9399

Diag. Cht. No. 1001-3 & 1236-2.

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

Type of Survey ..... HYDROGRAPHIC

Field No. PE-20-4-73

Office No. H-9399

LOCALITY

State ..... NORTH CAROLINA

General Locality ... CAPE FEAR

Locality ... OFF SOUTHERN END OF FRYING PAN SHOALS

1973

CHIEF OF PARTY
R. J. Land

LIBRARY & ARCHIVES

DATE 11/20/74

☆U.S. GOVERNMENT PRINTING OFFICE: 1974-763-098

9399

FORM C&GS-537 (5-66)

U.S. DEPARTMENT OF COMMERCE
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION
COAST AND GEODETIC SURVEY

HYDROGRAPHIC TITLE SHEET

REGISTER NO.

H 9399

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

PE-20-4-73

State North Carolina

General locality Cape Fear

Locality ~~OUTER PORTION OF~~ OFF SOUTHERN END OF ~~S SOUTHERN END~~ Frying Pan Shoals

Scale 1:20,000 Date of survey 12-15 Aug. 1973, 8-9 Sept. 73 9-19 Oct. 1973

Instructions dated 11 April 1973 Project No. OPR-437-PE-73

Vessel NOAA Ship PEIRCE, CSS-28

Chief of party Commander Ralph J. Land, NOAA

Surveyed by CDR R.J. Land, LCDR J.K. Callahan, LT M.R. Mulhern, LTJG J.M. Barnhill, LTJG R.W. Permenter, LTJG R.P. Floyd, ENS P.D. Harman, ENS K.M. Holden

Soundings taken by echo sounder, ~~hand lead~~, ~~pole~~ DE 723, Ross 200-A

Graphic record scaled by Ship's Personnel

Graphic record checked by Ship's Officers

Protracted by ~~Ship's Officers~~ Automated plot by AMC ~~Processing~~ Div. - CALCOMP 618

Soundings ~~p~~inked by ~~Ship's Officers~~

Soundings in ~~XXXXXX~~ feet at MLW ~~XXXXXX~~

REMARKS: All times are Greenwich Mean Time, 000° W.

Applied to stds 1/10/75
CAB

DESCRIPTIVE REPORT

TO ACCOMPANY

HYDROGRAPHIC SURVEY PE-20-4-73

REGISTRY NUMBER H-9399

OPR-437-PE-73

COAST OF NORTH CAROLINA

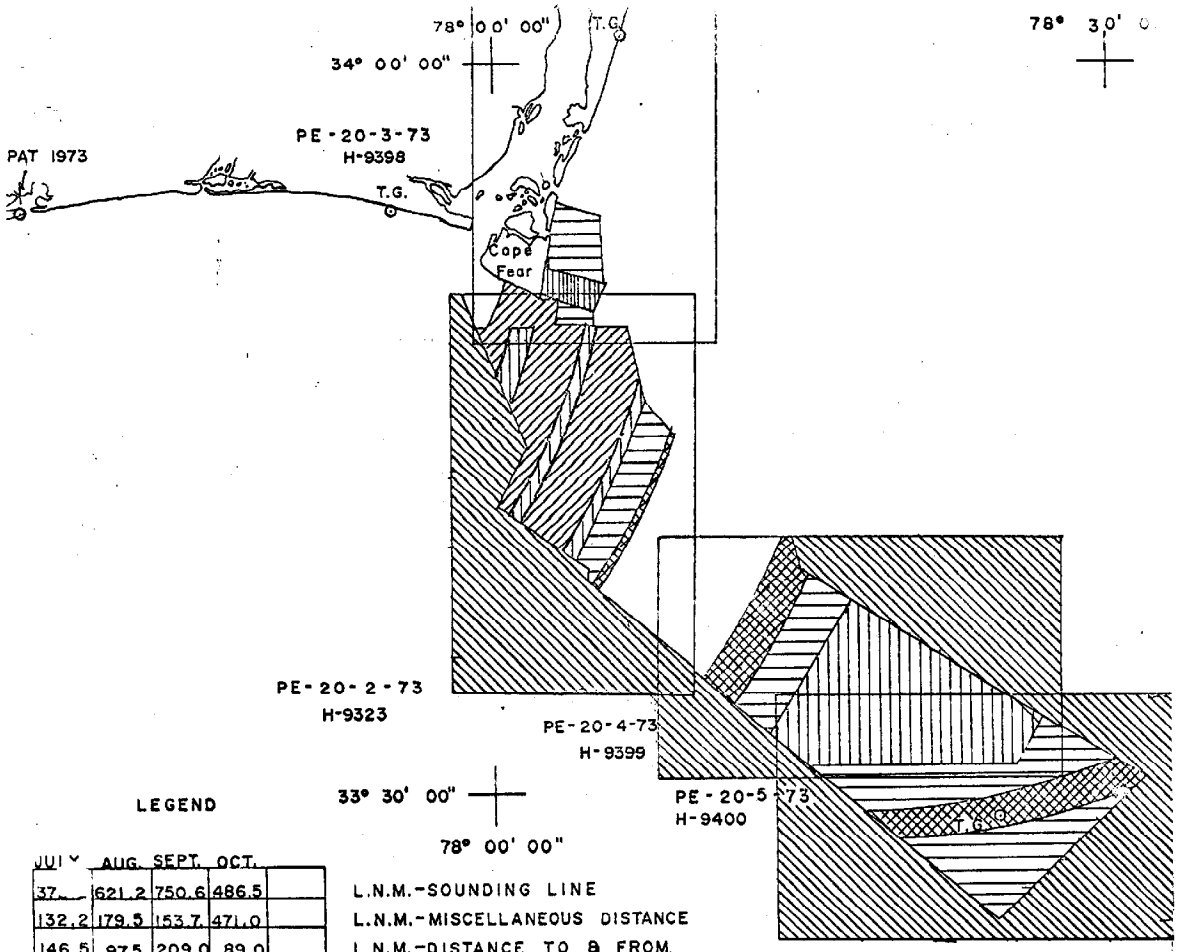
1973 FIELD SEASON

NOAA SHIP PEIRCE, CSS-28

RALPH J. LAND

CDR, NOAA

CHIEF OF PARTY



LEGEND

JULY	AUG.	SEPT.	OCT.	
37.	621.2	750.6	486.5	
132.2	179.5	153.7	471.0	
146.5	97.5	209.0	89.0	
			170.5	
20	5	17	64	
1	2	2	2	
0	0	0	2	
0	0	0	13	
304.7	130.7	89.3	63.9	
67.5	27.5	113.5	0	
	463.0	211.5	198.1	
		336.3	224.5	

