Colonial Bird Monitoring in South Florida National Parks.

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Colonial Bird Monitoring in South Florida National Parks

The colonial bird monitoring system has been developed to provide systematic coverage of colonial birds nesting in south Florida national parks. Coverage includes Everglades National Park, Biscayne National Monument, Big Cypress National Preserve, and nearby areas. Species monitored are Great White Herons, Great Egrets, Snowy Egrets, Louisiana Herons, Little Blue Herons, Cattle Egrets, White Ibis, Wood Storks, Brown Pelicans, Double-crested Cormorants, Laughing Gulls and Least Terns. The purpose of the monitoring system is to provide information on population status sufficient to determine yearly variation in numbers of nesting birds and to detect long-term trends in the population status of colonial birds in south Florida national parks.

Colonial wading birds as a group were probably the first species of wildlife to be monitored in south Florida parks. These species have been censused in some form since Audubon wardens began guarding nesting colonies from plume hunters in the early 1900's. In response to declining population levels, the National Park Service initiated intermittent aerial census and monitoring flights in the 1960's. These early flights emphasized particular species, such as Wood Storks and Great White Herons, that were subjects of detailed studies. During 1973-1974, Ogden, Kushlan, and Tilmant (1978) systematically covered much of the Everglades to obtain data on population movements of Wood Storks. The first systematic monitoring of south Florida wading bird populations was conducted in 1974-1975 in cooperation with a U.S. Fish and Wildlife Service survey of the east coast of North America. The results, published by Kushlan and White (1977a), provided the foundation for the development of a monitoring system for colonial birds in south Florida national parks. Techniques including the use of helicopters (Kushlan in press), were tested. This report details the procedures used to conduct colonial bird monitoring in south Florida national parks.

GENERAL METHODS

The colonial bird monitoring is conducted from a fixed-wing aircraft and/or helicopter every month of the year in south Florida national parks and nearby areas (Fig 1). The flight schedule alternates from 3 days of fixed-wing flights one month to 2 days of flights the next month, the first day by fixed-wing and the second day by helicopter, beginning with a 2-day flight in October. Daily flights take no more than 6 hours, and actual time depends upon the extent of bird activity. Observers are the pilot and wildlife biologist. Only one additional passenger, not susceptible to air sickness, is allowed because extra weight limits maneuverability of the aircraft at low altitudes. Methods of daily flights vary and are discussed for each day of the 3-day and 2-day flights.

Flight Procedures

Certain procedures are followed to help minimize possible effects of aircraft near colonies. The colony is approached by first circling it at a distance, either altitudinally or horizontally, to acclimate the birds to the presence of the aircraft. Airplanes are generally flown around the periphery of the colony. Helicopters are flown slowly, not hovering, over the colony. Close attention must be paid to birds in flight and notes are taken on any disturbances seen.

Three-day Flights

The primary objective of the 3-day flights is to cover the entire monitoring area in an effort to locate new colony sites. Additionally, all known colonies are checked. For these flights, south Florida is divided into 8 monitoring areas shown in Figure 2:

Biscayne Area	Day 1, morning
Florida Bay Area	Day 1, morning and afternoon
Cape Sable Area	Day 2, morning
West Coast Area	Day 2, morning
Big Cypress Area	Day 2, afternoon
Conservation Area	Day 3, morning
Loop Road Area	Day 3, morning
Shark Slough Area	Day 3, afternoon

Day 1

Coverage on day 1 of the 3-day flights includes colonies in the Biscayne area (Fig. 3) in the morning and complete coverage of Florida Bay keys (Fig. 4) in the morning and afternoon. After takeoff from Pine Island airstrip, the census begins by checking West Arsenicker and a colony south of Billy's Point (Fig. 3). The flight route continues from Billy's Point to Cormorant Rookeries which is in Barnes Sound just outside of the Everglades National Park boundary. This is the start of the Florida Bay area (Fig. 4). All keys are checked closely for Great White Herons, the least colonial of the species nesting, that are monitored. About half of the bay can be completed before refueling is necessary. Returning to Pine Island for fuel, the route passes by Madeira colony. Returning to the bay the flight route covers the western bay keys. Keys where colonies are known to be located are censused carefully. These are labeled in Figure 4. Day 1 is completed after checking Cuthbert colony site on the return to Pine Island.

General flight procedures for Day 1 are as follows: The perimeter of each key or keys, if there are several small keys together, is covered; and 1 or 2 passes are flown down the middle of the larger keys. The plane is flown at an altitude of 250 feet and no higher than 300 feet. When nesting birds are sighted the aircraft is lowered to 100-150 feet. At least 2-3 passes are taken over colonies to obtain an accurate nest count.

Day 2

Day 2 of the 3-day flights covers 3 areas: Cape Sable (Fig. 5), West Coast (Fig. 6), and Big Cypress (Fig. 7). After leaving Pine Island, the census begins along the southern edge of Cape Sable (Fig. 5) and is flown at an altitude of 500 feet. Two known colony sites, East River and Lane River, are checked on the last flight loop. After Cape Sable, coverage of the West Coast area (Fig. 6) begins near the mouth of the Shark River and continues north along the west coast. Duck Rock, Little Pavilion Key, and Chokoloskee are known colonies sites checked. The route loops south to the Shark River and again heads north near the eastern edge of the mangrove habitat. On this transect north the island colony in Rodgers River Bay colonysite is checked. These 3 transects along the west coast should be flown at an altitude of 500 feet. Fuel is usually needed upon completion of the West Coast Survey, and is obtained in Naples.

Coverage of the Big Cypress area (Fig. 7) begins in the afternoon at the southwest boundary, north of Tamiami Trail. This area is flown at 1000 feet along 10 transects that are 3 miles apart. When an aggregation is sighted the aircraft is lowered to determine whether the birds are actually nesting. Colonies may develop north of the jetport.

Day 3

Coverage on Day 3 includes the Conservation Areas and east Everglades (Fig. 8), Loop Road (Fig. 9), and Shark Slough (Fig. 10) areas. The census begins by checking the Taylor Slough colony site. The route meanders north just east of the Everglades National Park boundaries, through the east Everglades. Previously active colonies near Context Road and Chekika State Park are checked. Upon reaching Tamiami Trail the route continues north into Conservation Area 3B. Colony sites on tree islands just east of Levee 67 are checked. The route continued into Conservation Area 3A to the Andytown colonies near Alligator Alley and returns west of Levee 67 where tree islands are checked for colonies. The route covering these areas ends at the first transect of the Shark Slough area. This first transect is flown west to 40-mile Bend.

The Loop Road area (Fig. 9) is covered upon completion of the Conservation Areas and east Everglades, and upon deviation from the first transect of the Shark Slough area at 40-mile Bend. The 4 transects are 1.5-2 miles apart and are flown at an altitude of 750 feet. Roberts Lake Strand is a known colony site checked.

Coverage of the Shark Slough area continues at the first transect at 40-mile Bend. A total of 12 transects are flown 2 miles apart at an altitude of 500 feet. The western boundary of the monitoring area is the transition between sawgrass and mangroves. Previously active colony sites at 10-mile Corner, Panther Mound SW, Rookery Branch, and Hole-in-the-Donut are checked. Fuel is required during the flight and is obtained at Pine Island.

Two-Day Flights

The primary objective of the 2-day flights is to check all known or suspected colony sites. Many of the known colony sites are shown in Figure 11. The 2-day flights

vary from month-to-month with respect to colonies to be visited depending upon colony activity noted the previous month during the 3-day flights, and on other reports received. The flights must be planned carefully to determine the most efficient flight path to colonies that need to be visited. Active colonies as of 1978 and the species to be expected in each are shown in Table 1.

Day 1

The first day of the survey is conducted from fixed-wing aircraft with the purpose of checking active colonies relatively distant from Pine Island. Additionally, colonies are checked that are composed of species for which a fixed-wing aircraft has proven adequate for nest counts, i.e., pelicans and cormorants (Table 1). Colony sites at Rodgers River Bay, Lane River, East River, Cuthbert, Madeira, Hole-in-the-Donut, and Taylor Slough are also checked, to note if they should be visited the following day by helicopter.

Day 2

The second day flight is conducted from a helicopter. The purpose is to obtain a more exact census of the largest colonies, and to check colonies of those species that require a helicopter for an accurate nest count, such as smaller herons, Laughing Gulls, and Least Terns.

Equipment

Field equipment includes maps and flight data sheets (Appendix 1). Maps used for the 3-day flights include two sets of figures 3 through 10, that are presented in this

report (1 copy for the pilot), navigational charts of Florida Bay that provide the required detail for this area, aerial photographs of Everglades National Park and part of Big Cypress Preserve, and a rough field map of the Big Cypress to aid in colony location. Maps needed for the 2-day flights are figures 4 and 11 and Table 1 of this paper. The flight route is laid out on Figure 11 and stored. Figure 4 is usually sufficient for Florida Bay colony locations. Additionally, the aerial photographs and Florida Bay charts are taken in the event that greater detail may be required. A xerox map from an orthophoto quadrangle with the 3 Big Cypress colonies marked is needed for both the 3 and 2-day flights.

Recording Data

Field

The flight sheet (see Appendix 1) is for field use. As a key or colony is approached the name is recorded. Most Florida Bay keys have been given a specific name for the record. For example, Buchanan Keys are distinguished as Buchanan E and Buchanan W, and Rabbit Keys are referred to as Rabbit-big and Rabbit-little. At first sighting of a colony, the species observed are recorded. For species nesting, the number of nests and stage of nesting are recorded. The number of birds engaged in other activity including feeding and roosting, are recorded. When there is no activity on a key or at a usual colony site, the name is recorded and a zero placed in the species column. The column labeled "other observations" is used to record unusual behavior, notes of interest, animal sightings, unusual concentrations, or other observations.

Office

Data are transferred from the flight sheet to the colony activity form (see Appendix 2) immediately after the flights. Each active colony has an activity form in the activity notebook for that fiscal year. The activity form is similar to the flight sheet. Groups of keys are recorded as separate entities. The date, species, number of nests, stage, number of birds roosting or feeding near the colony, and activity are all recorded. Under comments, only observations that pertain to colonial birds are transcribed. Other interesting observations or sightings are recorded on Wildlife Observation Cards (see Appendix 3). A check is placed by the colony name on the flight sheet for those data that are transcribed to the activity form. It is necessary to add activity forms to the notebook through the year. When a form is added, data from past flight sheets are transcribed to the activity form in chronological order, and the colony is checked off on the flight sheet. If any changes are made in species, number of nests, etc., while transcribing data or later when data are analyzed, old data are crossed out lightly in pencil, and initials of the person changing the information are placed by the changed data. Data taken on ground visits to colony sites and activity noted during other flights are recorded in the colony activity notebook. Notes and data from other pertinent projects or studies (e.g., spoonbill study, Chocoloskee roost censuses) are kept in the back of the notebook under "other data" after being added to the colony activity sheets. Data collected on nesting Brown Pelicans are transcribed to the nesting activity sheet in the pelican notebook.

If a colony is found that had never been recorded, information on the colony is entered into the colony index notebook using the index form (see Appendix 4). The colony is given a descriptive name corresponding to nearby topographic features. Latitude and longitude, general location, and habitat are recorded. Under nesting history, the year the colony was found and species nesting are recorded. A map is xeroxed of the general area and precise location of the colony is circled.

REPORTS

Following monthly surveys a memorandum is written and distributed to district ranger personnel. This informs rangers when colonies are active so that they can decide whether action is necessary to increase protection of the colony site.

Five summary reports are associated with the colonial bird monitoring system during the year. Past reports are listed in the Literature of this report. Four of these are quarterly reports covering nesting activity from October-December, January-March, April-June, and July-September. The fifth report, an annual report covering October-September, is issued in October. Although format will remain fairly consistent, colonies represented by figures may vary from year-to-year.

On the activity form where more than one number was recorded for a species, in a month, the values used for reports are noted on the form and are initialed. All data of nesting activity throughout the year for all colonies are compiled and put on file. Other papers are written when accumulated data warrant publication in biological journals.

Colonial Bird Monitoring Literature

Bass, O. L., Jr. and L. C. McEwan. 1978. Status of colonial birds in south Florida National Parks, January-March 1978. Nat. Resour. Rep., South Florida Research Center.

Bass, O. L., Jr. and L. C. McEwan. 1978. Status of colonial birds in south Florida National Parks, April-June 1978. Nat. Resour. Rep., South Florida Research Center.

