H10598

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. MI-10-1-95

Registry No. H-10598

LOCALITY

State Florida

General Locality Tampa Bay

Sublocality Sunshine Skyway Bridge

19 95

CHIEF OF PARTY
CDR R. L. Parsons

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DATE SEP 20 1996

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NOAA FORM 77-28
(11-72)

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

REGISTRY NUMBER:

H-10598

HYDROGRAPHIC TITLE SHEET

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 NUMBER:
MI-10-01-95 (E)

State: Florida

General locality: Tampa Bay

Locality: Sunshine Skyway Bridge

Scale: 1: 10,000 Date of survey: 24 April to 25 August 1995

Instructions dated: 03 March 1995 & 30 March 1995 Project Number: OPR-J343-MI-95

Vessel: NOAA Ship MT MITCHELL S-222

Chief of Party: CDR Roger L. Parsons

Surveyed by: J.A. Ferguson, T. Duffy, E. J. Van Den Ameele, J.D. Swallow, J.A. Mann, E.J. Sipos, R.H. Aldridge, R.C. Jones, S.A. Shaulis, U.L. Gardner,Jr., P.G. Lewit, M.J. Annis, E.R. Yniguez, C.A Neely, S. L. Scherer, M.S. Platz, and M. Wiseman.

Soundings taken by echo sounder, hand lead-line, or pole: DSF 6000N fathometer

c record scaled by: MT MITCHELL personnel

Graphic record checked by: MT MITCHELL personnel

Protracted by: N/A Automated plot by: ENCAD NOVAJET III (AHB) Zeta 936 Plotters (FIELD)

Verification by: Hydrographic Surveys Branch ATLANTIC HYDROGRAPHIC BRANCH PERSONNEL

Soundings in: Feet: ✓ (AHB) Fathoms: Meters: (*) (FIELD) at MLW: MLLW: (*):

Remarks: Basic Hydrographic and 200% Side Scan Sonar coverage of Mullet Key Channel, CUT"A" and CUT "B", including AWOIS 8795-8797,

Electronic Data Processing (EDP) numbers involved in data acquisition: 2223, 2224, 2225 and 2226.

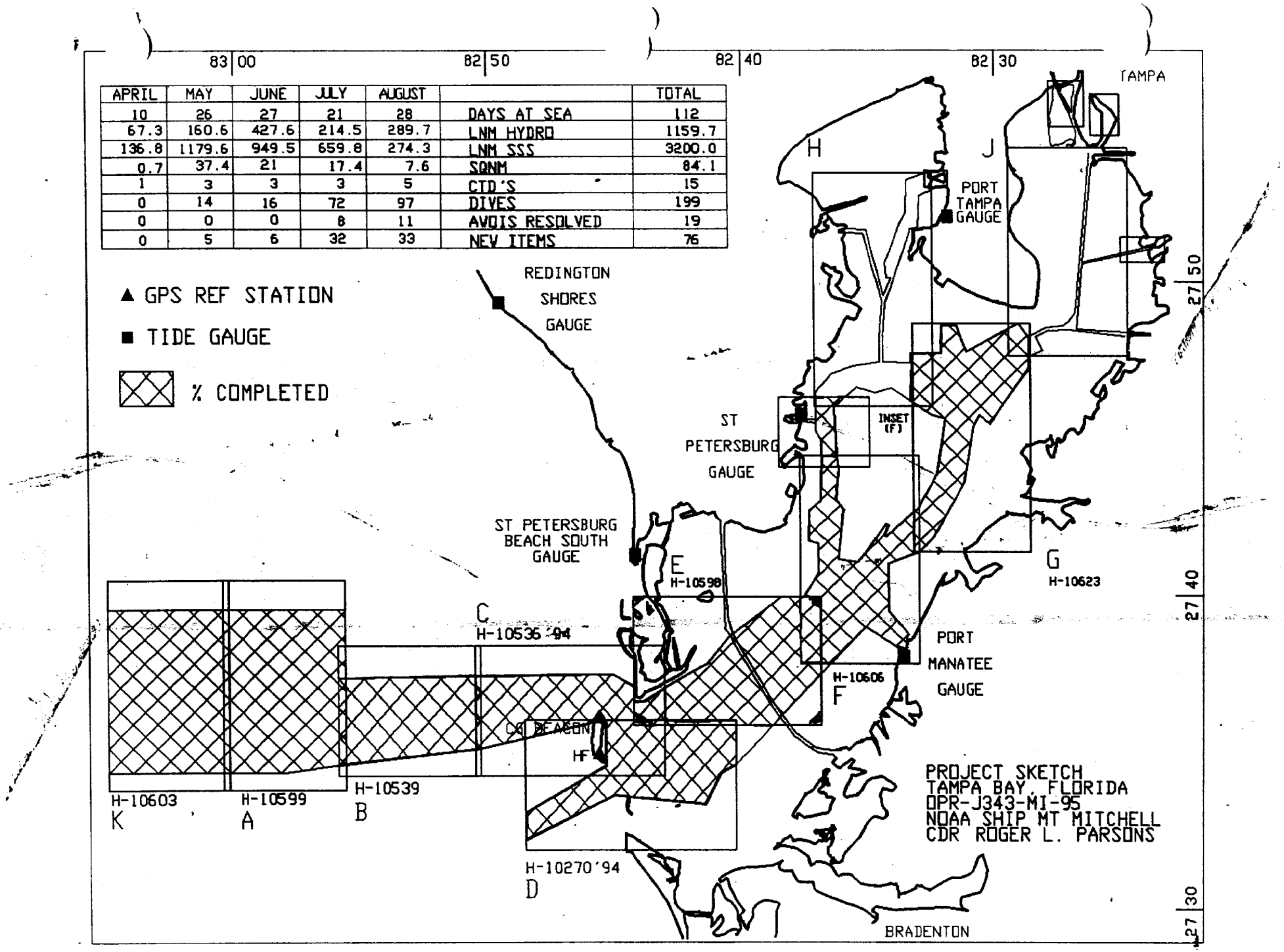
Time zones used: +0 (UTC) for data collection, +0 (UTC) for tidal data

NOTES IN RED WERE MADE DURING OFFICE PROCESSING

SURF/AWOIS 9/12/96 MCR

GKM 9/13/96 SEP 20 1996 SC

APRIL	MAY	JUNE	JULY	AUGUST		TOTAL
10	26	27	21	28	DAYS AT SEA	112
67.3	160.6	427.6	214.5	289.7	LNM HYDRO	1159.7
136.8	1179.6	949.5	659.8	274.3	LNM SSS	3200.0
0.7	37.4	21	17.4	7.6	SQNM	84.1
1	3	3	3	5	CTD'S	15
0	14	16	72	97	DIVES	199
0	0	0	8	11	AVOIS RESOLVED	19
0	5	6	32	33	NEW ITEMS	76



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A. PROJECT

A.1 This survey was conducted in accordance with Project Instructions OPR-J343-MI-95, Approaches to Tampa Bay, Florida.

A.2 The original date of the instructions is March 3, 1995.

A.3 Change No. 1: Amendment to Instructions is dated March 30, 1995 and concerns section 5.0 TIDES.

A.4 This sheet was designated by the project instructions as "Tampa Bay Sheet E". The registry number is H-10598. Registry number H-10594 was originally assigned, but was changed in the middle of the project. Therefore, some early data sets are numbered H-10594. However, **H-10598** is the official registry number.

A.5 Project OPR-J343-MI-95 is being conducted to accomplish a navigable area hydrographic survey, and to complete 200% side scan sonar coverage of the safety fairway and fairway anchorages at the approaches to Tampa Bay, Florida and in waters adjacent to dredged channels within Tampa Bay.

B. AREA SURVEYED

B.1 The H-10598 survey area encompasses a portion of Mullet Key Channel, Cut A and Cut B Channels from Buoys G "19" and R "20" eastward to Buoy's G "1B" and R "6A". Existing depths are between 2.3 7FT and 16.9 55FT meters. Survey limits were determined by shoal areas to the north and south of the dredged channels, corresponding approximately to the 20-foot contour. AWOIS Items #8795, #8796, and #8797 are included on this sheet. The frequent traffic in the area includes various deep draft vessels, barges, tugs, fishing boats, and pleasure craft.

B.2 The survey sheet is rectangular and delineated to the north and south by latitudes 027/39.9 N and 027/35.8 N respectively, and to the east and west by longitudes 082/36.9 W and 082/44.3 W, respectively.

The primary requirement on this survey sheet was basic hydrography. Two hundred percent side scan sonar coverage was conducted in Mullet Key Channel, Cut A and Cut B Channels as far north and south of the channel as water depths permitted.

B.3 Data acquisition began on April 24, 1995 (DN 114) and concluded on August 25, 1995 (DN 237).

C. SURVEY VESSELS

C.1 The following vessels were used during this survey:

VESSEL	ELECTRONIC DATA PROCESSING NUMBER	PRIMARY FUNCTION
JENSEN LAUNCH 1004 (MI-3)	2223	Hydrography/Side Scan Operations
JENSEN LAUNCH 1002 (MI-4)	2224	Bottom Sampling, Detached Positions
JENSEN LAUNCH 1021 (MI-5)	2225	Hydrography/Side Scan Operations, Detached Positions
JENSEN LAUNCH 1008 (MI-6)	2226	Hydrography/Side Scan Operations, Diving Operations, Detached Positions

C.2 There were no unusual vessel configurations used in this survey.

