H10600

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC/ SIDE SCAN SONAR

Field No. WH-10-4-95

Registry No. H-10600

LOCALITY

State GEORGIA

General Locality NORTH ATLANTIC OCEAN

Sublocality 17 NM SOUTHEAST OF GASKIN BANKS

19 95

CHIEF OF PARTY

CDR J. D. WILDER, NOAA

LIBRARY & ARCHIVES

DATE JUN 11 1996

☆U.S. GOV. PRINTING OFFICE: 1987—756-980

DIAGRAM 1111-1

(E)
Bp 158530-31

Charts

CP4
11513
11480 ~~App. 8-12-96 DBR~~ App 3/5/97 TLW
11009
411 App. 8-12-96 DBR

NOAA FORM 77-28 (11-72)

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

REGISTER NOS.

H-10600

HYDROGRAPHIC TITLE SHEET

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

FIELD NO.

WH-10-4-95

State: GEORGIA

General locality: NORTH ATLANTIC OCEAN

Locality: 17 NM SOUTHEAST OF GASKIN BANKS

Scale: 1:10,000 Date of Survey: 26 APR '95 - 6 JULY '95

Instructions dated: 8 MARCH, 1995 Project No.: OPR-G398-WH

Vessel: NOAA SHIP WHITING, S329

Chief of Party: CDR JOHN D. WILDER

Surveyed by: CDR J.D. WILDER, CDR M. KENNY, LT W.G. KITT, LT A.L. BEAVER, ENS C. PARRISH, ENS J. MICHALSKI, ENS K. BOWDITCH, ENS J. GARTE, F.R. CRUZ, J. GASKIN, M. CISTERNELLI, B.C. DETRICH, K.B. SHAVER

Soundings taken by echo sounder: DSF-6000N

Graphic record scaled by: WHITING SURVEY PERSONNEL

Graphic record checked by: WHITING SURVEY PERSONNEL

Protracted by: N/A Automated plot by: ENCAD NOVAJET III PLOTTER(CAHB) HP 7959B, BRUNNING (FIELD)

Verification by: ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in MLLW: DATUM AND DEPTHS IN UNITS OF METERS

REMARKS: TIME ZONE USED, 0 (UTC)