L.N.M.-SOUNDING LINE
L.N.M.-MISCELLANEOUS DISTANCE
L.N.M.-DISTANCE TO & FROM
SQ.N.M. - SOUNDINGS
BOTTOM SAMPLES
TDC CAST
NANSEN CAST
SALINITY SAMPLES
L.N.M.-SOUNDING LINE - PE-20-2-73 H-9323
L.N.M-SOUNDING LINE PE-20-3-73 H-9398
L.N.M-SOUNDING LINE PE-20-4-73 H-9399
L.N.M.-SOUNDING LINE PE-20-5-73 H-9400

JULY
AUGUST
SEPTEMBER
OCTOBER
COMPLETED ON PREVIOUS SURVEYS

PROGRESS SKETCH
OPR-437
NORTH CAROLINA COAST
NOAA SHIP PEIRCE
CDR. RALPH J. LAND COMDG.
1973 FIELD SEASON
SCALE OF CHART 1:10

TABLE OF CONTENTS

H-9399, PE-20-4-73

TABLE OF CONTENTS

DESCRIPTIVE REPORT

OPR-437-PE-73

PE-20-4-73

H-9399

A. PROJECT

This survey is an integral part of project SCOPE. The survey was accomplished in accordance with project SCOPE instructions, and with project instructions OPR-437-PE-73 dated 11 April 1973, North Carolina Coast. This project is a continuation of surveys conducted south and east of this area at various times during the past eight years. There are two sets of supplemental instructions; Change #1 to project instructions: OPR-437-PE-73, North Carolina Coast, dated 18 April 1973. And change #2 to project instructions; OPR-437-PE-73, North Carolina Coast, dated 17 August 1973.

B. AREA SURVEYED

This hydrographic survey is located off the coast of North Carolina. The northern most edge of the survey is approximately 15 nautical miles Southeast of Cape Fear, and is directly off the southern end of Frying Pan Shoals. The area surveyed is in the shape of an irregular heptagon, with the bulk of the survey located on the West-Northwest side of the area. This hydrographic survey encompasses an area of approximately 45 square nautical miles.

This survey is bounded on the South by it's junction with current PEIRCE survey PE-20-5-73, H-9400, 1:20,000, 1973;

The area is bounded on the ~~North~~ EAST by survey H-9045, 1:80,000, 1969. & H-9395, 1:40,000, 1974; & H-9389, 1:20,000, 1974 ON THE NORTH BY & H-6540, 1:40,000, 1939 on the west.

This survey overlaps prior surveys H-6540, 1:40,000, 1940, ~~and H-8512, 1:20,000.~~

This survey was conducted on the following days: 12-15 Aug. 1973, 8-9 September 1973, and 9-19 October 1973.

C. SOUNDING VESSEL

All soundings were obtained by the NOAA Ship PEIRCE without the aid of launches or skiffs.

D. SOUNDING EQUIPMENT

Soundings for the Julian Days 224-227 were recorded by a Ross fathometer Model 200-A, serial number 201745. The soundings for the Julian Days 284, and 288-292 were recorded by a Raytheon Survey Fathometer, Model DE 723-1, serial number 928. The fathometer initial was maintained at zero and the soundings were in feet. Depths ranged from ~~twenty~~ 22 to ~~seventy~~ 85 feet. No problems were encountered with the fathometers which would seriously effect the accuracy of the soundings. Phase checks were performed using a Digital Phase Checker on the Raytheon fathometer on the following days: 11 August, 15 July, and 21 September 1973. Results were very good with no appreciable phase error noted.

Phase checks were performed on the Ross fathometer during every watch and each time recording paper was changed, using the Ross's calibration mode. Results were very good with no appreciable error noted.

E. SMOOTH SHEET

All field records were transmitted to the Atlantic Marine Center for smooth computer plotting.

F. CONTROL

Raydist (Range-Range) was used for horizontal control, operating on a frequency of 3294.400 KHZ. Two portable Raydist shore stations were utilized. Pattern I was Pat 1973, located at Latitude 33° 53' 57.478", Longitude 78° 23' 11.792". Pattern II was Register II 1973 and was located at Latitude 34° 15' 42.760", Longitude 77° 46' 27.623".

Calibration of the Raydist equipment was accomplished by two methods. The first was by using three point sextant fixes with check angles, and the second method was by running a range and observing an angle to determine position.

For further details, consult the Electronic Position Control Report.

Calibration signals used were as follows:

Signal Number	Object
106	Fort Fisher, U.S. Air Force West Radar Tower, 1962
107	Fort Fisher, U.S. Air Force East Radar Tower, 1962
108	Kure Beach Water Tank
111	Bald Head Lighthouse 1851 (abandoned)
113	Oak Island Lighthouse 1962
116	Atomic Power Plant Stack, 1973
117	Yaupon Beach Water Tank
304	Cross Banner, 10 ft. High
312	Cross Banner, 10 ft. High
314	Cross Banner, 10 ft. High
307	Tripod, 35 ft. high
313	Tripod, 35 ft. high
328	Tripod, 35 ft. high
336	Tripod, 35 ft. high
PAT 1973	Raydist Station Lat. 33°53'57.478" Long. 78°23'11.792"
REGISTER II 1973	Raydist Station Lat. 34°15'42.760' Long. 77°46'27.623"

Signals 106, 107, and 113 are third order triangulation stations. Signals 111, 116, and 117 are second order triangulation stations. Signals 304, 312, 314, 307, 313 328, and 336 were established by Photo party 62 using third order traverse methods.

G. SHORELINE

There is no shoreline on this survey.

H. CROSSLINES

Crosslines constitute approximately 6% of all hydrography. Crossline depths were in excellent agreement with those on regular sounding lines, the agreement being within one (1) foot.

I. JUNCTIONS

The survey junctions with survey PE-20-5-73, H-9400, 1:20,000, 1973; And with survey H-9040, 1:80,000, 1969. H-9389(1974), 1:20,000; H-9395(1974), 1:40,000; H-6540(1939), 1:40,000 The comparison at the junction indicated that they are compatible and that there are no discrepancies. A butt junction was effected with H-6540(1939)

J. COMPARISON WITH PRIOR SURVEYS

There were six (6) presurvey items, 1 numbered and 5 unnumbered that were checked. All six items involved locating a shoal depth. ~~All~~ Five of the six items were found to compare favorably to the survey. ~~All~~ Five of the six items were within ~~one~~ (1) 3 ft. ~~foot~~ of the soundings which were taken in the respective areas during the survey. See Review Paragraph 6-A

The results of this survey were compared with prior survey H-6540, 1:40,000, 1940. A thorough comparison using an enlarging machine indicated that the survey was in good agreement with H-6540. There were slight differences, however all discrepancies were within a foot or two.

