

# 9144

Diag. Cht. No. 1001-3, 1240-3, & 1241-2

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. .... WH-40-1-73 ..  
Office No. .... H-9144 ..

### LOCALITY

State ..... GEORGIA ..  
General Locality .... OFF. SAVANNAH ..  
Locality ... TYBEE ROADS. TO. SAPELO SOUND ..

19 73-74

CHIEF OF PARTY

J. G. Carlen & R. A. Trauschke

### LIBRARY & ARCHIVES

DATE ..... 3/21/75 ..

9144

**HYDROGRAPHIC TITLE SHEET**

H-9144

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.

WH-40-1-73<sup>3</sup>

State Georgia

General locality off Savannah Georgia Coast

Locality Tybee Roads to Sapelo Sound  
Vicinity of Savannah Light

Scale 1:40,000

Date of survey 22 Mar - 2 May 1974  
22 Aug - 8 Sep 73

Instructions dated April 11, 1973

Project No. OPR-436-73

Vessel Ship WHITING & Launches WH-1, WH-2

*see other title sheet*

Chief of party CDR Jeffrey G. Carlen - CDR R.A. FENOSAKE

Surveyed by CDR J. G. Carlen, LCDR Veselenak, LT Theberge, LTJG Meyers  
LTJG Decker, ENS Polvi, ENS McMillan, ENS Gastaldo, CST Hill

Soundings taken by echo sounder, ~~hand depth~~

Graphic record scaled by Ship's Personnel

Graphic record checked by Ship's Personnel

Protracted by \_\_\_\_\_ Automated plot by WHITING System  
*ARC - Calcamp 618*

Soundings penciled by WHITING Shipboard System

Soundings in ~~fathoms~~ feet at MLW ~~MKKK~~

REMARKS: Time meridian of this survey was 0°.

LAUNCH WH-I and WH-II, Serial Numbers 1206 and 1208, are new  
to the WHITING having been placed on board in April of 1973.

*Applied to title 4/17/75*  
*CCB*

80° 41' 00"

80° 40' 30"

80° 40' 00"

32° 05' 00"

32° 05' 00"

PRE-SURVEY REVIEW ITEM  
WH-240 H-9144 (WH 40-1-73)

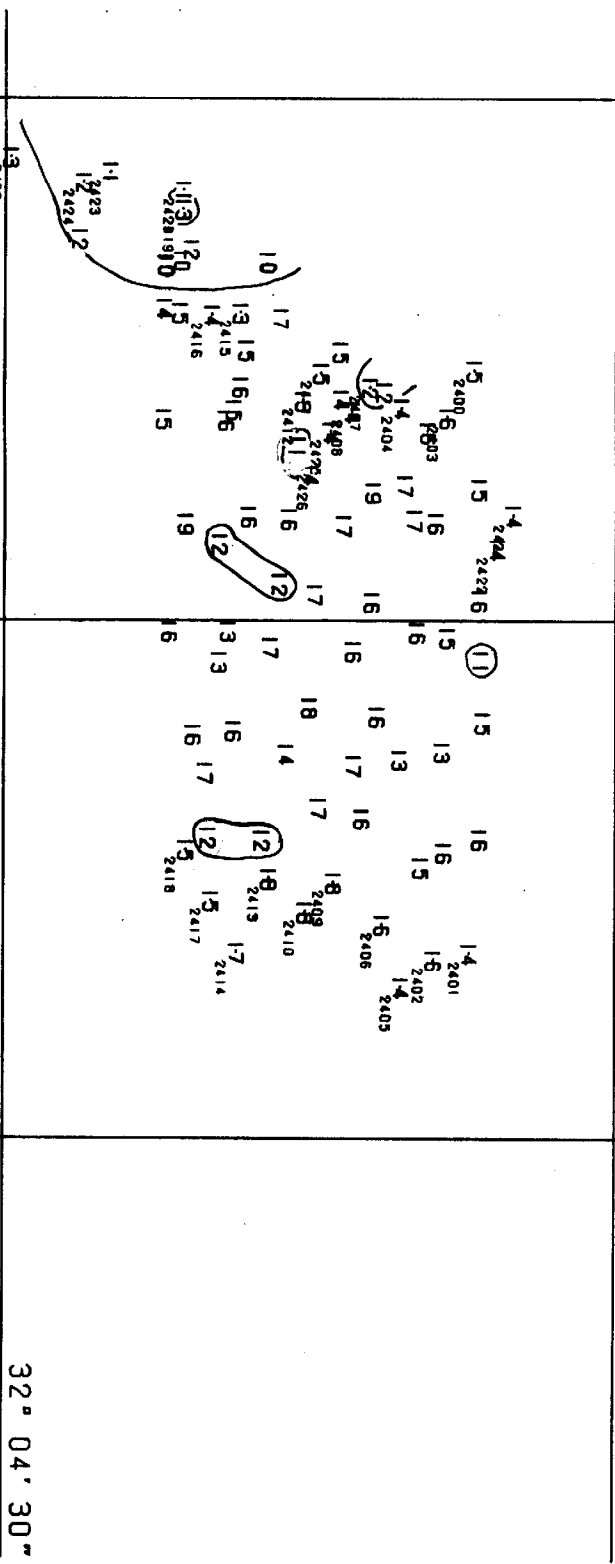
POSITION NO'S 2400 - 2427

SCALE 1:10,000

80° 41' 00"  
L 80° 41' 00"

80° 40' 30"

80° 40' 00"



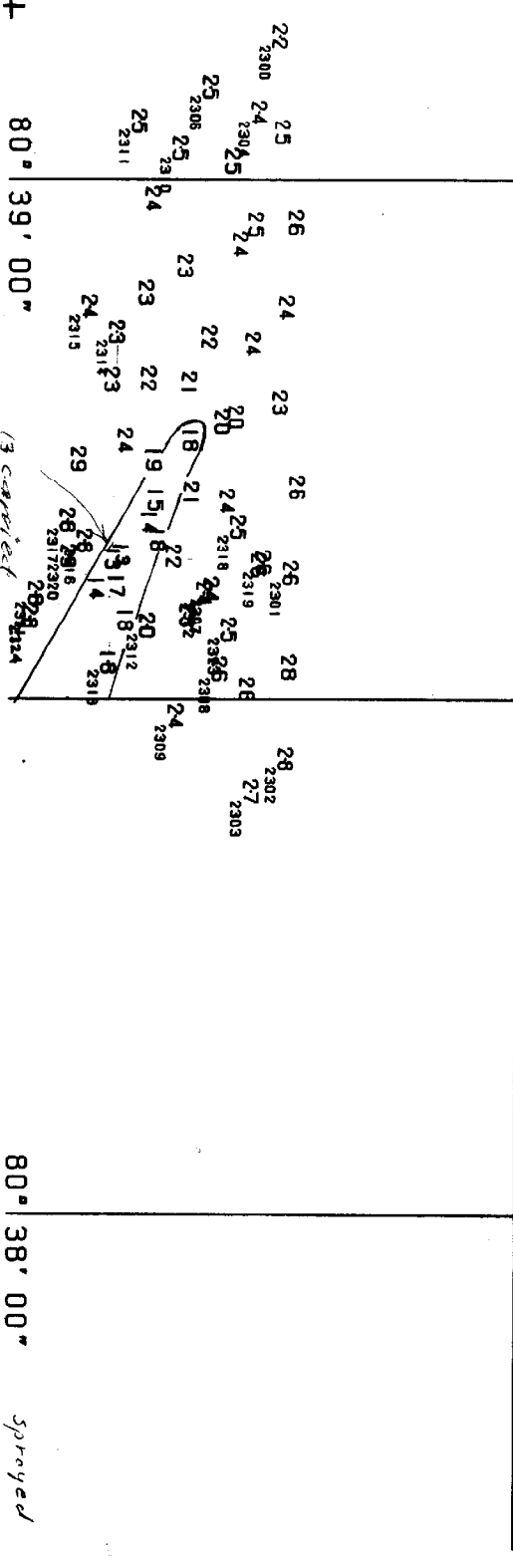
32° 04' 30"

1/22/75  
sprayed

80° 39' 00"      80° 38' 30"      80° 38' 00"      32° 05' 00"

32° 04' 30"      32° 04' 30"

PRE-SURVEY REVIEW ITEM 7  
 H-9144 (WH40-1-73)  
 POSITION NO'S 2300 - 2324  
 SCALE 1:10,000



*13 corrected  
 returned to main sheet*

*Sprayed  
 1/22/75*

HYDROGRAPHIC TITLE SHEET

H-9144

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.