D. AUTOMATED DATA ACQUISITION AND PROCESSING

SEE ALSO THE EVALUATION REPORT.

D.1a) Survey data acquisition and processing were accomplished using the HDAPS system with the following software versions:

Program Name	Version	Date Installed
BACKUP	2.00	March 8, 1995
BASELINE	1.14	March 8, 1995
BIGABST	2.07	March 8, 1995
BIGAUTOST	3.01	March 8, 1995
BLKEDIT	2.02	March 8, 1995
CARTO	2.17	March 8, 1995
CLASSIFY	2.12	April 12, 1995
CONTACT	2.48	April 12, 1995
CONVERT	3.65	March 8, 1995
DAS_SURV	6.80	April 12, 1995
DIAGNOSE	3.05	March 8, 1995
DISK_UTIL	1.00	March 8, 1995
DP	2.18	March 8, 1995
DPCONVERT	1.03	March 8, 1995
DSNEDITS	1.04	March 8, 1995
EXCESS	4.32	March 8, 1995

FILESYS	3.31	March 8, 1995
GRAFEDIT	1.06	March 8, 1995
HIPSTICK	1.01	March 8, 1995
HPRAZ	1.26	March 8, 1995
INVERSE	2.02	March 8, 1995
LISTDATA	1.02	March 8, 1995
LOADNEW	2.13	March 8, 1995
LSTAWOIS	3.10	March 8, 1995
MAINMENU	1.20	March 8, 1995
MAN_DATA	3.02	March 8, 1995
NEWPOST	6.13	March 8, 1995
PLOTALL	2.32	March 8, 1995
POINT	2.12	March 8, 1995
PREDICT	2.01	March 8, 1995
PRESURV	7.11	March 8, 1995
PRINTOUT	4.04	March 8, 1995
QUICK	2.07	March 8, 1995
RAMSAVER	1.02	March 8, 1995
REAPPLY	2.12	March 8, 1995
RECOMP	1.04	March 8, 1995
SCANNER	1.00	March 8, 1995
SELPRINT	2.05	March 8, 1995
SYMBOLS	2.00	March 8, 1995
VERSIONS	1.00	March 8, 1995
ZOOMEDIT	2.33	March 8, 1995

D.1b) MOD III diver least-depth gauge measurements were processed by the following software programs:

Program Name	Version	Date Installed
SMLGAUGE	2.2	March 23, 1995
DAILYDQA	2.2	March 23, 1995

D.1c) Differential GPS performance checks were computed using *SHIPDIM* (Ver. 2.1) and a *LOTUS 1-2-3* spreadsheet.

D.2 Sound velocity correctors were computed using the following software versions:

Program Name	Version	Date Installed
CAT	2.0	December 18, 1992
VELOCITY	2.11	September 21, 1994

D.3 On DN 171-173, Vessel No. 2225 collected data with the incorrect time (56 minutes slow) entered in HDAPS. The datasets affected by this erroneous time (Fix # 5169-5628) were block edited to add 56 minutes to each record.

E. SIDE SCAN SONAR EQUIPMENT

E.1 Side Scan Sonar (SSS) operations were conducted using an EG&G Model 260-TH slant

range corrected side scan recorder and a Model 272-T (single frequency) towfish. The following list shows the equipment serial numbers and corresponding dates used.

VESSEL #	EQUIPMENT	S/N	DATES USED
2223	EG&G Recorder	0012102	DN 114 - 232
2223	EG&G Towfish	10823	DN 114 - 145
2223	EG&G Towfish	11591	DN 151 - 232
2225	EG&G Recorder	016672	DN 115 - 232
2225	EG&G Towfish	11591	DN 115 - 145
2225	EG&G Towfish	10823	DN 151 - 232
2226	EG&G Recorder	016669	DN 115 - 232
2226	EG&G Towfish	0011904	DN 115 - 232

E.2 The side scan sonar towfish was configured with a 20° beam depression, which is the normal setting.

E.3 The 100 KHz frequency was used throughout the entire survey.

E.4 **a)** For most areas of the sheet the 50 meter range scale was used for main scheme coverage. In sufficiently deep water (greater than 8 meters water depth) the 75 meter range scale was used. Significant sonar contacts were developed using the 25 meter range scale. Near the north and south shoal limits of the sheet, the 25 meter range scale proved practical for main scheme coverage, but only when running parallel to the bottom contours.

Line spacing for main scheme SSS coverage was 120 meters for the 75 meter range scale, 70 meter line spacing for the 50 meter range scale, and 30 meter line spacing for 25 meter range scale. Line spacing was adjusted to ensure sufficient overlap with adjacent lines.

b) Daily opening and closing confidence checks were obtained by towing the SSS towfish past fixed or floating aids to navigation, over the ship's anchor chain, or over distinguishable bottom features.

c) In general, 100% side scan sonar coverage was achieved by running lines oriented northeast-southwest, while the 200% coverage ran perpendicular to this, oriented northwest-southeast. AWOIS Items #8796 and #8797 required 200% side scan sonar coverage, which fell within the normal main scheme coverage. AWOIS Item #8795 required 400% coverage, so the existing main scheme lines were split when running these additional side scan lines. Side scan coverage was not attempted in the shoal area located between the South Fishing Pier and the Sunshine Skyway Bridge (southern end) due to the difficulty of maneuvering with cable deployed in this small area, and the likelihood of snagging bridge debris. Basic hydrographic soundings at 35 meter line spacing were conducted in this area.

d) The shoal areas along with the significant bottom features in the spoil areas occasionally caused the towfish to loose bottom tracking briefly, creating reduced coverage holidays on the swath plot. However, these brief losses of bottom tracking only condense the data on the SSS trace. Full swath coverage is maintained as long as the towfish actually remains above a depth of 8% of the range scale.

e) All towfish were deployed from the stern of the Jensen launches in a standard towing configuration.

E.5 Any contact appearing significant was entered into the contact tables. The tables were reviewed and correlating contacts examined. Adjacent and 200% side scan sonar coverage was scanned for each contact to see if it appeared on multiple traces. Contacts which occurred only once were labeled "NC" (no correlation), those appearing insignificant were labeled IN , and those appearing multiple times were closely examined and calculated heights compared. Significant contacts were selected for SSS/fathometer development and/or diver investigation. Upon completion, dives were labeled NFI (no further investigation). The developments are discussed in Section N.

E.6 Overlap was checked on-line using the real-time plot. The edited swath plot was checked for gaps during processing. Gaps were filled in by running additional side scan sonar lines where water depths permitted.

F. SOUNDING EQUIPMENT

F.1 All hydrographic soundings were acquired using a Raytheon 6000N digital survey fathometer (DSF). The following list shows the equipment serial numbers and corresponding dates used:

VESSEL #	MODEL	S/N	DATES USED
2223	DSF-6000N Echosounder	B046N	DN 114 - 135
2223	DSF-6000N Echosounder	B053N	DN 137 - 143
2223	DSF-6000N Echosounder	B047N	DN 144 - 151
2223	DSF-6000N Echosounder	B054N	DN 152 - 193
2223	DSF-6000N Echosounder	A108N	DN 194 - 202 (a.m.)
2223	DSF-6000N Echosounder	B047N	DN 202 - 237
2224	DSF-6000N Echosounder	B054N	DN 115 - 138
2224	DSF-6000N Echosounder	B053N	DN 151 - 237
2225	DSF-6000N Echosounder	B053N	DN 115 - 130
2225	DSF-6000N Echosounder	C066	DN 130 - 137

2225	DSF-6000N Echosounder	B042N	DN 138 - 201
2225	DSF-6000N Echosounder	B054N	DN 202 - 214
2225	DSF-6000N Echosounder	A110N	DN 215 - 237
2226	DSF-6000N Echosounder	C066	DN 115 - 116
2226	DSF-6000N Echosounder	B047N	DN 116 - 141
2226	DSF-6000N Echosounder	B046N	DN 142 - 237

F.2 No other sounding equipment was used during this survey. System checks on launch fathometers were performed using lead lines in the survey area at depths less than 10 meters. The lead lines were calibrated as per instructions in the Hydrographic Manual section 7.2.1.2. Refer to **Separate IV*** for calibration data and a listing of lead line checks.

F.3 No problems were encountered with data acquisition using the DSF-6000 fathometers.

F.4 Both the high (100 KHz) and the low (24 KHz) frequency sounding data were recorded during data acquisition. Only high frequency soundings were selected for plotting. Both high and low frequency sounding data were examined for spikes and deeps indicating bottom relief. These spikes and deeps were added as inserts to the digital records and plotted.

G. CORRECTIONS TO SOUNDINGS

G.1a) The velocity of sound through water was determined using SeaCat Conductivity-Temperature-Density (CTD) sensors manufactured by Sea-Bird Electronics, Inc. (serial numbers 192472-0284 and 192472-0285, respectively).

A Data Quality Assurance (DQA) Test was conducted with each velocity cast to ensure that the instruments were within tolerance. DQA tests were done with hydrometers calibrated by using standards of the National Institute of Standards and Technology which conform to and satisfy the requirements set for this project.