200% SIDE SCAN SONAR COVERAGE

Notes in The Descriptive Report were made in red during office processing

AWOIS and SURF ✓ RWD 6/96

JUN 11 1996

NOAA FORM 77-28 SUPERSEDES FORM C & GS-537

PROGRESS SKETCH

HYDROGRAPHIC SURVEY

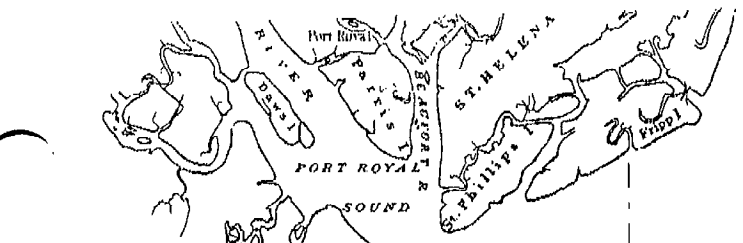
OPR-G115-WH

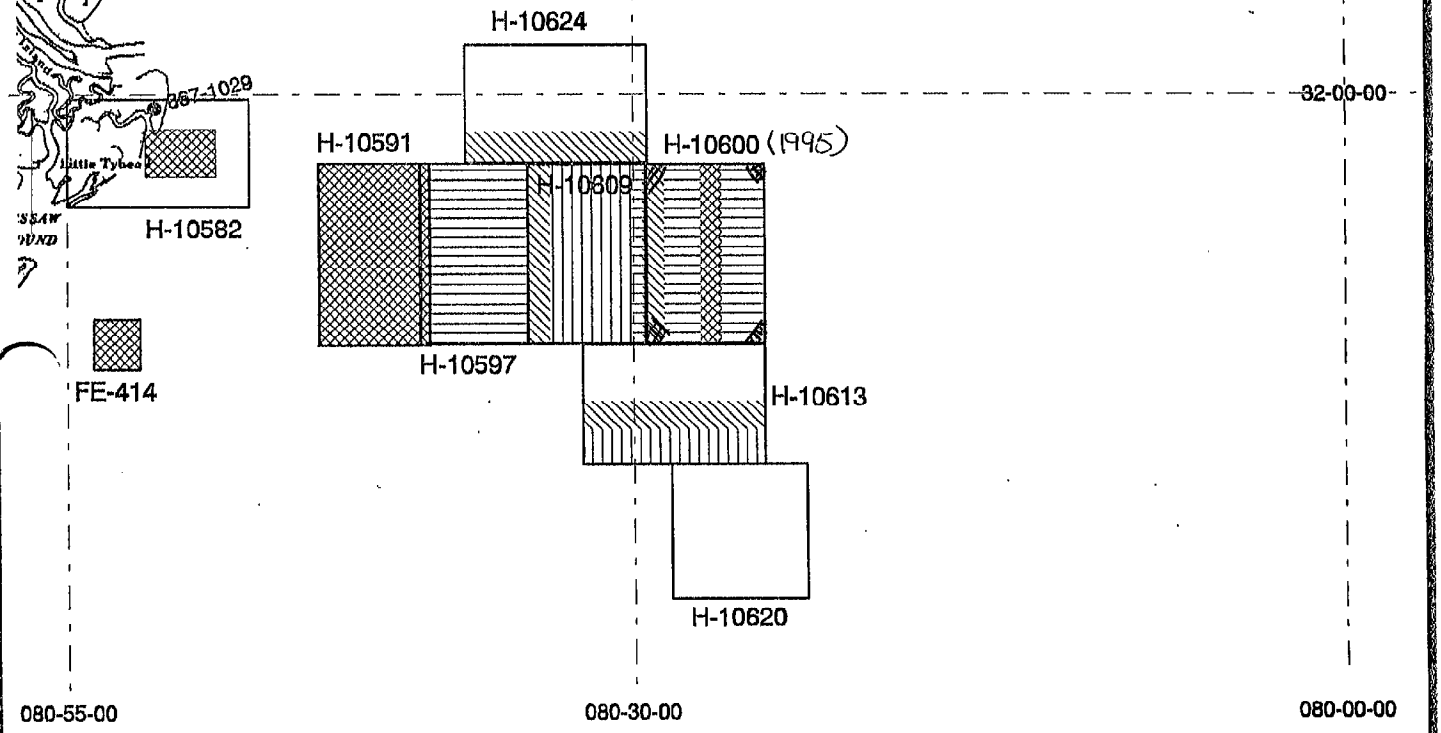
WASSAW SOUND and WILMINGTON RIVER

OPR-G398-WH

APPROACHES TO SAVANNAH RIVER

APRIL - NOVEMBER 1995





NOAA SHIP WHITING S329

CDR JOHN D. WILDER, COMMANDING

APR	MAY	JUNE	JULY	AUG	SEP	OCT	NOV	
24	25	27						DAYS AT SEA
156	83	218						LNM SOUNDINGS (SHIP)
173	10	24						LNM SOUNDINGS (LAUNCHES)
904	1208	1550						LNM SIDE SCAN (SHIP)
7	14	52						LNM SIDE SCAN (LAUNCHES)
38	49	64						SQ NM SURVEYED
6	10	22						ITEMS INV/DIVES
	8	4						VELOCITY CASTS
45	19	15						BOTTOM SAMPLES
20	0	0						WATER CLARITY OBS
								HYDROGRAPHY

DESCRIPTIVE REPORT TO ACCOMPANY
HYDROGRAPHIC SURVEY
OPR-G398-WH
WH-10-4-95
H-10600

NOAA SHIP WHITING
CDR John D. Wilder, NOAA
Commanding Officer

A. PROJECT

Project OPR-G398-WH is navigable area survey with 200-percent side scan sonar coverage. The purpose of the project is to provide contemporary hydrographic survey data for the approaches to Savannah, GA. The project responds to requests from the Georgia Ports Authority and the Savannah Pilots Association.

Survey operations were conducted in compliance with Hydrographic Project Instructions OPR-G398-WH dated March 8, 1995. Changes to the original project instructions are as follows:

Change No. 1 May 17, 1995

The survey covered in this descriptive report was assigned sheet letter "H", field sheet number WH-10-4-95, and registry number H-10600.

B. AREA SURVEYED

Hydrographic survey H-10600 is 17 nautical miles southeast of Gaskin Banks, South Carolina. The sheet is bounded by the following four positions:

Position Number	Latitude	Longitude
1	31° 51' 23.9" N	080° 24' 12.0" W
2	31° 51' 23.9" N	080° 29' ~~20.0~~ 21.0" W
3	31° 58' 34.1" N	080° 29' ~~20.0~~ 21.0" W
4	31° 58' 34.1" N	080° 24' 12.0" W

Survey operations began on April 26, 1995 (DN 116) and ended on July 6, 1995 (DN 187).

C. SURVEY VESSELS

NOAA ship WHITING (vesno 2930), launch 1015 (vesno 2931) and launch 1014 (vesno 2932) were used to acquire side scan sonar and sounding data.

No unusual vessel configurations were used nor were any problems encountered.

D. AUTOMATED DATA ACQUISITION AND PROCESSING *SEE ALSO EVALUATION REPORT*

Survey data acquisition and processing were accomplished using the HDAPS system with the following software:

Program	Version	Date Installed
BACKUP	*2.00*	*February 24, 1995*
BASELINE	*1.14*	*February 24, 1995*
BIGABST	*2.07*	*February 24, 1995*
BIGAUTOST	*3.01*	*February 24, 1995*
BLKEDIT	*2.02*	*February 24, 1995*
CARTO	*2.17*	*February 24, 1995*
CLASSIFY	*2.12*	*April 17, 1995*
CONTACT	*2.48*	*April 17, 1995*
CONVERT	*3.65*	*February 24, 1995*
DAS_SURV	*6.80*	*April 17, 1995*
DIAGNOSE	*3.05*	*February 24, 1995*
DISC_UTIL	*1.00*	*February 24, 1995*
DP	*2.18*	*February 24, 1995*
DPCONVERT	*1.03*	*March 07, 1995*
DSNEDITS	*1.04*	*March 07, 1995*
EXCESS	*4.32*	*February 24, 1995*
FILESYS	*3.31*	*March 07, 1995*
GRAFEDIT	*1.06*	*February 24, 1995*
HIPSTIC	*1.01*	*February 24, 1995*
HPRAZ	*1.26*	*February 24, 1995*
INVERSE	*2.02*	*February 24, 1995*
LISTDATA	*1.02*	*February 24, 1995*
LOADNEW	*2.13*	*March 07, 1995*
LSTAWOIS	*3.07*	*March 27, 1995*
MAINMENU	*1.20*	*February 24, 1995*
MAN_DATA	*3.02*	*March 07, 1995*
NEWPOST	*6.13*	*February 24, 1995*
PLOTALL	*2.32*	*February 24, 1995*
POINT	*2.12*	*March 07, 1995*

