U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

Beaches of Pinellas County, Florida: A History of their Comings and Goings (circa 1850 — present)

by

William A. Loeb, PE[1]

Open-File Report 94-565

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic Code. Any use of trade, product or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

[1]Center for Coastal Geology and Regional Marine Studies
600 Fourth Street South
St. Petersburg, FL 33701

TABLE OF CONTENTS

i. Introduction
ii. Plates
ii.-1. Pinellas Beaches Land cover - 1950
ii.-2. Pinellas Beaches Land cover - 1982

CHAPTERS 1-14 History of Islands and Passes

ISLANDS	PASSES	PAGES
1. Honeymoon Island		1.1
	2.Hurricane Pass	2.1
3. Caladesi Island		3.1
	4.Dunedin Pass	4.1
5. Clearwater Beach Island		5.1
	6.Clearwater Pass	6.1
7. Sand Key		7.1
	8.Johns Pass	8.1
9.Treasure Island		9.1
	10.Blind Pass	10.1
11. Long Key		11.1
	12.Passe-a-Grille/Bunces Pass/ The Reefs/Shell Key	12.1
13. Mullet Key		13.1
	14.Egmont Channel	14.1

APPENDIX

A-I.	Beach Renourishment Sand Sources	A.1
A-II.	Artificial Reefs	A.5
A-III.	Hurricane List	A.9
A-IV.	References	A.13
A-V.	Sources of Information	A.15
A-VI.	Aerial Photos Available	A.16
A-VII.	Pinellas Comprehensive Plan	A.17

i. INTRODUCTION

This report summarizes the chronology and treatment of the Pinellas County Gulf Beaches and Passes. Information was drawn from available published sources and discussion with knowledgeable individuals. More important than in-depth detail is the presentation of a large amount of diverse but pertinent information in one consistent and concise format.

The central theme is a listing in chronological form of the history of each island and each pass. These lists are supplemented by selected aerial photos and matching coastal maps. A summary of the Corps of Engineers location of a suitable source of sand for use in future projects is attached. Their exploration located in excess of 30 million cubic yards of suitable beach sand off Egmont Key. Future beach nourishment sand will come from pass maintenance dredging supplemented by this large Egmont Key channel source.

This study has tried to identify both volumes of sand added and/or removed and dollars expended. However, this data is spotty and should be considered illustrative at best, especially the dollar figures. We have identified approximately 9 million cubic yards of sand placed on the beaches over the years. This is in good balance with approximately 11 million cubic yards identified as removed for filling purposes. In addition, about 12 million cubic yards was placed offshore Egmont Channel.

The beach islands except for Honeymoon, Caladesi, and Mullet are almost fully developed. The future of the existing development is of interest, however, i.e. reconstruction after storm damage. It should be noted that the last big (100 year) hurricane was in 1921. The buildup has taken place since then, in the long calm after the storm.

Control over rebuilding after damage is in a formative stage. Incorporated municipalities are responsible within their borders, while the County Government is responsible for the unincorporated balance of the county. The Gulf shore consists mainly of 10 municipalities. To aid in planning, the County Departments of Civil Emergency Services and County Planning have prepared a Post-Disaster Redevelopment Guide expected to be finalized in 1994. It observes that "Pinellas County --- does not presently have --- institutional and decision-making structures concerned with questions of how the county rebuilds and develops following a disaster." The principal recommendation is that the county and each municipality establish a post-disaster Redevelopment Task Force for this purpose.

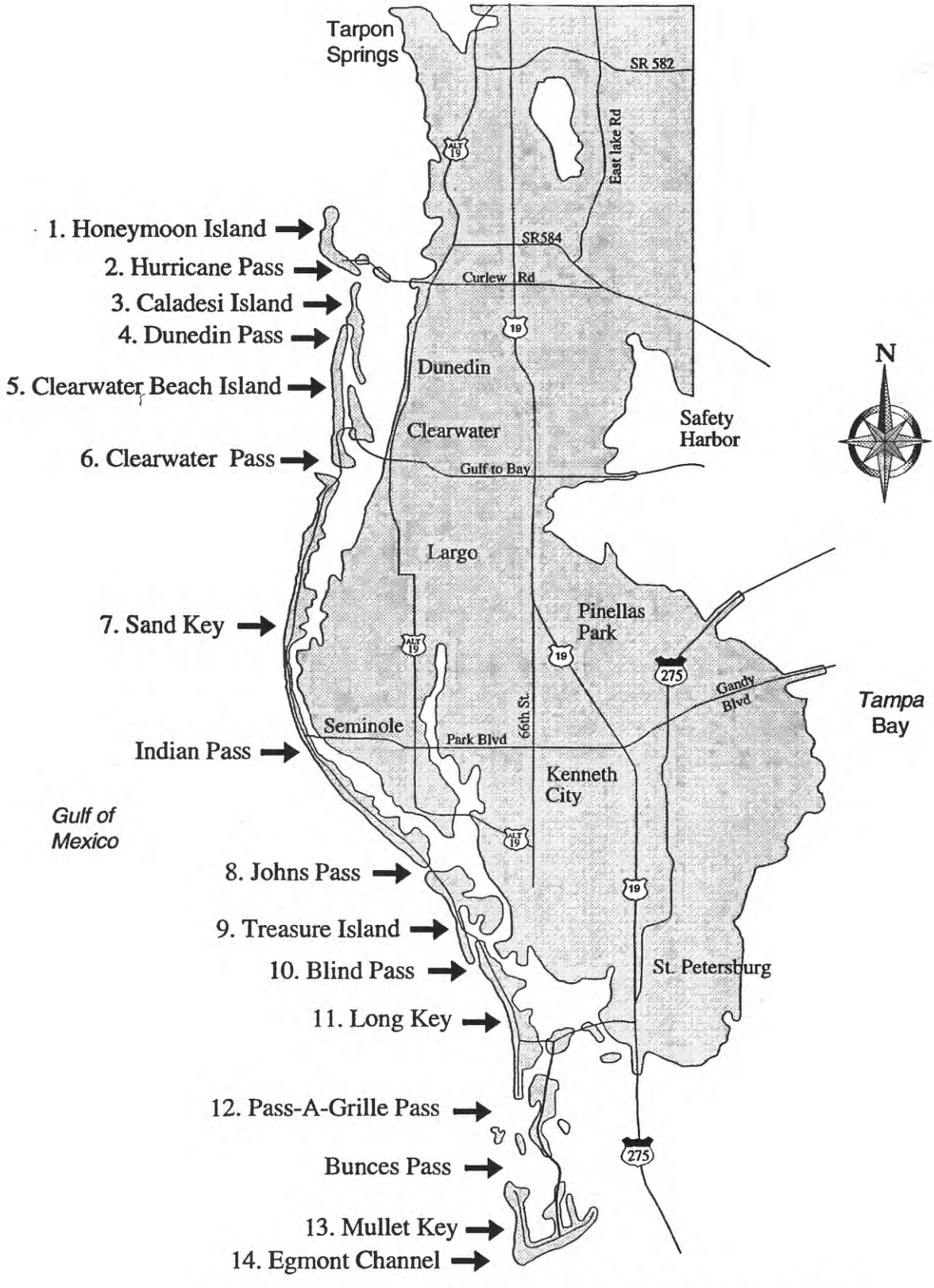
There is an established Coastal Construction Control Line, seaward of which construction is almost never allowed (Fla. Statutes Ch. 161). However, the present line runs essentially along the seawall and the landward edge of the beach. It serves to prevent building on the sand. Rebuilding is allowed on existing foundations so long as they do not require addition, repair, or modification. Control of building also comes under various Building Codes, Zoning Use Designations, and Federal Insurance Regulations.

This search has also identified numerous information sources, knowledgeable persons, reports, libraries, references, etc. These are collected and listed in the Appendix of this report.

The two aerial / satellite derived maps (plates 1,2) show the land usage for the coastal area treated in this report. This "before and after" display is meant to show both the changes in usage and their effects on the islands, waterways, and vegetation. This can only be displayed through the color coding of these maps.

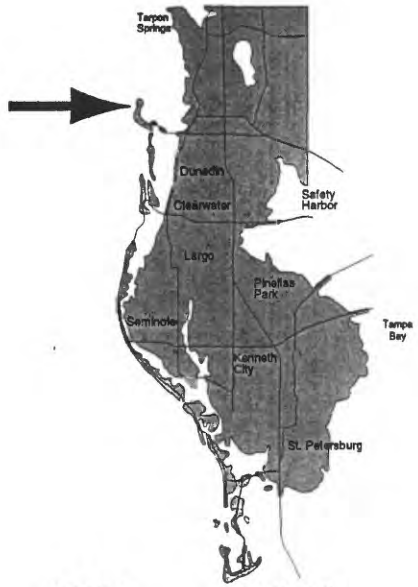
This report was initially prepared while the author was a volunteer with the U.S. Geological Survey's Center for Coastal Geology and Regional Marine Studies in St. Petersburg, FL. Presently, the USGS is conducting a study of the west-central Florida barrier island system, which includes Pinellas County, as well as Pasco county to the north and Hillsborough, Manatee and Sarasota Counties to the south. Guy Gelfenbaum and Tabatha Gleaton revised and edited this report.

PINELLAS COUNTY



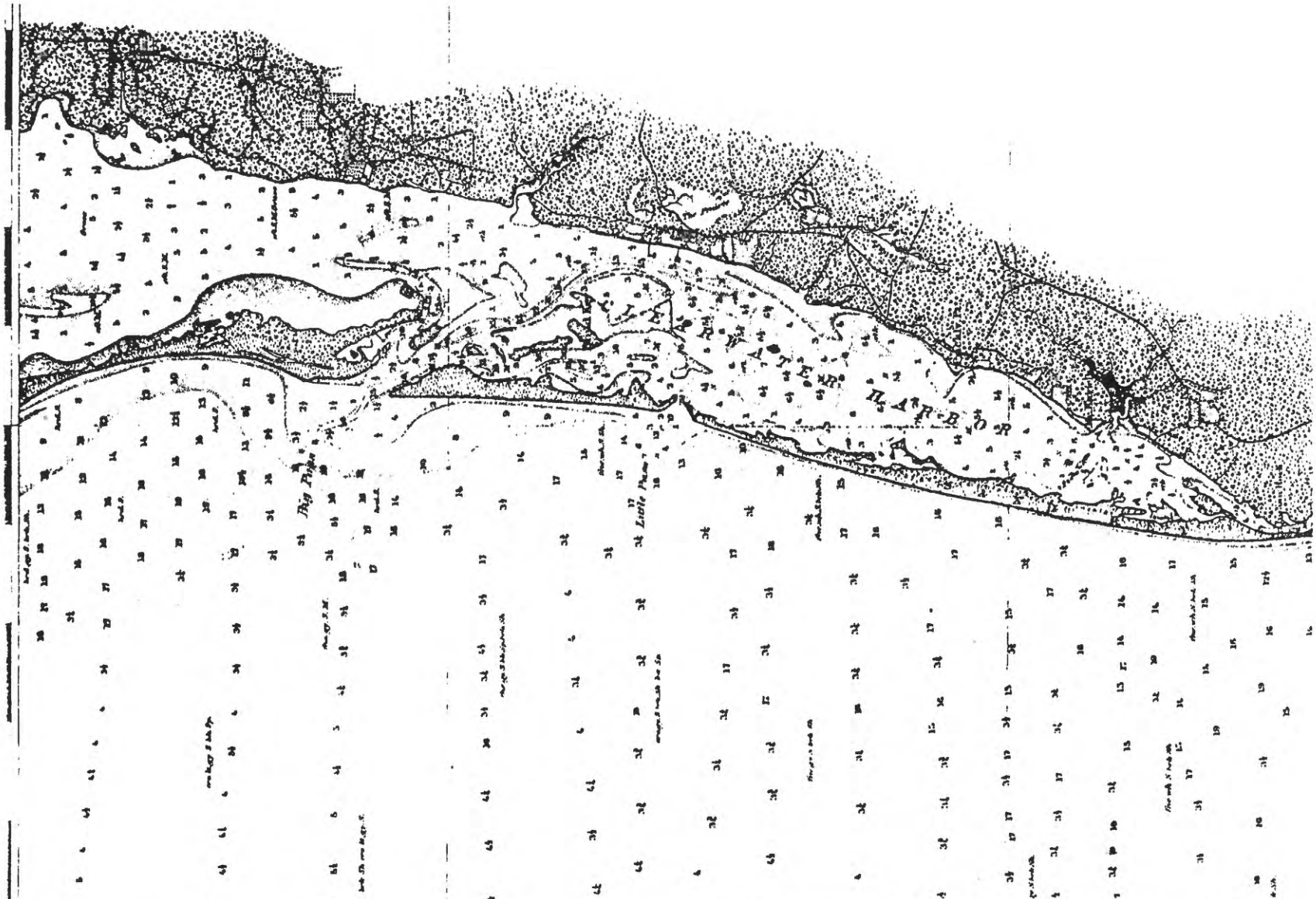
Arrows mark Gulf Barrier Islands and Inlets

1. HONEYMOON ISLAND

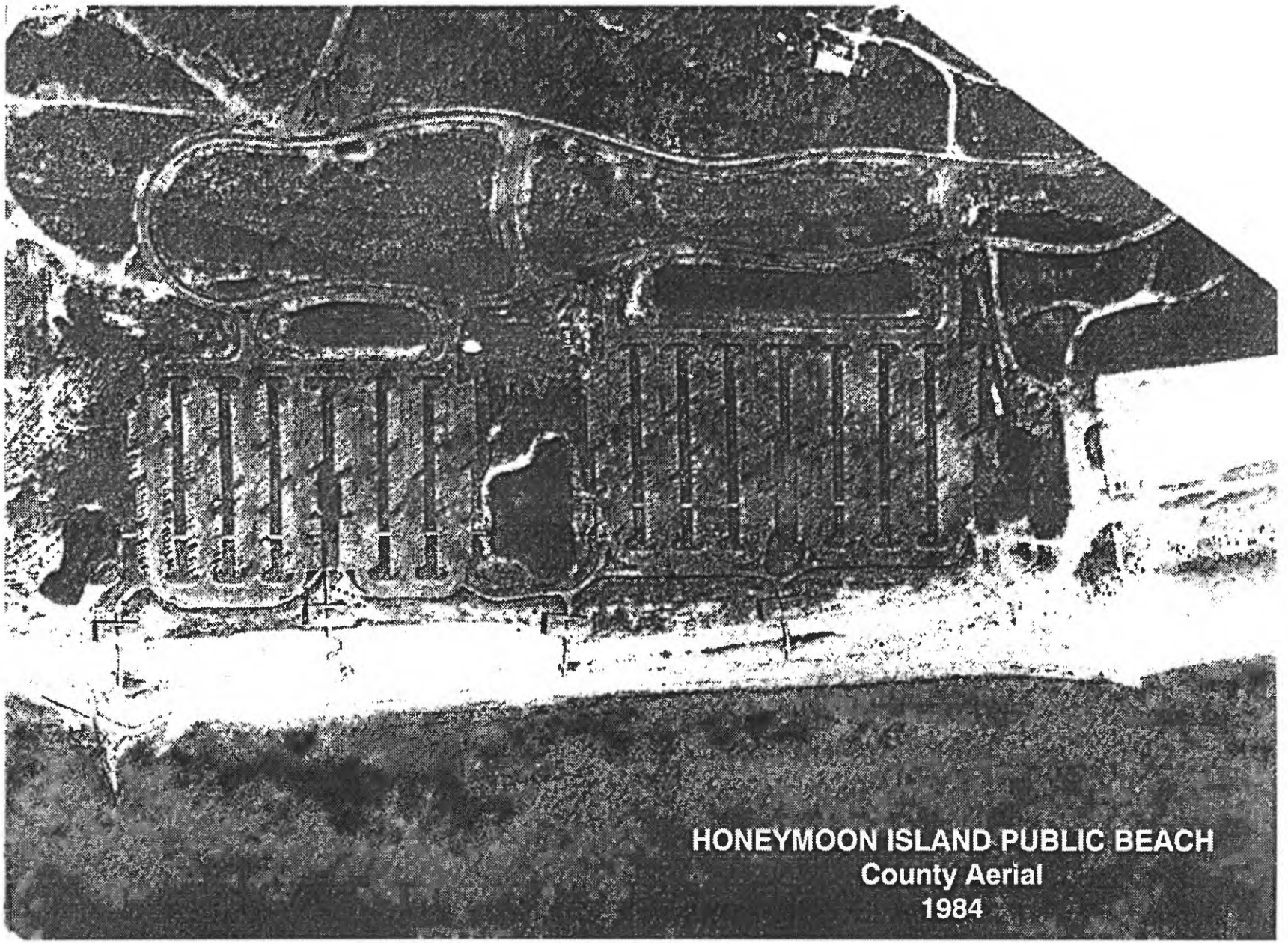


STORM DATE	DATE	AUTHORITY	IMPROVEMENT	SAND vol,yards	COST ,$
	1892	——	Honeymoon & Caladesi were one island known as Hogg Island.		
1921 (50 year)	——	——	Hurricane Pass cut by hurricane. Subsequently widened and deepened until 1926.		
	1921-26	City	Clearwater Causeway built. Hurricane Pass change slowed after 1926.		
1950 EASY			Drastic shoaling of Hurricane Pass. Pass then widened to 1963 with erosion of Honeymoon & Caladesi Islands.		
	1963	State	Honeymoon Island Causeway built. Hurricane Pass reduced with accretion on Honeymoon & Caladesi Islands.		

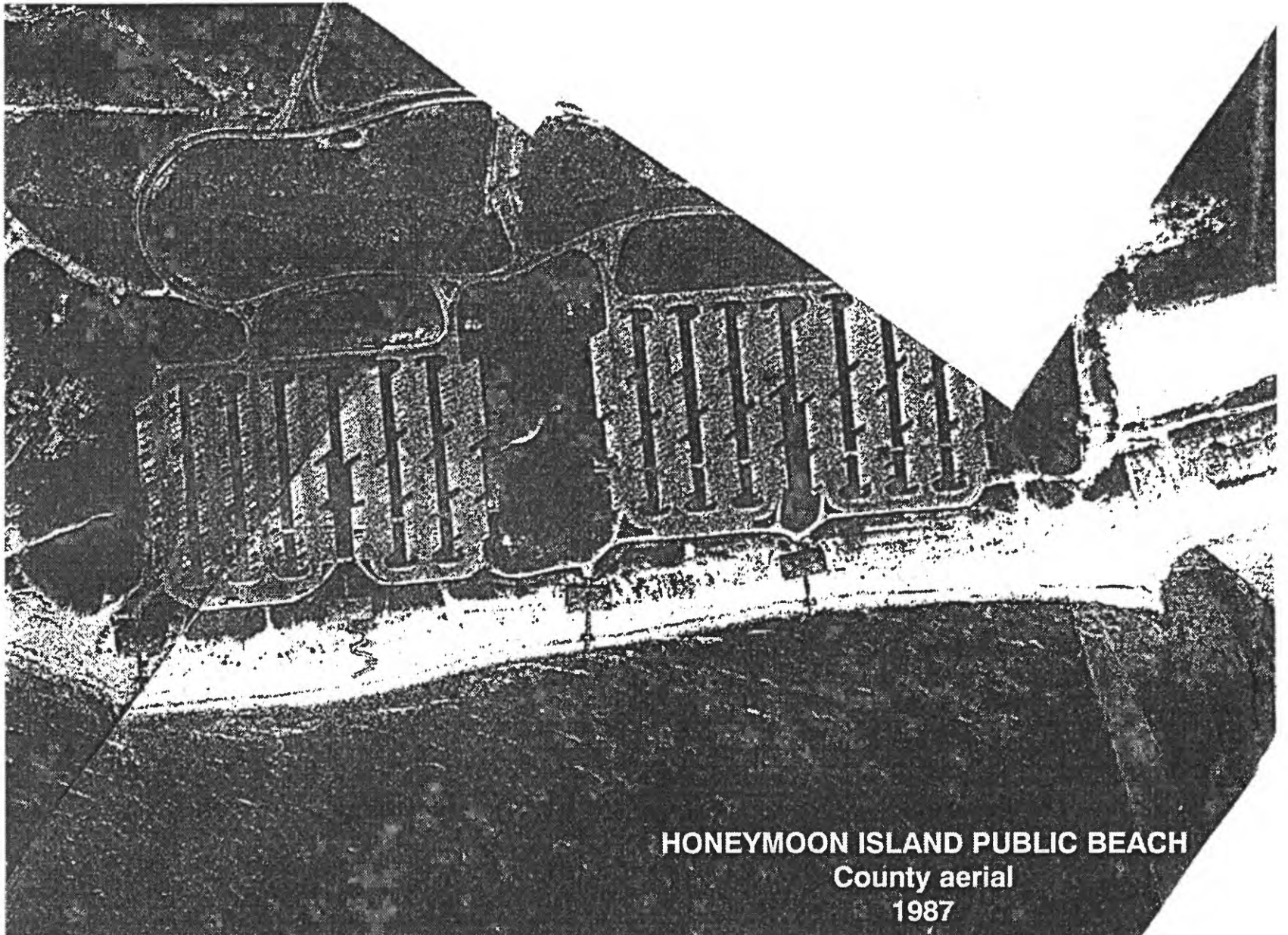
	1969	State	South west beach Honeymoon Island raised to 1.5m above mean sea level by filling from a site 450 yards offshore the pass. Sand washed out, leaving pebbles & cobbles. Some groins built at same time.	1,140,000	
	1970	State	Rip-rap placed on south end Honeymoon Island.		
	1974	State	Honeymoon acquired.		
——	to 1980	——	"Nothing" done to 1980. Did build park facilities on Caladesi, access and improvements on Honeymoon Island.	——	——
——	1989	State	1 mile of rocky beach in front of paved parking lot on central portion of island renourished with sand (trucked from mainland excavation project). Seven months later 800' of shoreline badly eroded. Estimate is 3 years life.	230,000	1,300,000
——	1990	Cty	Hurricane Pass maintenance dredging, sand placed on Honeymoon Island west of ferry landing (not on beach).	——	300,000



