNIC AREAS	SEVERE-TOO SANDY	PATHS AND TRAILS	SEVERE-TOO SANDY

CAPABILITY AND PREDICTED YIELDS -- CROPS AND PASTURE (HIGH LEVEL MANAGEMENT)

CLASS-DETERMINING PHASE	CAPABILITY		ORANGES (BOXES)		GRAPEFRUIT (BOXES)		PASTURE (AUM)									
	NIRR	IRR.	NIRR	IRR.	NIRR	IRR.	NIRR	IRR.	NIRR	IRR.	NIRR	IRR.	NIRR	IRR.	NIRR	IRR.
ALL	6S		400		525		4.0									

WOODLAND SUITABILITY (C)

CLASS-DETERMINING PHASE	ORD SYM	MANAGEMENT PROBLEMS					POTENTIAL PRODUCTIVITY		
		EROSION HAZARD	EQUIP. LIMIT	SEEDLING MORT.%	WINDTH. HAZARD	PLANT COMPET.	IMPORTANT TREES	SITE INDX	TREES TO PLANT
ALL	4S	SLIGHT	SEVERE	SEVERE	SLIGHT	MODERATE	SAND PINE	70	SLASH PINE
							SLASH PINE	70	

WINDBREAKS

CLASS-DETERMINING PHASE	SPECIES	HT	SPECIES	HT	SPECIES	HT	SPECIES	HT
	NONE							

WILDLIFE HABITAT SUITABILITY (D)

CLASS-DETERMINING PHASE	POTENTIAL FOR HABITAT ELEMENTS								POTENTIAL AS HABITAT FOR:			
	GRAIN & SEED	GRASS & LEGUME	WILD HERB.	HARDWD TREES	CONIFER PLANTS	SHRUBS	WETLAND PLANTS	SHALLOW WATER	OPENLD WILDLF	WOODLD WILDLF	WETLAND WILDLF	RANGELD WILDLF
ALL	POOR	POOR	FAIR	POOR	POOR	-	V. POOR	V. POOR	POOR	POOR	V. POOR	-

POTENTIAL NATIVE PLANT COMMUNITY (RANGELAND OR FOREST UNDERSTORY VEGETATION) (E)

COMMON PLANT NAME	PLANT SYMBOL (NLSPN)	PERCENTAGE COMPOSITION (DRY WEIGHT) BY CLASS DETERMINING PHASE				
PALMETTO	SERE2					
PINELAND THREEAWN	ARST5					
CABBAGE PALM	SAPA					
GALLBERRY	ILGL					
POTENTIAL PRODUCTION (LBS./AC. DRY WT):						
FAVORABLE YEARS						
NORMAL YEARS						
UNFAVORABLE YEARS						

FOOTNOTES

A RATINGS BASED ON "GUIDE FOR INTERPRETING ENGINEERING USES OF SOILS", NOV., 1971
B RECREATION RATINGS BASED ON SOILS MEMORANDUM-69, OCT., 1968
C BASED ON SOIL SURVEY INTERPRETATIONS FOR WOODLAND PROGRESS REPORT W-16, JAN., 1970
D WILDLIFE RATINGS BASED ON SOILS MEMORANDUM-74, JAN., 1970
E PRODUCTION DATA NOT AVAILABLE
1 COARSER SHELL FRAGMENTS MAY BE UNDESIRABLE
2 RATINGS BASED ON SCSWPC COMMITTEE IV GUIDE DRAFT, APRIL 1970

TABLE 1

SOILS DATA

Location	Canaveral High	Canaveral Low	Depth to Water Table, Jan. 15	Indicated Seasonal High
a	X		40 inches	15 inches
b	X		42	15
c		X	18	surface
d		X	30	surface
e	X		36	20
f	X		34	20
g		X	24	surface
h	X		40	20
i	X		35	20
j		X	30	8
k		X	30	8
l	X		50	30
m		X	20	8
n	X		62	30
o		X	30	8
p		X	20	surface
q	X		50	30

TABLE 1 , continued

SOILS DATA

Location	Canaveral High	Canaveral Low	Depth to Water Table, Jan. 16	Indicated Seasonal High
A	X		45 inches	25 inches
B	X		50	30
C	X		40	25
D	X		50	30
E	X		40	25
F	X		50	30
G		X	12	surface
H		X	25	8
I	X		35	20
J	X		50	30
K	X		40	20
L	X		50	30
M	X		37	28
N	X		45	22
O	X		39	30
P		X	20	surface
Q	X		47	32
R		X	30	9
S	X		45	30
T		X	20	10
U	X		45	25
V	X		70	30
W		X	25	5
Y	X		39	25

APPENDIX III

Locations of Soil Boring Sites within described Vegetation Communities and measured Depth to Water Table on January 15, 16, 1976.

KEY TO THE SOIL BORING LOCATION MAP.

Vegetation Communities are indicated by number and Soil Boring Locations are indicated by upper-case X and letter.

SCALE 1:9600

Vegetation Communities:

Those communities found predominately on Canaveral High soils:

1..... Cabbage Palm

2..... Open Dunelet Field

3..... Protected Dunelet Field

4..... Australian Pine

5..... Mixed Australian Pine/Native Shrub

14..... Sea Oats

15..... Developed

10..... Open Beach

Those communities found predominately on Canaveral Low soils:

6..... Mangrove

7..... Buttonwood

8..... Salt Flats

11..... Spoil Deposition

12..... Embayments

LEMON BAY

STUMP PASS

GULF OF MEXICO

N

APPENDIX IV

Map of the Soil Types found in the Study Area, as determined by the Direct Sample and the Vegetation Type.

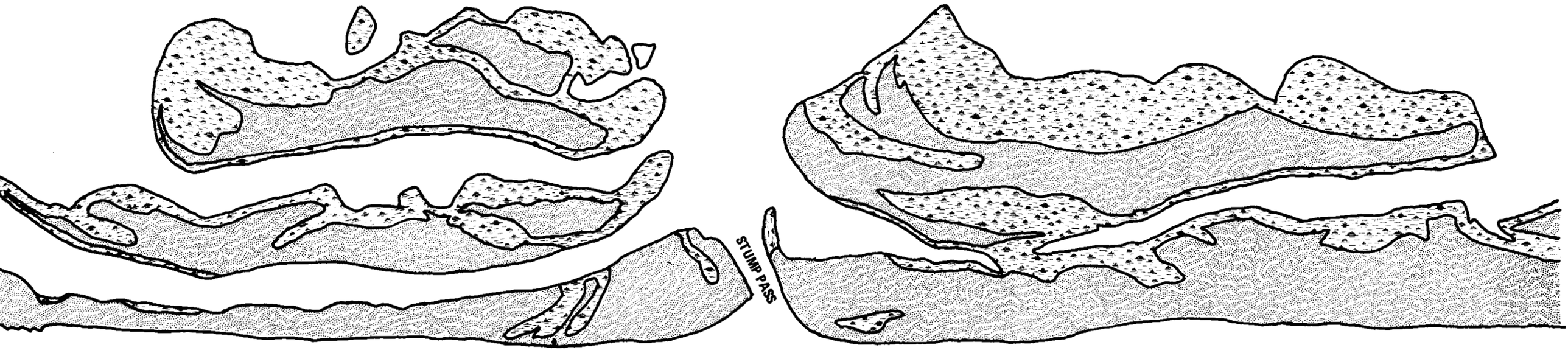
KEY TO THE MAP

..... Canaveral High Soil

..... Canaveral Low Soil

SCALE 1:9600

LEMON BAY



GULF OF MEXICO

HISTORIC SHORELINES

The natural forces of wind and wave action and tidal fluctuations cause ever-changing shorelines along the beach-front areas of Southwest Florida. The geomorphic effects of these forces are most evident in the vicinity of tidal inlets, where the full force of the tidal exchange between the sea and the bay is concentrated. The exchange of large volumes of water through a restricted opening causes increased rates of flow which can erode exposed headlands and carry the sands in suspension to areas of decreased rates of flow, where the sands settle out on accreting shorelines or shoal areas. Severe changes can occur rapidly during storm conditions, when the strength of the winds, waves and tides is intensified.

A sequence of the historical shorelines of Stump Pass was prepared to document the changes the pass has undergone since 1884. This sequence of outline maps shows that Stump Pass has undergone drastic changes, particularly during the latter 1800's and early 1900's. The same forces that caused the historic shoreline changes will continue to have an effect on Stump Pass in future years. Any future human development in the vicinity of Stump Pass should be approached with an awareness of the transitory nature of this area.

METHODS

Charts and aerial photographs of Stump Pass dating back to 1884 were available as listed in Appendix V . A pen and ink tracing of each chart or photograph was made with a light table on "Clearprint" tracing paper. Precise determination of the shoreline was difficult on black and white aerial photographs where little contrast occurred between beaches and adjacent submerged sandy areas. This error was significant primarily on the 1939 and 1943 photographs at the site of the small inlet that was open in 1939 and then closed in 1943. Another possible source of error was the drafted shoreline of some of the smaller mangrove islands, such as Grove City Key, in the charts from 1884 and 1895. However, this error was slight and does not detract from the long-term trends that can be seen in the outline maps. The original scale tracings were photographically enlarged or reduced to a common scale of 1:20000 by Aerospace Engineering Services of Sarasota, Florida.

RESULTS

The accompanying outline maps (Figures 1-10) show that the shorelines in the vicinity of Stump Pass have changed dramatically over the last 92 years. During this documented period, only Whidden Key and Thornton Key have maintained relatively stable shorelines. The effects of storm conditions, tidal scour, long-shore currents, and normal wind and wave action have wrought many changes on the other land areas due to their location facing the open Gulf of Mexico and Stump Pass. Grove City Key (Figures 1 and 10) has expanded in area mainly due to the growth of mangroves and the resulting entrapment of silts and sediments. Peterson Island originally formed by the accretion of two smaller islands, and then stabilized after the formation of lower Manasota Key as an off-shore barrier (Figures 1 and 4). Isolated remnants of Manasota Key have drifted southward, eventually joining Knight Island to form its northern spit. (Figures 5, 6, and 7.) Currently, shoals and sandbars are forming and drifting around the mouth of Stump Pass, providing a base for the possible formation of new islands off Knight Island.

The net littoral drift is from north to south along Manasota Key. The privately built groin fields to the north of the park boundary interrupt this flow of sand, resulting in a scarcity of beach material in the northern half of the park's recreation area. The elevation of the Key at this point is low, with an average elevation under six feet. This is also the narrowest area of lower Manasota Key, and supports exclusive stands of Australian Pine. These factors combine to make the Key susceptible to overwash under moderate storm conditions and possible breakthrough in the event of a major storm or hurricane.

The lower 3,000 feet of Manasota Key and the northern spit of Knight Island are less susceptible to overtopping by storm tides, due to their greater width. While these sections have undergone a gradual increase in land area as the shoreline has prograded westward over the past 25 years, each may undergo a temporary loss of beach due to erosion.

It is impossible to make definitive predictions on future shoreline changes in this vicinity. The same natural factors that have affected this area over the past 92 years will continue to affect similar changes. In addition, human activities will have some influence on future shorelines. We must realize that so-called erosion problems are not the result of shoreline loss or gain, but of poorly planned human activities in transitory areas. It is wiser and far more inexpensive to allow the shorelines to advance and recede as they may, than to define a line on a fluctuating shore and attempt to stabilize the shore to the line.