Kushlan, J. A. 1978. White Pelican Numbers in Everglades National Park. Florida Field Nat. 6:16-17.

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Kushlan, J. A. and M. C. Baumann. 1977. Status of colonial birds in Everglades National Park, January-March 1977. Nat. Resour. Rep., South Florida Research Center.

Kushlan, J. A. and M. S. Kushlan. 1977. Status of colonial birds in Everglades National Park, April-June 1977. Nat. Resour. Rep., South Florida Research Center.

Kushlan, J. A. and L. C. McEwan. 1977. Status of colonial birds in Everglades National Park, July-September 1977. Nat. Resour. Rep., South Florida Research Center.

Kushlan, J. A. and L. C. McEwan. in press. Colonial birds in south Florida National Park, 1976-1977. Tech. Rep., South Florida Research Center.

Kushlan, J. A. and W. R. Robertson, Jr. 1977. White Ibis nesting in the lower Florida Keys. Florida Field Nat. 5:41-42.

Kushlan, J. A. and D. A. White. 1977a. Nesting wading bird populations in southern Florida. Florida Sci. 40:65-72.

Kushlan, J. A. and D. A. White. 1977b. Laughing Gull colonies in extreme southern Florida. Florida Field Nat. 5:44-46.

McEwan, L. C. and J. A. Kushlan. 1977. Status of colonial birds in south Florida National Parks, October-December 1977. Nat. Resour. Rep., South Florida Research Center.

Ogden, J. C., J. A. Kushlan, and J. T. Tilmant. 1978. The food habits and nesting success of Wood Storks in Everglades National Park in 1974. U.S. National Park Service, Nat. Resour. Rep.

Table 1. Expected species to be found and technique used to monitor active colony sites during the 2-day colonial bird flights. X = key species; (X) other species that may be present.

Colony #[1] & name	Expected Species[2] GE	SE	LH	LB	CE	WI	WS	BP	Corm	LG	LT	Technique[3]
1. Chokoloskee	(X)							X	X			FW
2. Little Pavilion Key									X			FW
3. Duck Rock									X			FW
4. Rodgers River Bay	X	X	X	X		X						H
5. Lane River	X	X	X	X			X					H
6. East River	X						X					H
7. Oyster Keys	(X)								X			FW
8. Frank Key	X	X	X	X	X	X		X	X			FW & H (herons)
9. Palm Key	(X)								X			FW
10. Sandy Key	X	X	X	X					X			FW & H (herons)
11. Bouy SE, Curlew, Pelican, Man of War, Cluett, Pelican E, Little Rabbit, & Barnes Key	(X) Curlew & Barnes								(X) Man of War & Barnes	X		H
12. Lower Arsnicker Keys									(X)	X		H (LG)
13. Upper Arsnicker Keys								X	X			FW
14. Buchanan Key - West	(X)							X	X	X		FW & H (LG)
15. Buchanan Key - East	(X)							X	X			FW
16. Green Mangrove	(X)								X			FW
17. East Key										X		H

Colony #[1] & name	Expected Species[2] GE	SE	LH	LB	CE	WI	WS	BP	Corm	LG	LT	Technique[3]
18. Stake Key										X		H
19. Bottle Key											X	H
20. Cuthbert	X						X		X			FW & H (GE & WS)
21. Madeira	X						X					H
22. Nest Keys								X		X		FW & H (LG)
23. Cormorant Rookeries									X			FW
24. Hole-in-Donut				X	X							H
25. Anhinga				X	X							H
26. Taylor Slough				X	X	X						H
27. West Arsenicker	X			X	X				X			FW
28. Roberts Lake Strand	X											FW
29. Fifty-mile Bend North #2				X								FW
30. Fifty-mile Bend North #1						X						FW
31. Everglades 3 SW #1				X								FW
32. Andytown - East	X	X	X	X	X	X						FW
33. Andytown - West	X	X										FW

[1]Numbers indicate location of colonies in Fig. 11.

[2]Abbreviations for expected species: GE - Great Egret, SE - Snowy Egret, LH - Louisiana Heron, LB - Little Blue Heron, CE - Cattle Egret, WI - White Ibis, WS - Wood Stork, BP - Brown Pelican, Corm. - Double-crested Cormorant, LG - Laughing Gull, LT - Least Tern.

[3]Abbreviations for techniques: FW - fixed-wing aircraft, H - helicopter.

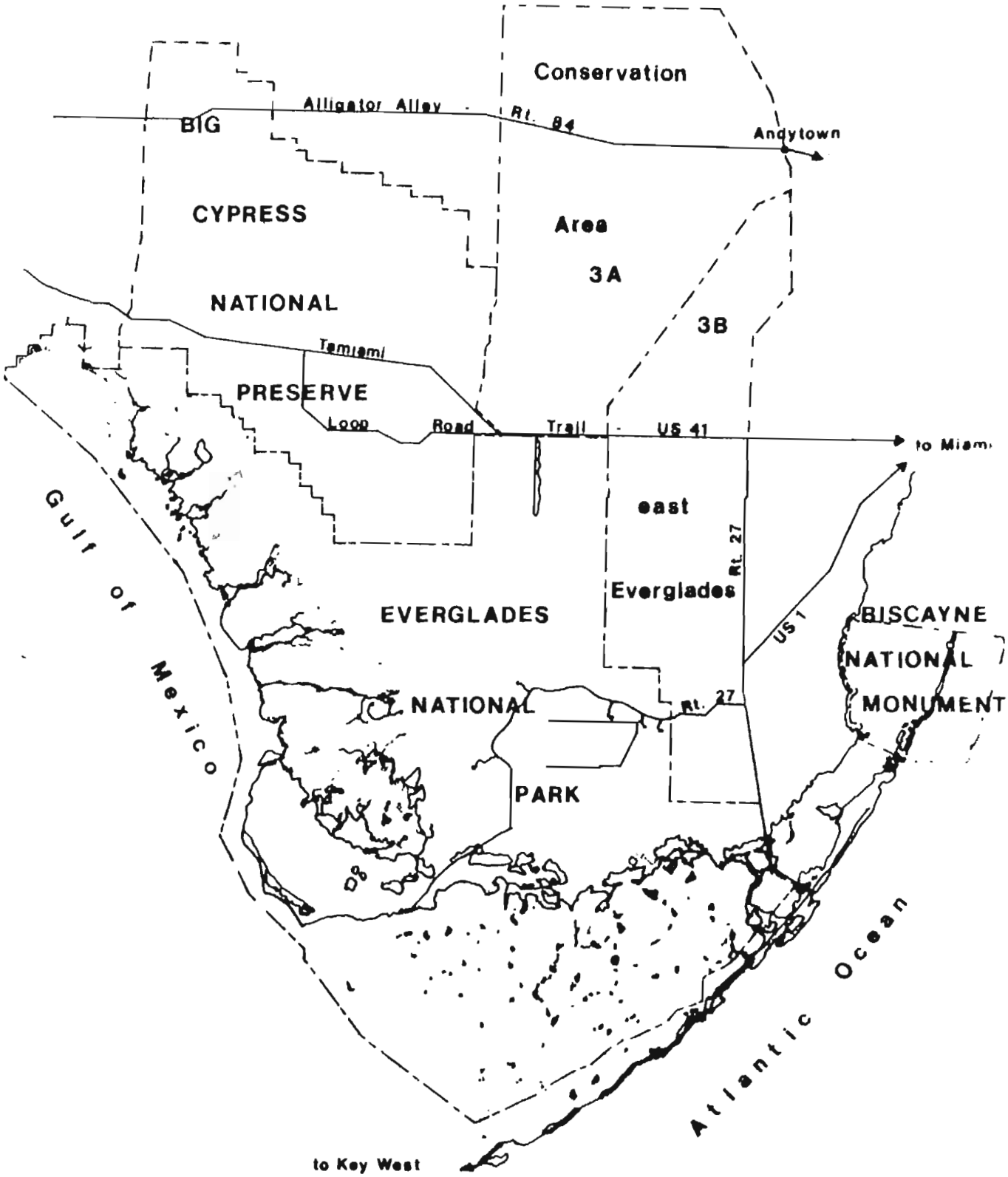

Fig.1. SOUTH FLORIDA NATIONAL PARKS and nearby areas.