HONEYMOON ISLAND to SAND KEY
USCGS Chart # 177
1879

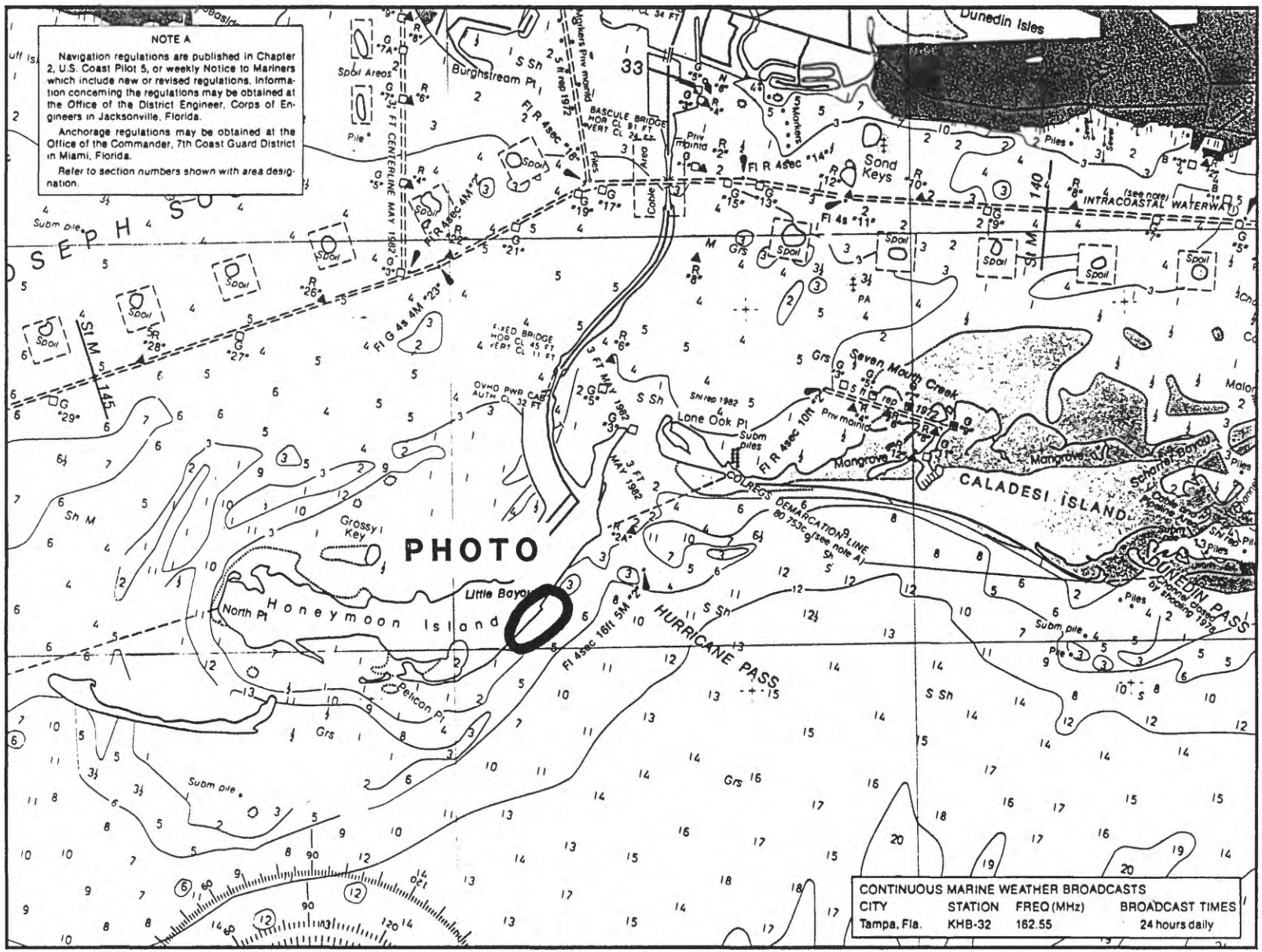


HONEYMOON ISLAND PUBLIC BEACH
County Aerial
1984

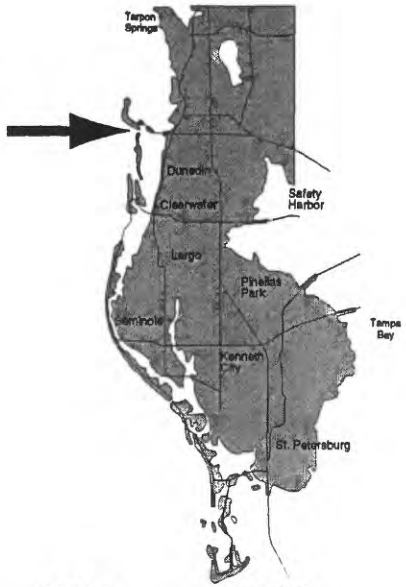

HONEYMOON ISLAND PUBLIC BEACH
County aerial
1987

Hurricane Pass

Excerpt From NOAA Chart #11411

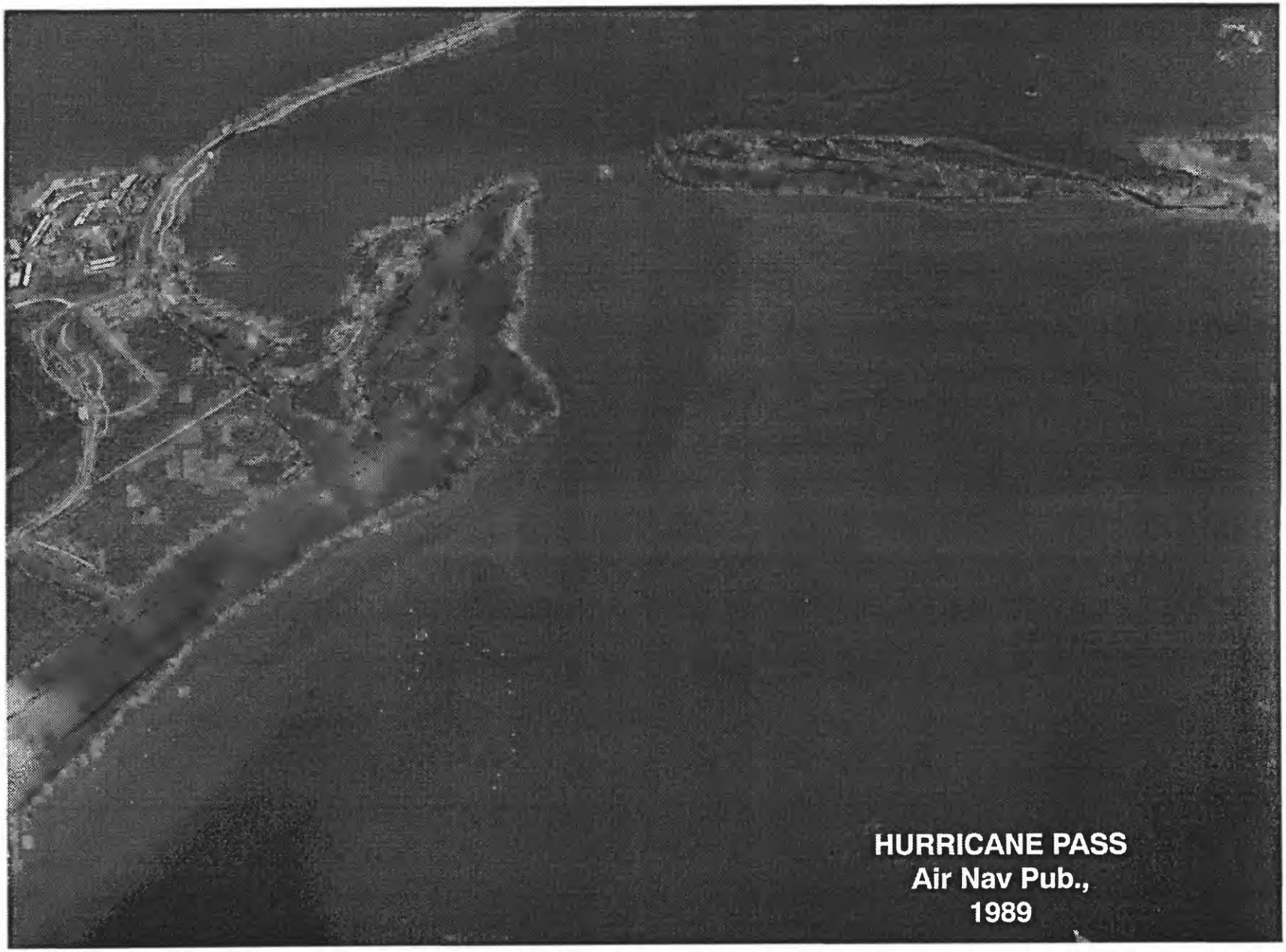


2. HURRICANE PASS



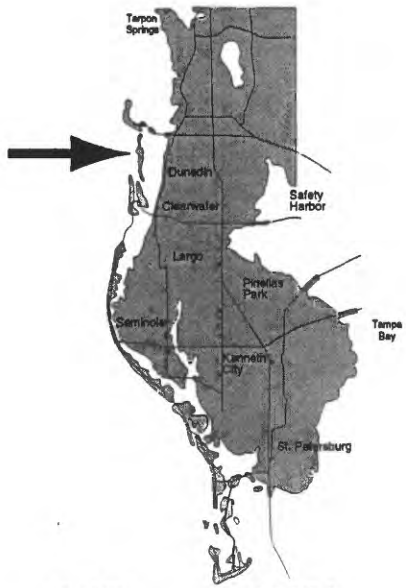
STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yards	COST,$
	1892		No Pass. Honeymoon & Caladesi were one island known as Hogg Island.		
1921 (50 year)			Hurricane Pass cut by hurricane. Subsequently widened and deepened until 1926.		
	1921-26	City	Clearwater Causeway built. Hurricane Pass change slowed after 1926.		
1950			Drastic shoaling of Hurricane Pass. Pass then widened to 1963 with erosion of Honeymoon & Caladesi Islands.		
	1960		Hurricane Pass 2000' wide/16' deep.		
	1963	State	Honeymoon Island Causeway built. Hurricane Pass reduced with accretion on Honeymoon & Caladesi Islands. Now 700' wide.		

	1969	State	South west beach Honeymoon Island raised to 1.5m above mean sea level by filling from a site 450 yards offshore the pass. Channel migrated northerly until by 1976 width equaled early 1920s, but located considerably more inshore	(1,140,000)	—
	1970	State	Rip-rap placed on south end Honeymoon Island.		
1985 ELENA (10 year)			Willys Cut opened near north end Caladesi.		
	1986		North Willys Cut opened.		
	1990	Cty	Hurricane Pass maintenance dredging, sand to be placed on Honeymoon Island west of ferry landing (not on beach).		300,000



HURRICANE PASS
Air Nav Pub.,
1989

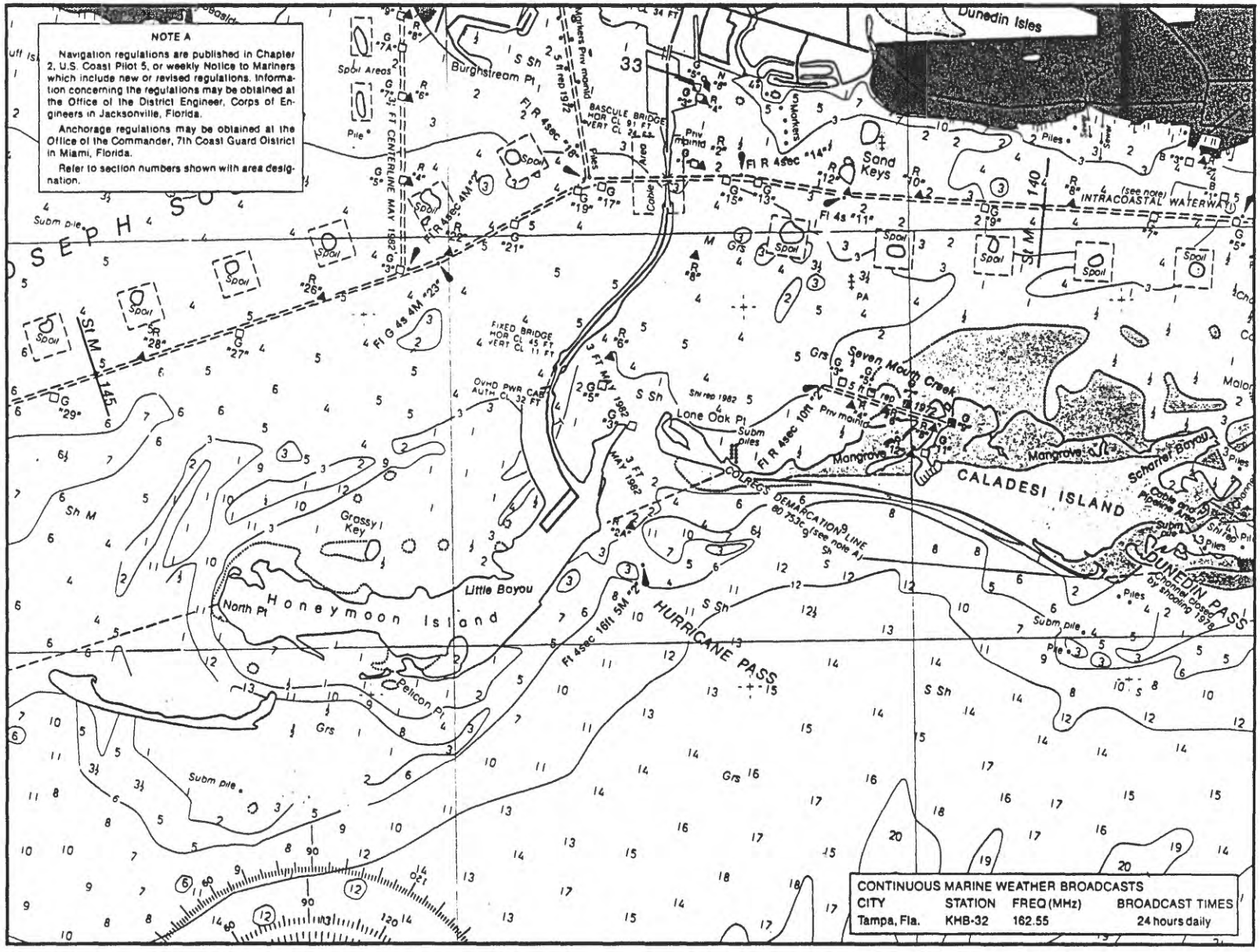
3. CALADESI ISLAND



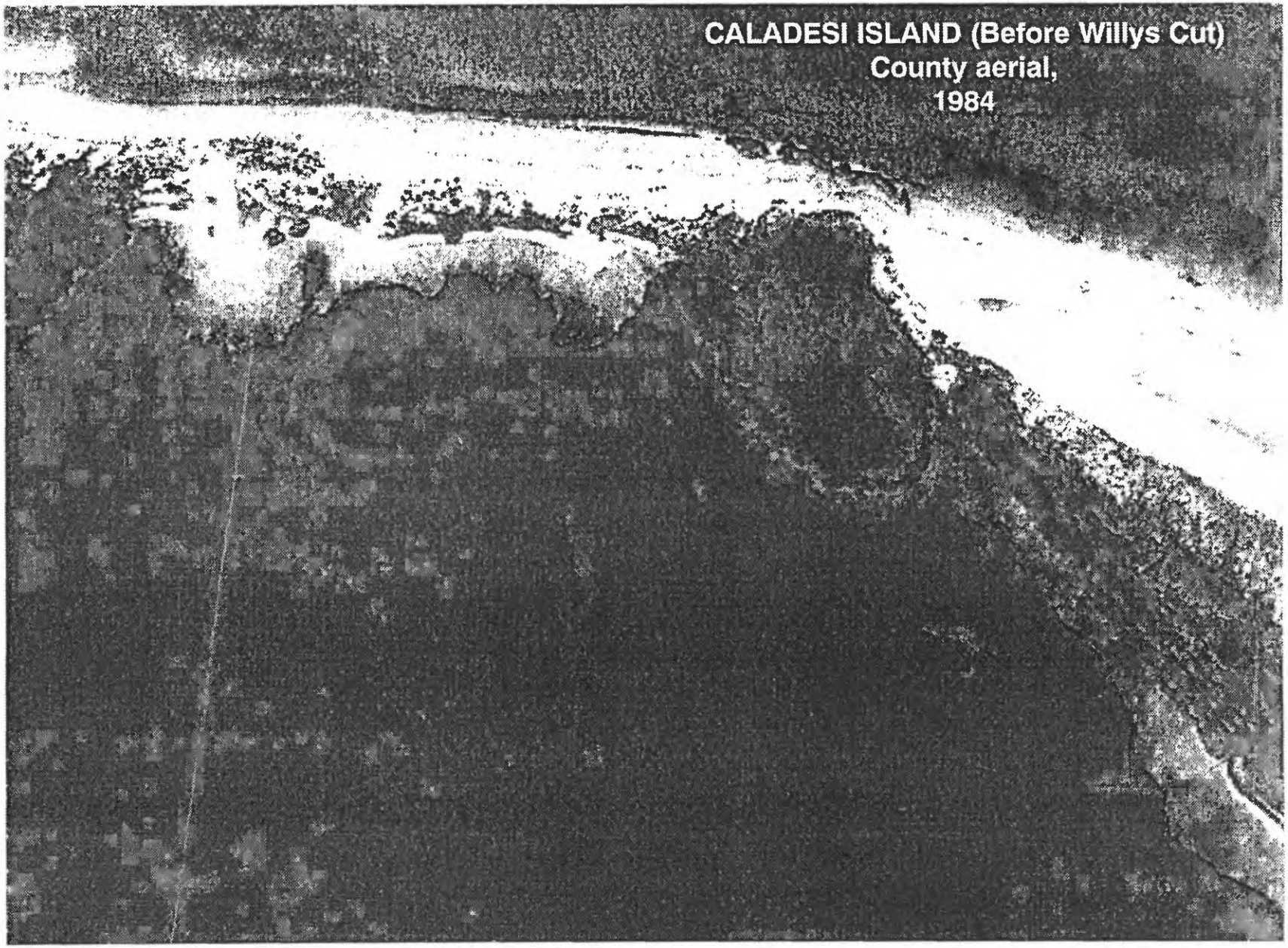
STORM DATE	DATE	AUTHORITY	IMPROVEMENT	SAND vol,yards	COST,$
	1892		No Pass. Honeymoon & Caladesi were one Island known as Hogg Island.		
1921 (50year)			Hurricane Pass cut by hurricane. Subsequently widened and deepened until 1926.		
	1921-26	City	Clearwater Causeway built.		
1950			Drastic shoaling of Hurricane Pass. Pass then widened to 1963 with erosion of Honeymoon & Caladesi Islands.		
	1963	State	Honeymoon Island Causeway built. Hurricane Pass reduced with accretion on Honeymoon & Caladesi Islands. Now 700' wide.		
	1966	State	Caladesi acquired. Recreation facilities built (Date?) on bay side of key.		

Hurricane Pass

Excerpt From NOAA Chart #11411



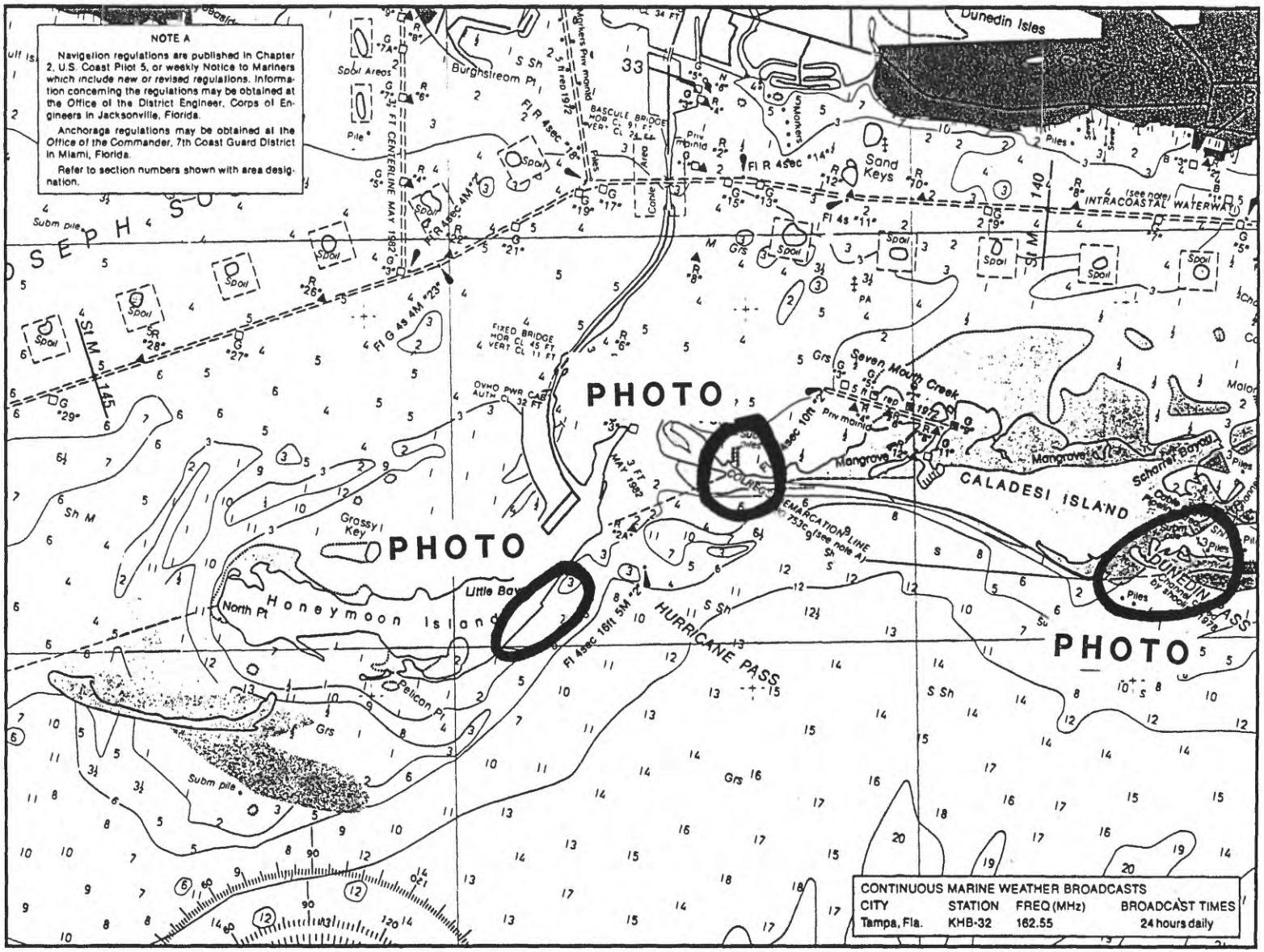
1985Elena (10 yr)	—		Willys Cut opened near north end Caladesi. Has continued to enlarge —now 3m deep at high tide.
			Dunedin Pass closed
—	1986	—	North Willys Cut opened by erosion in fall '86 100m north of Willys Cut. Now 3m deep.
—	1992	—	Willys cuts have merged into a single major cut.


CALADESI ISLAND (Before Willys Cut)
County aerial,
1984

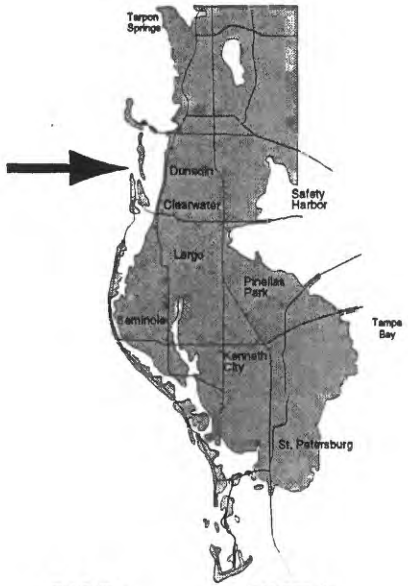
CALADESI ISLAND (After Willys Cut &
North Willys Cut)
County aerial, 1987

Hurricane Pass

Excerpt From NOAA Chart #11411



4. DUNEDIN PASS



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yards	COST,$
	1883		Dunedin Pass (known as Big Pass, width 0.7km) wide open, the predominant influence on Clearwater Bay St. Joseph Sound tidal area. Clearwater Pass (known as Little Pass, width 0.17km, 1/2 the present width).		
	1883-1920		Shoaling of Dunedin Pass (due to Clearwater Pass increasing in width, diverting flow from Dunedin Pass tidal prism?) From 1883-1950 Clearwater Beach Island north end migrated North only 1/4 mile; by 1970 had nearly closed the gap; by 1976 had moved 3/4 mile; by mid 1980s pass plugged.		
1921 (50year)			Hurricane Pass formed, further diverting flow from Dunedin Pass. Caused shoaling and formation of long curved channel.		
	1921-26	City	Clearwater Causeway built, partially isolating Dunedin Pass. Dunedin Pass width increased but migration continued. Clear-water Pass "narrowed markedly".		

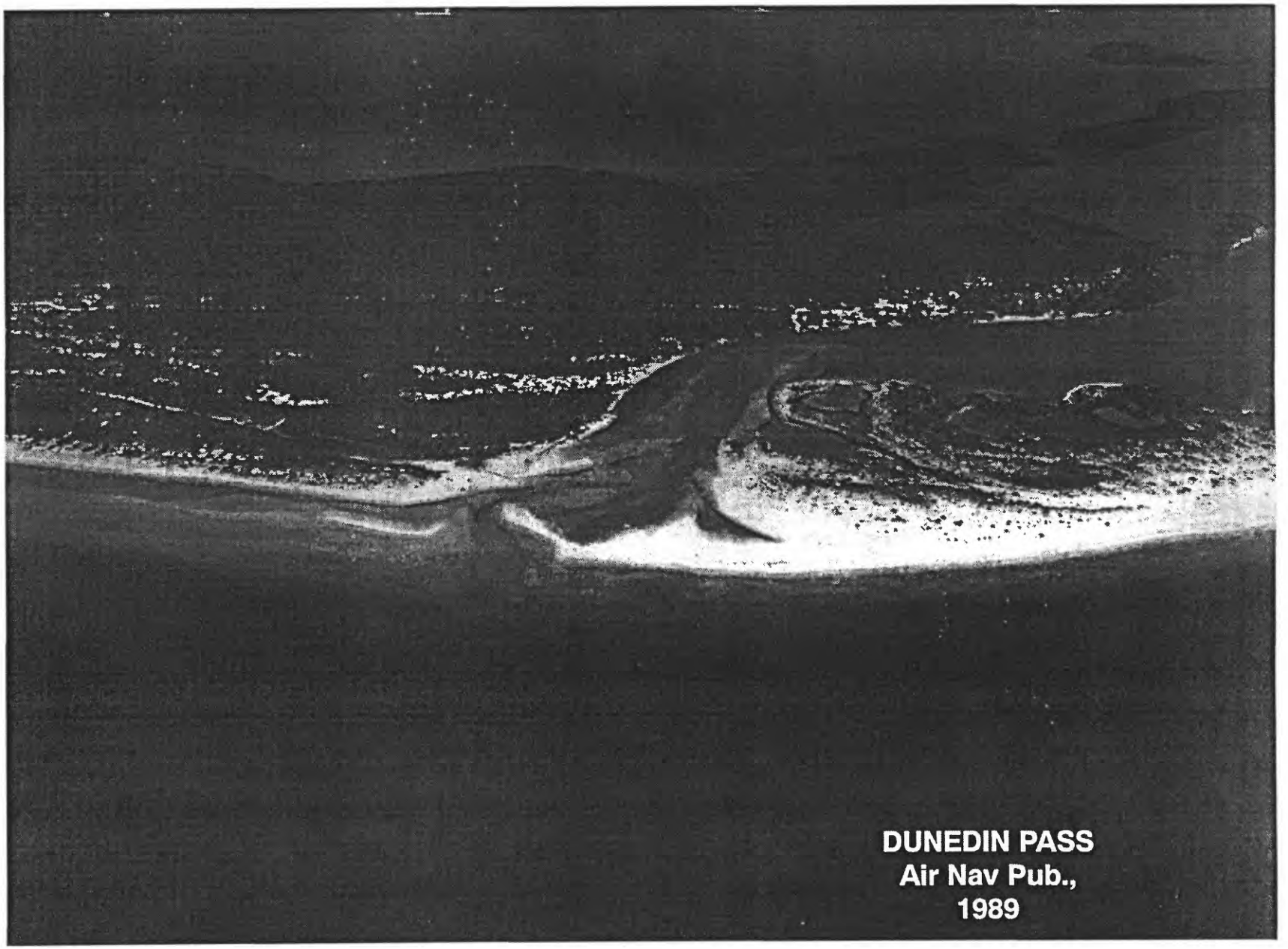
Sept. 1-7 1950			Deposited shoal material in Dunedin Pass which later washed ashore and formed bar system, leaving pass at pre-storm dimension.
	1950-58	Pvt.	Dredge & fill for Island Estates Development (Phase 1). Reduced Dunedin Pass tidal prism. Dunedin Pass narrowed and lengthened.
	1960	COE	Clearwater Pass dredged (10' deep x 150' wide). Inland waterway dredged through Clearwater Harbor.
	1963	State	Honeymoon Island Causeway built, isolating Dunedin Pass further. Hurricane Pass now carried bulk of this prism.
		City	Clearwater Pass Bridge built. Clearwater Pass maintenence dredging initiated.
1968 GLADYS			A small additional channel developed about 1/2mi south of Dunedin Pass. By the early 1970s this small channel had closed.
1972 AGNES			
1985 ELENA	1985		Before Elena, Dunedin Pass was down to width of under 100yards/max depth 6'. Dunedin Pass closed gradually by shoalling after Elena. Closed completely by summer 1988.
	1986 OCT.	—	Computer model analysis of prisms by USF/Tampa Ctr. of Math Models.

	in '86	Dun. Pass Enlarged to 3000 sq. ft.
Clearwater Pass	910 mill cu. ft.	865
Hurricane Pass	348	346
Dunedin Pass	83 (will close)	166

4.3

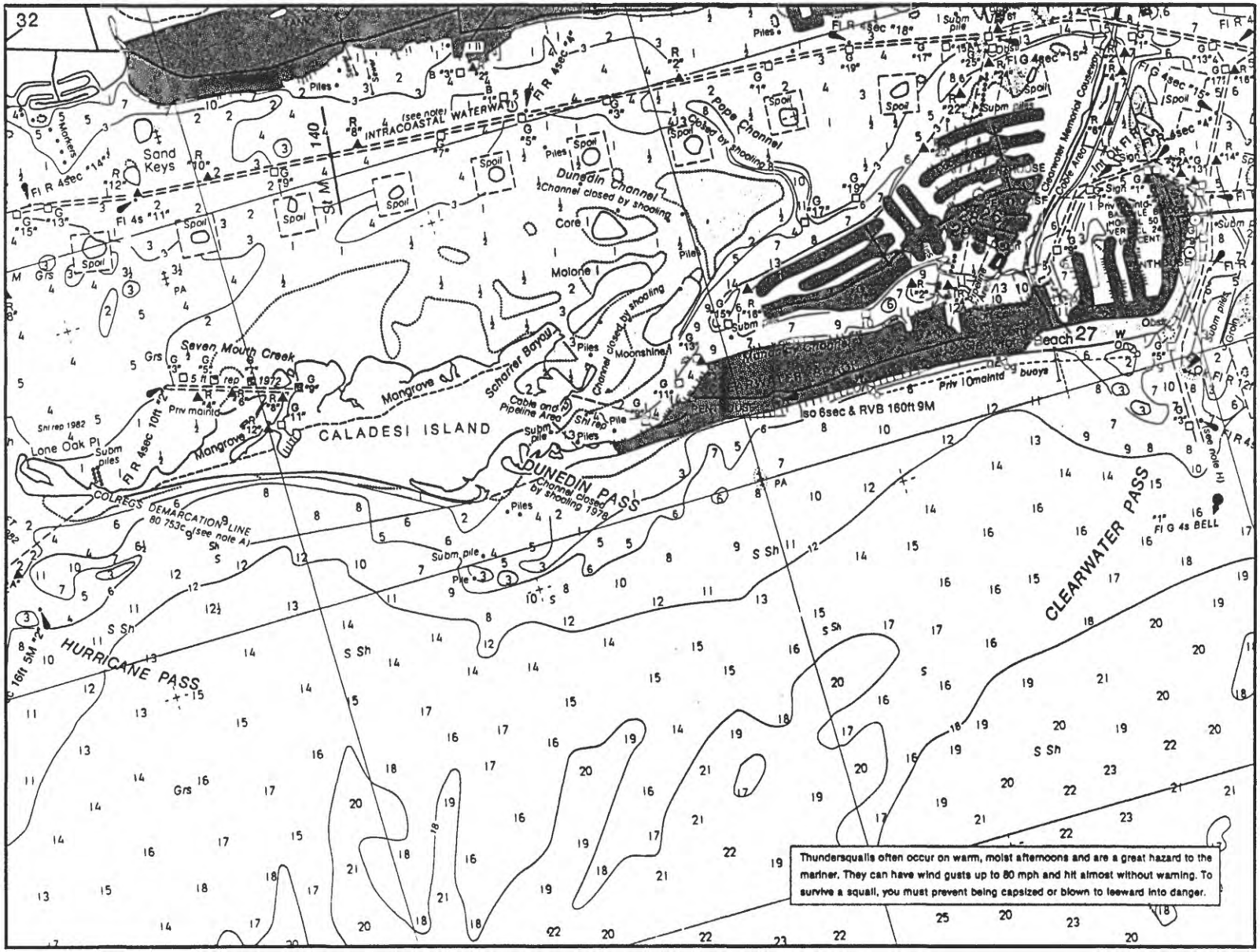
1986 KATE

1989-90	Cty (City)	Proposal to reopen Dunedin Pass (silted closed) denied by State DER. New proposal being made to excavate new pass (9'deep x 100 ' wide) located at site of 1968 temporary channel 1/2 mile south across narrow neck of Clearwater Beach Island	1,300,000
1991 Jan 20		Dunedin Pass reopened after severe storm. Closed again shortly later	
1992		Continues closed.	