KEY TO OUTLINE MAPS

SCALE 1:20000

W = Whidden Key

T = Thornton Key

P = Northern portion of Peterson Island

P' = Southern portion of Peterson Island

K = Knight Island

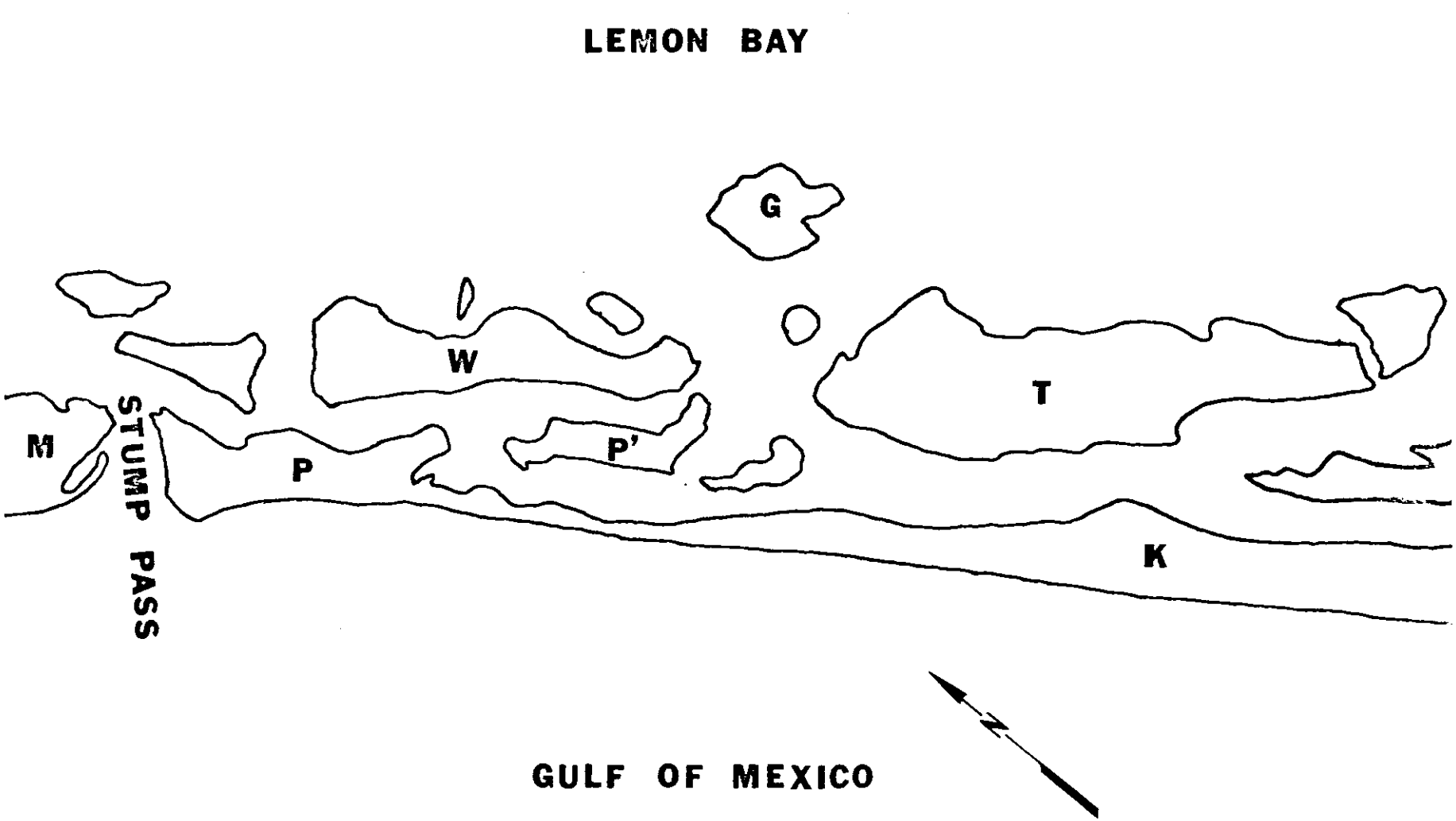
G = Grove City Key

M = Manasota Key

N = Northern remnant of Manasota Key

S = Southern remnant of Manasota Key

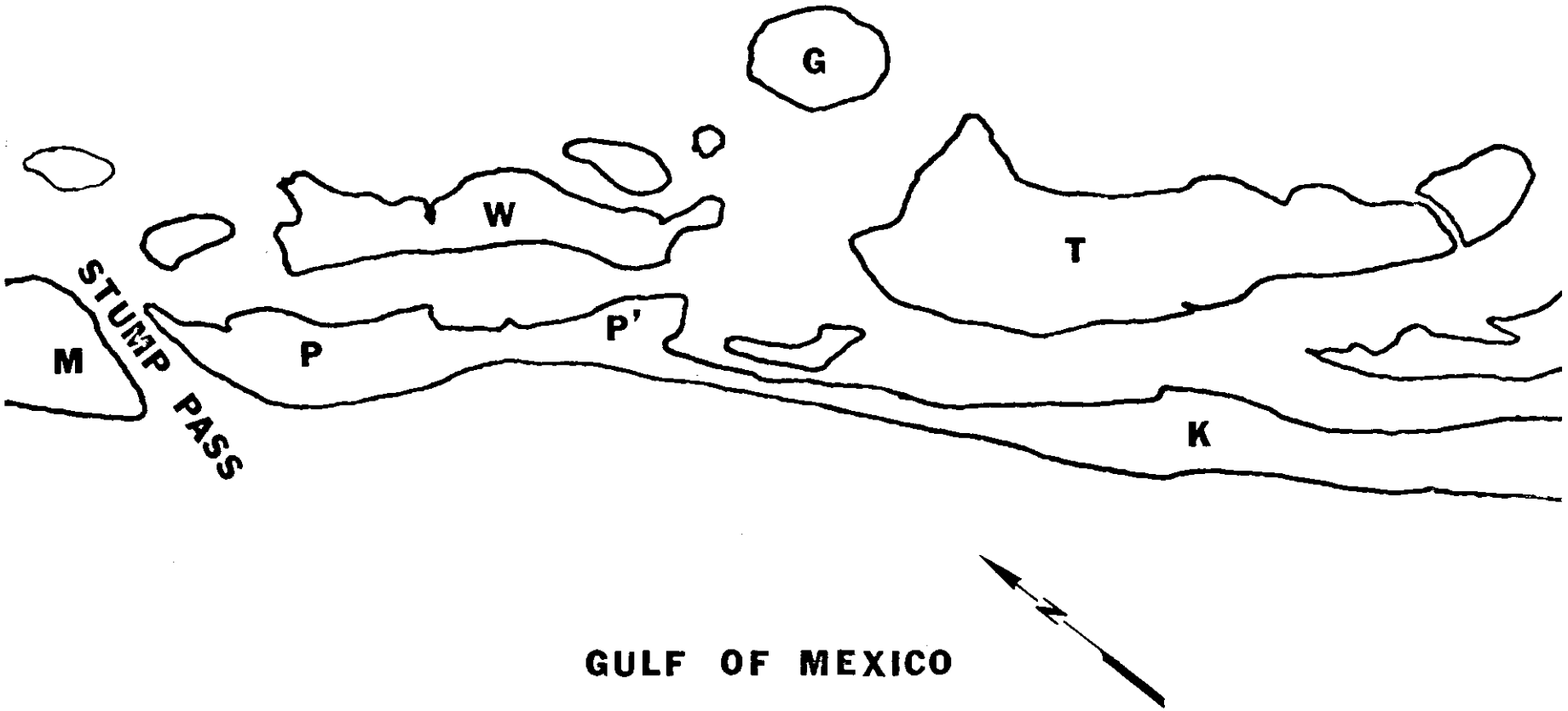
Figure 1. Configuration of Stump Pass as found in 1884.



1884

In 1884 Whidden Key (W) and Thornton Key (T) were in similar states as found in 1975. Both were protected from the Gulf frontage by other barriers which intercepted the full energy of the wind and waves. The two areas labeled P and P' were actually the precursors of Peterson Island. Shoaling caused the two smaller islands to connect between 1884 and 1895 (Figure 2) and to stabilize between 1925 and 1939 (Figure 3). The northernmost portion, P, was open to the Gulf of Mexico and was connected by a thin strip of land to Knight Island (K). Manasota Key had a recurved spit which indicates a southward littoral drift. Stump Pass was oriented on an east-west axis, and was located where the Sea Star Motel was found in 1975 at the northern boundary of Port Charlotte Beach State Park.

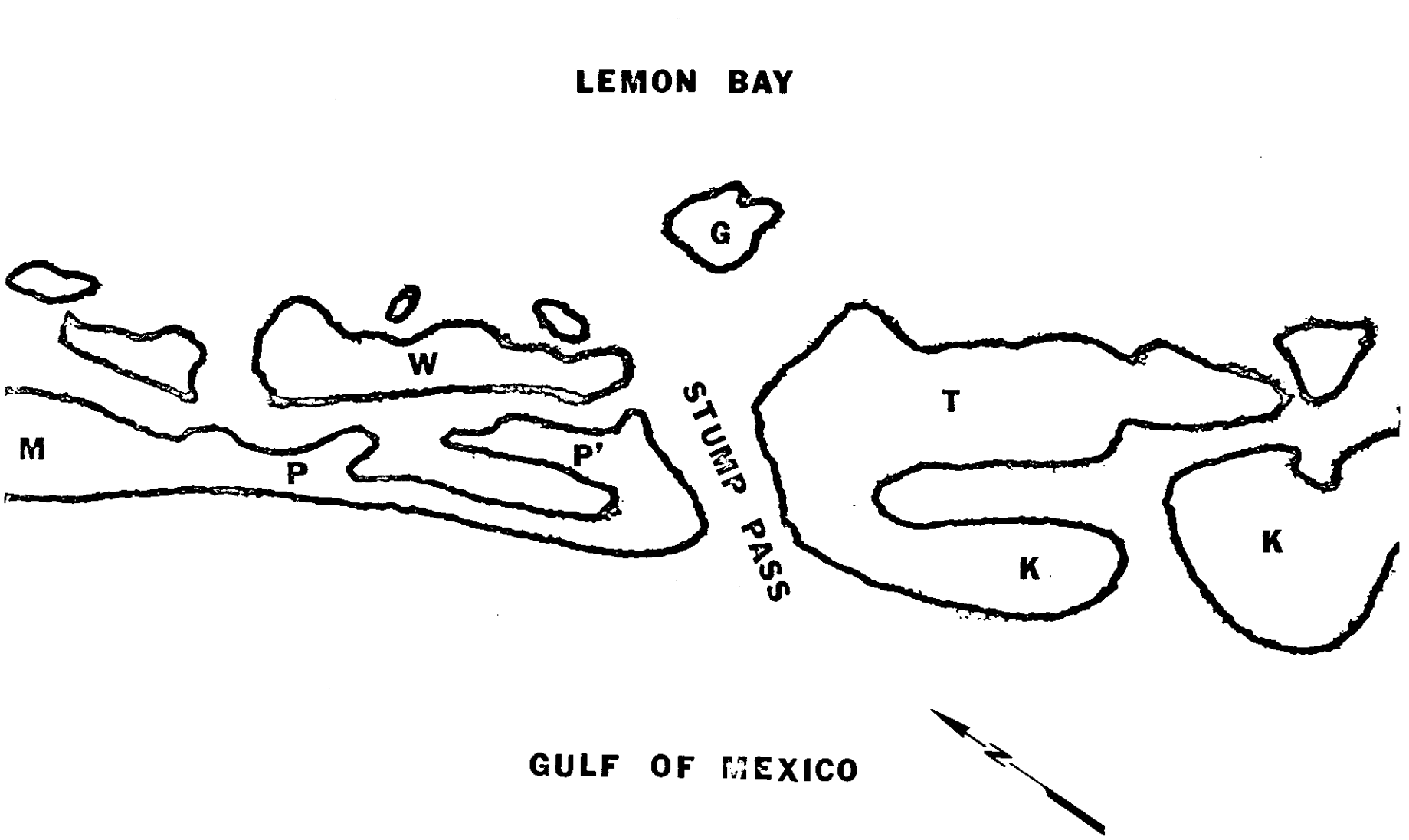
Figure 2. Configuration of Stump Pass as found in 1895.



1895

E. B. Camp's survey of 1895 (Figure 2) shows that substantial changes had taken place subsequent to 1884. Stump Pass had shifted to an oblique northeast-southwest orientation. Manasota Key had accreted approximately 800 feet southward from its 1884 position and lost the recurved spit. The north end of Peterson Island, (P), had receded, due to the scouring action of the tidal flow through Stump Pass as it shifted to the oblique position. The thin connection from Peterson Island,(P), to Knight Island shifted over 400 feet to the east, connecting Peterson Islands (P) and (P') yet remaining contiguous with Knight Island.

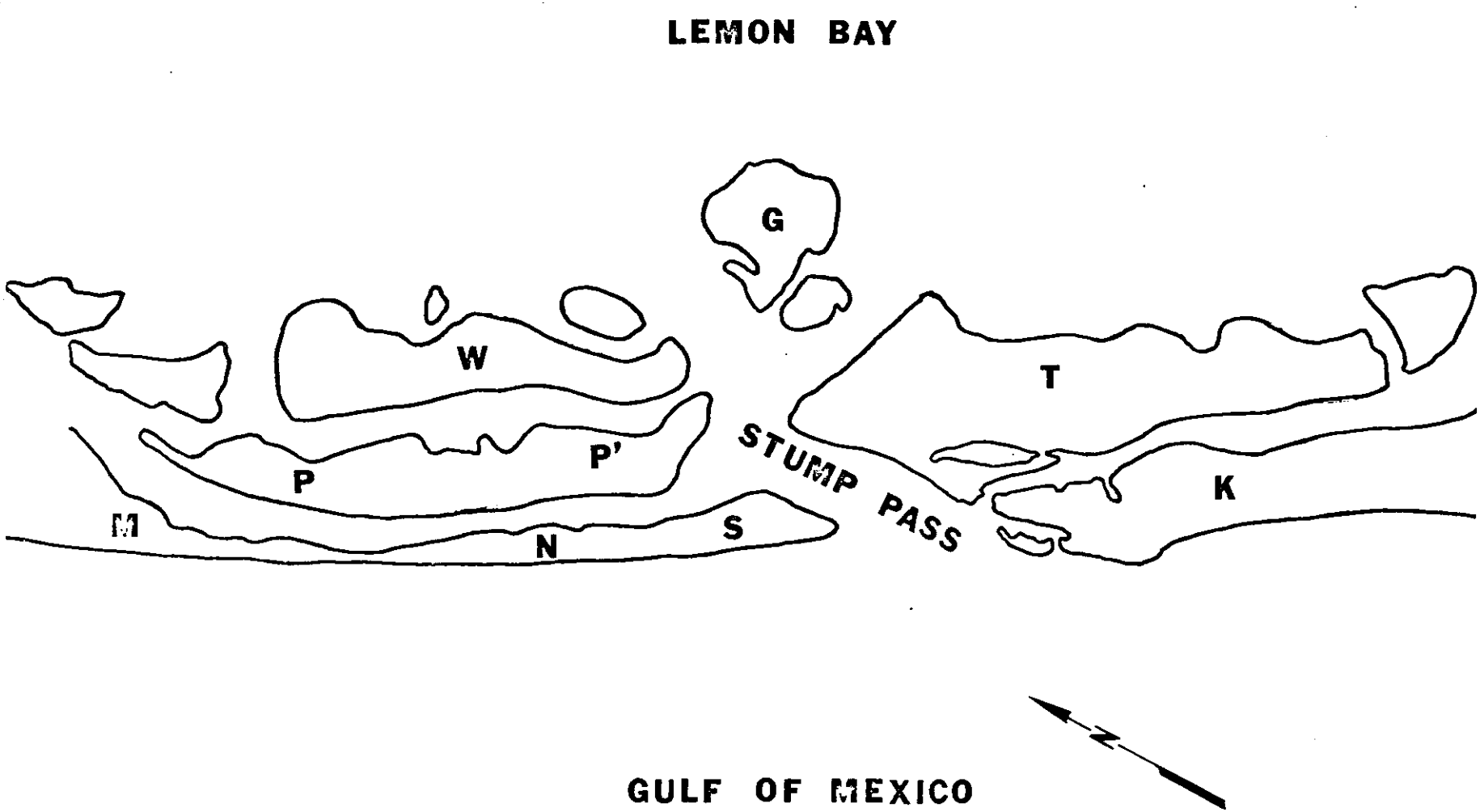
Figure 3. Configuration of Stump Pass as found in 1925.



1925

In the 30 years between E. B. Camp's survey and the U.S. Coast and Geodetic survey of 1925, nine hurricanes passed within 100 miles of Stump Pass, including a direct hit in 1910. (Appendix VI). The thin connection between Peterson (P) and Knight Island (K) was breached, forming the present day Stump Pass. The previous location of the pass filled in as Manasota Key accreted southward and connected with Peterson (P). The narrow strip of beach that connected Peterson (P) and Peterson (P') shifted to the west over 400 feet to approximately the same position it occupied in 1884. Peterson (P) and Peterson (P') were contiguous with Manasota Key, and formed a lagoon between the two. Knight Island (K) had been breached by a pass, and had connected to Thornton Key (T) to form the southern edge of Stump Pass.

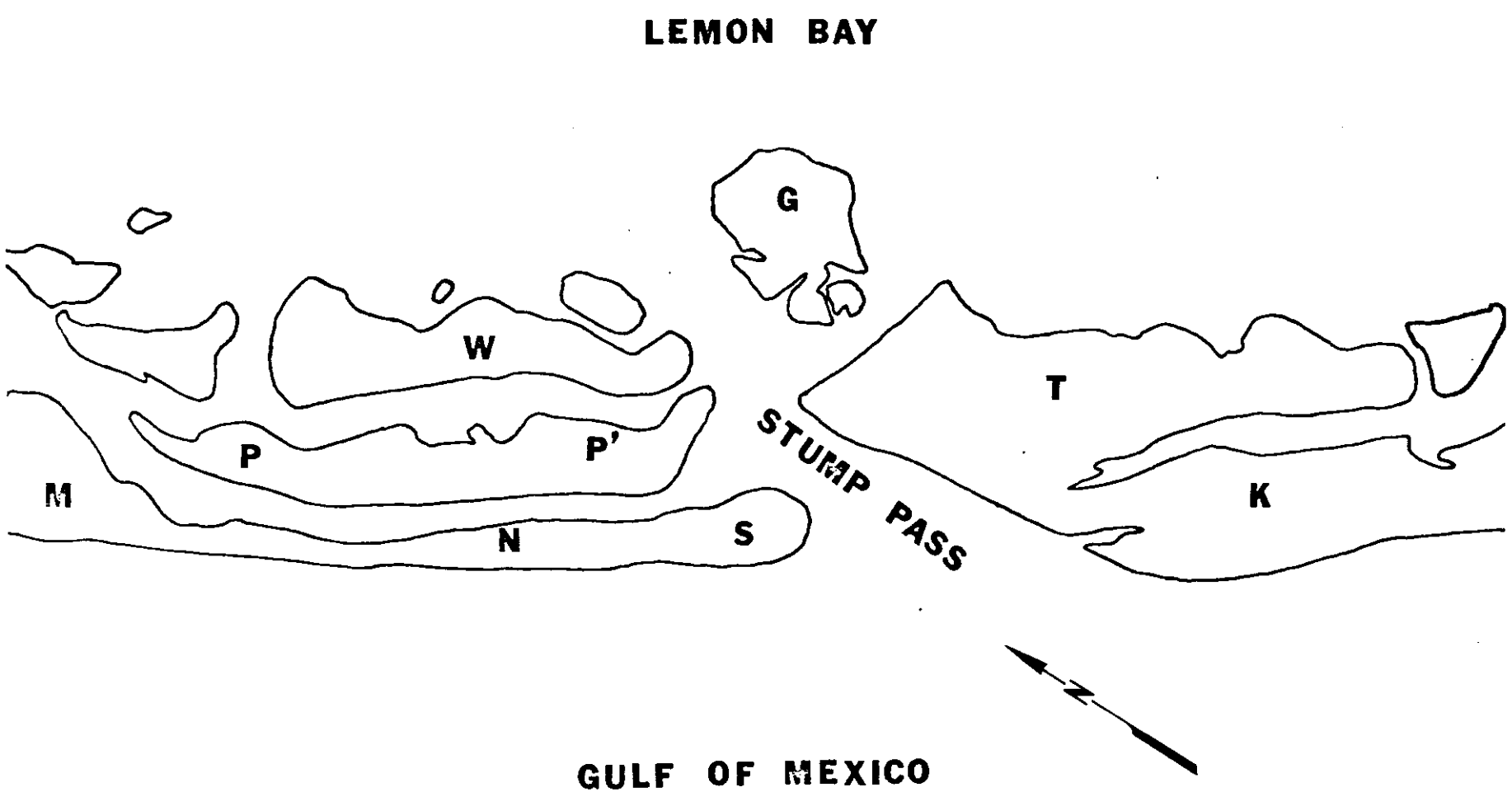
Figure 4. Configuration of Stump Pass as found in 1939.



