

F00865

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Service

DESCRIPTIVE REPORT

Type of Survey: Field Examination

Registry Number: F00865

LOCALITY

State(s): Florida

General Locality: Intracoastal Waterway Florida

Sub-locality: ICW Fort Lauderdale

2022

CHIEF OF PARTY
James L. Kirkpatrick

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

F00865

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

State(s): **Florida**

General Locality: **Intracoastal Waterway Florida**

Sub-Locality: **ICW Fort Lauderdale**

Scale: **5000**

Dates of Survey: **04/04/2022 to 04/20/2022**

Instructions Dated: **08/11/2022**

Project Number: **S-H912-NRTFB-22**

Field Unit: **NOAA Navigation Response Team - Fernandina**

Chief of Party: **James L. Kirkpatrick**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Side Scan Sonar Multibeam Echo Sounder Backscatter**

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

Remarks:

Revised project instructions received after survey completion to provide new registry number.

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <https://www.ncei.noaa.gov/>. Products created during office processing were generated in NAD83 UTM 17N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

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Descriptive Report to Accompany Survey F00865

Project: S-H912-NRTFB-22

Locality: Intracoastal Waterway Florida

Sublocality: ICW Fort Lauderdale

Scale: 1:5000

April 2022 - April 2022

NOAA Navigation Response Team - Fernandina

Chief of Party: James L. Kirkpatrick

A. Area Surveyed

Survey area consists of Intracoastal Waterway and surrounding waters from Port Everglades, FL north to Coral Ridge Yacht Club.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
26° 8' 29.58" N	26° 5' 8.01" N
80° 7' 25.23" W	80° 6' 12.68" W