All sound velocity data were processed using *VELOCITY* Version 2.11 and *CAT* Version 2.00 software. The computed velocity correctors were entered into the HDAPS sound velocity tables and applied on-line to digitized high frequency soundings except for data collected on the days of the casts. Data was reapplied for those days. Refer to **Separate IV*** for dates and positions of casts and for sound velocity correctors applied to this survey.

b) There was no variation in the DSF-6000N instrument initial.

c) No instrument correctors to the DSF-6000N were required.

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d) No instrument corrections were determined from direct comparison of lead-line checks. Refer to **Separate IV** for a list of leadline checks for each launch.

e) All sounding correctors were applied to both the narrow (100 kHz) and the wide (24 kHz) beams.

f) The static draft of the launches (VesNos. 2223, 2224, 2225, 2226) were determined in February, 1995. A calibrated steel tape was used to measure the distance from the transducer to a reference line on the launch above the waterline. The launches were then put in the water and the distance from the waterline to the reference line was measured. Static drafts were used in HDAPS offset tables online and during post-processing for all launches. Refer to **Separate III** * for the offset tables. There was no significant difference between the static draft measured in the Elizabeth River and the static draft measured in the project area.

g) Settlement and squat correctors for each launch were determined, using procedures outlined in the Hydrographic Manual, on the Elizabeth River in 1995 (2223 and 2226 in February, 2224 and 2225 in April). An observer, stationed with a level on a pier, measured changes in relative height as each launch ran toward and away from the observer at various speeds. Settlement and squat correctors were applied to soundings through the HDAPS offset table. Refer to **Separate IV*** for results of the static and dynamic draft determinations.

h) None of the launches are equipped with a heave, roll, and pitch sensor. Sea action on the fathogram from the launches was scanned out during processing.

G.2 The HDAPS program "Reapply" was used for data collected on the day of a velocity cast. On that day the launches ran on velocity table 0, and on the appropriate table thereafter. Once the new HDAPS velocity table became available the data was reapplied correspondingly.

G.3 Velocity zoning was not required and there were no special correctors applied to the fathometers.

G.4 Pneumatic depth gauges were not used during this survey. The MOD III pressure gauge was used for least depth determination during diver investigations. A DQA was performed once daily during non-dive days and before and after dive operations on dive days. The DQA was performed by comparing the MOD III gauge to the ship's barometer and entering the readings into the DAILYDQA program. DQA results are included in **Separate IV**.*

G.5 Frequently sea conditions affected the fathogram, creating a trace of constant peaks and deeps. Launches are not equipped with heave, pitch and roll sensors. To compensate, the sea action was scanned out manually and selected sounding depths were edited during processing.

G.6

a) The tidal datum for this project is Mean Lower Low Water (MLLW). The operating tide

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station at St. Petersburg, Florida (station number 872-6520) served as the primary reference station for datum determination of smooth tides. Predicted tides for the St. Petersburg gage were provided on magnetic (floppy) disk before the start of the project. Refer to **Appendix V*** for complete tidal information.

b) The data from the disk were used to generate predicted tide correctors for the tide tables. The tide tables were applied on-line and during processing of sounding data. A copy of the tide tables is included in **Separate IV.***

c) Zoning was required for this project. This survey crossed Zones 3, 4, and 5, requiring the following corrections to the primary reference station:

Zone	Time Corr.	Range Ratio
3	-2 hrs	0.96
4	-1hr 30m	1.00
5	-45m	1.00

Refer to **Appendix V*** for information about zoning. APPROVED ZONING AND TIDES WERE APPLIED DURING OFFICE PROCESSING.

H. CONTROL STATIONS

H.1 The horizontal datum for this project is the North American Datum of 1983 (NAD 83).

H.2 Two DGPS reference stations were used to control this survey. The list of horizontal control stations is located in **Appendix III.** APPENDED TO THIS REPORT.

H.3 Station TAMPA PILOTS on Egmont Key, Florida was recovered and position verified by MT. MITCHELL personnel on April 24, 1995. This position was used to set up a NOAA High Frequency (HF) DGPS system for secondary horizontal control of the project. Program *MONITOR* version 2.0 was run for 24 hours once the system was established to confirm the position and ensure that no multi-path or other site specific problems existed. This was done by setting up an Ashtech M-XII receiver connected to a Magnavox MX-50R beacon receiver over the mark and comparing the known position to the computed position. The MX-50R received the differential correctors from the U.S. Coast Guard beacon on Egmont Key, Florida. See **Appendix III*** for the *MONITOR* output.

H.4 The TAMPA PILOTS station mark was recovered in Egmont Key, Florida using the North American Datum of 1983 (NAD 83).

H.5 No horizontal control stations were established by MT MITCHELL during this survey. However, the Field Surveys Unit of the Field Photogrammetry Section conducted a horizontal

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control survey in the Tampa Bay area during the previous year to establish and verify landmarks and fixed aids to navigation for MT MITCHELL's hydrographic surveys.

H.6 No position anomalies, problems, or unconventional survey methods occurred during recovery of horizontal control for this project.

I. HYDROGRAPHIC POSITION CONTROL

I.1 The primary method of sounding position control was Differential Global Positioning System (DGPS).

I.2 In accordance with the Field Procedures Manual (FPM), the maximum expected positional error (EPE) for this survey was 15 meters (1.5 mm at a survey scale of 1:10,000). At no time in this survey did the estimated position error (EPE) consistently exceed 15 meters.

I.3 The NOAA-HF DGPS shore system consists of:

SITE	MODEL	S/N	DATES USED
Shore	Ashtech M-XII Receiver	700354B2501	DN 114 - 216
Shore	Ashtech M-XII Receiver	700354B2504	DN 217 - 231
Shore	L1/L2 GPS Antenna	700228D2311	DN 114 - 216
Shore	L1/L2 GPS Antenna	700228D2313	DN 217 - 227
Shore	L1/L2 GPS Antenna	700228D2311	DN 228 - 231
Shore	Raytheon 152 Transceiver	BS29252	DN 114 - 231
Shore	LRD-2 Data Modulator	606	DN 114 - 158
Shore	LRD-2 Data Modulator	613	DN 159 - 231

On each launch there is an Ashtech GPS receiver, a Magnavox MX-50R DGPS beacon receiver for U.S.Coast Guard differential beacons, and a LRD-1 long range data receiver for the NOAA-HF DGPS system. The ship also has the same equipment but is set up to monitor two reference stations simultaneously. The units used are as follows:

YESSEL #	MODEL	S/N	DATES USED
2220	Ashtech DGPS Receiver	700417B1004	DN 114 - 237
2220	Ashtech DGPS Receiver	700417B1129	DN 114 - 237
2220	LRD-1 HF Receiver	205	DN 114 - 237
2220	Magnavox MX-50R	315	DN 114 - 237
2220	Magnavox MX-50R	316	DN 114 - 237
2220	GPS Antenna (Stbd)	700391A0270	DN 114 - 237
2220	GPS Antenna (Port)	700391A0451	DN 114 - 237

2223	Ashtech DGPS Receiver	700417B1196	DN 114 - 237
2223	LRD-1 HF Receiver	249	DN 114 - 237
2223	Magnavox MX-50R	168	DN 114 - 237
2223	GPS Antenna	700391A0533	DN 114 - 237
2224	Ashtech DGPS Receiver	700417B1190	DN 115 - 237
2224	LRD-1 HF Receiver	250	DN 115 - 139
2224	Magnavox MX-50R	207	DN 115 - 237
2224	GPS Antenna	700378A0468	DN 115 - 237
2225	Ashtech DGPS Receiver	700417B1182	DN 115 - 237
2225	LRD-1 HF Receiver	206	DN 115 - 139
2225	LRD-1 HF Receiver	250	DN 141 - 237
2225	Magnavox MX-50R	215	DN 115
2225	Magnavox MX-50R	313	DN 116 - 121
2225	Magnavox MX-50R	117	DN 122 - 237
2225	GPS Antenna	700391A0517	DN 115 - 237
2226	Ashtech DGPS Receiver	700417B1197	DN 115 - 237
2226	LRD-1 HF Receiver	299	DN 115 - 237
2226	Magnavox MX-50R	219	DN 115 - 237
2226	GPS Antenna	700378A0232	DN 115 - 137
2226	GPS Antenna	700391A0509	DN 138 - 237

I.4 As stated in section **H.2**, two DGPS reference stations were used: U.S.C.G. Egmont Key beacon and a NOAA-HF DGPS shore system also on Egmont Key. To ensure EPE's of less than 15 meters the following $HDOP_{max}$'s were determined using the formula from FPM section 3.4.2.

Station	ESE	EDE	Max. HDOP
NOAA HF	4	0.3	3.7
USCG Egmont Key	4	0.3	3.7

DGPS performance checks were performed by comparing positioning from two independent DGPS stations. The inverse distance between the two independent stations' positions was computed to ensure it did not exceed the EPE_{max} of 15 meters. For the comparison, the launches would lay dead in the water alonside each other with their GPS antennae as close as possible. The launches would then simultaneously mark their position by dumping the on-line HDAPS screen to the printer. The Easting and Northing values from each launch, along with the HDOP, and number of satellites used were entered into the *LOTUS 1-2-3* spreadsheet for computation of position error. The performance checks were done with each launch on a different DGPS reference station for most of the checks but occasionally on the same station. When the same station was used a performance check was obtained aboard MT. MITCHELL

using the *SHIPDIM* program which monitored two independent stations. These checks were attempted once per week but were subject to down days due to bad weather. A copy of the performance checks is included in **Separate III.** *

MT. MITCHELL monitored two reference stations and recorded performance checks with the *SHIPDIM* program (version 2.1) during all periods of hydrography. The outlier files produced by the file were reviewed daily. A printed copy of the performance checks is included in **Separate III.** *

I.5 No calibration data were applied to the DGPS raw positioning data.

