F00818

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

# DESCRIPTIVE REPORT

| | |
|---|---|
| Type of Survey: | Natural Disaster Response |
| Registry Number: | F00818 |

## LOCALITY

| | |
|---|---|
| State(s): | Florida |
| General Locality: | Pensacola, FL |
| Sub-locality: | Pensacola |

**2020**

CHIEF OF PARTY
LT John Kidd

LIBRARY & ARCHIVES

Date:

| U.S. DEPARTMENT OF COMMERCE<br>NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION | REGISTRY NUMBER: |
|---|---|
| **HYDROGRAPHIC TITLE SHEET** | **F00818** |

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: | **Pensacola, FL** |
| Sub-Locality: | **Pensacola** |
| Scale: | **5000** |
| Dates of Survey: | **09/18/2020 to 09/19/2020** |
| Instructions Dated: | **09/17/2020** |
| Project Number: | **S-J939-NRT1-20** |
| Field Unit: | **NOAA Navigation Response Team - Stennis** |
| Chief of Party: | **LT John Kidd** |
| Soundings by: | **Multibeam Echo Sounder** |
| Imagery by: | **Multibeam Echo Sounder Backscatter  Side Scan Sonar** |
| Verification by: | **Pacific Hydrographic Branch** |
| Soundings Acquired in: | **meters at Mean Lower Low Water** |

Remarks:

***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 16N, 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 F00818

Project: S-J939-NRT1-20

Locality: Pensacola, FL

Sublocality: Pensacola

Scale: 1:5000

September 2020 - September 2020

**NOAA Navigation Response Team - Stennis**

Chief of Party: LT John Kidd

# A. Area Surveyed

The survey area is located in Pensacola within the sub locality of Pensacola Bay.

## A.1 Survey Limits

Data were acquired within the following survey limits:

| Northwest Limit | Southeast Limit |
|---|---|
| 30° 24' 25.35" N<br>87° 18' 33.32" W | 30° 19' 40.71" N<br>87° 12' 20.81" W |

*Table 1: Survey Limits*

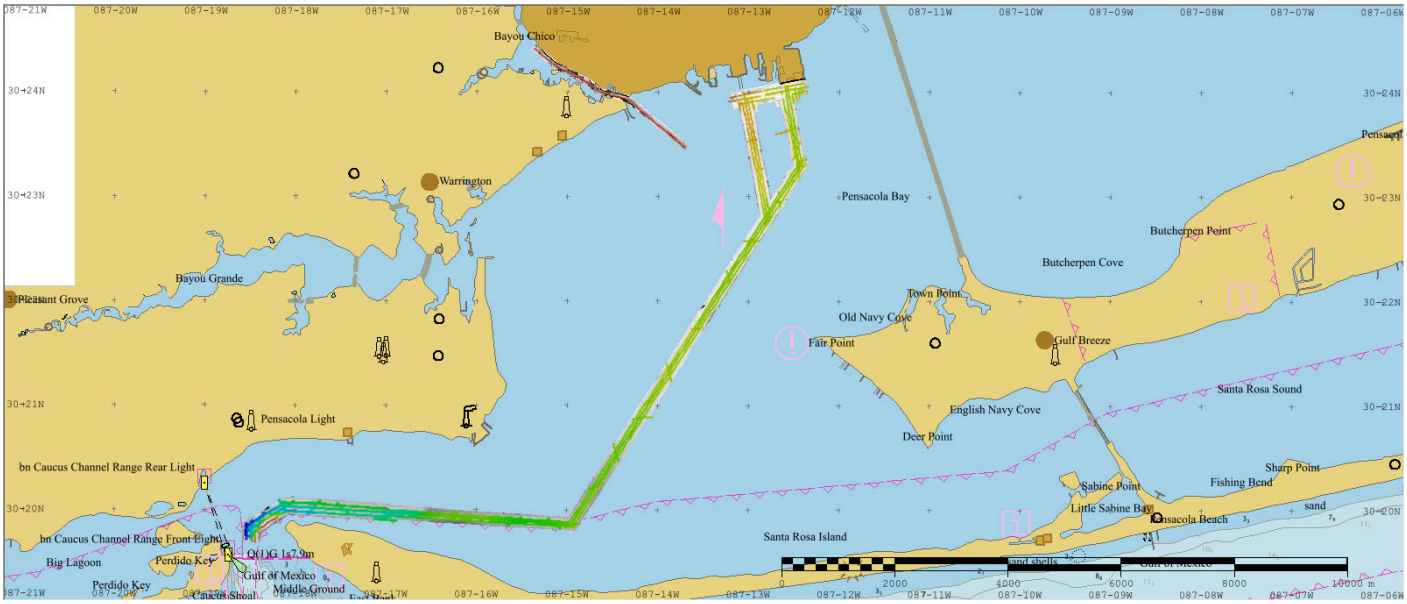



*Figure 1: Survey Extents*

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the NOS Hydrographic Surveys Specifications and Deliverables (HSSD). In all areas where the 3.5 meter depth contour or the sheet limits were not met, the Navigable Area Limit Line (NALL) was defined as the inshore limit of bathymetry due to the risks of maneuvering the survey vessel in close proximity to the shoreline, or the safety of the ship was in question due to significant debris associated with the aftermath of Hurricane Sally.

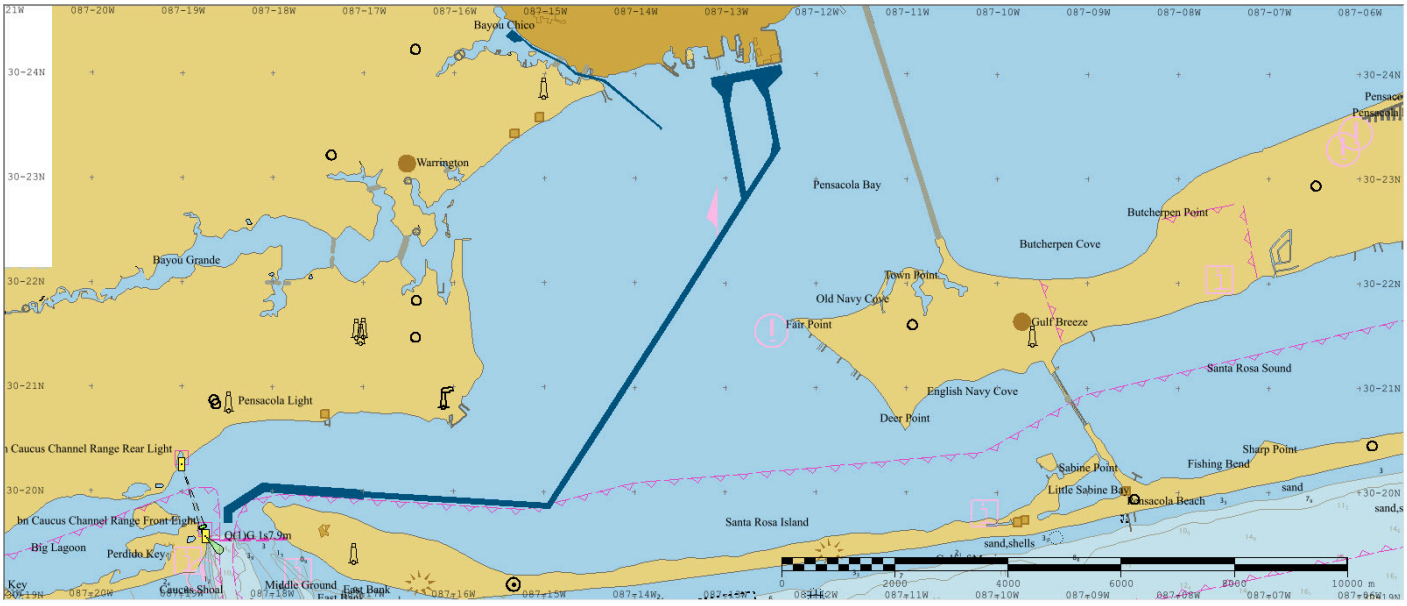



*Figure 2: Survey Limits as described in the Project Instructions and provided shapefile.*

## A.2 Survey Purpose

The purpose of this survey is in response to a USACE request for an emergency hydrographic survey in Pensacola, due to the effects of Hurricane Sally. Survey data from this project is intended to supersede all prior survey data in the common area.

## A.3 Survey Quality

The survey is partially adequate to supersede previous data.

All areas within the Pensacola Channel and within Bayou Chico met (option B) Object Detection and were within CATZOC A1 TPU limits. The extents that met this criteria are represented by the multibeam CUBE surface F00818_MB_50cm_MLLW_AreaBeta_Final.csar. However, a significant sediment plume and second density layer associated with the drainage of Hurricane Sally's storm surge resulted in multiple bottom returns. The separation of these layers resulted in significant vertical uncertainty in this area alone and only 93% of nodes meet CATZOC A2/B TPU standards. The extents of this area are represented by the multibeam CUBE surface F00818_MB_50cm_MLLW_AreaAlpha_Final.csar. Additional compliance statistics can be found in the Uncertainty section (B.2.2) of this report.

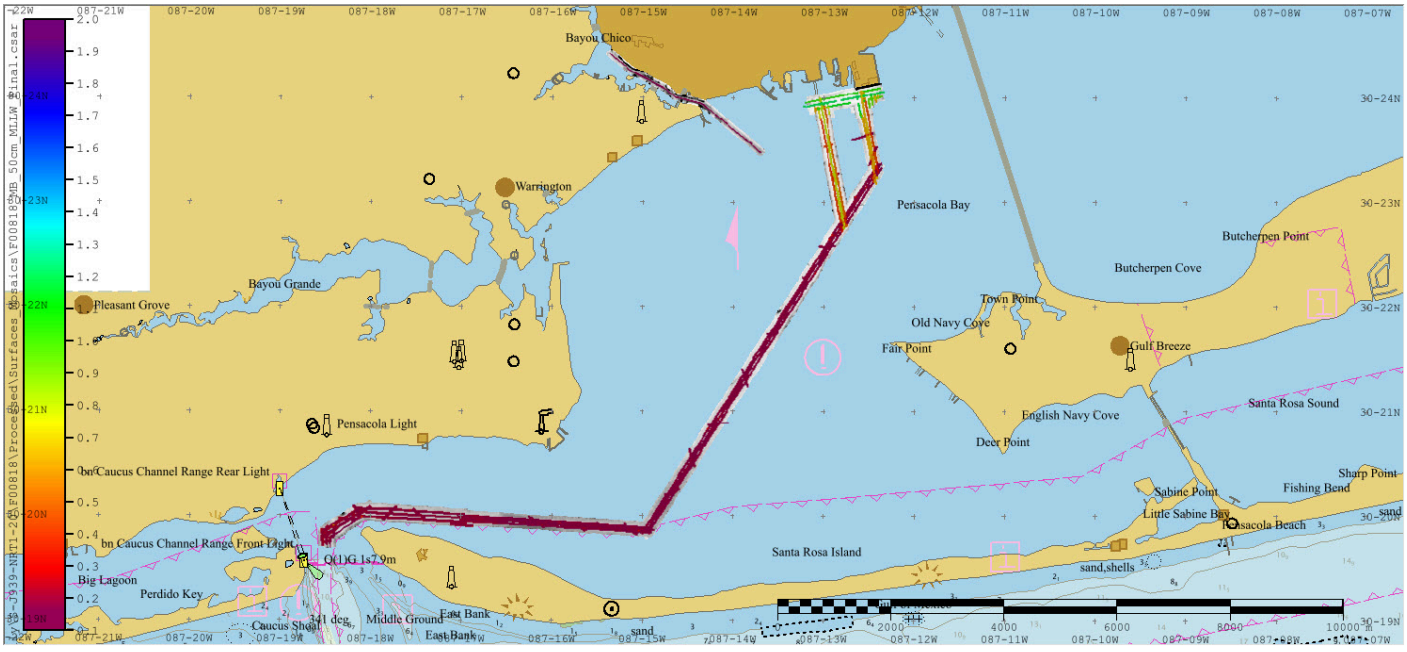



*Figure 3: CUBE surface uncertainty layer overview displayed over a mosaic representing 200% sidescan coverage*