Table 1: Survey Limits

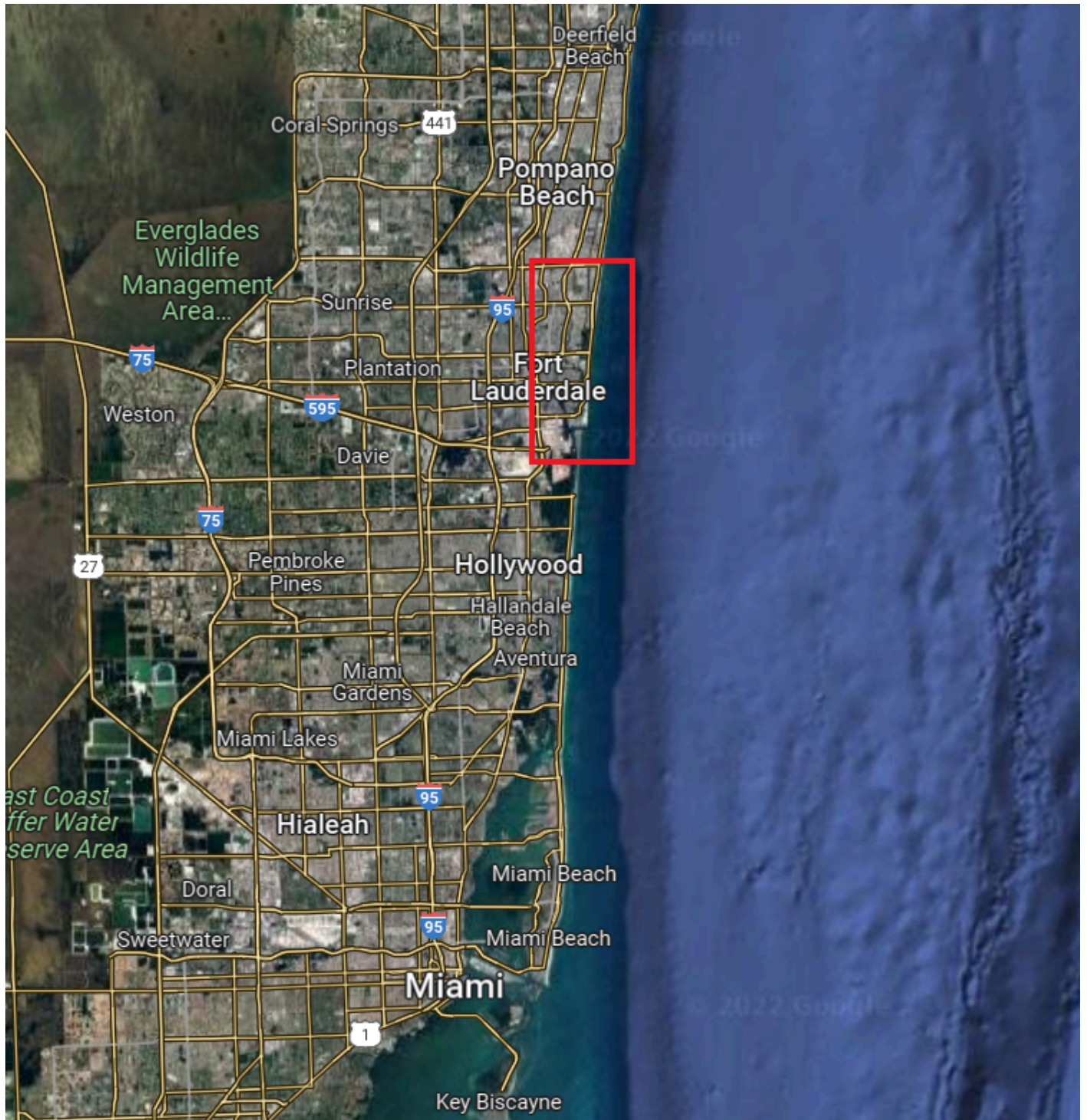


Figure 1: F00865 Area Overview.

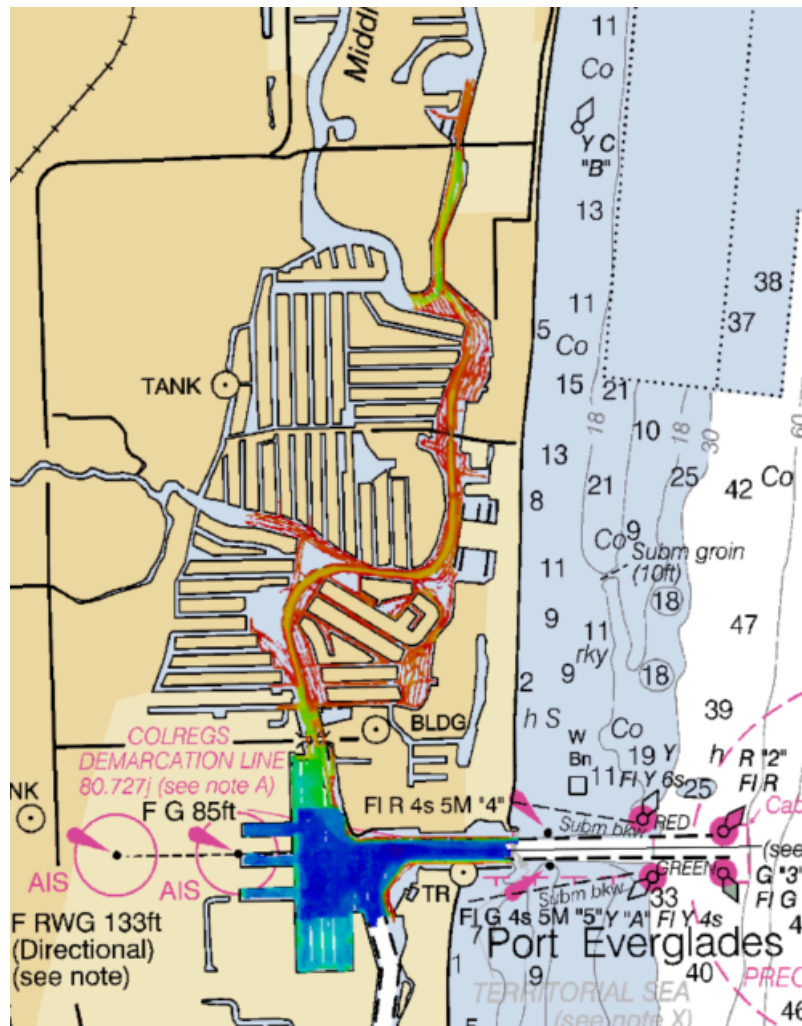


Figure 2: F00865 Area Detail.

