

**F00816**

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

**DESCRIPTIVE REPORT**

Type of Survey: Natural Disaster Response

Registry Number: F00816

**LOCALITY**

State(s): Texas

General Locality: Vicinity of Port Arthur, TX

Sub-locality: Sabine and Neches Rivers

**2020**

CHIEF OF PARTY  
James L. Kirkpatrick

LIBRARY & ARCHIVES

Date:

**HYDROGRAPHIC TITLE SHEET**

**F00816**

**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): **Texas**

General Locality: **Vicinity of Port Arthur, TX**

Sub-Locality: **Sabine and Neches Rivers**

Scale: **20000**

Dates of Survey: **09/01/2020 to 09/02/2020**

Instructions Dated: **09/14/2020**

Project Number: **S-K936-NRT2-20**

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

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

Soundings by: **Multibeam Echo Sounder**

Imagery by: **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 15N, 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 F00816

Project: S-K936-NRT2-20

Locality: Vicinity of Port Arthur, TX

Sublocality: Sabine and Neches Rivers

Scale: 1:20000

September 2020 - September 2020

**NOAA Navigation Response Team - Stennis**

Chief of Party: James L. Kirkpatrick

### A. Area Surveyed

Post Hurricane Laura requests came from United States Army Corps of Engineers (USACOE) through regional Navigation Managers. Two separate areas in the vicinity of Port Arthur, Texas were requested and included in survey F00816. 1. A request to investigate an area of debris in the channel in the Neches River in Beaumont at the reported position 30°04'28.93"/094°03'33.53". 2. NRT2 was also assigned to survey the ICWW from Pavell Island to Mile Marker 260. Survey data from this project is intended to supersede all prior survey data in the common area.

#### A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
30° 4' 45.82" N 94° 4' 3.64" W	30° 3' 27.7" N 93° 37' 32.77" W

*Table 1: Survey Limits*

All assigned survey limits were ensonified to object detection standards.

#### A.2 Survey Purpose

Survey F00816 is in response to a USACE request for emergency hydrographic surveys due to the effects of Hurricane Laura.

### A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data quality control was performed on all accompanying data and was found to meet guidelines in 2020 Hydrographic Surveys Specifications and Deliverables.

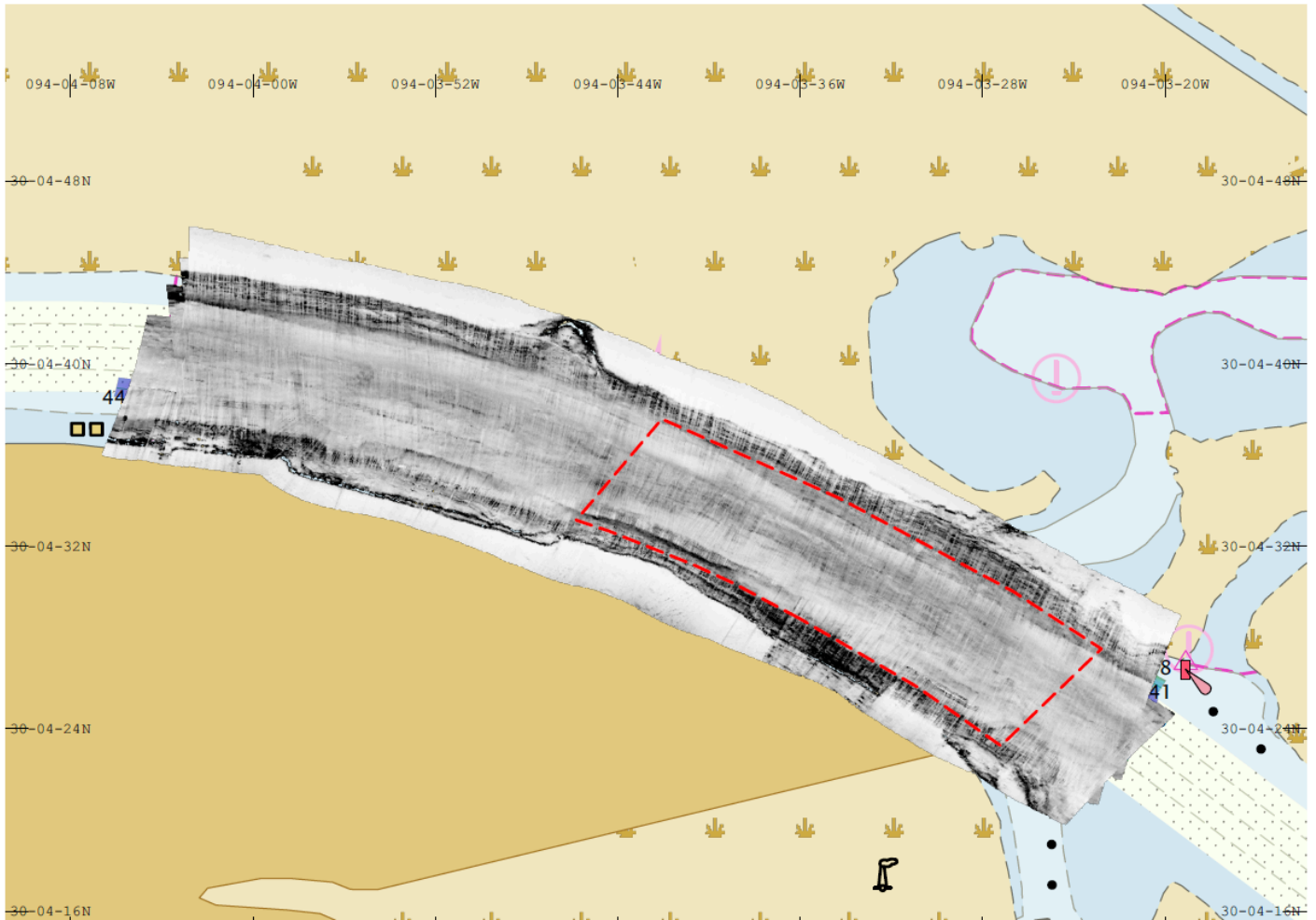
### A.4 Survey Coverage

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

<b>Water Depth</b>	<b>Coverage Required</b>
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 1: Neches River Coverage.*

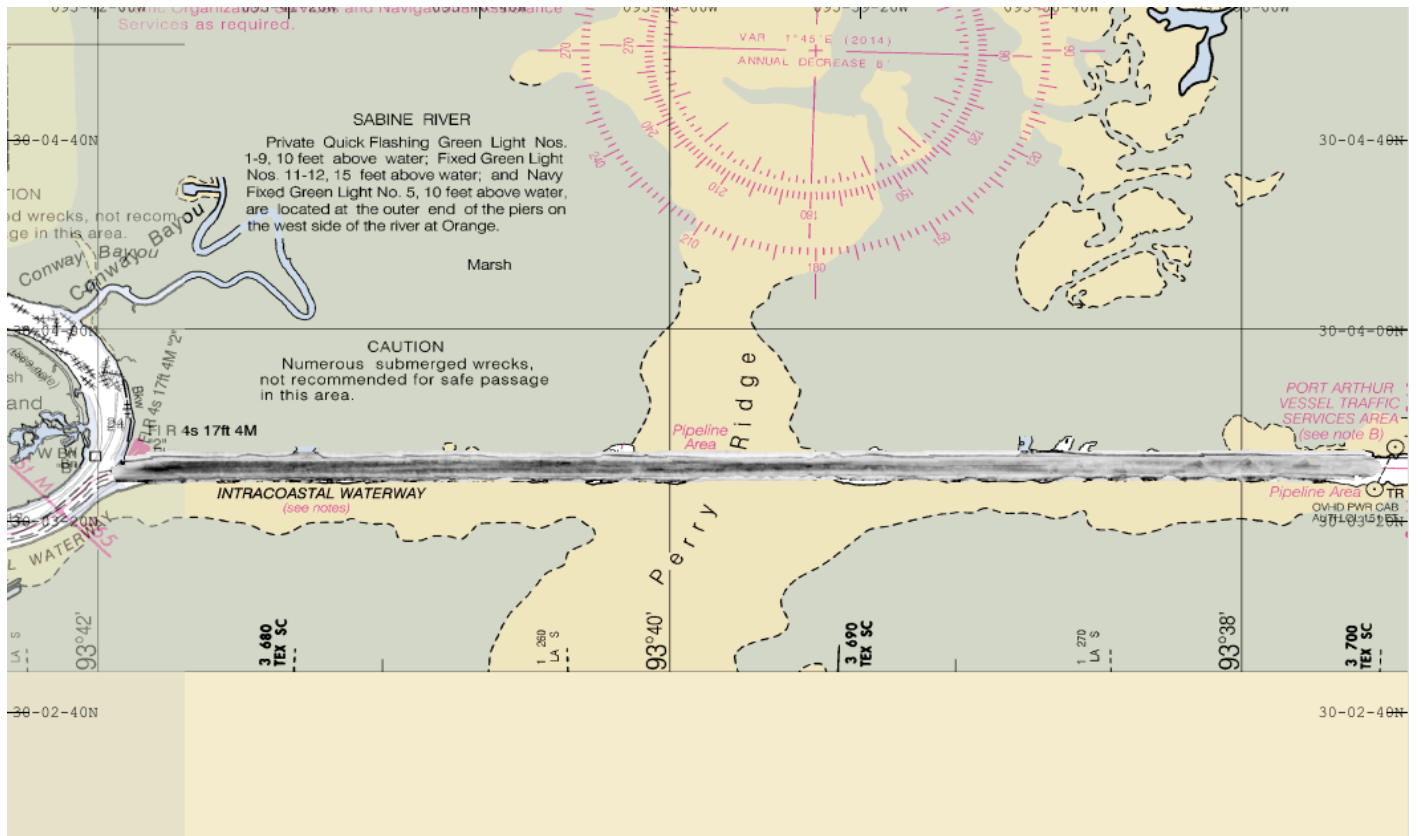


Figure 2: ICWW Pavell Island to MM260 Coverage.

## A.6 Survey Statistics

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



	<b>HULL ID</b>	<i>S3009</i>	<i>Total</i>
<b>LNM</b>	<b>SBES Mainscheme</b>	0	0
	<b>MBES Mainscheme</b>	0	0
	<b>Lidar Mainscheme</b>	0	0
	<b>SSS Mainscheme</b>	0	0
	<b>SBES/SSS Mainscheme</b>	0	0
	<b>MBES/SSS Mainscheme</b>	16.740	16.740
	<b>SBES/MBES Crosslines</b>	7.36	7.36
	<b>Lidar Crosslines</b>	0	0
<b>Number of Bottom Samples</b>			0
<b>Number Maritime Boundary Points Investigated</b>			0
<b>Number of DPs</b>			0
<b>Number of Items Investigated by Dive Ops</b>			0
<b>Total SNM</b>			0.5

*Table 3: Hydrographic Survey Statistics*

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

<b>Survey Dates</b>	<b>Day of the Year</b>
09/01/2020	245
09/02/2020	246

*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:

<b>Hull ID</b>	<i>S3009</i>
<b>LOA</b>	10.38 meters
<b>Draft</b>	0.6 meters

*Table 5: Vessels Used*



*Figure 3: S3009*

All survey data for F00816 was collected by Navigation Response Team 2 and S3009.

### B.1.2 Equipment

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

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

*Table 6: Major Systems Used*

All major systems are discussed in detail in the accompanying Data Acquisition and Processing Report.

## B.2 Quality Control

### B.2.1 Crosslines

Crosslines were collected, processed and compared in accordance with Section 5.2.4.32 of the HSSD. To evaluate crosslines, a surface generated via data strictly from mainscheme lines, and a surface generated via data strictly from crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated, and is submitted in the Separates II Digital Data folder. Statistics show the mean difference between the depths derived from mainscheme data and crossline data was 0.032 meters with a standard deviation of 0.046 meters.

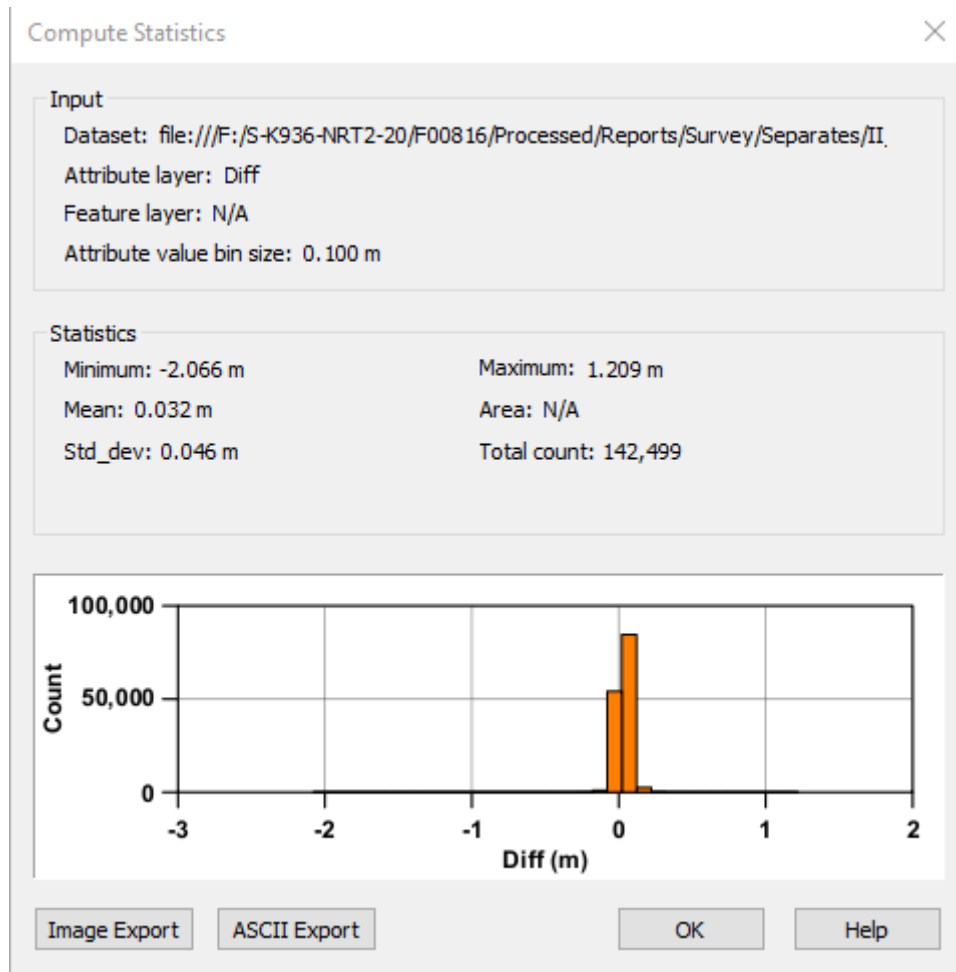


Figure 4: F00816 Crossline Statistics.

**B.2.2 Uncertainty**

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 centimeters	12.9 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S3009	2.0 meters/second	N/A meters/second	N/A meters/second	0.5 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 F00816. 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.

*The Tide Zoning Values applied to this survey are as follows: in the western portion of the survey a value of 12.7cm was used and for the eastern portion a value of 12.9cm was used. Though these differ from what was assigned in the Project Instructions, these differences do not result in any measurable changes in the gridded uncertainty values.*

*Poor Man's VDatum (PMVD) was not utilized for this survey. SBET RMS was derived utilizing an RTX solution.*

### **B.2.3 Junctions**

No junction surveys assigned for F00816.

There are no contemporary surveys that junction with this survey.

### **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**

There were no other factors that affected corrections to soundings.

### **B.2.7 Sound Speed Methods**

Sound Speed Cast Frequency: At least every 4 hours.

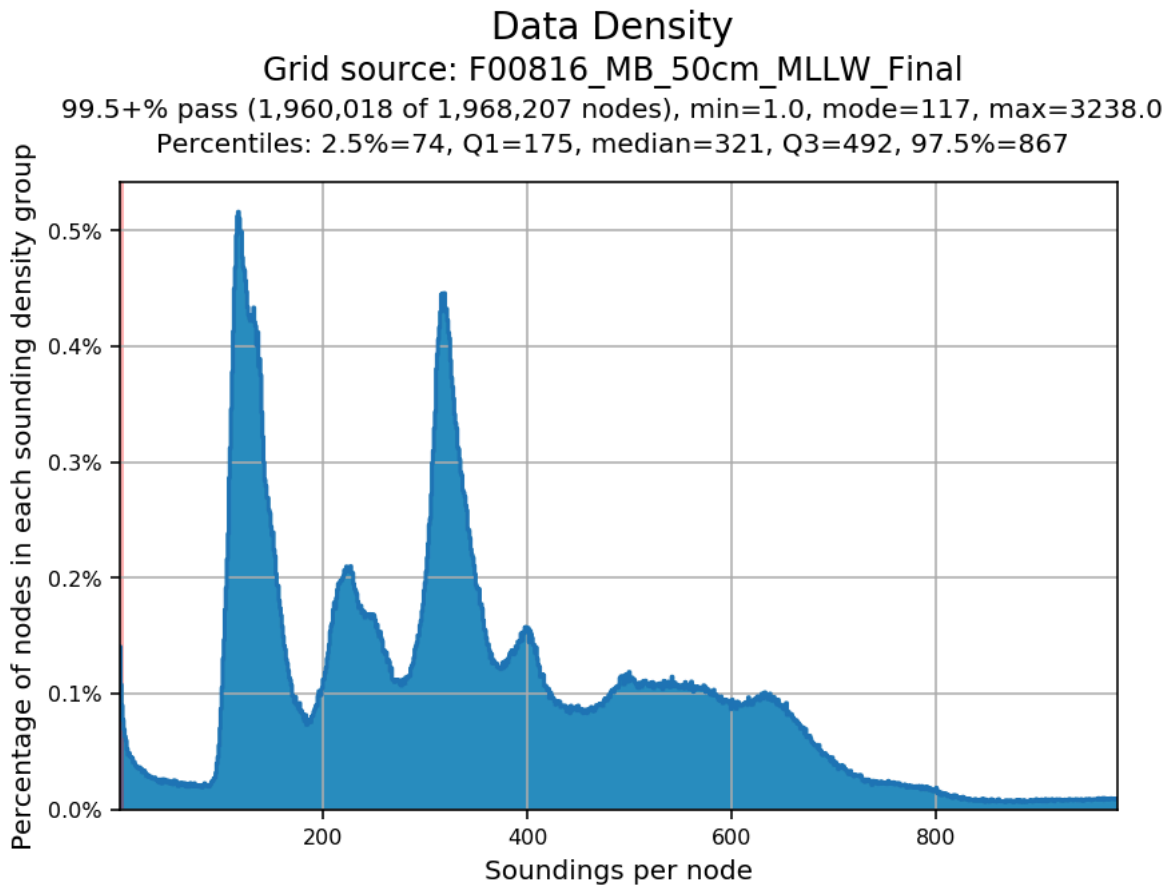
Casts were conducted at a minimum of one every four hours during launch acquisition. Casts were conducted more frequently in areas where the influx of freshwater had an effect on the speed of sound in the water column and when there was a change in surface sound speed greater than two meters per second.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

### **B.2.8 Coverage Equipment and Methods**

200% SSS with concurrent MBES was used over the entire survey area. In deeper areas 100% MBES was achieved.

### **B.2.9 Data Density**

The MBES surface was analyzed using the HydrOffice QC Tools Grid QA feature and the results are shown below. Density requirements for F00816 were achieved with at least 99.5% of 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 where acoustic shadowing occurred, and at the edges of the survey limits.



*Figure 5: F00816 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 not acquired for this survey.

*Backscatter was acquired by the field unit. Processing of backscatter data was performed by branch personnel.*

## B.5 Data Processing

### B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: Caris\_Support\_Files\_2020v3.

### 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
F00816_MB_50cm_MLLW_Final	CARIS Raster Surface (CUBE)	0.5 meters	6.814 US Survey feet - 52.279 US Survey feet	NOAA_0.5m	MBES Trackline
F00816_SSSAB_1m_400kHz_1of2	SSS Mosaic	1 meters	0 N/A - 0 N/A	N/A	100% SSS
F00816_SSSAB_1m_400kHz_2of2	SSS Mosaic	1 meters	0 N/A - 0 N/A	N/A	200% SSS

*Table 9: Submitted Surfaces*

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for F00816. 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 (82) were deemed to be valid aspects of the steep slopes and dynamic nature of the seafloor.

## C. Vertical and Horizontal Control

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

### 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-K936_VDatumLimits_100m_NAD83- MLLW_geoid12b.csar

*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 15.

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 comparison was performed between survey F00816 and raster charts 11331 and 11343 as well as ENC US5TX73M and US5TX61M using CARIS HIPS and SIPS sounding and contour layers derived from the F00816\_MB\_50cm\_MLLW\_Final surface. The contours and soundings were overlaid on the charts to assess differences between the surveyed soundings and charted depths. All data from F00816 should supersede charted data. In general, survey soundings agree with the majority of charted depths.

#### 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
US5TX61M	1:40000	25	05/21/2020	08/25/2020
US5TX73M	1:40000	40	04/16/2020	11/12/2020

*Table 11: Largest Scale ENCs*

#### D.1.2 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

#### D.1.3 Charted Features

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

#### D.1.4 Uncharted Features

No uncharted features exist for this survey.

#### D.1.5 Channels

All channels investigated were without shoaling as compared to the tabulated and controlling depths of the largest scale ENC's.

## **D.2 Additional Results**

### **D.2.1 Aids to Navigation**

ATON's were examined visually during transit to the survey areas. No missing or damaged aids were discovered.

### **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. Transmission power lines near mile marker 260 of the ICWW were down in the channel at the time of the survey. Recommend verifying new clearance heights.

### **D.2.5 Submarine Features**

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

### **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
James L. Kirkpatrick	Chief of Party	12/16/2020	KIRKPATRICK.JAMES.LEROY.IV.1400487398 Digitally signed by KIRKPATRICK.JAMES.LEROY.IV.1400487398 Date: 2020.12.16 22:34:39 -05'00'

## F. Table of Acronyms

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

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



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

APPROVAL PAGE

F00816

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

Approved: \_\_\_\_\_

**Commander Olivia Hauser, NOAA**  
Chief, Pacific Hydrographic Branch