I.6

a) No unusual methods of calibrating the electronic positioning equipment were used.

b) No equipment malfunctions were encountered.

c) Localized thunderstorms occasionally downgraded the signals of the DGPS stations and correctors would not be received for a few seconds at a time. After 30 seconds of losing correctors, HDAPS goes into a dead reckoning (DR) mode. After 30 seconds of being in DR mode, HDAPS stops data collection. Survey operations would stop until the signal returned or the control was changed. If the signal was lost for only a few seconds, and it was felt that the course was steady through the period, data collection would continue.

d) Weak signals were only observed during the strong thunderstorms associated with this project area. These thunderstorms adversely affected the NOAA HF fly-away station signal much more readily than the U.S.C.G. beacon signal. Consequently, the U.S.C.G. beacon was used almost exclusively.

e) No systematic errors were observed.

f) Antenna positions were corrected for offset and layback, and referenced to the position of the DSF-6000N transducer. These correctors were located in the HDAPS Offset table, and applied on-line to the positioning algorithm. Refer to **Separate III** * for a copy of offset tables used during this survey.

g) Offset and layback distances for the boom (tow point) were located in the HDAPS Offset table and applied on-line. The values of the offsets and laybacks are included in the same tables as discussed in section **f)** above. These values, along with the cable length, towfish height, and depth of water, were used by the HDAPS system to compute the position of the towfish.

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J. SHORELINE See also the Evaluation Report.

Shoreline verification was not required for this survey.

K. CROSSLINES

K.1 Crosslines on survey H-10598 were obtained by running eleven north and south hydrographic lines across the sheet. In addition, the second 100% side scan sonar lines were run perpendicular to the first 100% yielding a total crossline coverage of 45%. Overlapping soundings were compared for agreement.

K.2 Crossline to main-scheme sounding intersection comparisons were very good, with most of the soundings agreeing to within 0.5 meters or less. Some of the sounding line intersections occurred over steep bottom features found along the dredged edge of the channel, where a distance of only a few meters could reveal a large change in the water depth. All of the soundings, however, conformed to the contours of the channel or surrounding area.

K.3 The differences stated above could be attributed to to unequal scanning for mean depths during days of sea wave heights greater than 0.5 meters.

K.4 Soundings were collected with all the vessels listed for this survey. Direct comparison between those soundings yielded very good agreement.

L. JUNCTIONS See also the Evaluation Report.

L.1 The western edge of this survey sheet junctions with the eastern edge of survey sheet H-10536 and the southwestern edge of this survey sheet junctions with the northeastern edge of survey H-10270. Both of these surveys were run by MT MITCHELL personnel during the previous field season and are at the same scale as this survey. In addition, the northeastern edge of this survey sheet junctions with the southwestern edge of survey H-10606, which was conducted by MT MITCHELL personnel during the same time frame and at the same scale as this survey.

L.2. Agreement between H-10536, H-10270, H-10606 and this survey is very good. The soundings generally agree to within 0.5 meters. No side scan sonar contacts contained within shared coverage were found.

L.3. Because of good junction agreement, no further investigation is warranted.

L.4. No adjustments to soundings or features shared between these surveys are

recommended.

M. COMPARISON WITH PRIOR SURVEYS *See also the Evaluation Report*

M.1 The following surveys are the most recent prior surveys in the H-10598 survey area available for comparison:

Registry #	Scale	Year
H-8427	1:20,000	1958
H-8428	1:20,000	1958

M.2 Observed depths from a final 1:20,000 scale plot of this survey were compared to soundings from prior survey H-8427 and H-8428. Soundings show generally good agreement outside the navigation channel, with prior survey depths varying from 0.6 meters shoaler to 0.9 meters deeper in no consistent trend. Soundings within the channel are generally 6 meters deeper than during the prior survey.

M.3 There are no significant features from surveys H-8427 or H-8428 that have not been verified by this survey.

M.4 There were no significant shoaling trends observed.

M.5 There were no contemporary non-NOS surveys in this area available for comparison.

N. ITEM INVESTIGATIONS

N.1 AWOIS ITEM INVESTIGATIONS

There were three AWOIS items assigned for this survey area. Descriptions are as follows:

AWOIS 8795

State and Locality: Tampa Bay, Florida

Charted Position: 027/36/31.12 N 082/43/21.36 W

Search Radius: 400 meters

Type of Feature: Obstruction

Source: LNM31/77--7TH CGD.

Survey Requirements: 400% Side Scan Sonar Development, Dive; to locate an unknown obstruction.

Method of Investigation: 100% and 200% coverage was obtained during normal side scan sonar coverage of the area. 300% and 400% coverage was run perpendicular to each other within the search radius.

Results of Investigation: The obstruction was not found. All side scan sonar contacts within the search radius were considered insignificant.

Comparison with Prior Surveys: Item not on prior surveys.

Comparison with Chart: *Obstn PA* charted at above position.

Recommendation: Delete *Obstn PA* from the chart. Update this area with soundings obtained from this survey. Concur

AWOIS 8796

State and Locality: Tampa Bay, Florida

Charted Position: 027/37/05.12 N 082/39/29.35 W

Search Radius: 100 meters

Type of Feature: Obstruction

Source: LNM32/80--7TH CGD.

Survey Requirements: 200% Side Scan Sonar Development, Echosounder, Dive; to locate the remains of the Sunshine Skyway Bridge.

Method of Investigation: 100% and 200% coverage was obtained during normal side scan sonar coverage of the area. Significant contacts were further developed with sonar at 25 meter range scale to pinpoint their position for dive investigation.

Results of Investigation: Two significant contact groupings were located on side scan sonar, warranting a dive investigation. See **Dive Items E-412** and **E-416.**

Comparison with Prior Surveys: Item not on prior surveys.

Comparison with Chart: Chart shows bridge being removed .

Recommendation: Delete *Obstn PA* from the chart. CONCUR Add dashed lines as shown on field sheet to delineate the entire length of the old Skyway Bridge as an area foul with bridge debris, with the exception of the navigation channel. Update this area with soundings obtained from this survey. Chart "submerged pilings, least depth 8.7 meters (25 FT)" to mark the danger nearest the channel in position: DO NOT CONCUR. USE DIVE E-416, PAGES 24 AND 25, CHARTING RECOMENDATION

027/37/04.53 N
082/39/30.22 W

AWOIS 8797

State and Locality: Tampa Bay, Florida

Charted Position: 027/37/22.61 N 082/39/37.85 W

Search Radius: 150 meters

Type of Feature: Unknown

Source: CL739/54--COE, Jacksonville District.

Survey Requirements: 200% Side Scan Sonar Development, Echosounder, Dive; to locate wreckage of a concrete batching plant.

Method of Investigation: 100% and 200% coverage was obtained during normal side scan sonar coverage of the area. Significant contacts were further developed with sonar at 25 meter range scale to pinpoint their positions for dive investigations.

Results of Investigation: Two significant contact groupings were located on side scan sonar, warranting dive investigations. See **Dive Items E-44** and **E-45**.

Comparison with Prior Surveys: Item not on prior surveys.

Comparison with Chart: Wreck symbol charted at above position.

Recommendation: Delete wreck symbol from the chart. Add dashed lines as shown on field sheet to delineate the entire length of the old Skyway Bridge as an area foul with bridge debris. Update this area with soundings obtained from this survey. CONCUR. DO NOT CHART DASHED LINES.

N.2 DIVE INVESTIGATIONS

NOTE: All depths are raw least depths uncorrected for smooth tides.

Dive Item E-33

Position: 027/35/54.88 N 082/40/49.93 W

Type of Feature: Sunken Wreck

Least Depth of Feature: ~~1.2~~ 6.3 meters (20 FT)

Surrounding Water Depth: ~~8.5~~ 7.0 meters (23 FT)

Description: A dive was conducted on DN 220 to investigate side scan sonar contacts 4784.46 and 6555.56. Divers descended down a buoy line dropped on the contact site and discovered a 19 foot long metal hulled vessel similar to an aluminum Sea Ark, 7 feet wide. The MOD III gauge least depth was measured on the windshield, about 5 feet off of the bottom, at Detached Position 2787.

Recommendation: Chart a "sunken wreck, least depth ~~1.2~~ 6.3 (20 FT) meters". Concur. Chart as 20 WK

Dive Item E-38

Position: 027/36/40.32 N 082/42/33.30 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.1~~ 7.2 meters (23 FT)

Surrounding Water Depth: 8.2 meters (27 FT)

Description: A dive was conducted on DN 218 to investigate side scan sonar contacts 6781.19 and 4831.62. Divers descended down a buoy line dropped on the contact site and discovered a 45 foot long metal pipe, 3 feet in diameter, resting horizontally on the bottom. The MOD III gauge least depth was measured at Detached Position 2777.