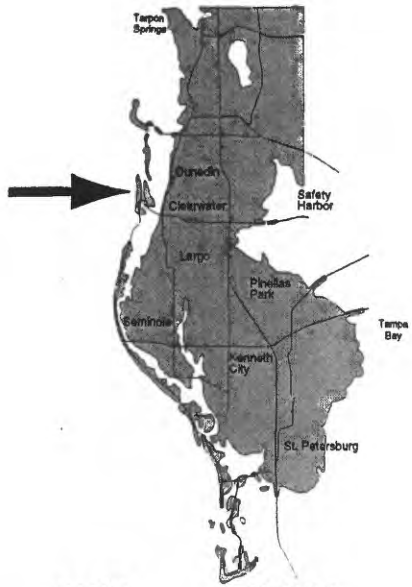

DUNEDIN PASS
Air Nav Pub.,
1989

Dunedin Pass

Excerpt From NOAA Chart #11411

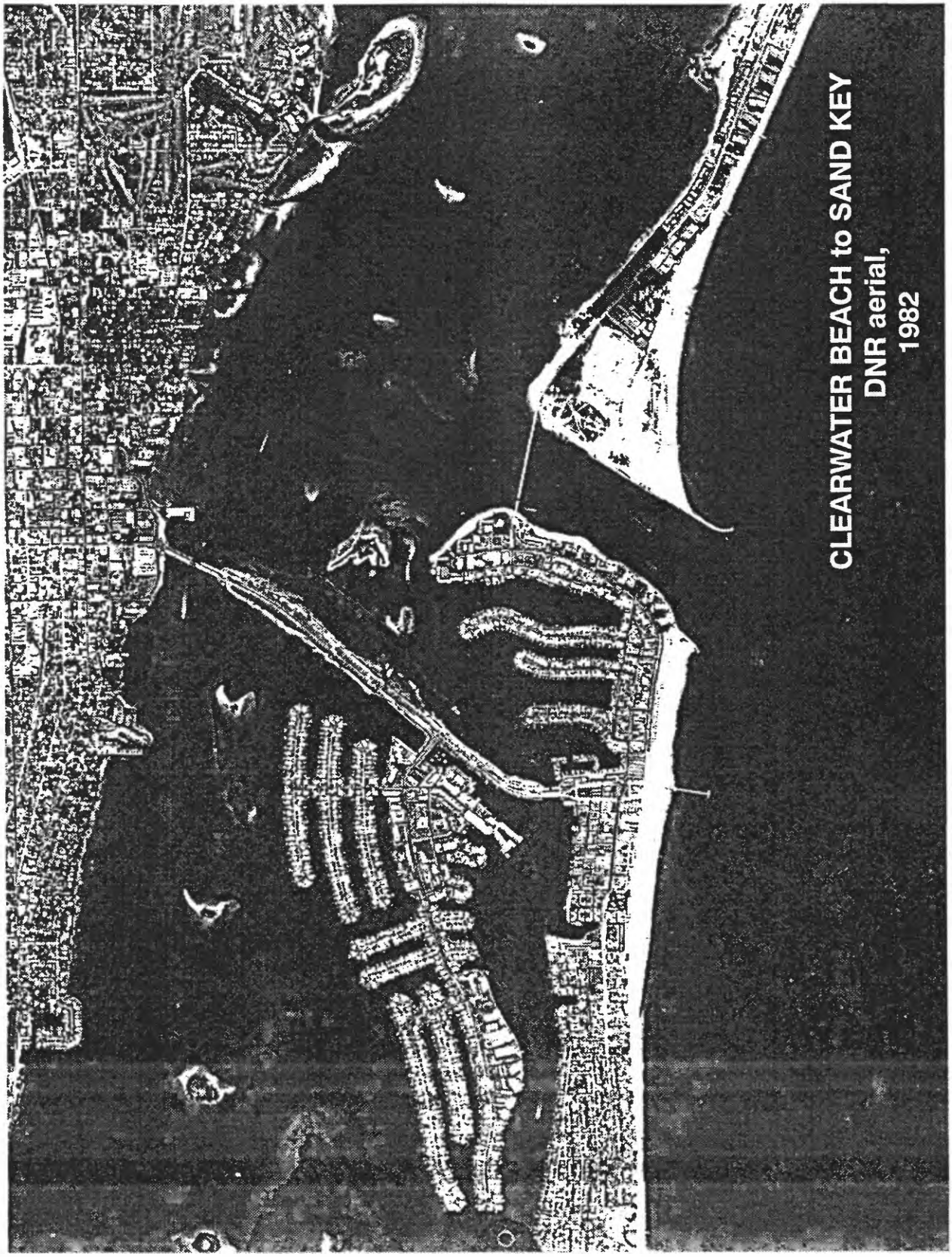


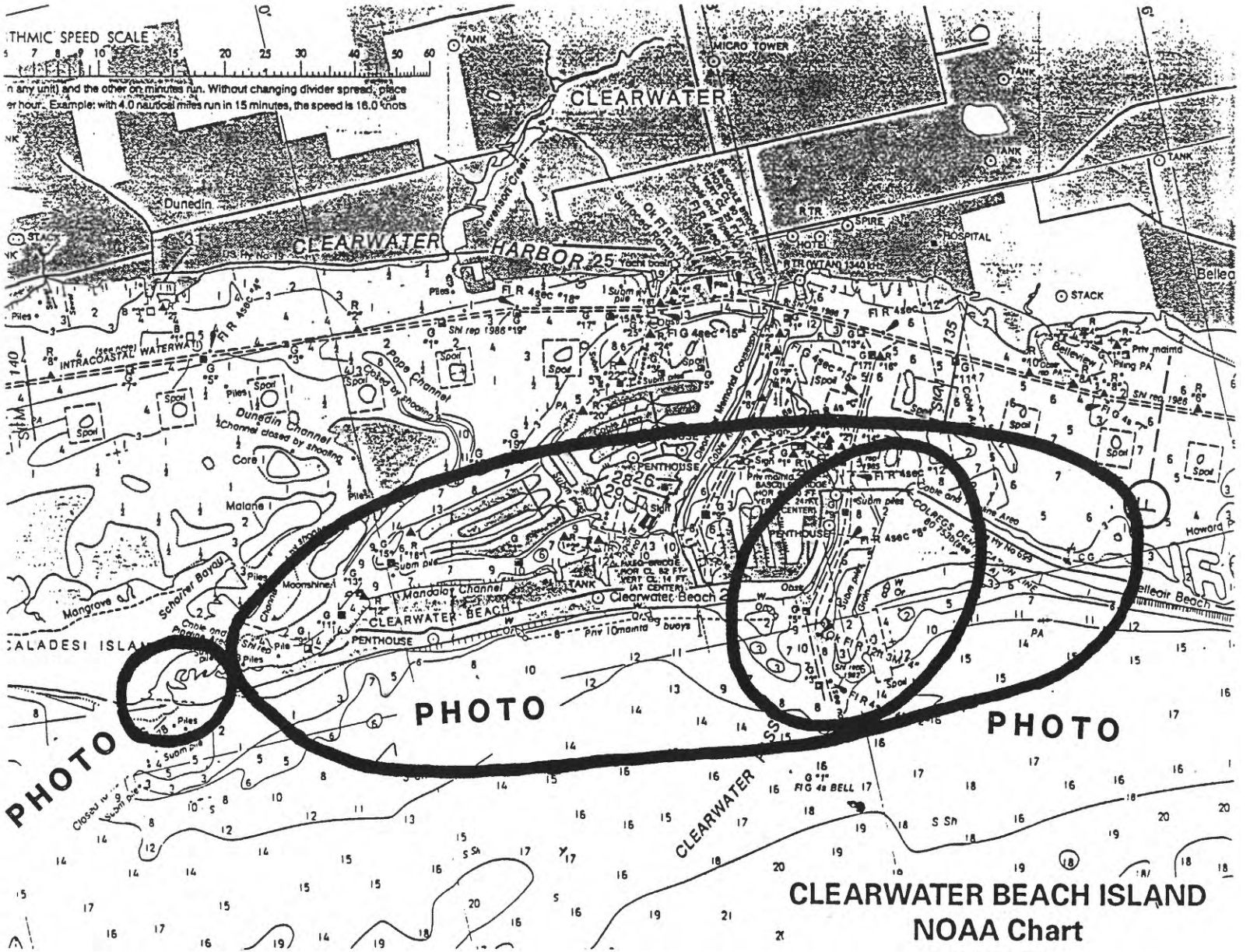
5. CLEARWATER BEACH ISLAND



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yards	COST,$
	1921-26	City	Clearwater Causeway built.		
	1949	City	Sand added on south end public beach.	30,000	5,000
		Pvt.	Sand added on pvt property to south.	120,000	—
Sept. 1-7, 1950	1950	City	2 groins at southern end of public property	—	12,000
	1952	City	500' conc. pier/groin (300' of conc. slab baffles.)	—	42,000
	1950-58	Pvt.	Dredge & fill for Island Estates Development (Ph.1).		
	1960	COE	Clearwater Pass dredged.		
	1961	City	7 groins	—	40,000

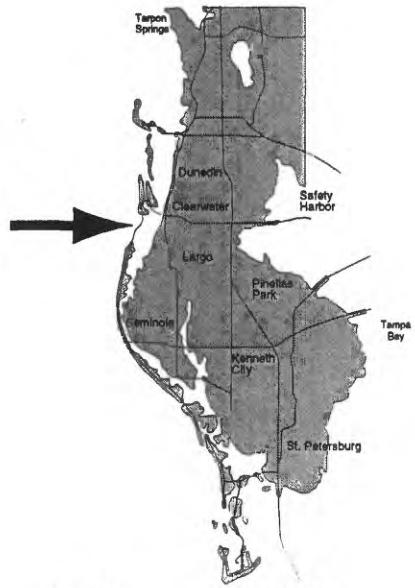
1963	City	Additional conc. baffle pier groin.	—	5,500
		Clearwater Pass Bridge built.		
		"Considerable amount" of rubble fill placed at south end of public property near Clearwater Pass.		
1990	Jt.	Expect maintenance of $15,000/year.		
		Propose to rebuild Clearwater Beach for 0.76miles. No date.	240,000	1,100,000


CLEARWATER BEACH to SAND KEY
DNR aerial,
1982



CLEARWATER BEACH ISLAND
NOAA Chart
 # 11411

6. CLEARWATER PASS



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yards	COST,$
—	1883	—	Clearwater Pass (known as Little Pass, width 0.17km, 1/2 the present width). Dunedin Pass(known as Big Pass., width 0.7km) the predominant tidal influence on Clearwater Bay-St. Joseph Sound.		
	1883-1920		Clearwater Pass increasing in width as Dunedin Pass shoaled.		
1921 (50year)			Hurricane Pass formed.		
	1921-1926	City	Clearwater Causeway built, partially isolating Clearwater Pass from Dunedin Pass. Dunedin Pass widened but migrated north. By 1926 Clearwater Pass had widened to 1.4km. Then "narrowed markedly" to 1000 ft in 1973.		
	1924(27?)	COE	Indian Pass closed by filling.		

Sept.1-6, 1950		—	Deposited shoal material in Dunedin Pass, later returned to pre-storm dimension.	
	1950-1958	Pvt.	Dredge & fill for Island Estates Development (Ph1). Dunedin Pass narrowed and lengthened.	
	1960	COE	Clearwater Pass dredged (10 deep x 150 ' wide).	
	1961-1963	COE	Dredged Intracoastal Waterway.	
	1963	State	Honeymoon Island Causeway built. No significant influence on Clearwater Pass tidal prism.	
	1963	City	Clearwater Pass bridge built. Clearwater Pass maintenance dredging initiated.	
	1963	City	"Considerable amount" of rubble fill placed at south end of public beach property near Clearwater Pass.	
			Expect maintenance of $15,000/year.	
	1965	COE	Maintenance dredging of Intracoastal World War channel.	
1968 GLADYS	—	—		
	1969	COE	Clearwater Pass maintenance dredging.	
			Material from '60,'67 & '69 Clearwater Pass dredgings pumped to four submerged disposal areas, one south of the entrance channel and three flanking the bay channel.	(320,822)
	1970	—	Clearwater Pass narrowing & deepening as Sand Key moved north against the hardened south end of Clearwater Beach Island. By late 1980's had undermined bridge supports.	

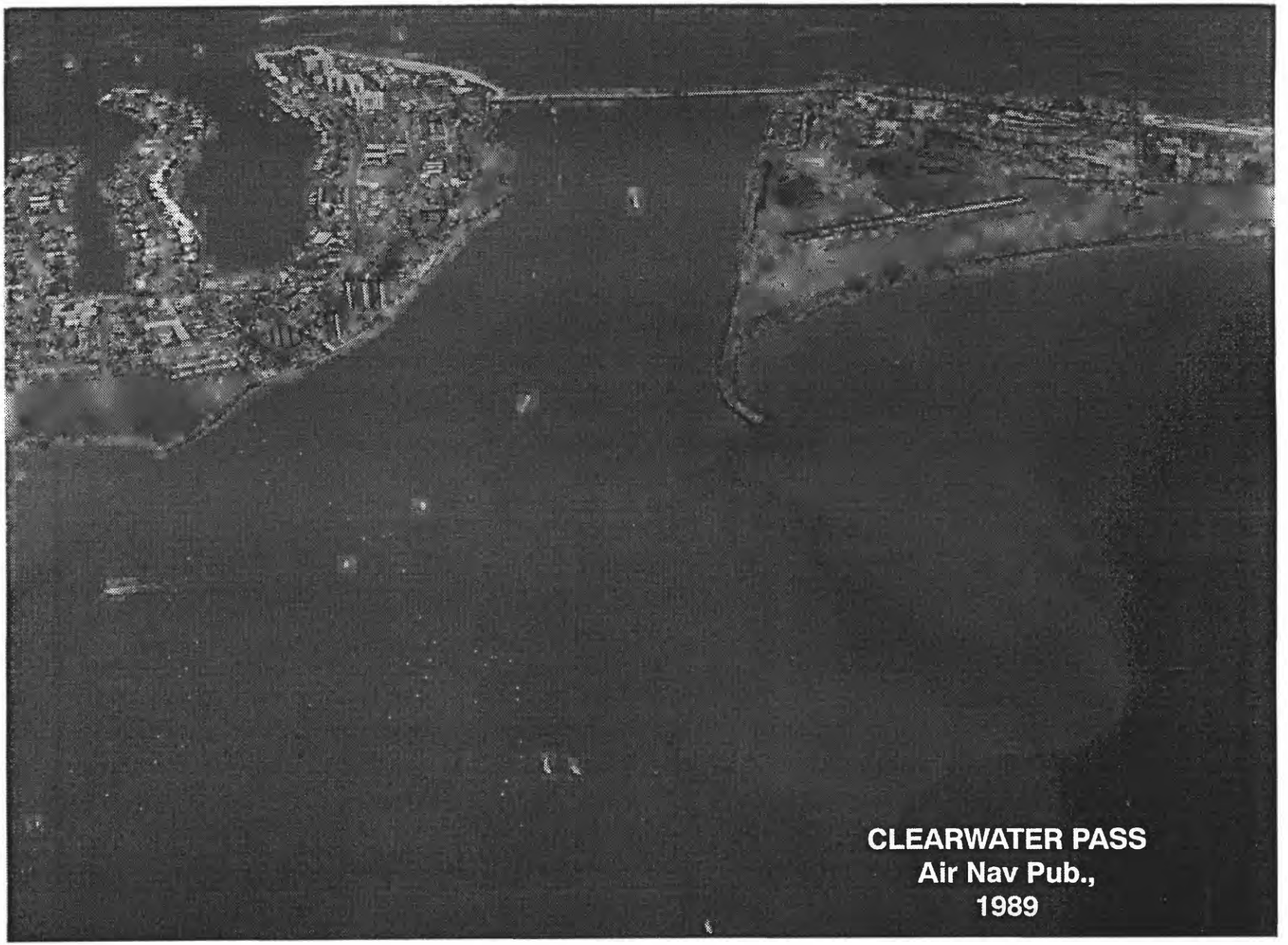
1972 AGNES

1973-1974	COE	Clearwater Pass maintenance dredging. Material placed on north end Sand Key.	(126,000)
1975	City	Clearwater Pass jetty south side built, 1280m long. Fixed width at 1400'. At some time in here seawalls were built to harden the south shore of Clearwater Pass. This prevented Clearwater Pass from eroding northward. Pass then narrowed and deepened until in the 80's Clearwater Pass Bridge supports were undermined and settled 1 ft.	2,500,000
1977	COE	Clearwater Pass maintenance dredging. Material placed on north end Sand Key.	(186,000)
1981	City	Clearwater Pass jetty north side built, 168m long.	
1980-1981	City	City acquired hydraulic dredge and took over Clearwater Pass maintenance dredging. Material placed on 2 miles of Sand Key beach just south of Clearwater Pass. Dredge proved too light, may no longer be in use?	(600,000)
1981-1984	City	Clearwater Pass maintenance dredging. Material placed on Clearwater Beach Island and to fill scour holes around Clearwater Pass Bridge abutments.	(350,000)

1985 ELENA

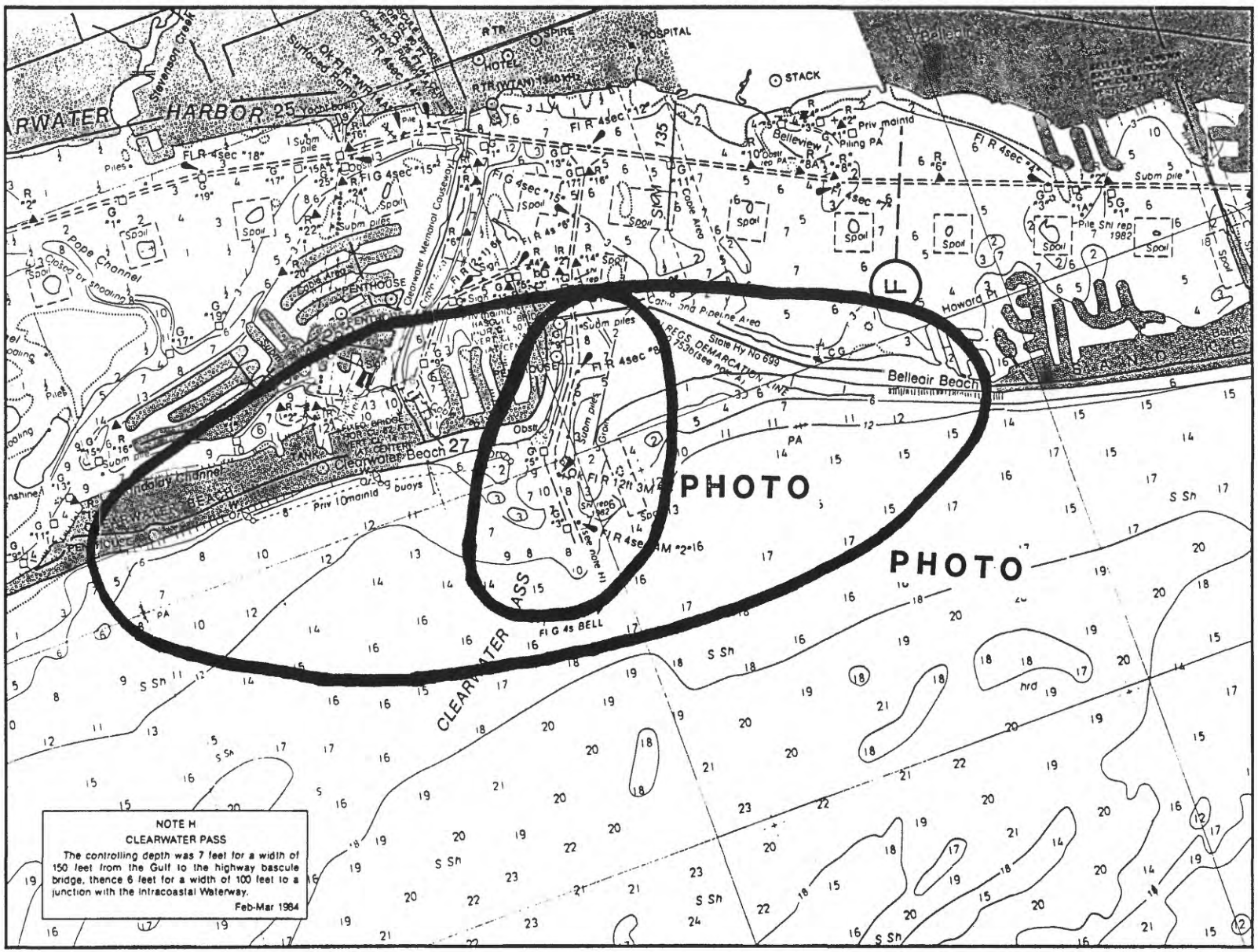
1986 KATE

Clearwater Pass now 8.5'deep x 1300 ' wide.

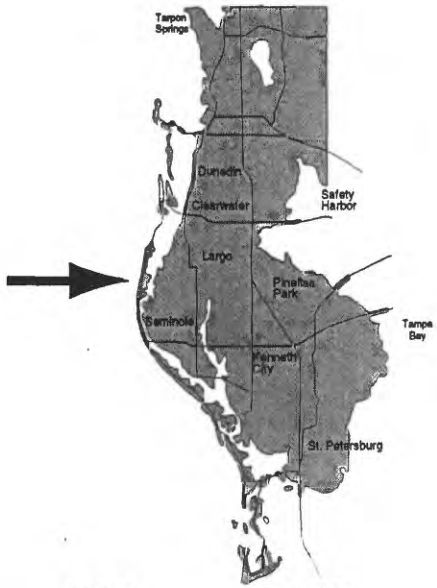

CLEARWATER PASS
Air Nav Pub.,
1989

Clearwater Pass

Excerpt From NOAA Chart #11411



7. SAND KEY



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yards	COST,$
1848 (100year)	—	—	Johns Pass "reported" cut by severe tropical storm		
	1892-1943		North end (3km) migrated toward bay up two 0.7km at Clearwater Pass.		
1921 (50year)					
	1924(27?)	COE	Indian Pass closed by filling, joining upper Sand Key to lower beaches. Reportedly "Indians formerly fished here". [Located at the town line between Indian shores and Redington Shores.] Closed to alleviate shoaling problems in the Intracoastal Water Way near The Narrows. Between 1879and 1926 entry to Indian Pass had moved northerly about 1/3mile either naturally or by filling.(See also 1985 item for Redington Shores Breakwater.)		
	BEFORE 1950	—	Seawalls/groins along north end.		