WH-40-1-74/3

State Georgia

General locality Georgia Coast OFF SAVANNAH

Locality Vicinity of Savannah Light THREE ROADS TO SABLE SOUND

Scale 1:40,000 Date of survey 22 March - 2 May 1974

Instructions dated 29 Oct & 10 Dec 1973 Project No. OPR-436-74

Vessel Ship WHITING

Chief of party CDR Robert A. Trauschke

Surveyed by CDR R. A. Trauschke, LCDR Daniels, LT Theberge, LT Meyers, ENS Gastaldo, ENS Perrin, ENS Gullekson, ENS Bennett

Soundings taken by echo sounder, ~~hand lead, etc.~~

Graphic record scaled by Ship's personnel

Graphic record checked by Ship's personnel

Protracted by \_\_\_\_\_ Automated plot by ANC - Calcamp 618  
~~WHITING System~~

Soundings penciled by WHITING Shipboard System

Soundings in ~~fathoms~~ feet at MLW ~~XXXXX~~

REMARKS: Time meridian of this survey was 0°.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SEA-FIX SPECIFICATIONS

Mode of Operation ..... Hyperbolic  
Frequency ..... 1618.65 KHZ  
Type of Transmission ..... interrupted continuous wave  
time multiplex  
Trigger Transmission Frequency..1555.65 KHZ  
Switching rate ..... Five times per second with  
rise and fall of 2 milliseconds  
Radiated Power ..... 150 watts  
Receiver Sensitivity ..... 4 micro volts  
Maximum Receiver Speed ..... one lane per second  
Instrumental Accuracy ..... better than .01 lane  
Receiver Bandwidth ..... approximately 200 Hz between  
3 dB points  
Power Supply ..... 22-28 VDC

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ATLANTIC MARINE CENTER  
APPROVAL SHEET  
FOR  
AUTOMATED SURVEY H- 9144

- 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 ~~been~~ made. A new final sounding printout has ~~been~~ made.

Date: March 10, 1975

Signed:

William L. Jones

Title:

William L. Jones  
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: March 10, 1975

Signed:

C. Dale North, Jr.

Title:

C. Dale North, Jr., LCDR, NOAA  
Chief, Processing Division

Reg. No. H-9144

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 REQ'D \_\_\_\_\_ INITIALS \_\_\_\_\_

REMARKS:

Reg. No. \_\_\_\_\_

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 9/23/87 TIME REQ'D \_\_\_\_\_ INITIALS JHC

REMARKS:



## TIDE NOTE

Predicted tides for this survey area were taken from the daily predictions of Savannah River entrance, Georgia, 1974, with appropriate differences applied for Savannah Light. The WHITING was furnished the following differences from Tides Branch for Savannah Light: -30 minutes for high and low, no correctors for height, and a .95 ratio. The following differences were used: -30 minutes for high and low, +0.0 feet for low, -0.4 feet for high, and a ratio of 1.0. The correctors for height were used because our software did not allow ratios with significant digits in the hundredths place.

The geographic locations for the tide gages encompassed in the survey area are as follows:

<u>Name</u>	<u>Latitude</u>	<u>Longitude</u>
Ft. Pulaski, GA	32° 02.'ON	80° 54.'1W
Savannah Beach, GA	32° 00.'3N	80° 50.'5W
Savannah Light, GA	31° 57.'ON	80° 40.'5W
St. Simons, GA	31° 08.'ON	81° 23.'7W

The standard tide gage at Fort Pulaski, Georgia (Savannah River entrance) served as the basic control gage. Data from all stations except Savannah Light was sent directly to Tides Branch, Rockville Office C-331. Hourly heights from Marigrams for Savannah Light Bubbler gage were scanned by WHITING personnel and sent to C-331 along with ADR tapes for Savannah Light.

A copy of the letter to Chief, Tides Branch, C-331 is included in this report.

ATLANTIC MARINE CENTER  
VERIFICATION OF SMOOTH TIDES

SURVEY H-9144

PLANE OF REFERENCE MLW OR MLLW  
TIME MERIDIAN 000  
HEIGHT DATUM ON STAFFS 1. 1.6 2. 3.0 3.     

<u>TIDE STATIONS</u>	<u>POSITION</u>	<u>TYPE</u> <u>GAGE</u>	<u>TIME CORR.</u>		<u>HEIGHT CORR. *</u>	
			<u>H.W.</u>	<u>L.W.</u>	<u>H.W.</u>	<u>L.W.</u>

1. Savannah Beach  $\emptyset$  32 00' 20" bubbler  
Y 80 50' 30"

2.  $\emptyset$   
Y

3.  $\emptyset$   
Y

HOURLY HRIGHTS  FROM ROCKVILLE OFFICE  
 FROM FIELD MARIGRAMS

VERIFIED BY:             

TIDE ZONING  NOT APPLICABLE  
 BY COMPUTER  
 FROM TWO OR MORE GAGES

LIMITS AND DESCRIPTION OF ZONING METHODS

Zoning direct on Savannah Beach Gage.

TIDE CORRECTIONS COMPILED  BY COMPUTER  
 MANUALLY

VERIFIED BY: R. Cram  
VERIFIED BY:             

HEIGHT OF MHW ABOVE PLANE OF REFERENCE 6.6

TIDE CORRECTIONS VERIFIED ON SOUNDING PRINTOUT BY: R. Cram

DATE OF VERIFICATION 16 Sept. 1974

\*OR RATIO

EXAMINED & APPROVED

8/28/74

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): Savannah Beach

Period: March 22 - May 2, 1974

HYDROGRAPHIC SHEET: H9144

OPR: 436/437

Locality: Off Coast of Georgia

Plane of reference (mean ~~lower~~ low water): 3.0 ft.

Height of Mean High Water above Plane of Reference is 6.6 ft.

Remarks: Zone direct. ←

*James R. Hubbard*  
for Chief, Oceanographic Div.

CAM3-1  
1/31/74

ATLANTIC MARINE CENTER

PROJECTION PARAMETERS

POLYCONIC OR MODIFIED TRANSVERSE MERCATOR

1. Project No. OPR-436 4. Requested By Verification Branch  
2. Reg. No. H-9144 5. Ship or Office AMC  
3. Field No. WH-40-1-73 6. Date Required ASAP

7. Polyconic  Modified Transverse Mercator

8. Central Meridian of Projection 80 ° 48 ' 12 "

9. Survey Scale: 1: 40,000

10. Size of Sheet (check one):

36 x 54  36 x 60  Other  Specify \_\_\_\_\_

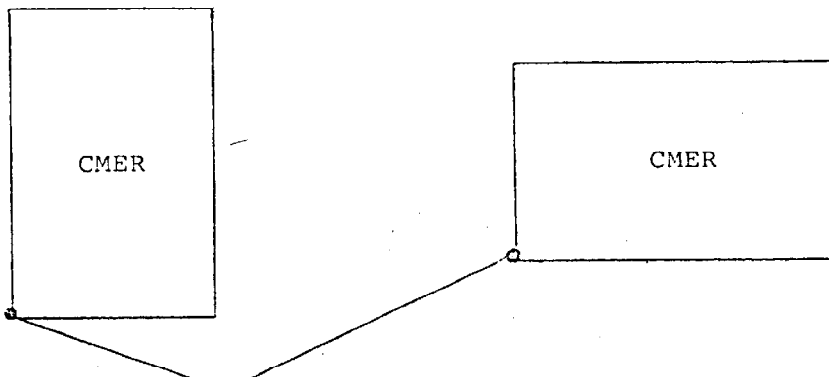
11. Sheet Orientation (check one):

NYX = 1

NYX = 0

N

N



12. Plotter Origin: S.W. Corner of Sheet (not necessarily a grid intersection)  
Latitude 31 ° 35 ' 00 "  
Longitude 80 ° 59 ' 00 "

13. G.P.'s of triangulation and/or signals attached

14. Material Desired: Tracing Paper  Mylar

Smooth Sheet  Other  Specify \_\_\_\_\_

15. Remarks: \_\_\_\_\_

ELECTRONIC CONTROL PARAMETERS

1 of 2

1. Project # OPR-436    2. Reg. # H-9144    3. Field # WH-40-1-73  
 4. Type of Control: Sea Fix (Hi-Fix, Raydist, EPI, etc.)  
 5. Frequency 1618.65 kHz (for conversion of electronic lanes to meters)  
 6. Mode of Operation (check one):

Range-Range

Range-Visual

Range One (R<sub>1</sub>)  
 Station I.D. \_\_\_\_\_  
 Range Two (R<sub>2</sub>)  
 Station I.D. \_\_\_\_\_

Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "  
 Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "  
 Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "  
 Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "

Hyperbolic (3-station)

Hyper-Visual

Slave One  
 Station I.D. Mayport, Fla.  
 Master  
 Station I.D. Harris Neck, Ga.  
 Slave Two  
 Station I.D. McKee, 1973

Lat. 30 ° 23 ' 40.366 "  
 Long. 81 ° 23 ' 41.056 "  
 Lat. 31 ° 37 ' 19.524 "  
 Long. 81 ° 15 ' 56.407 "  
 Lat. 32 ° 36 ' 29.611 "  
 Long. 80 ° 08 ' 30.713 "

7. Location of Survey:

Range-Range  Imagine an observer is standing at R<sub>1</sub> Station and looking directly at R<sub>2</sub> (check one):

Survey area is to observer's Right  A=β

Survey area is to observer's Left  A=1

Hyperbolic  Looking from survey area toward Master Station:

Slave One must be to observer's Left;

Slave Two must be to observer's Right.

8.  This form is submitted as an aid in preparing a boat sheet.  
 This form applies to all data on this survey.  
 This form applies to part of the data on this survey.