Recommendation: This item is insignificant compared to surrounding depths, do not chart. Do NOT Concur. Chart as 23 Obstn

Dive Item E-39

Position: 027/36/20.95 N 082/42/06.81 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.2~~ 7.3 meters (24 FT)

Surrounding Water Depth: ~~9.6~~ 8.5 meters (28 FT)

Description: A dive was conducted on DN 219 to investigate side scan sonar contacts 6075.78 and 6716.34. Divers descended down a buoy line dropped on the contact site and discovered a 24 foot long metal tank 5.5 feet in diameter. The MOD III gauge least depth was measured on the northwest end of the tank, at Detached Position 2781.

Recommendation: Chart an "obstruction, least depth ~~8.2~~ 7.3 (24 FT) meters". Concur, Chart as 24 Obstn

Dive Item E-316

Position: 027/36/47.155 N 082/43/04.468 W

Type of Feature: Obstruction

Least Depth of Feature: ~~7.0~~ 6.1 meters (20 FT)

Surrounding Water Depth: ~~7.3~~ 6.4 meters (21 FT)

Description: A dive was conducted on DN 218 to investigate side scan sonar contacts 6857.04 and 6666.44. Divers descended down a buoy line dropped on the contact site and discovered a 20 foot square concrete slab, one foot high. The MOD III gauge least depth was measured at Detached Position 2776.

Recommendation: Item is insignificant compared to surrounding depths, do not chart. Do NOT Concur Chart A 20 Obstn

Dive Item E-41

Position: 027/37/45.93 N 082/40/16.08 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.6~~ 7.3 meters (25 4 FT)

GLM 9/17/96

Surrounding Water Depth: ~~9.1~~ 7.7 meters (25 5 FT)

Description: A dive was conducted on DN 219 to investigate side scan sonar contacts 3687.77, 5442.27, and 5444.34. Divers descended down a buoy line dropped on the contact site and discovered a 6 foot square concrete block, 2.5 feet high. The MOD III gauge least

depth was measured at Detached Position 2783.

Recommendation: Item insignificant, do not chart. CONCUR

Dive Item E-42

Position: 027/37/43.82 N 082/40/23.43 W

Type of Feature: Obstruction

Least Depth of Feature: ~~7.6~~ 6.9 meters (22 FT)

Surrounding Water Depth: ~~7.7~~ 7.0 meters (23 FT)

Description: A dive was conducted on DN 178 to investigate side scan sonar contacts 3647.04, 5450.14, and 5454.21. Divers descended down a buoy line dropped on the contact site and discovered a 3 foot by 5 foot concrete block, 4 feet high, resting in a three sided depression. The MOD III gauge least depth was measured at Detached Position 2759.

Recommendation: Item is insignificant compared to surrounding depths, do not chart. CONCUR

Dive Item E-43

Position: 027/37/35.607 N 082/40/14.223 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8~~ 7.5 meters (24 FT)

Surrounding Water Depth: ~~8.4~~ 8.2 meters (27 FT)

Description: A dive was conducted on DN 219 to investigate side scan sonar contacts 3668.07, 5432.38, and 5434.18. Divers descended down a buoy line dropped on the contact site and discovered two concrete blocks side by side, 4 foot by 5 foot square, 3 feet high. The MOD III gauge least depth was measured at Detached Position 2784.

Recommendation: Chart an "obstruction, least depth 8.5 meters". CONCUR. CHART AS 24 Obstn

Dive Item E-44

In AWOIS No: 8797

Position: 027/37/23.00 N 082/39/39.38 W

Type of Feature: Sunken Wreck

Least Depth of Feature: ~~7.1~~ 6.3 meters (20 FT)

Surrounding Water Depth: 9.1 meters (30 FT)

Description: A dive was conducted on DN 220 to investigate AWOIS 8797 (wrecked parts of a concrete batching plant). A dive was conducted on significant side scan sonar contacts 3793.62, 3793.64, 5410.1 and 5386.29. Divers descended down a buoy line dropped on the contact site and discovered heaps of concrete and metal bar rubble scattered over an area of 60 square feet. The largest pile of rubble was 16 feet wide and 8 feet high. This is where the MOD III gauge least depth was measured, at Detached Position 2788.

Recommendation: Remove the wreck symbol at this position, CONCUR delineate this area as part of the area foul with bridge debris, bracketed between dashed lines along the entire length of the old Skyway Bridge. CHART A 20 Obstn. DO NOT CHART DASHED LINES.

Dive Item E-45

In AWOIS No: 8797

Position: 027/37/20.22 N 082/39/37.16 W

Type of Feature: Sunken Wreck

Least Depth of Feature: ~~6.7~~ 5.9 meters (19 FT)

Surrounding Water Depth: 9.5 meters (31 FT)

Description: Divers continued with a second dive on DN 220 in the same radius of AWOIS #8797 (wrecked parts of a concrete batching plant), to investigate significant side scan sonar contacts 3099.18 and 3793.861. Divers conducted a 50 meter circle search and discovered heaps of concrete rubble and metal rods scattered over an area of 60 square feet. The highest rod was 8 feet high, where the MOD III gauge least depth was measured, at Detached Position 2789.

Recommendation: Remove the wreck symbol at this position, delineate this area as part of the area foul with bridge debris, bracketed between dashed lines along the entire length of the old Skyway Bridge. CONCUR CHART A 19 OBSTN. DO NOT CHART DASHED LIMITS

Dive Item E-47

Position: 027/36/39.81 N 082/40/34.17 W

Type of Feature: Obstruction

Least Depth of Feature: 8.~~8~~ 7 meters (27 FT)

Surrounding Water Depth: 9.4 meters (31 FT)

Description: A dive was conducted on DN 179 to investigate side scan sonar contacts 3130.43, 3503.88, 5456.28 and 5458.27. Divers descended down a buoy line dropped on the contact site and discovered a round, hollow concrete object 6 feet in diameter covered with marine growth. The MOD III gauge least depth was measured at Detached Position 2775.

GLM 4/30/96

Recommendation: Chart an "obstruction, least depth 8.~~8~~ 7 meters" (27 FT). ~~DO NOT CONCUR. CHART SHOALER DEPTHS IN IMMEDIATE AREA.~~

Dive Item E-48

Position: 027/36/28.70 N 082/40/17.21 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.2~~ 7.3 meters (24 FT)

Surrounding Water Depth: ~~9.6~~ 8.5 meters (28 FT)

Description: On DN 219 divers investigated side scan sonar contacts 3167.47 and 3543.45, and discovered a 24 foot long metal cylindrical tank on its side, 6 feet high. The MOD III gauge least depth was measured at Detached Position 2782.

Recommendation: Chart an "obstruction, least depth ~~8.2~~ 7.3 meters" (24 FT). CONCUR. CHART AS 24 OBSTN

Dive Item E-49

Position: 027/36/16.71 N 082/39/07.73 W

Type of Feature: Obstruction

Least Depth of Feature: ~~5.0~~ 4.2 meters (14 FT)

Surrounding Water Depth: ~~7.1~~ 6.3 meters (20 FT)

Description: A dive was conducted on DN 179 to investigate side scan sonar contacts 3292.85, 3801.31, 5426.23, 5428.11 and 5430.24. Divers descended down a buoy line dropped on the contact site and discovered a 9.5 foot by 16 foot square concrete (or metal) block approximately 7 feet high. The MOD III gauge least depth was measured on a 0.5 foot metal post sticking out of the block, at Detached Position 2767.

Recommendation: Chart an "obstruction, least depth ~~5.0~~ 4.2 (14 FT) meters". CONCUR. CHART AS 14 OBSTN

Dive Item E-410

Position: 027/37/11.63 N 082/39/33.68 W

Type of Feature: Submerged Pilings

Least Depth of Feature: 8.~~8~~ 3 meters (27 FT)

Surrounding Water Depth: 10 meters (33 FT)

Description: On DN 178 divers investigated side scan sonar contacts 3794.61, 5402.10, 5404.35 and 5408.34, discovering eight wood pilings of various heights, the tallest 9 feet off of the bottom. The MOD III gauge least depth was measured at Detached Position 2760. See also Dive Item E-411.

Recommendation: Chart "submerged pilings, least depth 8.~~8~~ 3 (27FT) meters". CONCUR. CHART AS 27 OBSTNS TO INCLUDE THE 27 OBSTRUCTION FOUND ON DIVE ITEM E-411.

Dive Item E-411

Position: 027/37/10.60 N 082/39/33.83 W

Type of Feature: Submerged Pilings

Least Depth of Feature: 8.~~8~~ 2 meters (27 FT)

Surrounding Water Depth: 10 meters (33 FT)

Description: A dive was conducted on DN 179 to investigate side scan sonar contacts 3794.72 and 5404.29. Divers descended down a buoy line dropped on the contact site and discovered 12 wood pilings of varying heights, similar to **Dive Item E-410**, but located 30 meters further to the south at Detached Position 2771. The MOD III gauge least depth was measured on the highest pile, 10 feet off of the bottom.