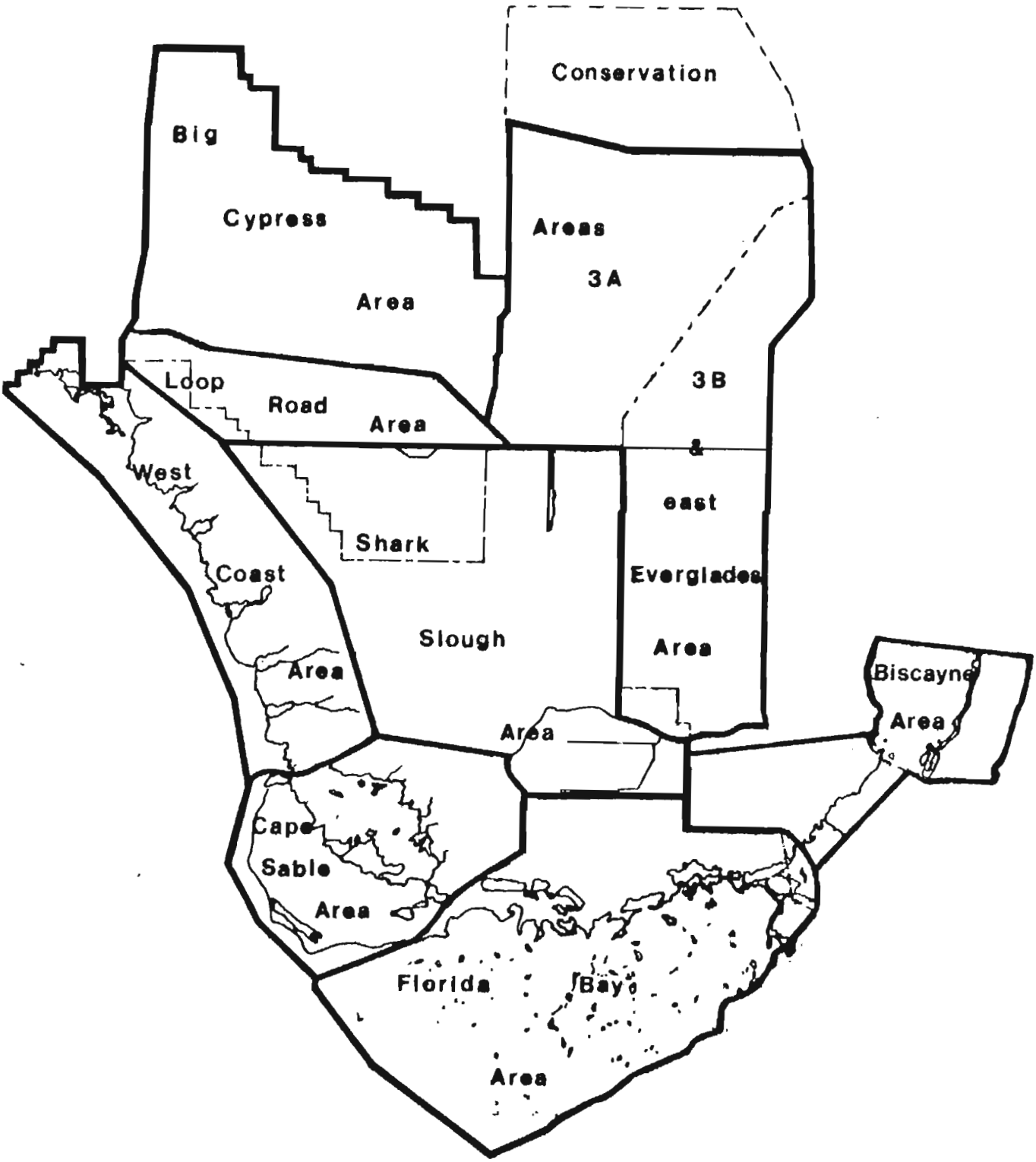

Fig. 2. MONITORING AREAS - 3 DAY

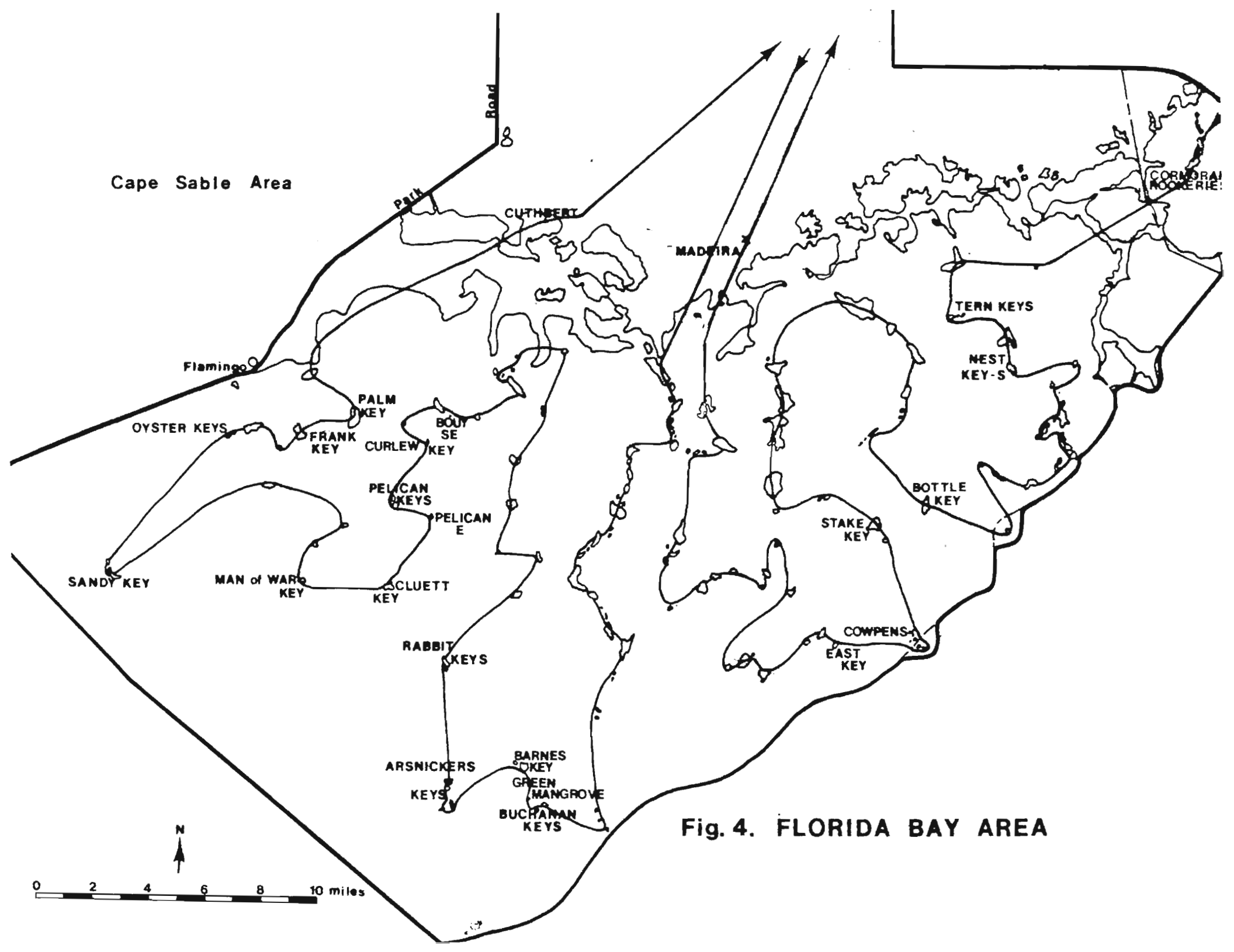

Fig. 4. FLORIDA BAY AREA

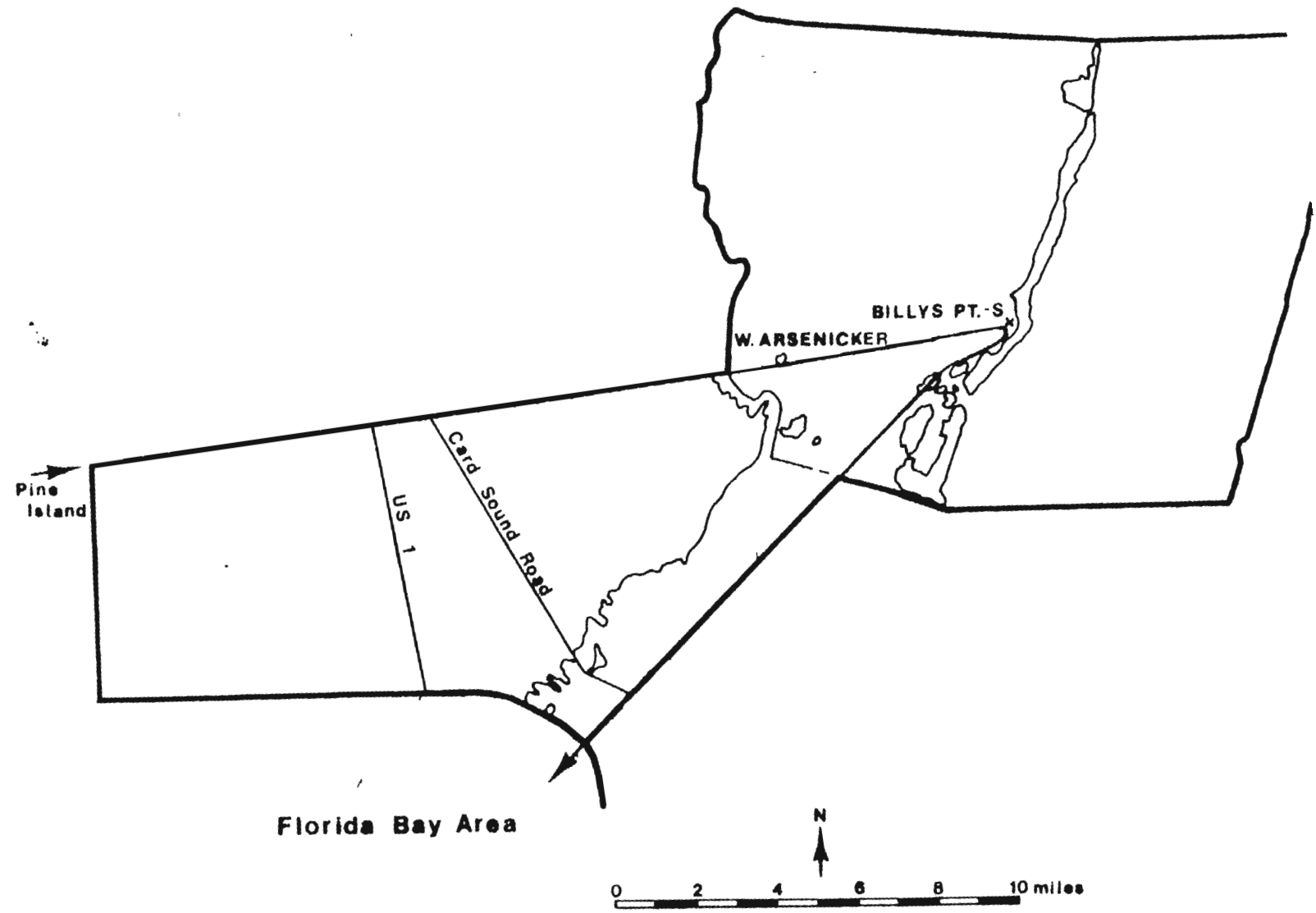

Fig. 3. BISCAYNE AREA

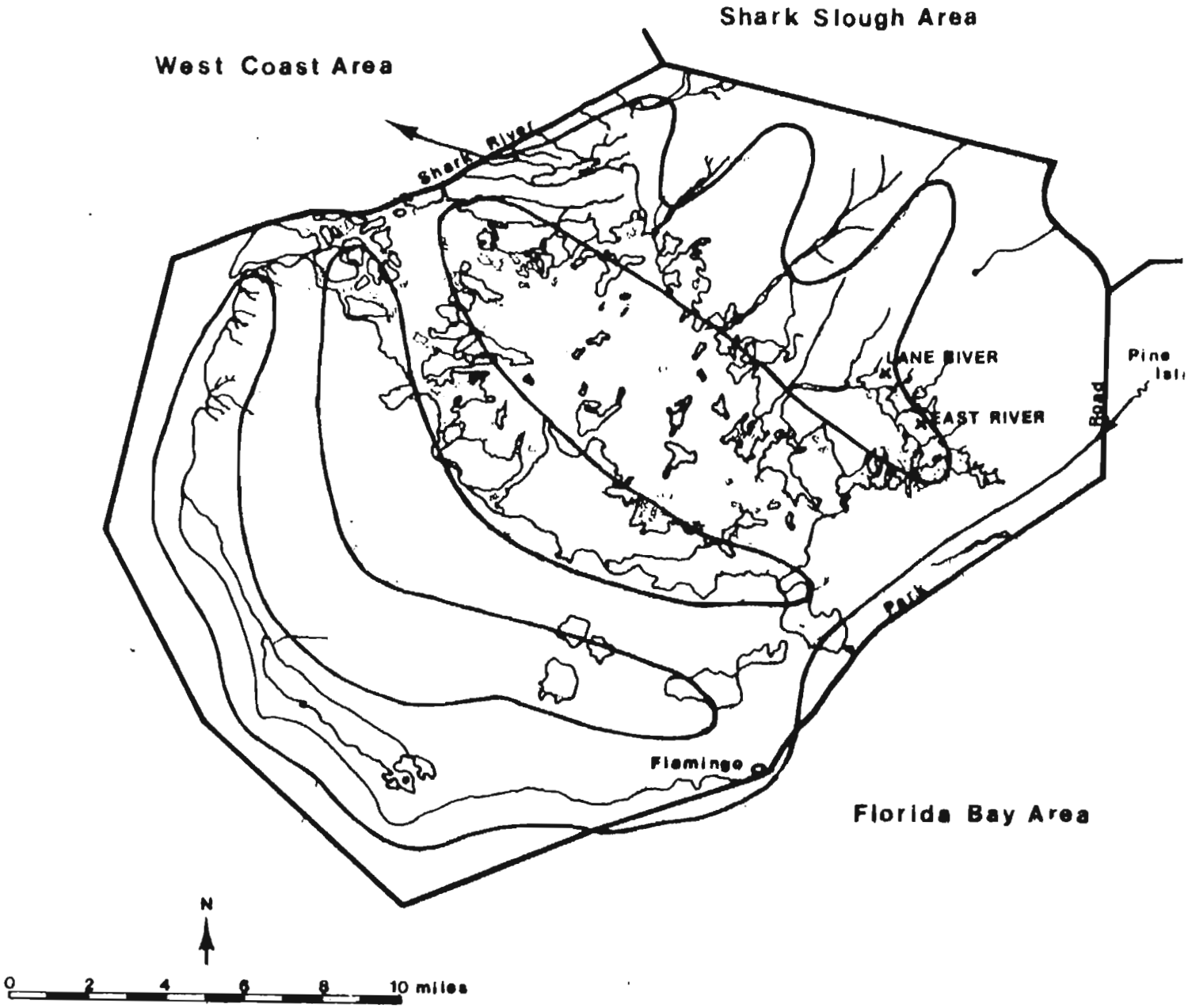

Fig. 5. CAPE SABLE AREA

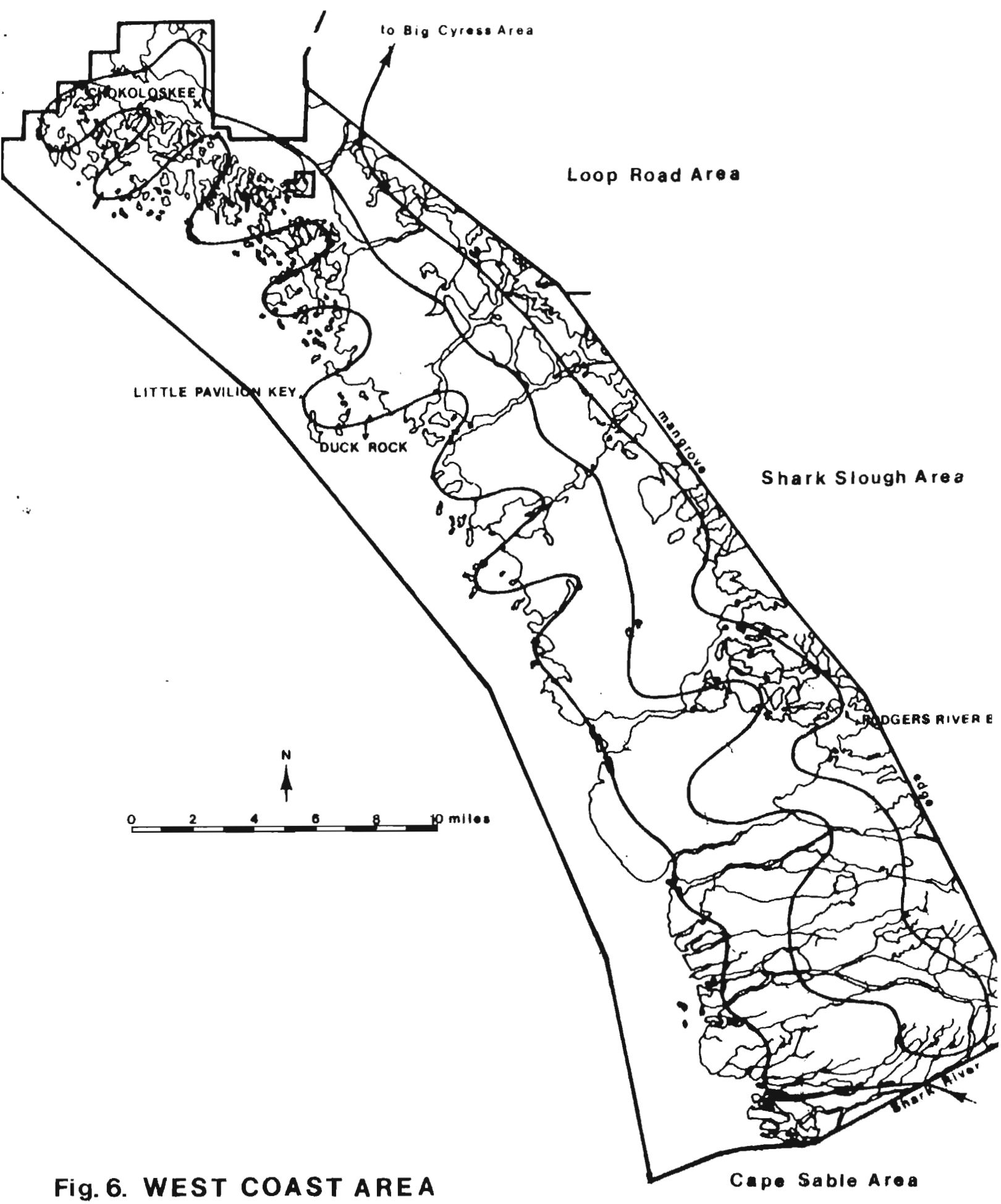

Fig. 6. WEST COAST AREA

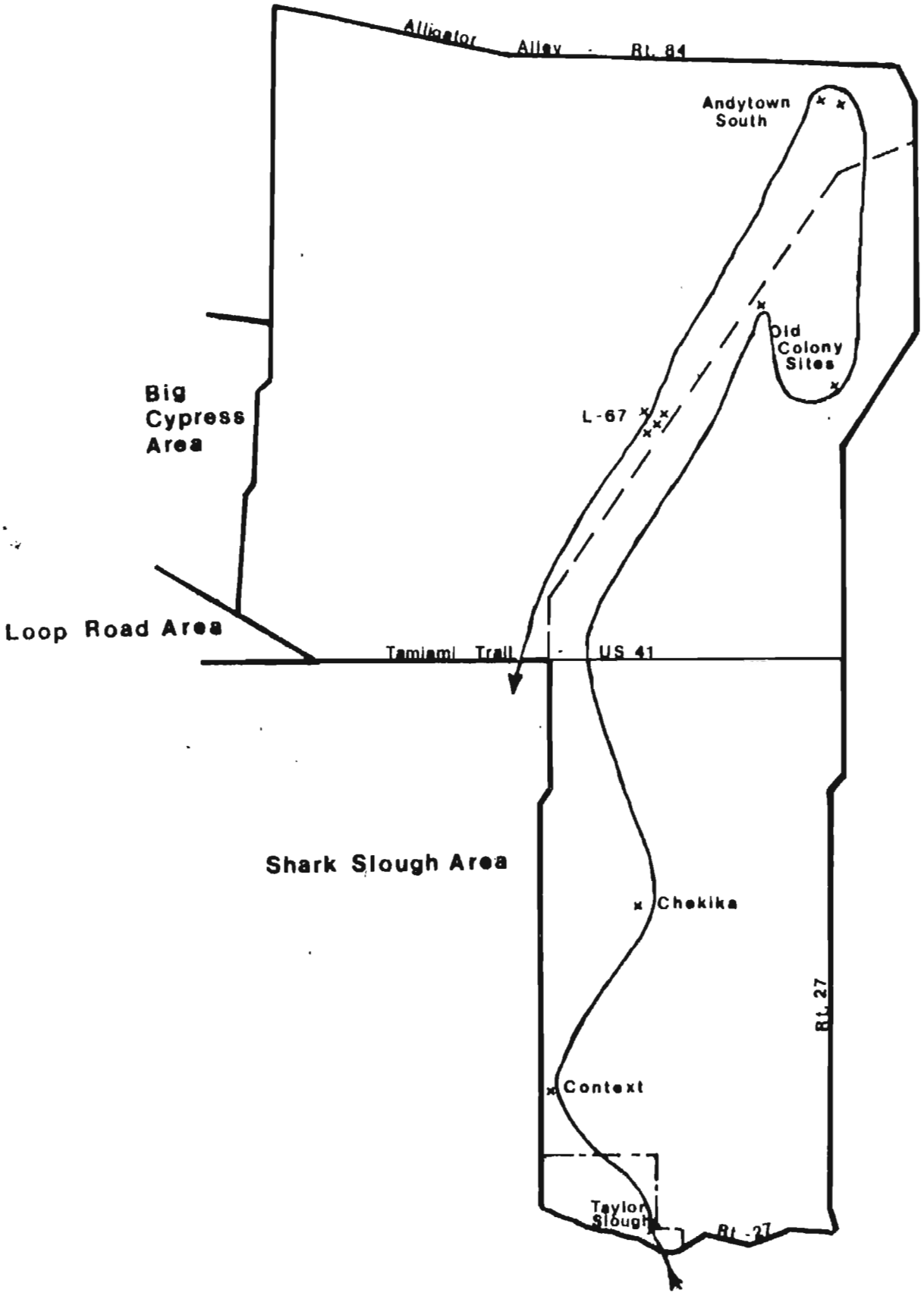

Fig. 8. CONSERVATION AREAS & EAST EVERGLADES AREA

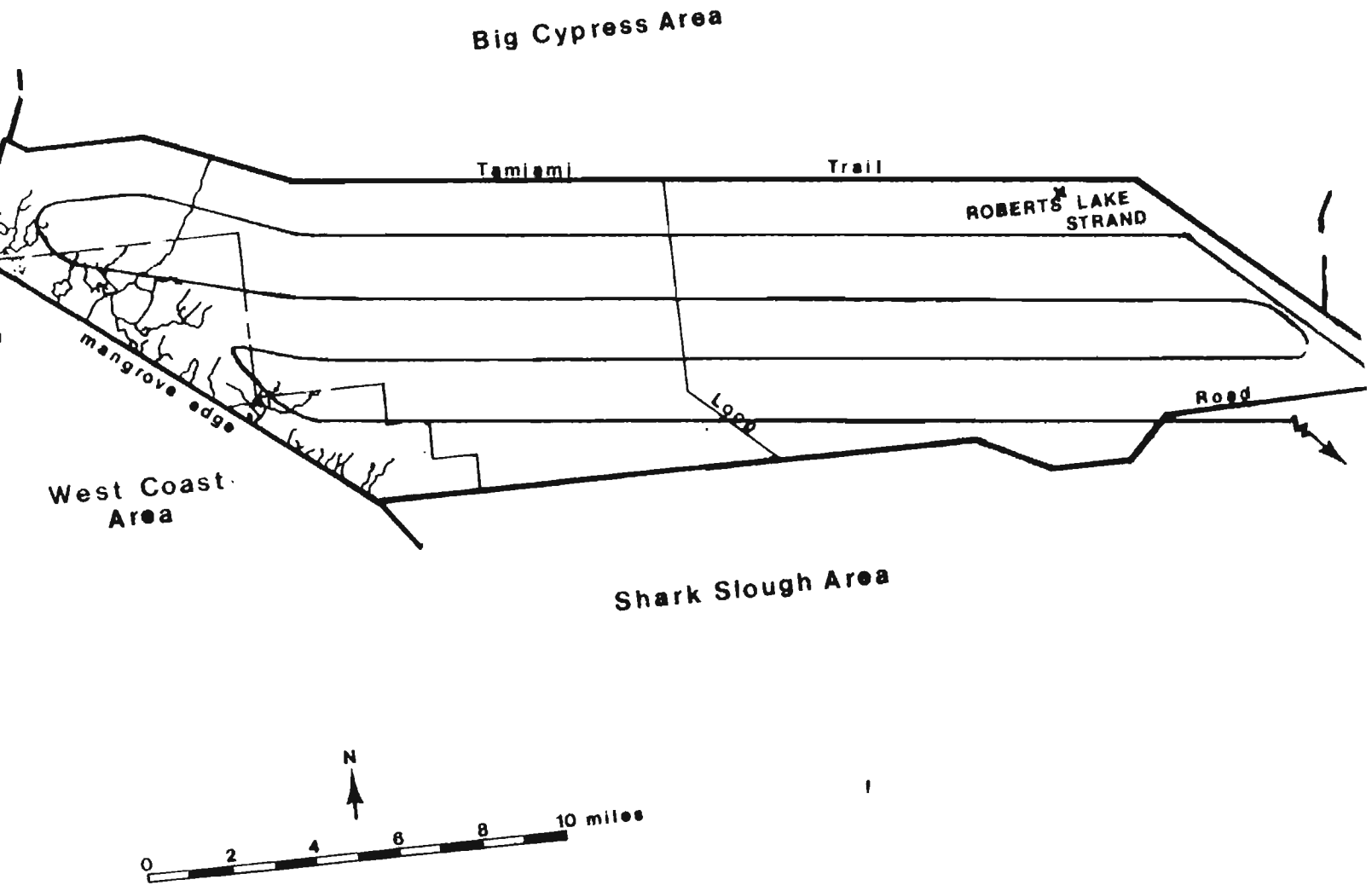

Fig. 9. LOOP ROAD AREA

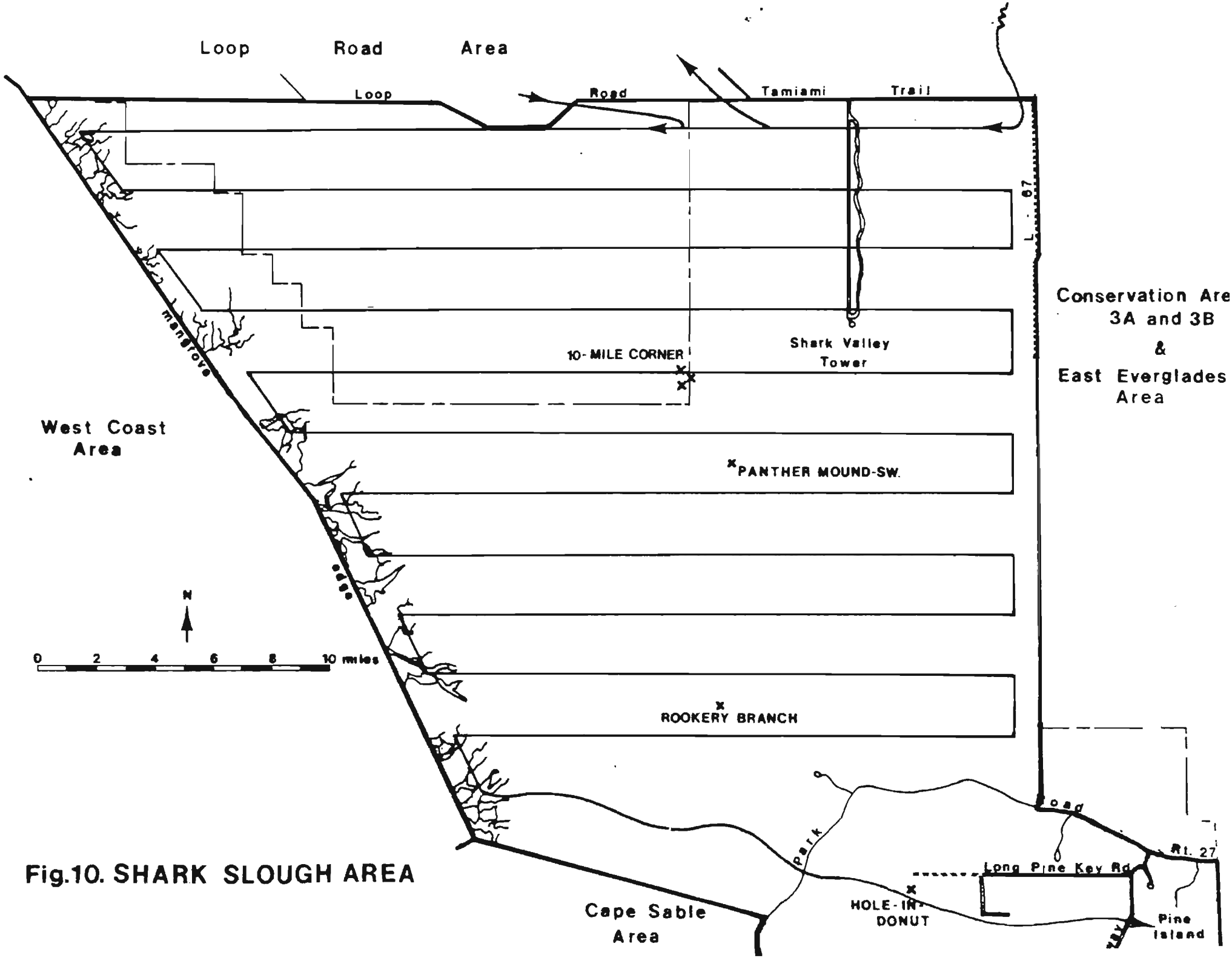

Fig.10. SHARK SLOUGH AREA