K. COMPARISON WITH CHART

A comparison was made with the largest scale chart of the area, Chart C&GS 1236, 1:80,000, 7th Edition, 1972. The following discrepancies were found:

Depth On Chart	Depth On This Survey	~~Latitude~~ Longitude	~~Longitude~~ Latitude
	6 SURVEY LOCATION	77° 38.7'	33° 32.8'
28 ft.	3~~8~~ ft. CHART LOCATION	77 38.6'	33 32.9'
	32	77° 47.08'	33° 36.~~16~~12'
29 ft.	~~40~~ ft.	77 47.~~1~~05'	33 36.~~32~~'
	41	77° 46.13'	33° 36.72'
30 ft.	~~39~~ ft.	77 46.13'	33 36.~~8~~72'
	1	77° 46.0'	33° ~~35.0~~ 34.96'
31 ft. Same	3~~8~~ ft.	77 ~~46.0~~ 45.95'	33 ~~35.0~~ 34.95'
	35 ft.	77° 39.61'	33° 34.05'
32 ft.	~~38~~ ft.	77 39.~~85~~'	33 34.~~21~~6'
	31 ft.	77° 46.22'	33° 34.83'
34 ft.	~~52~~ 47 ft.	77 46.~~84~~'	33 34.8'
	9	77° 45.~~8~~22	33° 32.~~12~~4
59 ft. Same	5~~8~~ ft.	77 45.3'	33 32.~~2~~1'

The comparison was made using an enlarging machine.

It should be noted that ~~in all the above cases except for the last~~ generally the charted depth is shoaler ~~by from 6 to 13 feet~~ than the depth given by the survey. These discrepancies could be due to the comparatively poor control on previous surveys, the changable nature of the bottom, and the inherent error in transferring the soundings from the small scale chart. In the process of taking TDC's in this area it was noted that the bottom currents appeared to be noticeable enough to be significant in the transporting of bottom materials. This

could be a contributing factor in the discrepancies between the charted and surveyed depths.

L. ADEQUACY OF SURVEY

This survey is adequate to supersede prior surveys for charting.

M. AIDS TO NAVIGATION

There was one aid to navigation in the area surveyed. It was buey R "2FP" Fl. 6 sec. WHIS ra ref, located at Latitude 33° 34.63', Longitude 77° 44.45'. The detached position of the buoy taken during the survey compared favorably with the charted position of the buoy, Lat. 33°34.91'- Long. 77°44.40'.

N. STATISTICS

Total Number of Positions	2539
Total Hydro Miles	850 NM
Total Crossline Miles	53 NM
Total Square Miles	45 Sq. NM
TDC Observations	3
Nansen Casts	1
Bottom Samples	37
Leadline Comparisons	1

O. MISCELLANEOUS

At the western edge of the survey there is an area running from Northwest to Southeast, that rises from 5 feet to 20 feet above the surrounding terrain. Bottom samples that were taken of this area show that the top layer is composed of "fine brown sand". It is probable that this area is made up of a foundation of either rock, or an outcropping of fossil coral overlayed by a siltation of "fine sand". The speculation that the foundation is made up of an outcropping of fossil coral is made because the area is located close to the extension of the central axis of Frying Pan Shoals, and fossil coral has been found to be an integral part of Frying Pan Shoals.

At the eastern edge of the survey, another uplifted area, running in the approximate same direction as the area mentioned in the paragraph above, was found. This region has a depth difference of from 2 feet to 12 feet when compared to the surrounding area. According to bottom samples taken in and around the area, the region is overlayed by various combinations of coarse brown sand and broken shell. The existence of this area could be due to reasons already mentioned above, but if so the geological state of this region is at a different point of development. This speculation is made because of the abundance of coarse sands and broken shell, rather than a presence of fine sand.

Fathogram scanning was accurate throughout the project with great care given to insure this accuracy. The fathogram was scanned by the OOD and the Hydrographer at the end of each watch, and compared to the printout for that watch. Any errors were then corrected and inserts of other significant soundings were made. This was then check scanned again, and any final corrections were then made and examined.

All times were in Greenwich Mean Time.

Bottom samples were logged using consecutive position numbers from the same series of position numbers as would have been used while running a regular hydro line.

P. RECOMMENDATIONS

It is recommended that this survey be considered adequate for charting purposes, and that it supersede prior surveys.

Q. REFERENCE TO REPORTS

Reference can be made to the following reports:

1. Corrections to Echo Soundings, OPR-437, Coast of North Carolina, NOAA Ship PEIRCE, 1973
2. Report on Raydist Electronic Control, OPR-437, Coast of North Carolina, NOAA Ship PEIRCE, 1973.

Respectfully Submitted For Approval By

Jon M. Barnhill

Jon M. Barnhill
LTJG, NOAA

APPROVAL SHEET

Field Number PE-20-4-73

Registry Number H-9399

The field work and processing of data from this hydrographic survey was under my immediate daily supervision. The boat-sheets and all records have been reviewed and are approved by me. This survey is complete and adequate to supersede all prior surveys of the area.

Ralph J. Land

CDR, NOAA

Comdg., NOAA Ship PEIRCE

Tide Note, Project SCOPE, OPR-437, H-9323, H-9398, H-9399, H-9400

Predicted tides for this survey were computed by the ship with the onboard PDP-8 computer using the standard gauge at Charleston, South Carolina, corrected to Cape Fear, North Carolina.

The tide gauges operating in the area are as follows:

1. Wilmington Beach, North Carolina
   lat. 34° 01!9, long. 77° 53!6

2. Frying Pan Shoals Light, North Carolina
   lat. 33° 29!1, long. 77° 35!4

3. Yaupon Fishing Pier, Yaupon Beach, North Carolina
   lat. 33.9° , long. 78.07°

The gauges were installed and maintained by the Tides Section, Atlantic Marine Center.

Zoning between gauges will be done by Atlantic Marine Center Processing Division, CAM22 in accordance with automatic computer zoning techniques.