Sept. 1-7 1950					
	1950-1957	Pvt.	Seawalls, timber bulkheads along "entire shore".		
	1957	Madeira . Beach	37 timber pile & panel groins (210' long, 300' apart) along southern end Sand Key. Stormed-caused breakthrough south of Clearwater Pass, closed shortly.		
	1960	Madeira Beach.	Johns Pass dredged.		
	1961	Madeira Beach.	King pile anchor groin (500') north side of Johns Pass. Fill from Johns Pass placed north of groin.	30,000	300,000
	1961	Madeira Beach.	Annual maintenance of groin system @ $10,000.		
	1966	COE	Johns Pass dredged (10'deep x 500 ' wide ;8'deep x 100 ' wide ;6'deep x 100 ' wide) to Intracoastal.		
1968 GLADYS					
	1969	COE	Indian Rocks Beach (Indian Shores?) 5,500' emergency filled from Intracoastal.	143,000	856,000
1972 AGNES					
	1973	COE	Indian Rocks Beach(& Indian Shores?) 5 miles emergency filled from Intracoastal & offshore. Follow-on maint. to local interests.	400,000	1,677,600
		COE	Clearwater Pass dredging material placed on northern end of Sand Key.	126,000	
	1975	Clearwater	Clearwater Pass jetty on south side Clearwater Pass, 1280m long.		2,500,000
	1974	COE	Clearwater Pass maintenance dredging. Beach disposal south side of Pass.	126,000	

	1977	COE	Clearwater Pass maintenance dredging. Beach disposal south side of Pass.	186,000	
	1980-1981	Clearwater	Clearwater Pass maintenance dredging fill placed on 2 miles of beach just south of Clearwater Pass.	600,000	—
1985 ELENA (10year)	1985 Spring	COE	Redington Shores offshore stone breakwater, 300' out, 400' long, sand fill between beach & break-water-offshore public property. Located approximately at 1879 outlet of Indian Pass. By Nov. 1987 beach had built out almost to breakwater. In Feb. '89 continues built out. Beach nourishment 2.1 miles, taken from shoal offshore Johns Pass.	13,500 (30,000?) 525,000	2,000,000 approx.
	1987	Madeira Beach.	Groins added.		
	?	COE	Rehab. anchor groin north side Johns Pass?		
	1987	—	Computer Model analysis of prism of a New Pass at The Narrows (to replace prior Indian Pass) by USF/ Tampa Center of Math Models.		
	1989	Clearwater	Dan's Island Condo(fronted by seawall) sand nourished by City under agreement. Sand later washed away & Dan's Island sued City and won. (Beach profiles taken 1year after Elena show Dan's Island beach 15m wide while unwalled beach 200m north rebuilt to 50m wide.)		

Pass	Present	w/ New Pass
Clearwater Pass	872 mill cu ft	810
Johns Pass	795	768
Blind Pass	68	67
New Pass	—	145(will be stable and small)

1990	COE	Indian Rocks Beach (3mi-between Township 30S & Indian Shores) nourishment from offshore Mullet Key, north side Egmont Channel. Follow-on study of erosion being carried out by USF/USGS.	1,300,000	13,000,000
1991	COE	Indian Shores (2.9mi) nourishment from same source.	850,000 for both	13,000,000
1992E	COE	North Redington Beach/Redington Shores maint. Also considering offshore breakwaters at Indian Rocks Beach. & at north Redington Beach.	 "	3,500,000 2,546,000 1,200,000

NOTE: Belleair Shs/Beach - very limited public beach access. Cities "do their own".
Belleair Beach. - condo at north end put in rip-rap around 1980. Otherwise, just rake/clean.
Belleair Shs. - After Elena ('85) beach came back more than before.

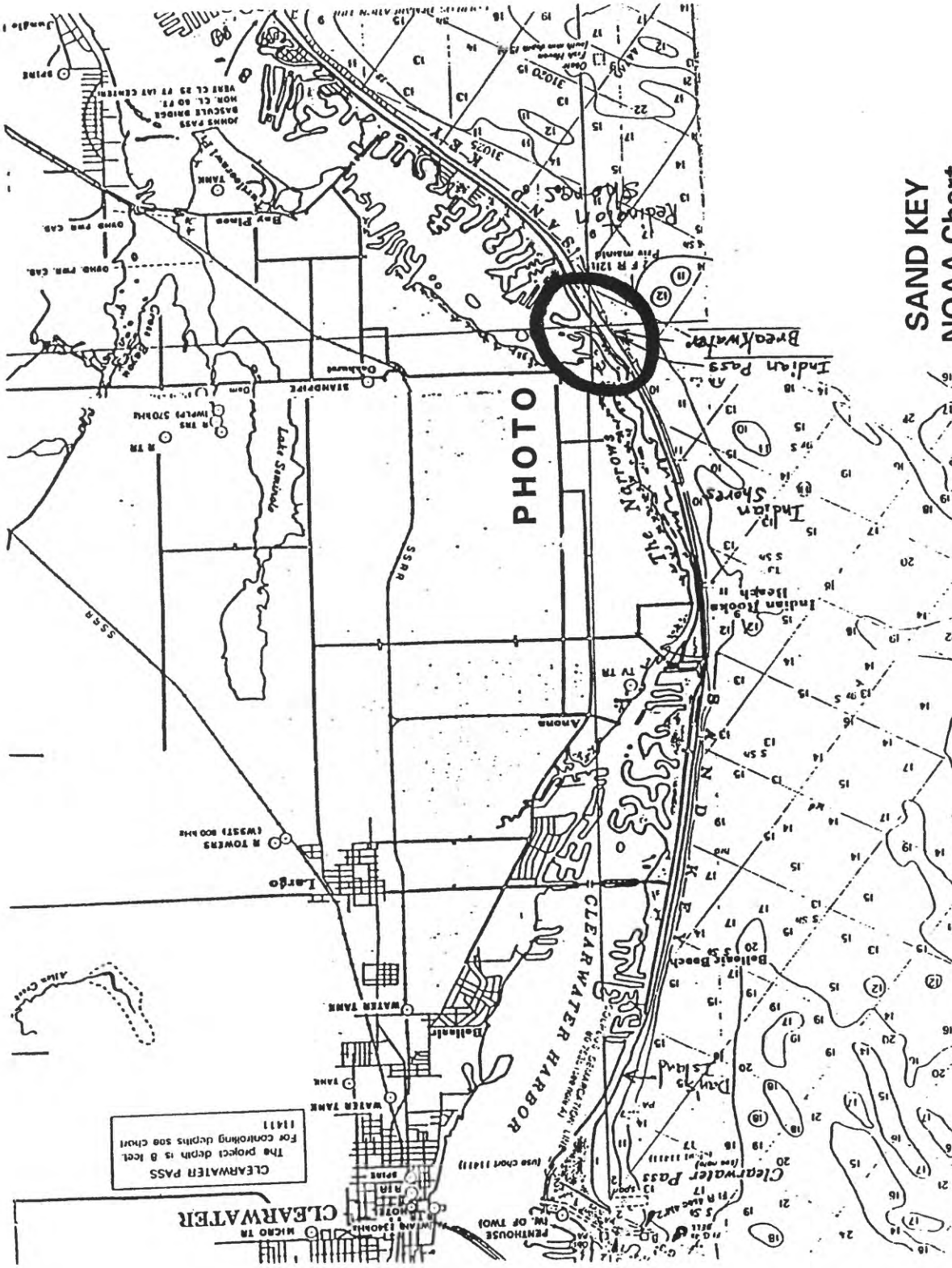
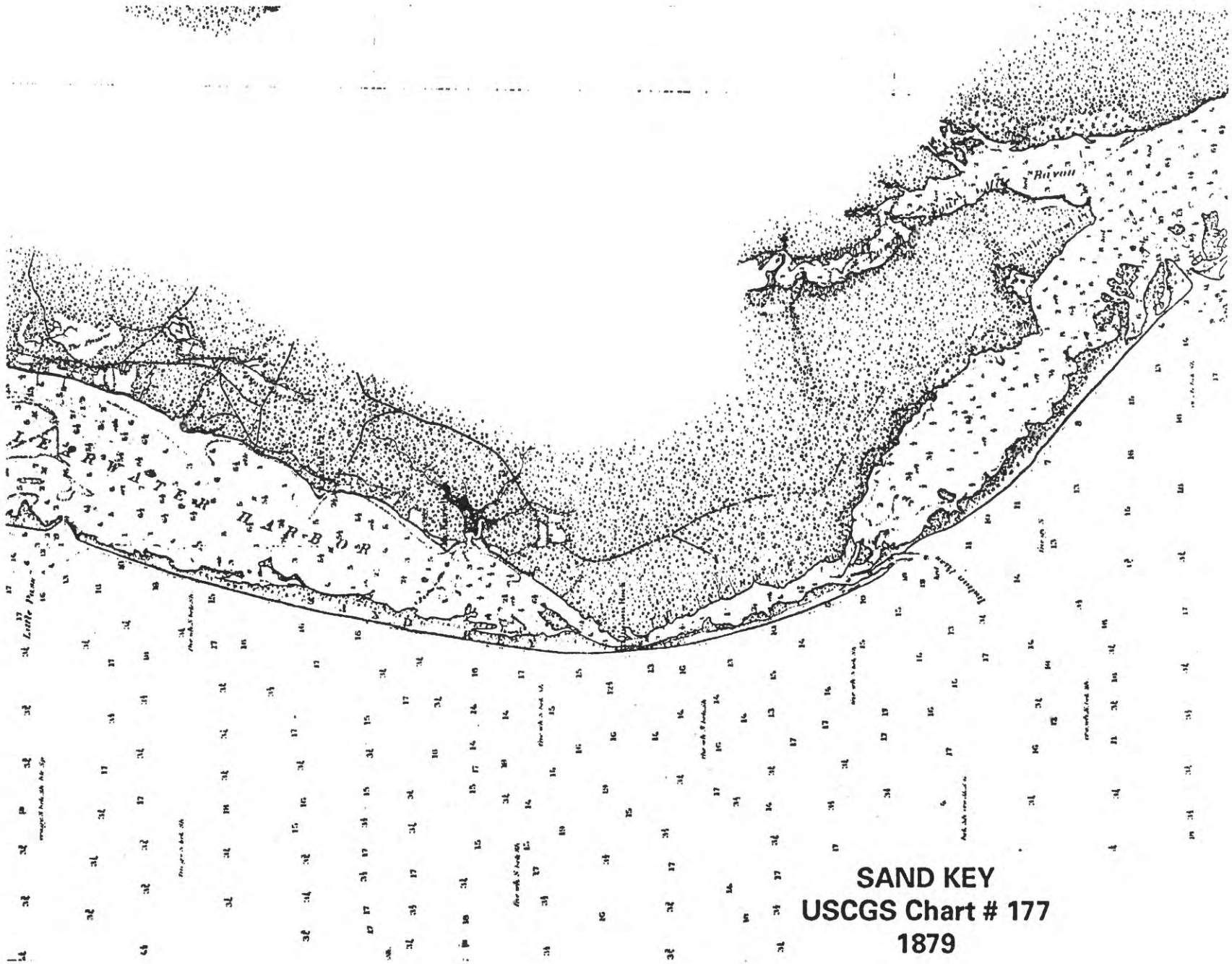
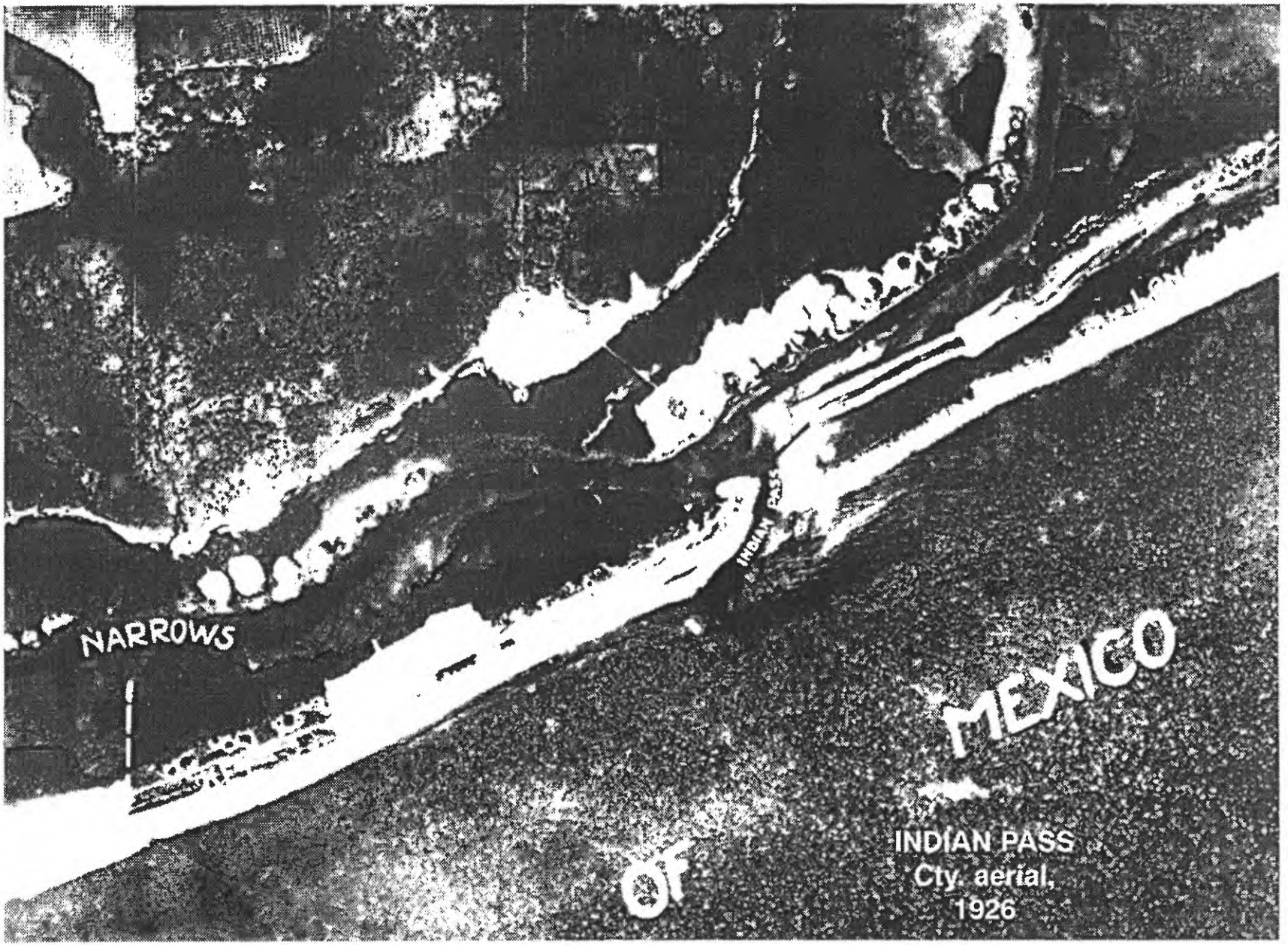


PHOTO
CLEARWATER
CLEARWATER PASS
The project depth is 8 feet
For controlling depths see chart
11411
CLEARWATER HARBOR
Clearwater Pass
Indian Shores
Indian Rocks Beach
Belleair Beach
Largo
Belleair
WATER TANK
STANDPIPE
Lake Seminole
Dunedin
Anona
Bay Pines
Indian Pass
Breakwater
Redington Shoals
SSRR
SAND KEY
NOAA Chart
11411

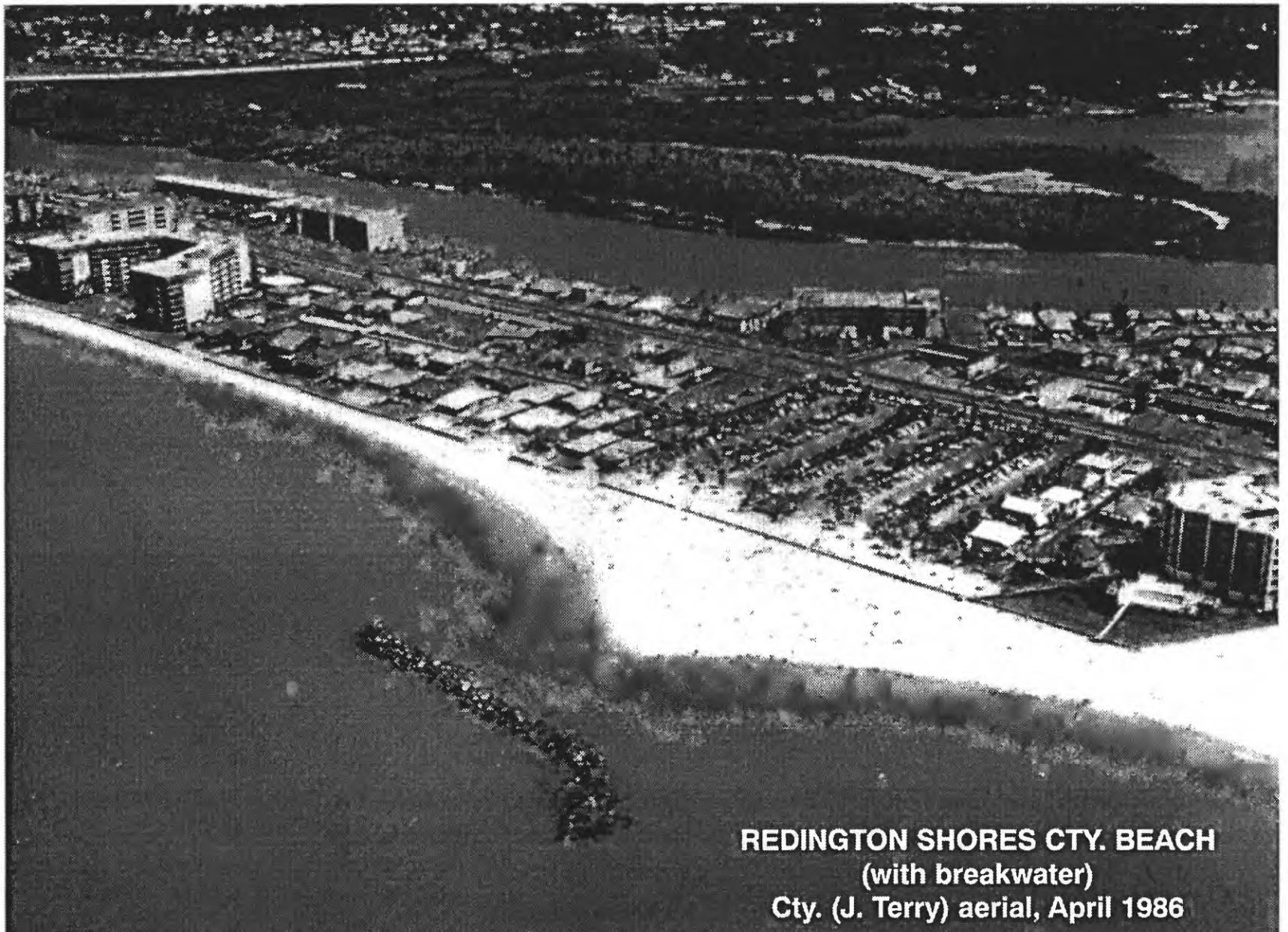


SAND KEY
USCGS Chart # 177
1879



INDIAN PASS
Cty. aerial,
1926

REDINGTON SHORES CTY. BEACH
(Before breakwater)
Cty. aerial, April 1984

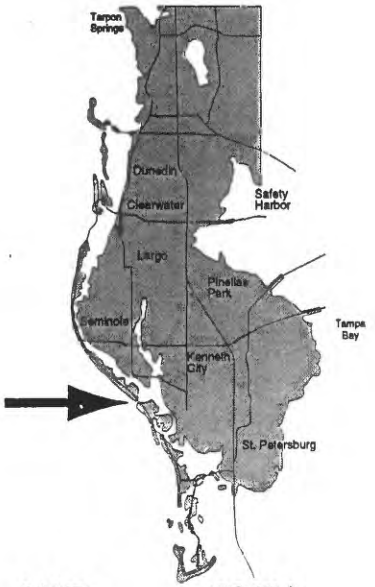


REDINGTON SHORES CTY. BEACH
(with breakwater)
Cty. (J. Terry) aerial, April 1986

REDINGTON SHORES CTY. BEACH
(with breakwater)
Cty. aerial, 1987

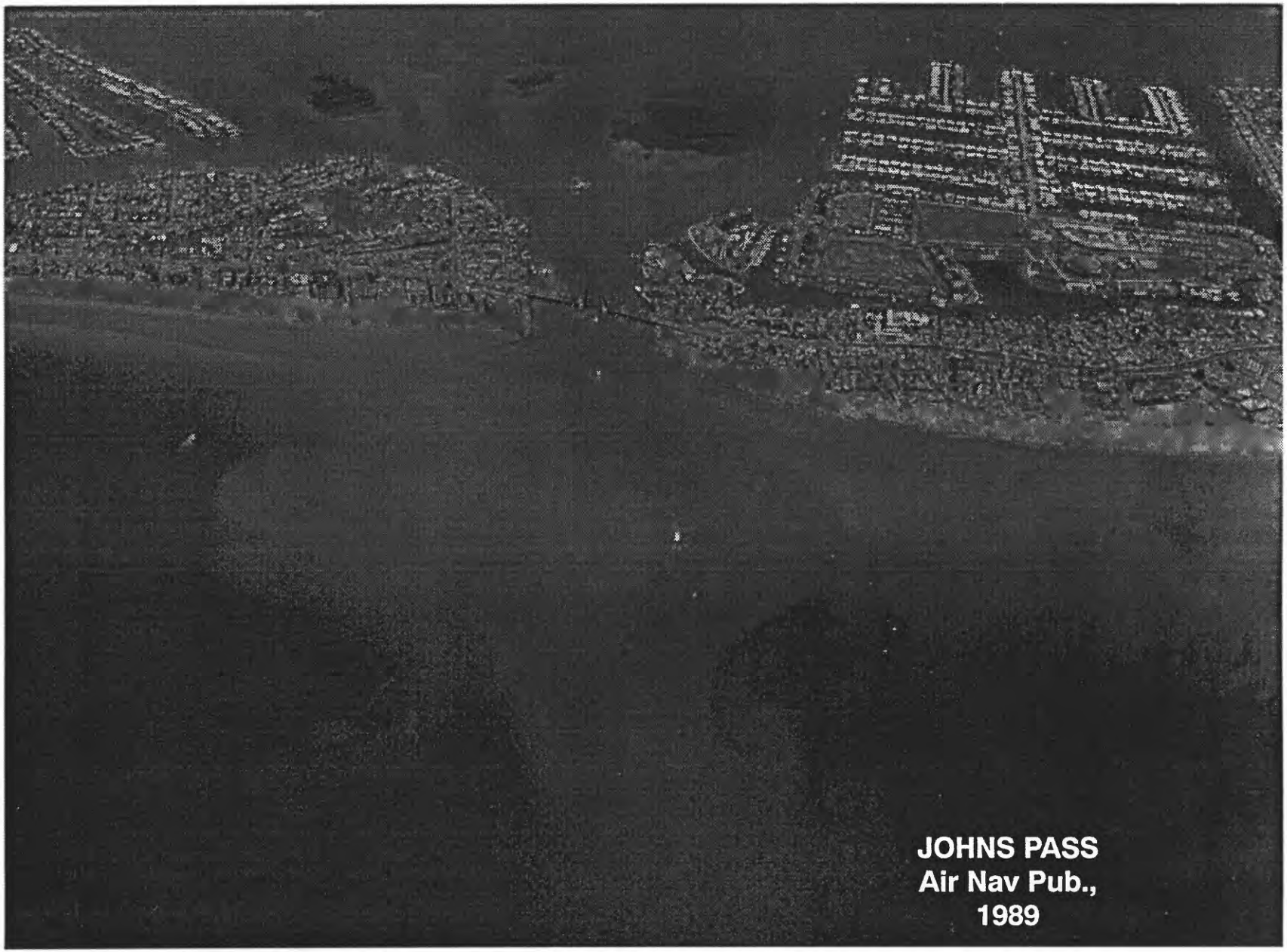
[illegible] SHORES CTY. BEACH
([illegible]kwater & safety fence)
([illegible]erry) aerial, April 1989

8. JOHNS PASS



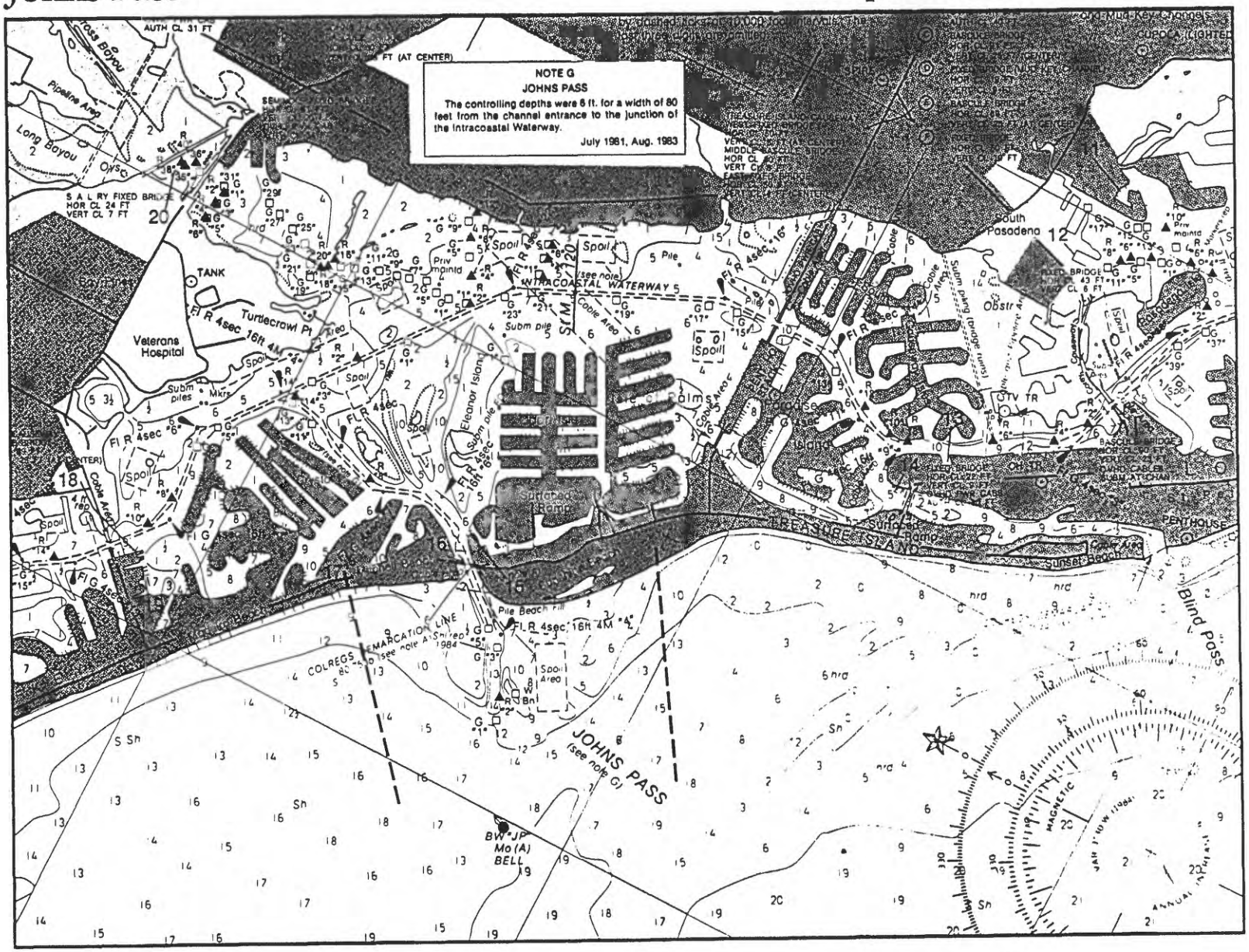
STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yards	COST,$
1848 (100year)	—	—	Johns Pass "reported" cut by severe tropical storm.		
	1916	Local	Secondary entrance at north end blind Pass closed by pumping sand from offshore bar.		
1921 (50year)					
	1926	City	Bridge across Johns Pass (removed 1969)		
	1924 (27?)	COE	Indian Pass closed by filling.		
Sept.1-7 1950 EASY					
	1960	Madeira Beach	Johns Pass dredged, material placed 7,000yards offshore south of dredged channel.	(94,000)	

	1961	Madeira Beach	King pile anchor groin (500') north side of Johns Pass. Fill from Johns Pass placed north of groin.	(30,000)	300,000
	1961	Madeira Beach	Expected annual maintenance of groin system @ $10,000.		
	1966	COE	Johns Pass dredged (10'deep X 500 ' wide ;8'deep X 100 ' wide ;6'deep X 100 ' wide) to Intracoastal. Spoil placed offshore.	(77,655)	
			Revetment on 920' of south side of Pass.		106,000
1968 GLADYS	1968	—	Offshore Sand (1960, 1966) migrated to beach south of Johns Pass, forming crescent shaped bar with water between bar & beach, known as O'Brien's Lagoon.		
	1969	Cty	New bridge across Johns Pass.		
	1971	COE	Removed fill from shore connected bar at north end of Treasure Island (O'Brien's Lagoon area) for 2,000' beach fill on Treasure Island between 104 & 108 St.	(75,000)	
1972 AGNES					
	1979-85	COE	Johns Pass maintenance dredging, used as beach fill on Treasure Island & to fill O'Brien's Lagoon. Includes 70,000 yds in 1981 to Treasure Island between Sta 28+50 and Sta 60+50.	(230,000)	
	After '87	COE	Rehab. anchor groin north side Johns Pass.		
	1990	COE	To dredge Johns Pass (10yr interval).		