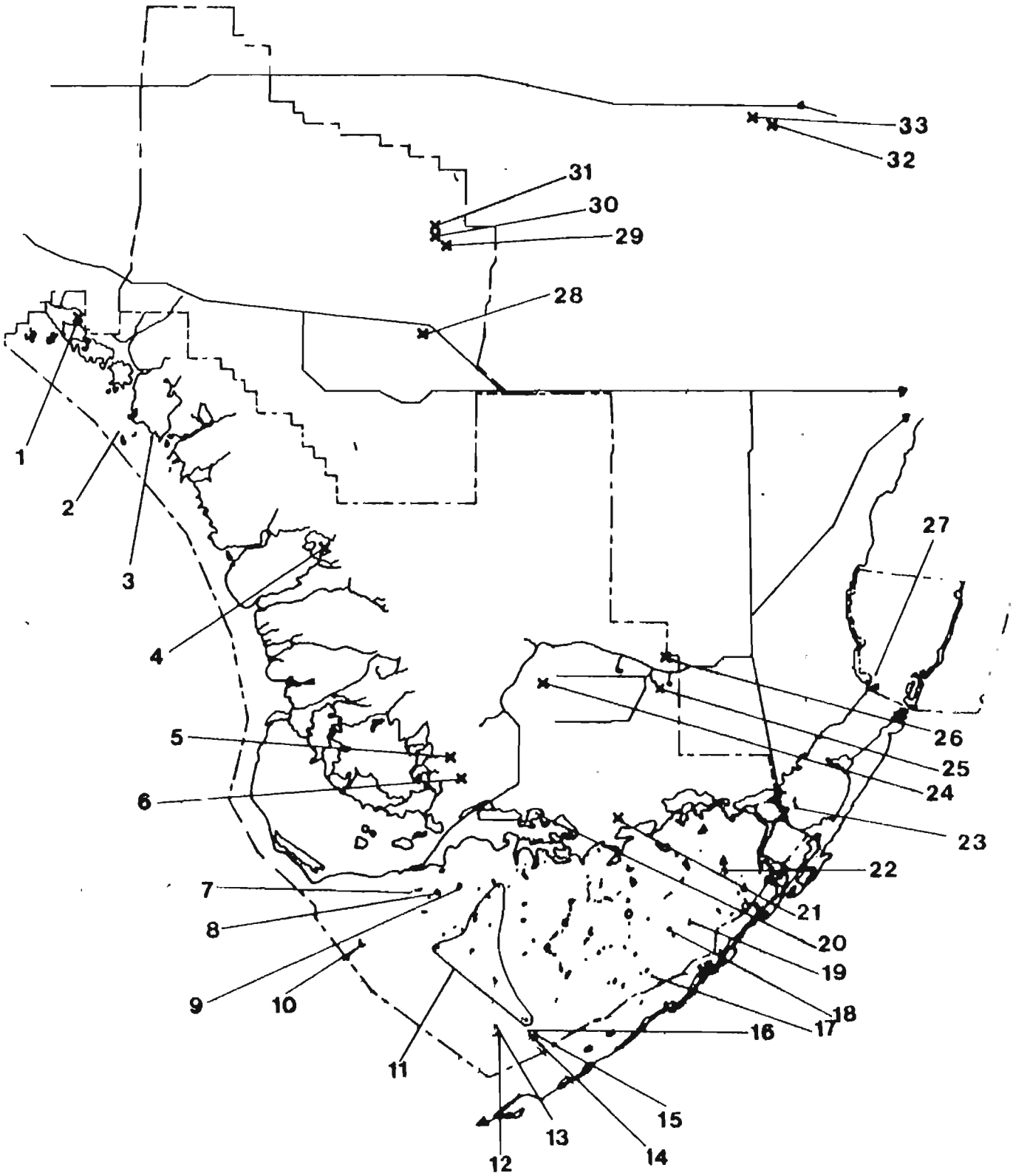

Fig. 11. COLONIAL BIRD COLONIES

Sheet ___ of ___

Date ______________
Observer ______________
Aircraft ______________
Pilot ______________

Appendix I

Colonial Bird Survey
Flight Sheet

Colony Name or Location	Bird Species	# of Nests	Stage of Nesting	# of Birds	Activity	Other Observations

Appendix 2

COLONY NAME ________________________ GRID ____________________

Yr	D	Mo	Species	# Nests	Stage	# Birds	Activity	Comments	Technique	Observer

Appendix 3

WILDLIFE OBSERVATION REPORT

Species		Observed By:
Date (Month, Day, Year)	Time (a.m., p.m.)	Weather
Location (As specific as possible)		
Observation: (Behavior, Number, Sketch, Map, etc.) (Use reverse if necessary)		

BE ACCURATE - DO NOT GUESS

Please send to: Research Division, Everglades National Park, P.O. Box 279, Homestead, FL 33030

Appendix IV

Nesting Colony Index

Colony Name:

Latitude - Longitude:

Township - Range:

Grid:

General Location:

Habitat:

Nesting History and other Activity:

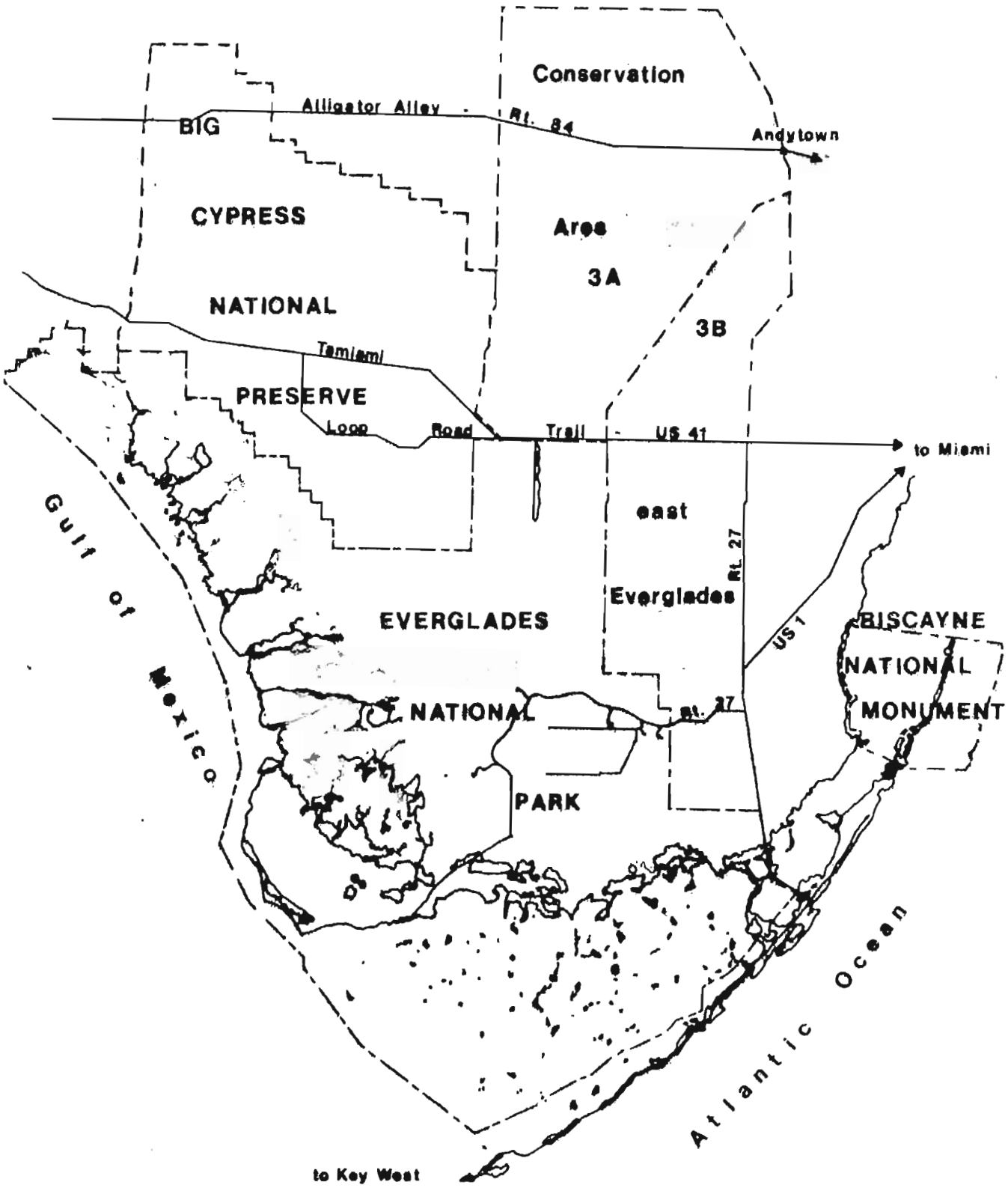

Fig.1. SOUTH FLORIDA NATIONAL PARKS and nearby areas.

