

F00808

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: F00808

LOCALITY

State(s): Massachusetts

General Locality: Taunton River, MA

Sub-locality: Taunton River

2020

CHIEF OF PARTY
LTJG Nicholas Azzopardi

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

F00808

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): **Massachusetts**

General Locality: **Taunton River, MA**

Sub-Locality: **Taunton River**

Scale: **5000**

Dates of Survey: **08/03/2020 to 08/19/2020**

Instructions Dated: **07/30/2020**

Project Number: **S-B927-NRT5-20**

Field Unit: **NOAA Navigation Response Team - New London**

Chief of Party: **LTJG Nicholas Azzopardi**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

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 19N, 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 F00808

Project: S-B927-NRT5-20

Locality: Taunton River, MA

Sublocality: Taunton River

Scale: 1:5000

August 2020 - August 2020

NOAA Navigation Response Team - New London

Chief of Party: LTJG Nicholas Azzopardi

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instructions S-B927-NRT5-20. The survey area F00808 is located where Taunton River connects to Mount Hope Bay, near Fall River, MA. The survey covers approximately 0.78 square nautical miles.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
41° 44' 12.5" N 71° 11' 41.01" W	41° 41' 20.71" N 71° 8' 25.93" W

Table 1: Survey Limits

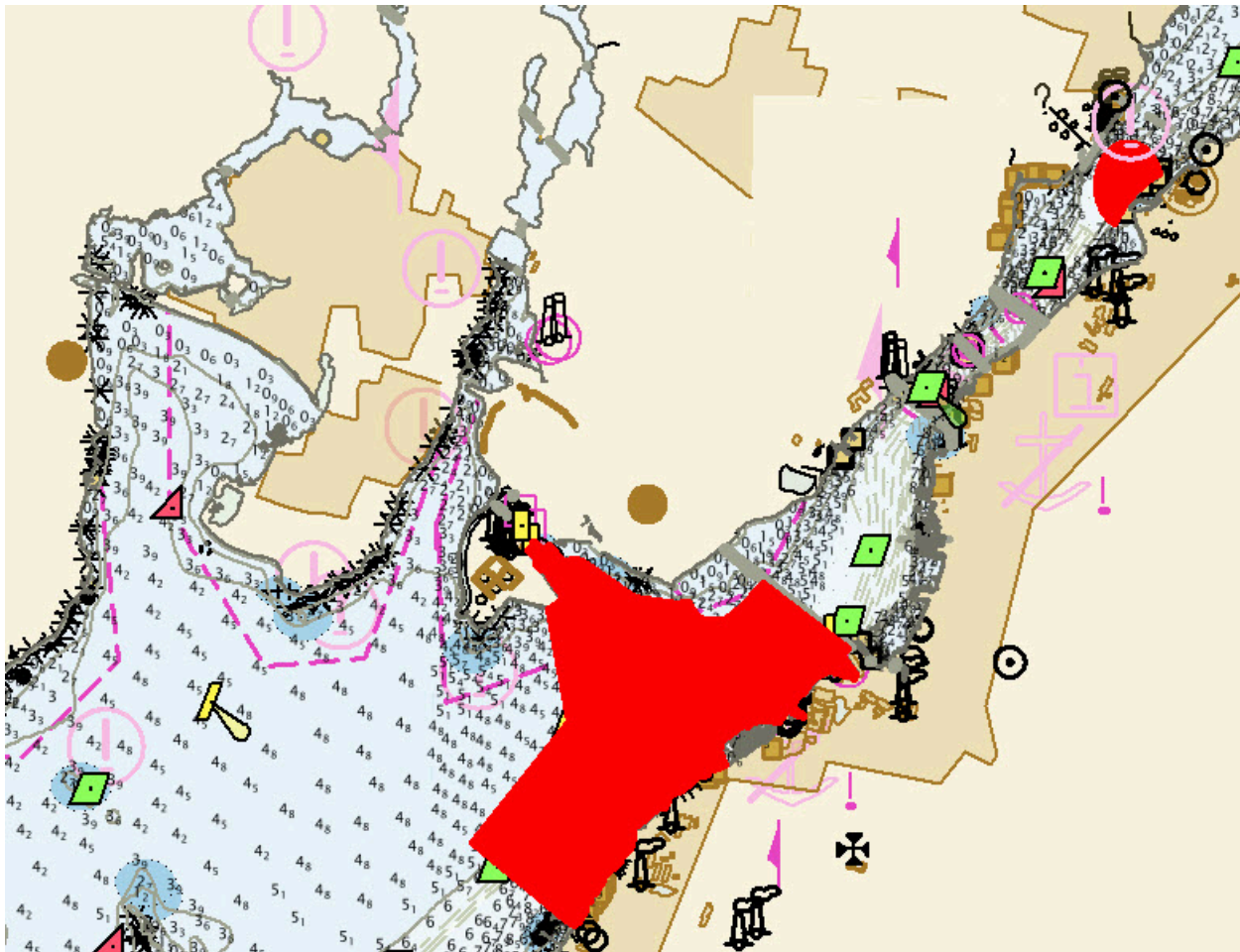


Figure 1: F00808 sheet limits (in red).

Survey limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

A.2 Survey Purpose

Waterways Management Division of USCG New England requested a hydrographic survey in Taunton River near Fall River, MA. There are reported discrepancies at the junction of the main channel and the approach to the port. The port has reopened and new vessels are using it. The survey will also help support the placement of ATONs by the USCG. 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.

The Grid QA tool within QC Tools was used to analyze multibeam echosounder (MBES) data density. The finalized surfaces meet the HSSD data density requirement.

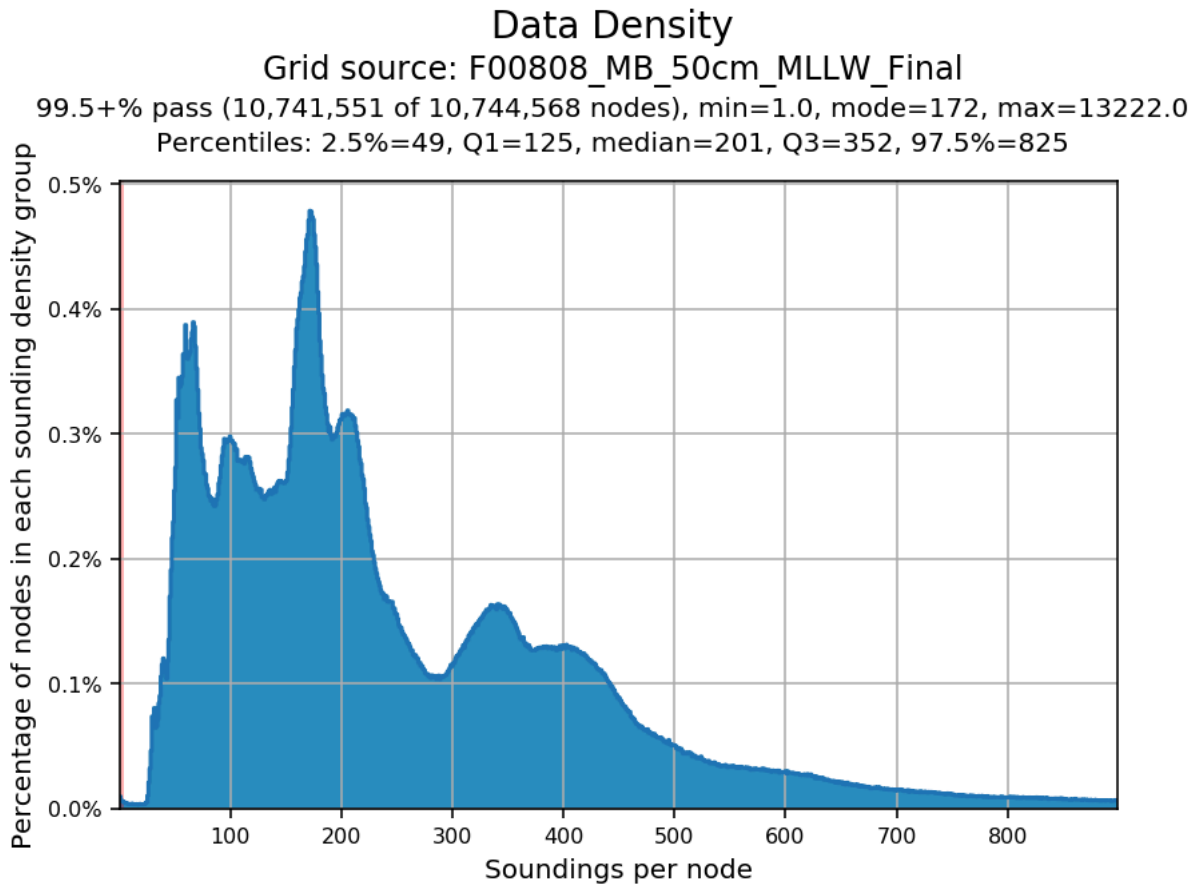


Figure 2: Pydro derived histogram plot showing HSSD object detection compliance of F00808 MBES data within the finalized CUBE surface.

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 with some exceptions. Pydro Explorer's Flier Finder found 21 holidays within F00808, however, most are on the edges

of the sheet or around bridge/pier supports. All holidays were investigated and do not appear to contain navigationally significant features.

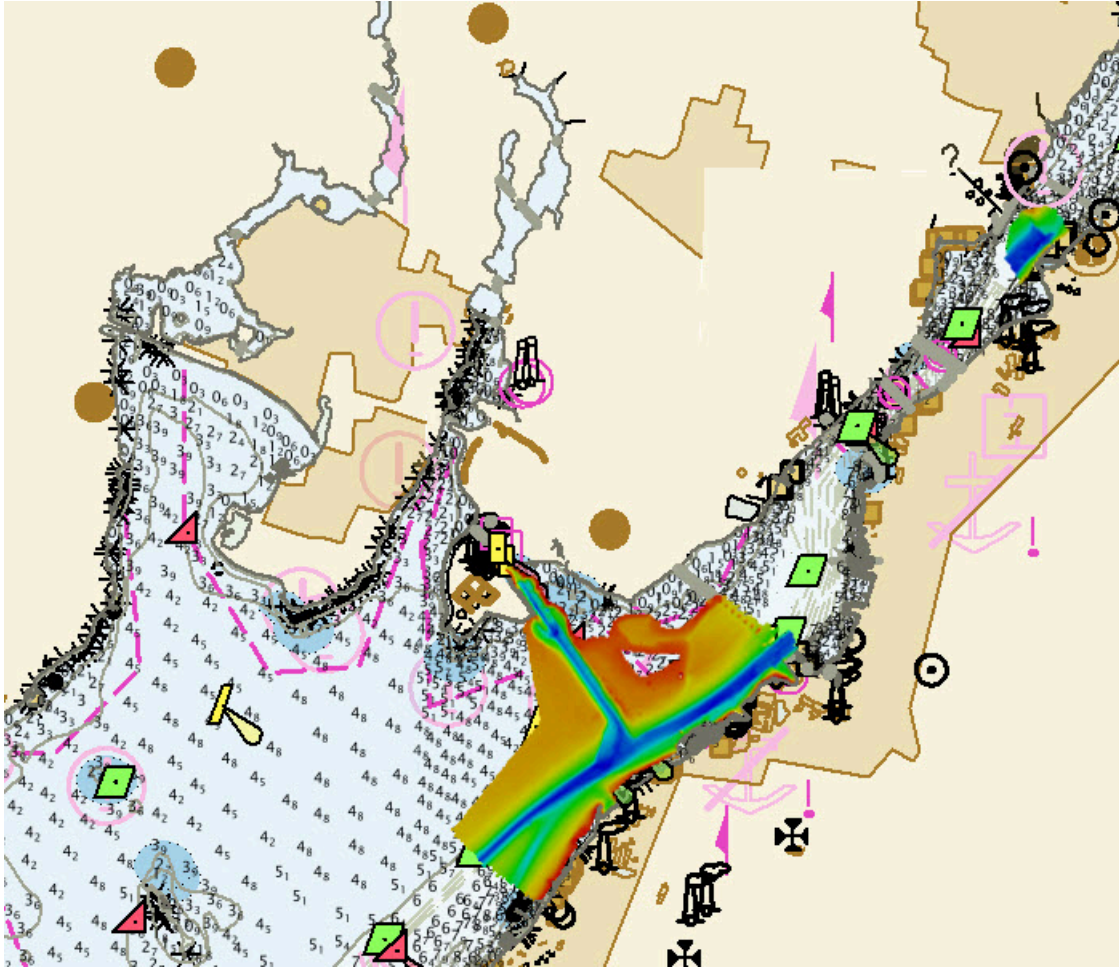


Figure 3: Survey coverage in Taunton River.

A.6 Survey Statistics

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

	HULL ID	<i>S3007</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0
	MBES Mainscheme	132.94	132.94
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	4.3	4.3
	Lidar Crosslines	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			0.78

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
08/03/2020	216
08/04/2020	217

Survey Dates	Day of the Year
08/05/2020	218
08/12/2020	225
08/13/2020	226
08/19/2020	232

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>S3007</i>
LOA	10.38 meters
Draft	0.6 meters

Table 5: Vessels Used



Figure 4: S3007 on its trailer.

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040C	MBES
YSI	CastAway-CTD	Conductivity, Temperature, and Depth Sensor
AML Oceanographic	SVP 71	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Multibeam crosslines acquired for this survey totaled 3.23% of mainscheme acquisition.

A 50cm CUBE surface was created using only mainscheme lines and a second 50cm CUBE surface was created using only crosslines. These surfaces were then input into the Pydro Tool "Compare Grids". The comparison passed HSSD specifications.

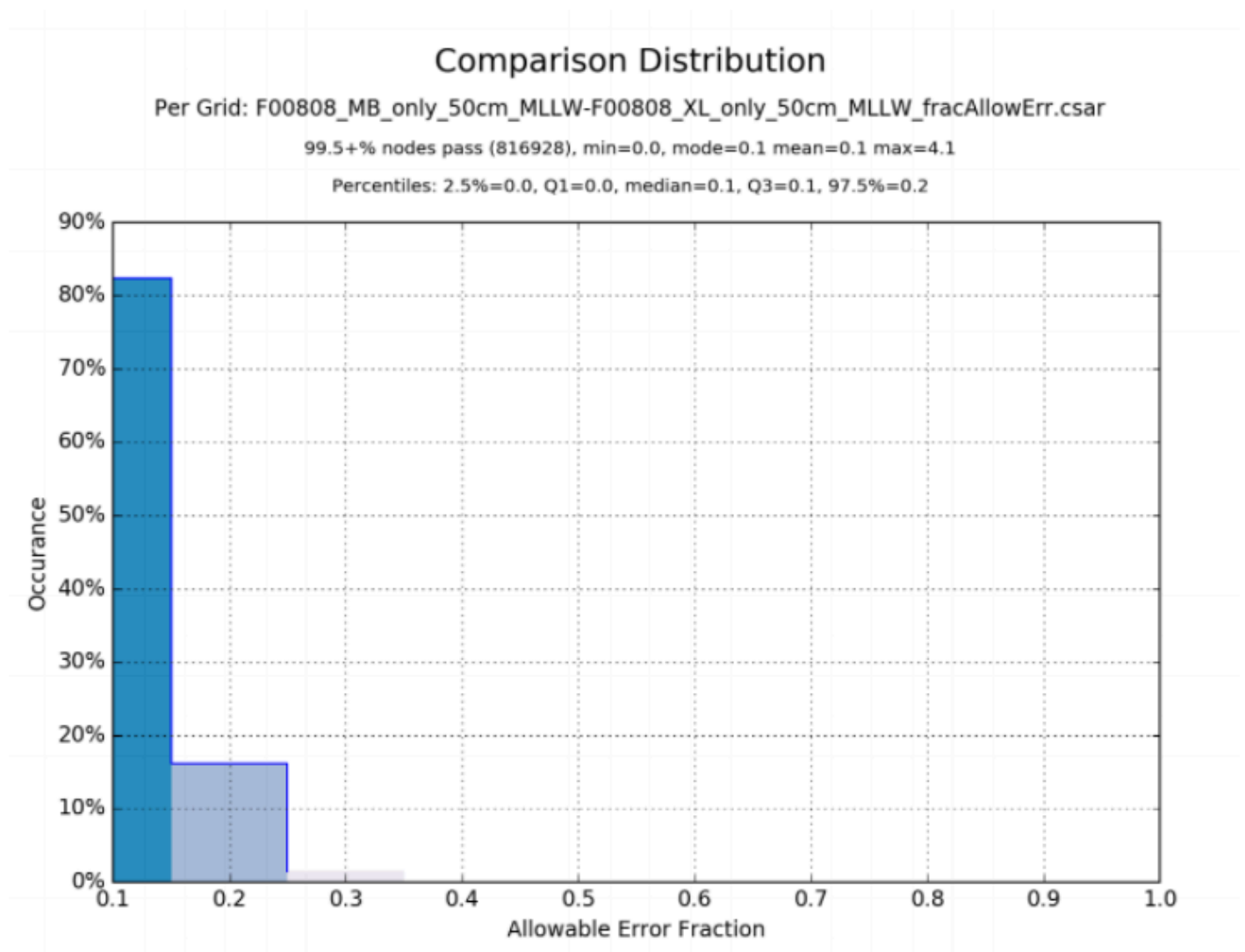


Figure 5: Pydro generated graph showing comparison between mainscheme and crosslines in F00808.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 centimeters	9.5 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S3007	2 meters/second	N/A meters/second	N/A meters/second	0.2 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for F00808 were derived from a combination of fixed values for equipment and vessel characteristics, as well as field assigned values for sound speed uncertainties. The uncertainty for the VDatum model was provided to the field units in the Project Instructions. A visual inspection of the Uncertainty layer revealed the areas of higher uncertainty occur in the outer beams, and a visual inspection of the Density layer revealed the areas of lowest density are in the deepest areas of the survey.

In addition to the usual a priori estimates of uncertainty, some real time and post processed uncertainty sources were also incorporated into the depth estimates of the survey. Real-time uncertainties from the Kongsberg MBES sonars were incorporated and applied during post processing. Uncertainties associated with vessel roll, pitch, gyro, navigation, and heave were applied during post-processing. All of the aforementioned uncertainties were applied in CARIS. As stated, F00808 is an ellipsoidally referenced survey (ERS) and the tidal component was accomplished with a separation model.

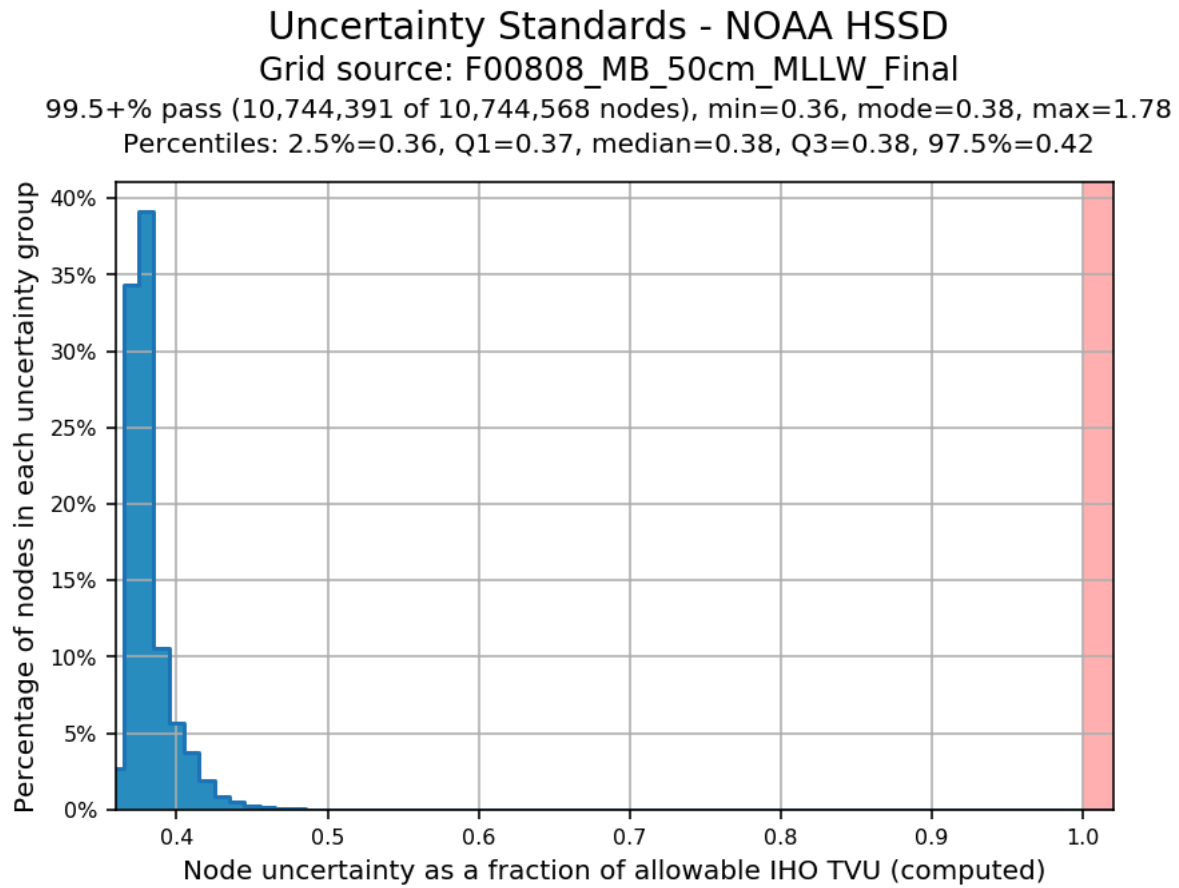


Figure 6: Pydro derived histogram plot showing HSSD uncertainty standards compliance of F00808 MBES data within the finalized CUBE surface.

B.2.3 Junctions

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

SBET issues

On DN218, DN225, and DN232, the SBETs had to be interpolated over spikes in the data. The largest interpolated gap was on DN232, at approximately 18 minutes. The interpolations resolved vertical offset issues seen in the data based on comparison with the surrounding area, and does not appear to have affected the accuracy of the data. Neither the number of satellites used nor PDOP values changed dramatically over these periods.

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: Once every four hours.

SVP casts were taken at least once every four hours in the deepest water nearest to the survey area being worked on. The SVP casts were applied to the MBES lines in CARIS using the "nearest in distance within time of 4 hours" method.

B.2.8 Coverage Equipment and Methods

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

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

Raw Backscatter was logged in the .all file and will be sent to the Processing Branch.

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
F00808_MB_50cm_MLLW	CARIS Raster Surface (CUBE)	0.5 meters	1 meters - 14.1 meters	NOAA_0.5m	Object Detection
F00808_MB_50cm_MLLW_Final	CARIS Raster Surface (CUBE)	0.5 meters	1 meters - 14.1 meters	NOAA_0.5m	Object Detection

Table 9: Submitted Surfaces

Pydro Explorer's Flier Finder was used to analyze the multibeam surfaces for data cleanliness, and all fliers have been addressed. The fliers that continue to be flagged are located on the surface edges and were found to not be fliers. The VALSOU check reported zero discrepancies.

C. Vertical and Horizontal Control

Field installed tide or GPS stations were not utilized for this survey, so no HVCR report is included.

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-B927-NRT5-20_VDatum_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 19.

The following PPK methods were used for horizontal control:

- Smart Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
MAMI	Milton
MAPL	Plymouth
MAFA	Falmouth
URIL	U of RI Coop
MADA	Dartmouth

Table 11: CORS Base Stations

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

Chart comparisons were made using CARIS sounding and contour layers derived from CUBE surfaces. The contours and soundings were overlaid on the latest ENC, and F00808 and US5RI26M were found to generally agree on soundings and contours except for one location, where the F00808 contours were found to be closer to shore.

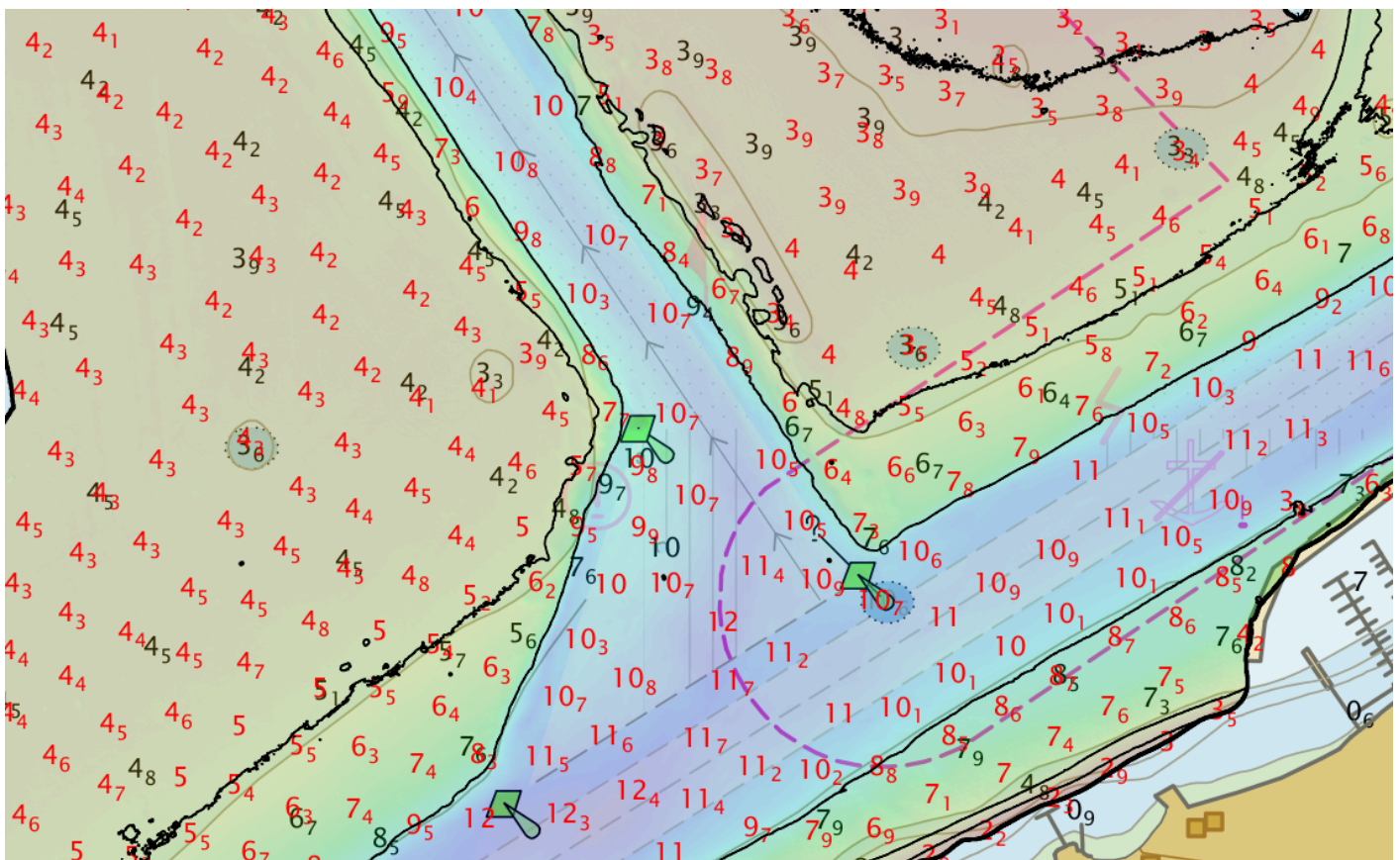


Figure 7: F00808 soundings (red) and contours (black) shown are in general agreement to charted soundings (black) and contours (light gray).

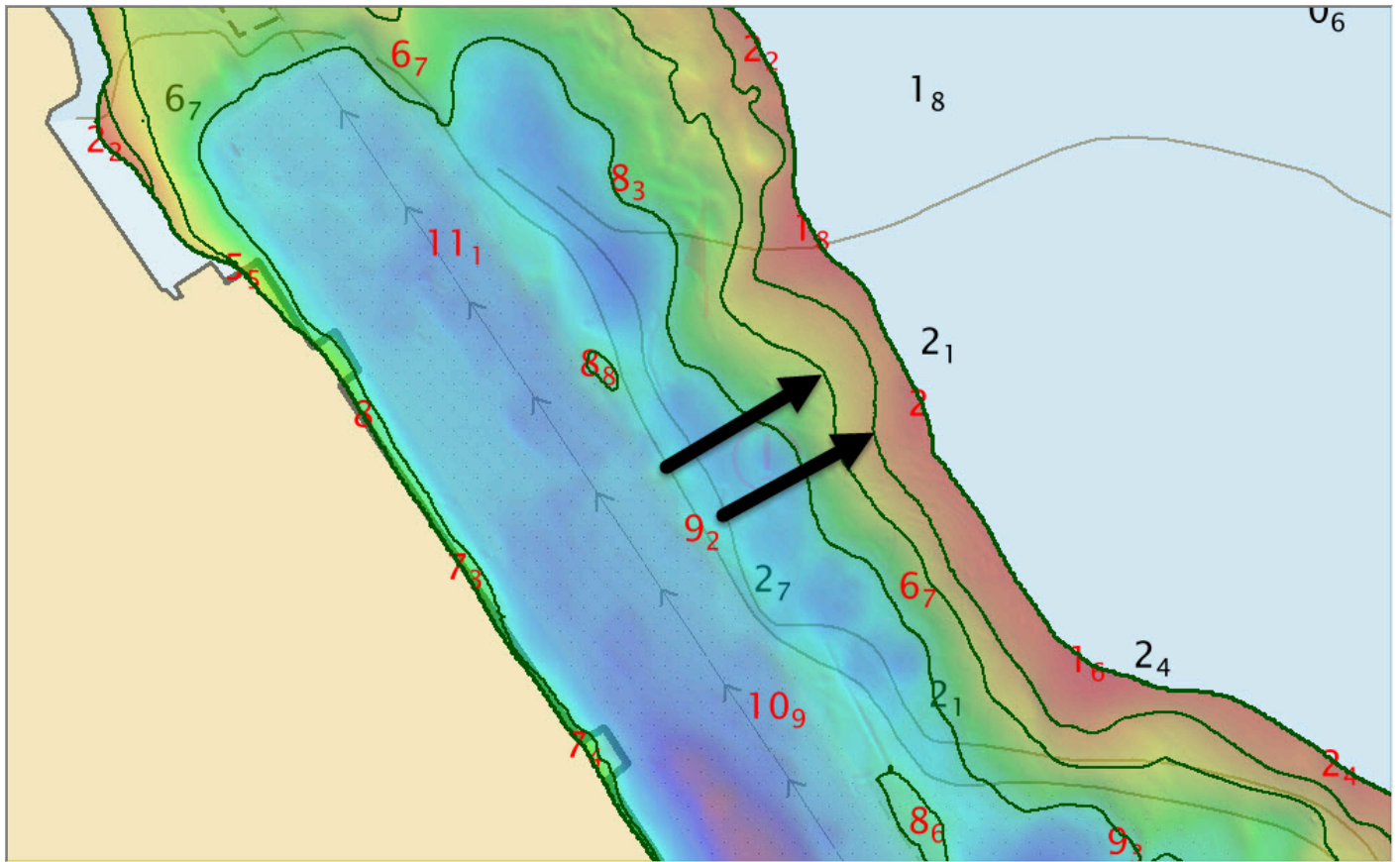


Figure 8: F00808 contours (black) are further to the northeast than charted contours (light gray) in the northern part of the sheet.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date
US5RI26M	1:10000	16	09/06/2019	12/03/2019

Table 12: 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

F00808 has one unverified wreck feature that was investigated. The wreck feature was not found within a 500m search radius in the MBES surface.

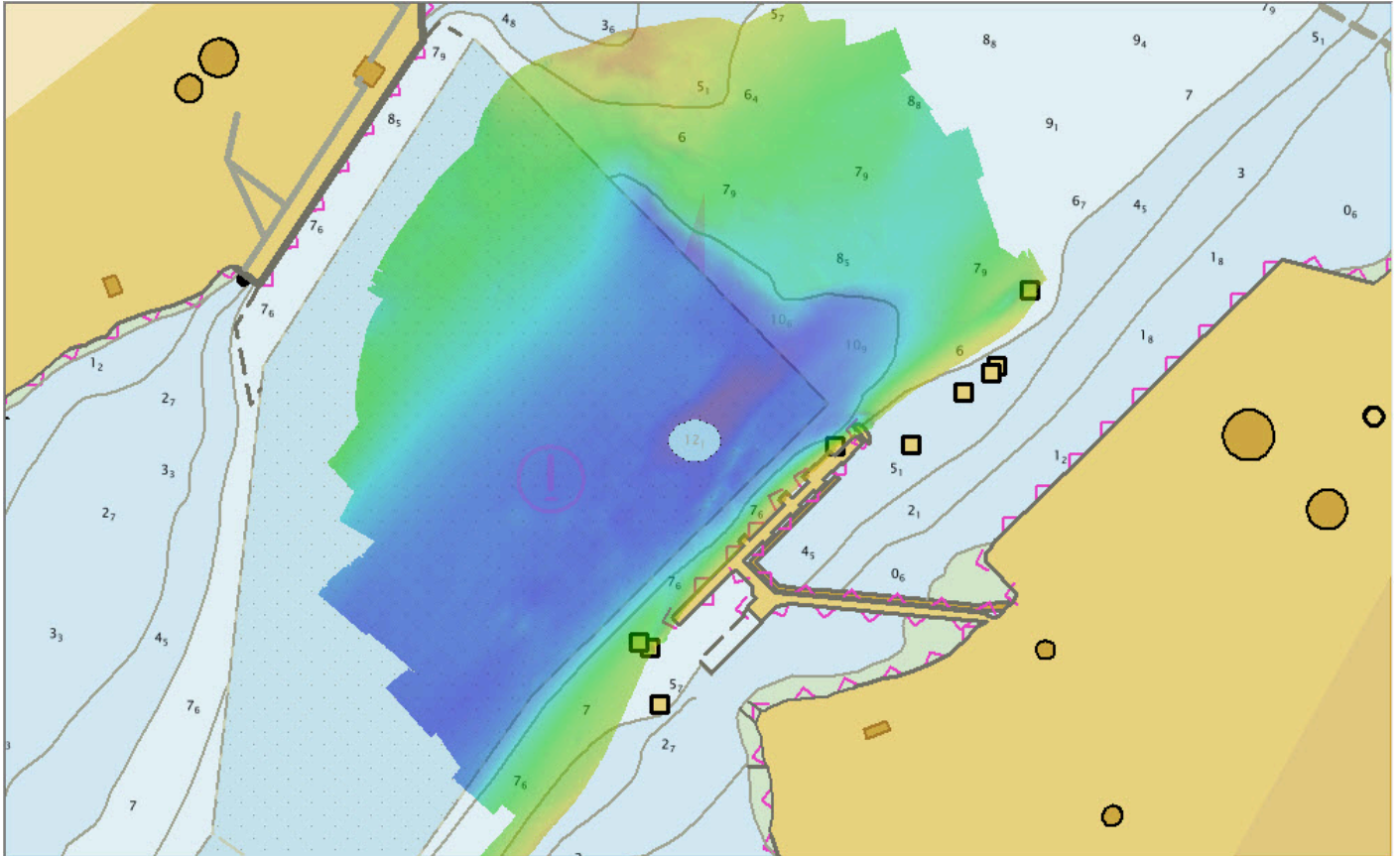


Figure 9: F00808 unverified wreck not found.

D.1.4 Uncharted Features

New features were found and are detailed in the Final Feature File.

D.1.5 Channels

Survey depths within dredged areas and charted channels are equal to or deeper than charted.

D.2 Additional Results

D.2.1 Aids to Navigation

All charted ATONs were found to be on station and serving their intended purpose. Three additional ATONs that were not included in the CSF but were on the latest ENC were found on the survey grounds and were added to the FFF.

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

A bridge is present in F00808 and is functioning normally.

D.2.5 Submarine Features

Submarine features exist for this survey, but were not assigned for investigation.

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
PST Michael Bloom	Sheet Manager	01/27/2021	<i>Michael Bloom</i>
LTJG Nicholas Azzopardi	Chief of Party	01/27/2021	AZZOPARDI.NICHOLAS.JAMES.1539165093 <small>Digitally signed by AZZOPARDI.NICHOLAS.JAMES.1539165093 Date: 2021.01.27 21:54:06 -05'00'</small>

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

APPROVAL PAGE

F00808

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: _____

Peter Holmberg

Products Team Lead, Pacific Hydrographic Branch