Recommendation: Chart "submerged pilings, least depth ~~8.8~~ 2 (27 FT) meters" to mark the danger nearest the channel. Chart the item within the dashed lines bounding the area foul with bridge debris along the entire length of the old Sunshine Skyway Bridge. – CONCUR DO NOT CONCUR, SEE DIVE ITEM E-410 FOR CHARTING RECOMMENDATION

Dive Item E-412

In AWOIS No: 8796

Position: 027/37/05.19 N 082/39/25.76 W

Type of Feature: Obstruction

Least Depth of Feature: ~~5.5~~ 4.8 meters (15 FT)

Surrounding Water Depth: ~~8.4~~ OR meters (27 FT)

Description: On DN 232 divers investigated a significant grouping of side scan sonar contacts in AWOIS 8796 (remains of Sunshine Skyway Bridge), contacts 3814.04, 5418.06 and 5418.08. Divers conducted a 50 meter circle search of the contact site and discovered a 24 foot by 30 foot area heaped with concrete rubble, rocks, metal I-beams and metal rods. The MOD III gauge least depth was measured at Detached Position 2794.

Recommendation: Delete Obstn PA , chart an "obstruction, least depth ~~5.5~~ 4.8 (15 FT) meters". CONCUR CHART AS 15 OBSTN

Dive Item E-414

Position: 027/37/18.06 N 082/39/54.12 W

Type of Feature: Obstruction

Least Depth of Feature: ~~7.5~~ 6.7 meters (22 FT)

Surrounding Water Depth: ~~9.1~~ 7.9 meters (26 FT)

Description: A dive was conducted on DN 218 to investigate side scan sonar contacts 3096.34

and 3724.74. Divers descended down a buoy line dropped on the contact site and discovered a 25 foot long metal container, flat on top with rounded edges, 8 feet wide. The MOD III gauge least depth was measured on top, about 6 feet off of the bottom, at Detached Position 2778.

Recommendation: Chart an "obstruction, least depth ~~7.5~~ 6.7 meters (22 FT)". CONCUR. CHART AS 22 OBSTN

Dive Item E-415

Position: 027/37/39.05 N 082/39/57.42 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.7~~ 7.9 meters (26 FT)

Surrounding Water Depth: ~~9~~ 8.5 meters (28 FT)

Description: A dive was conducted on DN 218 to investigate side scan sonar contacts 3054.22 and 3746.34. Divers descended down a buoy line dropped on the contact site and discovered a 5 foot by 5 foot square concrete block. The MOD III gauge least depth was measured on top, about 3 feet off of the bottom, at Detached Position 2779.

Recommendation: Chart an "obstruction, least depth ~~8.7~~ 7.9 meters (26 FT)". CONCUR. CHART AS 26 OBSTN

Dive Item E-416

In AWOIS No: 8796

Position: 027/37/04.53 N 082/39/30.22 W

Type of Feature: Submerged Pilings

Least Depth of Feature: ~~8~~ 7.7 meters (25 FT)

Surrounding Water Depth: 9.2 meters (30 FT)

Description: On DN 237 divers investigated side scan contacts 1908.52, 1910.13, 3025.64, 3386.35, 3386.39, 12069.41 and 12071.36. Divers descended down a buoy line dropped on the contact site and discovered a set of six pilings of various heights. The highest was 13 feet off of the bottom, on a slope. This was not the shoalest feature in the area. Divers continued swimming upslope and found the shoalest part of the ridge 65 feet to the north, where the MOD III gauge least depth was measured, on Detached Position 2795.

Recommendation: Chart "~~obstruction~~ Rock, least depth ~~8.7~~ 7 meters (25 FT)". CONCUR. CHART AS 25 Rk

Dive Item E-51

Position: 027/37/41.54 N 082/38/30.938 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.1~~ 6.9 meters (22 FT)

Surrounding Water Depth: 9.1 meters (30 FT)

Description: A dive was conducted on DN 178 to investigate side scan sonar contacts 167.31, 5372.128, 5374.105 and 5376.083. Divers descended down a buoy line dropped on the contact site and discovered an irregular shaped chunk of rock or concrete 12 feet long, covered with coral and marine growth. The MOD III gauge least depth was measured on the top of this object, about 5 feet off of the bottom, at Detached Position 2764.

Recommendation: Chart an "obstruction, least depth ~~8.1~~ 6.9 meters (22 FT)". CONCUR. CHART AS 22 OBSTN

Dive Item E-52

Position: 027/37/30.75 N 082/37/58.71 W

Type of Feature: Obstruction

Least Depth of Feature: ~~7.4~~ 6.3 meters (20 FT)

Surrounding Water Depth: ~~8.7~~ 7.6 meters (25 FT)

Description: On DN 221, divers investigated side scan sonar contacts 673.65, 7104.14, 5361.88, 5364.44 and 5366.59, discovering a 10 foot long metal cylindrical tank lying on its side, 5 feet in diameter. The MOD III gauge least depth was measured at Detached Position 2793.

Recommendation: Chart an "obstruction, least depth ~~7.4~~ 6.3 meters". DO NO CONCUR. LET DIVE ITEM E-53a MARK THIS AREA. SHOWN AS A 20 OBSTN (METAL TANK) ON THE PRESENT SURVEY

Dive Item E-53a

Position: 027/37/31.19 N 082/37/56.99 W

Type of Feature: Obstruction

Least Depth of Feature: 6.~~9~~ 1 meters (20 FT)

Surrounding Water Depth: 7.~~9~~ 6 meters (25 FT)

Description: Two dives were conducted on DN 220, to investigate two side scan sonar contacts 40 meters apart, designated **Dive Item E-53a** and **E-53b**. The first item includes contacts 5368.31, 5380.14, 5382.154, and 5384.19. Divers descended down a buoy line dropped on the contact site and discovered a 12 foot long cylindrical metal tank lying on its side, 3 feet in diameter. The MOD III gauge least depth was measured at Detached Position 2791.

Recommendation: Chart "obstructions (plural), least depth 6.~~9~~ 1 (20 FT) meters" to include both **Dive Item E-53a** and **E-53b**. AND E-52. ~~Concur. Chart as 20 Obstns.~~ DO NOT CONCUR, CHART SHOALER DEPTHS IN THE IMMEDIATE AREA.

Dive Item E-53b

Position: 027/37/32.47 N 082/37/57.01 W

Type of Feature: Obstruction

Least Depth of Feature: ~~7.2~~ 6.5 meters (21 FT)

Surrounding Water Depth: ~~8.2~~ 7.6 meters (25 FT)

Description: Two dives were conducted on DN 220, to investigate two side scan sonar contacts 40 meters apart, designated **Dive Item E-53a** and **E-53b**. The second item includes contacts 5382.075 and 5384.26. Divers descended down a buoy line dropped on the contact site and discovered an 11 foot long cylindrical metal tank lying on its side, 3 feet in diameter. The MOD III gauge least depth was measured at Detached Position 2792.

Recommendation: Do not chart this obstruction, let **Dive Item E-53a** mark this area. CONCUR. SHOWN AS A 21 OBSTR ON THE PRESENT SURVEY.

Dive Item E-54

Position: 027/36/56.78 N 082/38/34.84 W

Type of Feature: Obstruction

Least Depth of Feature: ~~1.4~~ 6.6 meters (21 FT)

Surrounding Water Depth: ~~8.7~~ 7.6 meters (25 FT)

Description: On DN 219, divers investigated side scan sonar contacts 779.45, 1621.09, and 1623.43, discovering several chunks of concrete, the largest 5 feet high. The MOD III gauge least depth was measured at Detached Position 2785.

Recommendation: Chart an "obstruction, least depth ~~1.4~~ 6.6 (21 FT) meters". CONCUR. CHART AS 21 OBSTN

Dive Item E-58

Position: 027/37/36.09 N 082/38/17.05 W

Type of Feature: Obstruction

Least Depth of Feature: ~~8.6~~ 7.8 meters (25 FT)

Surrounding Water Depth: ~~9.7~~ 8.8 meters (29 FT)

Description: A dive was conducted on DN 218 to investigate side scan sonar contacts 972.30, 7021.40 and 7023.13. Divers descended down a buoy line dropped on the contact site and discovered a 16 foot long irregular shaped object encrusted with marine growth. The MOD III gauge least depth was measured on top of the object, about 4 feet off of the bottom, at Detached Position 2780.

Recommendation: Chart an "obstruction, least depth ~~8.6~~ 7.8 (25FT) meters". CONCUR, CHART AS 25 OBSTN

Dive Item E-59

Position: 027/37/32.13 N 082/38/01.66 W

Type of Feature: Obstruction

Least Depth of Feature: ~~5.8~~ 4.9 meters (16 FT)

Surrounding Water Depth: ~~6.6~~ 4.2 meters (14 FT)

Description: A dive was conducted on DN 219 to investigate side scan sonar contacts 1898.23

and 1900.51. Divers descended down a buoy line dropped on the contact site and discovered an irregular shaped chunk of concrete 11 feet across. The MOD III gauge least depth was measured on top of the object, about 3 feet off of the bottom, at Detached Position 2786.

Recommendation: Chart an "obstruction, least depth ~~5.8~~ 4.9 (16FT) meters". DO NOT CONCUR. CHART SHOALER DEPTHS IN THE IMMEDIATE VICINITY.