Survey limits were ensonified with 200% SSS with few exceptions in shallow areas or near docks and other impedances. An additional area was added to the northern extent of the original survey limit.

A.2 Survey Purpose

Remote Sensing Division (RSD) collected topobathy LiDAR data from Miami to Fort Lauderdale in the ICW, project FL1703. RSD analyzed their data and sent NRB areas of gaps or voids, where data was not collected due to the depths. NRT2 is assigned to collect bathymetric data in these areas and investigate features in the ICW from Miami to Fort Lauderdale. Survey data from this project is intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area.	Object Detection Coverage (Refer to HSSD Section 5.2.2.2)

Table 2: Survey Coverage

Survey coverage was in accordance with the requirements listed above and in the HSSD.

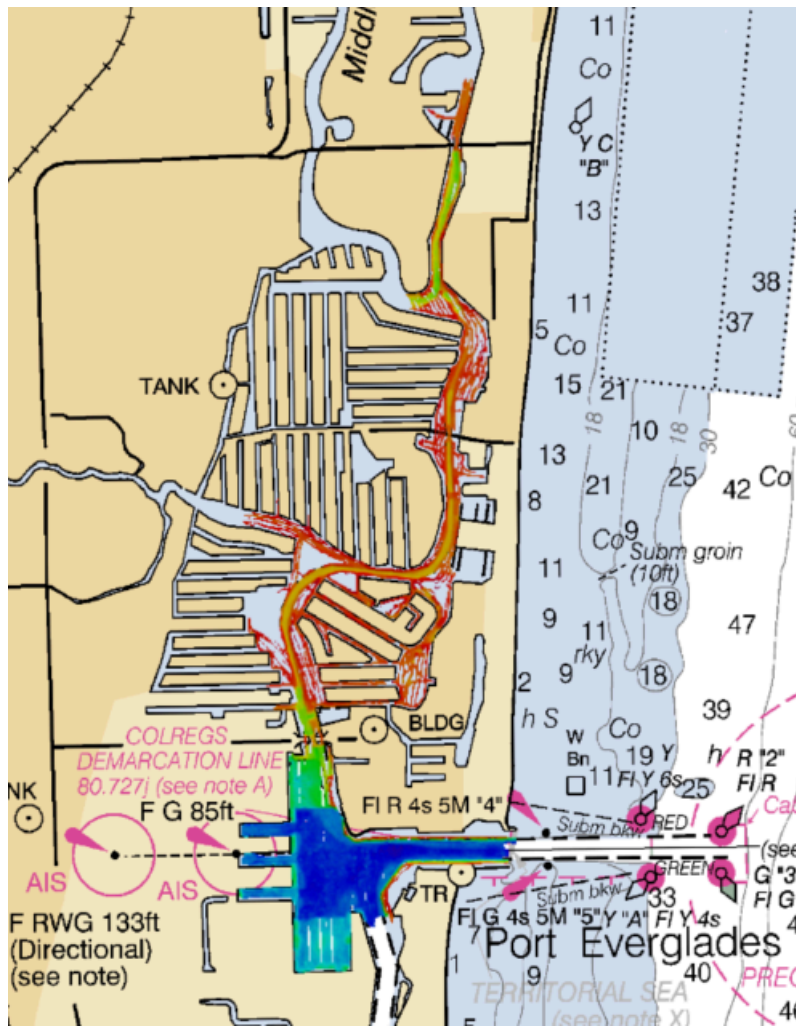


Figure 3: F00865 Coverage Graphic

A.6 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	<i>S3009</i>	<i>Total</i>
LNM	SBES Mainscheme	0.0	0.0
	MBES Mainscheme	76.09	76.09
	Lidar Mainscheme	0.0	0.0
	SSS Mainscheme	59.84	59.84
	SBES/SSS Mainscheme	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0
	SBES/MBES Crosslines	5.38	5.38
	Lidar Crosslines	0.0	0.0
Number of Bottom Samples			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			0.544

Table 3: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates	Day of the Year
04/04/2022	94
04/05/2022	95

Survey Dates	Day of the Year
04/06/2022	96
04/13/2022	103
04/14/2022	104
04/20/2022	110

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	<i>S3009</i>
LOA	10.0 meters
Draft	0.7 meters

Table 5: Vessels Used



Figure 4: S3009.

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040C	MBES
EdgeTech	4125	SSS
Applanix	POS MV 320 v5	Positioning and Attitude System
SonTek	CastAway-CTD	Conductivity, Temperature, and Depth Sensor
AML Oceanographic	MicroX SV	Sound Speed System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines totaled 7.1% of mainscheme acquisition. Results are in good agreement throughout the survey area. A difference surface was created in Caris Hips 11.4.18 and statistics were computed.

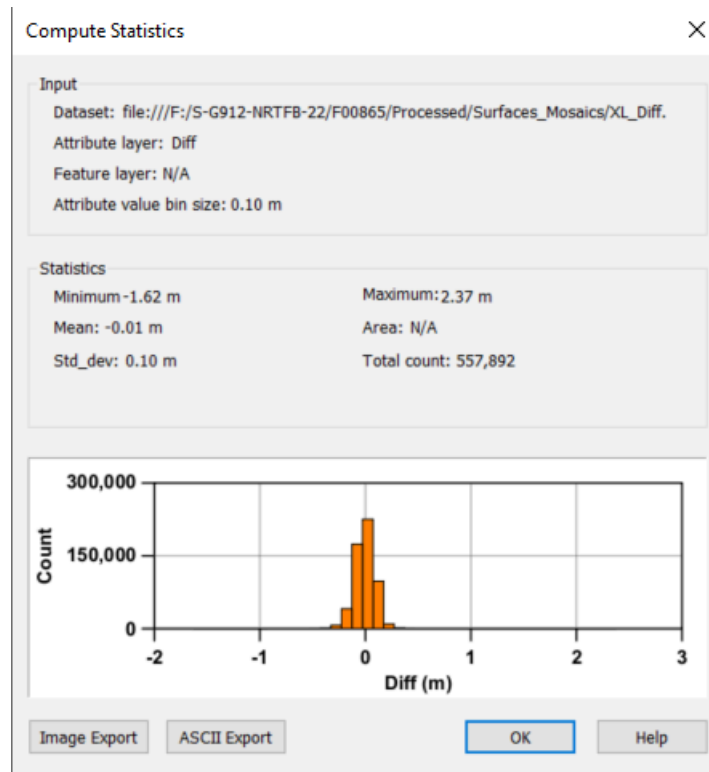


Figure 5: Crossline comparison statistics.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 centimeters	9.2 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S3009	2 meters/second	0 meters/second	0 meters/second	0.5 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Uncertainty provided in Project Instructions and from sound speed instrument manufacturers.

B.2.3 Junctions

Three junctioning surveys were assigned. All are from approximately 15 years ago. 2 are LiDAR surveys and one is a singlebeam survey. Comparison was performed and agreement is as expected considering the time lapse and sounding/positioning differences.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
F00532	1:5000	2007	Navigation Response Team 2	S
H12117	1:10000	2008	Tenix	E
H11896	1:10000	2008	Oceans Surveys, Inc.	E

Table 9: Junctioning Surveys

F00532

Singlebeam survey from NRT2 previous vessel.

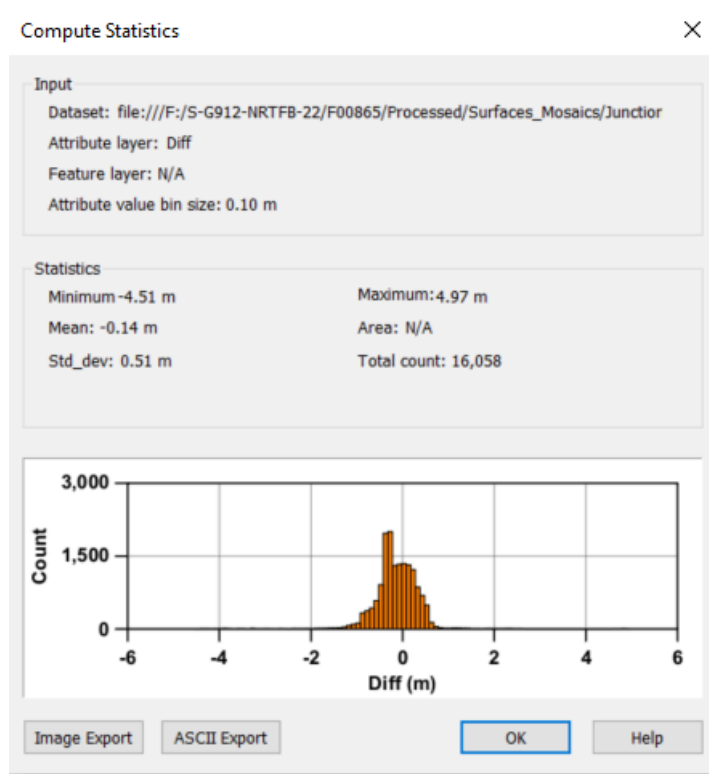


Figure 6: Difference statistics F00532.

H12117

LiDAR survey from contractor.

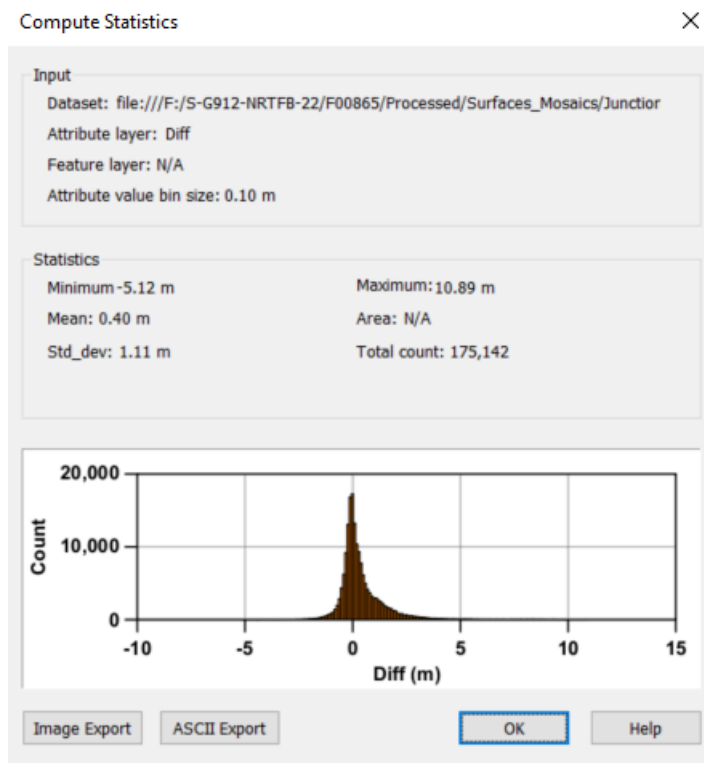


Figure 7: Difference statistics H12117.

H11896

LiDAR survey from contractor.

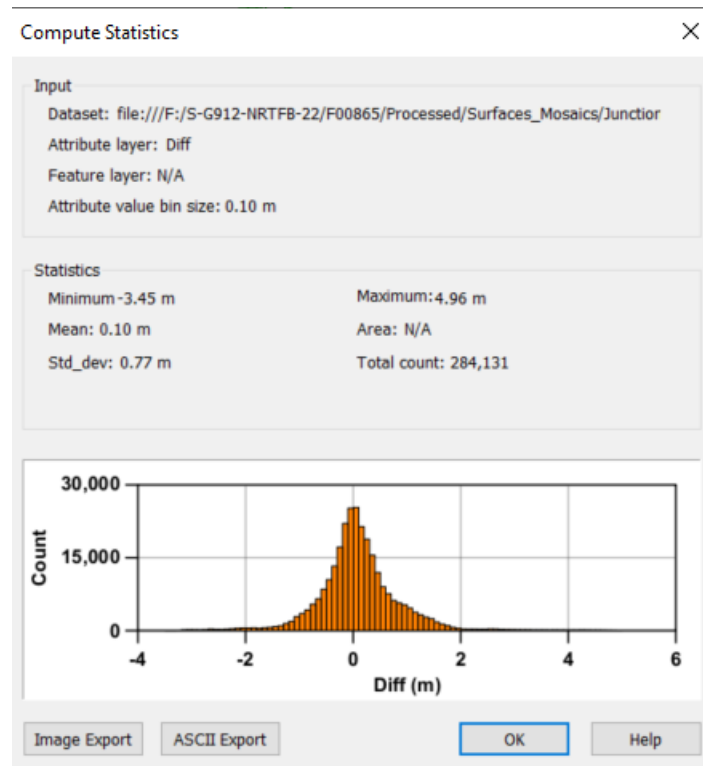


Figure 8: Difference statistics H11896

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

Sidescan/MBES Interference

It has been discovered, because of the mounting locations of the sonars, and the inability to significantly tune the Kongsberg unit, that the MBES data is severely affected by crosstalk with the low frequency SSS, especially in water under 5 meters deep. Attempts have been made to limit the interaction by adjusting frequencies to offset harmonics and power settings to no avail. This interference has made cleaning data especially challenging. Moving forward the low frequency SSS will not be used in shallow water.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Efforts were made to acquire a cast every 2 hours or when there was more than 2 m/s disagreement from the surface sound speed probe.

A total of 20 casts were taken over 6 days of survey operations. Sound speed was generally consistent across the survey area.

B.2.8 Coverage Equipment and Methods

200% SSS with concurrent MBES was used to meet object detection requirements.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

All equipment and survey methods were used as detailed in the DAPR.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: Caris_Support_Files_2022v2.

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00865_MB_50cm_MLLW_Final	CARIS Raster Surface (CUBE)	0.5 meters	0.47 meters - 16.75 meters	NOAA_0.5m	Object Detection
F00865_MBAB_2m_S3009_300kHz_1of1	MB Backscatter Mosaic	2 meters	0.47 meters - 16.75 meters	N/A	Object Detection
F00865_MB_50cm_MLLW	CARIS Raster Surface (CUBE)	0.5 meters	0.8 meters - 16.75 meters	NOAA_0.5m	Object Detection
F00865_SSSAB_1m_900kHz_1of2	SSS Mosaic	1 meters	-	N/A	100% SSS
F00865_SSSAB_1m_900kHz_2of2	SSS Mosaic	1 meters	-	N/A	200% SSS

Table 10: Submitted Surfaces

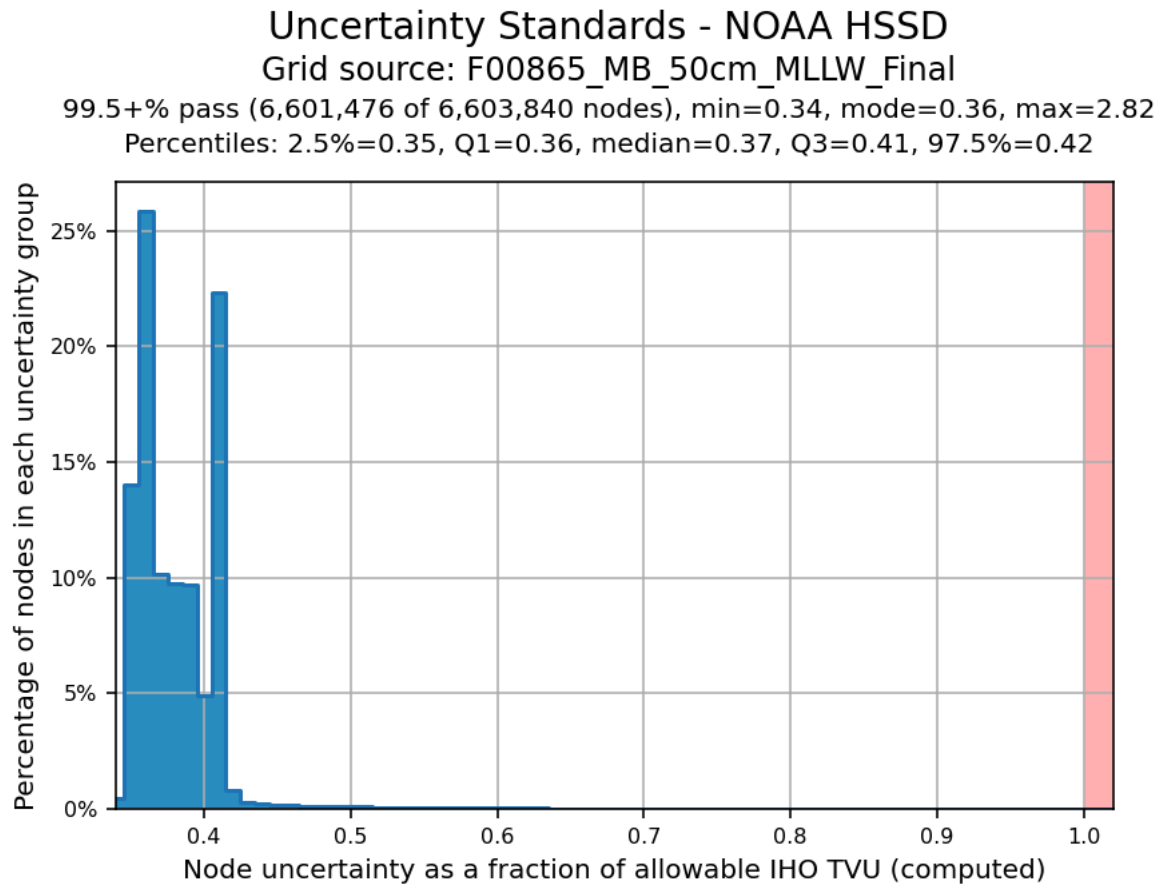


Figure 9: F00865 MBES Uncertainty Standards.

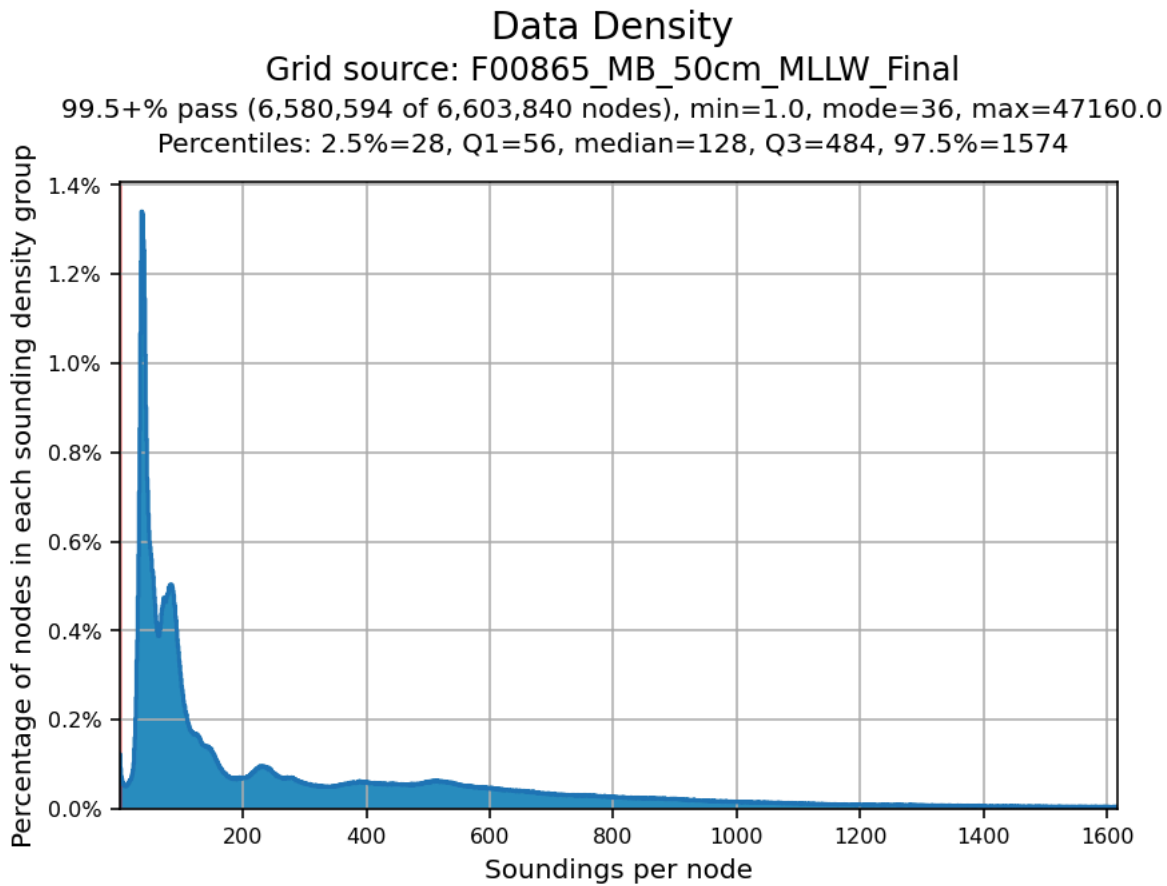


Figure 10: F00865 MBES Data Density.

C. Vertical and Horizontal Control

Horizontal and vertical control stations were not established during the project.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	NEW_Sep_ModelSBDARE(A)_100m_NAD83- MLLW_geoid12b.csar S-H912-NRTFB-22_VDatum_100m_NAD83- MLLW_geoid12b.csar

Table 11: ERS method and SEP file

An area was added to the north end of the survey area necessitating creation of a new separation model.

C.2 Horizontal Control

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

The projection used for this project is Universal Transverse Mercator (UTM) Zone 17.

The following PPK methods were used for horizontal control:

- RTX

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition.

D. Results and Recommendations

D.1 Chart Comparison

A sounding layer was created and compared to chart data. F00865 soundings are in good agreement with charted depths. Chart soundings and contours should be updated as usual.

D.1.1 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date
US5FL32M	1:10000	47	11/01/2022	11/01/2022
US5FL33M	1:40000	56	11/10/2022	11/10/2022

Table 12: Largest Scale ENC's

D.1.2 Shoal and Hazardous Features

No Danger to Navigation Reports were submitted for this survey.

D.1.3 Charted Features

No charted features exist for this survey except those included in the FFF

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Channels

Intracoastal Waterway depths are in agreement with reported controlling depths.

D.2 Additional Results

D.2.1 Aids to Navigation

One ATON was found off station and reported to the USCG. It had been reset in proper position before the survey ended. Correspondence attached.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

Submarine features exist for this survey, but were not investigated. No exposed cables were identified in the charted cable areas.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendations

No new surveys or further investigations are recommended for this area.

D.2.11 ENC Scale Recommendations

No new ENC scales are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
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KIRKPATRICK.JAMES.LEROY.IV.1400487398

Digitally signed by
KIRKPATRICK.JAMES.LEROY.IV.1400487398
Date: 2022.12.08 16:01:09 -05'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File