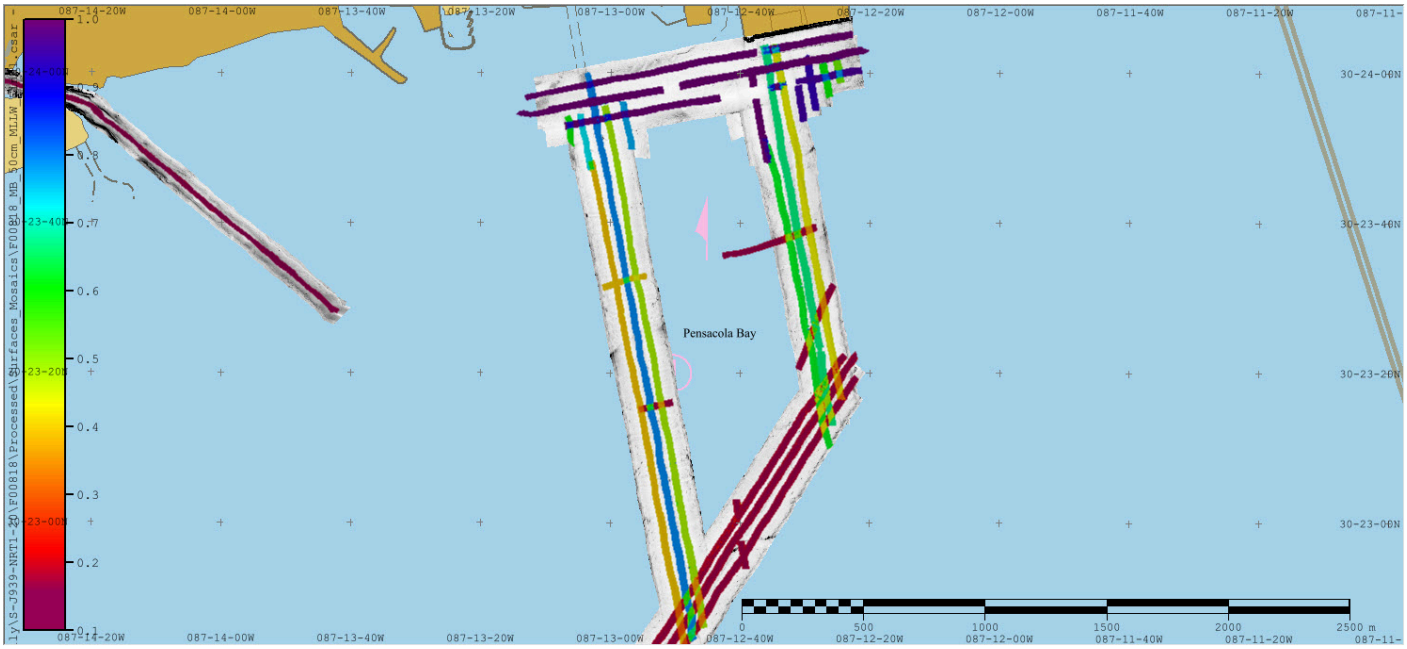



*Figure 4: CUBE surface uncertainty layer: area of higher uncertainty associated with the mud layer and sediment plume. Scale is from 0.1 meters to 1.0 meters of uncertainty.*

## 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*

There are two areas within the survey limits that do not meet Object Detection. There was an area in the north-eastern extent of the survey area that had a current and extensive sediment plume associated with the drainage of Hurricane Sally's storm surge. Data collection was not possible in certain areas on the day of the survey despite multiple attempts. There were also considerable vessel debris that prevented the survey of the turning basin at the western end of Bayou Chico. Aside from these areas, the entirety of F00818 was acquired in accordance with the 200% SSS with concurrent MBES coverage standard, meeting the requirements listed above and in the HSSD.


*Figure 5: Gaps in concurrent multibeam coverage displayed over an associated 200% sidescan mosaic. A transparent survey limit shapefile is overlayed in order to depict the areas where object detection coverage was not achieved.*

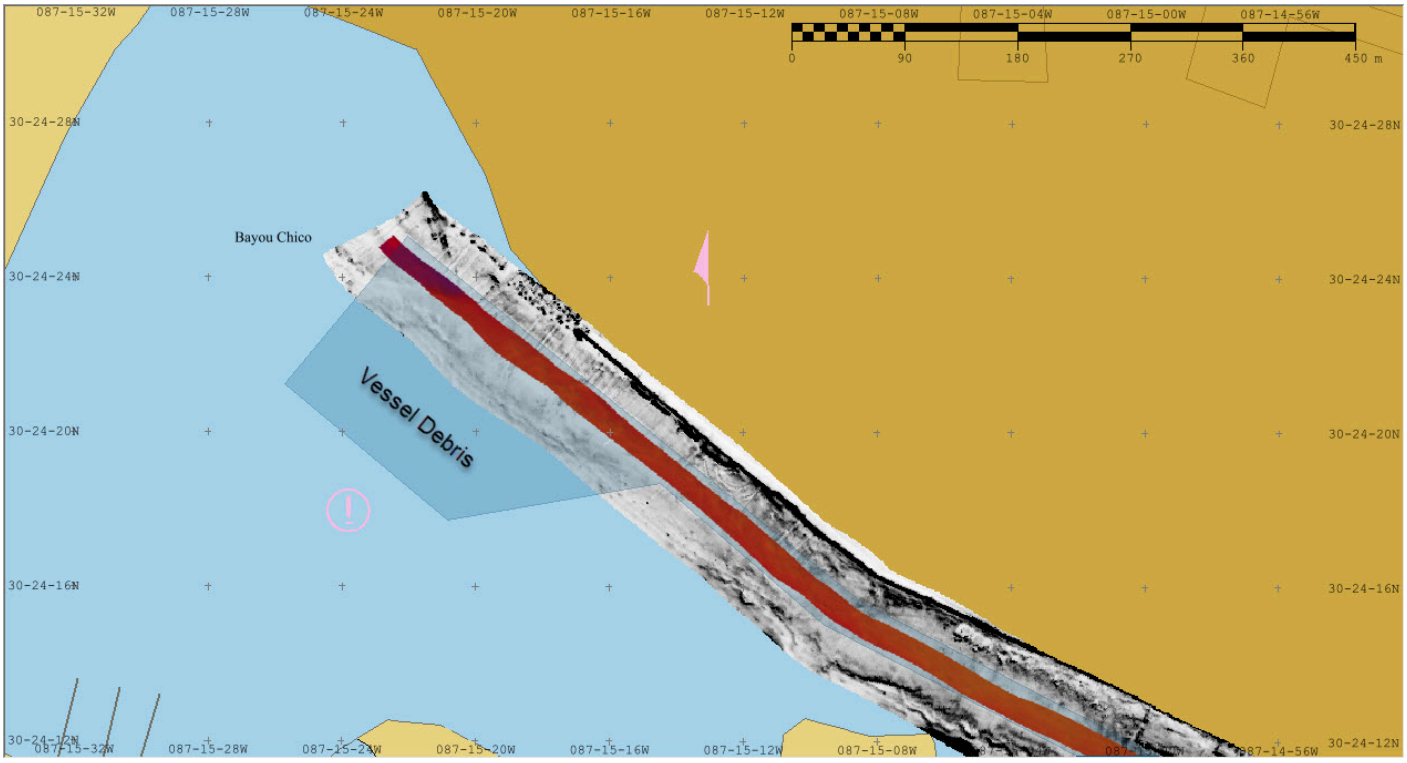



*Figure 6: Area of vessel debris within the survey limit shapefile within Bayou Chico*

## A.6 Survey Statistics

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

| | HULL ID | *S3005* | *Total* |
|---|---|---|---|
| **LNM** | **SBES Mainscheme** | 0.00 | 0.00 |
| | **MBES Mainscheme** | 37.09 | 40.27 |
| | **Lidar Mainscheme** | 0.00 | 0.00 |
| | **SSS Mainscheme** | 36.53 | 36.53 |
| | **SBES/SSS Mainscheme** | 0.00 | 0.00 |
| | **MBES/SSS Mainscheme** | 36.53 | 36.53 |
| | **SBES/MBES Crosslines** | 3.18 | 3.18 |
| | **Lidar Crosslines** | 0.00 | 0.00 |
| **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** | | | 1.689 |

*Table 3: Hydrographic Survey Statistics*

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

| Survey Dates | Day of the Year |
|---|---|
| 09/18/2020 | 262 |
| 09/19/2020 | 263 |

*Table 4: Dates of Hydrography*

# B. Data Acquisition and Processing

## B.1 Equipment and Vessels

Refer to the S-J939-NRT1-20 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** | ***S3005*** |
|---|---|
| **LOA** | 31 feet |
| **Draft** | 1.5 feet |