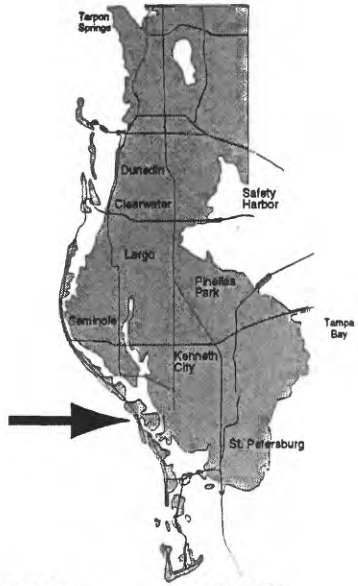

JOHNS PASS
Air Nav Pub.,
1989

Johns Pass

Excerpt From NOAA Chart #11411



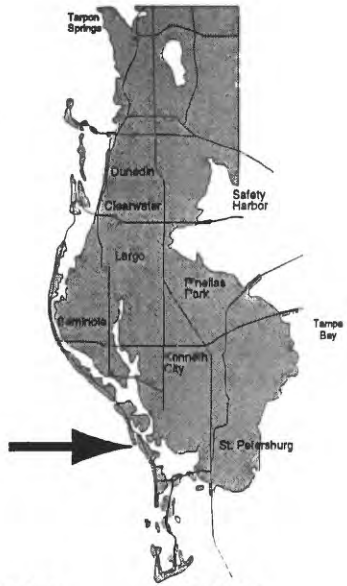
9. TREASURE ISLAND



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yds	COST,$
1848	—	—	Johns Pass "reported" cut by severe tropical storm		
	1916	Local	Secondary entrance at north end Blind Pass closed by pumping sand from offshore bar.		
Sept. 1950 EASY					
	1960	Treas Isl	56 groins (some at south end near Blind Pass) Reported in 1966 - "seem not to be effective".		228,000
	1962	Treas. Isl	Stone rubble jetty north side Blind Pass, 425' long.		18,000
	1964	Treas Isl	Sunset Beach added sand dredged from Blind Pass.	10,000	6,500
	1966	COE	Johns Pass channel dredged to Intracoastal (10'deep x 150 ' wide ;8'deep x 100 ' wide ;6'deep x 100 ' wide). Revetment on 920' of south side of Pass.		

1968 GLADYS	1968	—	Offshore sand (1960,1966 Johns Pass dredging) migrated to beach south of Johns Pass forming crescent shaped bar with water between bar & beach, known as O'Brien's Lagoon.		
	1968	Treas Isl	Blind Pass dredged.		
	1969	COE	9200' of emergency beach fill from 600' south of 77 Ave. [Sta 0+00] (0.3mi north of Blind Pass) to 104 Ave. [Sta 92+00]. Sources: {Pipeline dredge from Blind Pass. Eroded quickly, due to fine grain size. {Borrow from 1500-2000' offshore southern end of Treasure Island.	790,000 (108,00) (682,000)	
	1971	COE	2,000' beach fill from 104 St. [sta92+00} to 108 St. [Sta112+00]from shore connected bar at north end of Treasure Island. (O'Brien's Lagoon area).	75,000	41,250
1972 AGNES	1972	COE	2,000' beach nourishment form 83 St. to 77 St.		
	1976	COE	S'ly 1.5 mi beach nourished form offshore borrow (same as 1969). Groin #1 built 2300' north of Blind Pass Groin #2 (360' long) built on north side of Blind Pass.	380,000	990,000
	1978	COE	2,000' north of Groin #1 nourished from Blind Pass. Groin #2 raised 2-1/2 ft.	50,000	
	1979-85	COE	Beach fill on Treasure Island & to fill O'Brien's Lagoon from Johns Pass maintenance dredging. Includes 70,000yds on 3200' [Sta 28+50 to Sta 60+50] nourished in 1981.	230,000	
	1983	COE	4,200' of south end Treasure Island nourished from Blind Pass. Groin #2 extended 130' (total 490').	200,000	
1985 ELENA					
	1986		Beach renourished from Blind Pass & Passe-a-Grill Pass.		
	1990	COE	To dredge Johns Pass (10 yr interval).		
	No Date	COE	Treasure Island maintenance.		2,300,000

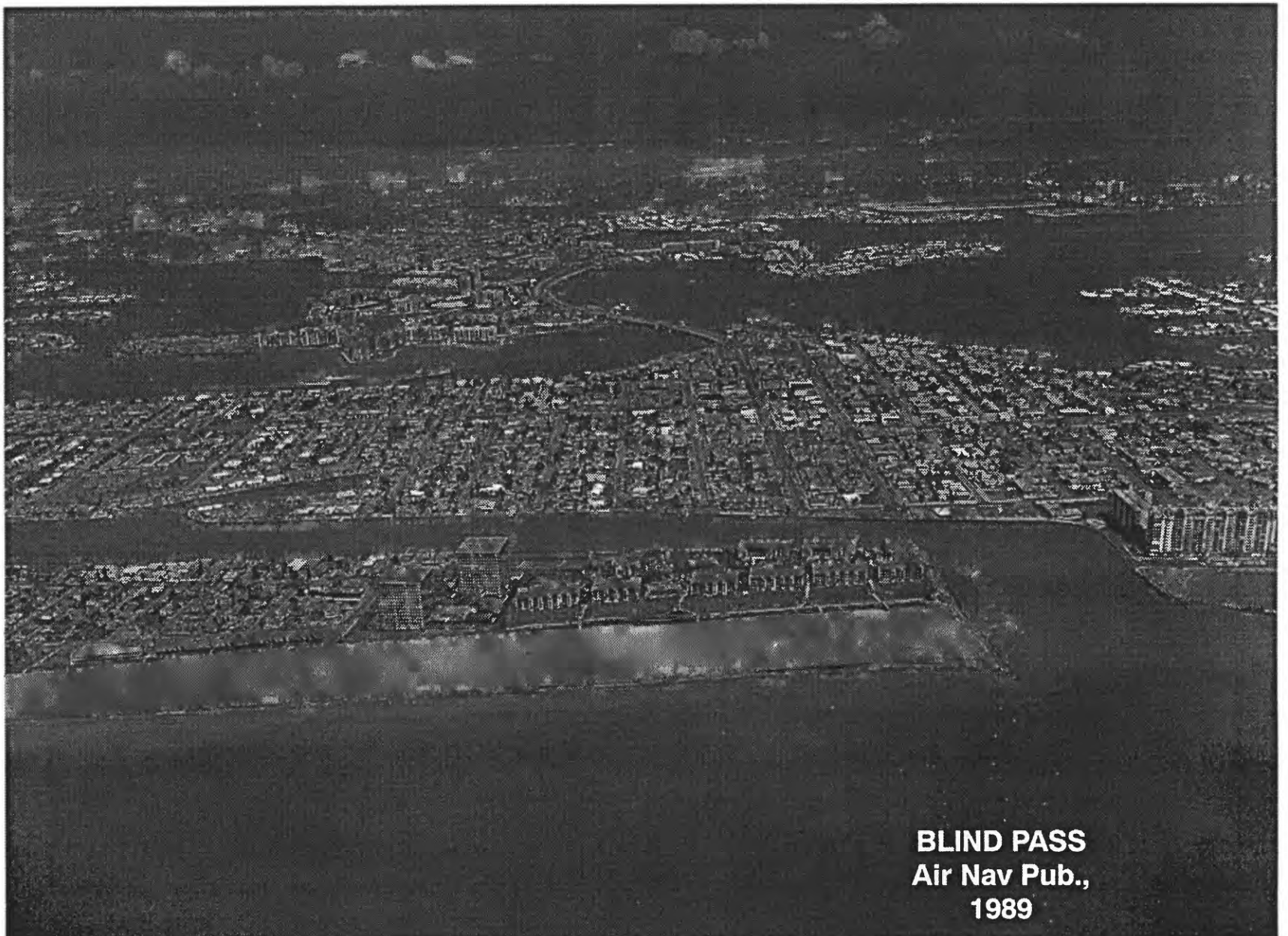
10. BLIND PASS



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yds	COST,$
	1873	—	Blind Pass approx. 1 mile north of 1936(present) location. Gradual southerly migration of entrance with at times 2 entrances in existence; a N'ly alternate entrance has opened and closed several times, last closure in 1935.		
	1916	Local	Secondary entrance at north end Blind Pass closed by pumping sand from offshore bar. Reopened. Reclosed by 1921 storm. Reopened in 1930. Last closed 1935.		
	1926	Cty	Built bridge.		
	1935	?	Alternate entrance closed for last time.		
	1936	City	Short jetty built on south side of Blind Pass-fixed location of Blind Pass. Short channel dredged across shoals north of jetty.		

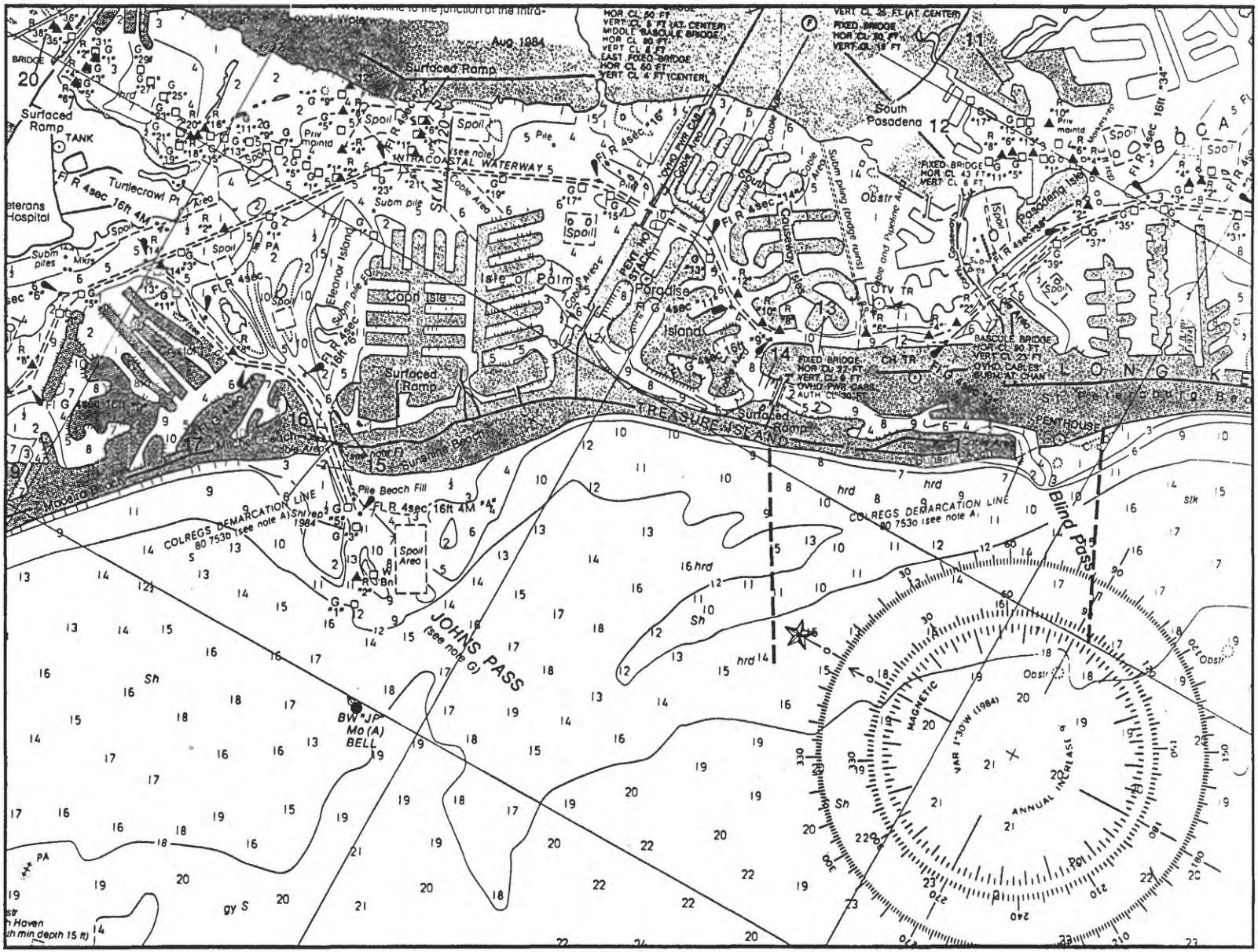
1950 EASY KING	1960	Treas Isl	Some Sunset Beach groins at south end Treasure Island.		
	1957-63	Local	First 930' south of Blind Pass bulkheaded.		
	1962	City	Stone/rubble-mound groin/jetty on north side Blind Pass 425' long.	—	18,000
	1964	Treas Isl	Blind Pass dredged; sand placed on Sunset Beach. (Treasure Island)	(10,000)	6,500
1968 GLADYS	1968	City	Blind Pass dredged; sand placed just south of Blind Pass.		
	1969	COE	Blind Pass dredged; sand added to Sunset Beach.	(108,000)	
1972 AGNES	1972	COE	Completed the "second nourishment" of Treas. Isl beaches. Source was offshore 2,500' north and 2,500' offshore Blind Pass. (See 1976 also.)		
	1974	City	Extended jetty on south side of Blind Pass from 171' to a total of 261'.		
	1975	City&Local	2 kingpile groins and beach fill from Blind Pass placed just south of Blind Pass.	(75,000)	
	1976	COE	Groin (#2) on north side Blind Pass extended to 360'. Groin (#1) built on Treasure Island 2300' north of Blind Pass,285'.1972 borrow area used again for 1976 beach nourishment campaign. Total removed in both offshore campaigns.	(554,849)	990,000
	1977	—	1975 fill eroded back to pre-1975 position.		
	1978	—	Blind Pass completely closed by shoaling.		

	1978	COE	Blind Pass dredged; sand added along 2,000' of Treasure Island north of Groin #1. Blind Pass rate of shoaling estimated as high as 75,000 yd/yr. Groin #2 (north side Blind Pass) raised 2-1/2ft.	(50,000)	
	1980	COE	Blind Pass dredged ; 2,800' of beach south of and adjacent to Blind Pass refilled. Also sand filled offshore as partial "breakwater" about 1,000' south of Blind Pass. (See aerial photo pp.23-4 in COE 1980 BEC Stage II Doc.) Rates of shoaling continue as high as 75,000 yd/yr.	(143,000) (100,000)	
	1983	COE	Blind Pass dredged; material placed on 4,200' of south end of Treasure Island (Sunset Beach). Groin #2 (north side Blind Pass) extended 130' to total 490'.		
1985 ELENA					
	1986	COE	Dredged in 1986; material used for beach nourishment on Treasure Island and Long Key (St. Pete Beach). Blind Pass is not Federally maintained but is a borrow source for beach material. Upham Beach renourished.	(75,000)	1,500,000
	1990	COE	Dredged Blind Pass. Renourished Upham Beach. Plan redo every 3 years.	(325,000)	1,500,000

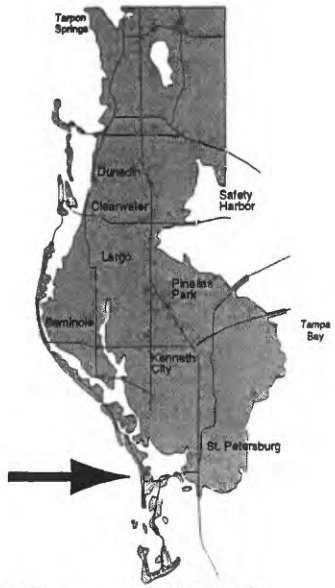

BLIND PASS
Air Nav Pub.,
1989

Blind Pass

Excerpt From NOAA Chart #11411



11. LONG KEY

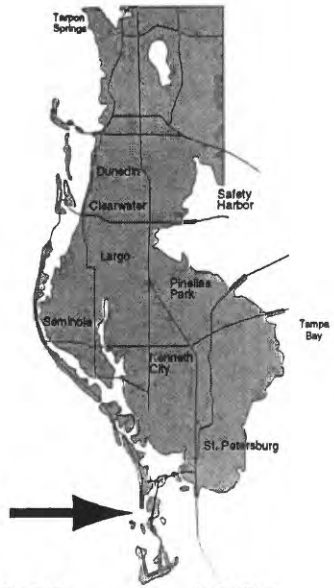


STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yds	COST,$
	1873	—	Blind Pass approx. 1 mile north of 1936 (present) location.		
	1936	City	Short jetty built on south side of Blind Pass-fixed location of Blind Pass.		
1950 EASY KING	1950-60	City	Groins & seawall at south end (Passe-a-Grille).	—	115,000
	1957-63	Local	First 930' south of Blind Pass bulkheaded.		
	1959-60	City	Rubble-mound jetty at Passe-a-Grill & some storm repair.	—	23,000
	1962	City	Extended Pass-a-Grille jetty and added fishing platform.	—	36,500
			Annual beach erosion control cost.	—	12,000
	1966	COE	Passe-a-Grille channel dredged to the Intracoastal (10'deep x 150'w;8'deep x 100 ' wide). Removed 20,000yds. No follow-on maintenance required.		

	1964	City	Sand dredged from Blind Pass placed on Sunset Beach (Treasure Island)	10,000	
1968 GLADYS	1968	City	Blind Pass dredged, placed just south of Blind Pass.		
1972 AGNES					
	1974	City	Extended jetty on south side of Blind Pass 171' to a total of 261'.		
	1975	City & Local	2 kingpile groins and beach fill from Blind Pass placed just south of Blind Pass.	75,000	
	1976	COE	Groin on north side Blind Pass extended to 360'.		
1977	—	—	1975 fill south of Blind Pass eroded back to pre-1975 position.		
1978	—	—	Blind Pass completely closed by shoaling. Blind Pass dredged; material used on Treasure Island		
	1980	COE	Refilled 2,800' at north end of island adjacent to Blind Pass. Also sand filled offshore as partial "breakwater" about 1,000' south of Blind Pass. (See aerial photo pp.23-4 in COE 1980 BEC Stage II Doc.) Fill from dredging of Blind Pass. Rates of shoaling continue as high as 75,000yd/yr.	143,000 1000,000	
	1983	COE	Blind Pass dredged; material used on Treasure Island		
	1984	COE	Rehabilitated pvt. anchor groin at south end of island (Passe-a-Grille jetty).		
1985 ELENA					
	1986	?	Renourish Passe-a-Grille Beach.	3,000	
	198-	City	Added Pass-a-Grille dune area sand fencing and sea oat planting.		
	1990	COE	Renourished N'ly 0.57mi Long Key Beach, including. Upham Beach.	325,000	1,500,000
	1992E	COE	Renourish S'ly 3.6mi	—	3,800,000

12. PASSE-A-GRILLE PASS

Including the Reefs & Shell Key



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yds	COST,$
Passe-a-Grille Pass has two entrance passes, separated by Shell Key.					
North Channel					
	1926-48	—	Shell Key migrated 1,800' north-east ;North Channel widened from 1,550' to 2,145' while South Channel narrowed from 640' to 520'.		
1950EASY KING	1950-60	City	Groins & seawall at south end Passe-a-Grille.		
	1959-60	City	Rubble-mound jetty at Passe-a-Grille & some storm repair.		
	1962	City	Extended Passe-a-Grille jetty and added fishing platform.		
	1966	COE	Passe-a-Grille North Channel dredged to the Intracoastal (10'deep X 150 ' wide ;8'deep X 100 ' wide). Spoil placed in an off-shore disposal site along the channel. No follow-on maintenance required.	(162,000)	

1984	COE	Rehabilitated jetty at south end of Passe-a-Grille.
1986		Borrow removed for beach renourishment on Long Key and Treasure Island.

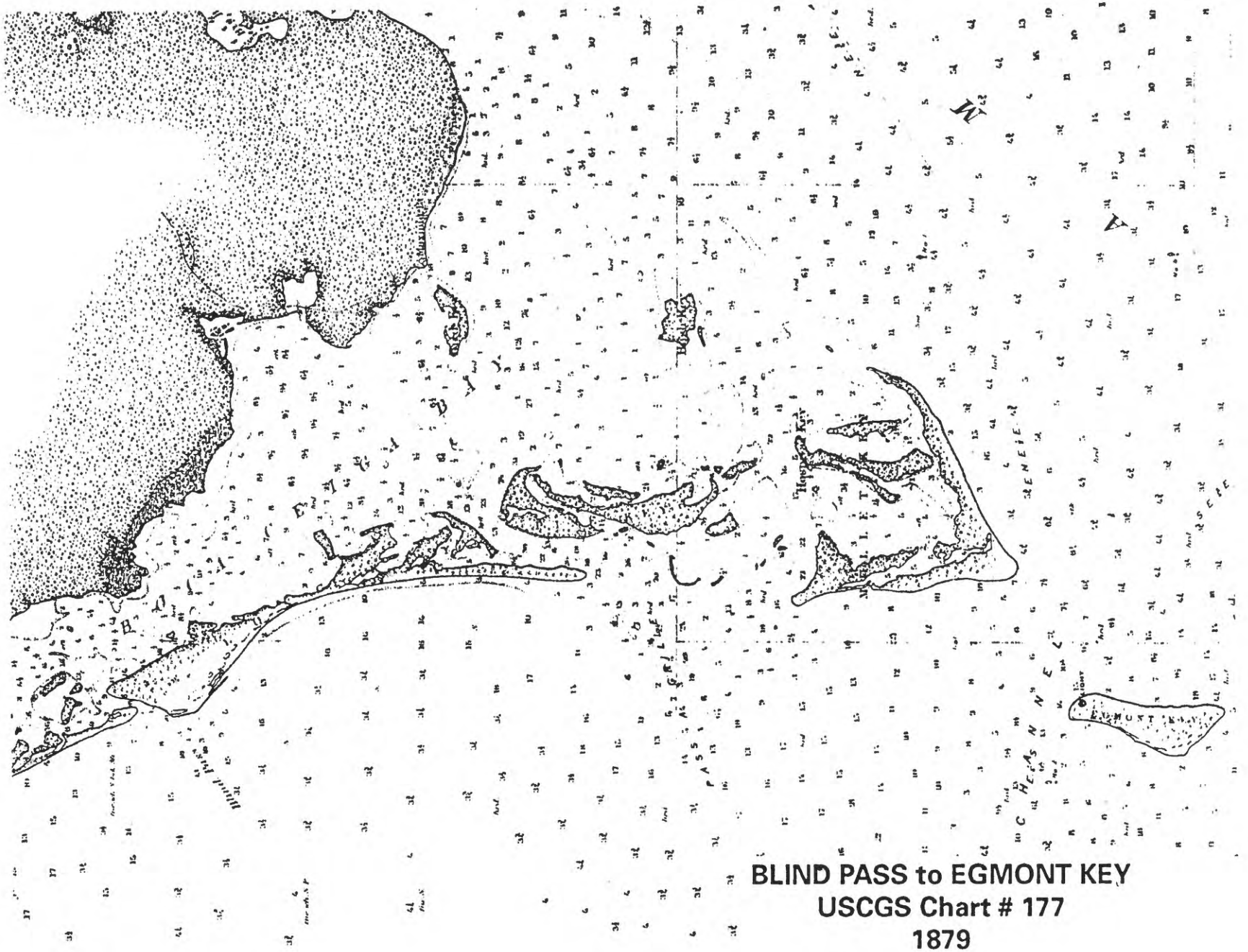
Shell Key, South Channel, The Reefs, Bunces Key

Shell Key, Bunces Key are sand keys. The Reefs are mangrove islands landward of the outer keys.
No work done.

From southerly edge of Passe-a-Grille North Channel, northerly side of Bunces Pass. Include South Passe-a-Grill Channel. Both South Passe-a-Grille & Bunces Pass are natural channels.

Bunces Pass

Known since 1873. A natural inlet across Boca Ciega Bay mangrove shallows to Tampa Bay. No work done. Limited boating use because of 2 fixed bridges with vertical clearance limited to 16'.

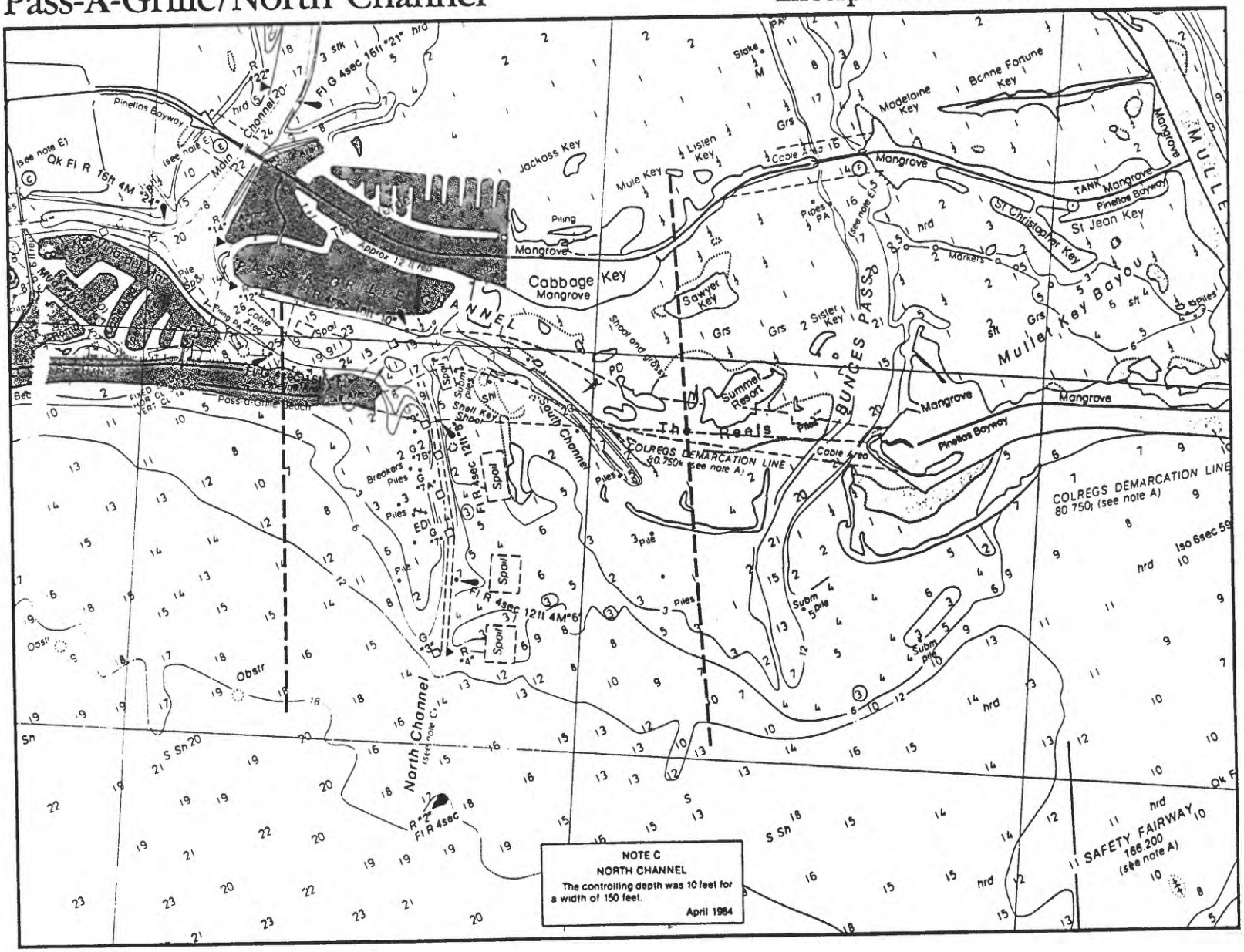


BLIND PASS to EGMONT KEY
USCGS Chart # 177
1879

PASSE-A-GRILLE CHANNEL
Air Nav Pub.,
1989

Pass-A-Grille/North Channel

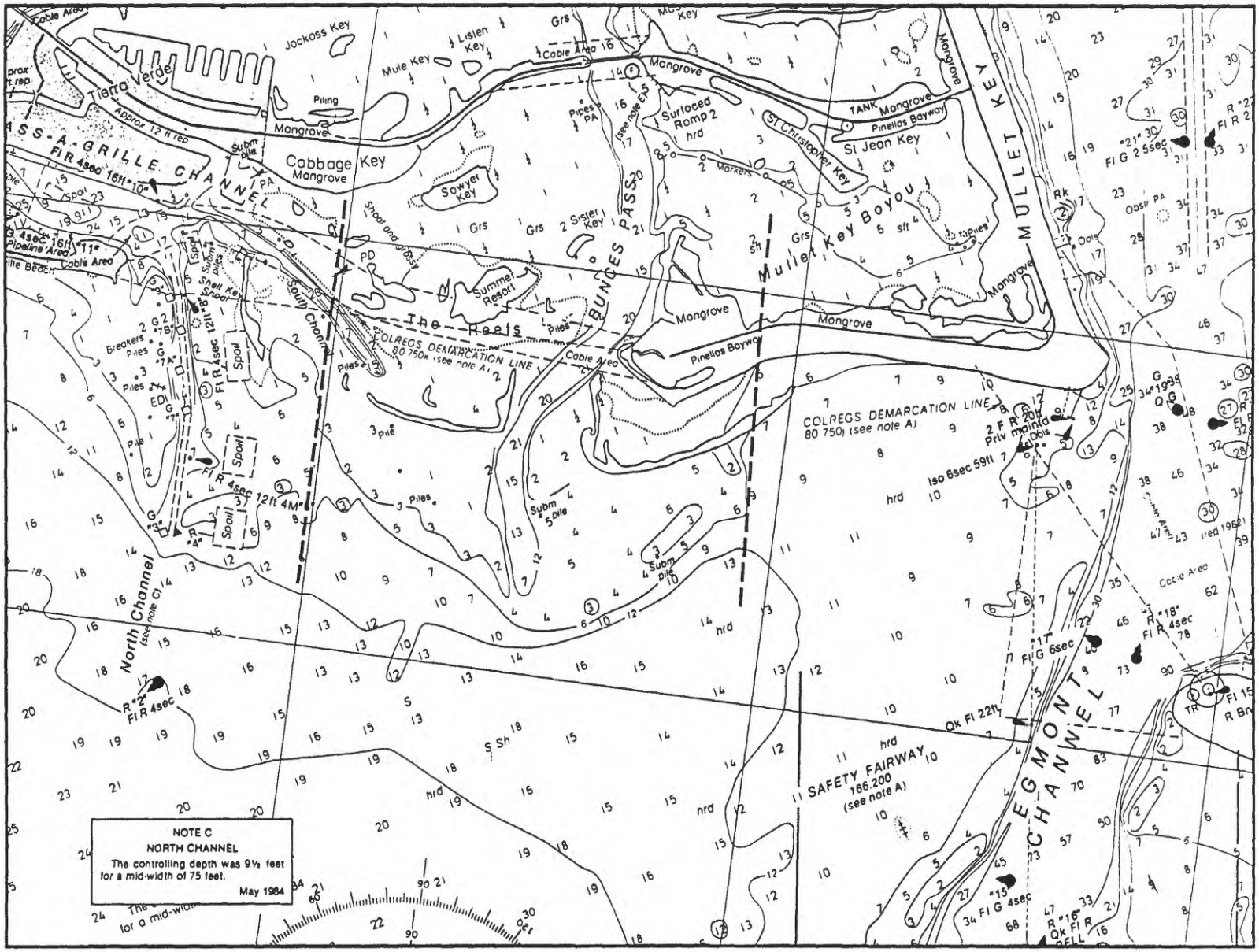
Excerpt From NOAA Chart #11411



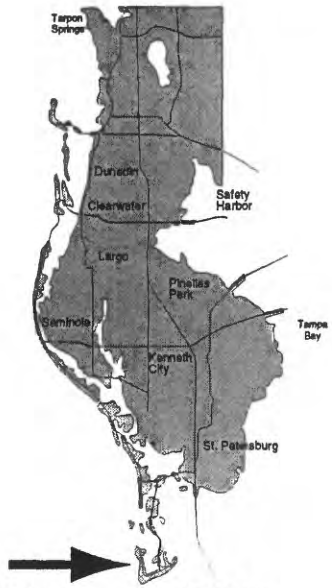
BUNCES PASS
Air Nav Pub.,
1989

Bunces Pass

Excerpt From NOAA Chart #11411



13. MULLET KEY

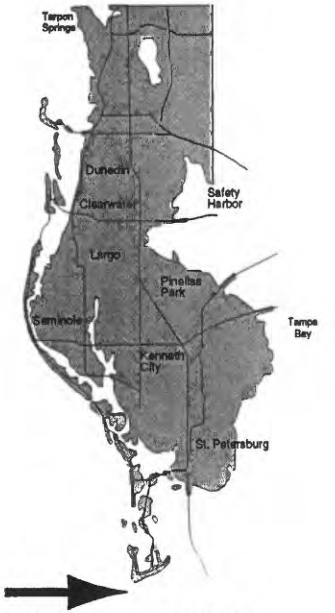


STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yds	COST,$
	185-?	US	Fort DeSoto built by Robert E. Lee.		
	1873-mid1900s		Was 2 islands separated by an inlet. Later merged to form the north-south leg of Mullet Key. Land points adjacent to the inlet shifted some 1300' landward, while the north & south ends of the leg receded about 800' & 200' respectively. The land area changed only from 510 to 465 acres. There was no change in the east-west leg. Offshore 6' & 12' contours remained the same from 1874 to closure of the inlet in 1940. S'ly of the midpoint foreshore and offshore profiles have steepened. At south-west point shoreline recession from 1875-1964 was 600'		
	1940		Inlet closed. Shore attained smooth concave configuration.		
	1940-45		World War II bombing range.		

1948	Cty	Purchased from U.S.		
1951	COE	Initiated Egmont Channel dredging.		
1962-65	Cty	Built access causeway.	—	7,000,000
		Master recreation plan estimated at $10,000,000. Spent $2,500,000 to 1965. Installed beach, groin, & revetment on south west point.	—	10,000,000
		Filled (except W'ly 1400') to elev. 5'-6'(2'-4' prior to fill).	516,769	
		Filled recreation beach. Filled protective beach.	61,000	14,2000
		Groin-rock/conc. sht. pile core wall, 116' long with shore end elev.5', slope down to elev. -1' at end.	77,000	17,9000
		Revetment-precast conc. interlocking blocks 1:3 slope from mlw to +5'.		78,365
		Recreational Pier 1000' long, 60' south of groin, conc/open pile with deck @ 12'.		84,000
1973	COE	Mat'l from Tampa Bay dredging project deposited on 14,000' along westerly shore.	750,000	
1977	COE	Revetment built on 2500' of tip of key south of Ft. Desoto. (Over earlier revetment?)		
		Nourished westerly shore from Tampa Bay.	350,000	
		South shore filled from same source	12,000	

SOUTHWEST CHANNEL
EGMONT KEY
PILOT LOOKOUT
MULLET KEY
Mullet Key Bayou
St Jean Key
St Christopher Key
Pinellas Bayway
Mangrove
Madelaine Key
Spoil Area
Discontinued Disposal Area Depths from survey of 1958
Cable Area
Breakers
Passage Key
COLREGS DEMARCATION LINE 80 750 (see note A)
SAFETY FAIRWAY 166 200 (see note A)
BUNCES PASS

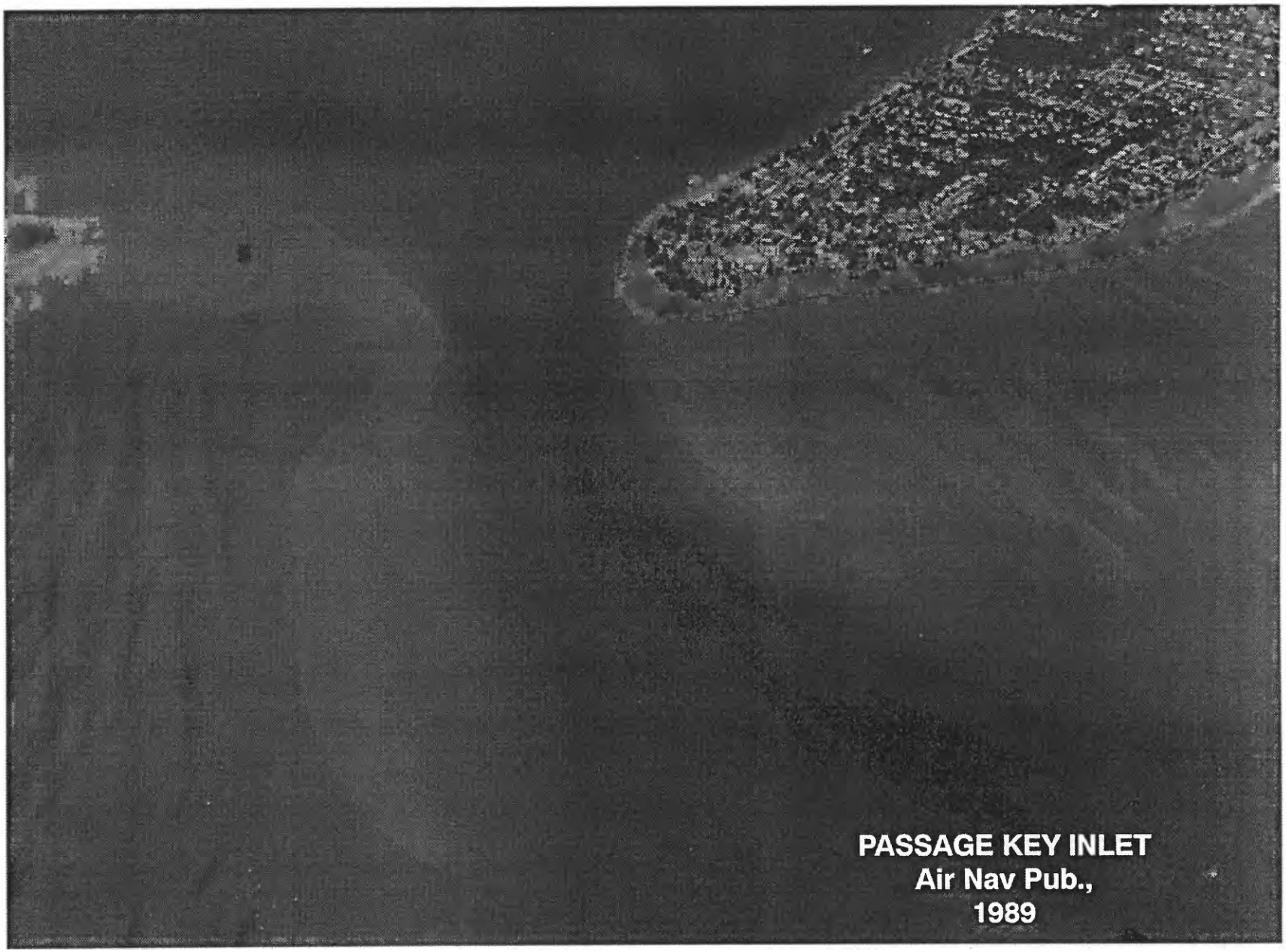
14. EGMONT CHANNEL



STORM DATE	DATE	AUTHORITY	IMPROVEMENTS	SAND vol,yds	COST,$
	1757		Egmont Key surveyed by Spanish explorer Celi.		
	1848		Egmont Key Lighthouse built.		
	1864		Egmont Key fortified.		
	1875		USCG Survey. Egmont Key "expanded" by 15-20% compared by 1757.		
	1899		Egmont Key fortified.		
	1907		Man-made mods. begin in Tampa Bay access.		
	1917		Egmont Key fortified.		
	1951-60	COE	Dredged main channel (10.4m deep X 122m wide).		

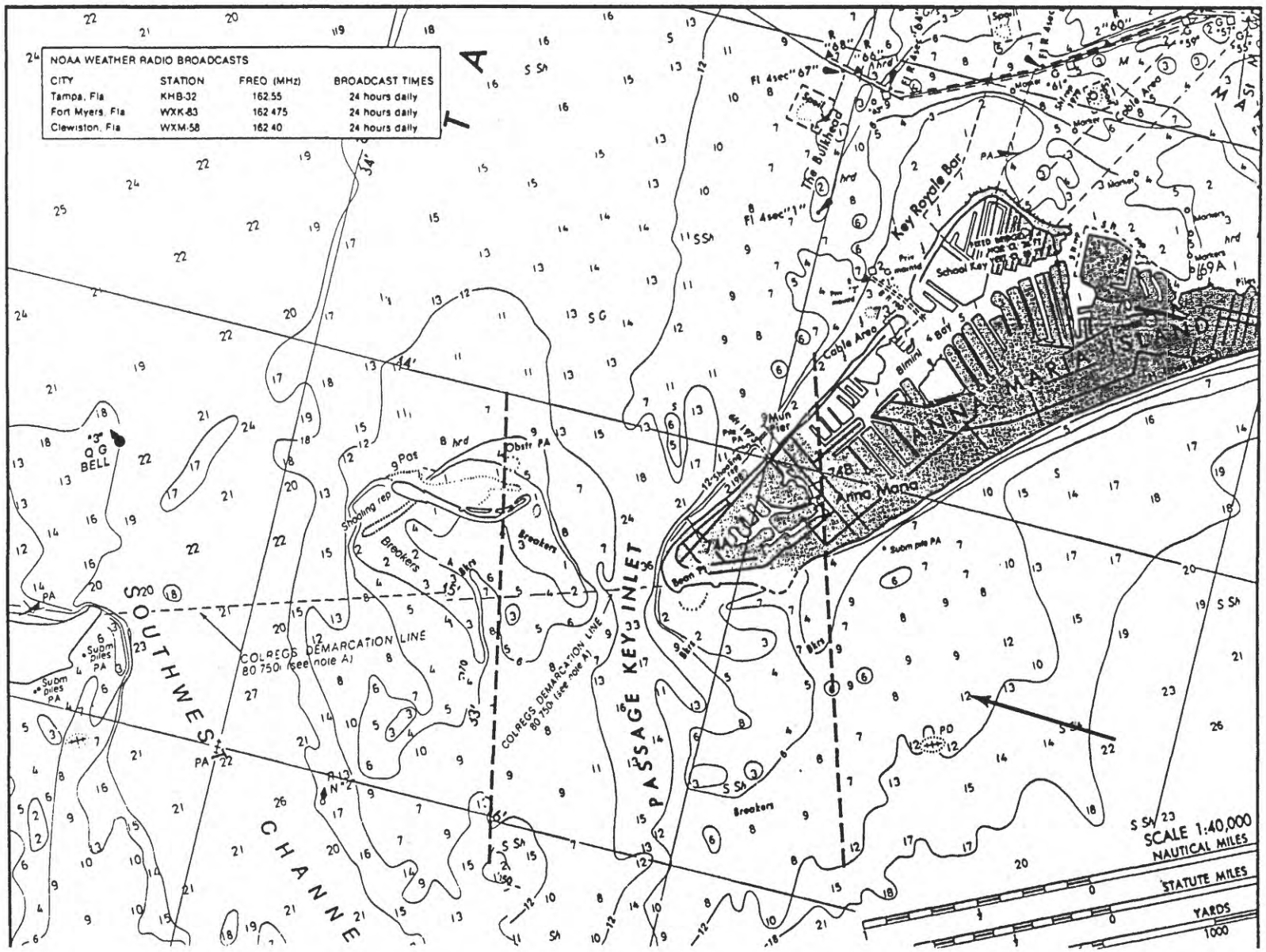
1970	US	Authorization by Congress to enlarge to 13.1m deep X 152m wide (Tampa Harbor Deepening Project). Quantity to be dredged 70 million yds. Quantity dredged in outer channel '51-'81 13.5 million yds. In tonnage Tampa is 3rd largest export, 7th largest overall port in US.	
1975		Egmont Key about the size of 1757.	
1970-81	COE	Dredged. Includes 1,7500,000 yd placed on Mullet Key to 1977, both west shore on Gulf & south shore along Egmont Channel. Bulk of this material placed in underwater sites offshore & in Tampa Bay. See Appendix for sand inventory analysis by COE in this area. Deemed to be in excess of 30million yds.	(13,500,000)
1989-92		Egmont Key eroding rapidly. Passage Key growing.	
1992	State	Egmont Key becomes State Park.	

NOTES: - Egmont Key is in Hillsbourough Cty.
- Passage Key is in Manatee Cty. This Key, between Egmont & Anna Maria comes and goes over a period of years.
- Anna Maria is in Manatee Cty.


PASSAGE KEY INLET
Air Nav Pub.,
1989

Anna-Maria/Passage Key Inlet

Excerpt From NOAA Chart #11411 & 11425



A-I. BEACH RENOURISHMENT SAND SOURCES

The Corps of Engineers has carried on a search for sand sources for use in replenishing the Pinellas beaches since 1960. Extensive exploration, including core borings from Egmont Key north to Anclote Key have indicated the availability of suitable beach replacement sand as follows:

-Principal source- Off Egmont Key - 30 million cubic yards.

-Alternate source- Shoals off Passe-a-Grille & Bunces Passes - 8 million cubic yards.

-Other spot sources- Limited amounts in the vicinity of the Passes. Made up of shoals in process of bypassing the inlet and navigation dredging of the pass. On the order of 300,000 cubic yards per pass.

The test program and data is summarized in COE's Beach Erosion Control (BEC) Project Review study, Pinellas County, Stage II Doc., Dec. 1980 and Long Key Segment, Addendum V, Sept. 1985.

Attached are:

-Composite Grain size distributions, Plate D-1 & Fig. 4.
-Core Boring Map (showing location of principal borrow areas), Plate A-2

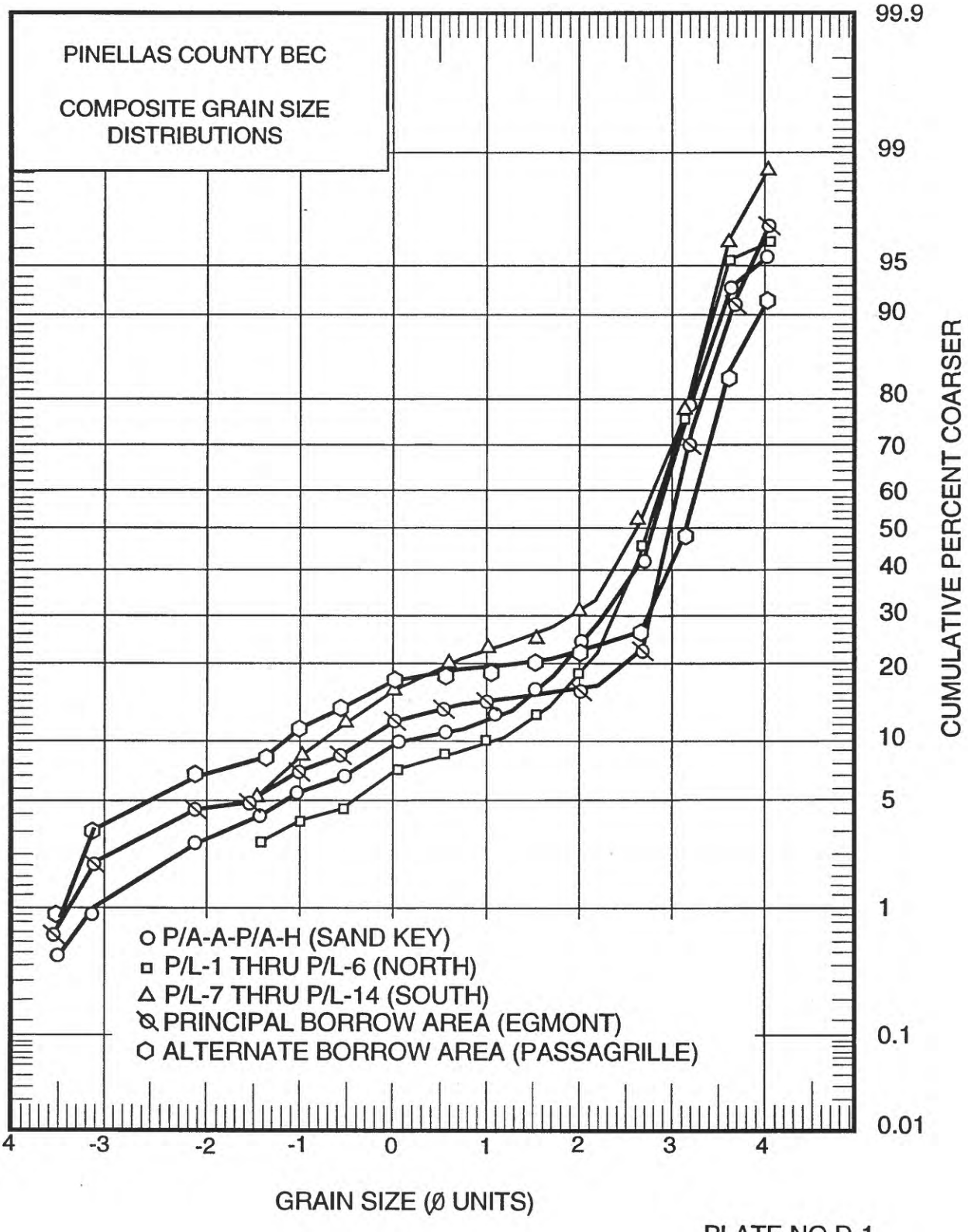

PINELLAS COUNTY BEC
COMPOSITE GRAIN SIZE DISTRIBUTIONS
99.9
99
95
90
80
70
60
50
40
30
20
10
5
1
0.1
0.01
CUMULATIVE PERCENT COARSER
4
-3
-2
-1
0
1
2
3
4
GRAIN SIZE (Ø UNITS)
P/A-A-P/A-H (SAND KEY)
P/L-1 THRU P/L-6 (NORTH)
P/L-7 THRU P/L-14 (SOUTH)
PRINCIPAL BORROW AREA (EGMONT)
ALTERNATE BORROW AREA (PASSAGRILLE)