1939

Between 1925 and 1939 eight hurricanes passed within a 100-mile radius of Stump Pass. (Appendix VI). Once again Stump Pass shifted to a northeast-southwest orientation. The northern end of Knight Island (K) which was contiguous with Thornton Key (T) in 1925 (Figure 3) had eroded due to the scour of tidal flow by 1939 (Figure 4). This action was similar to the erosion of Peterson Island (P) between 1884 (Figure 1) and 1895 (Figure 2). The connection between Manasota Key (M) and Peterson Island (P) was breached at the former site of Stump Pass in 1884 (Figure 1). This isolated Peterson Island (P and P'), and Manasota Key then built up as an offshore bar parallel to Peterson Island, but separated from it by a tidal swash channel (Figure 4). The southern extreme of Manasota Key was clearly opposite Thornton Key (T). The southern portion of Manasota Key between "N" and "S" was in the same longitudinal location as the connection between Peterson Island (P) and Knight Island (K) in 1884 (Figures 1 and 4).

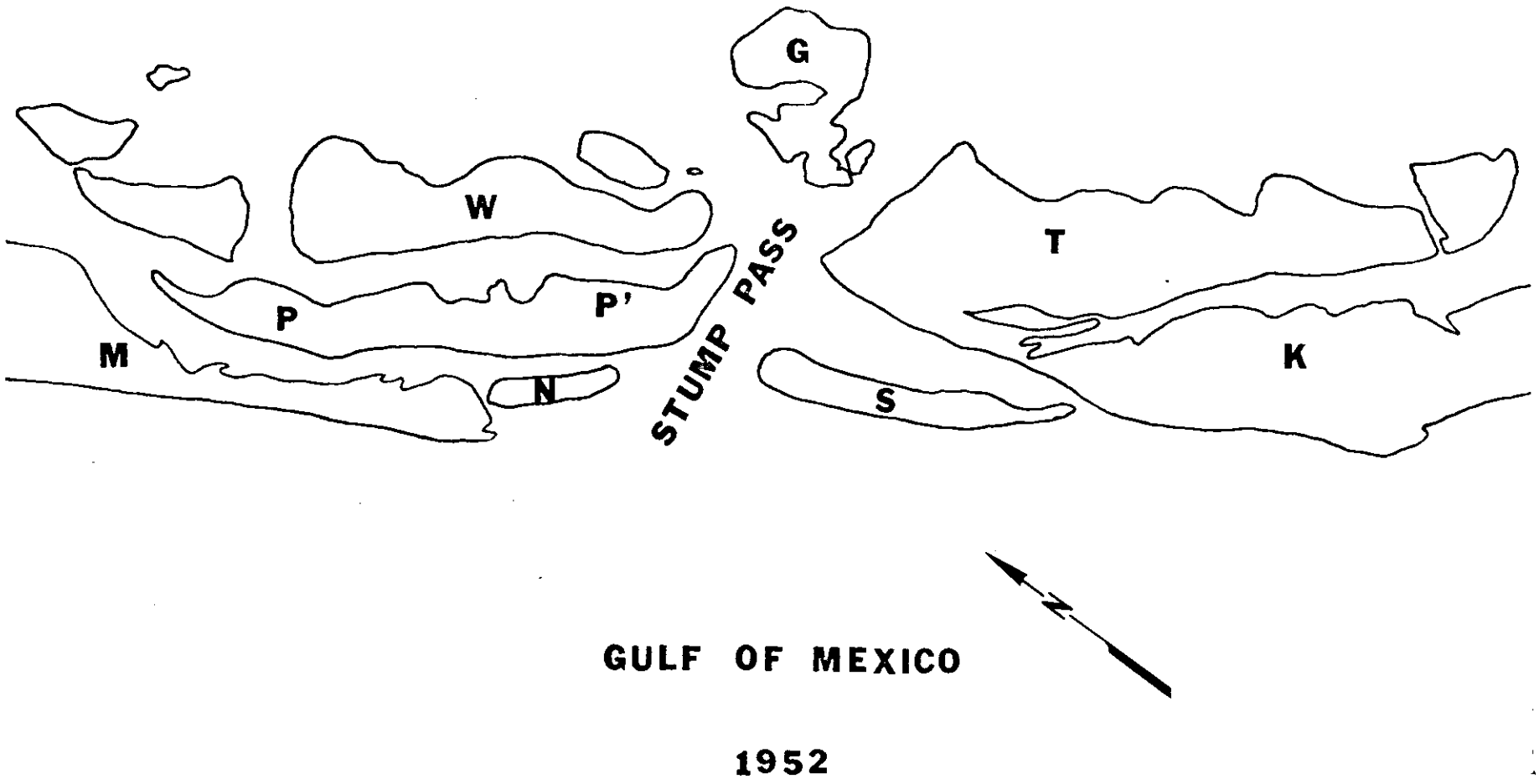
Figure 5. Configuration of Stump Pass as found in 1943.



1943

The only hurricane that passed within 100 miles of Stump Pass in this interval was a minor storm that made a direct hit in 1941 (Appendix VI). No substantial changes occurred between 1939 and 1943. The pass maintained its oblique orientation, but the first signs of reorientation are indicated by Manasota Key receding northward over 200 feet, losing its pointed spit, and becoming broader and more rounded at the southern point (Figure 5). The tidal inlet between Thornton Key and Knight Island filled, probably due to insufficient tidal prism. Knight Island prograded westward 200 feet just south of the former pass.

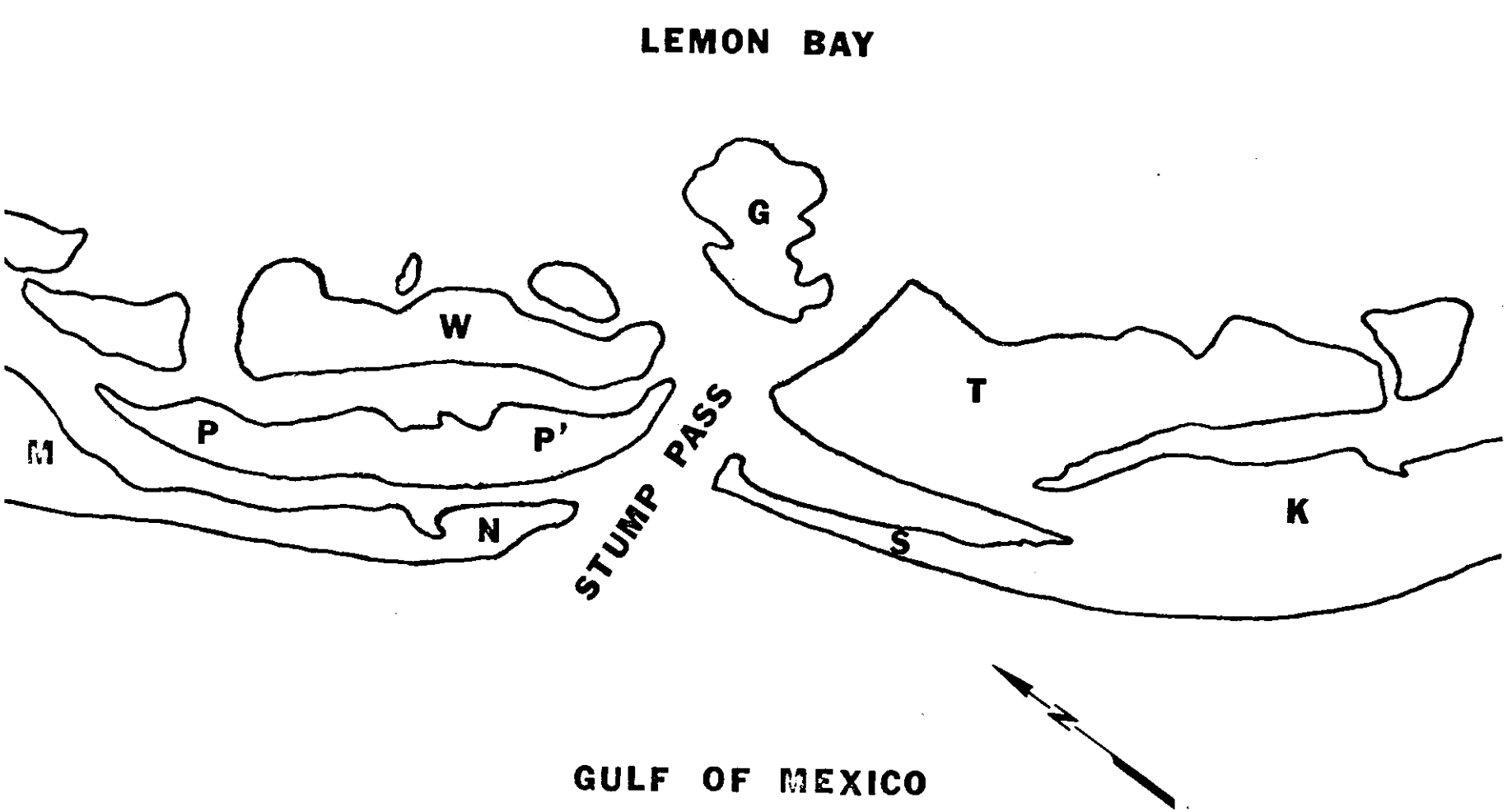
Figure 6. Configuration of Stump Pass as found in 1952.



1952

Between 1943 and 1952, seven hurricanes passed within the 100-mile radius of Stump Pass, including a direct hit in 1951 (Appendix VI). According to H. H. Anger of Englewood, the 1944 hurricane opened a pass through Manasota Key opposite the midpoint of Peterson Island. At this time the northern (N) and southern (S) remnants of Manasota Key were contiguous. In 1947 another hurricane breached a pass separating the northern and southern remnants; the southern remnant drifted south after this. An oblique aerial photograph taken in 1951 (Shepard, 1971, page 169) shows a small lunate key due west of the northern remnant (N), which probably acted as a natural breakwater enabling the northern remnant to rejoin with Manasota Key. This small key was probably washed away by the hurricane of 1951, as it did not appear in the 1952 aerial photograph (Figure 6). The southern remnant continued to drift southward, eventually connecting with Knight Island. In 1952, the southern remnant was in the same longitudinal position as Knight Island (K) in 1884 (Figure 1), and Stump Pass had oriented in a northwest-southeast position. The small projections on the bayside of Manasota Key were probably the result of overwash sediments fans which were recurved to the south due to the dominant ebb tide flowing between Manasota Key and Peterson Island.

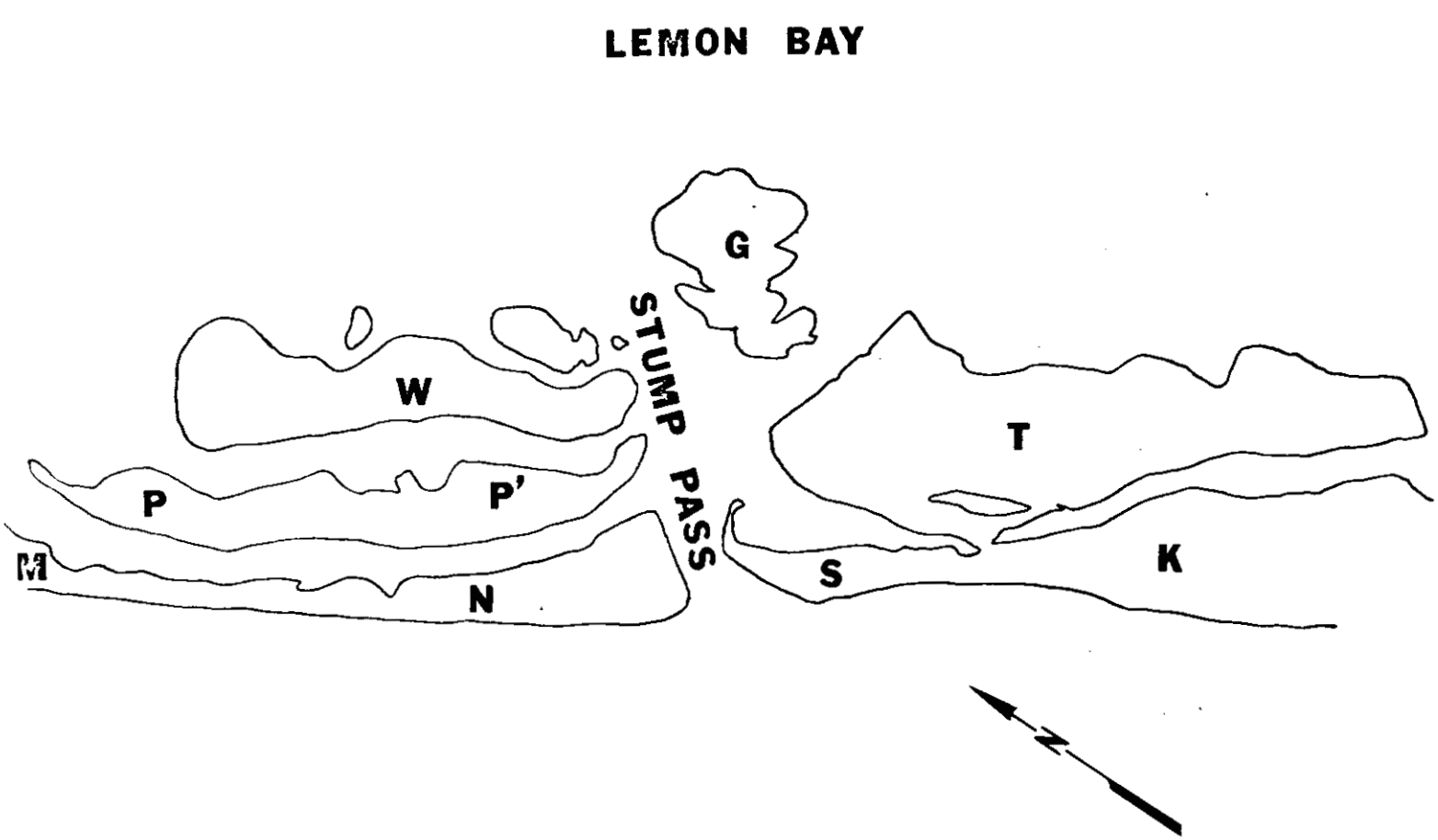
Figure 7. Configuration of Stump Pass as found in 1956.



1956

A direct hit by a hurricane in 1953 was the only major storm occurrence between 1953 and 1956 (Appendix VI). Stump Pass maintained its northwest-southeast oblique orientation. The northern and southern remnants established their respective connections with Manasota Key and Knight Island (Figure 7). The spit (S) of 1956 and the island (S) of 1952 (Figure 6) are in the same position; the connection occurring as Knight Island accreted westward and northward over 400 feet.

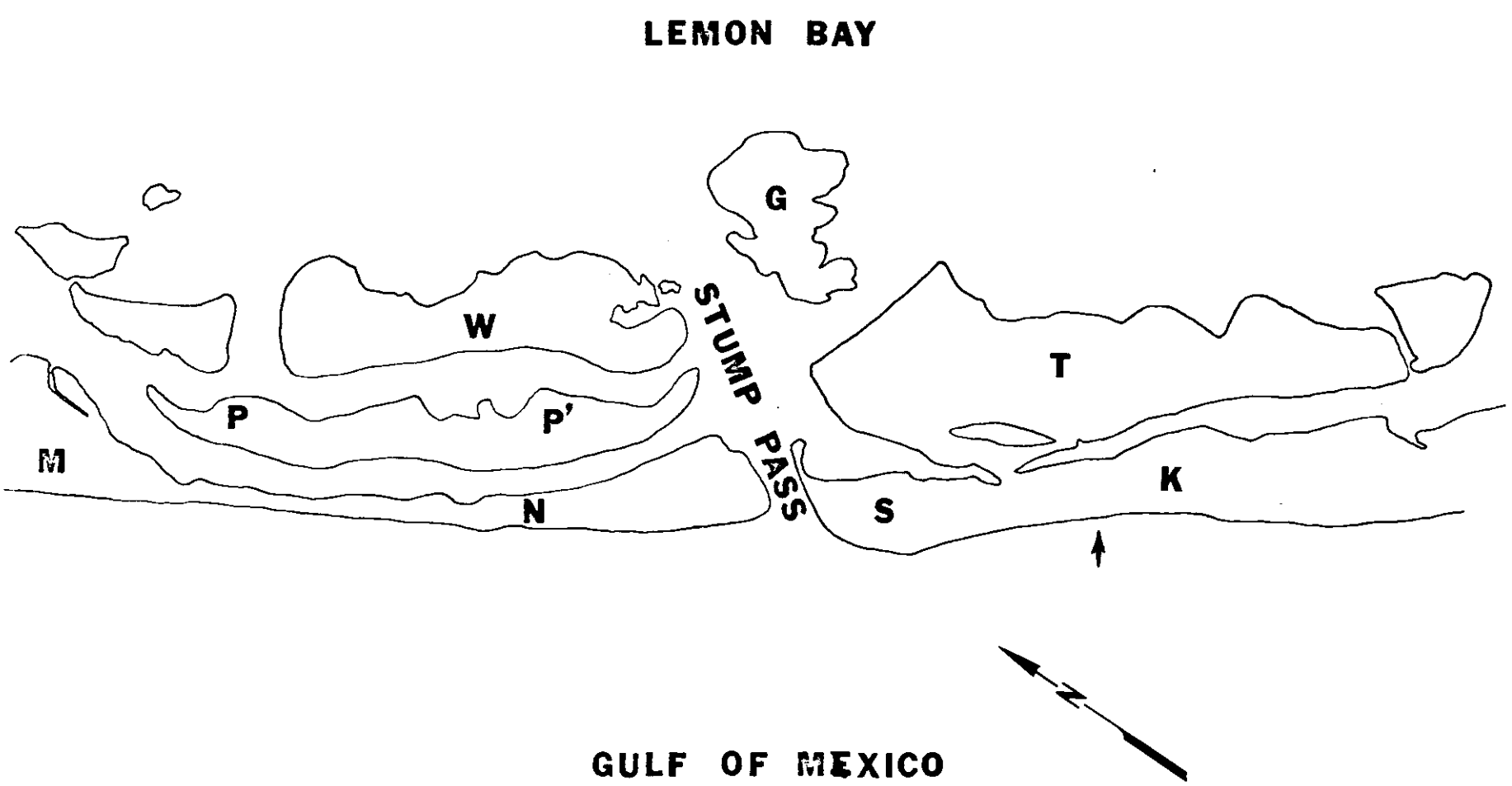
Figure 8. Configuration of Stump Pass as found in 1966.



1966

Two hurricanes occurred between 1956 and 1966, and Manasota Key extended to the south, some 1200 feet, and once again protected the full length of Peterson Island (Figure 8). Knight Island receded 400 feet, yet maintained its connection to the spit (S), which accreted westward and formed a recurved spit. Stump Pass was reduced to 400 feet in width, about half of its 1956 width, and reoriented to an east-west position.

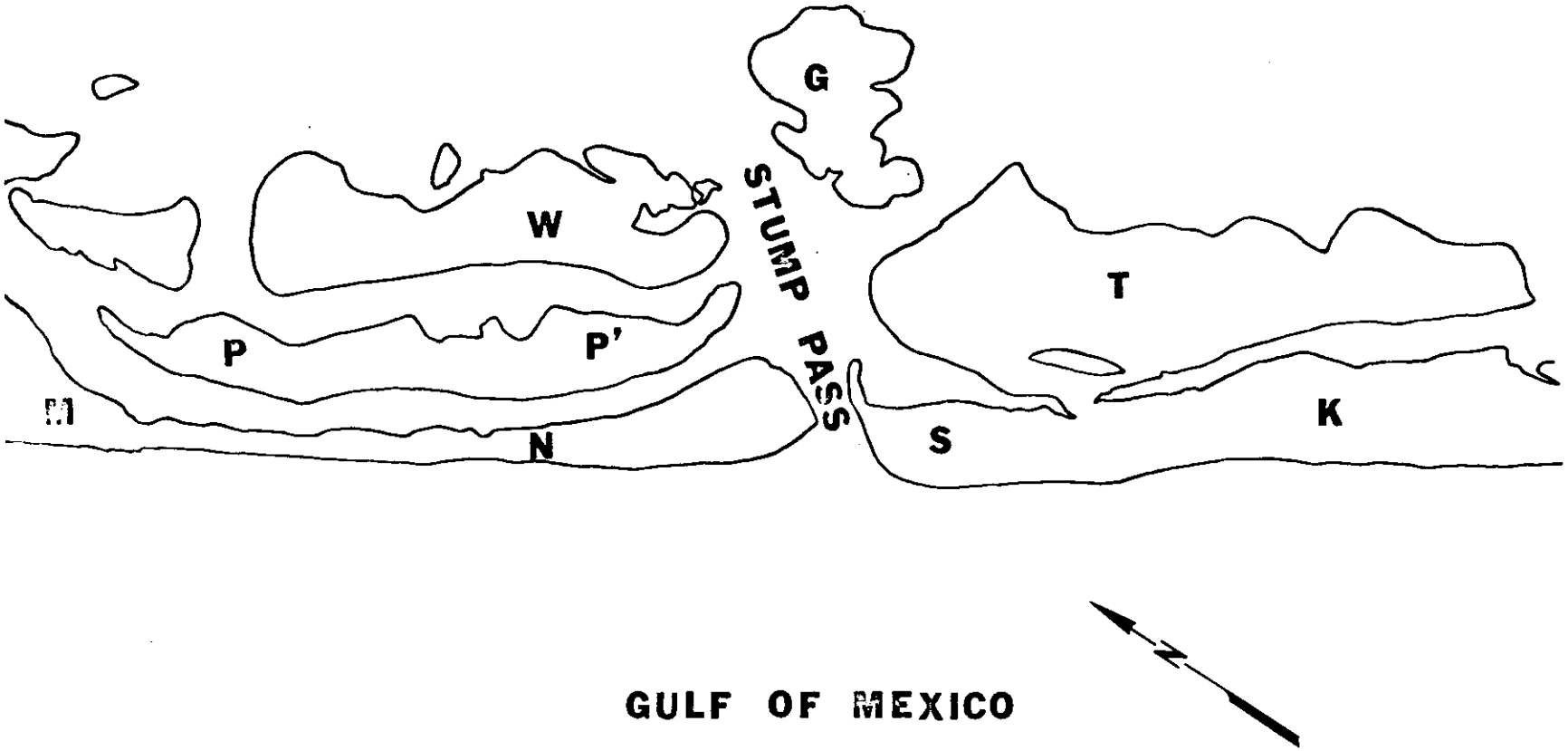
Figure 9. Configuration of Stump Pass as found in 1974.



1974

Two hurricanes occurred between 1966 and 1974 (Appendix VI). During this period Knight Island accreted westward some 300 feet to the north of the arrow, while receding 150 feet south of the arrow. The recurved spit (S) maintained its basic configuration, yet receded 100 feet to the south while Manasota Key prograded to the south by the same amount. Whidden Key enlarged by the addition of spoil material from the dredging of the Intra-coastal Waterway.

Figure 10. Configuration of Stump Pass as found in 1975.



1975

No hurricanes passed within 100 miles of Stump Pass between 1974 and 1975. Knight Island continued to accrete westward, due partly to the presence of offshore bars south of Stump Pass. Much shoaling has occurred around the mouth of Stump Pass. The marked channel through Stump Pass was 2½ feet deep at low tide on January 17, 1976, while the natural channel south of the marked channel was 6 feet deep.

The northern half of the recreation area on Manasota Key was found to be in the most tenuous position due to its susceptibility to overwash and breaching. This was the narrowest portion of Manasota Key and exclusive stands of Australian Pine were found there. A storm tide of 2½ feet combined with 6 to 8 foot waves overtopped the key through the stands of Australian Pine in September, 1975. Severe storms or a hurricane could open a new pass through Manasota Key along this narrow stretch, as they did between 1895 and 1925, and again between 1943 and 1952.

SUMMARY

Although no hydrographic data are available for Lemon Bay, a strong tidal current has been observed flowing from the north of Peterson Island through Skier's Channel. Sediments deposited on the bayside of Manasota Key by Hurricane Eloise (1975) were washed away by the force of the tidal flow. This action has been particularly strong at the northern end of Port Charlotte Beach State Recreation Area and has prevented Manasota Key from widening on the bayside there. The breaching of a new pass at this point is possible. If this occurs, the diverted tidal flow from Skier's Channel would likely be strong enough to maintain the opening.

Stump Pass is at present the only tidal exchange between Lemon Bay and the Gulf of Mexico. Historically, Blind Pass to the north and Bocilla Pass to the south carried portions of the tidal flow from Lemon Bay. Each appears to have closed due to insufficent tidal flows to maintain the openings. Although much shoaling occurs around the mouth of Stump Pass, the tidal exchange is sufficient to maintain the Pass.

Peterson Island, Whidden Key, and Thornton Key are least likely to undergo severe shoreline changes. The barriers of Manasota Key and Knight Island absorb much of the impact of normal wind and wave action and storm activity. As a result, these latter two areas will be the most subject to future short term changes, particularly around the mouth of Stump Pass and at the northern boundary of the Port Charlotte Beach State Park.

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APPENDIX V

SOURCES OF ORIGINAL CHARTS AND PHOTOGRAPHS

1884 U.S. Coast and Geodetic Survey
Hydrographic Chart H-1595a
1:20000

1895 Government Survey of Elisha B. Camp
Charlotte County Courthouse
1:31680

1925 U.S. Coast and Geodetic Survey
Hydrographic Chart 1255
1:80000

1939 Aerial Photograph
Gee and Jensen, Inc.
West Palm Beach, FL.
1:10000

1943 Army Air Force Aerial Photograph
Soil Conservation Service
Charlotte County
1:25000

1952 Joe Jacobson Flying Service Aerial Photograph
Soil Conservation Service
Charlotte County
1:25000

1956 U.S. Geological Survey
Topographic Map Series
Englewood Quadrangle
1:24000

1966 Florida Department of Revenue Aerial Photograph
Charlotte County Zoning Office
1:4800

1974 Florida Department of Revenue Aerial Photograph
Charlotte County Zoning Office

1975 William Reynolds, Aerial Photograph
New College Environmental Studies Program
Sarasota, FL.
1:2400

APPENDIX VI

CHRONOLOGICAL LIST OF HURRICANES PASSING WITHIN 100 MILES OF STUMP PASS SINCE 1900

1900	September 5-7	1936	July 27- August 1
1901	August 10-17	1941	October 4-12 Direct Hit
1903	September 10-16	1944	October 13-21
1910	October 11-13 Direct Hit	1945	September 15-20
1911	August 9-14	1946	October 7-9
1912	September 11-23	1947	September 11-19
1915	September 4	1948	September 19-25
1921	October 21-31	1950	September 1-7
1925	November 1	1950	October 15-19
1926	September 6-22 Direct Hit	1951	September 30- October 7 Direct Hit
1928	September 16-22	1953	October 8-10 Direct Hit
1929	September 22- October 4	1960	September 3-13
1932	August 24- September 4	1966	June 4-14
1933	July 25- August 4	1972	June 15-22
1935	August 31- September 8		

Sources: Storm Tides in Florida as Related to Coastal Topography, Bulletin N. 109, Florida Engineering and Industrial Experiment Station.

Hurricane Experience Levels of Coastal County Populations, National Oceanic and Atmospheric Administration.

RECREATIONAL USAGE

In order to effectively plan the future management of a site used predominantly for recreational purposes, the needs and desires of the people who visit the site must be taken into consideration. The questionnaire interview technique is an effective and efficient tool for gathering this information. It affords direct communication with the group of people under study, giving the respondents the opportunity during the dialogue to express relevant opinions which otherwise might be overlooked. The data thus gathered can be analyzed to determine what factors attract people to the area, what facilities or lack of facilities aredesired, what activities predominate, and other relevant information.

Since this information was not available for the area around Stump Pass, it was necessary to conduct a survey of the beach users. Although interviews were conducted over a limited time period and sampledonly winter users of the beach, the data give a sound reflection of the nature of the people who come to this site. The number of people interviewed and the number of permanent residents interviewed gave sufficient validity to the survey to form the basis for the future management of the area.

METHODS

In order to obtain data on present use of the Stump Pass area, a survey was conducted of people actively using the area. A total of 110 interviews were conducted, representing 277 individuals, during four days of interviewing. The survey covered the Port Charlotte Beach State Recreation Area, Thornton Key, the north end of Knight Island, and waters adjacent to these areas. Manasota Key was covered on all four days. Marine areas and land areas other than Manasota Key were covered on two of the four interview days.

The procedure followed was to approach the party, introducing oneself as working for the New College Environmental Studies Program on a private study of beach use. The interviewer then asked if the party would be willing to spend a few minutes answering the questions of the interviewer. If the response was affirmative, the interviewer then read each question aloud, and recorded the party's responses. Many of the parties interviewed expressed an interest in the study and the future of the recreation area. Often conversations continued for a time after the questionnaire had been completed; however, this

material was not recorded as a part of the questionnaire. Recorded responses were tabulated, then grouped according to the similarity of the response.

FIELD CONDITIONS

Saturday, January 11, 1976. A single interviewer arrived at the site on foot at 8:00 A.M. Interviews were conducted on Manasota Kay from the park boundary south to the point. Skies were clear in the morning and partly cloudy in the afternoon. Temperatures ranged from 62°F in the morning to 74°F in the afternoon. Winds were from the northwest, under 10 m.p.h. By 2:30 P.M., eighteen interviews had been conducted, representing fifty-three individuals. Eighty persons were estimated to have visited the beach between 8:00 A.M. and 4:00 P.M. During this period eighteen boats were counted in Skier's Channel and Stump Pass.

Saturday, January 18, 1976. Two interviewers arrived on the beach at 9:00 A.M., and covered Manasota Key until 3:00 P.M. The weather on this day was generally cold, clear and windy. Skies were clear all day and temperatures ranged from 51°F to 63°F. Winds were from the northwest, up to 20 m.p.h. Nineteen interviews were conducted, representing forty individuals. The total visitor population between 9:00 A.M. and 3:00 P.M. was estimated at sixty, and four boats were counted in Skier's Channel and Stump Pass.

Saturday and Sunday, January 24 and 25, 1976. Five interviewers arrived on the beach at 2:00 P.M. Saturday and remained at the site until 3:00 P.M. Sunday. Weather conditions were mild this weekend, with clear skies both days. Daytime temperatures ranged from 68°F to 78°F, and winds were under 10 m.p.h. from the northwest. During daylight hours three interviewers covered Manasota Key and two interviewers covered the remainder of the study area from a small skiff. A single interviewer covered Knight Island between sunset and 9:00 P.M., interviewing campers and fishermen. During this two-day period seventy-three interviews representing 186 people were conducted. The estimated population on Manasota Key between 8:00 A.M. and 3:00 P.M. Sunday was 150, with thirty-five boats in Stump Pass and Skier's Channel.

RESULTS

The results of the questionnaire were tabulated by question and are presented in Tables 2 through 27, which correspond with the numbered questions of the interview questionnaire (Appendix VII). The tables present the number of responses for each category and the percentage of the sample number.

Table 27 is a list of quotations taken from the additional comments made by the respondents. Table 28 is a comparison of the percentage of "Boaters" vs. "Non-Boaters" and "Residents" vs. "Visitors" for selected categories of responses. A descriptive paragraph accompanies each table, and a summary concludes the section.

1. Name. People interviewed were simply asked if they would like to give their name. This technique served as a means of introduction to "break the ice" between the respondent and the interviewer. No data were tabulated from this question.

2. Are you a permanent resident or a visitor? A "Resident" was defined as someone who claimed their permanent residence within commuting distance of Stump Pass. The most distant of these came from Lakeland and New Port Richey, but the majority were from Sarasota and Charlotte Counties. A "Visitor" was someone who maintained a permanent residence elsewhere, but stayed overnight in the vicinity while visiting Stump Pass. This included campers who rented spaces in campgrounds and trailer parks, people who rented motel rooms or apartments, people who were staying with friends or relatives and people who owned houses or trailers in the vicinity of Stump Pass. Informants were asked to indicate their permanent address by city and state, and their local address by geographic location, i.e. Manasota Key, Englewood/Grove City, Inland Charlotte County, or Sarasota County. Data were also obtained on the length of stay in the area for 93 of the 134 "Visitors" interviewed.

The total number of respondents was equally divided between "Residents" and "Visitors" (Table 2a). Since the interviews were conducted during the peak tourist season, it is likely that the percentage of tourists would drop at other times of the yea..

TABLE 2a

Relationship of "Residents" to"Visitors" using Stump Pass area on study dates.

	Beach Users	
	Number	Percent
Resident	143	51
Visitor	134	49
Total	277	100

The majority of "Visitors" to this beach, 74.2 percent, remained in the Englewood area longer than one month. Only 4.3 percent planned to stay less than one week (Table 2b). The Northeastern and Midwestern United States were the most common regions of permanent residence of the "Visitors" interviewed (Table 2c). The next largest number of "Visitors", 20.9 percent, had their permanent residences in Ontario, Canada. These three regions account for over 80 percent of the total "Visitor" population. Many of these people were on vacation simply to escape the cold winters of their homelands. Their choice was first to come south for the winter. Englewood was then secondarily selected by reference from friends or by trial and error visits to other areas. A number of the people interviewed came from rural areas and liked the Englewood area because of its lack of commercialization and overdevelopment.

TABLE 2b

"Visitors" length of stay in the Englewood area for 93 of 134 "Visitors" interviewed while using the Stump Pass area.

"Visitors" length of stay	"Visitors"	
	Number	Percent
One Week or Less	4	4.3
One Week to One Month	20	21.5
Greater than One Month	69	74.2
Total	93	100

TABLE 2c

Permanent residence of "Visitors" interviewed while using the Stump Pass area.

Permanent residence of "Visitors"	"Visitors"	
	Number	Percent
Florida	7	5.2
Southeastern United States	8	6.0
Northeastern United States	44	32.8
Midwestern United States	40	29.9
Far Western United States	2	1.5
Ontario, Canada	28	20.9
Other	5	3.7
Total	134	100.0

Manasota Key was the most represented area of local residence, with 56.7 percent of the "Visitor" population (Table 2d) The smallest group of "Visitors", 4.5 percent, came from the inland areas such as Port Charlotte. The assumption is that most visitors to Florida prefer to stay as close as possible to beach areas.

TABLE 2d

Local residence of "Visitors" interviewed, while staying in the Englewood area.

Local Residence of "Visitors"	"Visitors"	
	Number	Percent
Manasota Key	76	56.7
Englewood/Grove City	52	38.8
Charlotte County, Inland	6	4.5
Total	134	100.0

Stump Pass is located in Charlotte County, and 51.7 percent of the users interviewed lived in this county (Table 2e). However, Sarasota County is only a fifteen-minute drive north from the Port Charlotte Beach State Recreation Area. Much of southern Sarasota County near Venice is within a thirty-minute drive, and this proximity accounts for the high percentage (42.7%) of Sarasota County residents using this area. This would be meaningful only in the event of a large expenditure of funds from Charlotte County in maintenance of the Stump Pass area.

TABLE 2e

County residence of "Residents" interviewed while using the Stump Pass area.

County of Residence	"Residents"	
	Number	Percent
Charlotte County	74	51.7
Sarasota County	61	42.7
Other Counties	8	5.6
Total	143	100.0

3. How many people are in your party? The most common group seen in the study area was a two-person group, typically a married couple strolling along Manasota Key (Tables 3a and 3b). Seventy-three percent of these two-person groups were "Non-Boaters" (Table 28), The smallest number of groups, ten out of 110, consisted of five or more persons (Table 3a), all of whom were "Boaters" and eighty percent "Residents". Fourteen people came to the beach by themselves (Table 3a). All of these individuals were "Non-Boaters" and 78.6 percent were "Visitors".

Groups of friends (30.0 percent) were about twice as numerous as single family groups (14.5 percent). This figure may be misleading, as single groups consisting of two or more families were considered as groups of friends. Single individuals made up the smallest number of groups (Table 3b).

Ages of people on this beach ranged from infants to octogenarians. The largest percentage of people interviewed, 52.6 percent, were over 50 years of age (Table 3c). Only 19 out of 177 were under 15 years of age. Often, young people

have been observed gathering at the Englewood Public Beach, about one mile north of the study area. Many of these young people are associated with automobiles, sitting on top or inside of them. The convenience of parking facilities may have some effect on this segregation of peer groups.

TABLE 3a

Number of people in groups interviewed.

Number of persons	Groups	
	Number	Percent
1	14	12.7
2	63	57.3
3 or 4	23	21.0
5 or more	10	9.0
Total	110	100.0

TABLE 3b

Make-up of groups interviewed.

Make-up	Groups	
	Number	Percent
Husband and wife	47	42.7
Friends	33	30.0
Family	16	14.5
Single Individuals	14	12.8
Total	110	100.0

TABLE 3c

Age of people in groups interviewed.

Ages	Individuals	
	Number	Percent
Up to 15 years	19	6.9
15 to 25 years	47	17.0
25 to 50 years	65	23.5
Over 50 years	146	52.6
Total	277	100.0

4. How did you know of this area? It was made clear that this question was concerned with how the respondent came to know of the beaches immediately adjacent to Stump Pass. Most of the people, 62.8 percent, had learned of the area by word of mouth from friends and relatives or acquaintances met while traveling (Table 4). The next largest group, 20.2 percent, had found the area on their own, through explorations or by consulting charts. The third group, "Old Timers", consists of those long-term residents who claimed to have always known of Stump Pass. In the "Other" category, two people had learned of the beach through the Englewood Chamber of Commerce and one from a job which had brought him to the area.

TABLE 4

Method of learning of Stump Pass and its adjacent beaches.

Method of discovery	Individuals	
	Number	Percent
Word of Mouth	174	62.8
Self Discovery	56	20.2
Old Timers	44	15.6
Other	3	0.4
Total	277	100.0

5. Why did you come to this particular place? The single dominant reason for selecting this particular spot was recorded for each group (Table 5), even though some groups had multiple reason for coming to Stump Pass. Responses were grouped under more inclusive headings on the basis of their similarity. Responses included under the heading of "Natural Conditions", by far the largest group of responses (45.5 percent), included such responses as: no facilities, non-commercial, good for watching wildlife, longest stretch of undeveloped beach, natural beauty, and only accessible wild beach. "Fishing" included all those people who said good fishing, good crabbing, or good shellfishing attracted them to this spot. "Other" included such varied responses as: good place to walk the dog, proximity, business, only place to land the boat, and good shelling.

TABLE 5

Dominant reason for coming to this beach area.

Dominant Attraction	Individuals	
	Number	Percent
Natural Conditions	126	45.5
Fishing	41	14.8
Uncrowded	38	13.7
Waterskiing	25	9.0
Friends/Family	20	7.2
Other	27	9.8
Total	277	100.0

A distinction can be made between active and passive reasons for coming to the beach. Active reasons include wanting to engage in waterskiing, fishing, swimming or some other pastime that requires active participation. Passive reasons include the attraction of friends or family, and uncrowded beach, getting a suntan, or other non-active reasons. A large majority, 80.3 percent of the people who were attracted for active reasons, were "Residents" (Table 28). "Boaters" also were the majority (69.7 percent) of those with active reasons and a minority of those with passive reasons.

6. How did you arrive here? Although interviews were conducted with boaters extensively on only half of the interview days, boats were the means of arrival for 40.1 percent of the people interviewed (Table 6). Many boaters are attracted to this beach, as it is one of the few Gulf beaches that is accessible to boaters. A protected lagoon affords a safe anchorage adjacent to Knight Island, and the lee side of Manasota Key is commonly used as a beaching site for waterskiers, fishermen, and picnickers. The majority of boaters (79.3 percent) in this area are "Residents" (Table 28).

The people who drove automobiles, (36.5 percent; Table 6) were equally divided between residents and visitors (Table 28). However, all of the people who walked into the study area were "Visitors" (Table 28). Of these people, two had walked from Englewood Public Beach where they had parked their car, and five had walked from the friends' homes where they had parked their cars. The remainder were renting units on Manasota Key at various motels and cottages.

TABLE 6

Means of arrival in the study area.

Means of arrival	Individuals	
	Number	Percent
Boat	111	40.1
Automobile	101	36.5
Walking	65	23.4
Total	277	100.0

7. If (you came) by boat, where did you launch? Many boaters store their boats out of the water and must use a ramp site when launching. Others keep their boats at commercial marinas or waterfront homes with canals opening into Lemon Bay. Of the various launch sites available, commercial marinas on Lemon Bay were most frequently used (Table 7). Marinas usually provide services such as storage, maintenance, and fuel, and usually charge a small fee for the use of ramp facilities. The next largest percentage of boats, 21.2 percent, were launched from waterfront homesites on Lemon Bay. The only nearby public boat ramp is located at the west end of the causeway where State Road 776 joins Manasota Key, about two miles north of Stump

Pass. Four boats had been launched from this site, although some people reported it to be in disrepair and lacking in parking space. Four boats had also launched from private ramps available to the guests at certain motels. Of the 33 boating groups interviewed, only five had originated outside of Lemon Bay.

TABLE 7

Sites of Boat Launching.

Launch Site	Boats	
	Number	Percent
Commercial Marinas	13	39.4
Waterfront Homes	7	21.2
Outside Lemon Bay	5	15.2
Public Ramp	4	12.1
Private Ramp	4	12.1
Total	33	100.0

8. If (you came) by car or bicycle, where did you park? At present there is space for three cars to park legally in a sandy area at the north boundary of the recreation area. Once this spot is filled, drivers who wish to park must resort to parking along the side of the road beside a vacant lot, parking in private front yards, or parking in the private lots of nearby motels, particularly the Sea Star Motel adjacent to the recreation area. Three of those interviewed had parked at the homes of friends living nearby.

TABLE 8

Parking sites of automobiles.

Parking site	Automobiles	
	Number	Percent
Roadside	19	47.5
Sea Star	14	35.0
Legally by Gate	4	10.0
Nearby Houses of Friends	3	7.5
Total	40	100.0

9. How long will you be here today? Respondents were asked how long they planned to be in the study area on the day of the interview. As Table 9 shows, 41.5 percent of those interviewed remained in the study area for one or two hours. The next largest group stayed for a period of three to five hours. "Day-long" includes those people who stayed longer than five hours, but not overnight. Of this group 75 percent were "Visitors" (Table 28). Although camping is prohibited in Port Charlotte Beach State Recreation Area due to a lack of sanitary facilities, some people still camp in this area. Of the twenty-six people interviewed who were staying overnight in the study area, twenty-five were "Residents" and only one a "Visitor" (Table 28). Nineteen were sleeping on boats either beached on Manasota Key or in the lagoon between Knight Island and Thornton Key. Of the seven who set up camps on the land, three were on Peterson Island, three on Knight Island, and one on Manasota Key. Twenty-one of the campers remained overnight, four stayed for the weekend and one stayed for five months. At the other extreme, ten people remained in the study area less than one hour.

TABLE 9

Length of stay in the study area.

Length of stay	Individuals	
	Number	Percent
Less than 1 hour	10	3.6
1 of 2 hours	115	41.5
3 or 4 hours	78	28.2
Day-long	48	17.3
Overnight or longer	26	9.4
Total	277	100.0

TABLE 10

Time of arrival in the study area.

Time of arrival	Individuals	
	Number	Percent
Early morning	60	21.3
Mid-day	167	60.3
Late afternoon	50	18.4
Total	277	100.0

10. What time did you arrive? The three periods included are: Early morning, from 6:00 A.M. to 10:00 A.M.; Mid-day, from 10:00 A.M. to 2:00 P.M.; and Late afternoon, from 2:00 P.M. to sunset. Most people (60.3 percent) arrive during the Mid-day period (Table 10). Three periods of peak activity were observed on Manasota Key. A small group usually entered the area soon after sunrise, for exercise or shellfish collecting. These

early risers usually stayed for a period of an hour, returning daily about the same time. Another group usually arrived between 9:30 and 10:30 A.M., and remained on the beach for three to four hours. A smaller group usually arrived very late in the afternoon and walked the beach for about an hour to watch the sunset.

TABLE 11

Frequency of visits to the study area.

Frequency of visits	Individuals	
	Number	Percent
First Visit	24	8.7
Daily	92	33.2
3 or 4 time per week	40	14.4
Weekly	65	23.5
Once or twice a month	39	14.1
Less than once a month	17	6.1
Total	277	100.0

11. How often do you come here? The frequency of visits to the beach varied from those who made daily visits to those who made visits less than once a month. The largest categories were the "Daily" (33.2 percent) and "Weekly" (23.5 percent) users. Of the 92 people who visited the beach daily, 77.6 percent were "Visitors" (Table 28). Most of the "Visitors" visit Englewood on vacations for periods of a month or more (Table 2b) and make intensive daily use of the beach during these yearly visits. Ninety-three percent of the "Weekly" users were "Residents" (Table 28). Most of these people are limited in their use of the beach by daily commitments to their professions. They take advantage of their spare time on weekends to visit Stump Pass and do so the year around.

12. For how long have you been coming to this area? The length of time people had been using the Stump Pass area ranged from 37 people who were in the area for the first time to 64 people who had been using the area for over ten years (Table 12). Some of these people had been coming to Stump Pass for over

thirty years. Table 28 shows that of the people who had been using this beach for less than one year, 75.4 percent were "Visitors". Many of the "Residents" who had been using this beach for one year or less had only recently moved to the area. The number of "Boaters" and "Non-Boaters" was nearly equal for those who had been using the beach for less than one year (Table 28).

About one-third of the visitors had been coming to this area for over five years (Table 28). Many of these people had made annual visits to Englewood since their first visit, and had maintained winter homes there. A number of these people showed interest in the future of the park area and the Englewood area as a whole. Some planned to eventually establish residency there, yet also expressed concern over the increased development happening around Englewood.

TABLE 12

Length of time respondents had been coming to the Stump Pass area.

Length of Time	Individuals	
	Number	Percent
First Visit	37	13.4
1 Year	20	7.2
2 or 3 Years	62	22.4
4 or 5 Years	25	9.0
5 to 10 Years	69	24.9
Greater than 10 Years	64	23.1
Total	277	100.0

13. What is your main activity while here today ? Due to the weather conditions, very few people indicated swimming as their main activity during the study period; this would change during periods of warm weather. Under the category of "Beachcombing" were included such responses as: shelling, exercise, walking the beach, and beachcombing. "Fishing" included all those people who were fishing, collecting shellfish, or crabbing. "Skiing" included all those people who were waterskiing or

riding around in boats. "Other" included all those people who were picnicking, sailing, swimming, and watching the scenery.

As indicated by Table 13, the main activity of 55.9 percent of the people interviewed was "Beachcombing". Of this category, 63.2 percent were "Visitors" and 78.1 percent were "Non-Boaters". "Residents" made up the entire number of people who engaged in waterskiing and "Other" activities. People in the area mainly to fish consisted of 61.6 percent residents (Table 28). This is partly due to the fact that most of the "Residents" are also boaters and therefore tended to engage in those pursuits which utilize their boats, while "Visitors", most of whom are not boaters, engaged in pastimes not requiring boats.

TABLE 13

Main activity while in the study area.

Activity	Individuals	
	Number	Percent
Beachcombing	155	55.9
Fishing	73	26.4
Skiing	32	11.6
Other	17	6.1
Total	277	100.0

14. Is there anything that you would like to do here that you are unable to do at present? The overwhelming majority (Table 14) said that they were able to do everything that they would like to do with the park in an undeveloped state, and gave the response "None." A small number indicated that they would like to camp out in the park area or use restroom facilities. The "Other" category included the two people who would like to play tennis and the two people who would like to purchase food within the recreation area. The tabulated responses to this question speak for themselves.

TABLE 14

Activities that respondents would like to engage in but are unable to due to constraints of existing conditions.

Desired Activity	Individuals	
	Number	Percent
None	248	89.5
Camp	15	5.4
Use Restroom	10	3.6
Other	4	1.5
Total	277	100.0

15. What other areas do you visit for the same reasons as coming here? Other areas visited between Fort Myers Beach and Sarasota are listed by order of number of responses in Table 15. Areas outside this geographical range have been included under the heading "Other", and included such sites as Cape Cod, Cape Hatteras, and the Great Lakes, as well as other Florida beaches.

The largest percentage (49.1 percent) of people interviewed visited no other areas for the same reasons as visiting the Stump Pass beaches. Even Englewood Public Beach, one mile north of the Port Charlotte Beach State Recreation Area, was visited by only 7.2 percent of the population interviewed. Table 14 shows that the majority of people are able to do everything they wish with the park in an undeveloped state. Table 5 shows that most people come to this beach because of its "Natural Conditions", and Table 16 shows that most people find the "Natural State" to be the single most attractive feature of the park. As most of the other beaches along the Southwest coast have undergone some degree of development, or are not readily accessible (such as Cayo Costa Island), it stands to reason that most of the people interviewed would not care to visit other beach areas. This is equally true of "Boaters" and "Non-Boaters", and of "Residents" and "Visitors".

Charlotte Harbor was the other area most often visited (Table 15). One hundred percent of the people who visited Charlotte Harbor were boaters (Table 28). Few open beaches are found within Charlotte Harbor and much of the shoreline is in

its natural state of mangrove vegetation. This harbor is very attractive to boaters because of its natural beauty, fishing, and lack of crowds. "Non-Boaters" were in the majority of people who visited Sarasota beaches, Englewood Public Beach, Gasparilla Island, and other Florida beaches (Table 28).

"Residents" made up the greatest number of people who visited Charlotte Harbor, Gasparilla Island, and the Venice beaches (Table 28). "Visitors" made up the largest number of people who visited Englewood Public Beach and the Sarasota beaches. An equal number of "Residents" and "Visitors" visited other Florida beaches.

TABLE 15

Other areas visited for the same reasons as visiting Port Charlotte Beach State Recreation Area.

Site visited	Individuals	
	Number	Percent of Sample
Visit No Other Areas	136	49.1
Charlotte Harbor	55	19.8
Gasparilla Island	38	13.7
Manasota Public Beach	21	7.6
Englewood Public Beach	20	7.2
Venice Beaches	14	5.0
Sanibel/Captive Islands	12	4.3
Fort Myers Beach	8	2.9
Sarasota Beaches	6	2.2
Midnight Pass	5	1.8
Cayo Costa	4	1.4
Upper Captiva	1	0.3
Other	38	13.7
Total	358	129.0

16. What is most attractive about this area ? Respondents were asked to state the single most attractive feature of the recreation area to them. The responses are listed categorically in Table 16. The heading "Natural State" includes such responses as: vegetation, natural scenery, wildness, undeveloped, no facilities, unspoiled beauty, wildlife, sunsets, pristine waters, and naturalness. "Uncrowded" includes such responses as: desolate, few people, room on the beach, and secluded. "Good Skiing" refers to good conditions for water skiing in Skier's Channel. "Good Fishing" includes references to crabbing, shrimping, shell fishing, and fishing. "Good Shelling" refers to good conditions for collecting shells along the beach. "People" refers to the other people on the beach, and "Cleanliness" refers to the unlittered conditions of the park.

TABLE 16

Most attractive feature of the recreation area.

Most Attractive Feature	Individual	
	Number	Percent
Natural State	150	54.2
Uncrowded	67	24.2
Good Skiing	19	6.9
Good Fishing	14	5.1
People	10	3.6
Cleanliness	10	3.6
Good Shelling	7	2.4
Total	277	100.0

Table 16 shows that the majority of the people interviewed consider the natural state of the area to be the single most attractive feature of the recreation area. This response was equally distributed among the four categories of "Boaters", "Non-Boaters", "Residents" and "Visitors" (Table 28). People frequently mentioned that the lack of facilities was one of the most attractive features of the park.

The majority of people who felt that uncrowded conditions were most attractive were non-boating residents, while the majority of people who felt that good skiing and good fishing conditions were most attractive were boating residents (Table 28). The responses of "People", "Cleanliness", and "Good Shelling" were all given by non-boaters, and were equally divided between "Residents" and "Visitors".

17. What is least attractive about this area? As in question 16, respondents were asked to indicate what they feel to be the single least attractive feature of the recreation area. The majority of people (Table 17) felt that nothing about the area was unattractive to them. "Litter" covered all responses to trash and garbage on the beach. All responses regarding dogs and their droppings on the beach were headed "Dogs". "Inconsiderate Boaters" concerns responses about reckless water skiers and speed boaters, and problems from the wakes of large boats. Nine people felt the beach was overcrowded. Responses such as: park facilities, buildings, groins, and anything manmade, were headed "Construction". Any references to the hazard of the fallen Australian Pines on the beach were headed "Fallen Trees". Occasionally, motor vehicles illegally drive onto the beach, and responses about this were headed "Motor Vehicles". "Other" includes responses about red tide, pollution, erosion, and lack of facilities.

TABLE 17

Least attractive feature of the recreation area.

Least Attractive Feature	Individuals	
	Number	Percent
Nothing	152	54.9
Litter	50	18.1
Dogs	18	6.5
Inconsiderate Boaters	12	4.3
Construction	11	4.0
Overcrowded	9	3.2
Fallen Trees	8	2.9
Vehicles	8	2.9
Other	9	3.2
Total	277	100.0

18. If it were yours to do, what changes, if any, would you make here? This question allowed the respondents to indicate any changes they would make if it were their park to manage. The majority (53.1 percent) said they would make no changes and would leave the park in its natural state, indicated by the heading "Leave Natural" (Table 18). As Table 28 shows, this sentiment was shared equally by the four categories of "Boaters", "Non-Boaters", "Residents" and "Visitors". The next most common response (20.6 percent) was to put in litter barrels and provide for someone to clean the beaches. Eleven percent would like to add parking facilities, although none could suggest where they could be located. Both of these responses were given only by "Non-Boaters" and "Visitors" (Table 28). The addition of washrooms was suggested only by non-boating "Visitors" comprising 7.9 percent of the sample.

TABLE 18

Changes the respondent would like to make in the recreation area.

Changes	Individuals	
	Number	Percent of Sample
Leave Natural	147	53.1
Clean/Litter Barrels	57	20.6
Parking Facilities	32	11.6
Washrooms	22	7.9
Picnic Tables	18	6.5
Boat Speed Limits	18	6.5
No Camping	17	6.1
Camping Facilities	9	3.2
No Dogs	9	3.2
No Opinion	5	1.8
Other	38	13.7
Total	372	134.2

The majority of people who would like picnic tables were boating "Residents", who indicated that they would put the tables on the north end of Knight Island. Boat speed limits were desired by 6.5 percent of the respondents, all of whom were boaters. All of the people who preferred no camping in the park area were non-boaters, while all of the people who would like to have camping facilities were boaters (Table 28). Seventeen people were opposed to camping in the area, while nine would like to have camping facilities (Table 18). Under the "Other" category were included such responses as: hire a police officer for the beach, add a bike path, plant more native vegetation, cut down the Australian Pines, add water fountains, dredge Skier's Channel, mark Stump Pass, halt commercial fishing, keep out cars, place benches on Manasota Key, and control the erosion.

19. Would you be in favor of a shoreline stabilization program for these public lands, including beach renourishment, and construction of a 1,000 foot jetty at the mouth of the pass? 20. Would you be willing to accept a tax increase to enable Charlotte County to finance its share of the costs of such a program? 21. Would you be in favor of a program to maintain adequate markers to the natural channel through Stump Pass? 22. Would you be willing to accept a tax increase to support this program? Questions 19 and 21 refer to the shoreline stabilization program and the channel marking, respectively, The shoreline stabilization program, as proposed by the U.S. Army Corps of Engineers, was explained to consist of the construction of a 1,000 foot jetty at the southern tip of Manasota Key, construction of a revetment around the southern tip of Manasota Key, renourishment of the existing beach to a 30 foot berm along the Gulf frontage, and the building of a nine foot hurricane dune along the southern half of Manasota Key. This program would attempt to stabilize Stump Pass and build up the beach front within the recreation area. No mention of the estimated cost was given. The channel marking program was a hypothetical program to maintain markers to the natural channel through Stump Pass. These two question were asked of all respondents. Since the costs of such projects would be partially borne by Charlotte County residents but not by residents of other regions, questions 20 and 22 were asked only of those people who were tax-paying residents of Charlotte County.

The beach users interviewed opposed the shoreline stabilization program by the small majority of 122 to 110, with 45 expressing no opinion (Table 19). Of the people who opposed the project, 73 percent were "Resident" and 27 percent were "Visitors". However, only 48 percent of those in favor of the project were "Residents" (Table 28). Many of the "Residents" expressed concern over other similar projects that had been very expensive and yet had not solved the erosion problems as planned. Few of the "Visitors" were aware of the questionable success of such a project, and were more inclined to support

the stabilization project. All of the people who expressed no opinion were "Visitors" (Table 28).

TABLE 19

Opinions concerning the shoreline stabilization program proposed by the Corps of Engineers for Stump Pass.

Shoreline Stabilization	Individuals	
	Number	Percent
Favor	110	39.7
Oppose	122	44.0
No Opinion	45	16.3
Total	277	100.0

TABLE 20

Willingness of Charlotte County Residents to accept a tax increase to finance a shoreline stabilization program.

Tax Increase	Tax-Payers	
	Number	Percent
Willing to Accept	37	51.4
Not Willing to Accept	35	48.6
Total	72	100.0

Table 20 shows that a slight majority of Charlotte County residents were willing to accept a tax increase to support the shoreline stabilization program. Some of the people who were opposed to the project indicated that they would be willing to accept a tax increase if it was levied by a county-wide referendum.

TABLE 21

Opinions concerning a natural channel marking project for Stump Pass.

Channel Marking	Individuals	
	Number	Percent
Favor	139	50.2
Oppose	44	15.9
No Opinion	94	33.9
Total	277	100.0

One hundred thirty-nine people expressed opinions in favor of a marking program for Stump Pass, while only 44 were opposed (Table 21). Ninety-four had no opinion. All of those people expressing no opinion were "Visitors". No significant differences existed between groups for those who were in favor of or opposed to this project (Table 28). Only 18.1 percent of the Charlotte County residents would not be willing to accept a tax increase to support a channel marking program (Table 22).

TABLE 22

Willingness of Charlotte County Residents to accept a tax increase to finance a channel marking program.

Tax Increase	Tax-Payers	
	Number	Percent
Willing to Accept	59	81.9
Not Willing to Accept	13	18.1
Total	72	100.0

23. Do you have any feelings about future development in this area? People interviewed showed concern over the negative side-effects involved with construction of new residential and commercial buildings; the majority stated that ideally they would like to see no further development anywhere in the Lemon Bay area. Under the category "No Development" were included such responses as: leave it (the park) natural, no houses, leave the land alone, the less development the better, hate to see any buildings put up here, the park is fine with no facilities, and if they want to build, send them to Port Charlotte. The next largest group would like to see only limited planned development around the Lemon Bay area. Under "Limited Development" were included: No high-rises or condominiums, need to have sanitary planning, keep building to a minimum, no further development until a comprehensive plan is made, allow only residential building, allow only low density use, we need more control before it gets out of hand, and restrict building to small cottages. A separate category was made for those people who would like to keep development on the mainland, which included the responses: no building on the island, keep the beaches natural, all future development should be on the mainland, and we should save these last remaining beaches from development. Under the heading "Pro-Development" were included such responses as: More development is needed to stimulate the economy, we need more development to handle all the people, let development continue as is, it would be good to have more services available, we need more jobs and more development, and more building is O.K.

TABLE 23

Feelings on future development in the Lemon Bay area.

Opinion	Individuals	
	Number	Percent
No Further Development	175	63.2
Limited Development	47	17.0
Mainland Development	18	6.5
Pro-Development	15	5.4
No Opinion	22	7.9
Total	277	100.0

24. What hazards, if any, do you perceive here as a result of man's influence? The majority of people interviewed perceived no hazards as a result of human presence. However, each person's interpretation of what the term "hazard" connotes is highly subjective and personalized. Where one individual may give litter as a response to this question, another may feel that litter on the beach is an annoyance and a problem, yet not so great a problem as to be considered a hazard. This subjective factor must be taken into account when interpreting the results.

Under the heading "Litter" were included all responses referring to garbage, trash, beer cans, old crab traps, and other materials abandoned on the beach. "Pollution" included all responses referring to sewerage, boat wastes, and the general yet frequent response, pollution. "Disruption of Nature" covers such responses as: scaring away the birds, trampling the plants, scarcity of fish, and depletion of natural resources. "Boats" covers: reckless speed boats, large wakes from cruisers, and too many boats. "Overcrowding" covers all responses concerning too many people on the beach and too much traffic on Gulf Boulevard. Under "Buildings" are such responses as: building on the islands, building too close to shore, and building on the beaches. Three people cited "Dredging" as a hazard to the recreation area. The total number is greater than 277 due to multiple responses, and the percentage figures are calculated as the percentage of 277.

TABLE 24

Hazardous conditions perceived as a results of human influence.

Hazard	Individuals	
	Number	Percent
None	125	45.1
Litter	74	26.7
Pollution	50	18.1
Disruption of Nature	27	9.7
Boats	11	4.0
Overcrowding	10	3.6
Erosion	10	3.6
Buildings	13	4.7
Dredging	3	1.1
Total	323	116.6

25. What naturally occurring hazards, if any, do you perceive here? The largest number of responses fell under the category "None". It is possible that under different weather conditions or more recent storm damage that these figures would be different. The category "Hurricanes/Tides" covers all responses referring to storms, hurricanes, and storm tides. Some people considered "Erosion" to be a naturally occurring hazard. "Shoaling" covers responses referring to sand bars in the channels, shifting shoals, and channels moving around. All responses of snakes and rats, the only animals mentioned as hazards, were headed "Harmful Animals." "Other" covers the miscellaneous responses of fog, sandspurs, fallen trees, stumps in the channel and red tide. The total is greater than 277, but the percentage is calculated as the percentage of 277.