*Table 5: Vessels Used*

### B.1.2 Equipment

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

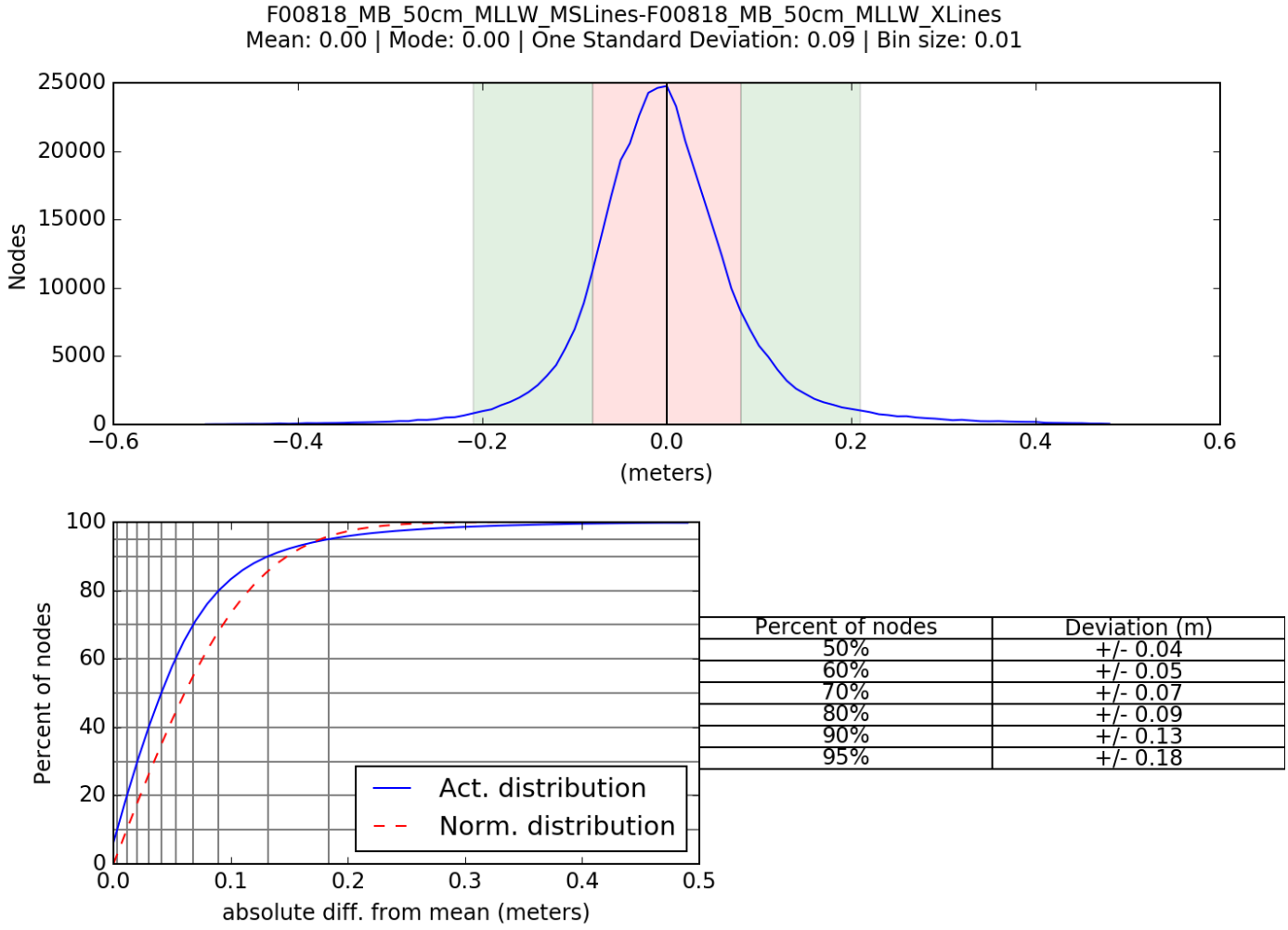
| Manufacturer | Model | Type |
|---|---|---|
| Kongsberg Maritime | EM 2040C | MBES |
| EdgeTech | 4125 | SSS |
| Applanix | POS MV 320 v5 | Positioning and Attitude System |
| YSI | CastAway-CTD | Sound Speed System |
| AML Oceanographic | MicroX SV | Sound Speed System |

*Table 6: Major Systems Used*

## B.2 Quality Control

### B.2.1 Crosslines

3.176 LNM of crossline multibeam data were collected and 37.094 LNM of main scheme multibeam data were collected. This describes an 8.56 % ratio of crosslines to main scheme multibeam collected. 99.5% of the differences between the crossline multibeam depths and the main scheme multibeam depths do not exceed the Allowable Error Fraction. The Allowable Error Fraction is computed by dividing the observed difference by the IHO-based HSD maximum allowable error for soundings (TVUmax) scaled according to the variance sum law, assuming independent, identically distributed observations. The results automatically handle the TVUmax 100-m depth switchover point for using IHO Order 1a (0-100m) or IHO Order 2a (100m+).




| Percent of nodes | Deviation (m) |
|---|---|
| 50% | +/- 0.04 |
| 60% | +/- 0.05 |
| 70% | +/- 0.07 |
| 80% | +/- 0.09 |
| 90% | +/- 0.13 |
| 95% | +/- 0.18 |

*Figure 7: Distribution of the differences, between the crossline multibeam CUBE depth surface and the main scheme multibeam CUBE depth surface, about the mean.*

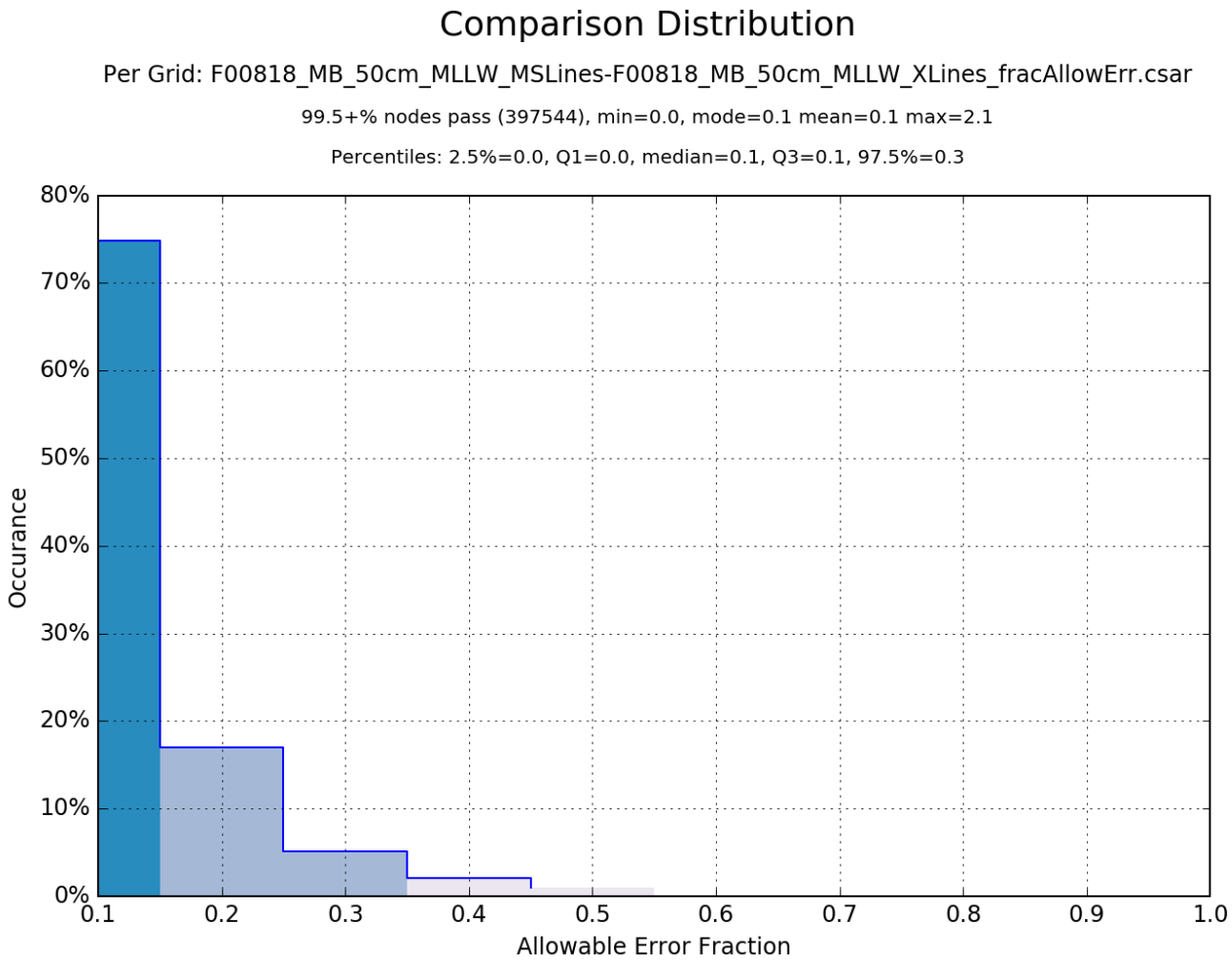



*Figure 8: Comparison Distribution of the Allowable Error Fraction*

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

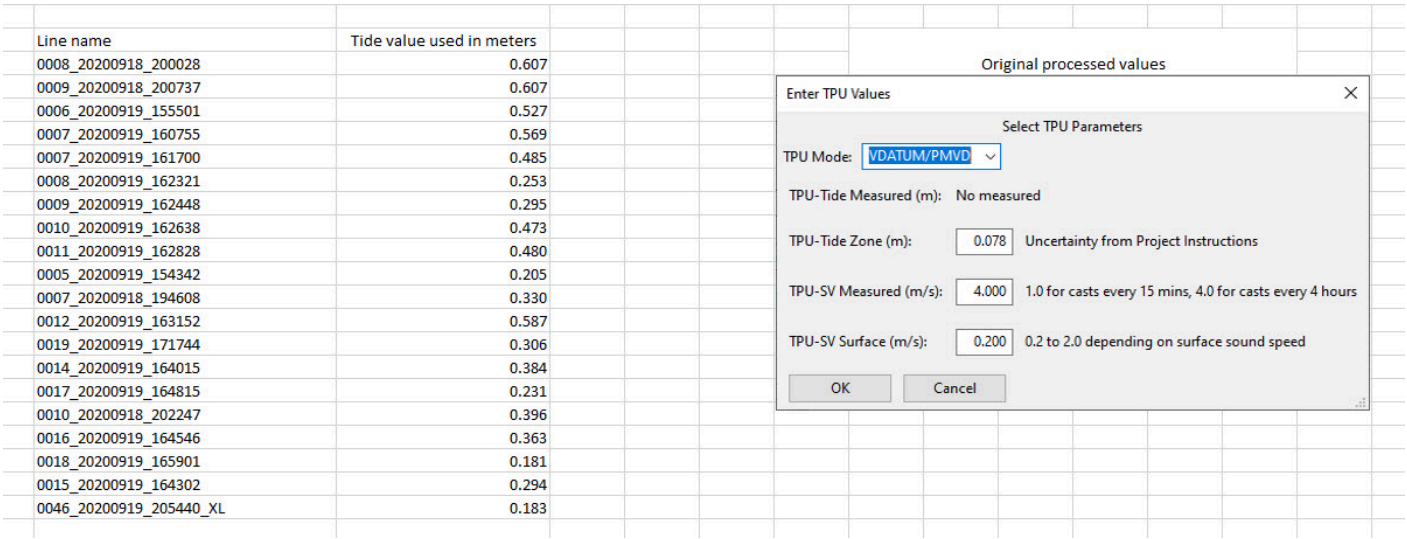
| Method | Measured | Zoning |
|---|---|---|
| ERS via VDATUM | 0.00 meters | 0.078 meters |

*Table 7: Survey Specific Tide TPU Values.*

| Hull ID | Measured - CTD | Measured - MVP | Measured - XBT | Surface |
|---|---|---|---|---|
| S3005 | 2.00 meters/second | 4.000 meters/second | 0.00 meters/second | 0.200 meters/second |