PLATE NO.D-1

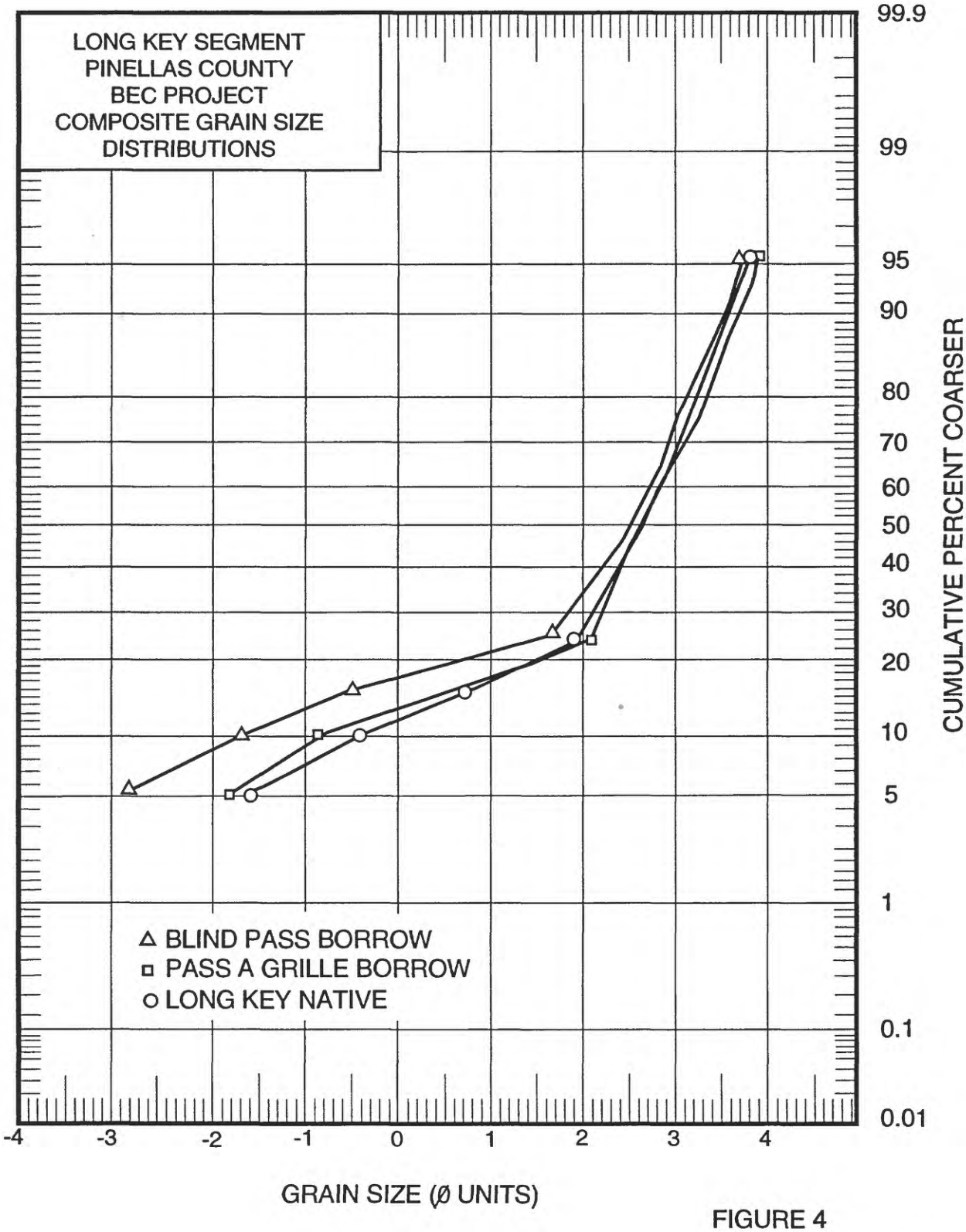
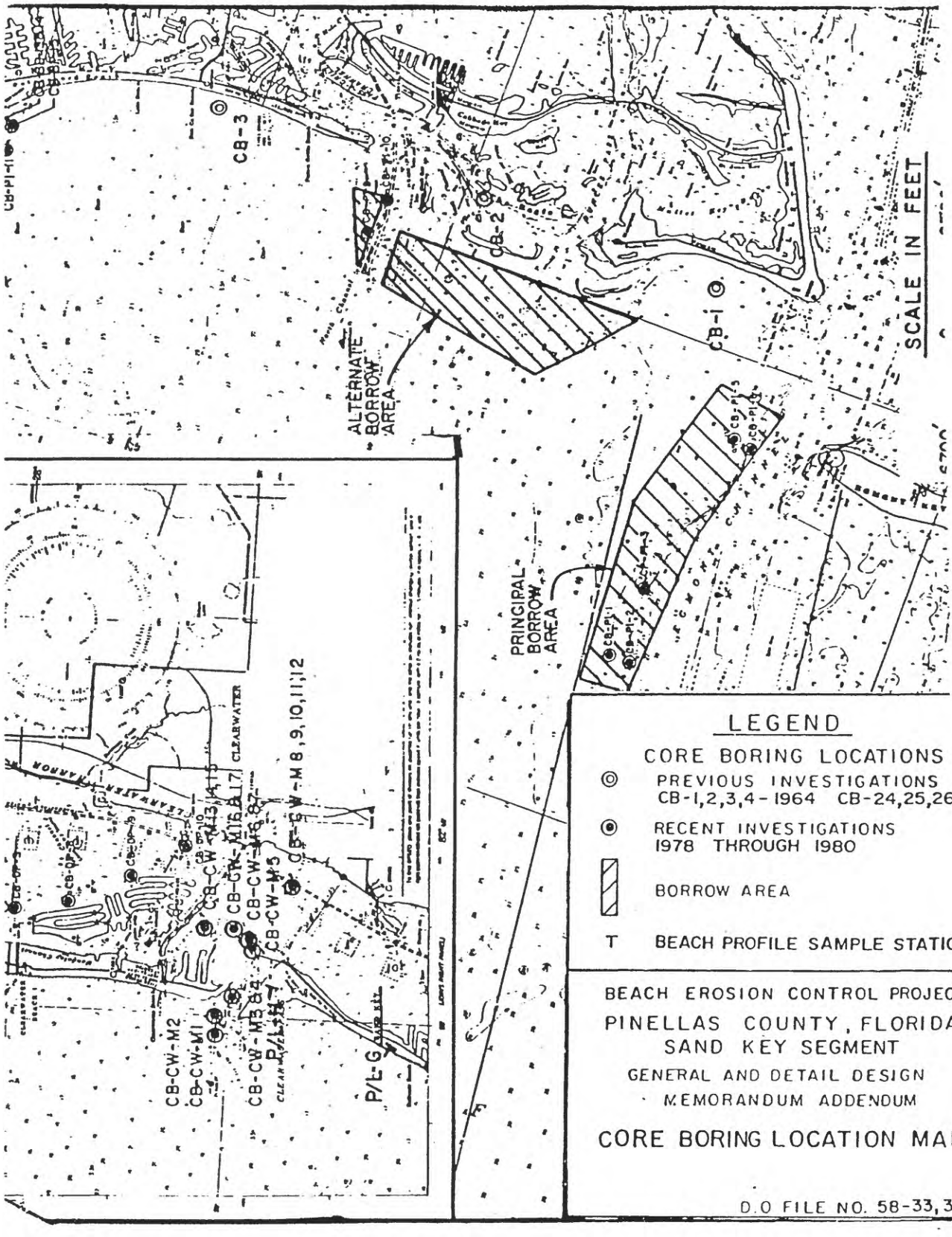


FIGURE 4
ADD.V, SEPT. 1985


CB-3
CB-2
CB-1
ALTERNATE BORROW AREA
PRINCIPAL BORROW AREA
SCALE IN FEET
CB-CW-M2
CB-CW-M1
CB-CW-M3
CB-CW-M5
CB-CW-M8,9,10,11,12
P/L-G
CLEARWATER
LEGEND
CORE BORING LOCATIONS
PREVIOUS INVESTIGATIONS
CB-1,2,3,4-1964 CB-24,25,26
RECENT INVESTIGATIONS
1978 THROUGH 1980
BORROW AREA
T BEACH PROFILE SAMPLE STATIC
BEACH EROSION CONTROL PROJEC
PINELLAS COUNTY, FLORIDA
SAND KEY SEGMENT
GENERAL AND DETAIL DESIGN
MEMORANDUM ADDENDUM
CORE BORING LOCATION MAF
D.O FILE NO. 58-33,3

A-II. ARTIFICIAL REEFS

Pinellas County has created 10 artificial offshore reefs. These sites are maintained by 5 full-time workers. Starting in 1974, over 138,000 tons of concrete and other materials have been deposited in this program. Site locations are shown in the accompanying sketch.

The original intent was to create recreational fish reefs. More recently, the question of waste disposal is getting increased attention. In Pinellas County there is current consideration of incorporating power plant waste ash into concrete for reef disposal. The county is funding a $400,000 lab study at the Florida Institute of Technology. If results are favorable the county plans to apply for permits to build a test reef made of ash and concrete near one of the existing artificial reefs.

Florida Power Corp. has expressed no interest in such disposal of their power plant waste, concluding that it is not economically attractive for them.

Pinellas County's artificial fishing reefs

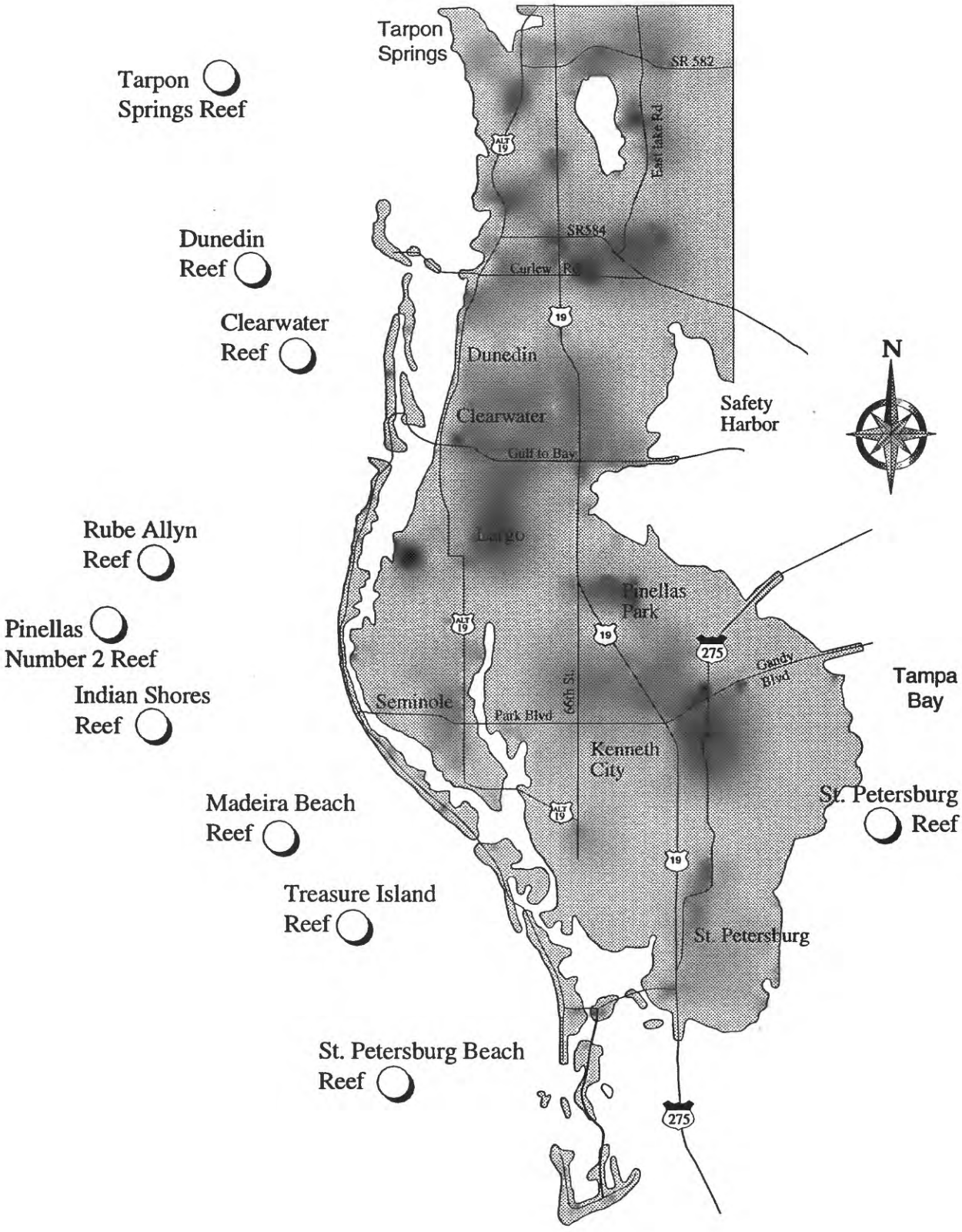


Table 2
ARTIFICIAL REEFS
MAINTAINED BY THE PINELLAS COUNTY
DEPARTMENT OF SOLID WASTE MANAGEMENT

Reef	Water Depth (Feet)	Reef Materials	Location (LORAN-C)
Tarpon Springs	26-28	——	14259.3 44935.3
Dunedin	25-30	Various materials ranging from fiberglass boat molds to cement seawalls.	14247.9 44887.3
Clearwater	27-29	Concrete pilings and steel barges.	14233.3 44851.1
Ruby Allyn (Pinellas No.1)	50	Steel barge, smaller steel vessels and a Japanese-designed reef structure.	14212.3 44886.4
Pinellas (No.2)	78-80	Two steel vessels.	14181.6 44943.3
Indian Shores	44-46	Two World War II Navy Landing Ships and a salt hopper barge.	14200.1 44859.6
Madeira Beach	30-33	Various cement goods.	14201.0 44768.0
Treasure Island	29-33	Various cement goods.	14200.8 44738.7
St. Petersburg Beach	34-36	Discarded rubble and culvert material and a barge.	14192.9 44694.1
St. Petersburg	34-36	Concrete bridge rubble, 100-ton concrete dolphins, cement sinkers, and a32-ft steel derelict.	One mile north east of Pier in downtown St. Petersburg.

Source: Pinellas County Department of Solid Waste Management.

A-III PINELLAS HURRICANE LIST

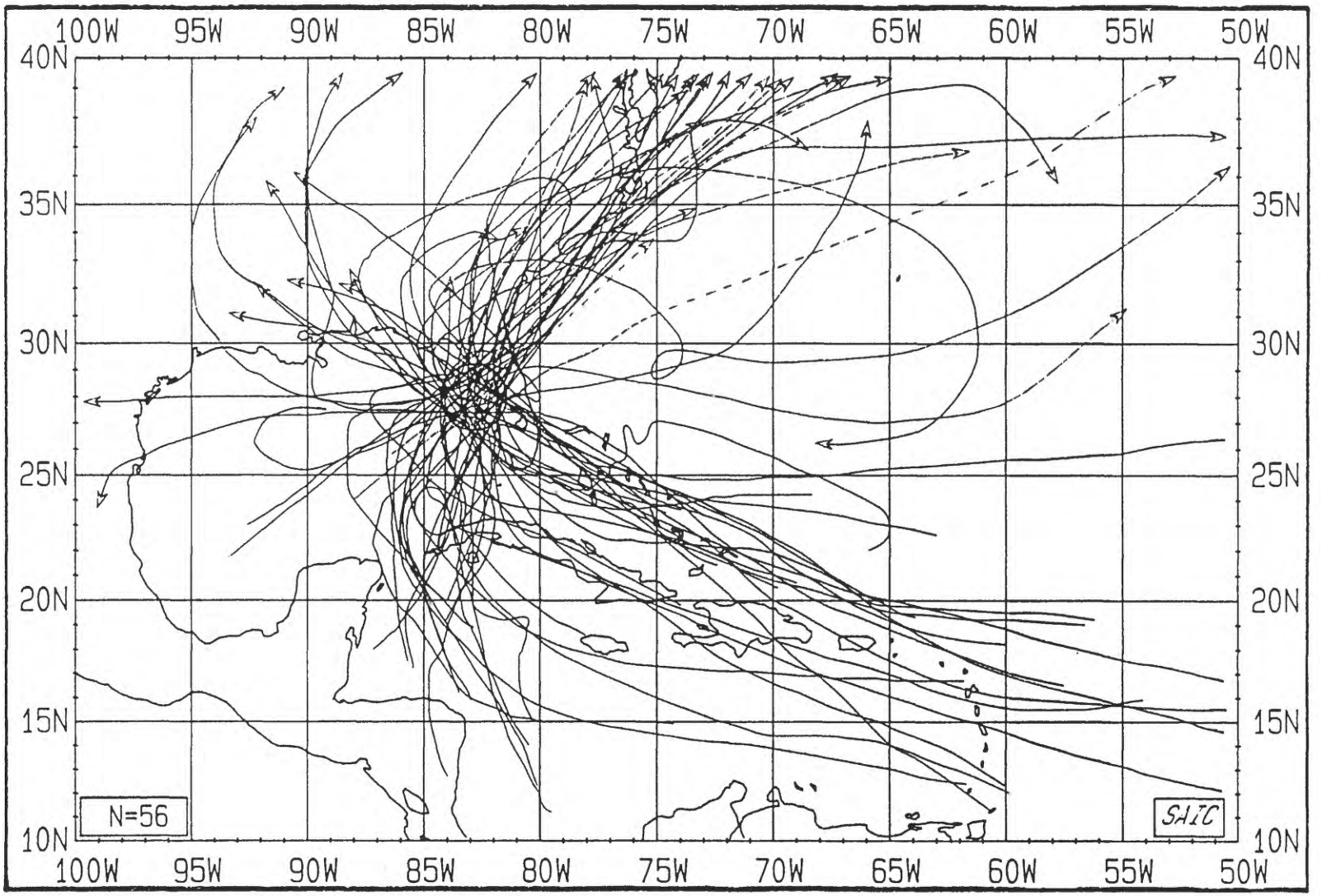
YEAR(NAME)	SOURCE					
	FEMA Map	Storms within 50 mi COE 1966 Rept.		Hurricanes within 120mm Xtal River		Impact of Hurricanes on Pinellas Cty '85
		Wind,MPH	Surge Ht.ft	Wind,mph	Intensity	
1848	—	—	—	—	—	12' Surge
1910	—	—	—	—	—	
1921	X	80-100	10.4	101	2	9' Surge
1926	X	50	4.5	81	1	
1928	X	—	—	—	—	
1929	X	—	—	—	—	
1935	X	75	5.3	95	1	
1941	X	—	—	87	1	
1944	X	56(100gust)	—	75	1	
1945	—	49	—	97	2	
1945	—	—	—	93	1	
1947	X	—	—	76	1	
1949	—	50(67gust)	4.8	87	1	
1950(EASY)	X	-(48hrs)	6-8	125	3	
1960(DONNA)	—	65	4	116	3	
1963	—	70	4-8	—	—	
1966(ALMA)	X	—	—	98	2	
1968(GLADYS)	X	—	—	81	1	
1985(ELENA)						24mph 6'surge
1985(JUAN)						15mph 3'surge
1985(KATE)						15mph 1.5'surge

TROPICAL CYCLONES (1886-1990) PASSING WITHIN 75 N.MI. OF TAMPA, FL

STORM INDEX NUMBER	STORM NAME	YEAR	MONTH	DAY (GMT)	STORM NUMBER FOR YEAR	MAXIMUM WIND (KTS) NEAR STORM CNTR AT CLOSEST PT. OF APPROACH	CLOSEST POINT OF APPROACH (CPA) N.Mi.	STORM HEADING (DEGS) AT CPA	STORM FORWARD SPEED AT CPA (KTS)
1	NOT NAMED	1886	JUL	18	4	85	40	058	9.8
2	NOT NAMED	1888	SEP	8	5	41	4	338	6.2
3	NOT NAMED	1888	OCT	10	7	83	67	046	20.5
4	NOT NAMED	1889	JUN	17	2	45	49	047	14.2
5	NOT NAMED	1891	OCT	9	8	42	49	035	9.6
6	NOT NAMED	1892	OCT	24	9	44	22	077	9.1
7	NOT NAMED	1894	SEP	26	3	93	66	010	10.2
8	NOT NAMED	1896	SEP	29	4	93	55	027	17.9
9	NOT NAMED	1897	SEP	27	3	33	65	053	11.0
10	NOT NAMED	1897	OCT	19	4	35	40	031	19.4
11	NOT NAMED	1898	AUG	2	1	65	9	307	13.8
12	NOT NAMED	1899	OCT	5	5	40	50	049	15.2
13	NOT NAMED	1901	AUG	13	4	45	46	279	6.3
14	NOT NAMED	1903	SEP	15	3	51	11	295	6.9
15	NOT NAMED	1909	JUN	29	2	35	46	309	7.9
16	NOT NAMED	1910	OCT	18	4	50	54	354	8.1
17	NOT NAMED	1911	AUG	10	1	70	70	330	8.4
18	NOT NAMED	1921	OCT	25	6	89	4	051	12.1
19	NOT NAMED	1925	DEC	1	5	51	48	039	24.9
20	NOT NAMED	1926	SEP	19	5	105	58	299	12.3
21	NOT NAMED	1928	AUG	9	1	20	69	312	7.3
22	NOT NAMED	1928	AUG	14	2	50	31	330	10.5
23	NOT NAMED	1928	SEP	17	4	100	56	337	11.4
24	NOT NAMED	1929	SEP	29	2	87	51	327	9.6
25	NOT NAMED	1930	SEP	9	3	35	3	048	6.0
26	NOT NAMED	1932	AUG	30	5	63*	67	305	12.8
27	NOT NAMED	1933	JUL	31	2	42	36	270	7.8
28	NOT NAMED	1933	AUG	19	6	40	65	360	13.5
29	NOT NAMED	1933	SEP	4	12	48	34	315	5.3
30	NOT NAMED	1934	JUL	23	3	45	58	247	15.0
31	NOT NAMED	1935	SEP	4	3	85	28	347	8.4
32	NOT NAMED	1936	JUL	30	5	60	63	308	8.0
33	NOT NAMED	1937	JUL	29	1	40	5	041	13.4
34	NOT NAMED	1939	AUG	12	2	65	33	297	10.9
35	NOT NAMED	1940	AUG	3	5	35	31	246	10.8
36	NOT NAMED	1941	OCT	5	5	85	37	318	19.4
37	NOT NAMED	1941	OCT	22	6	34	42	221	4.8
38	NOT NAMED	1944	OCT	19	11	65	37	009	16.2
39	NOT NAMED	1945	JUN	24	1	75	42	063	10.9
40	NOT NAMED	1945	SEP	5	7	35	31	304	18.4
41	NOT NAMED	1945	SEP	16	6	85	57	354	10.8
42	NOT NAMED	1946	OCT	8	5	40*	13	006	16.1
43	NOT NAMED	1947	SEP	23	5	50	14	011	8.2
44	NOT NAMED	1949	AUG	27	5	63*	39	323	10.5
45	EASY	1950	SEP	5	5	100	8	052	4.4
46	LOVE	1950	OCT	21	13	55	51	035	17.7
47	DONNA	1960	SEP	11	5	103	54	009	12.3
48	ALMA	1966	JUN	9	1	85	41	328	17.9
49	ABBY	1968	JUN	4	1	55	66	022	7.8
50	GLADYS	1968	OCT	18	8	70	22	047	7.3
51	SUBTROP	1974	JUN	25	1	48	14	049	19.9
52	SUBTROP	1982	JUN	18	2	37	28	043	22.5
53	ISIDORE	1984	SEP	28	10	45	39	337	9.7
54	ELENA	1985	SEP	1	5	90	55	219	2.8
55	KEITH	1988	NOV	23	12	52	39	065	14.6
56	MARCO	1990	OCT	11	13	43	4	348	8.2

CHART 1

NOAA Hurricane Ctr., Miami



TROPICAL CYCLONES PASSING WITHIN 75 N.M. OF TAMPA, FL 1886-1990

CHART 2

(SITE LOCATION MOVED TO 28.0N, 82.9W)

NOAA Hurricane Ctr., Miami

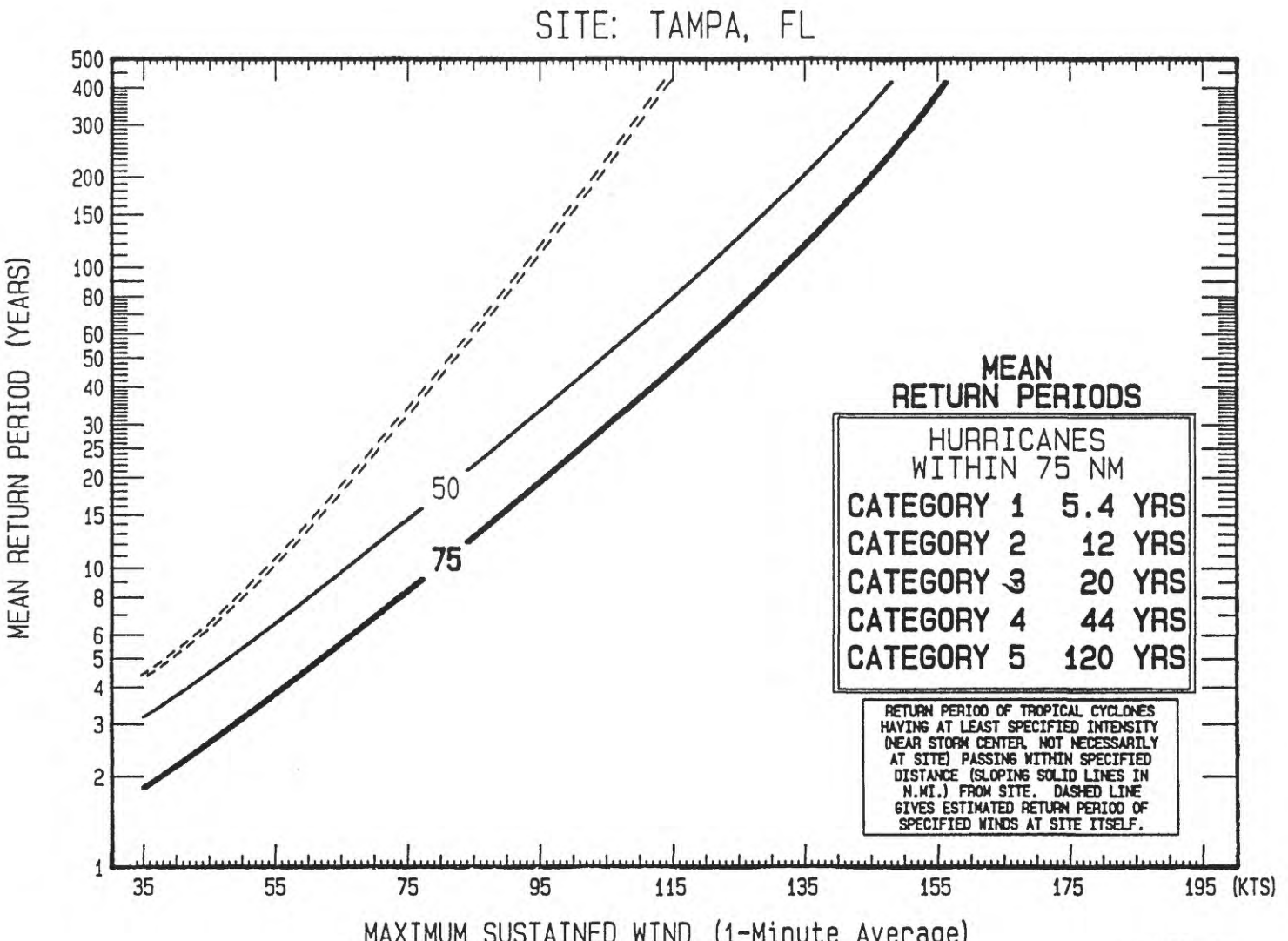


CHART 9

NOAA Hurricane Ctr., Miami

A-IV REFERENCES

	PUBLICATION	LOCATION
COE(Jacksonville)	-Pinellas County, FL, Beach Erosion Control Project Long Key Segment-Gen'l Design Memo Add. V, Beach Nourishment & Breakwater, Sept'85	Cty Engr, Jim Terry(JT)
	-BEC Study, Pinellas Cty, Jan'66	JT
	-BEC, Sand Key, Gen'l Design Memo, Add IV & Environmental Impact Statement, June'84	JT
	-BEC, Review Study, Pinellas Cty, Dec'80	JT
	-BEC, Sand Key, Feature Design Memo, Redington Shores Breakwater, DEC'84	JT
	-BEC, Long Key, Gen'l & Detail Design Memo, Add. Sep'78	JT
	-BEC, Mullet Key, '65	USF Tampa Library
	-BEC, Treasure Island, July'68	USF Tampa Library
	-BEC, Treasure Island/Long Key, Add.III, Jan'82	USFT
	-BEC, Sand Key, Add. IV, June'84	USFT
	-Coast of Florida Erosion & Storm Effects Study Recon, Rept., July'86'	Prof. L. Doyle USF St. Pete (LD)
Independent Review of COE Plan for Beach Restoration of Sand Key Robert Dolan Assocs., R. Davis, R. Dean, et al, Dec'87		Prof. A. Hine USF St. Pete(AH)
Impact of Florida's Gulf Coast Inlets on the Coastal Sand Budget, Final Rpt. to DNR, '86, A. Hine, R.A. Davis, et al		LD