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY

Date : 8 November 1973

Reply to Attn. of:

To : Chief, Tides Section C331

From : Commanding Officer, NOAA Ship PEIRCE

Subject: Verified Hourly Heights of Tide,
Project SCOPE, OPR-437, PE 20-2-73, H-9323,
PE 20-3-73, H-9398, PE 20-4-73, H-9399,
PE 20-5-73, H-9400

Please provide verified hourly heights and value of MLW on the tide staff for the following gauges:

1.) Wilmington Beach, North Carolina
lat. 34° 01!9, long. 77° 53!6

2.) Frying Pan Shoals Light, North Carolina
lat. 33° 29!1, long. 77° 35!4

3.) Yaupon Fishing Pier, Yaupon Beach, North Carolina
lat. 33.9°, long. 78.07°

The survey operations began on 14 July 1973 and ended on 19 October 1973, inclusive. Actual times of hydrographic operations are enclosed.

Please forward the requested information directly to Atlantic Marine Center, ATTN: CAM22 and an informational copy to the ship.

Ralph S. Land
Cdr., NOAA

1/17/74

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

TIDE NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center

Hourly heights are approved for form 362

Tide Station Used (NOAA Form 77-12): Wilmington Beach
Frying Pan Shoals, Lt. House
Yaupon Beach

Period: 14 July - 19 Oct 1973

HYDROGRAPHIC SHEET: H-9323, H-9398, H-9399 and H-9400

OPR: 437

Locality: Coast of North Carolina

Plane of reference (mean ~~lower~~ low water):

Height of Mean High Water above Plane of Reference is

Remarks:

Station	Greenwich Intervals HWI	LWI (hrs)	Mean Range (ft)	MLW Datum (ft)
Wilmington Beach	12.30	6.11	4.2	3.4
Yaupon Beach	12.24	5.82	4.9	7.5
Frying Pan Shoal	12.25	5.97	3.8	7.5

Note: Add 0.3 ft. to hourly heights at Wilmington Beach for the month of August 1973.

The difference between intervals represents the approximate time difference between the occurrence of high water or low water at the tide station.

Zoning: Use automated zoning for the above Hydro Sheets.

C. L. Thurlow
Chief, Tides Division

NOAA FORM 76-155
(11-72)

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

SURVEY NUMBER

H-9399

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
ATLANTIC OCEAN										1
FRYING PAN SHOALS										2
										3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
					Approved					19
					Chas. L. Harrington					20
					Staff Geographer					21
					10 Feb 1975					22
										23
										24
										25

ATLANTIC MARINE CENTER
APPROVAL SHEET
FOR
AUTOMATED SURVEY H- 9399

A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~has not~~ been made. A new final sounding printout has/~~has not~~ been made.

Date: Sept,19,1974

Signed: William L. Jonns
William L.Jonns
Title: Chief, Verification Branch

B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Hydrographic and AMC Manuals. Exceptions are listed in the verifier's report.

Date: Sept.19,1974

Signed: C Dale North
C.Dale North,Jr.LCDR,NOAA
Title: Chief, Processing Division

NOAA FORM 77-27
(9-72)
(PRESC. BY HYDROGRAPHIC MANUAL 20-2. 6-94, 7-13)

U. S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC SURVEY STATISTICS

HYDROGRAPHIC SURVEY NO. 9399

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET & PNO	1	BOAT SHEETS	1
DESCRIPTIVE REPORT	1	OVERLAYS	3

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES	[illegible]		1			
CAHIERS	1					
VOLUMES	1					
BOXES			2 Bundles			Saw tooth records 1

T-SHEET PRINTS (List)

SPECIAL REPORTS (List)

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				2539
POSITIONS CHECKED		254		
POSITIONS REVISED		25		
DEPTH SOUNDINGS REVISED		65		
DEPTH SOUNDINGS ERRONEOUSLY SPACED		NA		
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		NA		
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS	--	--		
JUNCTIONS		5	16	
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		20	-	
SPECIAL ADJUSTMENTS		NA	40	
ALL OTHER WORK		66		
TOTALS		91	161	

	BEGINNING DATE	ENDING DATE
PRE-VERIFICATION BY: J. Murphy & G. Trefethen	Jan. 15, 1974	May 24, 1974
VERIFICATION BY: Roy Cram	Aug. 29, 1974	Sept. 4, 1974
REVIEW BY: F. SAULSBURY		Sep 29, 1975

Inspect. D. Baumgardner 22 hrs. 7/24/76
Engle 10 12-30-76

* U.S. G.P.O. 1972-769-562/439 REG.#6

REGISTRY NO. 9399

The Computer and Excess Sounding Cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey, the following shall be completed:

CARDS CORRECTED

DATE_____ TIME REQUIRED_____ INITIALS_____

REMARKS:

REGISTRY NO. H-9399

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE 2/25/81 TIME REQUIRED_____ INITIALS PEK

REMARKS:

H-9399

Items for Future Presurvey Reviews

This is a good basic survey with no unresolved items.

Position Index Lat.	Long.	Bottom Change Index	Use Index	Resurvey Cycle
333	0775	5	2	25 years
333	0774	4	2	25 years

OFFICE OF MARINE SURVEYS AND MAPS

MARINE SURVEYS DIVISION

MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9399 FIELD NO. PE-20-4-73

North Carolina, Cape Fear, Off Southern End of Frying Pan Shoals

SURVEYED: August 12 - October 19, 1973

SCALE: 1:20,000 PROJECT NO.: OPR-437

SOUNDINGS: DE-723 and Ross 200-A Depth Recorders CONTROL: Raydist (Range-Range)

Chief of Party	R. J. Land
Surveyed by	J. K. Callahan
	M. R. Mulhern
	J. M. Barnhill
	R. W. Permenter
	R. P. Floyd
	P. D. Harman
	K. M. Holden
Automated Plot by	Cal Comp 618 (AMC)
Verified by	R. Cram
Reviewed by	F. P. Saulsbury
	Date: September 29, 1975
Inspected by	S. Baumgardner

1. Control and Shoreline

The origin of control is adequately covered in part F of the Descriptive Report.

This is an offshore survey with no shoreline within its limits.

2. Hydrography

A. Depths at crossings are in good agreement.

B. The usual depth curves are adequately delineated. Dashed curves and optional 36-foot depth curves were added to accentuate shoal bottom configuration.

C. The development of the bottom configuration and the determination of least depths are considered adequate.

3. Condition of Survey

The sounding records, plotting, various printouts, and the Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual supplemented by the Instruction Manual - Automated Hydrographic Surveys. However, it was necessary to retrieve from excess and hand plot numerous soundings at the time of review.