*Table 8: Survey Specific Sound Speed TPU Values.*

In addition to the usual a priori estimates of uncertainty provided via device models for vessel motion, VDatum, Poor Mans VDatum (PMVD), and real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey F00818. Real-time uncertainties were provided via MBES data and Applanix Delayed Heave RMS. Following post-processing of the real-time vessel motion, recomputed uncertainties of vessel gps height and navigation were applied in CARIS HIPS and SIPS via a Smoothed Best Estimate of Trajectory (SBET) RMS file generated in Applanix POSPac. A Measured Tide uncertainty was added to multibeam lines that described a distinct second density layer associated with the area in the north-eastern extent of the survey area described by the surface F00818_MB_50cm_MLLW_AreaAlpha.csar and in section A.4 Survey Coverage. The values for each uncertainty was based upon an analysis of the greatest node standard deviation found in each affected line. A table of the actual value of the measured tide added to each line is described below and correspondence with PHB relating to this process may be found in the Project_Correspondence folder.



| Line name | Tide value used in meters |
|---|---|
| 0008_20200918_200028 | 0.607 |
| 0009_20200918_200737 | 0.607 |
| 0006_20200919_155501 | 0.527 |
| 0007_20200919_160755 | 0.569 |
| 0007_20200919_161700 | 0.485 |
| 0008_20200919_162321 | 0.253 |
| 0009_20200919_162448 | 0.295 |
| 0010_20200919_162638 | 0.473 |
| 0011_20200919_162828 | 0.480 |
| 0005_20200919_154342 | 0.205 |
| 0007_20200918_194608 | 0.330 |
| 0012_20200919_163152 | 0.587 |
| 0019_20200919_171744 | 0.306 |
| 0014_20200919_164015 | 0.384 |
| 0017_20200919_164815 | 0.231 |
| 0010_20200918_202247 | 0.396 |
| 0016_20200919_164546 | 0.363 |
| 0018_20200919_165901 | 0.181 |
| 0015_20200919_164302 | 0.294 |
| 0046_20200919_205440_XL | 0.183 |



*Figure 9: Measured tide uncertainty added to each affected multibeam line.*

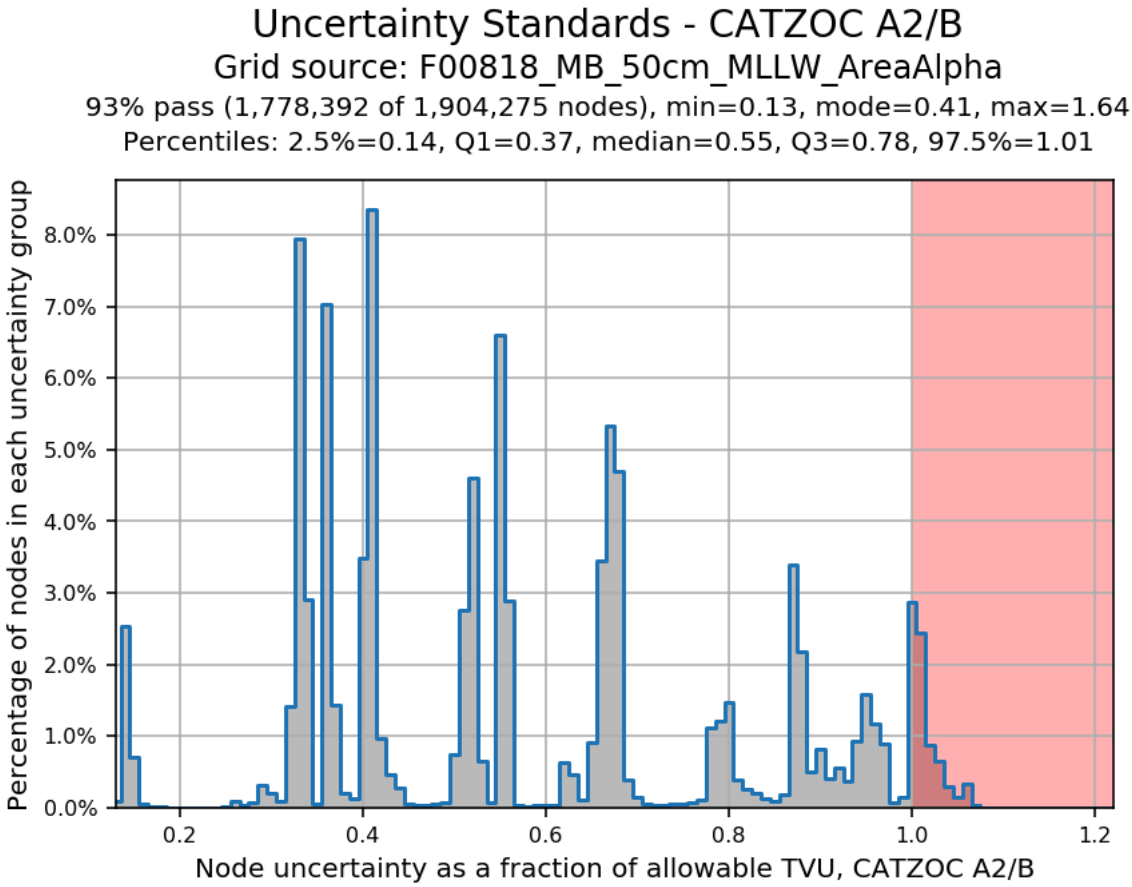



*Figure 10: CATZOC uncertainty standards for surface F00818_MB_50cm_MLLW_AreaAlpha_Final.csar*

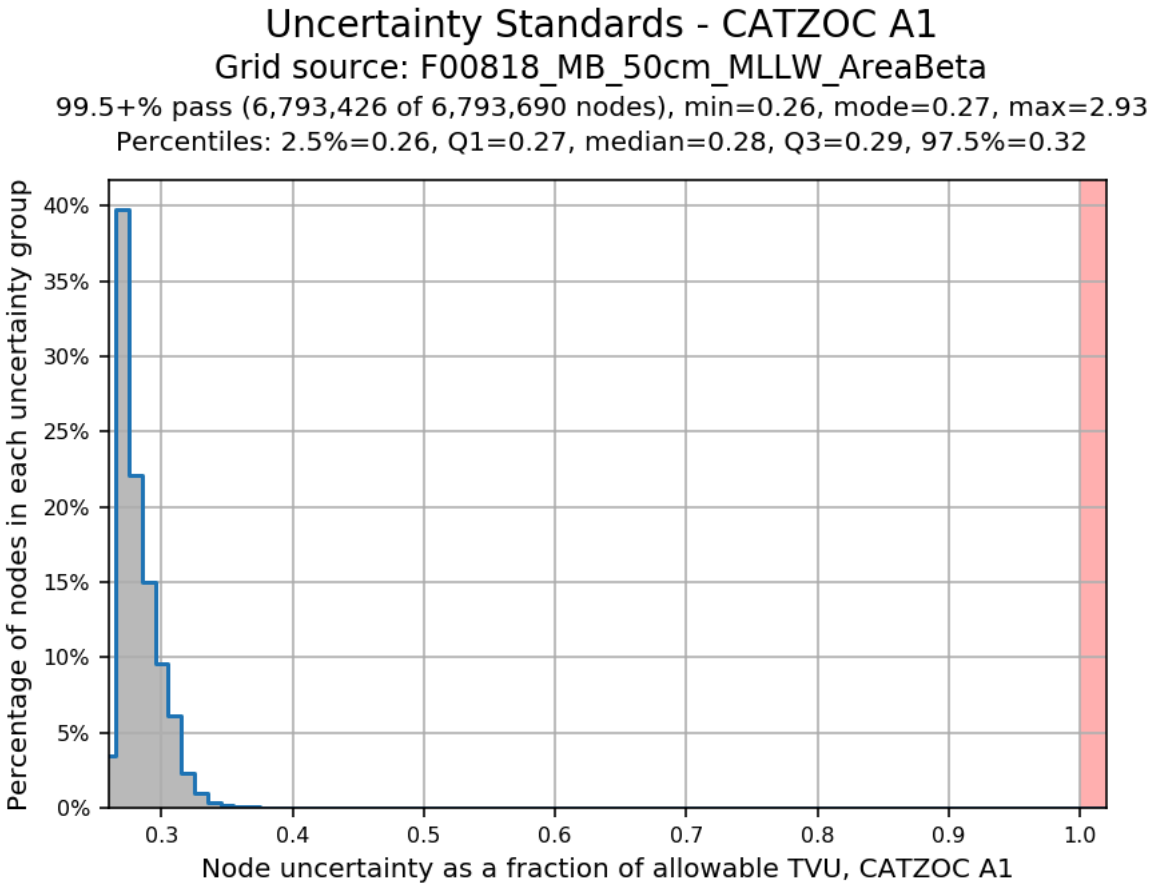



*Figure 11: CATZOC uncertainty standards for surface F00818_MB_50cm_MLLW_AreaBeta_Final.csar*

### B.2.3 Junctions

There were no junctions for this survey.

There are no contemporary surveys that junction with this survey.

***Contemporary data does exist for this survey and a junction analysis was performed during review at the Pacific Hydrographic Branch. The reviewer completed a grid comparison between F00818 and survey D00262, a Hurricane Michael response survey acquired by NRT1 in 2018.***

### 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

There were no conditions or deficiencies that affected equipment operational effectiveness.

### B.2.6 Factors Affecting Soundings

Hurricane Sally's storm surge

There was an extensive sediment plume associated with the drainage of Hurricane Sally's storm surge. Major flooding from this storm surge and more than 20 inches of rain had occurred with 24 hours of this survey in and about Pensacola. We believe that these conditions led to the two distinct density layers associated with depths in the upper north-eastern area of the survey extents in proximity to the port. This density layer was not evident in prior surveys of this area. Data collection in some distinct areas was not possible due to these post-storm conditions despite multiple attempts. Correspondence with PHB relating to these dual layers may be found in the Project_Correspondence folder.

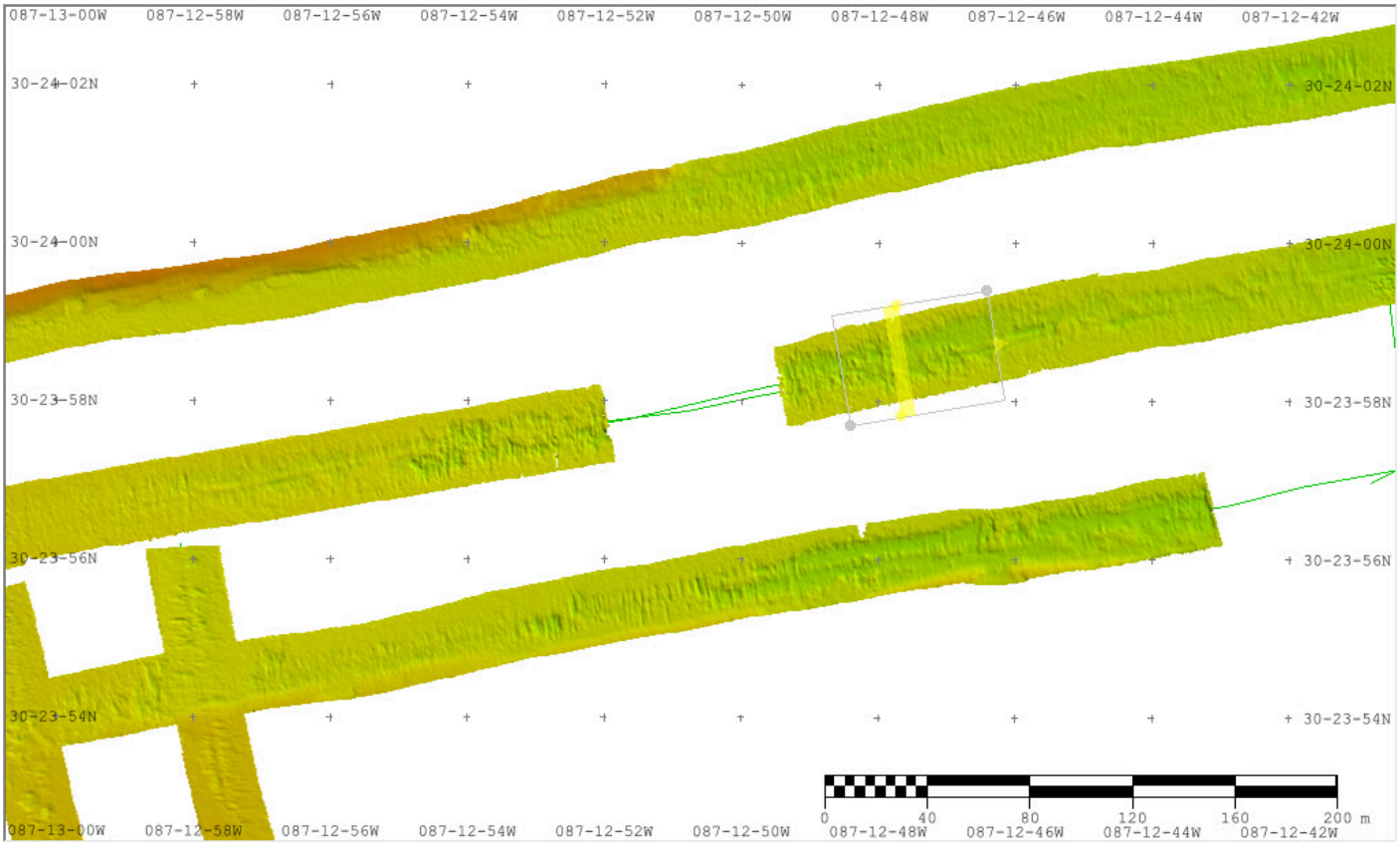



*Figure 12: Surface depicting the multiple layers.*

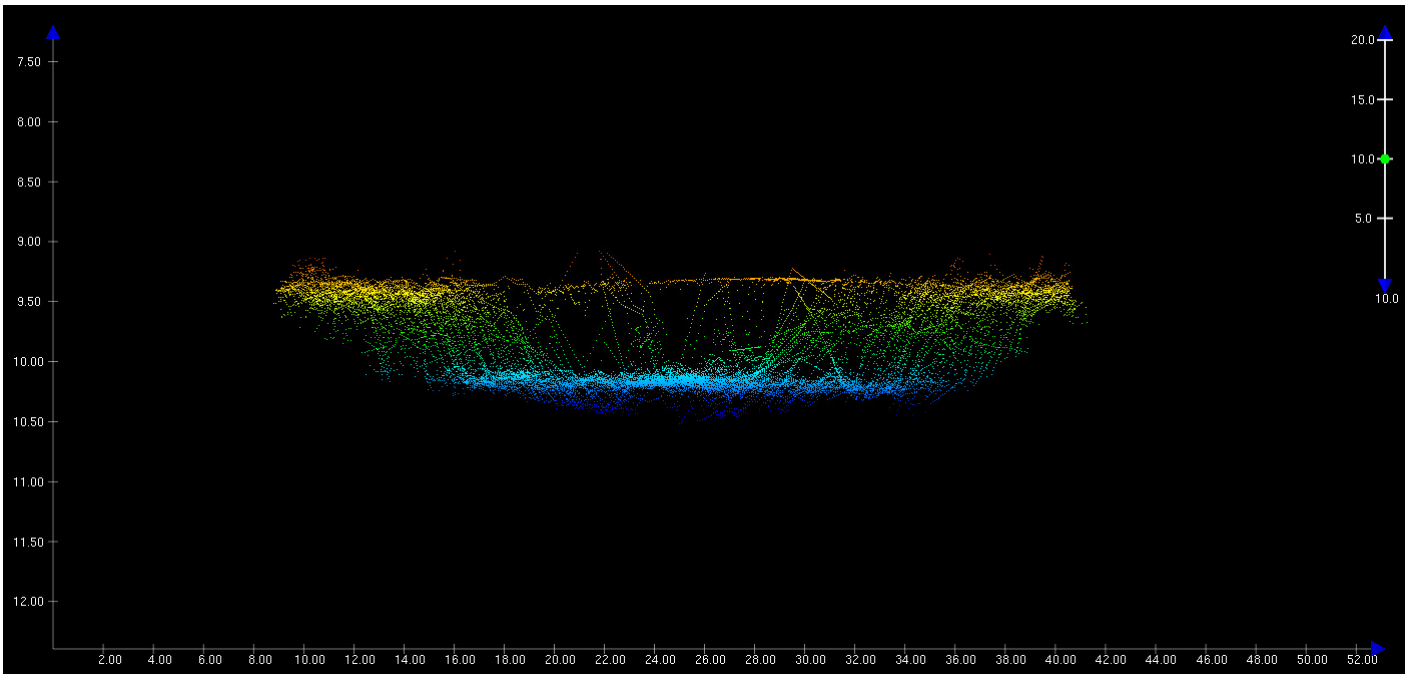



*Figure 13: Subset of same area depicting the two density layers.*

### B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Casts were conducted at a minimum of one every four hours during launch acquisition.

Casts were conducted more frequently in areas where the influx of freshwater had an effect on the speed of sound in the water column and when there was a change in surface sound speed greater than two meters per second. All sound speed methods were used as detailed in the DAPR.

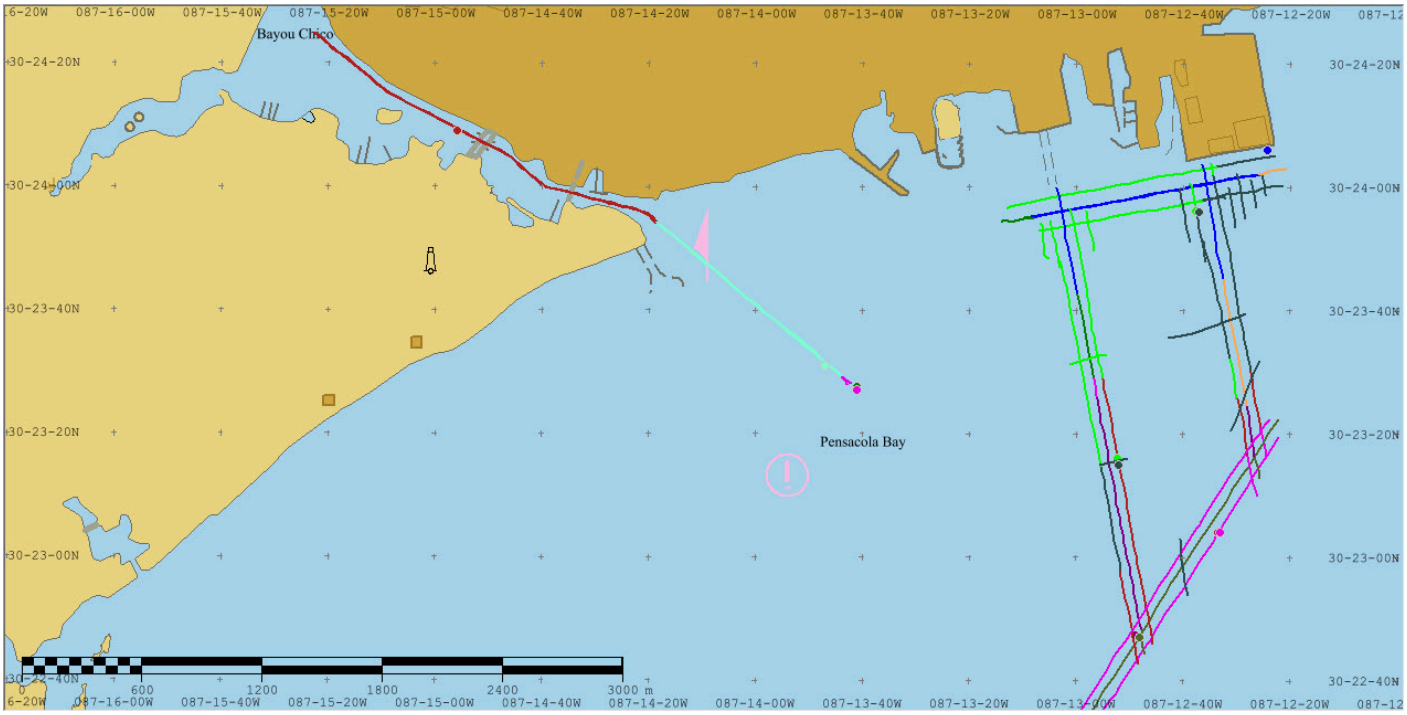



*Figure 14: Sound Velocity cast locations and lines colored by cast used.*

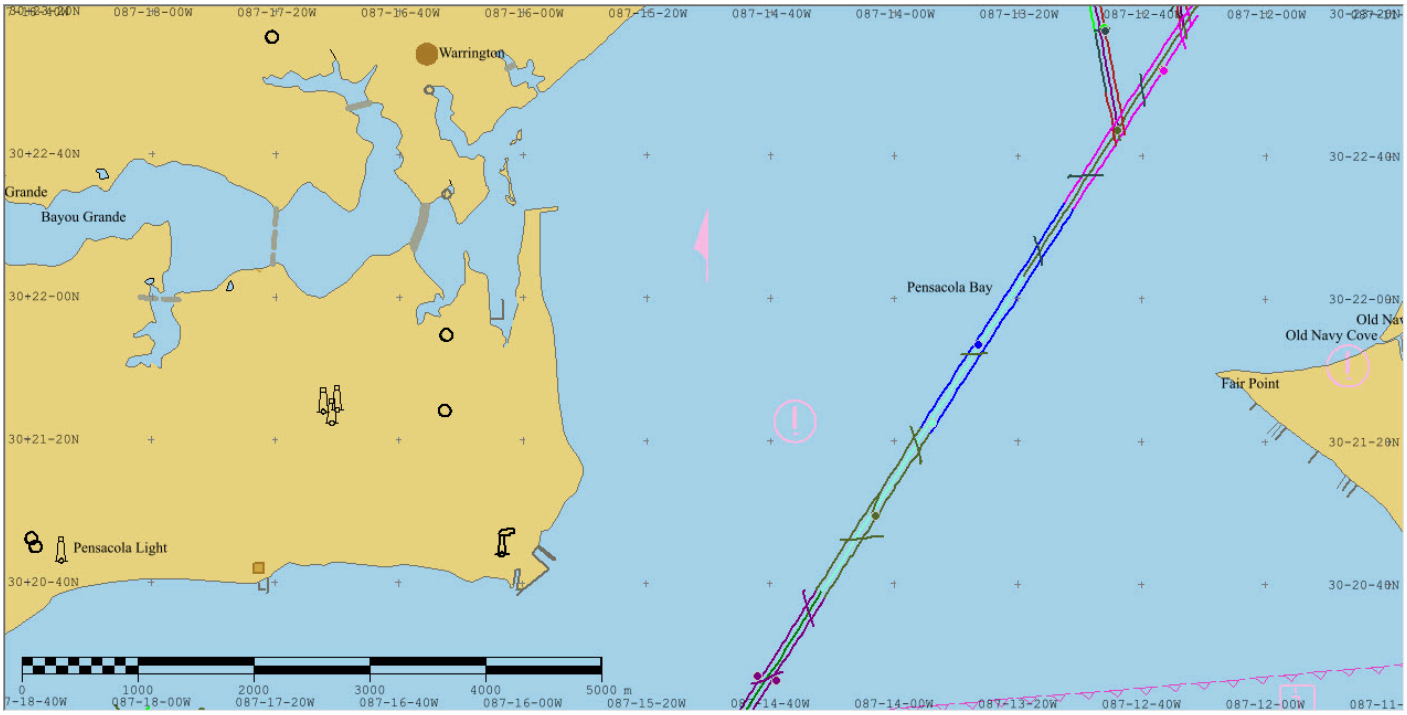



*Figure 15: Sound Velocity cast locations and lines colored by cast used.*

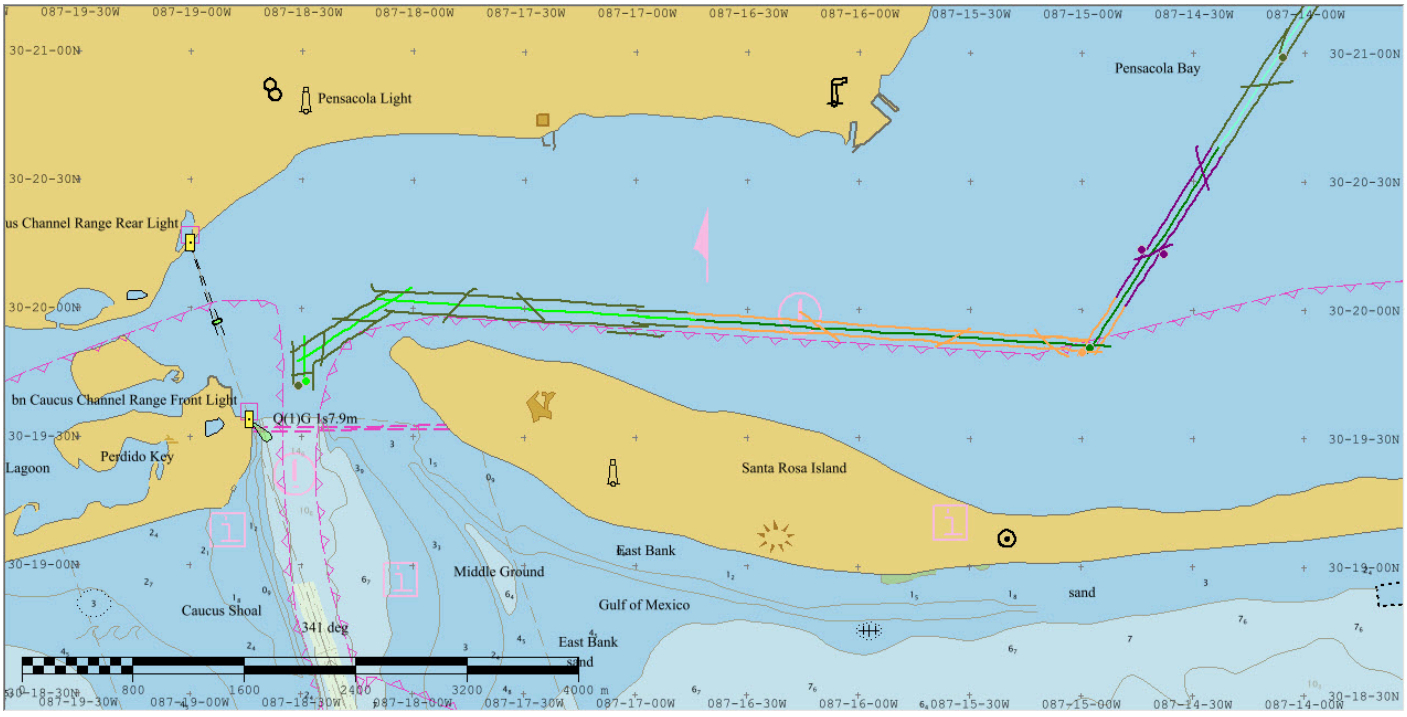



*Figure 16: Sound Velocity cast locations and lines colored by cast used.*

### B.2.8 Coverage Equipment and Methods

The survey was designed to collect Option B: 200% side scan sonar coverage using the Edgtech 4125 with concurrent multibeam bathymetry collection using the Kongsberg 2040c multibeam.

### B.2.9 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature and the results are shown below. Density requirements for F00818 were achieved with at least 99% surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3. The few nodes that did not meet density requirements are due to sparse data in the outer beams, especially near steep slopes and rocky areas where acoustic shadowing occurred, and at the edges of the survey limits. For the individual graph of density requirements, see the Standards and Compliance Review located in Appendix II.

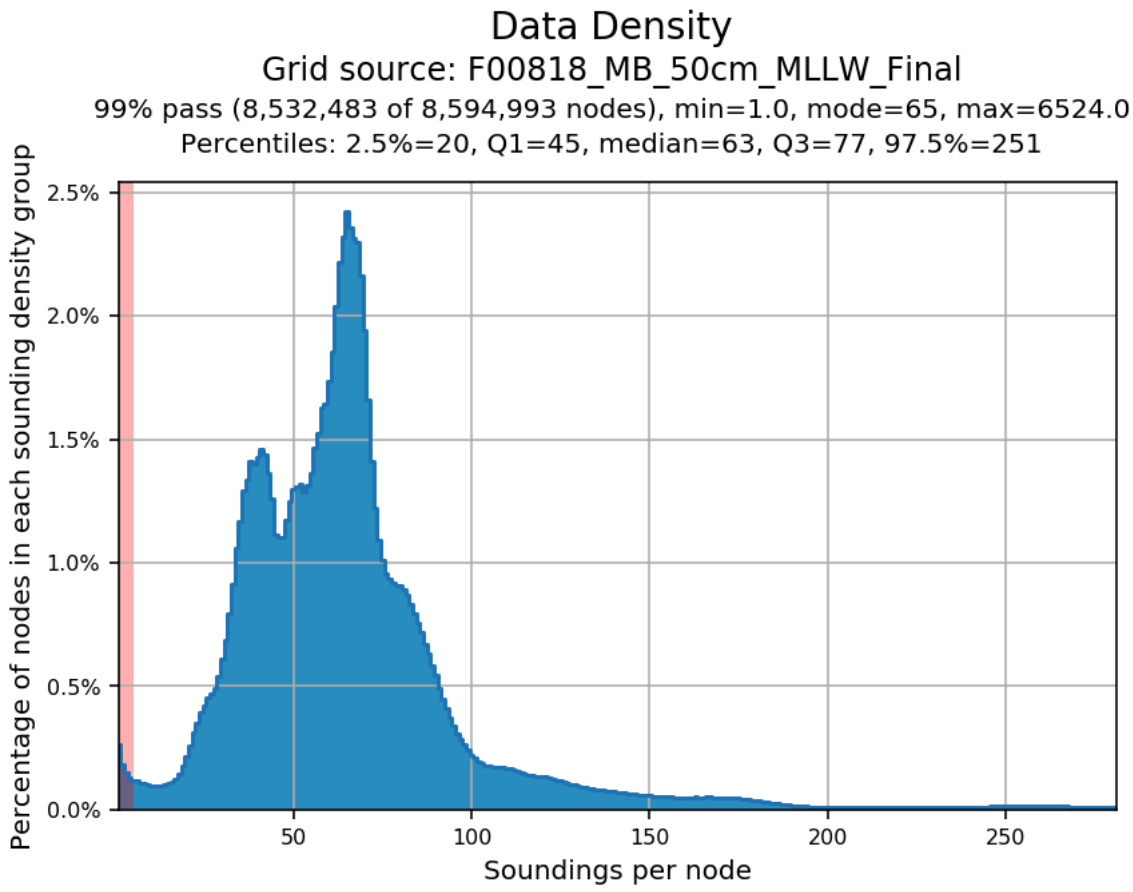



*Figure 17: Data Density*

## 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

Backscatter was acquired but not processed. All equipment and survey methods were used as detailed in the DAPR.

***Backscatter GSF files and mosaics were generated during office review.***

## B.5 Data Processing

### B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile Version 2020.

### 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 |
|---|---|---|---|---|---|
| F00818_SSSAB_1m_455kHz_1of2 | SSS Mosaic | 1 meters | - | NOAA_1m | 100% SSS |
| F00818_SSSAB_1m_455kHz_2of2 | SSS Mosaic | 1 meters | - | NOAA_1m | 200% SSS |

| Surface Name | Surface Type | Resolution | Depth Range | Surface Parameter | Purpose |
|---|---|---|---|---|---|
| F00818_MB_50cm_MLLW | CARIS Raster Surface (CUBE) | 0.5 meters | 2.7 meters - 22.7 meters | NOAA_0.5m | Object Detection |
| F00818_MB_50cm_MLLW_Final | CARIS Raster Surface (CUBE) | 0.5 meters | 2.7 meters - 22.7 meters | NOAA_0.5m | Object Detection |
| F00818_MB_50cm_MLLW_AreaAlpha | CARIS Raster Surface (CUBE) | 0.5 meters | 5.8 meters - 12.4 meters | NOAA_0.5m | Object Detection |
| F00818_MB_50cm_MLLW_AreaAlpha_Final | CARIS Raster Surface (CUBE) | 0.5 meters | 5.8 meters - 12.4 meters | NOAA_0.5m | Object Detection |
| F00818_MB_50cm_MLLW_AreaBeta | CARIS Raster Surface (CUBE) | 0.5 meters | 2.7 meters - 22.7 meters | NOAA_0.5m | Object Detection |
| F00818_MB_50cm_MLLW_AreaBeta_Final | CARIS Raster Surface (CUBE) | 0.5 meters | 2.7 meters - 22.7 meters | NOAA_0.5m | Object Detection |

*Table 9: Submitted Surfaces*

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for F00818. The surfaces have been reviewed where noisy data, or "fliers," are incorporated into the gridded solutions causing the surface to be shoaler or deeper than the true sea floor. Where these spurious soundings cause the gridded surface to be shoaler or deeper than the reliably measured seabed by greater than the maximum allowable Total Vertical Uncertainty at that depth, the noisy data have been rejected by the hydrographer and the surface recomputed. Flier Finder, part of the QC Tools package within HydrOffice, was used to assist the search for spurious soundings following gross cleaning. Flier Finder was run iteratively until all remaining flagged fliers were deemed to be valid aspects of the steep slopes and dynamic nature of the seafloor.

***Naming conventions have been updated by reviewer to meet the latest specifications at the time of review:***
***- F00818_MB_50cm_MLLW_AreaAlpha_Final = F00818_MB_50cm_MLLW_Final_1of2***
***- F00818_MB_50cm_MLLW_AreaBeta_Final = F00818_MB_50cm_MLLW_Final_2of2***

# C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

## 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 | S-J939_VDatum_100m_NAD83-MLLW_geoid12b |

*Table 10: ERS method and SEP file*

## 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 16.

The following PPK methods were used for horizontal control:

- RTX

Vessel kinematic data were post-processed using Applanix POSPac processing software and RTX positioning methods described in the DAPR. Smoothed Best Estimate of Trajectory (SBET) and associated error (RMS) data were applied to all MBES data in CARIS HIPS and SIPS.

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 comparison was performed between a CARIS HIPS and SIPS sounding set created from a finalized surface and all coincident ENCs listed in section D.1.1 using Pydro's CA Tools. In general, the surveyed soundings agreed with the majority of charted depths. No significant differences were found.

### D.1.1 Electronic Navigational Charts

The following are the largest scale ENCs, which cover the survey area:

| ENC | Scale | Edition | Update Application Date | Issue Date |
|---|---|---|---|---|
| US5FL72M | 1:30000 | 37 | 04/15/2020 | 09/11/2020 |
| US5FL73M | 1:10000 | 29 | 07/01/2020 | 09/03/2020 |

*Table 11: Largest Scale ENCs*

### D.1.2 Shoal and Hazardous Features

All shoals were properly charted and presented no unreported danger to navigation.

### D.1.3 Charted Features

All charted features within the survey area were investigated.

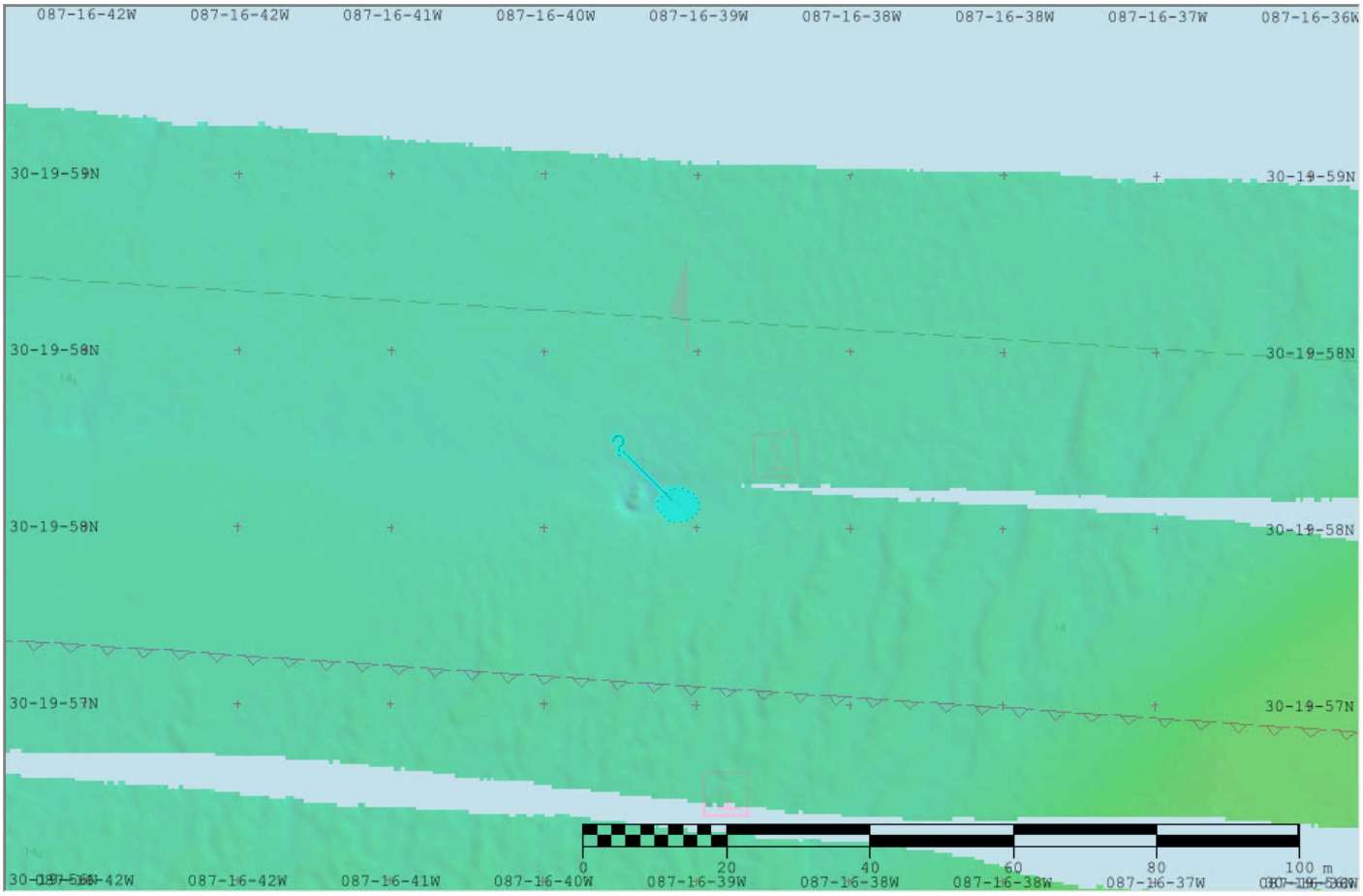



*Figure 18: Feature ID: US 0265102534 04291 was evident, but was not assigned.*

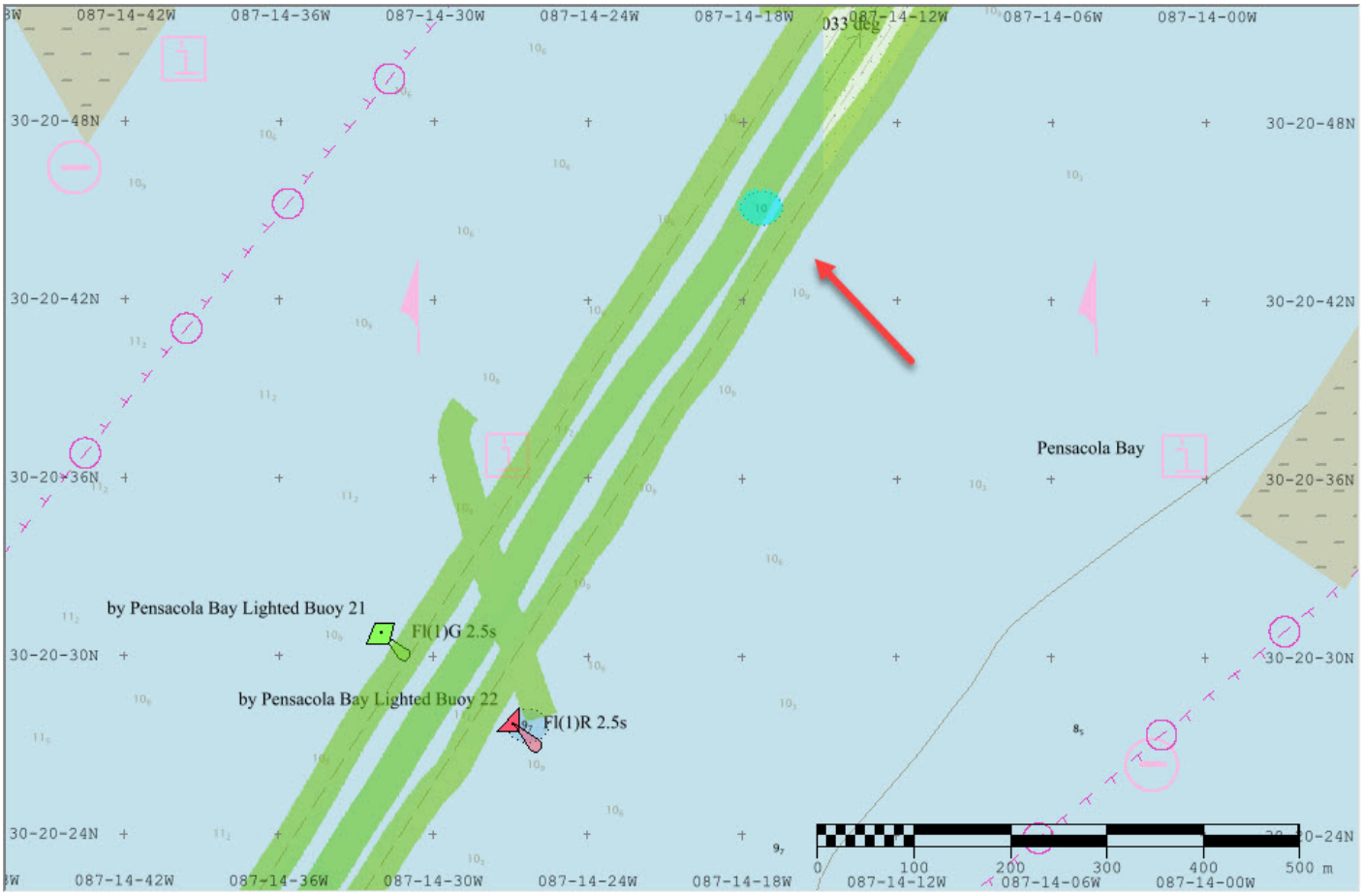



*Figure 19: Feature ID: US 0262820034 04516 was not evident in MB bathymetry or sidescan imagery. However, it was not assigned and a 500 meter radius was not developed for disproval.*

### D.1.4 Uncharted Features

Survey F00818 has 0 new features that are addressed in the F00818 Final Feature File. Of these features, there are 0 new Obstructions, 0 new Seabed Areas, 0 new Underwater Rocks. of which 0 are submitted as DTONs.

### D.1.5 Channels

In general, the surveyed depths meet or exceed the controlling depths, tabulated depths, and reported depths of all maintained channels in the survey area.

## D.2 Additional Results

### D.2.1 Aids to Navigation

No aids to navigation were reported to the U. S. Coast Guard.

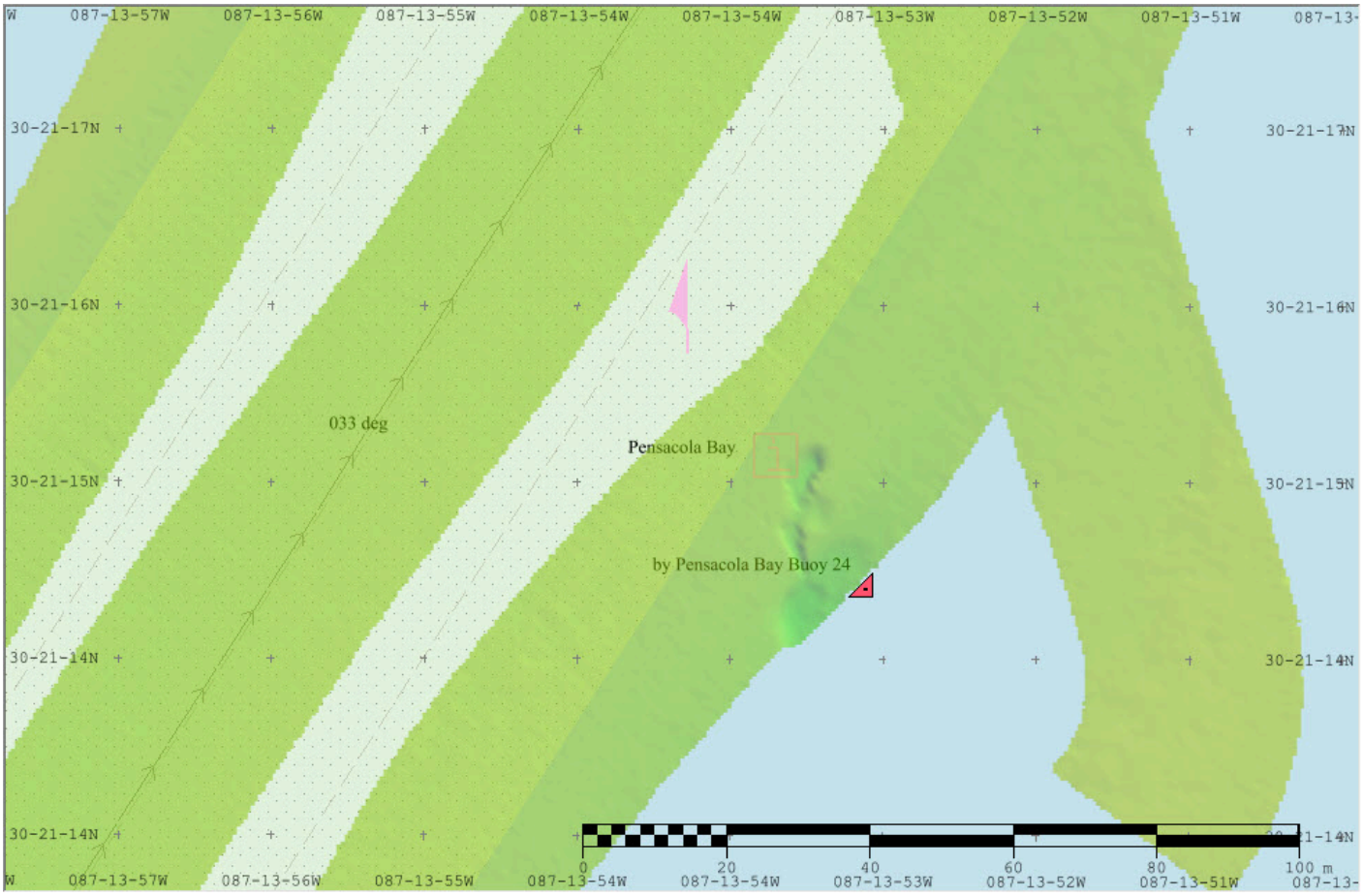



*Figure 20: Buoy 24 was evident in the survey data.*

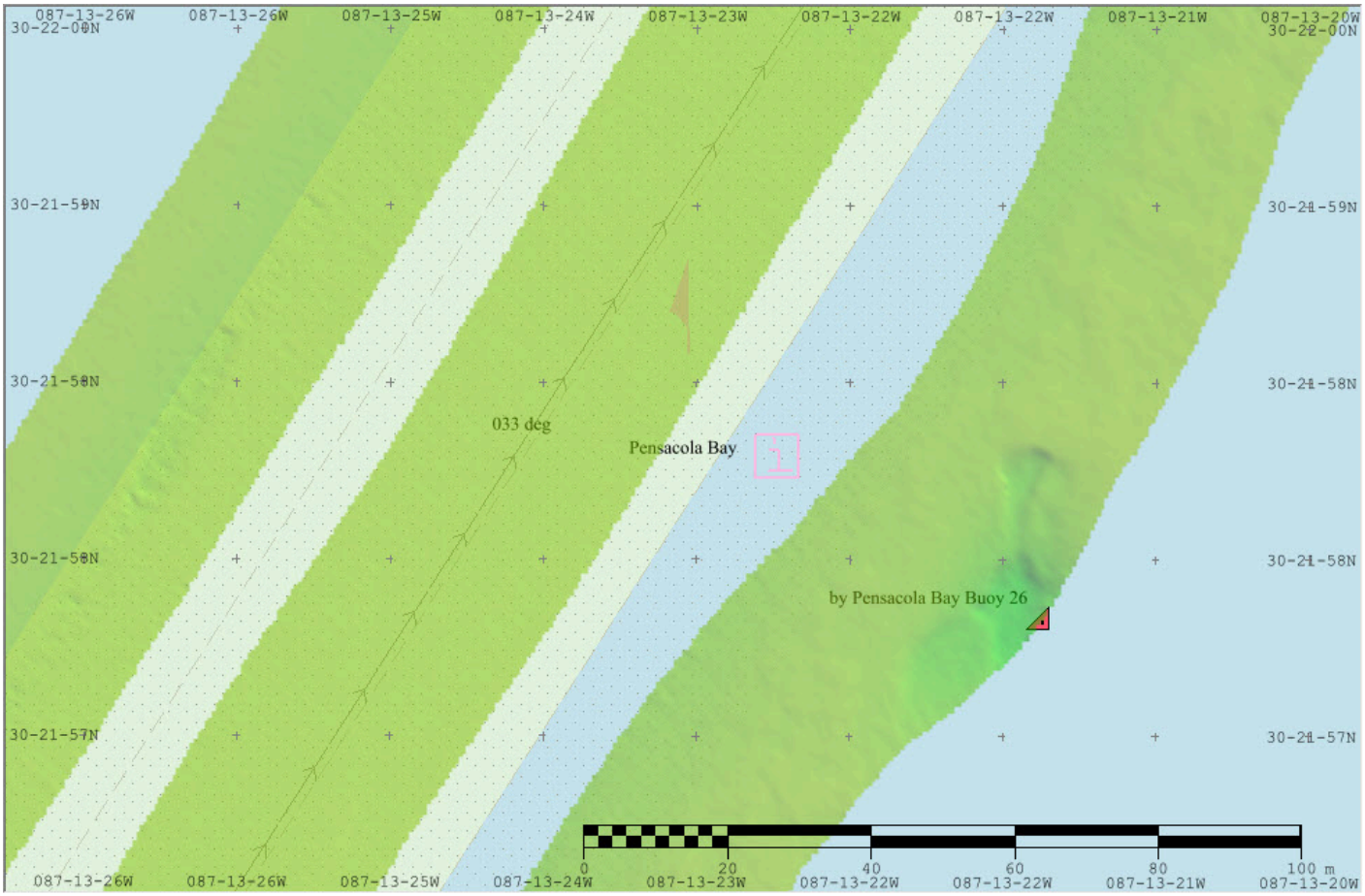



*Figure 21: Buoy 26 was evident in the survey data.*

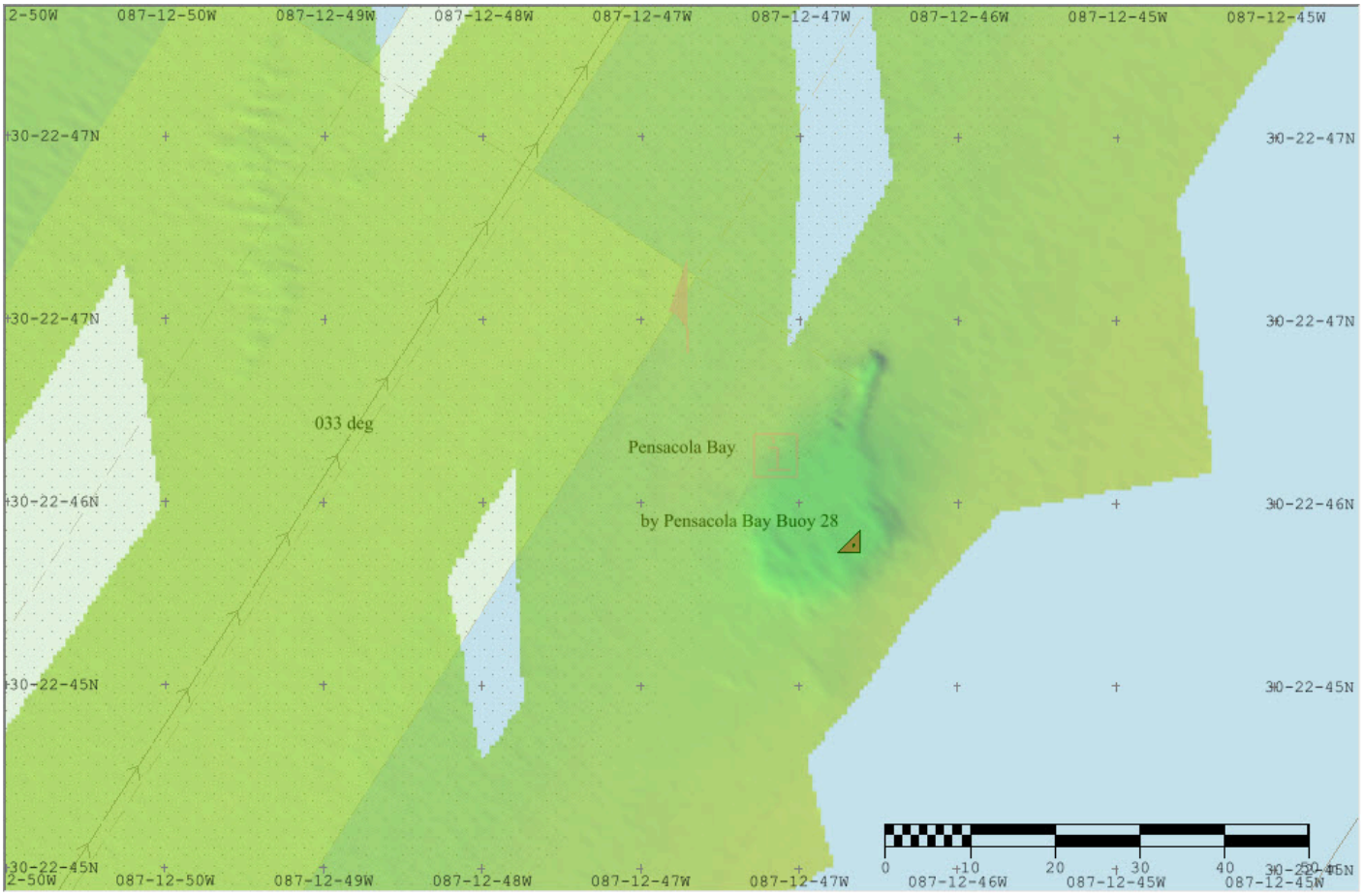



*Figure 22: Buoy 28 was evident in the survey data.*

### 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

Overhead features exist for this survey, but were not investigated.

### D.2.5 Submarine Features

No submarine features exist for this survey.

### 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 |
|---|---|---|---|
| Joshua Bergeron | Sheet Manager | 01/25/2021 | BERGERON.JOSHUA.STEPHAN.1239796180 Digitally signed by BERGERON.JOSHUA.STEPHAN.1239796180 Date: 2021.02.01 15:43:17 -06'00' |
| LT John Kidd | Chief of Party | 01/25/2021 | Digitally signed by KIDD.JOHN.RYAN.1401688524 Date: 2021.02.01 14:49:59 -06'00' |

# 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 |