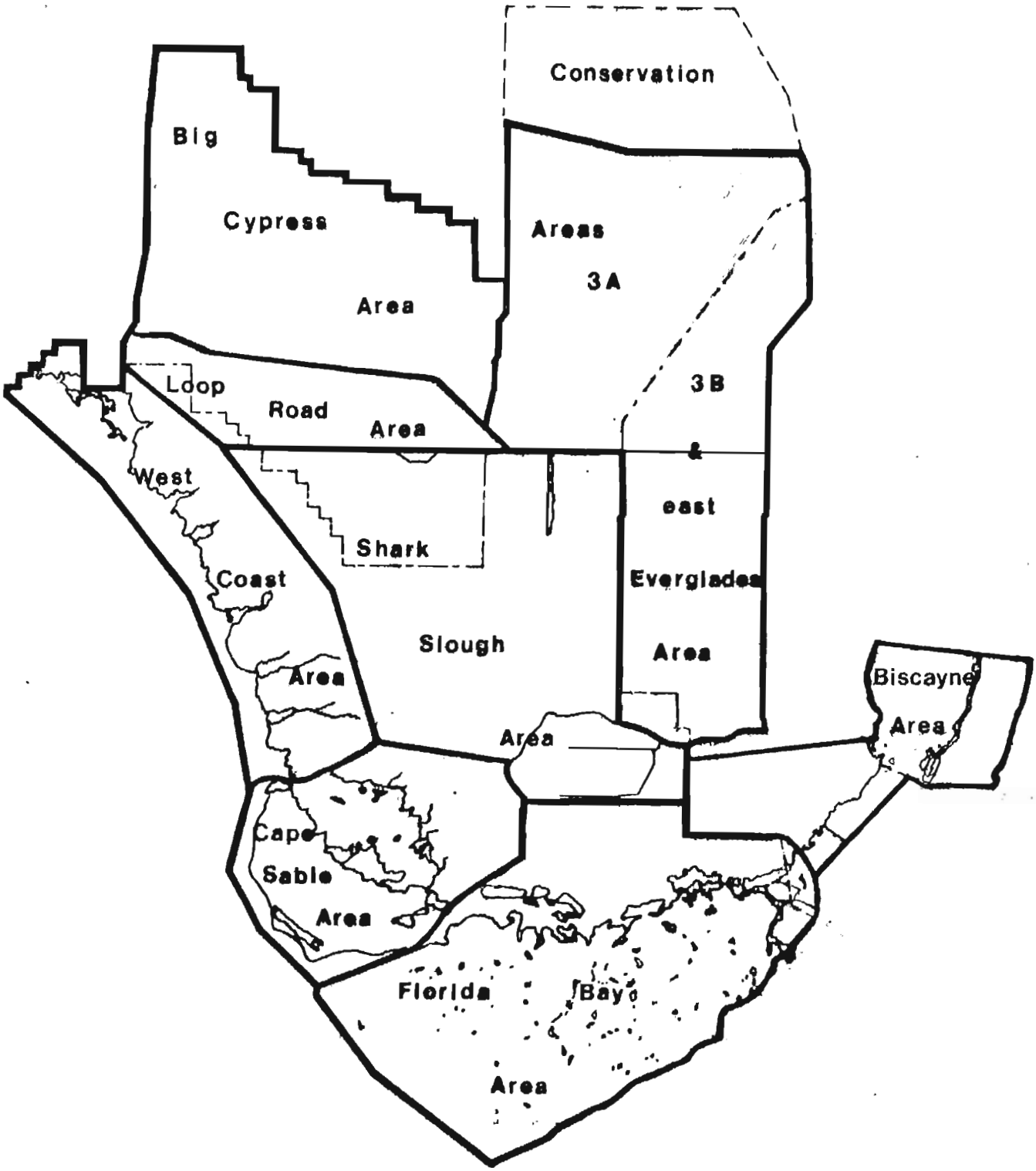

Fig. 2. MONITORING AREAS - 3 DAY

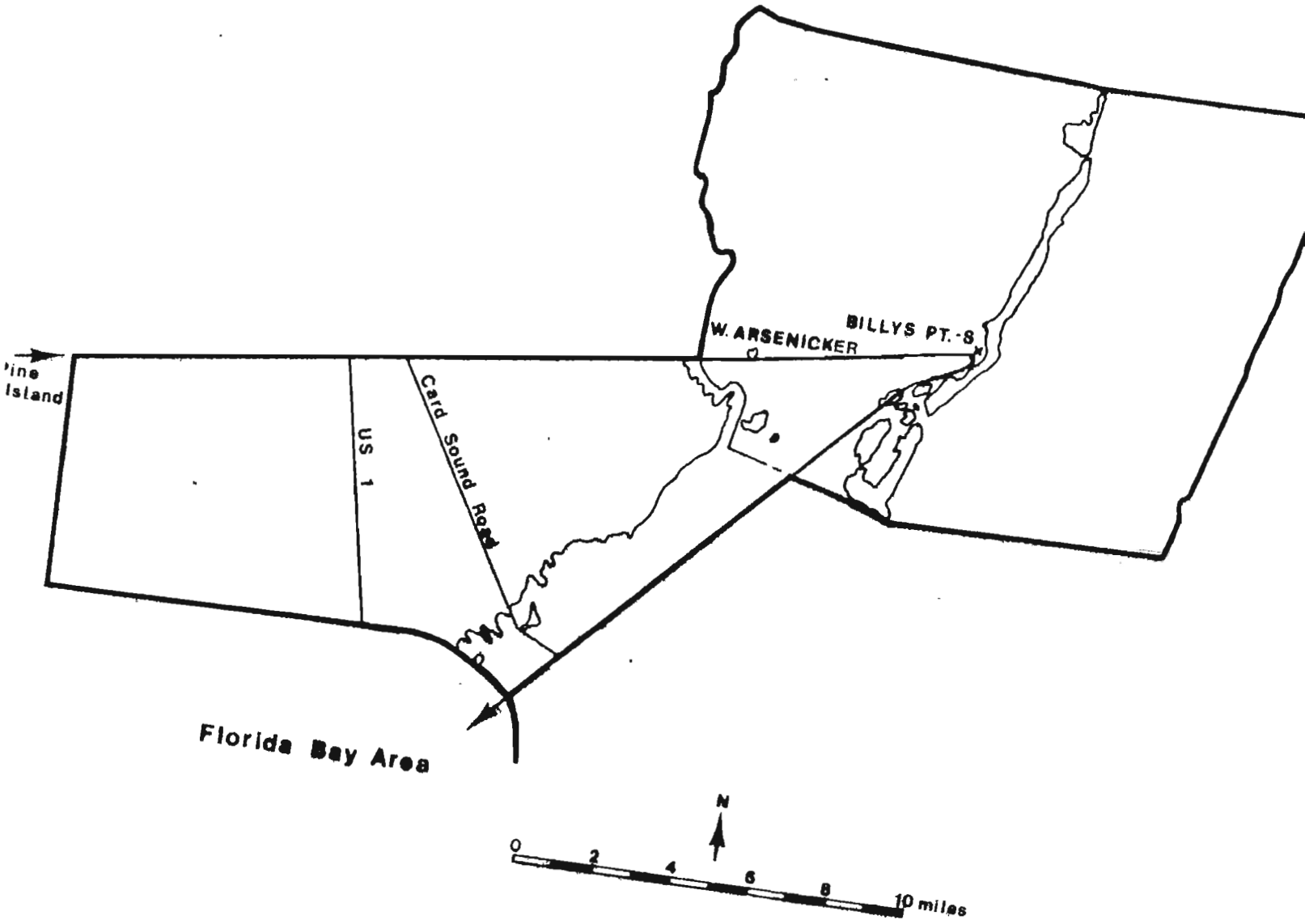

Fig. 3. BISCAYNE AREA

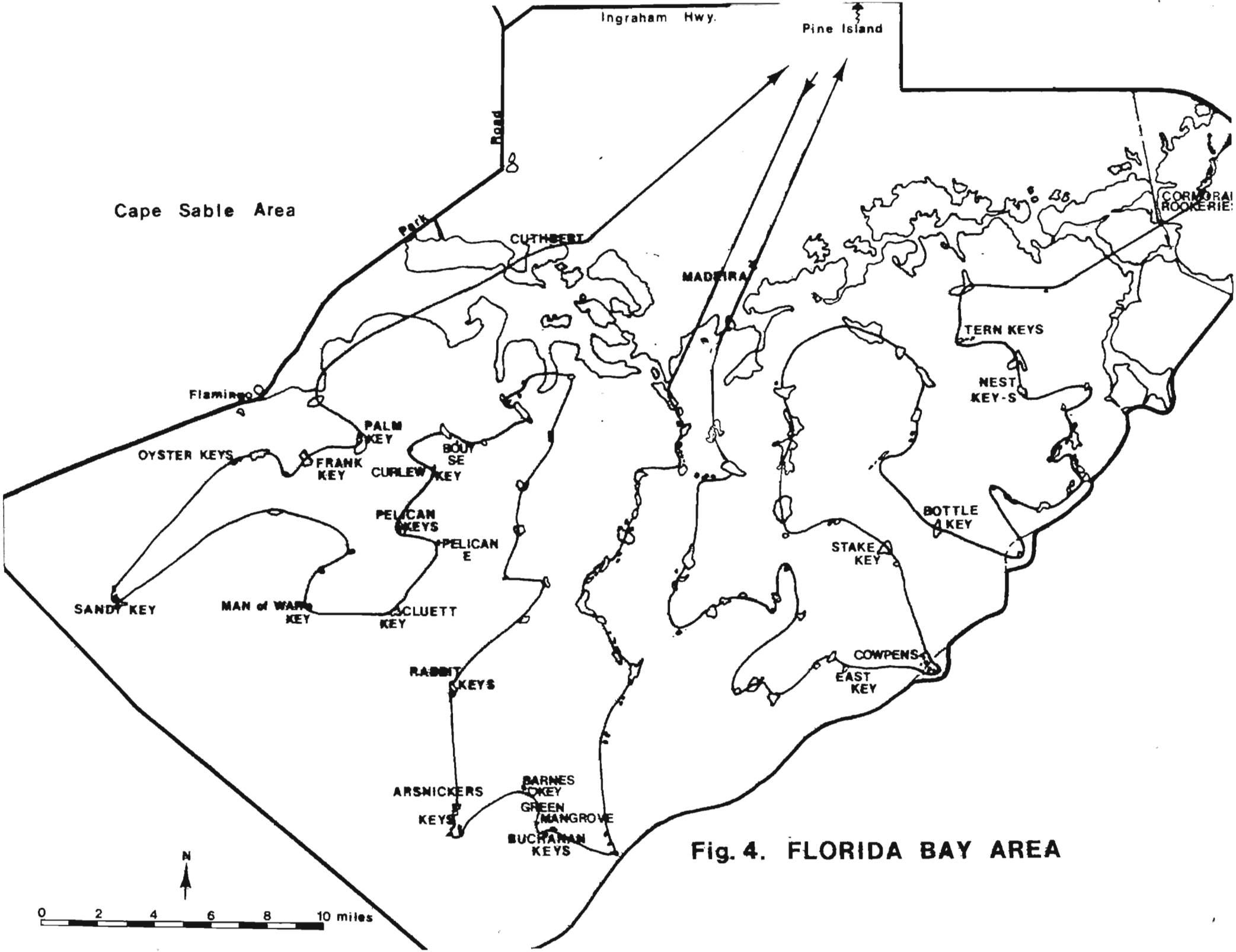

Fig. 4. FLORIDA BAY AREA

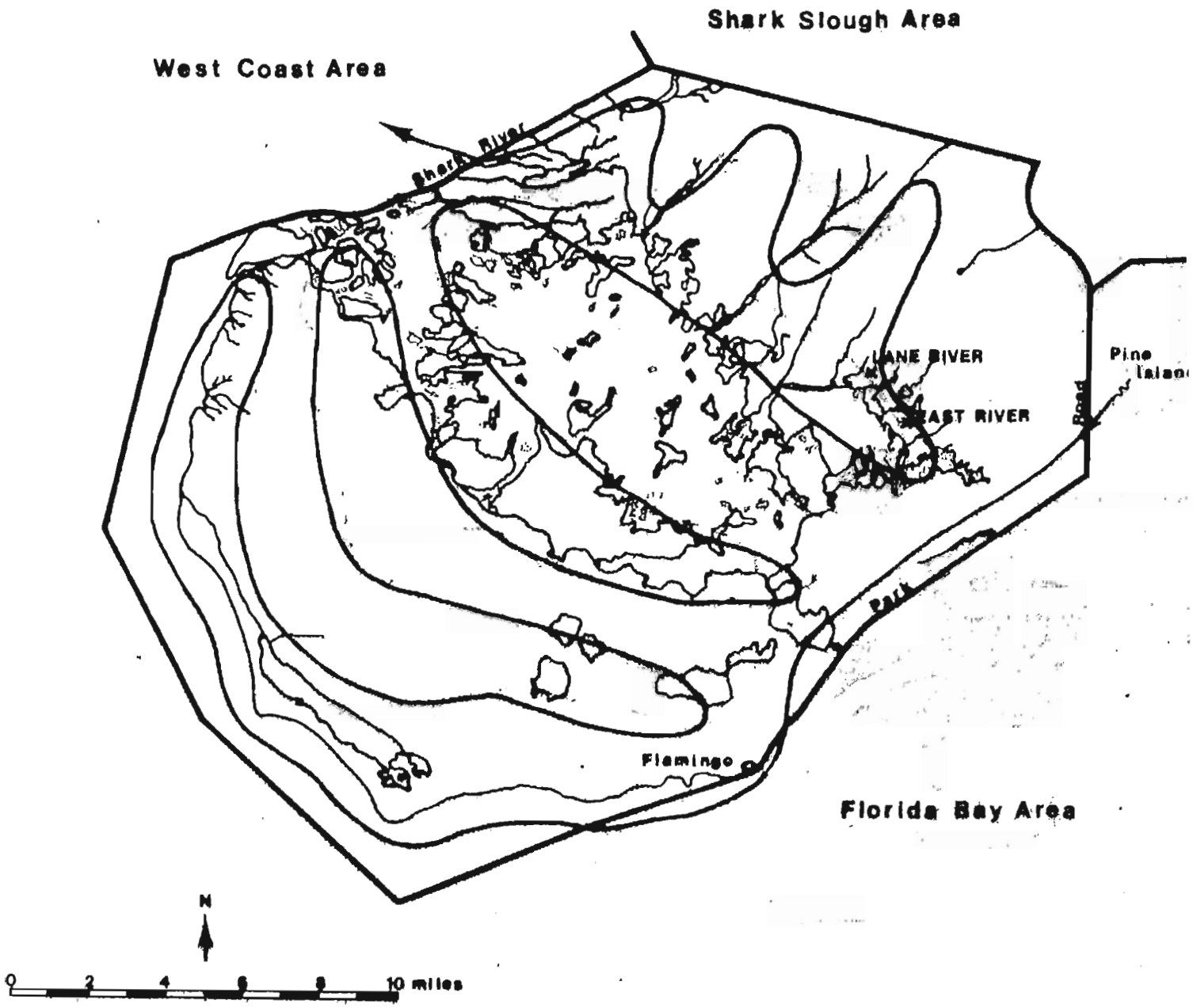