4. Junctions

A butt junction was effected with H-6540 (1939) on the west. Differences in depths are attributed to the changeable nature of the bottom and a 34-year period between surveys. Adequate junctions were made with H-9400 (1973) on the south, H-9045 (1969) on the east, with H-9389 (1974) on the northwest, and with H-9395 (1974) on the north.

5. Comparison with Prior Surveys

A.

H-277	(1851)	1:20,000	H-2808	(1906)	1:40,000
H-306	(1851)	1:20,000	H-4313	(1923)	1:40,000
H-768	(1860)	1:500,000	H-4523	(1925)	1:100,000
H-1517	(1882)	1:40,000			

These surveys represent early hydrographic coverage of the present survey area. No comparison is made since they are superseded by subsequent surveys within the common area.

B.

H-4323	(1923)	1:40,000
H-4437	(1924)	1:40,000

These surveys are for the most part superseded by H-6540 (1939). A comparison between the present depths and the prior depths within the remainingarea reveals a general deepening of 1 foot to 3 feet in depths. Variable differences of as much as 12 feet have occurred in the area where sand waves exist.

The differences may be attributed to weak control on the prior surveys and strong bottom currents continually changing the bottom and very possibly affecting the accuracy of the lead line casts on the prior surveys.

The present survey is adequate to supersede these prior surveys within the common area.

C.

H-6540	(1939)	1:40,000

Comparison between the prior and present surveys reveals differences of 2 to 6 feet, the present survey being generally deeper, except in sand

wave areas where differences are variable and as great as 12 feet. A butt junction with this survey is discussed in paragraph 4 above. The present survey is adequate to supersede the prior survey in the common area.

6. Comparison with Chart 1236 (latest print date April 22, 1972)
1001 (latest print date August 31, 1974)

A. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration, supplemented by the partial application of soundings from the present survey.

Presurvey Review Item #11, charted as 28 feet (reported) in latitude 33°32.9', longitude 77°38.6' from an examination by J. E. Pillsbury in 1886, with no record of a tide corrector being applied, was investigated in 1924 (H-4437) and the least depth found was 38 feet. Again in 1939 (H-6540) an investigation found least depths of 37 feet. Comprehensive development on the present survey found a least depth of 36 feet in latitude 33°32.8, longitude 77°38.7'.

The 28 feet (reported) sounding is considered discredited and its deletion from the chart is recommended.

The present survey is adequate to supersede the charted hydrography within the common area.

B. Aids to Navigation

One aid to navigation, Frying Pan Shoals Lighted Whistle Buoy "2 FP," falls within the survey area. Its position on the survey plots approximately one-quarter mile south of its charted location.

7. Compliance with Instructions

This survey adequately complies with the Project Instructions.

8. Additional Field Work

This is a good basic survey and no additional field work is recommended.

Examined and Approved:

Chief
Marine Surveys Division

Associate Director
Office of Marine Surveys
and Maps

Times of Hydrographic Operations, OPR-437, H-9323, H-9398, H-9399, H-9400, 1973

Date	Julian Day	From(GMT)	To(GMT)
14 Jul 73	195	1200	1820
24 Jul 73	205	1522	1746
25 Jul 73	206	1246	1905
26 Jul 73	207	1100	2345
27 Jul 73	208	1204	2140
28 Jul 73	209	1100	2040
29 Jul 73	210	1100	2310
30 Jul 73	211	1100	1945
31 Jul 73	212	1224	1935
06 Aug 73	218	1605	2010
07 Aug 73	219	1200	2030
08 Aug 73	220	1200	2030
09 Aug 73	221	1200	2030
10 Aug 73	222	1332	1905
12 Aug 73	224	1757	2400
13 Aug 73	225	0000	2400
14 Aug 73	226	0000	2400
15 Aug 73	227	0000	0810
07 Sep 73	250	1320	1926
08 Sep 73	251	1426	2400
09 Sep 73	252	0000	1836
11 Sep 73	254	1426	2400
12 Sep 73	255	0000	2400
13 Sep 73	256	0000	1656
18 Sep 73	261	1622	1919
20 Sep 73	263	1205	2215
21 Sep 73	264	1210	2015
22 Sep 73	265	1238	2020
23 Sep 73	266	1200	2000
24 Sep 73	267	1349	1440
01 Oct 73	274	1849	2400
02 Oct 73	275	0000	2400
03 Oct 73	276	0000	1856
04 Oct 73	277	1201	2020
05 Oct 73	278	1323	1428
10 Oct 73	283	0415	2400
11 Oct 73	284	0000	0323
15 Oct 73	288	2211	2400
16 Oct 73	289	0000	2400
17 Oct 73	290	0000	0332
18 Oct 73	291	1408	2400
19 Oct 73	292	0217	0908

```
 175700 0 0111 0001 224 283000 009399
001440 0 0111 0001 225 283000 009399
014620 0 0111 0001 226 283000 009399
000000 0 0109 0001 227 283000 009399
142620 0 0112 0001 251 283000 009399
000020 0 0111 0001 252 283000 009399
091340 0 0111 0002 252 283000 009399
123200 0 0111 0001 252 283000 009399
041100 0 0113 0001 284 283000 009399
221100 0 0112 0001 288 283000 009399
000100 0 0112 0001 289 283000 009399
000840 0 0111 0001 290 283000 009399
140820 0 0111 0001 291 283000 009399
000500 0 0111 0001 292 283000 009399
225800 0 0111 0001 292 283000 009399
```

VELOCITY TABLE 1 OPR 437 H-9399 PE 20-4-73

```
000058 0 0002 0001 000 283000 939900
000092 0 0004
000128 0 0006
000165 0 0008
000200 0 0010
000242 0 0012
000274 0 0014
000312 0 0016
000348 0 0018
000382 0 0020
000420 0 0022
000458 0 0024
000490 0 0026
000530 0 0028
000568 0 0030
000598 0 0032
000638 0 0034
000675 0 0036
000712 0 0038
000746 0 0040
000780 0 0042
000818 0 0044
000860 0 0046
000890 0 0048
000928 0 0050
000964 0 0052
001000 0 0054
999999 0 0056
```

VELOCITY TABLE 2 OPR 437 H-9399

PE 20-4-73

```
000128 0 0008 0002 000 283000 939900
000200 0 0016
000312 0 0020
000348 0 0022
000350 0 0023
000382 0 0025
000420 0 0027
000458 0 0028
000490 0 0030
000530 0 0032
000550 0 0035
000598 0 0037
000638 0 0039
000650 0 0043
000712 0 0045
000746 0 0047
000818 0 0051
999999 0 0053
```