PREDICT	*2.01*	*February 24, 1995*
PRESURV	*7.11*	*February 24, 1995*
PRINTOUT	*4.04*	*February 24, 1995*
QUICK	*2.07*	*February 24, 1995*
RAMSAVER	*1.02*	*February 24, 1995*
REAPPLY	*2.12*	*February 24, 1995*
RECOMP	*1.04*	*March 07, 1995*
SCANNER	*1.00*	*February 24, 1995*
SELPRINT	*2.05*	*February 24, 1995*
SYMBOLS	*2.00*	*February 24, 1995*
VERSIONS	*1.00*	*February 24, 1995*
ZOOMEDIT	*2.33*	*February 24, 1995*

Sound velocity corrections were determined using *CAT* version 2.00 and *VELOCITY* versions 2.10 and 2.11. The DGPS station was checked using *MONITOR* version 1.2.

There were no nonstandard automated acquisition or processing methods used.

E. SIDE SCAN SONAR EQUIPMENT

Side scan sonar (SSS) operations were conducted using an EG&G model 260 slant-range corrected SSS recorder and an EG&G 272-TH dual-channel, single frequency towfish. The towfish was operated on the 100 kHz frequency and configured with a 20° beam depression. Data were collected using the 100 meter range scale. Confidence checks were obtained by noting objects on the sea floor at the outer edges of the 100 meter range scale. The following sonar equipment was used throughout the survey:

VESNO	TYPE	S/N	FIX NUMBERS
2930	Towfish	A001343	6000 - 11416
2930	Recorder	016942	6000 - 11416
2931	Towfish	016835	1 - 135
2931	Recorder	016671	1 - 135
2932	Towfish	0011902	3015 - 3040
2932	Recorder	016673	3015 - 3040

The towfish was deployed from a Reuland winch (model number 8377-XF5461A, s/n 814861A-1) on the stern of WHITING. The SSS towfish was towed by armored cable connected to the acquisition computer with a slip-ring assembly.

The SSS towfish was maintained at a height off the bottom of 8 to 20 percent of the range scale in use. SSS operations were limited to a speed-over-ground of 6.0 knots or slower.

All potentially significant contacts were measured off the sonargram and entered into an HDAPS contact table. Using the contact utility program, WHITING hydrographers could determine contact heights, positions and correlations to one another. The items were then further examined by divers.* DATA FILED WITH FIELD Records.

F. SOUNDING EQUIPMENT

Raytheon Digital Survey Fathometer (DSF) 6000N echosounders were used to measure bottom depths during the survey. The DSF 6000N produced a graphic record of the high frequency (100 kHz) and low frequency (24 kHz) bottom depths. Digital depths from the high frequency and low frequency beams were recorded by the HDAPS acquisition system. High frequency depths were selected as the primary depths and are shown on the sounding plots. Echograms were carefully reviewed for significant features along the track line. Any features on the graphic record that were not selected as primary soundings were manually inserted.

The following fathometers were used during this survey:

VESSEL	S/N	FIX NUMBER
2930	B051N	6000 - 11416
2931	B050N	1 - 135
2932	A105N	3000 - 3040

G. CORRECTIONS TO SOUNDINGS

Sound-velocity profiles of the water column were determined using a Seacat Conductivity, Temperature and Depth (CTD) profiler (model SBE 19, s/n 286). The profiler was calibrated on February 16, 1995, during WHITING's winter inport period. Copies of the calibration report are included in Separate IV.*

After the CTD casts, programs *CAT 2.00* and *VELOCITY 2.10* were used to process the data, select significant data points, and create a corrector table. The velocity correctors were manually entered into an HDAPS velocity table. The correctors were applied to both high and low frequency beams during acquisition. Velocity profile data are in the Separates* submitted with this survey.

Data Quality Assurance (DQA) for the Seacat CTD profiler was performed by using a hydrometer and a thermometer to measure the density and temperature of a surface water sample taken during each CTD cast. The program *CAT* compared these values to the CTD surface values, and confirmed that the velocity probe was working properly.

*DATA Filed with original field records.

The velocity casts for mainscheme data acquisition were performed as described below:

DN	Vel.Table#	Latitude	Longitude	Depth
117	11, ~~12~~	31° 53' 04" N	080° 25' 53" W	25.1 m
124	13, ~~14~~	31° 52' 06" N	080° 25' 19" W	30.5 m
141	~~22~~, 23	31° 51' 48" N	080° 24' 30" W	27.7 m
165	31, 32	31° 51' 38" N	080° 30' 22" W	27.1 m
186	34	31° 59' 00" N	080° 30' 00" W	16.8 m

Sound velocity tables 12, 14, 22 and 32 were created for the launches, while 11, 13, 23 and 31 were applied to data collected by WHITING. Additional velocity casts were performed on days when the MOD III diver's least depth gauge was used to acquire depths, but are not listed above.