Vessel EDP #	From		To		Position Numbers (inclusive)	
	Time	Day	Time	Day		
<u>2930</u>	<u>170659</u>	<u>234</u>	<u>175711</u>	<u>256</u>	<u>00001</u>	to <u>09407</u>
<u>2931</u>	<u>125920</u>	<u>249</u>	<u>143800</u>	<u>249</u>	<u>04119</u>	to <u>04191</u>
<u>2932</u>	<u>182130</u>	<u>235</u>	<u>145442</u>	<u>250</u>	<u>02000</u>	to <u>09401</u>

9. Remarks: This data pertains to 1973 surveyed area only

ELECTRONIC CONTROL PARAMETERS

2 of 2

1. Project # OPR-436    2. Reg. # H-9144    3. Field # WH-40-1-73  
 4. Type of Control: Sea Fix (Hi-Fix, Raydist, EPI, etc.)  
 5. Frequency 1618.65 kHz (for conversion of electronic lanes to meters)  
 6. Mode of Operation (check one):

Range-Range

Range-Visual

Range One (R<sub>1</sub>)  
 Station I.D. \_\_\_\_\_  
 Range Two (R<sub>2</sub>)  
 Station I.D. \_\_\_\_\_

Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "  
 Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "  
 Lat. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "  
 Long. \_\_\_\_\_ ° \_\_\_\_\_ ' \_\_\_\_\_ "

Hyperbolic (3-station)

Hyper-Visual

Slave One  
 Station I.D. Mayport, Fla.  
 Master  
 Station I.D. Simon, 1974  
 Slave Two  
 Station I.D. Radd 2, 1974

Lat. 30 ° 23 ' 40.366 "  
 Long. 81 ° 23 ' 41.056 "  
 Lat. 31 ° 08 ' 27.12 "  
 Long. 81 ° 22 ' 33.11 "  
 Lat. 32 ° 01 ' 12.30 "  
 Long. 80 ° 50 ' 35.22 "

7. Location of Survey:

Range-Range  Imagine an observer is standing at R<sub>1</sub> Station and looking directly at R<sub>2</sub> (check one):

Survey area is to observer's Right  A=β

Survey area is to observer's Left  A=1

Hyperbolic  Looking from survey area toward Master Station:

Slave One must be to observer's Left;

Slave Two must be to observer's Right.

8.  This form is submitted as an aid in preparing a boat sheet.

This form applies to all data on this survey.

This form applies to part of the data on this survey.

Vessel EDP #	From		To		Position Numbers (inclusive)	
	Time	Day	Time	Day		
<u>2930</u>	<u>215731</u>	<u>081</u>	<u>091956</u>	<u>122</u>	<u>00068</u>	to <u>04282</u>
_____	_____	_____	_____	_____	_____	to _____
_____	_____	_____	_____	_____	_____	to _____

9. Remarks: This data pertains to 1974 surveyed area only.

NOAA SHIP WHITING  
CORRECTORS APPLIED FOR ELECTRONIC CONTROL

WH-40-1-73 H-9144

Day	Time	WHITING	LAUNCH I	LAUNCH II
234	170659	-2.08, 0.08		
234	185356	-0.08, 0.08		
235	141201	-0.08, 0.12		
240	133150	-0.06, 0.10		
241	131611	-0.06, 0.14		
248	145700	-0.07, 0.16		
251	115640	-0.07, 1.12		
251	133846	-0.05, 0.13		
256	155539	0.00, 0.00		
249	125920		-0.07, -0.95	
235	182130			-0.11, 0.06
236	134247			-0.11, 0.09
238	132422			-0.10, 0.04
239	183114			-0.10, 0.05
240	132719			-0.09, 0.05
240	142115			0.00, 0.00

ITEM 7, WH #122, C&GS 571

11 ft. sounding  
Lat. 32°04'.24N  
Long. 080°38.80'W

This item was searched for on Julian Day 239 by WH-2. An 11 ft. sounding was found to the southeast of the given position at Lat. 32°04'.17N, 080°38'.63W. The hydrographer recommends charting the 11 ft. sounding at position determined by the survey. <sup>13</sup> *from 2313-2314 vessel 2932* **CONCUR**

ITEM , WH #240, C&GS 571

9 ft. sounding in 15 ft. of water  
Lat. 32°04'.75N  
Long. 080°40'.5W

This item was searched for on Julian Day 240 by WH-2. An ~~eight~~ eight foot sounding was found just west of the given position at Lat. 32°04'.70N, Long. 080°40'.83W. The hydrographer recommends charting the eight foot sounding at the position determined by the survey. *Shoalest depth in the area ~~is an 8-ft sounding located at lat. 32°04'.58', long. 80°40'.83'~~*

ITEM BB, WH #138, C&GS 440

Obstruction covered by 23 feet of water, position approximate  
Lat. 31°59'.1N  
Long. 080°43'.0W

This item was searched for on Julian Day 249 by WH-1. The area was developed by 17 lines with fifty meter spacing. No sign of the obstruction was found. The hydrographer recommends verification by wire drag. *This has already been removed from Chart 440, 40th Ed JUN 14/75 per*

ITEM 9, WH #139, C&GS 440

Submerged wreck  
Position approximate  
Lat. 31°58".0N  
Long. 080°42.5'W

No specific hydrographic investigation was required. Fathograms in the area showed no suspicious traces. Hydrographer recommends verification by wire drag. *This has already been removed from Chart 440, 40th Ed JUN 14/75 per CL*

ITEM AA, WH #141, C&GS 440

Proposed Fish Haven  
Lat. 31°56'.9N  
Long. 080°42'.2W

No specific hydrographic investigation was required. Fathograms were searched for evidence of an artificial reef. None was found, so the hydrographer recommends no notation on the chart. *There is no notation on Chart 440, 40th Ed JUN 14/75*



A. PROJECT

This survey was accomplished in accordance with Project Instructions OPR-436-WH-74 dated 29 October 1973 and a change dated 10 December 1973. ✓

B. AREA SURVEYED

The boatsheet, Registry Number H-9144, is located in the vicinity of Savannah Light off the Georgia Coast. This survey, Field Number WH-40-1-74, completes the hydrography of Sheet H-9144 which was begun last year, Field Number WH-40-1-73. ✓

Approximate survey limits:

	LATITUDE (NORTH)		LONGITUDE (WEST)	
	DEGREES	MINUTES	DEGREES	MINUTES
1	31	55.2	80	49.4
2	31	55.2	80	43.2
3	31	54.8	80	43.2
4	31	54.8	80	38.4
5	31	45.8	80	38.4
6	31	45.8	80	42.2
7	31	36.2	80	42.2
8	31	36.2	80	58.0
9	31	45.0	80	58.0

The survey is off-shore and not bounded by coast line. Work on H-9144 commenced on 22 March 1974 and ended on 2 May 1974 (Julian Days 81-122). ✓

The survey area is bounded on the north by prior surveys HSL 20-2-71 (H-9197) and WH-40-1-73 (H-9144). The survey area is bounded on the east by prior surveys WH-40-2-73 (H-9145) and ~~PE 66-1-72 (H-9299)~~. The southern boundary of the survey area junctions with WH-40-2-74 which has not been completed and consequently no junction soundings from this survey are plotted on the boatsheet. The western boundary of the sheet does not junction with any current survey. Also junctions with H9460, H9461, H9462, (1974) all on the western edge and H9465 (1974) on the south. ✓

C. SOUNDING VESSELS

The hydrography for this survey was accomplished by the NOAA Ship WHITING. ✓

D. SOUNDING EQUIPMENT

The WHITING was equipped with a Ross Depth Recorder, Model 5000. Two Ross Recorders were used, Serial Numbers 1049 and ✓

1055. Depths ranging from about 25 feet to 70 feet were recorded during survey operations.

Corrections to depths were determined by computing velocity corrections from TDC data. Leadline comparisons were made to validate velocity corrections. Detailed information is included in the "Fathometer and Velocity Corrections Report" in Appendix II of this report.

#### E. SMOOTH SHEET

The smooth sheet will be plotted on the computer system at the Atlantic Marine Center, Norfolk, Virginia. The boat-sheet discussed in this report consists of two plotter sheets made on the WHITING's Cal Comp Flat Bed Plotter, WH-40-1N-743 and WH-40-1S-743 and two overlay sheets for splits, developments, crosslines, and bottom samples. Description of the electronic control and calibration data is included in Appendix I of this report. The stability and accuracy of the control was very good as indicated by the standard deviations of the calibration data.

#### F. CONTROL

The only method of control utilized during this survey was Sea-Fix in the hyperbolic mode. See Appendix I, "Electronic Control Report" for details on Sea-Fix and the locations of the transmitting stations.

#### G. SHORELINE

There is no shoreline within the bounds of the survey area.

#### H. CROSSLINES

A total of 207 miles of crosslines were run; this is about 8.6% of the total main scheme hydrography. Most crosslines were between zero and two feet; however, a small percentage were between three and four feet. The discrepancies usually occurred in areas where the gradient of the depth was large. Sand ridges within the survey area are the cause of occasional large depth gradients.

The remaining discrepancies exist because some of the hydrography including crosslines were done in high seas. *Fathograms were re-scanned and a mean was obtained; crosslines check within one ft.*

#### I. JUNCTIONS

Junction depths from all junction surveys mentioned in Part B are plotted on the Boatsheet WH-40-1-743. All junctions were good. Soundings from HSL-20-2-71 and WH-40-1-73 were taken from boatsheets and did not have

velocity and final TRA corrections added. Because the Boatsheet WH-40-1-74<sup>3</sup> does not have velocity and final TRA corrections added, the junction soundings of HSL-20-2-71 and WH-40-1-73 differed by less than two feet. However, the junction soundings from WH-40-2-73 and PE-80-1-72 were taken from smooth sheets with all corrections applied. The final TRA correction that is on the TC/TI tape is +1.2 feet; the velocity corrector for the depths of the junction with WH-40-1-73 and PE-80-1-72 is between +2.0 and +2.5 feet. These final corrections (TRA and velocity, see Appendix II for details) were not applied to the soundings on the Boatsheet WH-40-1-74<sup>3</sup>; consequently, one would expect the soundings of WH-40-1-74<sup>3</sup> to be between 3.0 and 4.0 feet shallower than the junction soundings on WH-40-2-73 and PE-80-1-72. This is indeed the case; however, there are occasional discrepancies of an additional couple of feet with PE-80-1-72 because that survey was sounded in fathoms and WH-40-1-74<sup>3</sup> was sounded in feet.

#### J. COMPARISON WITH PRIOR SURVEYS

Presurvey review items within the survey area are listed ✓ on the following page. The number of the item refers to the number next to the review item circled on Charts 440 and 1241 on the following two pages. In addition, the number and location of the presurvey review items are plotted on the overlay sheets of WH-40-1-74<sup>3</sup>. Specific investigation was not required for any of the items. In reviewing items final corrections were applied by inspection to uncorrected soundings on the boatsheet. A more complete comparison can be made after the smooth sheet is plotted.

✓ ~~Presurvey review item C&GS 440, #010, 31-foot charted sounding; not found. 33-foot sounding found .25 miles east. Recommended charting shallowest sounding in area.~~ ✓  
*Present Survey 1241*

✓ ~~Presurvey review item, C&GS 440, #011, 36-foot charted sounding; not found. 37-foot soundings found .3 miles east. Recommend charting shallowest sounding in area.~~  
*Present Survey*

✓ Presurvey review item, C&GS 1241, #014 & 015 (labeled LL ✓ on Presurvey Review) is a fishing reef with two buoys at the locations 014 and 015. Notice to Mariners, No. 37 of 1973, Paragraph 3401 (copy following presurvey review sheets) says that H-North has been replaced by an orange and white banded Nun buoy named "KC" and H-South has been discontinued. "KC" was found as described. Two detached positions were taken on the buoy: one on Julian Day 084, Position Number 847; the other on Julian Day 094, Position Number 2813. The position determined is Latitude 31° 50.77' N, Longitude 80° 46.81' W. Recommend charting "KC" in the position determined. In the vicinity of the buoy

~~PRE-SURVEY REVIEW ITEMS~~

FOR

WH-40-1-~~74~~ (H-9144)

73

<u>NUMBER</u>	<u>LATITUDE (NORTH)</u>			<u>LONGITUDE (WEST)</u>		
	<u>DEGREES</u>	<u>MIN.</u>	<u>SEC.</u>	<u>DEGREES</u>	<u>MIN.</u>	<u>SEC.</u>
✓010	31	52	24	080	48	35
✓011	31	52	06	080	44	09
✓014	31	50	48	080	46	42
✓015	31	50	00	080	46	44
✓018	31	49	06	080	54	24
✓019	31	47	41	080	53	15
✓020	31	47	55	080	48	16
✓021	31	47	55	080	46	32
✓022	31	45	42	080	55	07
✓023	31	45	29	080	42	42
✓024	31	44	44	080	54	14
✓025	31	44	07	080	43	41
✓029	31	42	57	080	57	56
✓030	31	42	18	080	56	49
✓034	31	40	24	080	53	19
✓036	31	38	35	080	56	23
✓037	31	38	27	080	55	10
✓038	31	38	39	080	52	33
✓042	31	36	27	080	50	06
✓043	31	36	15	080	45	26
✓044	31	36	19	080	43	10
✓062	31	41	54	080	58	00

(Position Numbers 847 & 2813) stray traces were found on the fathogram; however, a large obstruction is not indicated and certainly not to the extent that is indicated on C&GS 1241. Recommend deleting the large obstruction indicated on the chart and indicate a fish haven in the immediate vicinity of "KC." *Recommend the fish haven to be retained on the chart. The charted buoy adequately marks the feature intended.*  
Presurvey review item, C&GS 1241, #018, 36-foot sounding from H-3983 and 39-foot charted sounding. 37-foot sounding found. 0.2 mile north a 36-foot sounding was found. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item, C&GS 1241, #019, 34-foot sounding from H-3983 and 36-foot charted sounding. 35-foot sounding found in area. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item C&GS 1241, #020, 36-foot charted sounding. 36-foot sounding found .15 miles east. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item, C&GS 1241, #021, 34-foot charted sounding. 37-foot sounding found. 35-foot sounding found .4 mile east. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item C&GS 1241, #022, 37-foot sounding from H-3983. 41-foot sounding found. 34-foot sounding found .3 miles southwest. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item C&GS 1241, #023 (labeled 20 on Presurvey Review) is an obstruction. No specific investigation was required. Fathograms in the area were scanned for suspicious traces; none were found. Recommend verification by wire drag. *The obstruction reported charted at lat. 31°45.5', long 80°42.15' from NM 12 of 1942 was not verified or disproved on the present survey and should be retained on chart.*  
Presurvey review item C&GS 1241, #024, 36-foot charted sounding. Sounding was found. Recommend sounding remain charted. CONCUR

Presurvey review item C&GS 1241, #025, 44-foot sounding from H-3983; not found. A 43-foot sounding was found .3 miles north. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item C&GS 1241, #029, 28-foot charted sounding, 30-foot sounding found. 29-foot sounding found .1 mile west. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item C&GS 1241, #030, 30-foot charted sounding. 32-foot sounding found. 30-foot sounding .1 mile southwest. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

Presurvey review item C&GS 1241, #034, 39-foot sounding from H-3983 and 42-foot charted sounding. 42-foot sounding found. 40-foot sounding found .1 mile south. Recommend charting shoalest sounding in area. *Present Survey* CONCUR

~~Presurvey review~~ item C&GS 1241, #036, 44-foot sounding from H-3983 and 46-foot charted sounding. 46-foot sounding found. 43-foot sounding found .1 southeast. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

~~Presurvey review~~ item C&GS 1241, #037, 38-foot charted sounding. 39-foot sounding found. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

~~Presurvey review~~ item C&GS 1241, #038, 47-foot sounding from H-3983. 48-foot sounding found. 46-foot sounding found .1 mile south. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

~~Presurvey review~~ item C&GS 1241, #042, 50-foot sounding from H-3983. 51-foot sounding found. 50-foot sounding found .1 mile west. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

~~Presurvey review~~ item C&GS 1241, #043, 51-foot sounding from H-3983. 53-foot sounding found. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

~~Presurvey review~~ item C&GS 1241, #044, 55-foot sounding from H-3983. 55-foot sounding found. There are a number of 55-foot soundings in the area. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

~~Presurvey review~~ item C&GS 1241, #062, 30-foot charted sounding. 34-foot sounding found. 29-foot sounding found .15 mile east. Recommend charting ~~shoalest~~ <sup>present survey</sup> sounding in area. CONCUR

#### K. COMPARISON WITH THE CHART

Comparison was made with C&GS 1241, March 1974 edition. A number of comparisons were made in Part J. Numerous other ✓ comparisons were made. Comparisons usually ranged from 0 to 3 feet. When greater discrepancies existed, there usually existed a comparable depth within a few hundred meters. This would indicate that there has been some movement of the sand ridges since the last survey, H-3983 of 1916 and 1917, or there was some positioning error in the early surveys or both. However, in the areas of Latitude 31° 37'N, Longitude 80° 48.3'W, and Latitude 31° 36.5'N, Longitude 80° 47.4'W, the present survey indicates depths about five feet shoaler than C&GS 1241. ✓

A small section of the survey extends beyond the east limit of C&GS 1241. However, no comparisons were made with C&GS 1111 for the following reasons: only <sup>two</sup> ~~the~~ charted depths on 1111 lie within the survey area not included in 1241, and the scale of 1111 is 1:449,659 which would prohibit accurate positioning of the charted soundings on the boatsheet.

L. ADEQUACY OF THE SURVEY

This survey is complete and adequate and should supersede all prior surveys. ✓

M. AIDS TO NAVIGATION

The survey includes one aid to navigation, the privately maintained fish haven buoy "KC." For its location and description, see Part J., Items #014 and 015. ✓

N. STATISTICS

Positions	4250
L.N.M. Sounding Line	2747
S.N.M. Surveyed	246.2
Bottom Samples	9
	L.N.M.
Main Scheme Hydrography	2400
Cross Line	207
Splits and Developments	140

O. MISCELLANEOUS

All bottom samples taken indicate that the bottom is sand. However, throughout the survey area there exist mounds, holes, and trenches. These features are very predominate south of Latitude 31° 44'. The magnitude of the depth gradient is frequently as much as 10 feet per 200 meters. Gradients of this magnitude indicate extensive scouring action by currents. The currents involved could be caused by tides, wind and seas, or water leaving St. Catherines Sound during times of high precipitation. ✓

On the western boundary, the line spacing in some areas was reduced to 100 meters to develop the area of the 30 foot curve. On Julian Day 096 it was determined that in using 200 meter line spacing, spacing frequently went to 230 meters or more. At this time we reduced the line spacing to 190 meters in an attempt to limit gaps created when the ship was off line; this plan proved to work well. On Julian Days 114-116 splits were run in the areas of greater than 230 meter line spacing. ✓

P. RECOMMENDATIONS

I recommend consideration be given to a changing bottom when trying to junction with prior surveys. ✓

Q. REFERENCES TO REPORTS

Appendix I: Electronic Control Report

Appendix II: Fathometer and Velocity Corrections Report

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ELECTRONIC CONTROL REPORT

OPR 436-7H

WH-40-1

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GENERAL EQUIPMENT DESCRIPTION:

The hyperbolic electronic positioning system used by the WHITING on OPR 436-74 is described as follows:

"The control network, known as Sea-Fix, is a small solid-state electronic positioning system manufactured by Decca Navigator and modified by Odom Offshore Surveys, Inc. The Sea-Fix chain consists of a master and two slave transmitters.

The master unit emits both a trigger and master pulse. Both slave receivers pick up these pulses; the first 'triggers' the electronic timer while the master pulse locks the receiver to the phase and frequency of the master signal. The locked receivers now contain a phase datum which is repeatedly kept in phase with the received master transmission. Each slave receiver injects a pulse into its associated transmitter and the resulting radiated signal is picked up by the user's receiver. The vessel's receiver 'sees' two sets of hyperbolae as it traverses the operations area; these are known as Pattern I and Pattern II. The position lines of each pattern are registered in lanes and hundredths on a digital type counter. One lane along the base line =  $1/2$  the wave length. At any instant a fix is provided by the observed readings on both counters.

Technically Sea-Fix operates on the same principles as HI-FIX with the exception that the repetition rate is five times greater and the gonios no longer drive the output. This increase in the repetition rate was made to reduce the possibility of lane jumps occurring. Further technical specifications can be found in Appendix I."\*

The locations of the stations were established by third-order methods. The southern slave antenna was placed at the existing location of the southern slave station during SCOPE operations of last year. The northern slave and master stations were located by AMC Photo Party 62. Appendix II shows the relative position of the stations and lists their geographic positions. As the uncompleted area of SCOPE lies off the coast of Georgia, the northern station was placed on Tybee Island and the southern station was placed at the Naval Base at Mayport, Florida.

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\*Electronic Control Report, NOAA Ship WHITING, OPR-436-73, written by Gary Decker

GENERAL EQUIPMENT DESCRIPTION (Continued):

Both the WHITING and the MT. MITCHELL used this net independently. The length of the net was 108 nautical miles this year as opposed to 155 nautical miles last year. The signal was generally more stable this year. This stability is attributed to the decreased size of the chain.

INSTALLATION:

The antenna was erected by personnel from the WHITING, MT. MITCHELL, and AMC. A multiplexor was used removing the need for a receiving antenna and reducing the area required for the stations. In an attempt to achieve greater range, one hundred-foot towers were used rather than eighty-foot towers as were used last year. Odom Offshores Industry, the company which modified the system, reported that they had experienced trouble loading their one hundred-foot towers as harmonic interference within the system had been difficult to eliminate. They also stated that no increase in range would result from a tower shorter than one hundred forty feet in height. Mr. Herbert Tittle, the WHITING electronic technician who performed all electronic installation, did successfully tune the entire net. It was, however, necessary to use the maximum adjustment of the loading coil to tune the southern slave station. The Sea-Fix net was subsequently checked by Mr. Franz Van de Kop of Odom Offshores Industry. No discrepancies were found and no difficulties with the signal have been experienced.

In view of the length of the operation, the towers were guyed with wire rope rather than nylon line.

The stations were periodically checked by a MT. MITCHELL electronic technician during hydrographic operations. As each station was located within one mile of a Coast Guard Station, communication from any station to either ship could be readily established.

CALIBRATIONS:

Calibrations were made by circling Savannah Light and observing the rates of predetermined bearings, for which the rates were computed, and comparing the time figures. (Pattern I crosses the light on bearings 029° true and 209° true at 46.94 lanes. Pattern II crosses the light on bearings 077° true and 257° true at 1102.30 lanes.) As the position of Savannah Light was subsequently questioned, we obtained fifteen sextant calibrations on Day 115 at both Tybee Roads and in the area between Savannah Light and Braddock Point.

CALIBRATIONS (Continued):

The correctors determined from Savannah Light on this day were:

Pattern I: +.19                      Pattern II: -.28

We had eight strong fixes (with inverse distances less than 6.44 meters) for which the average correctors were:

Pattern I: +.100 lanes              Pattern II: -.318 lanes  
Standard Deviation: .009              Standard Deviation: .012

The weaker fixes (with inverse distances from 10.15 meters to 24.70 meters) had the following average correctors:

Pattern I: +.099                      Pattern II: -.340  
Standard Deviation: .007              Standard Deviation: .078

The history of stability of the signal coupled with the variation between the correctors obtained from Savannah Light bearing observations and those obtained with sextants lead us to conclude that there is a discrepancy in the position of Savannah Light.

AMC has reported that Savannah Light will be relocated shortly. Should an error in the position of the light be discovered, AMC Processing Division will have to apply a correction to this data.

For the first two trips, corrector values, consisting of an average of all calibrations made during a single trip to the light, were applied immediately to the data as it was being collected. An average of all correctors for a given trip was applied to all data collected during that trip. On subsequent trips, the correctors used during actual data collection consisted of an average of all correctors determined during the current eleven-day period at sea. The last corrector for the period is thus an average of all correctors determined from calibrations during that period, and is the corrector applied with the editor program to the data from that period. By calibrating at random times during the day and by averaging our correctors in this fashion, we sought to eliminate the effect of any diurnal variation.

The greatest mean deviation of all our calibration correctors was .020 lane on Pattern I. The greatest standard deviation of this sample was .027 lane, also on Pattern I. See Appendix III.

CONCLUSION:

Coordination with Photo Party 62 during the initial reconnaissance for the sites permitted the WHITING personnel to handily choose sites which were both easily located and compatible with the electronic control requirements.

The use of available AMC personnel in the field, coupled with the accessibility of the working area to Norfolk, enabled the WHITING to construct the towers prior to sailing in spite of a temporarily reduced ship's force.

During the first three periods at sea the Sea-Fix System has been both stable and trouble free.

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#### A. PROJECT

This survey was accomplished in accordance with Project Instructions OPR-436-WH-73, dated April 11, 1973. ✓

#### B. AREA SURVEYED

The boatsheet, Registry Number H-9144, is located in the vicinity of Savannah Light. Survey limits are Latitude  $31^{\circ}54'.7N$  and  $32^{\circ}04'.5N$ , Longitude  $80^{\circ}38'.5W$  and  $80^{\circ}44'.1W$ . In addition, a pre-survey review item was surveyed at  $32^{\circ}04'.7N$  and  $80^{\circ}40'.8W$ . ✓

The survey area is bound on the north by contemporary survey WH-20-3-73, H-9314. The eastern boundary of the sheet junctions with contemporary surveys WH-40-2-73, H-9145, and PE-40-1-73, H-9198. The survey area is not bound on the south by any current survey but overlaps with prior survey H-3986, 1916-17, 1:80,000. The western boundary junctions with prior survey HSL-20-2-71, H-9197. ✓

Survey operations began on August 22, 1973 and ended September 8, 1973. ✓

#### C. SOUNDING VESSELS

The hydrography for this survey was accomplished by the NOAA Ship WHITING and the Launches, WH-1 and WH-2. The ship surveyed the area south of Latitude  $32^{\circ}02'.5N$  while WH-2 surveyed the area north of this latitude. WH-1 accomplished one pre-survey review item on Julian Day 249. The position numbers used are as follows: Ship (1-850), WH-1 (4119-4191), WH-2 (2000-2427). ✓

#### D. SOUNDING EQUIPMENT

WH-1 was equipped with a Raytheon Fathometer, Model DE-723D (Serial Number 37018), WH-2 and the WHITING were equipped with Ross Depth Recorders, Model 5000 (Serial Numbers 1049 and 1055 respectively.) No other sounding equipment was used. ✓

Echo sounder corrections for WH-2 and the ship were determined from velocity corrections computed from TDC data. Velocity corrections were verified by leadlines for the ship's recorder and by bar checks for WH-2's recorder. Corrections for WH-1 were determined by bar checks because a slight discrepancy existed between bar check corrections and TDC velocity corrections. For further description, see OPR-436-WH-73 "Velocity and Fathometer Corrections Report." Fathometer operators made frequent checks for proper initial settings. A-F scale comparisons and stylus checks were performed by the operators of the Raytheon Fathometer. Operators of the Ross Fathometers utilized their internal phase check. Both fathometers were initialized at zero feet. ✓

#### E. SMOOTH SHEET

The smooth sheet will be plotted on the computer system at the Atlantic Marine Center, Norfolk, Virginia. The boatsheet discussed in this report is WH-40-1N-73 with an overlay for crosslines and bottom samples. Calibration data and conclusions as to accuracy are in OPR-436-WH-73 "Electronic Control Report."

#### F. CONTROL

The only method of control utilized during this survey was Sea-Fix in the hyperbolic mode transmitting on a frequency of 1618.65 KHz. See "Electronic Control Report" for details of the Sea-Fix positioning system's characteristics and reliability as control for hydrographic surveying. Stations were located by third order methods by ship's personnel and a sub-unit of Photo Party 62.

The stations are located at:

SLAVE I	Mayport, Florida	30°23'40".366	81°23'41".056
MASTER	Harris Neck, Georgia	31°37'19".524	81°15'56".407
SLAVE II	Seabrook Island, S.C.	32°36'29".611	80°08'30".713

#### G. SHORELINE

There is no shoreline within the bounds of the survey area.

#### H. CROSSLINES

A total of thirty-one nautical miles of crosslines comprised about eight per cent of the main scheme hydrography plotted on WH-40-1-73. Most crossings were between zero to two feet; however, a small percentage were between three to four feet. However, due to the large number of sand ridges, the few three to four feet crossings are not significant.

#### I. JUNCTIONS

Junction soundings with all junction surveys mentioned in Part B were very good; most junction soundings differed by only zero to two feet and very infrequently three feet due to sand ridges. No comparison was made with H-3986, 1916-17, 1:80,000 because the survey is outdated. However, comparison was made with Chart 1240 (See Part K.)

#### J. COMPARISON WITH PRIOR SURVEYS

The pre-survey review items that were reviewed in this survey area are shown in red on the following two pages. Each is discussed below:

K. COMPARISON WITH THE CHART

Comparison with Chart 1240, January 1, 1972, usually ranged ✓  
from 0 to 4 feet.

*See Review Report "Comparison with Prior Surveys"*

✓ Pre-survey review Item 7 shifted southeast about 400 meters  
from the position on the chart. ~~In the southeast corner of  
WH 40 1 73 the survey indicates shoaler water from that charted  
by about six feet (approximate position 31°56'.0N, 080°39'.5W).~~  
The two pre-survey review items, BB and 9, are charted on  
C&GS 1240 but were not found (see Part J for recommendations).  
No new dangers to navigation were found. ~~NOT CHARTED ON THE CHART~~

~~12/10/72 Ed 1000 23/14~~

L. ADEQUACY OF THE SURVEY

This survey is complete and adequate and should supersede all ✓  
prior surveys.

M. AIDS TO NAVIGATION

The survey area included one aid to navigation, Savannah Light.  
The position was acquired from the Chief of Photo Party 62 and  
is as follows: Latitude 31°57'00.42", Longitude 080°40'59.06". ✓  
It agrees with the charted position and the position in the  
Light List.

N. STATISTICS

	<u>WHITING</u>	<u>WH-1</u>	<u>WH-2</u>
POSITIONS	850	73	355
L.N.M. SOUNDING LINE	395	5	125
S.N.M. SURVEYED	37	0	10
BOTTOM SAMPLES	6	0	2

O. MISCELLANEOUS

At first glance, the area surveyed appears to be devoid of any-  
thing of note. However, contouring shows a series of small  
ridge and basin type structures trending NE-SW. The relief on  
these structures is of the order of 3 to 6 feet. Because of  
the nature of the bottom throughout the area (i.e., an  
unconsolidated fine to coarse grained sand) these features are  
highly reminiscent of migrating dune-type ripples. If they  
are, this could be highly significant to the hydrographer as  
the whole area could be subject to continual shifting of the  
bottom. Junctions and overlap with future surveys would be ✓  
meaningless.

P. RECOMMENDATIONS

I recommend that serious consideration be given to the concept ✓  
of shifting-dune type structures in an area of sandy bottom  
exposed to the sea and possible strong current action. If this

(over 2 pages)



idea is accepted, it could save much time, work, and worry ,  
in attempting to make junctions fit where the bottom is  
continually changing.

Q. REFERENCES TO REPORTS

TRA Note  
Tide Note  
Electronic Control Report  
Velocity and Fathometer Corrections Report

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TRA NOTE  
WH-40-1-73, H-9144  
OPR-436-WH-73

LAUNCHES

WH-1 and WH-2 operated at standard speed at all times. The TRA corrector for both launches at standard speed is 2.4 feet (draft plus settlement and squat). A combined total of 2.4 feet was used on the hydroplot controller and/or corrector tape for both launches. Consequently, 0.0 feet is used on the TC/TI tapes for both launches.

SHIP

The ship operated at standard speed at all times. The settlement and squat corrector at standard speed is +0.7 feet.

The draft of the ship during the survey operations of WH-40-1-73 fluctuated around 10.5 feet. A draft value of 10.0 feet was used in the hydroplot controller; therefore, 0.5 must be added to the TRA corrector on the TC/TI tape.

In addition, incorrect fathometer initials were made for days 234-241, after which time (hydrography starting day 248), the initial was correct. For a phase check comparison for the ship's Ross fathometer on Day 251, look at the phase check for WH-40-2-73 (H-9145) on Day 251 at 100930Z. This is because survey operations for both sheets were conducted on Day 251.

SHIP TC/TI TAPE CORRECTIONS (FEET)

<u>JULIAN</u> <u>DAY</u>	<u>S&amp;S</u>	<u>DRAFT</u>	<u>INITIAL</u>	<u>TOTAL</u>
234	+0.7	+0.5	-0.2	+1.0
235	+0.7	+0.5	-0.2	+1.0
236	+0.7	+0.5	-0.2	+1.0
240	+0.7	+0.5	-0.2	+1.0
241	+0.7	+0.5	-0.2	+1.0
248	+0.7	+0.5	+0.0	+1.2
251	+0.7	+0.5	+0.0	+1.2

*1973 work*

APPROVAL SHEET

Submitted by:

*Edward Gastaldo*  
Edward Gastaldo, ENS, NOAA

Supervision of field and office work on this hydrographic survey was continuous on a day to day basis to insure completeness of the survey and that the work done was in accordance with the instructions.

Approved/Forwarded:

*John C. Vasilenak*  
for Jeffrey G. Carlen  
CDR, NOAA  
Commanding Officer, NOAA Ship WHITING

Appendix 111

<u>Day</u>	<u>Trip</u>	<u>No. of visit to Savannah Light</u>	<u>No. of Calibrations Per visit</u>	<u>Average of Calibrations per visit</u>	
				<u>Pattern I</u>	<u>Pattern II</u>
081	1st	1	1	+ .11	- .31
		2	1	+ .11	- .32
082		3	2	+ .145	- .345
		4	2	+ .140	- .320
		5	1	+ .14	- .30
084		6	1	+ .14	- .31
085		7	1	+ .17	- .28
086		8	2	+ .170	- .275
088		9	1	+ .19	- .32

	<u>Pattern I</u>	<u>Pattern II</u>
Average corrector for 1st trip to be applied with editor program:	+ .146	- .309
Mean deviation:	.020	.017
Standard deviation:	.027	.022

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<u>Day</u>	<u>Trip</u>	<u>Savannah Light</u>	<u>No. of Calibrations Per Visit</u>	<u>Average of Calibrations per visit</u>	
				<u>Pattern I</u>	<u>Pattern II</u>
092	2nd	1	1	+ .16	- .31
094		2	1	+ .22	- .31
097		3	5*	+ .188	- .298
098		4	3	+ .200	- .31
101		5	1	+ .18	- .28
				<u>Pattern I</u>	<u>Pattern II</u>
Average corrector for 1st trip to be applied with editor program:				+ .190	- .302
Mean deviation				.009	.009
Standard deviation:				.022	.011

\*Each bearing observed was by a different officer. There was no significant difference.

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<u>Day</u>	<u>Trip</u>	<u>No. of visit to Savannah Light</u>	<u>No. of Calibrations per visit</u>	<u>Average of Calibrations per visit</u>	
				<u>Pattern I</u>	<u>Pattern II</u>
106	3rd	1	3	+0.190	-0.281
114		2	3	+0.175	-0.307
115		3	1	+0.19	-0.28
116		4	1	+0.19	-0.30

	<u>Pattern I</u>	<u>Pattern II</u>
Average corrector for 1st trip to be applied with editor program:	+0.186	-0.292
Mean deviation	.006	.012
Standard deviation	.008	.014

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Bottom samples were taken on the morning of Julian Day 122. Immediately after taking the bottom samples, the ship went to Savannah Light to calibrate. The correctors obtained are as follows:

Pattern I

+ .18

Pattern II

- .28

After calibrating, an officer was put ashore in Savannah to hand carry the boat sheet to Atlantic Marine Center. The above correctors were used on the corrector tape rather than an average value for the trip since the only work done on the survey during the fourth trip was the collection of bottom samples on Julian Day 122.

APPROVAL SHEET

Submitted by:

*Bradford B. Meyers*

Bradford B. Meyers  
LT, NOAA

Approved/Forwarded:

*Robert A. Trauschke*  
Robert A. Trauschke  
CDR, NOAA  
Commanding

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FATHOMETER AND VELOCITY CORRECTIONS REPORT

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PROJECT OPR-436-WH-74

GEORGIA COAST

-----oOo-----

NOAA SHIP WHITING

ROBERT A. TRAUSCHKE, CDR, NOAA

COMMANDING

A. GENERAL DISCUSSION:

The hydrography for the boat sheet WH-40-I-74<sup>H-9144</sup><sup>3</sup> of OPR-436-WH-74 was accomplished with the NOAA Ship WHITING. Ross Model 5000 Fathometers were used. Fathometer S.N. 1055 was used from the beginning of hydrography until Julian Day 087 (time 184535 Z) and from Julian Day 115 (time 173101 Z) to the completion of the sheet. Fathometer S.N. 1049 was used during the period from Julian Day 087 to Julian Day 115.

Fathometer operators made frequent checks for proper initial settings, and utilized the internal phase check. Both Fathometers were initialized at zero feet.

B. VELOCITY CORRECTIONS:

Velocity corrections to depth soundings were determined from TDC cast data. Leadline comparisons were taken to validate the use of TDC velocity corrections. TDC casts were made on the eastern side of the sheet to encompass greater depths.

Computer Program AM530 was used to calculate velocity of sound, and corrections to soundings from TDC data. The program uses input of salinity, temperature, and depth from surface to depth. The TDC data was algebraically corrected in accordance with actual conditions. The program corrects for the vessel's draft. Graphs #1 and #2 show that over small changes in temperature and conductivity, the corrections to TDC observations are nearly constant. In the ranges we experience, the differences in corrections are

B. VELOCITY CORRECTIONS (Continued):

negligible. Graph #3 shows that for the range we work (14°C to 25°C) the slope and placement of the curve closely approximates the real curve. The data for these graphs is from calibrations done by the National Oceanographic Instrumentation Center during this year's inport period.

TDC casts were made on Julian Days 085, 106, and 121. The data from each of these casts is in the Appendix. Velocity correction tables and plots (Graph #4) of all three casts are on the following pages. At no depth is the discrepancy between plots greater than 1.0% of the depth so that averaging the three would cause them all to be within 0.5% of the depth from the average. This is the largest discrepancy allowed by the Hydrographic Manual. After averaging the correction values at each depth, these values were subtracted from the corresponding depth to obtain the Fathometer depth versus the correction plot (Graph #5). This is the necessary plot used to generate the velocity table which is listed in the Appendix.

Velocity corrections were verified by leadline comparisons taken on Julian Days 087 and 106. The data is in the Appendix, and listed below are the results.

<u>Leadline</u>	<u>Velocity Corr.</u>	<u>Avg. Depth</u>	<u>% Discrepancy</u>
087	2.2'	60.6'	1.2%
106	3.0'	75.9'	0.6%

These leadlines are in good agreement with the velocity corrections used for this boat sheet.

VELOCITY CORRECTION TABLE

<u>Day</u>	<u>Depth</u>	<u>Total Corrections</u>
085	0.0	.00
	6.6	.21
	13.1	.43
	19.7	.64
	26.2	.86
	47.6	1.57
106	0.0	.00
	6.6	.26
	13.1	.53
	19.7	.79
	26.2	1.06
	47.6	1.92
	64.0	2.57
121	0.0	.00
	6.6	.29
	13.1	.59
	19.7	.88
	26.2	1.17
	47.6	2.10
64.0	2.82	
Average	0.0	.00
	6.6	.25
	13.1	.52
	19.7	.77
	26.2	1.03
	47.6	1.87
64.0	2.70	

C. TRA CORRECTIONS:

Settlement and squat observations were made on Ship WHITING 6 September 1973 (see Fathometer and Velocity Report, Project OPR-436-WH-73, Coast of South Carolina and Georgia). The results are as follows:

Full Speed	.7 ft.
Reduced Speed	.2 ft.

The WHITING's draft was measured during the times of hydrography. A draft of 10.0' was used in the hydroplot controller except at times of reduced speed, when 9.5' was used, or a -0.5' was used as the TRA correction on the corrector tape. This procedure eliminated the need for correcting for reduced speed soundings on the TC/TI tape. All ship TRA correctors are of the form:

$$\text{TRA} = \text{Draft} + \text{S\&S}$$

$$= \text{Hydroplot Draft} + (\text{Draft} - \text{Hydroplot Draft}) + \text{S\&S}$$

Full Speed:

$$\text{TRA} = 10.0' + (\text{Draft} - 10.0') + 0.7'$$

Reduced Speed:

$$\text{TRA} = 9.5' + (\text{Draft} - 9.5') + 0.2'$$

$$= 9.5' + (\text{Draft} - 10.0' + 0.5) + 0.2'$$

$$= 9.5' + (\text{Draft} - 10.0') + 0.7'$$

The above shows that only the sum of  $(\text{Draft} - 10.0') + 0.7'$  must be used on the TC/TI tape.

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C. TRA CORRECTIONS (Continued):

The average draft was calculated to be 10.5' (see Draft Data Table). The largest deviation for any cruise from this average was 0.2', which is only 0.6% of the minimum depth of hydrography. The value used on the TC/II tape is:

$$\begin{aligned} \text{TRA} &= (10.5' - 10.0') + 0.7' \\ &= 1.2' \end{aligned}$$

The TC/II tape is listed in the Appendix.

No Fathometer initial corrections were necessary since the Fathometer was initialed at zero feet and checked frequently.

APPROVAL SHEET

Submitted by:

*Edward D. Gullekson*

Edward D. Gullekson  
ENS, NOAA

Approved/Forwarded:

*Robert A. Trauschke*  
Robert A. Trauschke  
CDR, NOAA

Commanding Officer, NOAA Ship WHITING

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APPROVAL SHEET

Submitted by:

*Edward Gastaldo*

Edward Gastaldo  
ENS, NOAA

Supervision of field and office work on this hydrographic survey was continuous on a day<sup>ly</sup> basis to insure completeness of the survey and that the work done was in accordance with the instructions.

Approved/Forwarded:

*Robert A. Trauschke*

Robert A. Trauschke  
Commander, NOAA  
Commanding Officer, NOAA Ship WHITING



APPENDIX III

Electronic Corrector Abstract

TRA Corrector Abstract

Position Abstract

Log Sheet M-Bottom Samples

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## ELECTRONIC CORRECTOR ABSTRACT

<u>JULIAN DAY</u>	<u>TIME (C.U.T.)</u>	<u>PATTERN I</u>	<u>PATTERN II</u>
081	215731	+0.15	-0.31
084	205848	+0.15	-1.31
085	175830	+0.15	-0.31
092	031339	+0.19	-0.30
094	083945	+0.19	+0.70
094	194520	+0.19	-0.30
095	112750	-0.81	-0.30
097	211811	+0.19	-0.30
114	053835	+0.19	-0.29
114	101431	+1.19	-0.29
114	163401	+0.19	-0.29
122	042001	+0.18	-0.28

NOTE: Correctors are applied from the time given until the time of the next corrector. The last corrector is applied for the remaining work in the survey.

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GEOGRAPHIC NAMES

H-9144

Name on Survey	Source of Information										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST			
Atlantic Ocean	39									1	
TYBEE ROADS	1240									2	
SAPELD SOUND	1241									3	
SAVANNAH	1240									4	
										5	
										6	
										7	
										8	
										9	
										10	
										11	
										12	
										13	
										14	
										15	
										16	
										17	
										18	
										19	
										20	
										21	
										22	
										23	
										24	
										25	

**HYDROGRAPHIC SURVEY STATISTICS**  
HYDROGRAPHIC SURVEY NO. H-9144 WH-40-1-73

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

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET & 2-Overlays	1	BOAT SHEETS	3
DESCRIPTIVE REPORT	1	OVERLAYS	2

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
<del>ENVELOPES</del>			1			
CAHIERS	2		1			
VOLUMES						
BOXES			1			

T-SHEET PRINTS (List)  
No shoreline.

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				5459
POSITIONS CHECKED		550	1000	
POSITIONS REVISED		2	50	
DEPTH SOUNDINGS REVISED		1500	20	
DEPTH SOUNDINGS ERRONEOUSLY SPACED		-	-	
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		-	-	
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS		1	-	1
JUNCTIONS		8	10	18
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		36	10	46
SPECIAL ADJUSTMENTS		6	5	11
ALL OTHER WORK		256	35	291
<b>TOTALS</b>		307	60	367
PRE-VERIFICATION BY M.B. Hickson, W.H. Guy	BEGINNING DATE 6/6/74	ENDING DATE 12/4/74		
VERIFICATION BY B.J. Stephenson	BEGINNING DATE 1/15/75	ENDING DATE 1/20/75		
REVIEW BY L. Quinlan	BEGINNING DATE 8 Sep 75	ENDING DATE 20/SEP 75		

Can. Insp: S.K. Myers 4/16/76 31 hrs Coast Guard U.S. G.P.O. (1972-769-562/439) REG.#6

H-9144

Information for Future Presurvey Reviews

*SEE Para. 3B and 8 of Review*

There are no noteworthy items for a future presurvey review in the area of the present survey. However, the sandy bottom is subject to change due to tidal and ocean current activity in the area.

<u>Position Index</u>		<u>Bottom Change Index</u>	<u>Use Index</u>	<u>Resurvey Cycle</u>
<u>Lat.</u>	<u>Long.</u>			
314	0804	3	2	50 years
315	0804	3	4	25 years
320	0804	4	2	25 years
313	0805	3	2	50 years
314	0805	4	2	25 years
315	0805	3	4	25 years
320	0805	4	4	25 years
313	0810	4	2	25 years
314	0810	4	2	25 years
315	0810	4	2	25 years

OFFICE OF MARINE SURVEYS AND MAPS  
MARINE SURVEYS DIVISION  
MODIFIED HYDROGRAPHIC SURVEY REVIEW

REGISTRY NO. H-9144

FIELD NO. WH-40-1-73

Georgia, off Savannah, Tybee Roads to Sapelo Sound

SURVEYED: August 22 - September 8, 1973  
March 22 - May 2, 1974

SCALE: 1:40,000

PROJECT NO.: OPR-436

SOUNDINGS: DE-723 D Depth Recorder  
Ross Depth Recorders Model 5000

CONTROL: Sea Fix  
(Hyperbolic mode)

Chief of Party ..... J. G. Carlen  
..... R. A. Trauschke  
Surveyed by ..... J. C. Veseledak  
..... A. E. Theberge  
..... B. B. Meyers  
..... G. J. Decker  
..... R. D. Polvi  
..... M. C. McMillan  
..... E. Gastaldo  
..... W. A. Hill  
Automated Plot by ..... CALCOMP 618 (AMC)  
Verified by ..... B. J. Stephenson  
Reviewed by ..... L. Quinlan  
..... September 30, 1975  
Cursory inspection made--survey ..... G. K. Myers  
processing considered complete ..... April 16, 1976

1. Control and Shoreline

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

There is no shoreline within the limits of the survey area.

2. Hydrography

- A. Depths at crossings are in good agreement.
- B. The usual depth curves were adequately delineated.
- C. The development of the bottom configuration is considered adequate.

### 3. Condition of the Survey

The survey records, automated plotting, and Descriptive Report are adequate and conform to the requirements of the Hydrographic Manual, as amended by Instruction Manual - Automated Hydrographic Surveys, except as follows:

A. It was necessary during the review to rescan some of the fathograms that noted chop. This examination resolved several discrepancies between soundings at crosslines and provided a more accurate portrayal of the bottom configuration.

B. The hydrographers identified several soundings as presurvey review items in the Descriptive Report. In many instances, additional development in areas of these depths was not accomplished.

### 4. Junctions

Adequate junctions were effected with H-9314 (1973) on the north, H-9197 (1971-73) on the northwest, H-9363 (1973) on the northeast, H-9145 (1973) on the east, H-9429 (1974) on the south, and H-9460 (1974), H-9461 (1974), and H-9462 (1974) on the west. *The junction with H-9299 (1972) on the east is considered in the review of that survey.*

### 5. Comparison with Prior Surveys

A. H-4155 (1920) 1:20,000

This prior survey is covered in part by the present survey, but is not discussed in the present review.

B. H-3561 (1912-1913) 1:50,000  
H-5134 (1931) 1:40,000  
H-3897 (1916) 1:40,000  
H-3983 (1916-1917) 1:80,000

These prior surveys taken together cover the entire area of the present survey. A comparison between prior and present depths reveals differences of 2-4 feet throughout a major portion of the survey. However, a few depths were found to differ by as much as 7 feet in random areas. These changes are attributed to current action and different survey methods.

The 11-foot depth charted at latitude 32°04.24', longitude 80°38.80', originating with H-3897 (1916), falls in depths of about 20 feet on H-5134 (1931) and 20-25 feet on the present survey. A fathometer investigation of this sounding was made with negative results. A comparison between prior and present depths reveals marked changes of the bottom due to undercurrent activity in this area and therefore, the 11-foot sounding should be deleted from the chart.

The present survey portrays the bottom configuration in much greater detail and is adequate to supersede the prior survey in the common area.

6. Comparison with Charts 11511 (573), 7th Ed., March 22, 1975  
 11512 (440), 40th Ed., June 14, 1975  
 11516 (571), 19th Ed., November 2, 1974  
 11509 (1241), 12th Ed., January 11, 1975  
 11513 (1240), 12th Ed., November 23, 1974  
 11480 (1111), 18th Ed., November 2, 1974
- 

A. Hydrography

The charted hydrography originates with the previously discussed prior surveys which require no further consideration supplemented by the partial application of depths from the boat sheet and verified smooth sheet of the present survey.

Presurvey Review information is described in Paragraph J of the combined 1973-1974 Descriptive Report. Except as noted in the aforementioned reference, the present survey is adequate to supersede the charted hydrography in the common area.

B. Aids to Navigation

The charted positions of the aids to navigation adequately mark the features intended.

7. Compliance with Project Instructions

The survey adequately complies with the Project Instructions.

8. Additional Field Work

This survey is considered a very good basic survey and no additional field work is recommended. However, a wire-drag investigation of the reported obstruction charted latitude  $31^{\circ}45.5'$ , longitude  $80^{\circ}42.75'$  should be made.

Examined and Approved:

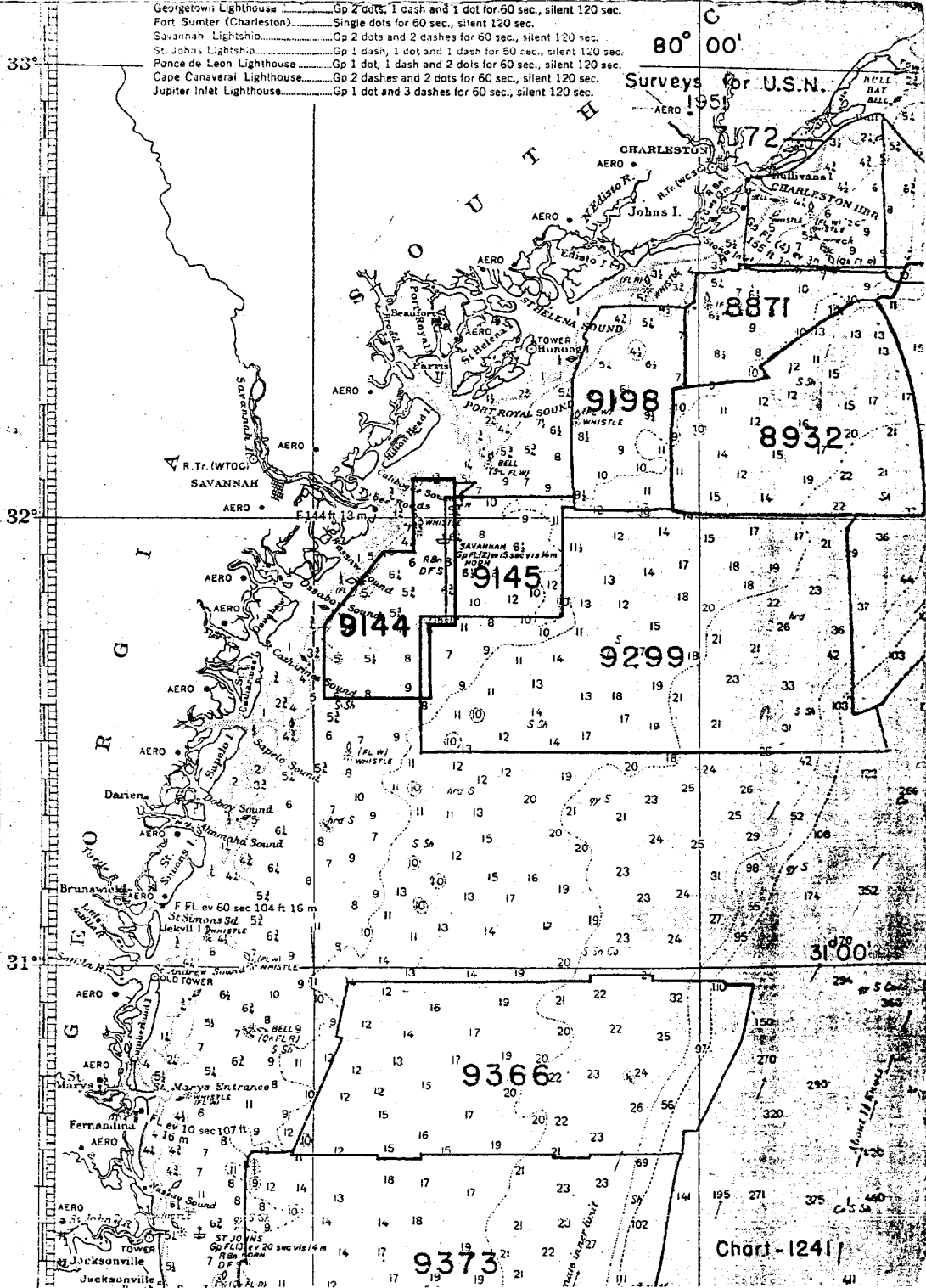
a. J. Petril  
 Chief  
 Marine Surveys Division

R. H. Houten  
 Associate Director  
 Office of Marine Surveys  
 and Maps



Georgetown Lighthouse ..... Gp 2 dots, 1 dash and 1 dot for 60 sec., silent 120 sec.  
 Fort Sumter (Charleston) ..... Single dots for 60 sec., silent 120 sec.  
 Savannah Lightship ..... Gp 2 dots and 2 dashes for 60 sec., silent 120 sec.  
 St. Johns Lightship ..... Gp 1 dash, 1 dot and 1 dash for 60 sec., silent 120 sec.  
 Ponce de Leon Lighthouse ..... Gp 1 dot, 1 dash and 2 dots for 60 sec., silent 120 sec.  
 Cape Canaveral Lighthouse ..... Gp 2 dashes and 2 dots for 60 sec., silent 120 sec.  
 Jupiter Inlet Lighthouse ..... Gp 1 dot and 3 dashes for 60 sec., silent 120 sec.

Surveys for U.S.N.



RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9144

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
11512 (440) 11511 (573)	4-22-75	E. Moore	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No.
	8-14-75	KIRBY BEAN	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. 14 & 14M
1241	9-30-75	KIRBY BEAN	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. 25
571	11/14/75	Frankie Brown	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. <sup>got</sup> Category I
440	2/13/76	Eli Rodmann	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. Category I - Part applied thru
573	4/24/76	Tommy Alexander	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. Category I (Scope project) Fully applied hydro after inspection.
440	30-XI-76	Alex. Radichevich	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No.
1240	12-1-76	JAY SHERMAN	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. (SCOPE) CATEGORY 1 THRU 440 & PART DIRECT
1241	12-XII-76	Alex Radichevich	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. (SCOPE) CATEGORY 1
1111	9/30/77	Harold M Schantz	<del>Full Part Before</del> <sup>After Verification</sup> <del>Review</del> Inspection Signed Via Drawing No. 21 - part thru 1240, and part thru 1241, part direct