Beach Conditions in Fla.-A Statewide Inventory...of Erosion Problem Areas, Beaches & Shores Tech. & Des. Memo 89-1 Fla. DNR, Ralph R. Clark, April'89 LD

Coastal Zone Atlas, Northern Pinellas Cty., R.A.Davis, A.Hine Final Report to Fla. Sea Grant Prog., Sept'82 AH

Clearwater Pass, Glossary of Inlets Report #12, R. Newman Coastal & Oceanographic Engr.. Lab, V. Fla.., Gainesville, Apr'83 AH

Johns Pass & Blind Pass, Glossary of Inlets Rept. #4, Dec'76 AH

Effect of Hurricane Elena on Fla.. Marsh-dominated Coast: Pasco, Hernando, Citrus Ctys., Fla. Sea Grant TP-49, A. Hine, et al, Mar'87 AH

Current Measurements & Sedimentation Analysis: Dunedin Pass, R. Davis et al to Pinellas Cty Comm., '86 JT

Pinellas Coast Inlet Study, Part 1-Dunedin Pass,Oct'86 B. Ross, H. Dorzback, Ctr. of Math Models, USF Tampa JT

Midnight Pass, Fla.: Inlet Instability Due to Man-Related Activities in Little Sarasota Bay, R. Davis, A. Hine, M. Bland, Coastal Sediments '87, ASCE

Geology of the Barrier Island and Marsh-Dominated Coast, West Central Florida, R. Davis, A. Hine, D. Belknap, Geological Soc of America, Oct'85

Pinellas Cty Comprehensive Plan, Coastal Management Element, Mar;89 Pinellas County Planning Dept.

PCCP, Compendium-Supplement to Above Plan, Aug'89

Fed'l (FEMA) Flood Insurance Studies (by town), Tampa Library Fed'l Repository, microfilm

A-V SOURCES of INFORMATION

James Terry, Pinellas Cty. Engrs.

Prof. Al Hine, USF St. Petersburg

Prof. Larry Doyle, St. Petersburg

Prof. R. Davis, USF Tampa

Gordon Beardsley, Chf. Land Use Planner, Pin. Cty Met. Planning Comm.,
14 S. Ft. Harrison, Clearwater, 462-47541

Gail McGarry, DNR St. Petersburg

COE-Jacksonville-Tom Martin (904) 791-2428
Tampa Frank Mohr 840-0824

USF Tampa Library

Tampa Public Library

Pinellas Cty. Engineers Off., 440 Court St., Clearwater

Town Clerks/Mayors Ind Shores Twn Clerk 595-4020
Belleair Beach Mary Black, Twn Clerk 595-4646
Belleair Shs. George Jirotta, Mayor 446-8525

Coastal Engineering Lib. Gainesville-"gray" literature collection 622-1436

Pinellas Cty Historical Society

Coastal Engineering Archives, U., of Fla., 433 Weil Hall, Gainesville, FL 32611
Helen Twedell

A-VI PINELLAS AERIAL PHOTOGRAPHS

Available at County Engineers Office
440 Court Street, Clearwater, FL
Telephone: 462-3251

YEAR	SCALE, ft/in.
1926	800
1930-1940	660-800 Scattered Coverage
1941	400
1942	400
1952	400
1953	400
1960s	400 3 Sets in This Decade
1977	400
1980-1987	200 At 3 Year Intervals

These are on screened mylar masters. Prints are available at $3.00 per 1/2 section (oblong) and $6.00 per section (square). At 200'/in., a section is about 30 in. x 30in.

AERIAL PHOTOS at 200 ft/in
of
COASTAL CONSTRUCTION CONTROL LINE

Available at Florida DNR, Dir. of Beaches & Shores
Bureau of Coastal Data Acquisition
3900 Commonwealth Blvd.
Tallahassee, FL 32303

A-VII PINELLAS COUNTY COMPREHENSIVE PLAN

COASTAL MANAGEMENT ELEMENT

MAJOR FINDINGS

1. The barrier island system in Pinellas County is comprised of a variety of islands having several different origins.

2. Few of the barrier islands are located in unincorporated Pinellas County. Mullet Key, Bunces, Keys, and the southern portion of Anclote Key are the only barrier islands under the direct jurisdiction of the Board of County Commissioners.

3. Most of the barrier islands have been extensively developed. In many instances development occurred upon the primary and secondary dunes. This interference with the coastal processes between the dunes and the beach in many cases has caused the beach to erode and threaten the exposed structures.

4. The most effective and efficient coastal protection is provided by a natural or artificial beach and dune system, which is being used by Pinellas County extensively.

5. Initial attempts at beach restoration and renourishment were done on a piecemeal basis with little or no coordination among the various coastal communities. Since that time, a coordinated approach with local, state, and federal involvement has developed. The results are county-wide management plans that are consistent among themselves. These plans form the basis for the county's current beach nourishment/restoration program.

6. Pinellas County has taken the lead responsibility in managing coastal beach restoration/renourishment projects from inception through completion.

7. Currently, several beach restoration/renourishment projects are identified in the Pinellas County Beach Enhancement Five-Year Program.

COASTAL MANAGEMENT ELEMENT
GOALS, OBJECTIVES, AND POLICIES

NATURAL RESOURCES

1. GOAL: PINELLAS COUNTY SHALL PRESERVE, PROTECT, RESTORE AND MANAGE THE NATURAL RESOURCES OF THE COASTAL AREA TO MAINTAIN OR ENHANCE WATER QUALITY, PLANT AND ANIMAL DIVERSITY, AND ESTUAR INE PRODUCTIVITY.

1.1. Objective: Pinellas County shall protect and conserve living marine resources and marine and estuarine habitats (including marine wetlands) within the coastal area by continuing to maintain; and enhance where possible, the current balance of plant and animal species within this area.

1.1.1. Policy: The county shall continue to prohibit dredging and filling or other development activities having significant long-term impacts on seagrass beds, mangroves, tidal marshes and tidal flats, except in cases clearly in the public interest.

1.1.2. Policy: By October 1, 1990, the county shall adopt an erosion control ordinance to reduce sedimentation and turbidity in coastal habitats (particularly seagrass beds) resulting from upland development activities.

1.1.3. Policy: By October 1, 1990, the county shall encourage alternatives to the hardening and bulkheading of natural coastal shorelines, natural stream courses, and tidal creeks through adoption of appropriate ordinances.

1.1.4. Policy: By October 1, 1990, the county shall develop a program to provide for the eradication of ecologically undesirable vegetation from intertidal, riverine and nearby upland areas that is not indigenous to Florida and which has altered natural ecosystems by competi tively excluding native plant species.

1.1.5. Policy: The county shall continue to cooperate with the Florida Department of Natural Resources, the Southwest Florida Water Management District and other appropriate agencies in restoring or enhancing natural habitats, estuaries, and drainage systems such as tidal flats, mangrove forests, seagrass beds, salt marshes and uplands by participating in revegetation projects, the development and implementation of management plans for Tampa Bay and the Boca Ciega Bay and Pinellas County aquatic preserves, Pollution Recovery Trust Fund environmental enhancement projects, Pinellas-Anclote River Basin Board Cooperative Funding projects, and other appropriate mitigative programs.

1.1.6. Policy: Pinellas County shall continue to prohibit non-water-dependent development of redevelopment within natural intertidal areas (e.g. salt marshes, tidal flats and mangrove forests).

1.1.7. Policy: By October 1, 1990, regulations shall be established that require natural upland buffers adjacent to estuaries, bays and other surface waters.

1.1.8. Policy: Upon adoption by the State of Florida of the State's Manatee Protection Plan, that plan shall become a part of the Pinellas County Comprehensive Plan.

1.1.9. Policy: Objectives 7.1, 7.2, 7.3, and 7.4. of the Conservation Element and their associated policies shall include marine and estuarine habi tats and wildlife species located within the coastal area.

1.1.10. Policy: The Pinellas County Board of County Commissioners shall continue to utilize its regulatory authority as the Pinellas County Water and Navigation Control Authority to ensure development is consistent with the objectives and policies of this element pertaining to the protection, enhancement, and restoration of coastal resources.

1.2. Objective: By October 1, 1995, Pinellas County shall have achieved measurable improvements in the overall water quality conditions of the Waters of the County when compared to the baseline study established pursuant to Policy 3.1.2., Conservation Element-Water Quality.

1.2.1. Policy: By October 1, 1990, Pinellas County shall establish an ongoing monitoring program for surface water quality.

1.2.2. Policy: By October 1, 1990, the county shall adopt a stormwater ordinance requiring redeveloped sites, other than individual single-family residential areas, to meet the current applicable stormwater management standards.

1.2.3. Policy: Pinellas County shall continue to promote the reduction and/or elimination of point source pollutant loadings to surface waters through alternative re-use and disposal options.

1.2.4. Policy: Development being served by septic tanks shall be required to hook up to a county or city sewer system within six months of avail ability.

1.2.5. Policy: The county shall continue to encourage the use of natural or artificial wetlands for stormwater treatment.

1.2.6. Policy: The county shall continue to cooperate with regional and state agencies to improve monitoring and compliance enforcement of point and non-point source discharges to coastal waters and their tributaries.

1.3. Objective: The county shall support and cooperate in the development of comprehensive and coordinated management plans for Tampa Bay and the aquatic preserves located in Pinellas County by providing staff resources and technical support in the preparation, review, and implementation of these management plans.

1.3.1. Policy: The county shall cooperate with, and assist as appropriate, the Southwest Florida Water Management District in the development and implementation of Surface Water Improvement and Management Plans for water bodies in Pinellas County.

1.3.2. Policy: The county shall continue to participate with the Florida Department of Natural Resources in the development of the Boca Ciega Bay and Pinellas County Aquatic Preserves Management Plan.

1.3.3 Policy: The county shall continue to participate in the Agency on Bay Management as a means to provide a multi-jurisdiction/multi-disciplinary forum for managing the resources of Tampa Bay.

1.3.4 Policy: Pinellas County shall coordinate with other local governments in protecting multi-jurisdictional estuaries by soliciting municipal comments before applications for development are heard by the Pinellas County Water and Navigation Control Authority.

NATURAL DISASTER PLANNING

2. GOAL: PINELLAS COUNTY WILL PROTECT HUMAN LIFE, PRIVATE PROPERTY AND PUBLIC INVESTMENT FROM THE EFFECTS OF HURRICANES AND OTHER NATURAL DISASTERS.

2.1. Objective: Pinellas County shall adopt a post-disaster redevelopment plan by October 1, 1991 as part of the Pinellas County Recovery Implementation Guide, and shall continue to implement hazard mitigation measures to reduce the exposure of human life and public and private property to natural hazards.

2.1.1. Policy: The redevelopment plan shall distinguish between the immediate emergency period actions needed to protect the public health and safety and long-range restoration activities.

2.1.2. Policy: The redevelopment plan shall establish who will be responsible for making crucial decisions after a natural disaster regarding repair, reconstruction, relocation and hazard mitigation; this body could take the form of a recovery task force.

2.1.3. Policy: The redevelopment plan shall establish procedures for the restoration of essential public services and facilities following a disaster.

2.1.4. Policy: The redevelopment plan shall establish procedures for evaluating the effectiveness of current hazard mitigation measures at preventing damage.

2.1.5. Policy: The redevelopment plan shall establish procedures for utilizing information obtained from damage assessment teams in expediting post-disaster recovery.

2.1.6. Policy: The redevelopment plan shall contain provisions for enactment of a temporary moratorium on reconstruction and repair not immediately needed to protect the public health, safety and welfare.

2.1.7. Policy: The redevelopment plan shall establish criteria for evaluating the options for repairing, replacing, modifying or relocation public and private facilities and infrastructure within coastal high-hazard areas.

2.1.8. Policy: The redevelopment plan shall establish that structures damaged by fire or natural forces to the extent that the cost of reconstruction or repair exceeds 50 percent of the appraised value of the structure shall be rebuilt to meet all applicable federal, state, and local reg ulations.

2.1.9. Policy: The redevelopment plan shall establish guidelines for determining priorities for the acquisition of storm-damaged property in the coastal high-hazard area. These guidelines shall give priority to eliminating unsafe conditions and inappropriate uses.

2.1.10. Policy: Pinellas County shall continue to implement its existing hazard mitigation programs that include shoreline restoration and enhance ment, building code and floodplain regulations, development management techniques such as land use, zoning, and subdivision reg ulations, and other applicable hazard mitigation measures. These mitigation programs shall be amended, as necessary, to remain consistent with federal and state requirements.

2.1.11. Policy: During the evaluation and appraisal process for the comprehensive plan, Pinellas County shall update its inventory of areas needing redevelopment within the hurricane vulnerability zone.

2.2. Objective: Pinellas County shall cooperate with state and regional agencies, and with other local governments to maintain or reduce hurricane clearance times as a component of the evacuation times for Pinellas County.

2.2.1. Policy: Pursuant to Policy 1.1.2. of the Capital Improvements Element, the Capital Improvements Program Committee shall annually eval uate projects proposed for inclusion within the Six-Year Schedule of Improvements and shall prioritize improvement needs for criti cal links and evacuation route points, and for bridges, causeways and highways facilities designated as regional evacuation routes when scheduling capital improvement projects.

2.2.2. Policy: By October 1, 1990, the Board shall pass an ordinance requiring the development of a hurricane evacuation plan by recreational vehicle parks and transient accommodations.

2.2.3. Policy: The county shall coordinate with the Florida Department of Transportation Improvement Plan for District 7 in order to encourage the State to give priority to road improvement projects on regional hurricane evacuation routes.

2.2.4. Policy: By October 1, 1990, the county shall evaluate the feasibility of utilizing the county-wide computerized traffic signalization program currently under development as a mechanism to expedite hurricane evacuation.

2.2.5. Policy: The county shall continue its public awareness campaign in cooperation with the Tampa Bay Regional Planning Agency to educate the general public on proper hurricane evacuation procedures.

2.2.6. Policy: Pinellas County shall cooperate with the State Division of Emergency to coordinate multi-county evacuations in a manner consistent with the Pinellas County Hurricane Evacuation Implementation Guide.

2.2.7. Policy: County-maintained roadways used as evacuation routes shall continue to be clearly posted.

2.2.8. Policy: Hurricane evacuation shall be planned and conducted in a manner consistent with the Pinellas county Peacetime Emergency Plan.

2.3 Objective: Pinellas County shall restrict development within the coastal high hazard area and the Evacuation Level A areas identified in the most recent regional hurricane evacuation study, and shall direct population concentrations out of the coastal high-hazard area.

2.3.1. Policy: The coastal high-hazard area (CHHA) shall include the FEMA Velocity Zone, areas seaward of the coastal construction control line, areas where public facilities have been damaged or undermined by coastal storms, and inlets which are not structurally controlled.

2.3.2. Policy: Pinellas County shall prohibit the construction of hospitals, nursing homes, and adult congregate living facilities within the coastal high-hazard area and the Evacuation Level A area. The county shall discourage the siting of these facilities within the Evacuation Level B area.

2.3.3. Policy: Pinellas County shall not approve any request for residential density above 5.0 units per gross acre on the Future land Use Element for areas within the coastal high- hazard area and the Evacuation Level A area.

2.3.4. Policy: Pinellas County shall prohibit the siting of new or the expansion of existing mobile home development within the coastal high-haz ard area and the Evacuation Level A area.

2.3.5. Policy: By October 1, 1991, the county's existing hazard mitigation programs, including development regulations, shall be reviewed and revised to reduce the vulnerability of future development in coastal high-hazard areas. This review shall evaluate the recommenda tions of existing interagency hazard mitigation reports and the hazard mitigation annex of the Pinellas County Peacetime Emergency Plan.

2.3.6. Policy: Consistent with Policy 2.1.9. of this element and the availability of budgeted funds, the county shall evaluate the acquisition of storm-damaged property in the coastal high-hazard area.

2.4. Objective: Pinellas County shall restrict public expenditures that subsidize development in the coastal high-hazard area.

2.4.1. Policy: County-funded infrastructure shall be prohibited within the coastal high-hazard area except for the following:

a) the expenditure for the maintenance, repair or replacement of existing facilities; or
b) the expenditure for restoration or enhancement of natural resources or public access; or
c) the expenditure needed to address an existing deficiency identified in this plan; or
d) the expenditure for the retrofitting of stormwater management facilities for water quality enhancement of stormwater runoff; or
e) the expenditure for the development or improvement of public roads and bridges identified in the Traffic Circulation Element of this plan; or
f) the expenditure for a public facility of overriding public interest to ensure public health and safety.

2.4.2. Policy: When public infrastructure within the coastal high-hazard area is destroyed or receives damage that equals or exceeds 50 percent of the cost of replacing the facility at its current location, the county shall analyze the feasibility of relocating this infrastructure land ward of the coastal high-hazard area. This requirement shall be included within that portion of the post-disaster redevelopment plan adopted pursuant to Policy 2.1.7. of the Coastal Management Element.

2.4.3. Policy: Pinellas County shall not construct bridges or causeways to barrier islands not serviced by such infrastructure at the time of plan adoption.

2.5. Objective: By October 1, 1991, the number of public shelter spaces in Pinellas County shall be increased, and by October 1, 1994, there shall be a reduction in the deficit of public shelter spaces within the county.

2.5.1. Policy: The county shall assist the Pinellas county Red Cross in coordinating with local jurisdictions and appropriate agencies in the devel opment of a county-wide plan for increasing the number of public shelter spaces in Pinellas County.

2.5.2. Policy: Pinellas county shall expand its coordination efforts within the limits provided by legislative authority to coordinate facility expan sion plans and development review with the Pinellas County School Board so that new school facilities and facility expansion will be located and designed to provide hurricane shelters.

2.5.3. Policy: Whenever possible, new or expanded county buildings shall be located, designed, and constructed so that they may be utilized for hurricane shelters.

BEACH AND DUNE SYSTEMS

3. GOAL: PINELLAS COUNTY SHALL CONSERVE, MAINTAIN, AND RESTORE COASTAL BEACH AND DUNE SYSTEMS SO AS TO RETAIN THEIR CONTRIBUTIONS TO STORM PROTECTION, RECREATION, NATURAL RESOURCES, AND ECO NOMIC DEVELOPMENT.

3.1. Objective: Pinellas county shall continue implementation of the Pinellas County Beach Enhancement Five-Year Program, to restore altered beaches and dunes, and shall annually update the program.

3.1.1. Policy: Pinellas County shall continue a program for restoring and renourishing sandy beaches and dunes.

3.1.2.. Policy: Pinellas County shall continue the role as lead agency for coordinating and managing beach restoration/renourishment projects.

3.1.3. Policy: Pinellas County shall monitor erosion of the county's renourished beaches and shall develop alternative strategies for beach enhancement based on the results of the monitoring program.

3.2 Objective: Pinellas County shall continue to protect the stability of the dune systems and the beach itself by utilizing construction standards, development regulations and other appropriate measures that minimize the impacts of man on the beach and dune systems.

3.2.1. Policy: New development shall be prohibited in the frontal dune and beach area.

3.2.2. Policy: Vehicle and foot traffic over the frontal dune systems shall be restricted by providing providing vehicular parking and dune walkovers.

3.2.3. Policy: The county shall continue to implement county and state regulations pertaining to construction seaward of the State Coastal Construction Control Line.

3.2.4 Policy: Pinellas County shall designate undeveloped coastal barrier islands as preservation or open space in the Future Land Use Element.

PUBLIC ACCESS

4. GOAL: PUBLIC ACCESS TO COASTAL RESOURCES SHALL BE PROVIDED IN ACCORDANCE WITH PUBLIC NEED.

4.1. Objective: Public access to the beaches and shorelines of Pinellas County shall be increased through acquisition, development, and expansion of facilities.

4.1.1. Policy: By October 1, 1995, Pinellas County shall have opened the following shoreline parks and beach access sites to the public:
. Wall Springs on Boggy Bayou, and
. Beach access sites in Treasure Island, St. Petersburg Beach, and Indian Rocks Beach.

4.1.2. Policy: The county shall continue to acquire environmentally sensitive lands, parkland and beach access sites.

4.1.3. Policy: Pinellas County shall not expend public monies for renourishing/restoring sandy beaches where the amount of public access does not meet the minimum standards established by the state of Florida for state-financed beach renourishment/restoration projects.

4.1.4. Policy: New or rebuilt county bridges shall be designed when it is practical to include catwalks or other facilities for fishing.

LAND USE

5. GOAL: LAND USE DESIGNATIONS IN THE COASTAL AREA SHALL BE CONSISTENT WITH THE FUTURE LAND USE ELE MENT AND COMPATIBLE WITH THE COUNTY'S NATURAL AND HISTORIC RESOURCES.

5.1. Objective: The county shall give priority to water-dependent and water-related land uses in the coastal area.

5.1.1. Policy: By October 1, 1990, the county shall amend the county land development regulations to provide performance standards for water-dependent and water-related land uses.

5.1.2. Policy: The county shall as a minimum use the following criteria for siting marinas:

- -Adequate water depth to accommodate the proposed beat use. Sites that require no dredging or filling to provide access by canal, channel or road are preferred.
- -Preference shall be given to the expansion of suitable existing marinas rather than new construction.
- -Located in areas where there is adequate flushing of the basin to prevent stagnation and water quality deteriora tion.
- -No adverse impact on archaeological or historic sites as defined by state and local comprehensive plans.
- -Reasonable access to a large navigable water body.
- -Sufficient upland area to accommodate all needed utilities and support facilities, such as parking spaces, rest rooms, dry storage, etc.
- -Capacity of the surrounding roadways to handle boating traffic to and from the marina.
- -Compatible land uses.
- -Adequate wastewater treatment capacity in accordance with State standards.
- -Marina development should be sensitive to the special requirements for developing in the following areas:
  - a)Aquatic preserves
  - b)Outstanding Florida Waters
  - c)Class II waters
  - d)Areas approved or conditionally approved by the Florida Department of Natural Resources (FDNR) for shellfish harvesting, and
  - e)Other highly productive and/or unique habitats as determined by FDNR based on vegetation and/or wildlife species.

5.1.3. Policy: No marina shall be constructed or expanded in areas determined by the Florida Department of Natural Resources to be critical to the survival of the West Indian Manatee.

5.1.4. Policy: No marina project shall be approved until a hurricane plan for this project has been established.

5.1.5. Policy: The development of marinas shall be supported as a means of providing public water access to the extent that their development shall not adversely impact estuarine resources.

HISTORIC RESOURCES

6.	GOAL:	TO PRESERVE AND PROTECT HISTORIC AND ARCHAEOLOGICAL RESOURCES WITHIN THE COASTAL AREA OF PINELLAS COUNTY.
6.1.	Objective:	The county shall identify, protect and preserve historic and archaeological resources.
6.1.1.	Policy:	By October 1, 19991, the county shall complete a survey to identify historic and archaeological sites in unincorporated Pinellas County.
6.1.2.	Policy:	The inventory shall include the identification of all structures built prior to 1940.
6.1.3.	Policy:	Sites of historical or archaeological significance shall be submitted to the Florida Department of State for inclusion in the Florida Master Site File.
6.1.4.	Policy:	By October 1, 1991, the county shall adopt regulations that provide for the protection, preservation, and appropriate use of historic and archaeological resources.
6.15.	Policy:	Historic and archaeological sites shall be shown on site plans submitted.

PUBLIC FACILITIES

7.	GOAL:	ADEQUATE PUBLIC FACILITIES SHALL BE AVAILABLE TO SERVE THE DEVELOPMENT AND REDEVELOPMENT PROPOSED IN THE FUTURE LAND USE ELEMENT FOR THE COASTAL AREA.
7.1	Objective:	Upon plan adoption, Pinellas County shall establish level of service standards and a mechanism for scheduling infrastructure improvements to ensure that an adequate level of service will be provided by public facilities within the coastal area.
7.1.1.	Policy:	The levels of service standards adopted elsewhere in the Pinellas County Comprehensive Plan shall be the standards for public facil ities within the coastal area.
7.1.2.	Policy:	The scheduling of public facility improvements within the coastal area shall be consistent with the Capital Improvements Element of this plan.
7.1.3.	Policy:	The service areas for public facilities within the coastal area shall be those identified and/or established elsewhere in this plan.