There were no variations in instrument initials.

All sounding corrections were applied on-line to both the narrow (100 kHz) and wide (24 kHz) DSF-6000N beams.

Bar checks were performed on launches 1014 and 1015 to detect the need for corrections to digitized readings from the DSF-6000N. No corrections were needed.

Leadlines used for H-10600 were made and calibrated on February 23, 1995. Leadline comparisons were made on May 11, 1995.

The correction for the static draft for launches 1014 and 1015 is 0.55 meters, measured July 28, 1993. The correction for WHITING's static draft is 3.2 meters, a historical value which WHITING divers confirmed with the MOD III depth gauge on May 11, 1995.

Settlement and squat measurements for launches 1014 and 1015 were determined on March 29, 1995. The correctors were entered in Offset Tables 2 and 1, respectively, and applied in real time throughout the survey. Settlement and squat measurements for WHITING were determined on November 10, 1993 and entered in Offset Table 9. The settlement and squat correctors were applied to the sounding data in real time on each survey platform. Data filed with field records.

For data acquired by WHITING, the HDAPS data acquisition computer logged, in real time, heave data from a heave, roll and pitch sensor (HIPPY, s/n 19101-C). Heave correctors were applied in post processing. Heave correctors were applied in post processing for launches 1014 and 1015 by manually scanning the echograms.

The tidal datum for this project was Mean Lower Low Water. The operating tide station at Fort Pulaski, Georgia (867-0870) served as the reference station for predicted tides. No tidal zoning was done for this survey.

Time and height correctors used for this survey are as follows:

Time Correction	Height Ratio
- 0 hr 20 min	x0.90

Tidal data used during data acquisition were taken from Table 2 of the East Coast of North and South America Tide Tables and were applied on-line to the digital data using HDAPS software. The tidal data, in digital form, were received on floppy disk from N/CG24, Hydrographic Surveys Division.

On March 29, 1995, WHITING installed a tide station at Tybee Marina (867-1029) for datum control of H-10600. Opening levels were run on March 30, 1995. A request for smooth tides was submitted to Product and Services Branch, Datum Section, N/OES231 on July 14, 1995. Approved Tides were applied during office processing

H. CONTROL STATIONS See Also Evaluation Report

The horizontal datum for this project is the North American Datum of 1983 (NAD-83). The source of differential correctors used was an HF Differential GPS station set on a tower over control mark "SKID" on Skidaway Island, GA. Additionally, WHITING used the forward range marker on Jones Island Range for performance checks. The adjusted NAD-83 positions for Jones Island Forward Range (4th Order) were provided by the Field Photogrammetry Section on August 16, 1994. The positions are as follows:

	Latitude	Longitude
Jones Island Range, Front	32° 02' 31.71243" N	080° 51' 10.09256" W
SKID	31° 59' 19.22599" N	081° 01' 12.26294" W

WHITING used *MONITOR* version 1.2 to verify the station position and to check for multipath in the area. The *OUTLIER.SUM* files and associated scatterplots are in Separate III.

I. HYDROGRAPHIC POSITION CONTROL

A Differential Global Positioning System (DGPS) was used as the navigation system for this survey. Ashtech Sensor GPS receivers and LRD-1 HF receivers were used on both the ship and the launches for DGPS navigation.

WHITING personnel erected a HF Differential GPS station on the grounds of Skidaway Institute of Oceanography (station SKID). The station contains the following equipment: 1) an Ashtech MK XII receiver, 2) a LRD III modulator, and 3) a RAY 152 HF transceiver.

DGPS positioning was accomplished in accordance with the FPM, section 3.4. Horizontal Dilution of Precision (HDOP) limits were computed as required in section 3.4.2 of the FPM.

The HDOP limit for a 1:10,000 scale survey using the Skidaway Island station is 3.75. No position flyers were encountered. All suspect positions (high HDOP, DR'ed positions, high EPE) were examined for reliability. Questionable positions were either smoothed or rejected.

The serial numbers of the Ashtech Sensor and LRD-1 receivers used are as follows:

	Device	Serial Number
WHITING	Ashtech Sensor	700417B1203
	LRD-1	248
Launch 1014	Ashtech Sensor	700417B1194
	LRD-1	206
Launch 1015	Ashtech Sensor	700417B1191
	LRD-1	233

DGPS performance checks were done in two stages. The first stage was to send a launch to the Jones Island Forward Range marker. The launch would take ten detached positions and compare them to the known position. All DGPS performance checks confirmed that the DGPS station was working properly. Stage two was conducted with each launch securely housed in WHITING's davits. Simultaneous HDAPS positions were compared between WHITING and each launch; and offset in distance and azimuth was then applied between the ship and each launch system. A summary of the DGPS performance checks was submitted under separate cover for the entire project to N/CG244 on July 3, 1995 (DN 184).

DGPS offsets and laybacks were measured on July 28, 1993, for launches 1014 and 1015. Offsets and laybacks were measured using the 100 kHz (high frequency) echosounder transducer as the reference. Antenna heights were also measured on the same date using the water line as the reference. The offsets and laybacks were applied by HDAPS on-line. A minimum of four satellites were used during survey H-10600 (1:10,000), providing altitude unconstrained positioning.

Offset, layback, and height corrections for each launch's SSS aft towing boom were measured on July 28, 1993, and verified on April 5, 1994.

All offset, layback and height data were applied by HDAPS on-line. These data are on file at N/CG244. Correctors from offset table 1 and 2 were applied to all data acquired from launches 1015 and 1014 respectively.

J. SHORELINE

There is no shoreline within the limits of survey H-10600.

K. CROSSLINES

A total of 84.28 nautical miles of crosslines were run on H-10600, or 10.7% of the total linear nautical miles of mainscheme lines run. Agreement between crosslines and mainscheme lines is adequate. Eighty percent (80%) of the crossline soundings agree with mainscheme soundings to within 0.5 meters, with 1.4 meters being the maximum observed discrepancy.

L. JUNCTIONS *See Also Evaluation Report*

Comparisons were made with H-10609 (G sheet), and H-10624 (D sheet). Comparisons with F sheet and H-10613 (J sheet) have not been made, as these surveys are not yet complete.

Agreement between H-10600 and H-10609 is good; contours from the two sheets line up well at the junction.

H-10600 and H-10624 overlap at the northwest corner of H-10600 and the southeast corner of H-10624. Agreement is excellent, with most soundings agreeing to within 0.2 meters and 0.4 meters being the maximum discrepancy.

M. COMPARISONS WITH PRIOR SURVEYS *See Also Evaluation Report.*

Prior surveys were not available for comparison with H-10600. Prior survey comparisons will be completed by Atlantic Hydrographic Section.

N. ITEM INVESTIGATIONS

The following items were investigated by WHITING divers:

SECTION	NAME
N1.	7487.22P
N2.	7076.22P
N3.	10242.07
N4.	10059.42
N5.	8681.57

N1. Contact 7487.22P

Contact 7487.22P was investigated by divers on June 28, 1995 (DN 179). WHITING divers

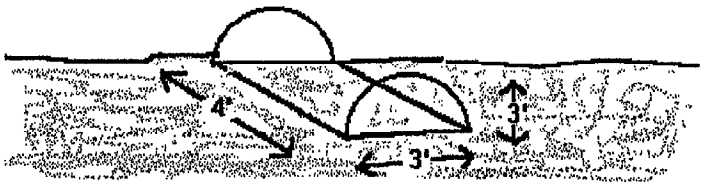
conducted a 25 meter circle search at the position calculated using the HDAPS Side Scan Contact Utility and were unable to locate the contact. No obstruction exists; WHITING recommends general survey depths be charted in this area. Concur

N2. 7076.22P

31° 52' 06.826" N
080° 26' 48.872" W

Contact 7076.22P was investigated by divers on June 28, 1995 (DN 179, fix #3002). The divers located metal arches sticking off the bottom, as shown in the diagram below (Note: the dimensions given in diagram are approximations based on the divers' depiction of the object). The corrected least depth of the arches is 19.4 meters (MOD III depth gauge, corrected to ~~predicted~~ Approved MLLW). The surrounding depths, calculated by the HDAPS Side Scan Contact Utility with the ship's draft correction applied, are 20.1 meters. 66 FT. Due to the surrounding depths, the contact is insignificant. WHITING recommends general survey depths be charted in this area and the obstruction not be charted. Concur

ARCHES



N3. 10242.07

31° 52' 59.111" N
080° 28' 59.373" W

Contact 10242.07 was investigated by divers on June 29, 1995 (DN 180, fix #3012). The divers located a metal box with legs sticking off the bottom. The corrected least depth of the box is 22.7 meters (MOD III depth gauge, corrected to ~~predicted~~ Approved MLLW). The surrounding depths, calculated by the HDAPS Side Scan Contact Utility with the ship's draft correction applied, are 19.9 meters. Due to the surrounding depths, the contact is insignificant. WHITING recommends general survey depths be charted in this area and the obstruction not be charted. Concur

N4. 10059.42

31° 53' 36.430" N
080° 29' 12.386" W

Contact 10059.42 was investigated by divers on June 29, 1995 (DN 180, fix #3008). The

divers located metal arches (similar to item 7487.22P, but turned "upside down"). The corrected least depth of the arches is 18.1 meters (MOD III depth gauge, corrected to ~~predicted~~ Approved MLLW). The surrounding depths, calculated by the HDAPS Side Scan Contact Utility with the ship's draft correction applied, are 18.6 meters. Due to the surrounding depths, the contact is insignificant. WHITING recommends general survey depths be charted in this area and the obstruction not be charted. CONCUR

N5. 8681.57

Contact 8681.57 was investigated by divers on June 29, 1995 (DN 180). WHITING divers conducted a 25 meter circle search at the position calculated using the HDAPS Side Scan Contact Utility and were unable to locate the contact. No obstruction exists; WHITING recommends general survey depths be charted in this area. Concur

In total, 10 contacts were noted on the side scan records from H-10600 with the same "box-like" shape. Dozens more of these objects were found on J sheet (H-10613) and G sheet (H-10609). In all cases in which divers investigated these items, the contacts were found to be metal arches similar to 7076.22P. Since none of these arches were determined to be a significant obstruction, several of the contacts on sheet H-10600 which were originally recommended for diver investigation were later dismissed as "insignificant". Concur

O. COMPARISON WITH THE CHART SEE ALSO Evaluation Report

Charted depths from chart 11480 (32nd ed., May 14/94, 1:449,659) and chart 11513 (21st ed., June 4/94, 1:80,000) were compared to H-10600 soundings. Soundings from H-10600 were rounded to the nearest fathom to enable comparison with chart 11480. Soundings from H-10600 were systematically deeper than charted depths from chart 11480. On average, soundings from H-10600 were one fathom deeper than the charted depths. None of the soundings were shoaler than the charted depths, and none were more than one fathom deeper.

Agreement with chart 11513 is good; seventy-five percent of the soundings from 11513 agree to within 0.5 meters, with 1.3 meters being the maximum observed difference. Splits run in the area where the maximum difference was located confirmed that the depths in the area are over a meter greater than the charted depth, based on ~~predicted~~ Approved tides.

P. ADEQUACY OF SURVEY SEE ALSO evaluation Report

All items found during this survey have been resolved. This survey is complete and adequate to supersede all prior surveys of the area.

Q. AIDS TO NAVIGATION

There are no aids to navigation within the survey area.

There are no submarine cables, pipelines or ferry routes within the survey limits.

R. STATISTICS

Number of Positions	5482
Main-scheme Sounding Lines (Nautical Miles)	785.77
Crosslines (Nautical Miles)	84.28
Square Nautical Miles Surveyed	30.52
Days of Production	22
Detached Positions	5
Bottom Samples	11
Tide Stations Installed	1
Current Stations	None
Number of CTD Casts	4
Magnetic Stations	None

S. MISCELLANEOUS *SEE ALSO Evaluation Report*

No anomalies in either tide or current and/or unusual magnetic variations were encountered in the survey area. No unusual submarine features were discovered.

Bottom samples were submitted to the Smithsonian Institution.

T. RECOMMENDATIONS *SEE ALSO SECTION P of The Evaluation Report*

H-10600 is complete and without inadequacies. No additional fieldwork is required.

U. REFERRAL TO OTHER REPORTS

There are no other relevant reports submitted as a part of OPR-G398-WH.

Submitted By:

Christopher Parrish

ENS Christopher Parrish, NOAA
Junior Officer, NOAA Ship WHITING

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-G398-WH

SURVEY H-10600 FIELD SHEET WH-10-4-95
ITEM NUMBER 7076.22 P
CHART NO. (largest scale) 11480

DESCRIPTION OR CROSS REFERENCE(S):

AWOIS POS: L ° ' " N
(NAD 83) λ ° ' " W

SSS POS: L 31° 52' 07.203" N
λ 080° 26' 48.973" W
E 61294.5
N 22481.0

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify)

DIVE DATA: Divers SHAVER / MICHALSKI
Time of Dive (UTC): Commenced Completed
Current Slack (0.5 kts) 1 kt 1.5+ kts Bottom Type (S) Sh M P
Visibility 0 1 2 3 4 5 6 (7) 8 9 >10 m

INVESTIGATION NOTES: Divers conducted circle search and found arches sticking off the bottom. Position the same as SSS Position

POSITION: Date/DN 28 JUNE '95 / 179 Time (UTC) 19:19:53 Fix # 3002
Easting 61297.2 Northing 22469.4
Latitude 31° 52' 06.826" N Longitude 080° 26' 48.872" W
LORAN C: W 14 X 31 Y 45459.7 Z ~~61141.4~~ 61141.4
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN / Time (UTC)
Method
S/N

Measured ~~Depth~~ Pressure: 1. 14.67 (IN) 2. 43.69 (L.D.) 3. 14.62 (OUT) Avg. m ft

Uncorrected Depth:	~~18.22~~ 19.53	meters
Tide Corrector:	~~.1~~ .13	meters
Draft Corrector:		meters
Velocity Corrector:		meters
CORRECTED LEAST DEPTH:	19.42	meters

computed by SMLGAUGE program

62.9 FT 63 PLOTTED

Recorder FPO Checked by ne

SEE D/R Section N, Page 9 for Charting Recomendations

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-~~G398~~-WH

SURVEY H-10600 FIELD SHEET WH 10-4-95
ITEM NUMBER 10059.42
CHART NO. (largest scale) _____

DESCRIPTION OR CROSS REFERENCE(S):

AWOIS POS: (NAD 83) L ° ' " N λ ° ' " W

SSS POS: L 31 ° 53 ' 35.398 " N λ 080 ° 29 ' 12.539 " W
E 57510.9
N 25183.0

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack (0.5 kts) 1 kt 1.5+ kts Bottom Type (S) Sh M P
Visibility 0 1 2 3 4 (5) 6 7 8 9 >10 m

INVESTIGATION NOTES: Upside down arches.

POSITION: Date/DN 6/29/95 / 180 Time (UTC) 15:10:29 Fix # 3008
Easting 57514.8 Northing 25214.8
Latitude 31 ° 53 ' 36.430 " N Longitude 080 ° 29 ' 12.386 " W
LORAN C: W 14 X 31 Y 45480.0 Z ~~61538~~ 59.1
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN 6/29/95 / 150 Time (UTC) 1500
Method MOD 3
S/N 68332 14.70 Pin

Measured Depth: 1. 42.95 psi 2. _____ 3. _____ Avg. _____ m ft

Uncorrected Depth:	19.46	meters
Tide Corrector:	-1.77	meters
Draft Corrector:	_____	meters
Velocity Corrector:	_____	meters
CORRECTED LEAST DEPTH:	~~17.7~~ 17.7	meters
	58 FEET	

Recorder WES Checked by MC

See D/R SECTION N, Pages 9 & 10 for Charting Recommendations

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-~~395~~-WH

SURVEY H-10600 FIELD SHEET WH-10-4-95
ITEM NUMBER 10242.07
CHART NO. (largest scale) _____

DESCRIPTION OR CROSS REFERENCE(S):

AWOIS POS: (NAD 83) L ° ' " N λ ° ' " W

SSS POS: L 31° 52' 58 " N λ 80° 28' 59 " W
E 57848.2
N 24060.2

METHOD OF INVESTIGATION: (circle)
Echosounder (Diver) Other (specify) _____

DIVE DATA: Divers 2
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack (0.5 kts) 1 kt 1.5+ kts
Visibility 0 1 2 3 4 (5) 6 7 8 9 >10 m
Bottom Type (S) Sh M P

INVESTIGATION NOTES:
Metal Box w/ legs

POSITION: Date/DN 6/29/95 / 180 Time (UTC) 15:59:22 Fix # 3012
Easting 57861.0 Northing 24066.6
Latitude 31° 52' 59.11 " N Longitude ° ' " W
LORAN C: W 14 X 31 Y 45475.9 Z 61155
(LORAN for AWOIS only. GRI = 79.80 ..E. United States.)

LEAST DEPTH: Date/DN 6/29/95 / 180 Time (UTC) _____
Method MOD 3
S/N 68332 Pin = 1469

Measured Depth: 1. _____ 2. _____ 3. _____ Avg. _____ m ft

Uncorrected Depth:	19.716	meters
Tide Corrector:	-1.1 -1.3	meters
Draft Corrector:	_____	meters
Velocity Corrector:	_____	meters
CORRECTED LEAST DEPTH:	~~18.4~~ 19. 18.613 60 feet.	meters

Recorder _____ Checked by _____

See D/R Section IV, Page 9 for Charting Recommendations

NOAA SHIP WHITING
ITEM INVESTIGATION REPORT
OPR-G398-WH

SURVEY H-10600 FIELD SHEET WH-10-4-95
ITEM NUMBER 8681.57
CHART NO. (largest scale) _____

DESCRIPTION OR CROSS REFERENCE(S):

AWOIS POS: (NAD 83) L ° ' " N λ ° ' " W

SSS POS: L ° ' " N λ ° ' " W
E 64743.8
N 32828.6

METHOD OF INVESTIGATION: (circle)
Echosounder Diver Other (specify) _____

DIVE DATA: Divers ___
Time of Dive (UTC): Commenced _____ Completed _____
Current Slack 0.5 kts 1 kt 1.5+ kts Bottom Type S Sh M P
Visibility 0 1 2 3 4 5 6 7 8 9 >10 m

INVESTIGATION NOTES: Nothing found

POSITION: Date/DN 6/29/95 / 180 Time (UTC) _____ Fix # 303
Easting _____ Northing _____
Latitude ° ' " N Longitude ° ' " W
LORAN C: W 14 X 31 Y 45 Z 61
(LORAN for AWOIS only. GRI = 7980, S.E. United States.)

LEAST DEPTH: Date/DN 6/29/95 / 180 Time (UTC) _____
Method MBD 3
S/N 68332 Pm

Measured Depth: 1. _____ 2. _____ 3. _____ Avg. _____ m ft

Uncorrected Depth: _____ meters
Tide Corrector: _____ meters
Draft Corrector: _____ meters
Velocity Corrector: _____ meters
CORRECTED LEAST DEPTH: _____ meters

Recorder _____ Checked by _____

See D/R, Section IV, Page 10 for Charting Recommendations

HORIZONTAL CONTROL STATIONS

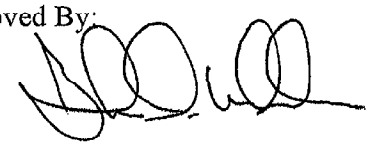
WHITING personnel erected a HF Differential GPS receiver/transmitter on the grounds of Skidaway Institute of Oceanography (station SKID). The position of the Skidaway mark was faxed from Field Photogrammetry Section to the WHITING on March 6, 1995. WHITING launches conducted DGPS performance checks using the Jones Island Range, Front Light as a known position. The positions are as follows:

Station:	**SKID**
Latitude:	31° 59' 19.22599" N
Longitude:	081° 01' 12.26294" W
Ellipsoid Ht:	-29.858 meters
Station:	**Jones Island Range, Front Light**
Latitude:	32° 02' 31.71243" N
Longitude	080° 51' 10.09256" W

APPROVAL SHEET
HYDROGRAPHIC SURVEY
OPR-G398-WH
1995
WH-10-4-95
H-10600

The data for this survey were acquired and checked under my daily supervision. Position and sounding accuracy meet the requirements specified in the Field Project Instructions, Hydrographic Manual, Hydrographic Survey Guidelines and the Field Procedures Manual for Hydrographic Surveying. This survey is complete and adequate for the intended purpose of delineating bottom topography, determining depths and identifying all potential dangers to navigation. No final field sheets were prepared for this survey. The survey data and accompanying records are complete for the preparation of the smooth sheet.