ELECTRONIC CORRECTOR TAPE OPR437 H-9399

PE 20-4-73

```
175700 0 0000 2830 224 000031 000009
002800 0 0000 2830 225 100005 000014
000000 0 0000 2830 226 000030 000000
224900 1 0280
000000 0 0000 2830 227 000030 000000
142620 0 0000 2830 251 100007 000050
202820 0 0000 2830 251 100007 000067
000020 0 0000 2830 252 100007 000067
113000 0 0000 2830 252 100007 000084
041100 0 0000 2830 284 000003 000076
221100 0 0000 2830 288 100008 100004
000000 0 0000 2830 289 100008 100004
000840 0 0000 2830 290 100008 100004
140820 0 0000 2830 291 100008 100004
000500 0 0000 2830 292 100008 100004
```

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ELECTRONIC CORRECTOR ABSTRACT

VESSEL : 2830 SHEET : H-9399

TIME	DAY	PATTERN 1	PATTERN 2
175700	224	+00031	+00009
002800	225	-00005	+00014
000000	226	+00030	+00000
000000	227	+00030	+00000
142620	251	-00007	+00050
202820		-00007	+00067
000020	252	-00007	+00067
113000		-00007	+00084
041100	284	+00003	+00076
221100	288	-00008	-00004
000000	289	-00008	-00004
000840	290	-00008	-00004
140620	291	-00008	-00004
000500	292	-00008	-00004

ASCII SIGNAL TAPE PRINTOUT
OPR-437-PE-73, COAST OF NORTH CAROLINA, NOAA SHIP PEIRCE
H-9323, H-9398, H-9399, H-9400

101	33°50'2641"N	077°57'4644"W	CAPE FEAR 1962
102	33 50 4725	077 57 5825	CAPE FEAR LIGHTHOUSE 1905
103	33 52 4637	077 57 2611	BUZZARD 1962
104	33 57 3662	077 56 2984	FEDERAL POINT
105	33 58 1516	077 55 0193	FORT FISHER UNUSED STEEL TOWER 1962
106	33 58 4861	077 55 0317	FORT FISHER USAF WEST RADAR TOWER 1962
107	33 58 4903	077 54 5923	FORT FISHER USAF EAST RADAR TOWER 1962
108	33 39 5608	077 54 2604	KURE BEACH WATER TANK 1962
109	34 02 0392	077 53 4786	CAROLINA BEACH MUNI WATER TANK 1962
110	33 51 4614	078 00 3345	BALD HEAD 1962
111	33 52 2406	078 00 0234	BALD HEAD LIGHTHOUSE 1851
112	33 53 3338	078 00 5564	FORT CASWELL 1962
113	33 53 3354	078 02 0677	OAK ISLAND LIGHTHOUSE 1962
114	33 53 3573	078 01 0989	FORT CASWELL, STEEL WATER TANK
115	33 55 1666	078 01 1292	SOUTHPORT MUNICIPAL WATER TANK 1962
116	33 57 2356	078 00 3400	* STACK, ATOMIC PLANT
117	33 54 3353	078 04 4734	* YAUPON BEACH MUNICIPAL WATER TANK 1973
301	33 51 3511	078 00 2889	* B01
302	33 51 2870	078 00 1839	* B02
303	33 51 2220	078 00 0221	* B03
304	33 51 1700	077 59 4931	* B04
305	33 51 1259	077 59 3287	* B05
306	33 51 0736	077 59 1769	* B06
307	33 51 0273	077 59 0148	* B07
308	33 50 5664	077 58 4530	* B08
309	33 50 4910	077 58 2995	* B09
310	33 50 4435	077 58 1837	* B10
311	33 50 3421	077 58 0179	* B11
312	33 50 2844	077 57 4407	* 312
313	33 50 3810	077 57 4230	* B12
314	33 50 5268	077 57 4093	* 314
315	33 51 0992	077 57 4015	* 315
316	33 51 2323	077 57 3913	* MARK 316
317	33 51 3605	077 57 3657	* 317
318	33 51 4887	077 57 3464	* SIG 318
319	33 52 0092	077 57 3307	* 319
320	33 52 1500	077 57 3092	* 320
321	33 52 3328	077 57 2812	* 321
324	33 52 5663	077 57 2272	* OL 4 324
325	33 53 0654	077 57 1944	* RAT 325
326	33 53 1942	077 57 1689	* OL 3 326
328	33 53 3041	077 57 1472	* VUB 328
330	33 53 4113	077 57 1327	* PRI 330
332	33 53 5611	077 57 0851	* POL 332
334	33 54 1105	077 57 0134	* OL 2 334
336	33 54 2619	077 56 5407	* DUN 336
338	33 54 4284	077 56 4852	* OL 1 338
340	33 54 5502	077 56 4447	* RED 340
342	33 55 0980	077 56 4625	* ACE 342
344	33 55 2365	077 56 4110	* BAT 344
346	33 55 3747	077 56 3616	* COW 346

*Stations established by Photogrammetric Party 62, National Ocean Survey, 1973

None on 9399

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

Date: September 26, 1973

Reply to Attn of: C3233

Subject: Assignment of Registry Numbers

To: Commanding Officer
NOAA Ship PEIRCE

The following hydrographic registry numbers, H-9398, H-9399, and H-9400, are assigned in accordance with the information listed below:

Registry No.	Field No.	Area	Project No.
H-9398	PE-20-3-73	Frying Pan Shoals, N.C. Coast 33°49'N, 34°03'N 77°50'W, 78°01'W	OPR-437
H-9399	PE-20-4-73	Frying Pan Shoals, N.C. Coast 33°31'N, 33°40'N 77°33'W, 77°52'W	OPR-437
H-9400	PE-20-5-73	Frying Pan Shoals, N.C. Coast 33°24'N, 33°33'N 77°27'W, 77°46'W	OPR-437

George H. Mastrogianis

George H. Mastrogianis
Chief, Hydrographic Data Section
Marine Chart Division

FORM C&GS-733M
(6-66)

OCEANOGRAPHIC LOG SHEET - M
BOTTOM SEDIMENT DATA

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

VESSEL	PROJ. NO.	YEAR		CHECKED BY	DATE CHECKED
PEIRCE	OPR-437	1973	PE-20-4-73 H-9399		

SERIAL NO.	DATE	SAMPLE POSITION LATITUDE	SAMPLE POSITION LONGITUDE	DEPTH (Fathoms)	WEIGHT OF SAMPLER	APPROX. PENETRATION	LENGTH OF CORE	COLOR OF SEDIMENT	FIELD DESCRIPTION	REMARKS (Unusual conditions, cohesiveness, dented cutter, stat. no., type of bottom relief i.e., slope, plain, disposition, etc.)	OBS. INIT.
835	11 Oct.	33° 33.1′	77°34.8′	57					crs br S[illegible]		
836	11 Oct.	34.4	37.4	56					crs br S & brk Sh		
837	11 Oct.	34.7	39.0	48					crs br S & brk Sh		
838	11 Oct.	33°34.7′	77°40.7′	49.5					crs br S		

-26-

Use more than one line per sample if necessary.

USCOMM-DC 37019-P66

FORM C&GS-733M
(6-66)

OCEANOGRAPHIC LOG SHEET - M
BOTTOM SEDIMENT DATA

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

VESSEL	PROJ. NO.	YEAR		CHECKED BY	DATE CHECKED
PEIRCE	OPR-437	1973	PE-20-4-73 H-9399		

SERIAL NO.	DATE	SAMPLE POSITION LATITUDE	SAMPLE POSITION LONGITUDE	DEPTH (Fathoms) feet	WEIGHT OF SAMPLER	APPROX. PENETRATION	LENGTH OF CORE	COLOR OF SEDIMENT	FIELD DESCRIPTION	REMARKS (Unusual conditions, cohesiveness, dented cutter, stat. no., type of bottom relief i.e., slope, plain, disposition, etc.)	OBS. INIT.
1819	11 Oct.	33°31.8'	77°34.8'	51					crs br S & brk Sh		
820	11 Oct.	31.9	36.5	50					crs br S & brk Sh		
821	11 Oct.	31.8	38.1	42					crs br S & brk Sh		
822	11 Oct.	31.9	39.8	62					crs br S & brk Sh		
823	11 Oct.	31.8	41.3	58					fne br S		
824	11 Oct.	31.8	42.8	60					fne br S		
825	11 Oct.	31.8	44.5	54					fne br S		
826	11 Oct.	31.8	46.0	70					br S		
827	11 Oct.	33.2	47.7	64					fne br S		
828	11 Oct.	33.2	46.1	50					fne br S		
829	11 Oct.	33.2	44.4	49					fne br S		
1830	11 Oct.	33.3	42.8	58					fne br S		
31	11 Oct.	33.2	41.2	53					fne br S		
2	11 Oct.	33.2	39.6	51.5					br S & brk Sh		
33	11 Oct.	33.2	38.0	56.5					crs br S		
834	11 Oct.	33°33.2'	77°36.3'	52.5					crs br S		

e more than one line per sample if necessary.

USCOMM-DC 37019-P66

FORM C&GS-733M (6-66)

OCEANOGRAPHIC LOG SHEET - M
BOTTOM SEDIMENT DATA

U.S. DEPARTMENT OF COMMERCE
ESSA
COAST AND GEODETIC SURVEY

VESSEL	PROJ. NO.	YEAR		CHECKED BY	DATE CHECKED
PEIRCE	OPR-437	1973	PE-20-4-73 H-9399		

SERIAL NO.	DATE	SAMPLE POSITION LATITUDE	SAMPLE POSITION LONGITUDE	DEPTH (Fathoms) feet	WEIGHT OF SAMPLER	APPROX. PENETRATION	LENGTH OF CORE	COLOR OF SEDIMENT	FIELD DESCRIPTION	REMARKS (Unusual conditions, cohesiveness, dented cutter, stat. no., type of bottom relief i.e., slope, plain, disposition, etc.)	OBS. INIT.
2479	18 Oct.	33°37.2'	77°43.7'	31					crs br S & brk Sh		
2480	18 Oct.	35.7	42.6	35					crs br S		
2481	18 Oct.	37.3	42.1	37.5					crs br S & brk Sh		
✓ 2477	18 Oct.	37.1	47.0	27.5					fne br S ✓		
✓ 2478	18 Oct.	37.1	45.4	27.5					br S ✓		
2528	18 Oct.	34.7	42.3	39					crs br S & brk Sh		
✓ 2529	18 Oct.	34.5	44.0	38					fne br S		
2530	18 Oct.	34.6	45.7	42					fne br S		
2531	18 Oct.	34.5	47.2	45					fne br S		
2532	18 Oct.	34.7	48.7	49					fne br S		
2533	18 Oct.	35.9	45.8						br S		
2534	18 Oct.	35.8	47.7	34					fne br S		
35	19 Oct.	35.9	45.2	27					br S		
2536	19 Oct.	35.8	40.9	31					crs br S & brk Sh		
2537	19 Oct.	36.0	39.3	44					crs br S		
✓ 2538	19 Oct.	37.5	43.8	44					brk Sh ✓		
✓ 2539	19 Oct.	33°38.5'	77°45.1'	28					crs br S & brk Sh ✓		

Use more than one line per sample if necessary.

USCOMM-DC 37019-P66

CAM3-1
2-18-71

ATLANTIC MARINE CENTER

PROJECTION PARAMETERS

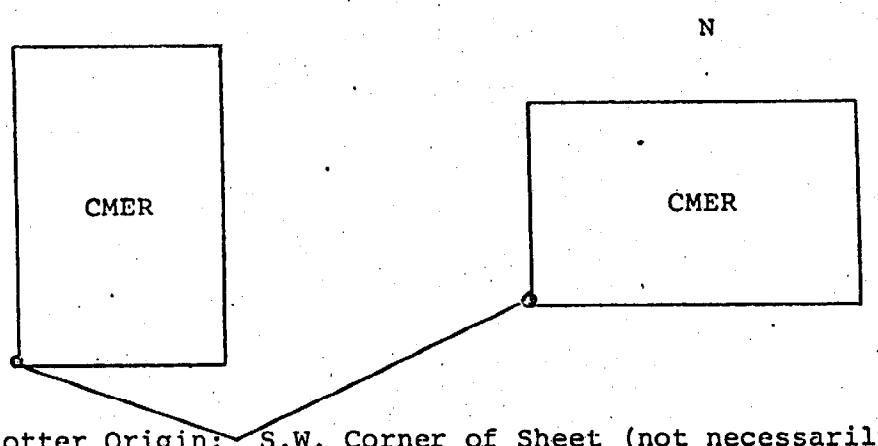
POLYCONIC OR MODIFIED TRANSVERSE MERCATOR