O. COMPARISON WITH THE CHART SEE ALSO THE EVALUATION REPORT.

O.1 The following charts are affected by this survey:

Chart #	Edition	Date	Scale
11412	35th	April 24, 1993	1:80,000
11414	35th	February 26, 1994	1:40,000

No Notice to Mariner changes affected the survey area during data acquisition.

O.2 No dangers to navigation messages were submitted during this survey.

O.3 Charted soundings from chart 11414 which lie in this survey area were compared to soundings from this survey at a 1:40,000 scale. Soundings from this survey ranged from 0.6 meters (2.0 ft) shoaler to 0.9 meters (2.9 ft) deeper than the charted depth.

O.4 Comparison of non-sounding features. See section **N.**

O.5 No changes to the scales of the published charts of the survey are recommended.

P. ADEQUACY OF SURVEY SEE ALSO THE EVALUATION REPORT.

P.1 All AWOIS items assigned to this sheet have been resolved. This survey is complete and adequate to supersede prior surveys affecting this area.

P.2 This survey is considered complete and adequate for updating the chart.

Q. AIDS TO NAVIGATION SEE ALSO THE EVALUATION REPORT

Q.1 There was no correspondence with the U.S. Coast Guard regarding the location, maintenance, or establishment of floating aids in the area during this survey.

Q.2 The buoys listed below have characteristics matching those listed in the Light List. The charted positions listed in the Light List match the positions on chart 11414. The survey positions are summarized in the table below. THESE AIDS ARE ADEQUATE TO SERVE THEIR INTENDED PURPOSES.

Buoy	Charted Position	Survey Position	Inverse	D.P.
G 5A	27/38/02N 082/37/40W	27/38/02.51N 082/37/40.16W	16	9951
G 3A	27/37/36N 082/38/30W	27/37/39.39N 082/38/30.79W	106	9952
R 4A	27/37/30N 082/38/30W	27/37/33.97N 082/38/28.55W	128	9953
G 1A	27/36/58N 082/40/02W	27/36/57.71N 082/40/00.84W	33	9961
G 25	27/36/48N 082/40/34W	27/36/49.05N 082/40/33.04W	42	9962
R 24	27/36/33N 082/41/41W	27/36/32.47N 082/41/40.84W	17	9968
G 23	27/36/39N 082/41/43W	27/36/38.95N 082/41/42.39W	17	9967
R 22	27/36/22N 082/42/59W	27/36/21.69N 082/42/57.84W	33	9969
G 21	27/36/28N 082/43/00W	27/36/28.16N 082/42/59.06W	26	9970
R 26	27/36/45N 082/40/15W	27/36/45.47N 082/40/15.51W	20	9963
R 4	27/35/50N 082/43/46W	27/35/49.91N 082/43/45.39W	17	9971
R 6A	27/38/00N 082/37/30W	27/38/01.80N 082/37/28.31W	72	10012
G 1B	27/38/14N 082/37/26W	27/38/12.84N 082/37/25.67W	37	10013

Q.3 See Appendix II for listing of non-floating aids to navigation located during the survey. APPENDED TO THIS REPORT

Q.4 The Sunshine Skyway Bridge is located within the survey limits. The following fix #'s delineate the bridge span and fenders: 9985-10003, 10006-10007.

Q.5

a) No submarine cable crossings to shore are present within the survey limits.

b) There are no submarine pipelines within the survey limits.

c) There are no ferry routes in the survey area.

Q.6 There are no ferry terminals in the survey area.

R. STATISTICS

R.1.	VN 2223	VN 224	VN 2225	VN 2226	Total
a) Number of positions:	1999	64	2808	2149	7020
b) Lineal nautical miles of SSS/sounding lines:	318.3	0	431.1	337.6	1087
c) Total days of production:	16	2	23	21	44
d) Detached positions:	0	13	6	70	89
e) Bottom samples	0	49	0	0	49
f) Tide stations:	0	0	0	0	0
g) Current stations	0	0	0	0	0
h) Velocity casts:	1	1	3	6	11
i) Dives	0	0	0	25	25

No current stations, magnetic stations or XBT drops were established or performed.

S. MISCELLANEOUS See Also the Evaluation Report.

S.1

a) No unusual silting was noted during this survey.

b) All unusual submarine features have been discussed previously.

c) No anomalous tidal conditions were encountered.

d) No anomalous current conditions were encountered.

e) No magnetic anomalies were encountered during this survey.

S.2 Forty-nine bottom samples were submitted to the Smithsonian Institution. See **Separate II.**

T. RECOMMENDATIONS

T.1 No inadequacies have been found during this survey.

T.2 There is no present or planned construction or dredging that will affect the results of this survey.

T.3 There were no unusual conditions or sea features which require further investigation.

U. REFERRAL TO REPORTS

None.

SUBMITTAL SHEET
Survey H-10598

This descriptive report accurately describes all activities pertaining to the control, collection and processing of data for this survey, and is respectfully submitted by:

Lieutenant Torsten Duffy, NOAA

APPENDIX VII
Letter of Approval
Registry No. H-10598

Field operations contributing to the accomplishment of this survey were conducted under my supervision with frequent personal checks of progress and adequacy. This report, final field sheets, and all accompanying data have been closely reviewed and are considered complete and adequate for updating the nautical chart.

Roger L. Parsons, CDR, NOAA
Commanding Officer
NOAA Ship MT MITCHELL

APPENDIX III
List of Horizontal Control Stations

1. List of Horizontal Control Stations.

2. Copy of *MONITOR* program output plot and statistics.

Horizontal Control Stations

Station 000 - United States Coast Guard, Egmont Key, Florida Differential Beacon

Lat: 27° 36' 01.488" N
Long: 082° 45' 37.170" W
Transmission Rate: 200 bps
Transmission Frequency: 310 KHz
Source: USCG DGPS Radio beacon Prototype Status & Operating Specifications

Station 001 - TAMPA PILOTS, Egmont Key, Florida (NOAA-HF System)

Lat: 27° 35' 06.214" N
Long: 082° 45' 40.512" W
Transmission Rate: 100 bps
Transmission Frequency: 2774.50 KHz
Antenna Elevation: 14.0 meters
Source: NGS, established in 1981 and position confirmed by MT. MITCHELL in 1995

Light	Charted Position	Survey Position	Inverse (m)	D.P.
Cut "B" Lower Range Front Light	27/37/12N 082/38/12W	27/37/14.69N 082/38/12.71W	85	9955
Cut "B" Lower Range Rear Light	27/36/35N 082/38/48W	27/36/33.58N 082/38/48.66W	47	9956
Mullet Key Channel Range Front Light	27/36/51N 082/39/57W	27/36/51.07N 082/39/56.47W	15	9960
Mullet Key Channel Range Rear Light	27/36/57N 082/39/13W	27/36/57.17N 082/39/13.12W	6	9957
Platform Fl R (SE of channel)	27/37/04N 082/39/20W	27/37/02.87N 082/39/21.11W	46	9958
Platform Fl R (NW of channel)	27/37/17N 082/39/30W	27/37/18.12N 082/39/29.38W	38	9959
White Daybeacon "Danger -- Piles"	27/37/30N 082/41/06W	27/37/28.83N 082/41/06.20W	36	9966
Lighted Daybeacon G "1"	27/37/56N 082/40/21W	27/37/56.12N 082/40/21.14W	5	10008

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: February 12, 1996

MARINE CENTER: Atlantic

HYDROGRAPHIC PROJECT: OPR-J343

HYDROGRAPHIC SHEET: H-10598

LOCALITY: Tampa Bay, Florida

TIME PERIOD: April 24 - August 25, 1995

TIDE STATION USED: 872-6384 Port Manatee, Tampa Bay Fl.
Lat. 27° 38.2'N Lon. 82° 33.8'W

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

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.9 ft.

TIDE STATION USED: 872-6430 St. Petersburg Beach, South End, Fl.
Lat. 27° 41.0'N Lon. 82° 44.3'W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 8.79 ft.

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.0 ft.

REMARKS: RECOMMENDED ZONING

1. East of a line between the southern point of Mullet Key, and Bean Point on Anna Maria Key, and west of the Sunshine Skyway apply a -1 hour time correction, and heights are direct using Port Manatee, Fl. (872-6384).

2. East of the Sunshine Skyway, and west of a line between Point Pinellas and Piney Point, times and heights are direct using Port Manatee, Fl. (872-6384).

Notes: 1. Times are tabulated on Greenwich Mean Time.

2. Data for Port Manatee, Fl. (872-6384) and St. Petersburg Beach, Fl. (872-6430) are stored in temporary files #672-6384 and #672-6430 respectively.

3. Zoning is not provided for Mullet Key Bayou nor the area between Madeline Key and the Sunshine Skyway, north of Mullet Key.