Approved By:



Commander John D. Wilder, NOAA
Commanding Officer, NOAA ship WHITING

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SERVICE
Office of Ocean and Earth Sciences
Silver Spring, Maryland 20910

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE: October 25, 1995

HYDROGRAPHIC BRANCH: Atlantic

HYDROGRAPHIC PROJECT: OPR-G398-WH

HYDROGRAPHIC SHEET: H-10600

LOCALITY: East of Tybee Island and the Savannah River Entrance

TIME PERIOD: April 26 - July 6, 1995

TIDE STATION USED: 867-1029 Tybee Marina, Ga.
Lat. 31° 59.8'N Lon. 80° 51.3'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): -0.05 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 6.8 ft.

REMARKS: RECOMMENDED ZONING

Apply a -20 minute time correction and a x0.93 range ratio to heights using Tybee Marina, Ga. (867-1029).

Notes: 1. Times are tabulated in Greenwich Mean Time.
2. Data for Tybee Marina, Ga. (867-1029) are temporarily stored in file #667-1029.

Caution: Tybee Marina, Ga. (867-1029) data are considered preliminary until vertical stability is verified with closing levels by the NOAA ship Whiting.

Walter M. Hughes

CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10600

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 11513, 11480	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	
GASKIN BANKS (title)	X		X							1
GEORGIA (title)	X		X							2
NORTH ATLANTIC OCEAN	X		X							3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
				Approved						18
										19
										20
				Chief Geographer						21
				JAN 19 1996						22
										23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

06/03/96

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10600

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	5482
NUMBER OF SOUNDINGS	31081

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	25	12/07/95
VERIFICATION OF FIELD DATA	88.50	03/11/96
QUALITY CONTROL CHECKS	0	
EVALUATION AND ANALYSIS	9	
FINAL INSPECTION	4	03/20/96
COMPILATION	18	05/30/96
TOTAL TIME	145	

ATLANTIC HYDROGRAPHIC BRANCH APPROVAL 03/27/96

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10600 (1995)

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

Hydrographic Processing System
NADCON, version 2.10
AUTOCAD, Release 12
QUICKSURF, version 5.1
MicroStation, version 5.0
I/RAS B, version 5.01

The smooth sheet was plotted using an ENCAD NovaJet III plotter.

H. CONTROL STATIONS

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). Office processing of this survey is based on these values. The smooth sheet has been annotated with ticks showing the computed mean shift between the NAD 83 and the North American Datum of 1927 (NAD 27).

To place this survey on the NAD 27, move the projection lines 0.785 seconds (24.165 meters or 2.40 mm at the scale of the survey) north in latitude, and 6.230 seconds (16.717 meters or 1.67 mm at the scale of the survey) east in longitude.

L. JUNCTIONS

H-10609 (1995) to the west
H-10613 (1995) to the south
H-10630 (1995) to the north

Standard junctions were effected between the present survey and surveys H-10609 (1995), H-10613 (1995), and H-10630 (1995).

There are no junctional surveys to the east.

M. COMPARISON WITH PRIOR SURVEYS

A comparison with prior surveys was not done during office processing in accordance with section 4. of the memorandum titled "Changes to Hydrographic Survey Processing", dated May 24, 1995.

O. COMPARISON WITH CHARTS 11480 (32nd Edition, May 14/94) 11513 (21st Edition, June 4/94)

Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparison with chart 11480 in section O. of the Descriptive Report. On chart 11513 present survey depths are in good agreement west of Longitude 80°29'W, with differences of plus or minus (±) 1 to 2 feet ($\pm 0^3$-0^6 m). East of Longitude 80°29'W present survey depths are as much as 7 feet (2^1 m) deeper than charted depths. These differences are attributed to natural change and improved surveying technology.

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

P. ADEQUACY OF SURVEY

This is an adequate hydrographic/side scan sonar survey. No additional work is recommended.

S. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

WHITING Processing Team

Franklin L. Saunders
Cartographic Technician

Norris A. Wike
Cartographer

APPROVAL SHEET
H-10600

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with NOS requirements except where noted in the Evaluation Report.

Robert G. Roberson Date: 27 MARCH 1996
Robert G. Roberson
Cartographer
Chief, Cartographic Section

I have reviewed the smooth sheet, accompanying data, and reports. This survey and accompanying digital data meet or exceed NOS requirements and standards for products in support of nautical charting except where noted in the Evaluation Report.

Nicholas E. Perugini Date: 27 March 1996
Nicholas E. Perugini
Commander, NOAA
Chief, Atlantic Hydrographic Branch

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Final Approval:

Approved: Andrew A. Armstrong III Date: July 2, 1996
Andrew A. Armstrong, III
Captain, NOAA
Chief, Hydrographic Surveys Division

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10600

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
11513	5-3-96	[signature]	Full ~~Part Before~~ After Marine Center Approval Signed Via FULL APP OF
			Drawing No. SNDGS FROM SS
11480	5-29-96	[signature]	Full ~~Part Before~~ After Marine Center Approval Signed Via FULL APP OF
			Drawing No. SNDGS FROM SS THRU 11513
411	9-3-96	[signature]	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. Applied through 411
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.