TABLE 25

Hazardous conditions perceived as occurring naturally.

Hazard	Individuals	
	Number	Percent
None	164	59.2
Hurricanes/Tides	48	17.3
Erosion	34	12.3
Shoaling	22	7.9
Harmful Animals	10	3.6
Other	8	2.9
Total	286	103.2

26. Please indicate on the accompanying map the places you visit most often. For this question respondents were presented the outline map that accompanied the questionnaire and asked to indicate the places they visited most often. From this, respondents were classified as either predominantly "Beach" or "Marine" oriented in their activities. In reality no such clear-cut distinction exists, as many people utilize both the land areas and the water areas. "Beach" oriented people are those who came to the area mainly to spend time on the land areas or in shoreline waters; although they may have used a boat to arrive at the site, their main activities are on the beach. "Marine" oriented people are those who spend the majority of their time actually in their boats or on the water, and use the beaches secondarily.

Nine areas of use were described, and the number of respondents using each area was indicated. The total number of responses was greater than 277 due to multiple responses. "Manasota Key North" indicates those people who had never ventured further than half the distance from the Sea Star to the point, confining their activities to the north end of the park. "Manasota Key to Point" indicates those people who regularly walked the entire distance to the point. "Knight Island" included all those who used the beaches on Knight Island. The above three categories are those which indicate predominantly "Beach" oriented people. Those categories which indicate "Marine" oriented people follow. "Rag Alley" covers those boaters who frequented that channel between Peterson Island and Whidden Key. Boaters who frequently used the channel between Peterson Island and Manasota Key are included under the heading "Skier's Channel". People who were frequently in the main channel of Stump Pass between the Intracoastal Waterway and the Gulf of Mexico were included under "Stump Pass". The people who were commonly in the lagoon between Knight Island and Thornton Key were headed "Lagoon." "Open Bay" includes all those boaters who were frequently in Lemon Bay to the east of Thornton Key and Whidden Key. Boaters commonly in the Gulf of Mexico were headed "Gulf." Where totals exceed 277 due to multiple responses the percentages are based on 277. Common place names used are illustrated on Figure 1.

TABLE 26a

Comparison of "Beach" and "Marine" oriented users of the Stump Pass vicinity.

Orientation	Individuals	
	Number	Percent
Beach	174	62.8
Marine	103	37.2
Total	277	100.0

TABLE 26b

Comparison of areas of usage in the vicinity of Stump Pass.

Area of Use	Individuals	
BEACH ORIENTED	Number	Percent
Manasota Key North	18	6.5
Manasota Key to Point	173	62.5
Knight Island	40	14.4
MARINE ORIENTED		
Rag Alley	15	5.4
Skier's Channel	67	24.2
Stump Pass	70	25.3
Lagoon	48	17.3
Open Bay	58	20.9
Gulf	11	4.0
Total	500	180.5

27. Further comments. This section was included to allow the respondents the opportunity to express any feelings, ideas, or opinions that were not adequately covered during the interview. The majority of respondents had no further comments, but 41 out of 277 did wish to make additional comments. Quotations taken directly from the respondents' comments are listed in Table 27.

TABLE 27

Direct quotations taken from additional comments made by 41 respondents.

On keeping the area in a natural state:
"We want no facilities in the park at all."
"There should be no picnic tables or other stuff."

"Leave the park totally natural."
"Keep the park as natural as possible."
"We would like no facilities in the park."
"There are so few natural areas like this, we would like to see this one remain as it is."
"These barrier beaches are fragile and should not be tampered with by man."
"Keep the park in a natural state."
"No facilities in this park."
"We want this place to stay truly natural, because there are no other places like it left."
"I don't want to see any roads or facilities in this park."
"Don't allow anything to be built in the park, even sanijohns."
"The park should be left natural."
"Our friends who visited here were real happy to find an unspoiled place."
"We would rather picnic in the sand than on tables."
"This place should not be tampered with, the natural forces should be allowed to run their course."

On Knight Island and Palm Island Estates:
"All the beaches and barrier islands should be kept public."
"We want the State to buy Knight Island."
"Do not develop Knight Island; the wilder the beach, the better."
"The State should purchase Knight Island before it is ruined."
"We are opposed to developing Palm Island. It should be left public."
"Palm Island should be acquired by the State."
"Palm Island should be left undeveloped."
"Make Palm Island a recreation area."
"The State should make Palm Island a park, too."
"No development on Palm Island."
"I want no building on Palm Island."
"We don't like the idea of houses on Palm Island."

Miscellaneous:
"Use should be limited to the natural capacity of the park."
"Enlarge and repair the public boat ramp at the causeway."
"The public ramp has a sharp drop-off and should be repaired."
"Camping would be too heavy an impact on this place."
"Open up Blind Pass on Manasota Key."
"Blind Pass should be opened to allow better flushing in Lemon Bay."
"People camping in boats shouldn't take up beach space on Manasota Key."
"Large cruisers should look out for their wake and be aware of how it affects others."
"Environmentalists have too much say about what goes on around here."

"No parking should be allowed down here."
"We would like to see managed camping."
"The beach should be more accessible."
"Peterson Island would be a good place to hike and picnic."

TABLE 28

A comparison of percentages of "Boaters" vs. "Non-Boaters" and "Residents" vs. "Visitors" for selected headings.

Heading	Total Number	Percentage of Total Number			
		Boaters	Non-Boaters	Residents	Visitors
2. Residency					
Residents	143	68.5%	31.5%	100.0%	0.0%
Visitors	134	30.0	70.0	0.0	100.0
3. Size of Group					
1	14	0.0	100.0	21.4	78.6
2	63	27.0	73.0	41.3	58.7
3 or 4	23	73.9	26.1	73.9	26.1
5 or more	10	100.0	0.0	80.0	20.0
4. Method of Discovery					
Word of mouth	174	40.2	59.8	35.1	64.9
Self Discovery	56	62.5	37.5	55.4	44.6
Old Timers	44	63.6	36.4	79.5	20.5
Other	3	0.0	100.0	0.0	100.0
5. Reason for Coming to this Beach Area					
Natural Conditions	126	46.8	53.2	43.7	56.3
Passive Reasons	85	40.0	60.0	52.9	47.1
Active Reasons	66	69.7	30.3	80.3	19.7

TABLE 28. Continued.

Heading	Total Number	Percentage of Total Number			
		Boaters	Non-Boaters	Residents	Visitors
6. Means of Arrival					
Boat	111	100.0%	0.0%	79.3%	20.7%
Automobile	101	0.0	100.0	47.7	52.3
Walking	65	0.0	100.0	0.0	100.0
9. Length of Stay					
½ Day or Less	203	41.0	59.0	46.4	53.6
½ Day to 1 Day	48	37.5	62.5	25.0	75.0
Overnight	26	96.2	3.8	96.2	3.8
11. Frequency of Visits					
Daily	116	29.3	70.7	22.4	77.6
3 or 4/ Week	40	72.5	27.5	32.5	67.5
Weekly	65	78.5	21.5	93.8	6.2
Monthly	56	33.9	66.1	89.3	10.7
12. Number of years of utilization of area.					
1 Year or Less	57	50.9	49.1	24.6	75.4
2 to 3 Years	62	39.1	61.3	48.4	51.6
4 to 5 Years	25	0.0	100.0	0.0	100.0
5 Years or More	133	59.4	40.6	68.4	31.6

TABLE 28. Continued.

Heading	Total Number	Percentage of Total Number			
		Boaters	Non-Boaters	Residents	Visitors
13. Main Activity					
Beachcombing	155	21.9	78.1	36.8	63.2
Fishing	73	79.5	20.5	61.6	38.4
Skiing	32	100.0	0.0	100.0	0.0
Other	17	58.8	41.2	100.0	0.0
15. Other Areas Visited					
None	136	44.1	53.9	44.1	53.9
Charlotte Harbor	55	100.0	0.0	87.2	12.8
Gasparilla Island	38	36.8	63.2	86.8	13.2
Manasota Beach	21	42.9	57.1	42.9	57.1
Englewood Beach	20	0.0	100.0	15.0	85.0
Venice Beach	14	42.8	57.2	78.6	21.4
Sarasota Beach	6	0.0	100.0	33.3	66.7
Other Florida Beaches	30	20.0	80.0	50.0	50.0
16. Most Attractive Feature					
Natural State	150	50.7	49.3	48.7	51.3
Uncrowded	67	19.4	80.6	80.6	19.4
Skiing	19	100.0	0.0	100.0	0.0
Fishing	14	85.7	14.3	64.3	35.7
Other	27	0.0	100.0	48.1	51.9

TABLE 28. Continued.

Heading	Total Number	Percentage of Total Number			
		Boaters	Non-Boaters	Residents	Visitors
18. Management Changes					
Leave Natural	147	53.0%	47.0%	56.5%	43.5%
Clean/Litter Barrel	57	0.0	100.0	24.6	75.4
Parking	32	0.0	100.0	25.0	75.0
Washrooms	22	0.0	100.0	0.0	100.0
Picnic Tables	18	77.8	22.2	77.8	22.2
Boat Speed Limit	18	100.0	0.0	88.9	11.1
No Camping	17	0.0	100.0	35.2	64.7
Camping Facilities	9	100.0	0.0	100.0	0.0
Other	52	51.9	48.1	29.4	70.6
19. Shoreline Stabilization					
No Opinion	45	35.6	64.4	0.0	100.0
Oppose	122	60.7	39.3	73.0	27.0
Favor	110	48.2	51.8	48.2	51.8
21. Channel Marking					
No Opinion	94	20.2	79.8	0.0	100.0
Oppose	44	52.3	47.7	52.3	47.7
Favor	139	53.2	46.8	59.0	41.0

SUMMARY

The people who utilize Port Charlotte Beach State Recreation Area and the beaches and marine areas surrounding Stump Pass are quite a diverse group. Because of the varied life histories of individuals in a group such as this, one is certain to encounter dissimilar beliefs and opinions. In addition, there emerge regional quirks and characteristics that distinguish the urban dweller from the rural, and the Cracker from the Buckeye. However, in spite of the heterogeneity of the individuals interviewed, this questionnaire brought to light some interesting similarities of sentiment and behavior in a group of people visiting a unique beach area.

A major theme that carried through a majority of the interviews was the appreciation of the natural setting of this area. Frequent references were made to natural features of the beach and the lack of disruption by construction of buildings or facilities. In three separate questions (reason for coming to this beach, most attractive feature, and future management changes) this preference for the natural condition was expressed by a majority of the respondents.

Most of the people interviewed had heard of Englewood and Stump Pass through conversations with friends and relatives. Others had explored South Florida until they discovered this site and found it to their liking. None had learned of the area through the advertising media.

Most of the people who visit this area have been doing so for over five years. A considerable number had spent their winters or lived year-round near Stump Pass for over twenty years. A majority of the first-time users indicated that they preferred these beaches to other places they had vacationed, and would return here. All felt that the presence of the "wild" beach was a strong factor in their desire to live and visit in the area.

Beachcombing is the predominant pastime of the people on this beach. Other activities include fishing, water skiing, and swimming in appropriate weather. Although the park is completely devoid of man-made facilities, the overwhelming majority said they were able to do everything they desired. In fact, half of the people interviewed visited no other beaches. This is particularly striking in light of the fact that there are two public beaches located one mile and seven miles north of Port Charlotte Beach State Recreation Area. These two beaches are fully developed with parking facilities, outdoor grills, showers, bathrooms, drinking fountains, and sheltered picnic tables.

The people who visit Stump Pass have developed patterns of behavior that give this area a particular identity. Through

their direct involvement they have formed definite ideas concerning the future development of this beach. This survey sheds light on the major characteristics and ideas of the people involved. The attitudes and feelings of these people should be of major concern for future planning of Port Charlotte Beach State Recreation Area and the vicinity of Stump Pass.

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APPENDIX VII

PORT CHARLOTTE BEACH STATE RECREATION AREA

RESOURCE USE QUESTIONNAIRE

1. Name (Optional) _____

2. Are you a permanet resident or visitor?

Residence	Local Address
_____	_____
_____	_____

3. How many people are in your party?

Person	1	2	3	4	5	6	7	8	9	10
Age										
Sex										
Relation to you(friend, son, husband, etc.)										

4. How did you know of this area?

5. Why did you come to this particular place?

6. How did you arrive here? Car Boat Bicycle Walk

7. If by boat, where did you launch?

8. If by car or bicycle, where did you park?

9. How long will you be here today, in total?

10. What time did you arrive?

11. How often do you come here?

12. For how long have you been coming to this area?

13. What is your main activity while here today?

14. Is there anything that you would like to do here that you are unable to do at present?

15. What other areas do you visit for the same reasons as coming here?

16. What is most attractive about this area?

17. What is least attractive about this area?

18. If it were yours to do , what changes, if any, would you make here?

19. Would you be in favor of a shoreline stabilization program for these public lands, including beach renourishment and construction of a 1,000 foot jetty at the mouth of the pass?

20. Would you be willing to accept a tax increase to enable Charlotte County to finance its share of the costs of such a program?

21. Would you be in favor of a program to maintain adequate markers to the natural channel through Stump Pass?

22. Would you be willing to accept a tax increase to support this program?

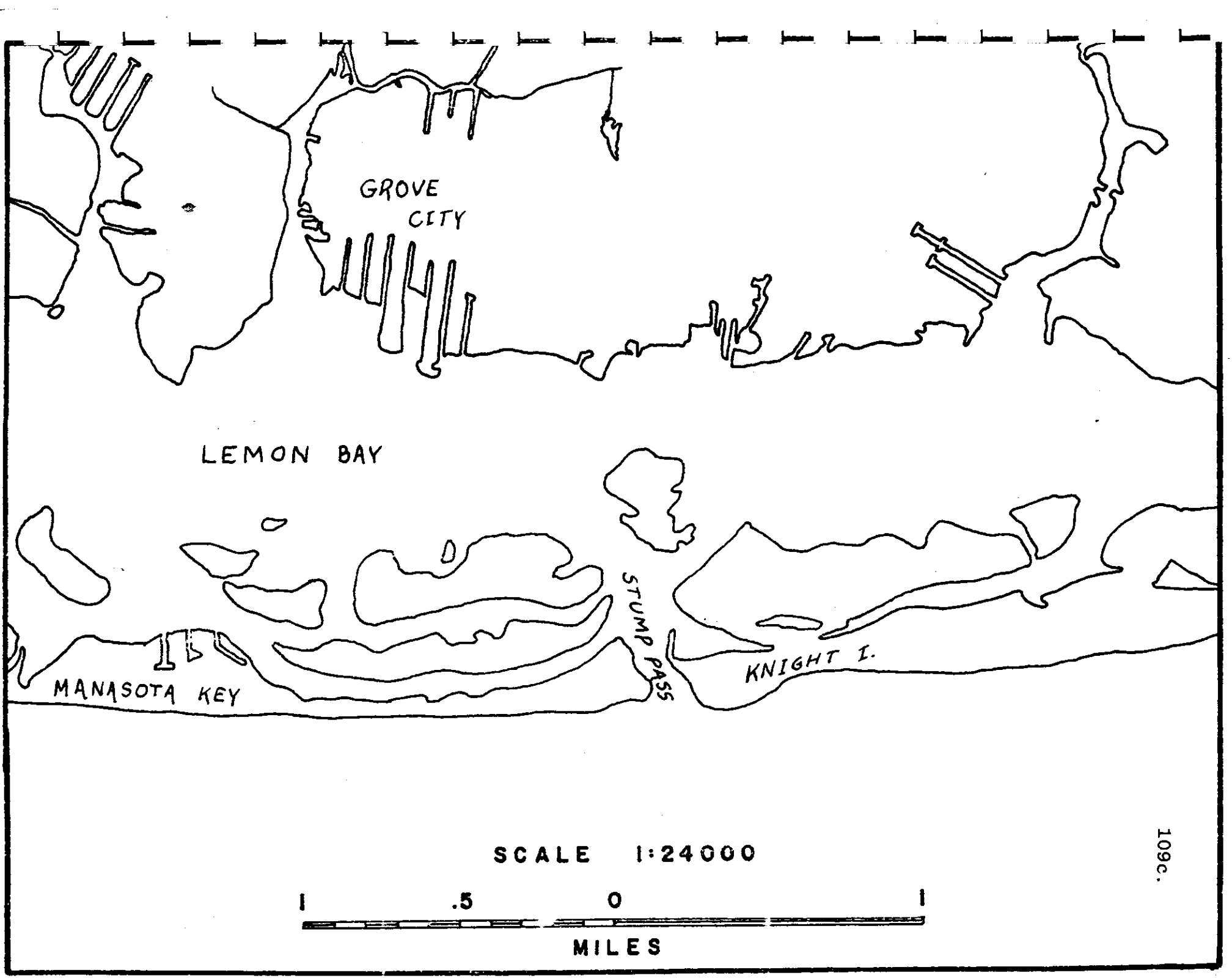
23. Do you have any feelings about future development in this area?