William M. Hubbard

CHIEF, DATUMS SECTION

NOAA FORM 76-155
(11-72)

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

SURVEY NUMBER

H-10598

GEOGRAPHIC NAMES

Name on Survey	A ON CHART NO. 1414, 1411, 1412	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	
BONNE FORTUNE KEY	X		X							1
CONCEPTION KEY	X		X							2
FLORIDA (title)	X		X							3
MADELAINE KEY	X		X							4
MULLET KEY	X		X							5
MULLET KEY BAYOU	X		X							6
MULLET KEY CHANNEL	X		X							7
MULLET KEY SHOAL	X		X							8
SAINT CHRISTOPHER KEY	X		X							9
SAINT JEAN KEY	X		X							10
SUNSHINE SKYWAY CHANNEL	X		X							11
SUNSHINE SKYWAY TOLL										12
BRIDGE	X		X							13
TAMPA BAY	X		X							14
TAMPA BAY CHANNEL CUT A	X									15
TAMPA BAY CHANNEL CUT B	X									16
										17
										18
					Approved:					19
										20
										21
					Chief Geographer					22
					JUN 26 1996					23
										24
										25

NOAA FORM 76-155 SUPERSEDES C&GS 197

NOAA FORM 61-29
(12-71)

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

LETTER TRANSMITTING DATA

REFERENCE NO.
N/CS33-99-96

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY *(Check)*:

☐ ORDINARY MAIL ☐ AIR MAIL
☐ REGISTERED MAIL ☒ EXPRESS
☐ GBL *(Give number)* _____

TO:

NOAA/National Ocean Service
Chief, Data Control Group, N/CS3x1
SSMC3, Station 6815
1315 East-West Highway
Silver Spring, MD 20910-3282

DATE FORWARDED
September 9, 1996

NUMBER OF PACKAGES
1 Box, 1 Tube

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H-10598

Florida, Tampa Bay, Sunshine Skyway Bridge

1 Box Containing:

1 Original Descriptive Report for H-10598
1 Envelope with HISTORY OF CARTOGRAPHIC WORK (NOAA form 76-71) for H-10598 for charts 11411 and 11414

1 Tube Containing:

1 Original Smooth Sheet for H-10598
2 Paper Composite plots (sheets 1 & 2) of Survey H-10598 for NOS chart 11411
2 Paper Composite plots (sheets 1 & 2) of Survey H-10598 for NOS chart 11414
1 Mylar H-DRAWING of H-10598 for NOS chart 11411
1 Mylar H-DRAWING of H-10598 for NOS chart 11414

FROM: *(Signature)* R. H. Whitfield
Richard H. Whitfield

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

Atlantic Hydrographic Branch N/CS331
439 W. York Street
Norfolk, VA 23510-1114

NOAA FORM 61-29 SUPERSEDES FORM C&GS 413 WHICH MAY BE USED.

☆U.S.GPO:1983-0-664-006/1192

09/06/96

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NUMBER: H-10598

NUMBER OF CONTROL STATIONS	2
NUMBER OF POSITIONS	7020
NUMBER OF SOUNDINGS	22309

	TIME-HOURS	DATE COMPLETED
PREPROCESSING EXAMINATION	12	03/15/96
VERIFICATION OF FIELD DATA	196.50	06/28/96
QUALITY CONTROL CHECKS	17	
EVALUATION AND ANALYSIS	34	
FINAL INSPECTION	11	07/15/96
COMPILATION	126	09/05/96
TOTAL TIME	396	

ATLANTIC HYDROGRAPHIC BRANCH APPROVAL 07/18/96

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT FOR H-10598 (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 (HPS)
AUTOCAD, Release 12
QUICKSURF, version 5.1
MicroStation, version 5.0
NADCON, version 2.10
I/RAS B, version 5.01

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

H. CONTROL

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD 83). 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 1.118 seconds (34.42 meters or 3.44 mm at the scale of the survey) north in latitude, and 0.644 seconds (17.65 meters or 1.76 mm at the scale of the survey) east in longitude.

J. SHORELINE

Shoreline for the present survey originates with National Ocean Service (NOS) chart 11414 (35th Edition, Feb 26/94). The shoreline is shown on the present survey smooth sheet in brown and is for orientation purposes only.

L. JUNCTIONS

H-10606 (1995) to the northeast
H-10270 (1994-95) to the south
H-10536 (1994-95) to the west

A standard junction could not be effected with survey H-10606 (1995). The survey has not reached the sounding stage of office processing. In this case, the note "ADJOINS" has been shown on the present survey smooth sheet. Any adjustments to the depth curves in the junctional area will

have to be made on the chart during compilation.

The smooth sheets for surveys H-10536 (1994-95) and H-10270 (1994-95) are archived at National Ocean Service (NOS) headquarters, Silver Spring, Maryland and a standard junction could not be made. In this case, the note "ADJOINS" has been shown on the present survey smooth sheet. Any adjustments to the depth curves in the junctional area will have to be made on the chart during compilation.

There are no contemporary surveys to the north and southeast of the present survey. Present survey depths are in harmony with the charted hydrography to the north and southeast.

M. COMPARISON WITH PRIOR SURVEYS

An adequate comparison was made with prior surveys H-8427 (1958) and H-8428 (1958) in section M., page 14, of the Descriptive Report. 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.

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

O. COMPARISON WITH CHARTS 11411 SC (9th Edition, June 04/94) 11412 (36th Edition, June 04/94) 11414 (35th Edition, Feb. 26/94)

Hydrography

The charted hydrography originates with the previously discussed prior surveys and needs no further discussion. The hydrographer makes an adequate chart comparison in section O. of the Descriptive Report. The following should be noted:

1. Three charted Spoil Areas in the vicinities of Latitude 27°36'00"N, Longitude 82°42'15"W, Latitude 27°36'10"N, Longitude 82°41'10"W, and Latitude 27°36'40"N, Longitude 82°39'42"W were developed by the field unit. It is recommended that the charted limits and the notations Spoil Area be retained. It is also recommended that the blue tint be deleted within the limits of the spoil areas and depths from the present survey be charted as shown on the present survey.

2. The charted Spoil Area in the vicinity of Latitude 27°35'50"N, Longitude 82°43'20"W has been fully developed by

the present survey. The spoil area was partially developed by survey H-10270 (1993). It is recommended that the charted limits and the notations Spoil Area be retained. It is also recommended that the blue tint be deleted within the limits of the spoil areas and depths from the present survey be charted as shown on the present survey.

3. The charted Spoil Area south of Cut A Channel and Cut B Channel from the Sunshine Skyway Toll Bridge in Latitude 27°36'57"N, Longitude 82°39'08"W extending northeast to Port Manatee Channel in Latitude 27°39'25"N, Longitude 82°35'53"W has not been fully developed by the present survey. A charting recommendation for the spoil area will be made in the Evaluation Report for H-10606 (1995) upon completion of that survey.

4. The charted yellow nun buoy in Latitude 27°37'16.5"N, Longitude 82°39'20.5"W has been disproved by the field unit. It is recommended that yellow nun buoy be deleted from the chart.

5. The charted platform PA in Latitude 27°36'34"N, Longitude 82°38'45"W is considered disproved by the present survey. It is recommended that the platform PA be deleted from the chart.

6. The two pairs of charted AERO FL R Obstruction lights for the old bridge on the south and north side of the channel in Latitude 27°37'05"N, Longitude 82°39'28"W and Latitude 27°37'13"N, Longitude 82°39'32"W have been disproved by the hydrographer. It is recommended that the AERO FL R Obstruction lights be removed from the chart.

~~7. Because of the amount of debris in the area of the old bridge, it is recommended a note "caution, bridge debris in area" be added to the chart in the vicinity of Latitude 27°37'37"N, Longitude 82°39'47"W.~~ SKM 9/10/96

8. A charted visible wreck PA, shown on chart 11411 in Latitude 27°36'49"N, Longitude 82°39'35"W, was not investigated by the field unit. Two hundred percent side scan sonar coverage in the area shows no indication of the wreck. It is recommended that the visible wreck PA be removed from chart 11411. The visible wreck is not shown on the latest edition of charts 11414 or 11412.

9. It is recommended that the charted old Sunshine Skyway bridge ruins and the notes Being removed be deleted from the chart.

Controlling Depths

A conflict exists with the charted controlling depth in Mullet Key channel in Latitude 27°36'50.8"N, Longitude 82°40'12.8"W. The present survey shows a depth of 42 feet with a controlling depth of 43 feet.

The present survey is adequate to supersede the chart in the common area.

P. ADEQUACY OF SURVEY

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

Q. AIDS TO NAVIGATION

The following fixed aids to navigation were located by the field unit.

Aid to Navigation	Latitude N	Longitude W
Cut B Channel Lower Range Front Light	27°37'14.69"	82°38'12.71"
Mullet Key Channel Range Rear Light	27°36'57.17"	82°39'13.12"
Sunshine Skyway Channel Light "1"	27°37'56.12"	82°40'21.14"

These aids to navigation are presently charted as Position Approximate (PA). It is recommended that the notations PA be removed from the chart.

S. MISCELLANEOUS

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

MT MITCHELL Processing Team

Marilyn Schlüter

Marilyn L. Schlüter
Cartographic Technician
Verification of field data

R. H. Whitfield

Richard H. Whitfield
Cartographer
Evaluation and Analysis

APPROVAL SHEET
H-10598

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: 18 July 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: 18 July 1996
Nicholas E. Perugini, CDR, NOAA
Chief, Atlantic Hydrographic Branch

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Final Approval:

Approved: Andrew A. Armstrong, III Date: Sept 20, 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-10598

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
11411	7/24/96	[signature]	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No.
11414	8/7/96	[signature]	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No.
11412	11/13/96	[signature]	Full ~~Part~~ ~~Before~~ After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
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			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED.