H13386

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13386

LOCALITY

State(s):	Connecticut New York
General Locality:	New York and Connecticut
Sub-locality:	Scott Cove, CT to West Oyster Bay, NY

2020

CHIEF OF PARTY
John R. Bean

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13386**

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):	**Connecticut New York**
General Locality:	**New York and Connecticut**
Sub-Locality:	**Scott Cove, CT to West Oyster Bay, NY**
Scale:	**10000**
Dates of Survey:	**07/28/2020 to 12/11/2020**
Instructions Dated:	**06/26/2020**
Project Number:	**OPR-B300-KR-20**
Field Unit:	**Ocean Surveys**
Chief of Party:	**John R. Bean**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Atlantic 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 18N, 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 H13386

Project: OPR-B300-KR-20

Locality: New York and Connecticut

Sublocality: Scott Cove, CT to West Oyster Bay, NY

Scale: 1:10000

July 2020 - December 2020

Ocean Surveys

Chief of Party: John R. Bean

A. Area Surveyed

This survey provides hydrographic data for the waters of western Long Island Sound, including along the shorelines of southwestern Connecticut and northwestern Long Island, NY. The general locations of the survey limits are presented in Table 1.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
41° 3' 29.48" N 73° 39' 50.39" W	40° 53' 49.91" N 73° 26' 45.02" W

Table 1: Survey Limits

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

A.2 Survey Purpose

The following text is quoted from the Project Instructions' Purpose and Location section:

As the second largest port in the U.S., handling more $187.3 billion in cargo in a year mostly of foreign imports (1), within one of most densely populated areas in the U.S. with 23.3 million people living within a 50-mile radius of Long Island Sound (2), the Port of New York / New Jersey stands as an important international commercial gateway to the U.S. As a result, increasing demand for larger cargo ships with ever deeper drafts demand precise and safe navigation.

The primary purpose of this project is to provide contemporary hydrographic data to update National Ocean Service (NOS) nautical charting products and services in the U.S. that support commerce and water transportation in the regions of New York, New Jersey, and Connecticut.

Data will inform scientific studies including Office of Coast Survey's precision navigation program, and the management and planning of state agencies and private consortia monitoring the health of benthic habitats and environmental quality of Long Island Sound (3).

The survey area occupies 90 square nautical miles of estuarine water from the East River at Randalls Island, through Throgs Neck, and western Long Island Sound.

Western Long Island Sound and the eastern portion of the East River were last surveyed in the late 1990s and early 2000s. Survey data from this project is intended to supersede all prior survey data in the common area.

Sources:
1. U.S. Department of Transportation, Bureau of Transportation Statistics, Transportation Statistics Annual Report 2018 (Washington, DC: 2018).
2. Mackun, Paul; Wilson, Steven, "Population Distribution and Change: 2010 Census Briefs." U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau, March 2011. http://longislandsoundstudy.net/wp-content/uploads/2010/08/c2010br-01.pdf.
3. Long Island Sound Research Collaborative, "Status and Trends LIS Environmental Indicators" Long Island Sound Study, http://longislandsoundstudy.net/2010/08/population-within-50-mile-radius-of-lis/. Accessed 23 January, 2020.

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	Complete Coverage (refer to HSSD Section 5.2.2.3)
All waters in survey area	Acquire backscatter data during all multibeam data acquisition (refer to HSSD Section 6.2)

Table 2: Survey Coverage

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

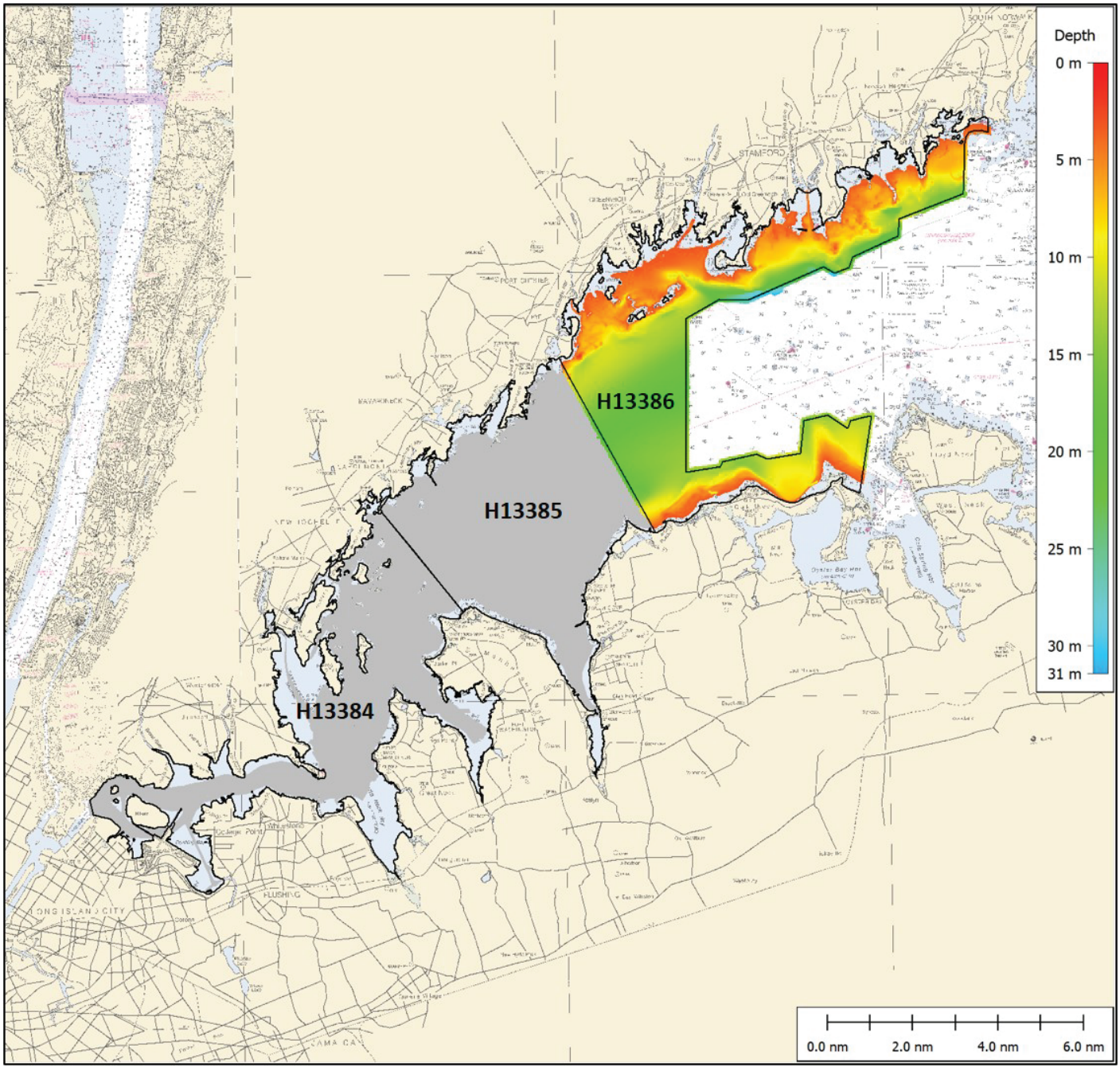

Figure 1: Survey H13386 coverage overlaid on a composite of RNCs.

A.6 Survey Statistics

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

	HULL ID	*RV Osprey*	*RV Ready 2*	*Total*
LNM	**SBES Mainscheme**	0	0	0
	MBES Mainscheme	1879.4	483.7	2363.1
	Lidar Mainscheme	0	0	0
	SSS Mainscheme	0	0	0
	SBES/SSS Mainscheme	0	0	0
	MBES/SSS Mainscheme	0	0	0
	SBES/MBES Crosslines	90.0	25.6	115.6
	Lidar Crosslines	0	0	0
Number of Bottom Samples				7
Number Maritime Boundary Points Investigated				0
Number of DPs				0
Number of Items Investigated by Dive Ops				0
Total SNM				26.4

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
07/28/2020	210

Survey Dates	Day of the Year
07/29/2020	211
07/30/2020	212
07/31/2020	213
08/01/2020	214
08/02/2020	215
08/03/2020	216
08/05/2020	218
08/06/2020	219
08/07/2020	220
08/08/2020	221
08/09/2020	222
08/10/2020	223
08/11/2020	224
08/12/2020	225
08/13/2020	226
08/14/2020	227
08/15/2020	228
08/16/2020	229
08/17/2020	230
08/18/2020	231
08/19/2020	232
08/20/2020	233
08/21/2020	234
08/22/2020	235
08/23/2020	236
08/24/2020	237
08/25/2020	238
08/26/2020	239
08/27/2020	240
08/28/2020	241
08/31/2020	244
09/02/2020	246

Survey Dates	Day of the Year
09/03/2020	247
09/04/2020	248
09/08/2020	252
09/09/2020	253
09/10/2020	254
09/11/2020	255
09/12/2020	256
09/13/2020	257
09/14/2020	258
09/15/2020	259
09/16/2020	260
09/17/2020	261
09/18/2020	262
09/21/2020	265
09/22/2020	266
09/23/2020	267
09/25/2020	269
09/26/2020	270
12/11/2020	346

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	*RV Osprey*	*RV Ready 2*
LOA	7.9 meters	7.6 meters
Draft	0.6 meters	0.4 meters

Table 5: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Teledyne RESON	SeaBat T50-R	MBES
Applanix	POS MV 320 v5	Positioning and Attitude System
Velodyne LiDAR	VLP-16	Lidar System
Trimble	NetR9	Positioning System
AML Oceanographic	MicroX SV	Sound Speed System
AML Oceanographic	BaseX	Sound Speed System
AML Oceanographic	BaseX2	Sound Speed System

Table 6: Major Systems Used

All equipment was installed, calibrated, and operated in accordance with the DAPR.

B.2 Quality Control

B.2.1 Crosslines

Multibeam crosslines acquired for this survey total 4.9% of mainscheme acquisition. Crosslines were collected on an ongoing basis throughout the survey as the vessels progressed through 9 geographic sections that were defined to assist with data management. Within each section the majority of the mainscheme data was collected over several consecutive days followed by 1-2 days of crossline acquisition. Figure 2 shows the layout of the crosslines within the survey.

A difference surface was generated in CARIS HIPS comparing the crosslines to the mainscheme data, and a histogram of the depth differences was plotted to show the relative agreement of surveyed depths. Depth discrepancies were minimal, as shown in the histogram in Figure 3. There was no geographic pattern to the magnitude of discrepancies.

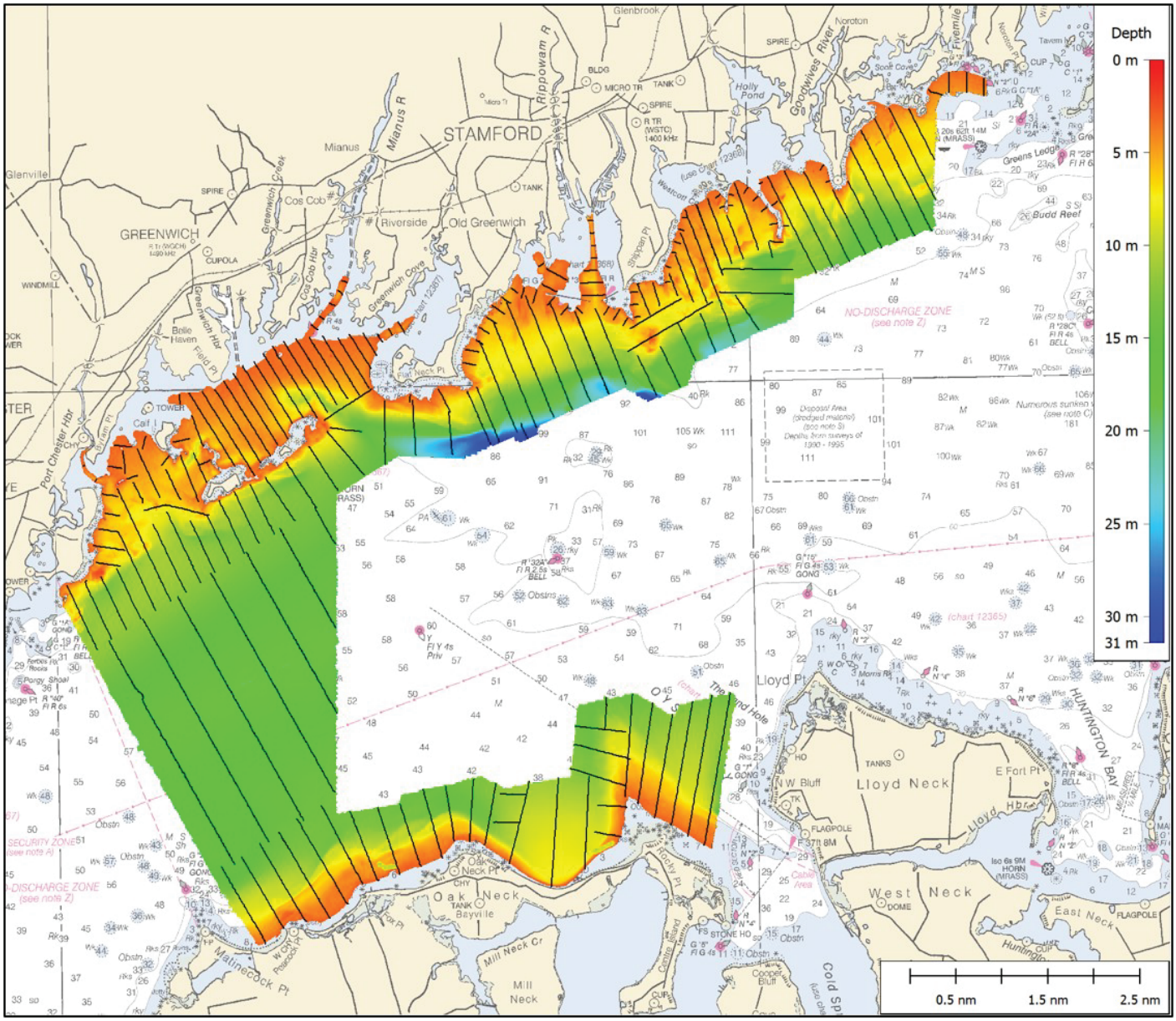

Figure 2: An overview of crossline layout on a 1m surface created from mainscheme MBES data and colored by depth, with a composite image of RNCs in the background.

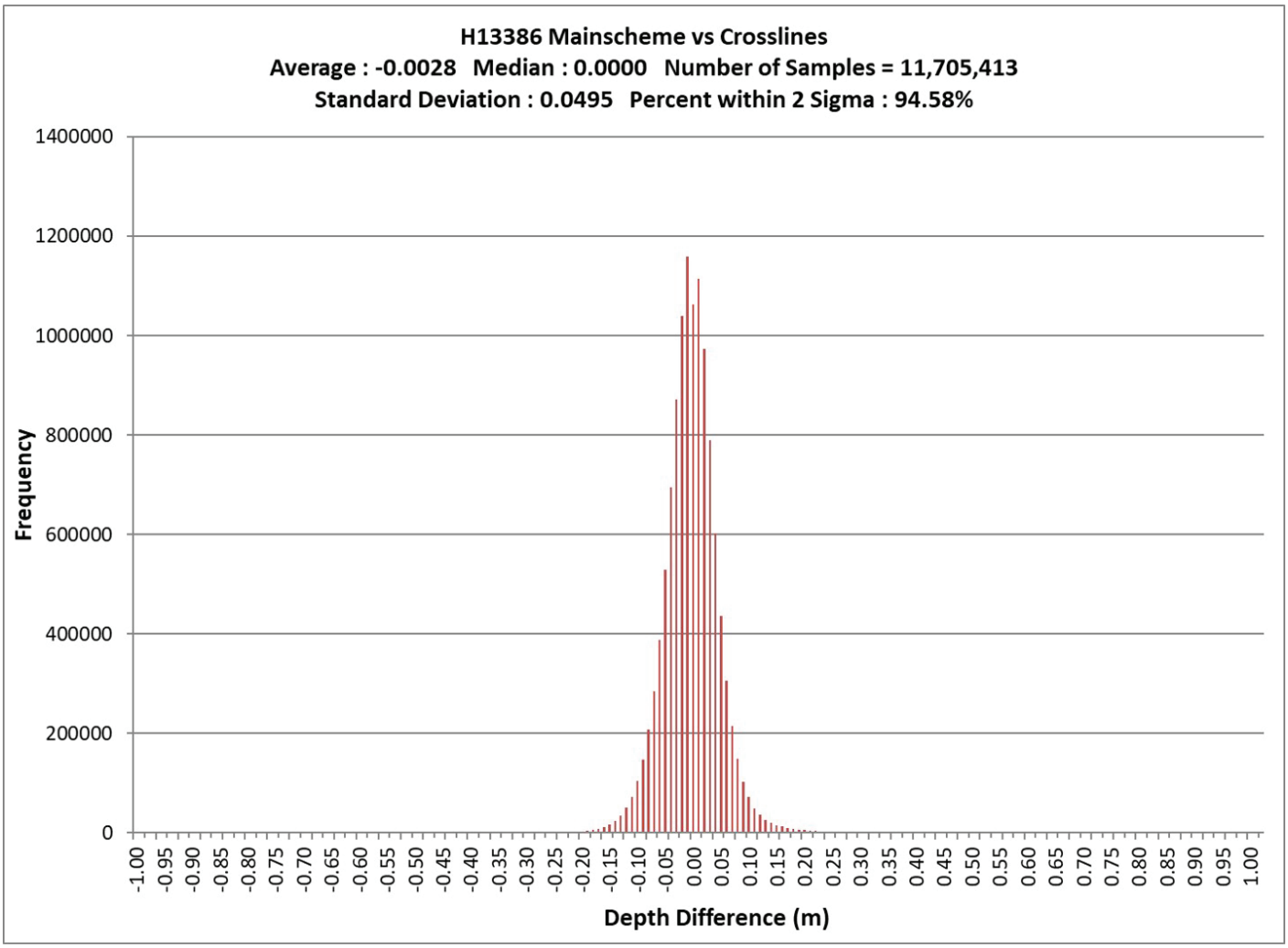

Figure 3: A frequency distribution of the depth differences between H13386 crossline vs mainscheme MBES data. Statistics from the depth difference sample set are displayed above the graph.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	9.45 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
RV Osprey	4 meters/second	N/A	1 meters/second
RV Ready 2	4 meters/second	N/A	1 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The methods used to minimize the uncertainty in the corrections to echo soundings are described in detail in the project DAPR.

The HydrOffice "QC Tools" application was used to calculate TVU QC, determined by a ratio of uncertainty to the allowable error per NOAA and IHO specifications. The finalized surface for Survey H13386 passed the uncertainty check, with 99.5+% of the nodes meeting uncertainty standards (Figure 4).

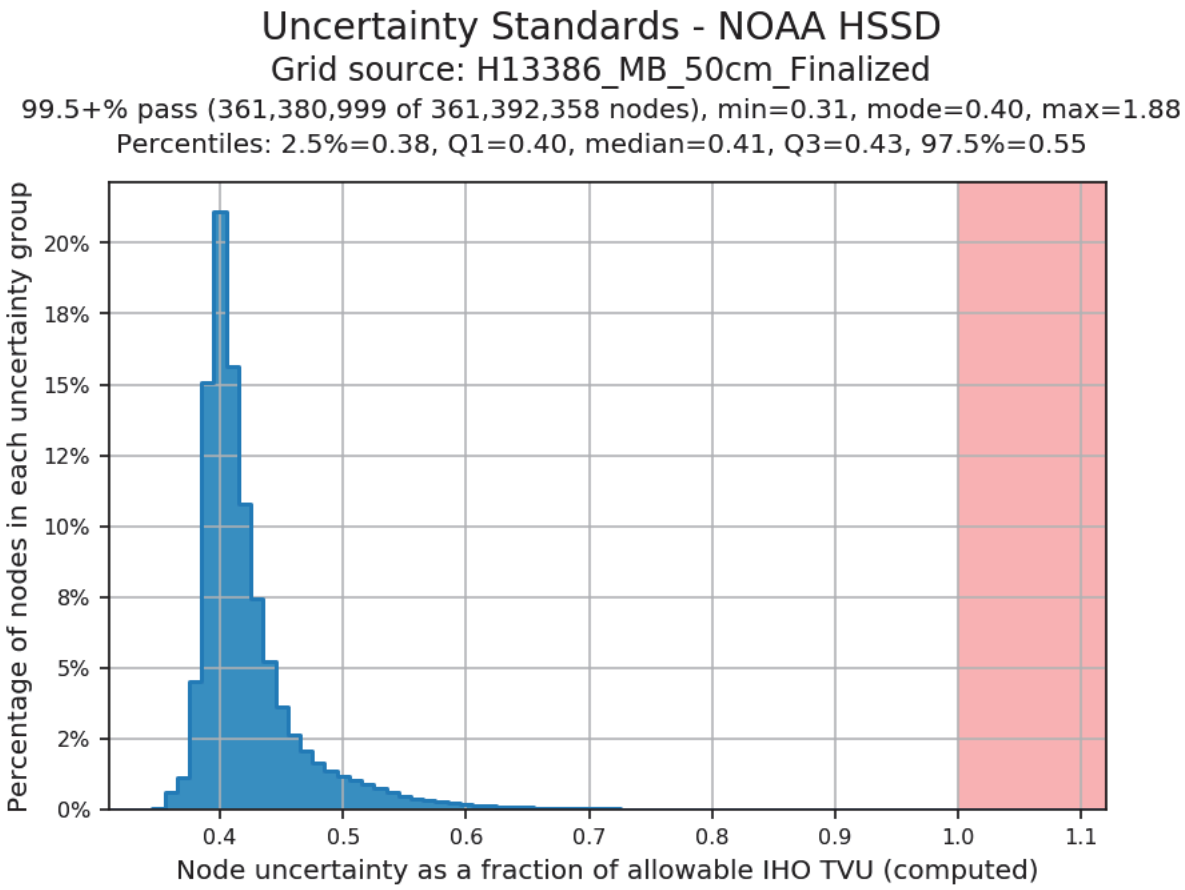

Figure 4: H13386 MBES surface uncertainty statistics

B.2.3 Junctions

There are 2 prior surveys and 1 contemporary survey that junction with H13386. The contemporary junction is discussed in the DR for Survey H13385. Figure 5 displays the location of the junction surveys for Project OPR-B300-KR-20, and the junctions specific to this survey are listed in Table 9.

Junction analyses were conducted by generating a difference surface in CARIS HIPS for each pair of surveys to compare the MBES surfaces where they overlap. A histogram of the depth differences was plotted to show the relative agreement of the surveyed depths. The magnitude of differences were compared to the maximum allowable TVU, which was 0.5m for the water depths in Survey H13386.