1. Project No. OPR-437
2. Reg. No. H-9399
3. Field No. PE-20-4-73
4. Requested By AMC
5. Ship or Office Verification Branch
6. Date Requiredat time of sounding overlay
7. Polyconic [X] Modified Transverse Mercator [ ]
8. Central Meridian of Projection 77 ° 42 ' 00 "
9. Survey Scale: 1:20,000
10. Size of Sheet (check one):

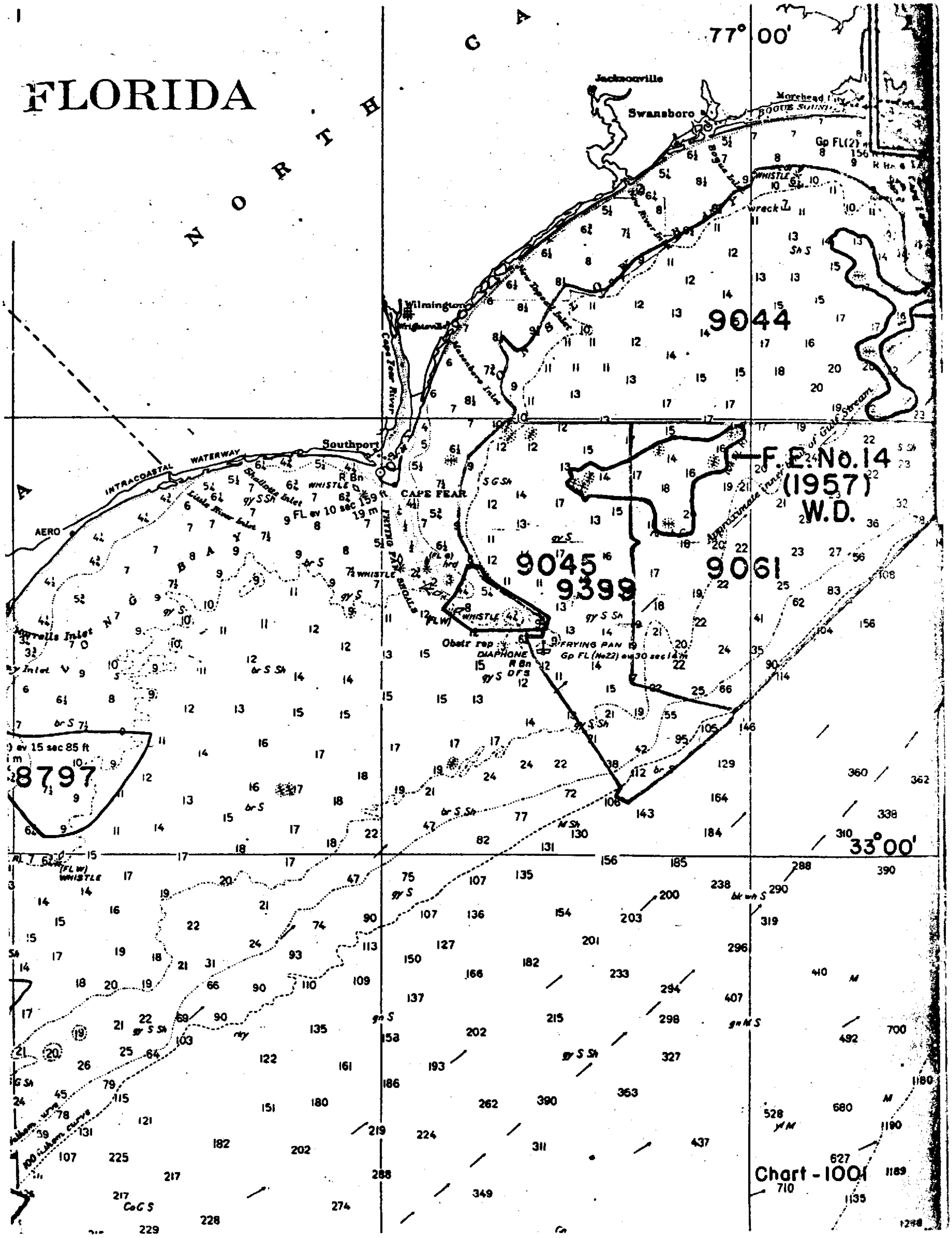
    36 x 54 [ ] 36 x 60 [X] Other [ ] Specify _____

11. Sheet Orientation (check one):

    NYX = 1 [ ] NYX = Ø [X]



12. Plotter Origin: S.W. Corner of Sheet (not necessarily a grid intersection)
    Latitude 33 ° 30 ' 30 "
    Longitude 77 ° 51 ' 00 "
13. G.P.'s of triangulation and/or signals attached [ ]
14. Material Desired: Tracing Paper [ ] Mylar [X]
    Smooth Sheet [ ] Other [X] Specify Sounding Overlay
15. Remarks: _____


FLORIDA
NORTH CA
77° 00'
Jacksonville
Swansboro
Morehead
Wilmington
Cape Fear River
Southport
INTRACOASTAL WATERWAY
AERO
CAPE FEAR
FRYING PAN SHOALS
FRYING PAN
DIAPHONE
9044
9045
9399
9061
8797
F.E. No.14
(1957)
W.D.
Approximate inner edge of Gulf Stream
33° 00'
100 fathom curve
Chart - 1001

FORM C&GS-8352
(3-25-63)

NAUTICAL CHART DIVISION

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9399

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.
1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
1236	1/21/75	Allen L. Daugh	~~Full~~ Part ~~Before~~ After Verification Review Inspection Signed Via (Before)
	3/24/75	DR Costa	Drawing No.
1110	3/24/75	DR Costa	~~Full~~ Part Before ~~After~~ Verification Review Inspection Signed Via
			Drawing No. ~~No~~ Crit. Corrs.
1601	3/24/75	DR Costa	~~Full~~ Part Before ~~After~~ Verification Review Inspection Signed Via
			Drawing No. No Crit. Corrs.
11536	1st May 79	Alex. Radichevich	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No.
11520	10/21/82	Mark Pruesse	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 41 Fully appld thru Chart 11536
11009	2-17-83	B. Fernandez	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 49 Fully appl through Cht 11520
411	9-21-90	Dan Black	Full ~~Part Before~~ After Verification Review Inspection Signed Via
			Drawing No. 62, EXAM, ~~NC~~ APPLIED THRU CHT. 11009 ~~#49~~.
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.
			Full Part Before After Verification Review Inspection Signed Via
			Drawing No.