Fig. 5. CAPE SABLE AREA

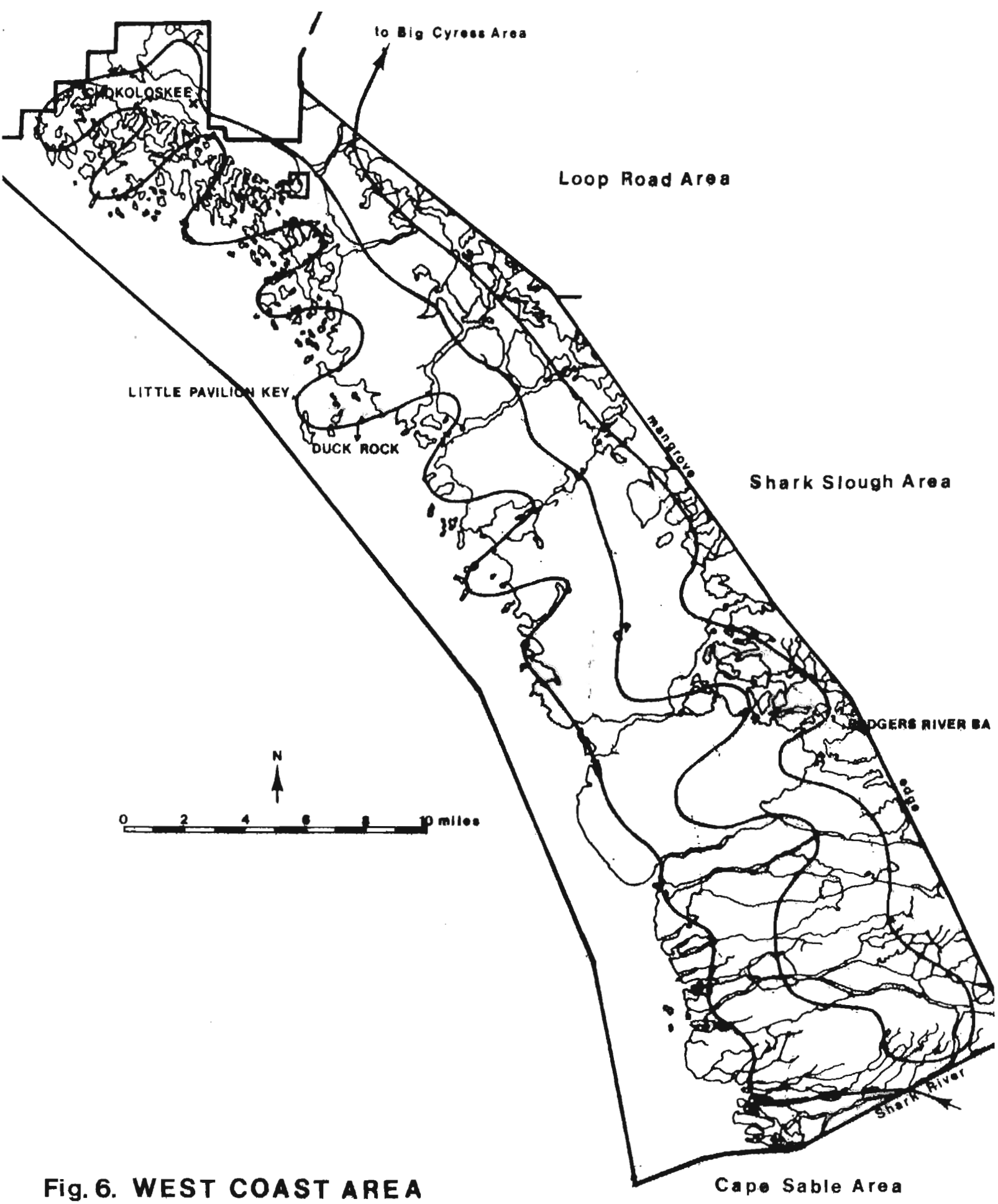

Fig. 6. WEST COAST AREA

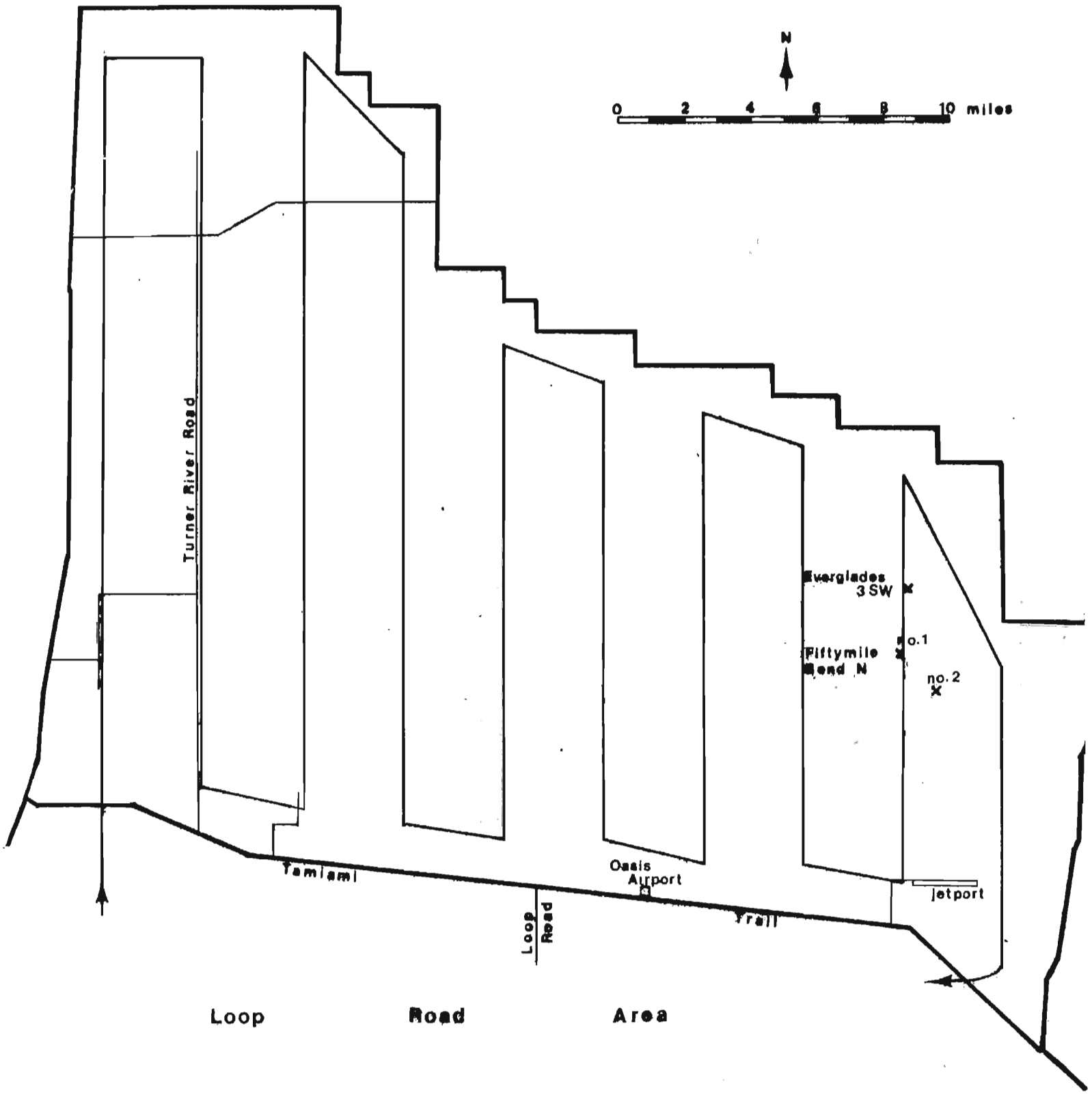

Fig. 7. BIG CYPRESS AREA

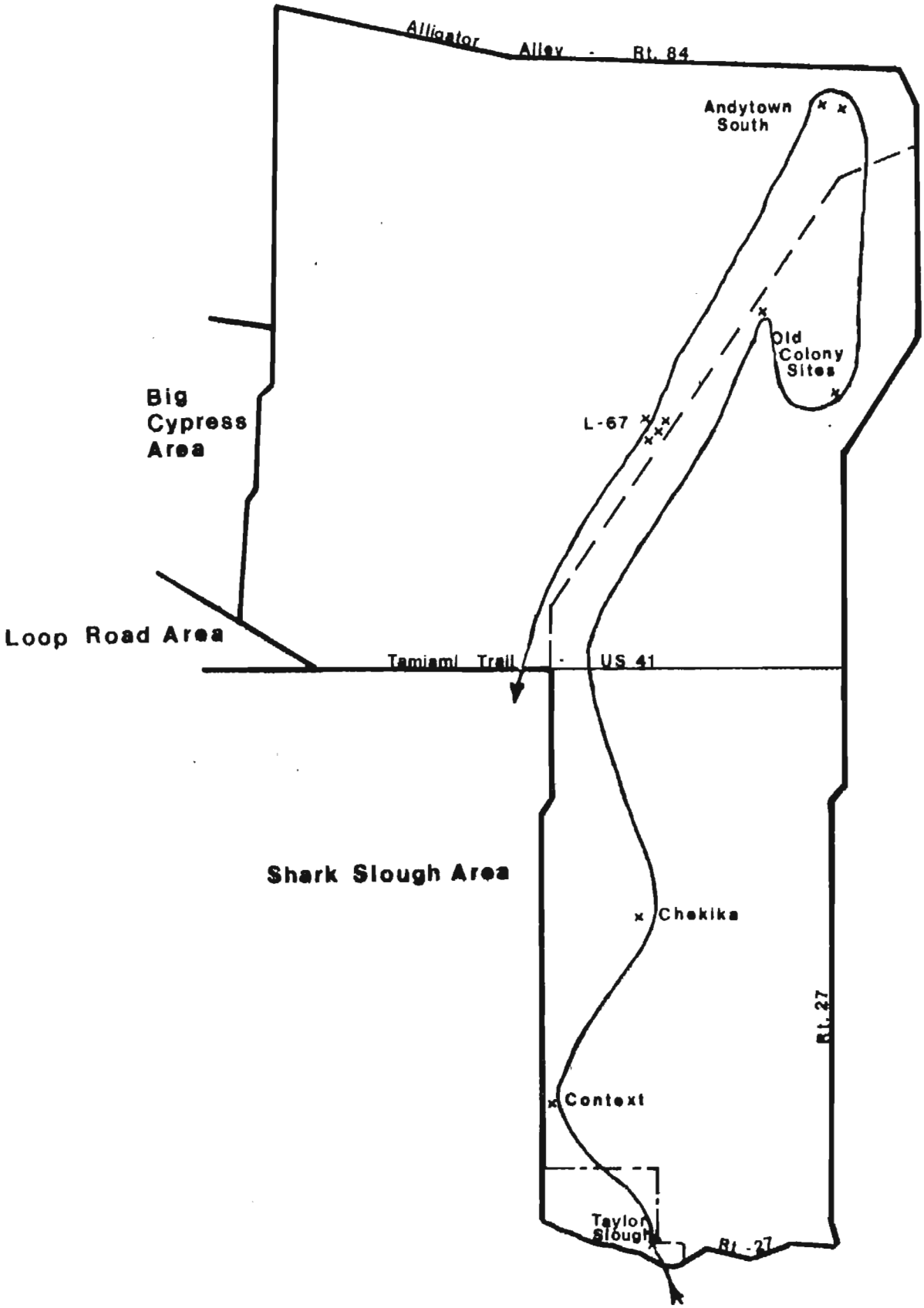

Fig. 8. CONSERVATION AREAS & EAST EVERGLADES AREA

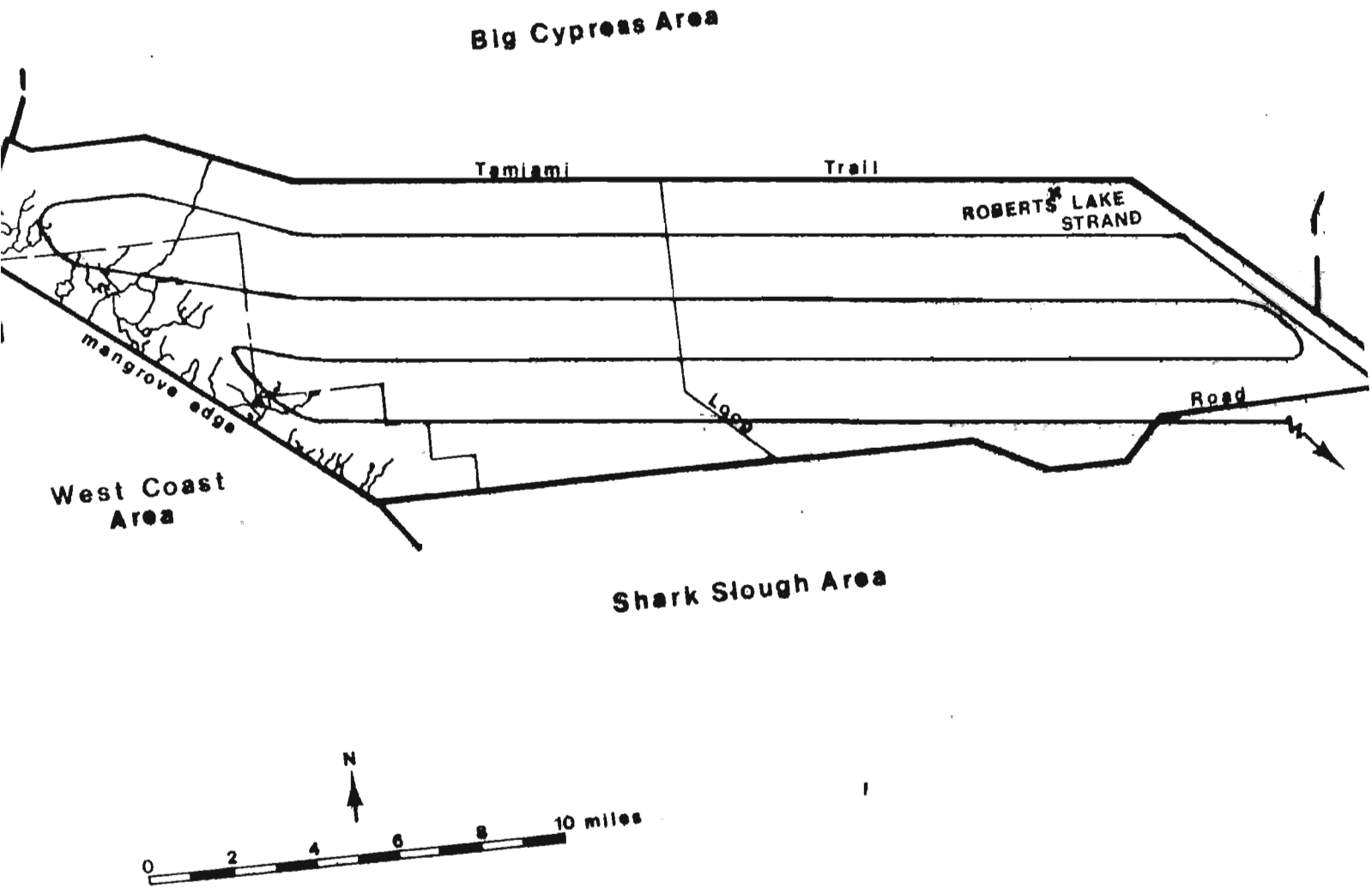

Fig. 9. LOOP ROAD AREA

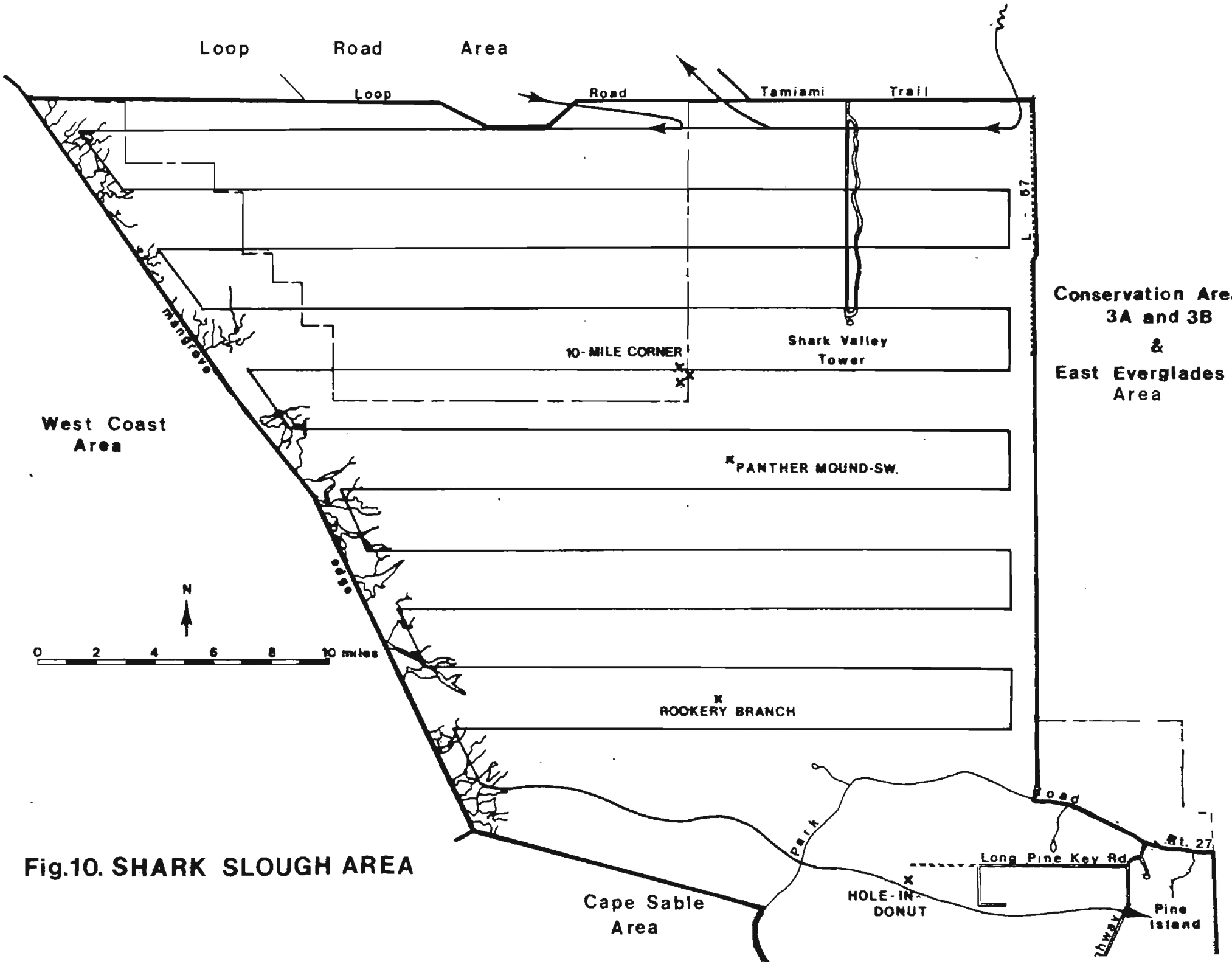

Fig.10. SHARK SLOUGH AREA

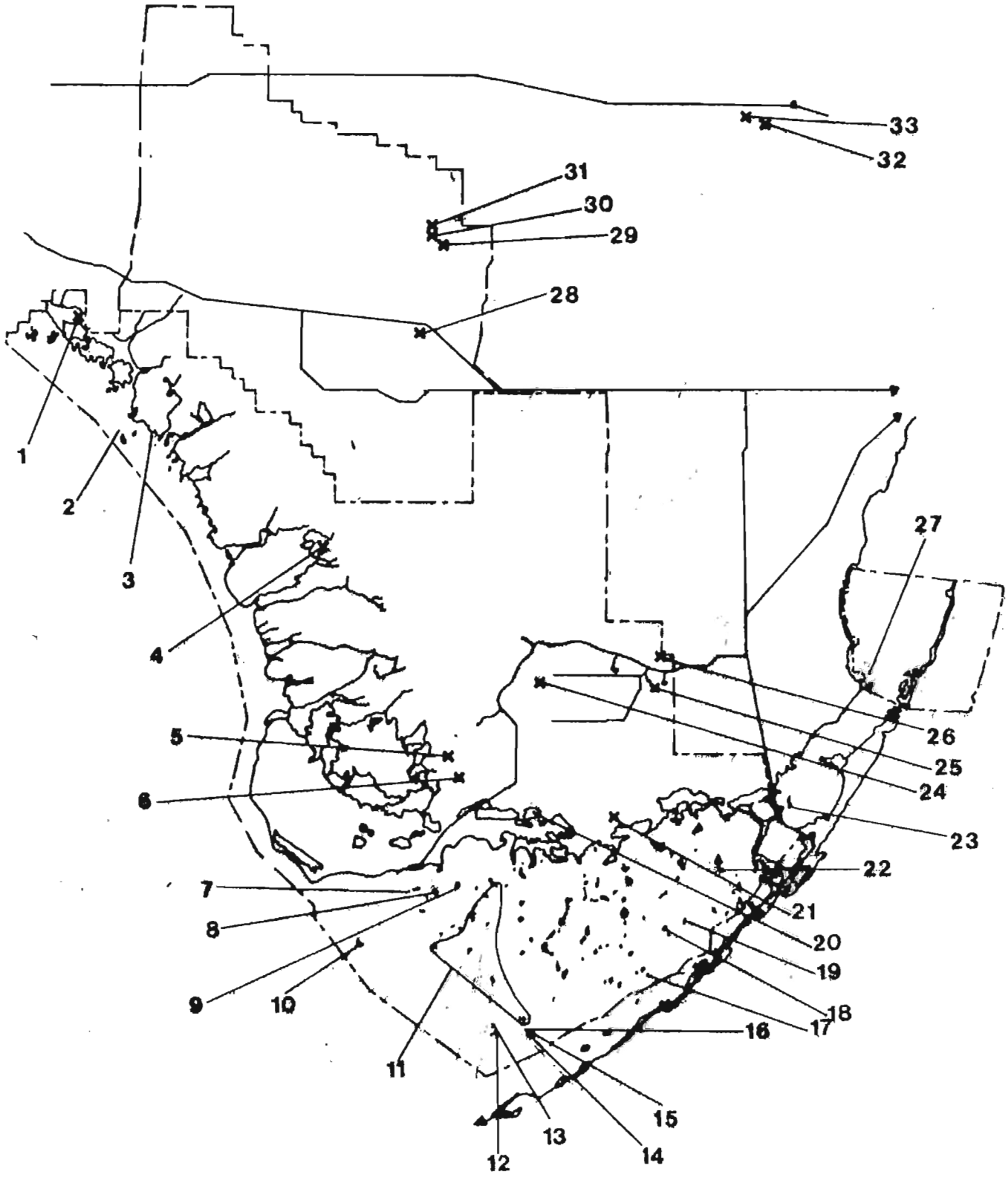

Fig. 11. COLONIAL BIRD COLONIES