24. What hazards, if any, do you perceive here as a result of man's influences?

25. What naturally occurring hazards, if any, do you perceive here?

26. Please indicate on the accompanying map the places you visit most often.

27. If you would like to add any further comments please do so.


GROVE
CITY
LEMON BAY
STUMP PASS
KNIGHT I.
MANASOTA KEY
SCALE 1:24000
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MILES

109c.

RECOMMENDATIONS

The Recommendations for the management of the Port Charlotte Beach Recreation Area outlined in this section are based on the data presented in the preceding sections. Three main topics of management concerns include: Entry to the Park; Recreational Facilities; and Protection of the Natural Systems. Considerations for the management recommendations stated here roughly follow the guidelines in The Florida Department of Natural Resources, Division of Recreation and Parks' Unit Classification System and the issues discussed at the State Park Policy Issues Conference held in Tallahassee September 10-11, 1975. Summarily the Unit Classification System criteria for state recreation areas provides for major emphasis on providing active recreational opportunities, with resource considerations having secondary consideration; encouragement of active recreational pursuits over passive pursuits; and development aimed at maximizing the area's recreational potential. One primary concern of this report is seeking a balance between protecting the integrity of the natural systems of the area and allowing recreational pursuits which the people who use the area desire.

1) Encourage the use of boats as the major means of entry to the park area. Discourage, but do not prohibit the use of automobiles as a means of entry to the park.

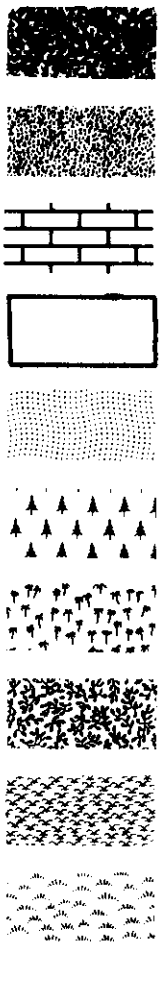
According to the survey conducted as a part of this study 40% of the users of this area arrived by boat, 36% by car and 23% by foot. As no parking spaces are provided at the entrance to the park, those people who arrive in automobiles must utilize whatever parking space they are able to find nearby. There is space for these cars to park on state owned property adjacent to the north entrance to the recreation area. (Figure). When more than three cars are present they must park along the roadside adjacent to a nearby vacant lot. Some park illegally in the lots of nearby motels, particularly the Sea Star. However, the north end of the recreation area is not a feasible site for a parking lot. This portion of the key is narrow and low lying and subject to overtopping (flooding) during storms. The current flowing through Skier's Channel inhibits the natural expansion of the shoreline on the bayside. This is also the former site of the main channel of Stump Pass (See chapter on Shoreline Changes), and may be subject to reopening in the event of a major storm.

Two nearby public beaches provide adequate paved parking

FIGURE 1

Aerial View of the Area Immediately
Adjacent to the Northern Boundary
Of Port Charlotte Beach State Recreation Area.

KEY TO THE MAP



..... Public Roadway

..... Private Drives and Parking Lots

..... Houses and Motels

..... Docks

..... Unvegetated Beach

..... Australian Pines

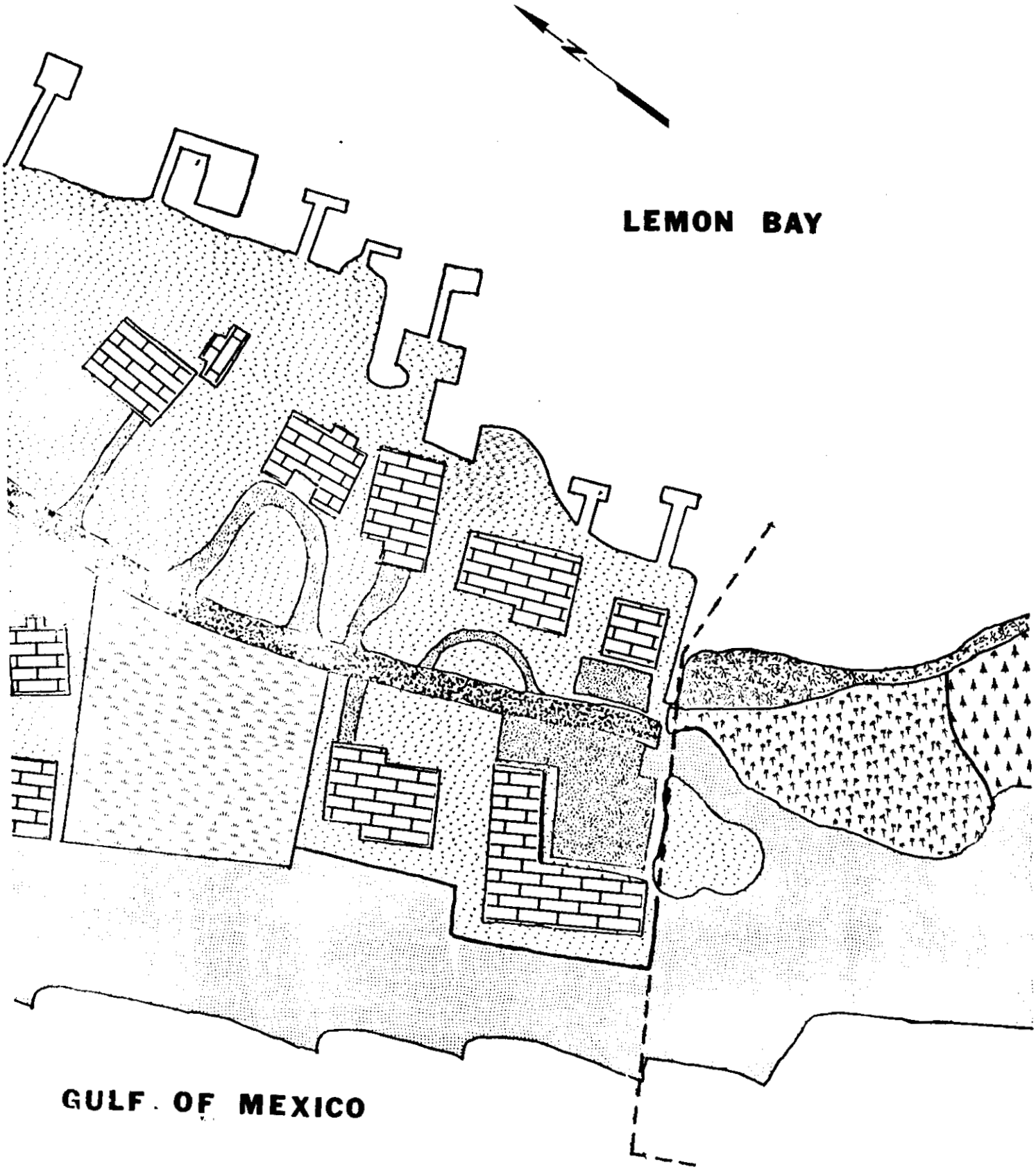
..... Native Upland Vegetation

..... Mangroves

..... Landscaped Lots and Patios

..... Vacant Lot

..... Approximate Park Boundary


LEMON BAY
GULF OF MEXICO

areas for those who choose to drive automobiles to the beach. Englewood Public Beach is located less than one mile north of the recreation area, and Manasota Public Beach is located six miles north of the recreation area. Both sites are readily accessible whenever parking is not available at the Port Charlotte Beach State Recreation Area.

Few beachfront sites are available and suitable for use by the boating public. The area around Stump Pass affords navigable waters, safe anchorage, and ease of access from the site of anchorage to the beachfront. Boaters are able to beach their boats well away from swimming areas, so as not to endanger people swimming in the Gulf of Mexico. Ramp facilities are available at private marinas in and around Englewood, and a public ramp is located at the west end of the Tom Adams Causeway, State Road 776. Having these natural advantages and nearby facilities makes the area around Stump Pass suitable for identification as a predominately boater oriented state recreation area.

Taking an attitude of salutory neglect towards the parking of automobiles at the north end of the park would still allow access to those who must drive to this site. The limiting factor to the numbers of people who could arrive in this manner would be the number of parking sites along the road. However, an official stance of predominately boat access would identify this area as being of primary interest to the boating public.

2) The recreation area should be left in an undeveloped condition, with no man-made facilities.

The majority of people interviewed on the beach stated that they came to this particular beach because of its "Natural Conditions" (See section on Beach Use Survey) and would make no changes in the park if it were theirs to manage. Ninety percent of those interviewed also said that they could do everything which they desired to do with the park in its undeveloped state. The main activities of visitors to this area are beachcombing, fishing, skiing, and swimming during the summer. Two nearby public beaches, Englewood Public Beach and Manasota Public Beach, located one mile and six miles north of the recreation area respectively, offer facilities such as washrooms and showers, picnic tables, running water, and charcoal grills for fire. These areas are readily accessible to those people who would like the use of such facilities. With a large number of people desiring access to a "natural" site, it would be in the best public interest to leave the Port Charlotte Beach Recreation Area undeveloped.

As it now stands, camping is prohibited within the recreation area due to a lack of sanitary facilities. The soil

that is formed in the park is not suitable for septic tank systems, due to the high water table, excessive permeability, and lack of organic material inthe soil (see section on soils). A larger number of users of the beach indicated they would prefer to see no camping than said they would like to have camping facilities. Even though camping is not allowed, small numbers of people continue to camp for short periods of time on Manasota Key and the adjacent islands. Also, many boaters camp on their boats, yet are moored within the recreation area. It is expected that some people will continue to camp in the recreation area, even though facilities are not provided and signs prohibiting camping are placed on the beach. The impact of the campers is light enough that the presence of campers can be overlooked, unless definite problems arise from large numbers of campers using the area.

3) Exotic plants, particularly the Australian Pine and Brazilian Pepper, should be controlled where they are disrupting native plant communities and causing hazardous conditions.

The Australian Pine is the most problematical of the exotic plants formed in this area. It is easily established in disturbed sites, and in early succession communities where plant density is low. Once established it usually grows to the exclusion of other plants. This is particularly harmful along beachfront areas, where the Australian Pine out competes the native beach stabilizing vegetation. The Australian Pine lacks a dense ground level foliage and is therefore incapable of trapping and holding wind or water borne sand particles. When the land under Australian Pines is washed by waves or blown by the wind, the sand is carried away, eroding the beach and eventually causing the trees to topple into the water and die. These fallen trees are hazardous to swimmers, beachcombers, and certain marine animals such as sea turtles.

The Brazilian Pepper is another exotic which tends to outcompete native plants of this area. Like the Australian Pine it is easily established in disturbed habitats or communities with much open ground. The Brazilian Pepper, if left uncontrolled, can eventually grow to be the dominant plant in many of the communities found in the study area. Already it is fairly common in the Protected Dunelet Field habitat, and is becoming abundant in the Cabbage Palm habitat, particularly in those areas affected by fires.

The most effective action that could be taken at this time would be cutting down the existing trees, primarily along the beachfont areas, and following this with the removal of seedlings every few years. This would remove the problem plants and allow the native plants to regain an equilibrium.

A major factor in determining which Australian Pines should be removed is their usefullness to humans. The Australian Pines afford the only habitat where people can seek shade on relatively open ground in the park. This is of concern along the northern half of the Port Charlotte Beach State Recreation Area, where many people gather under the pines to picnic and rest from the sun. Retaining some of the Australian Pines in this area would benefit the people who use this beach. This will be discussed further in the following recommendations.

4) Plantings of native plants, particularly the Sea Oats, should be made in disturbed and barren areas along the length of Manasota Key.

Along Manasota Key are sites that have been affected by storm tides, motor vehicles, and other human activities. Such activities have left areas of the beachfront vegetation in a sparse condition, or in some cases defoliated. These disturbed areas are more subject to erosion than those with a healthy flora and dune ridge. Plantings of Sea Oats would help to protect the shoreline by stabilizing the sands and building a dune ridge. Care would have to be taken to prevent newly planted vegetation from damage by human foot traffic. One means of doing this is by delineating meandering paths through the planted areas. As the plantings become established the pathways would remain obvious to people walking through the site. A meandering footpath would not be subject to blowouts and wash outs such as occur with straight pathways out through dune sites.

Plantings would also be beneficial along the beach edges of stands of Australian Pines. At present, much of the area vegetated by the Australian Pine is subject to overwash during storm periods. A healthy native community of dune building plants on the Gulf facing side of these stands would help to prevent overwash and erosion. In these sites it would also be suitable to provide meandering footpaths to allow people access to the areas of Australian Pines behind the planted sites.

5) The land adjacent to Stump Pass on the south should remain in an undeveloped state, preferably by means of public acquisition.

The lands both north and south of Stump Pass are integral to the identity and recreational value of the Stump Pass area. Fishermen are frequently found around the eastern shore of Thornton Key, and the lagoon between Knight Island and Thornton Key is a popular mooring site for pleasure boaters. Boaters from as far away as the Sarasota-Bradenton area (35 miles north) regularly visit this particular lagoon, due to its unique location providing navigable waters, safe anchorage, and ease of access to the beach in such a pristine area. The development of the upland areas would detract from the "naturalness" of this area and hinder the free use of this site as an anchorage, picnic area, beach, and fishing site.

The development of the land south of Stump Pass would also have a negative effect on those people who primarily use the beach on Manasota Key. One of the major attractions of this beach is the secluded feeling and scenic view found at the southern point of Manasota Key. Residential developments south of Stump Pass would eliminate the pristine visual character of the area. Public purchase of these lands would permit their management in terms of recreational and conservational value.

6) The name "Port Charlotte Beach State Recreation Area" should be changed to "Stump Pass State Recreation Area" in order to more accurately describe its geographic location.

Stump Pass is the predominate natural feature of the recreation area. Incorporating "Stump Pass" in the name of the recreation area would more accurately reflect the nature and location of the recreation area than does "Port Charlotte." Port Charlotte is a city located some 25 miles from the recreation area. "Stump Pass" would also be preferable to "Englewood" or "Manasota Key" as two nearby public beaches already utilize these geographic names.

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"... and so there ain't nothin' more to write about, and I'm rotten glad of it, because if I'd 'a' knowed what a trouble it was to make a book I wouldn't 'a' tackled it ..."

Huck Finn