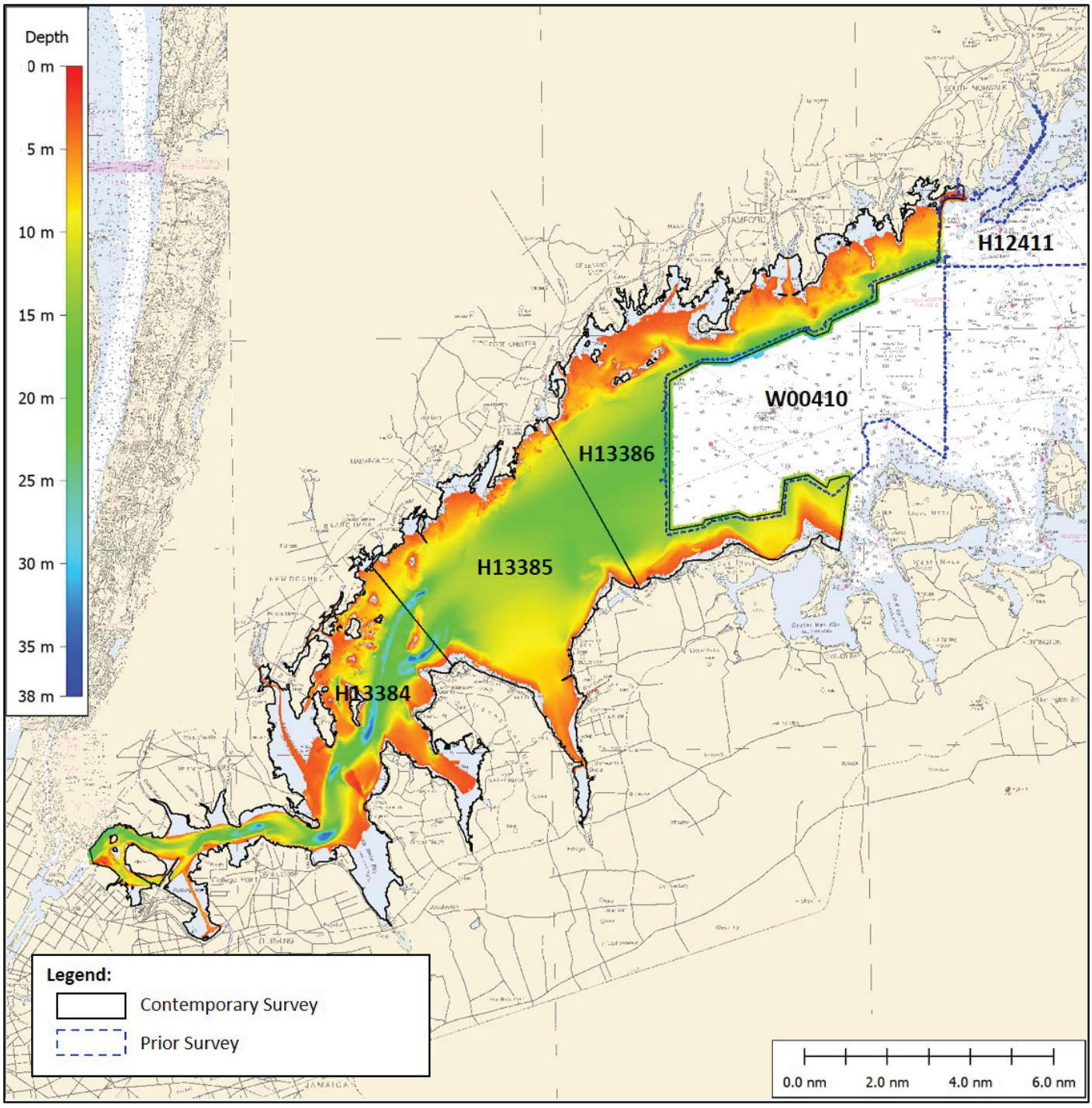

Figure 5: Survey junctions for Project OPR-B300-KR-20.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12411	1:10000	2012	TJ	NE
W00410	1:40000	2017	NF	E

Table 9: Junctioning Surveys

H12411

The northeastern boundary of Survey H13386 meets prior Survey H12411 in a north-south junction approximately 2.8km long that curves east at the northern end for another 1.0 km. The width of the junction area is 150m to 200m. The depth discrepancies between the two surveys are small, with less than 0.1% of nodes having a depth difference greater than the maximum allowable TVU. There is no geographic pattern to the depth differences.

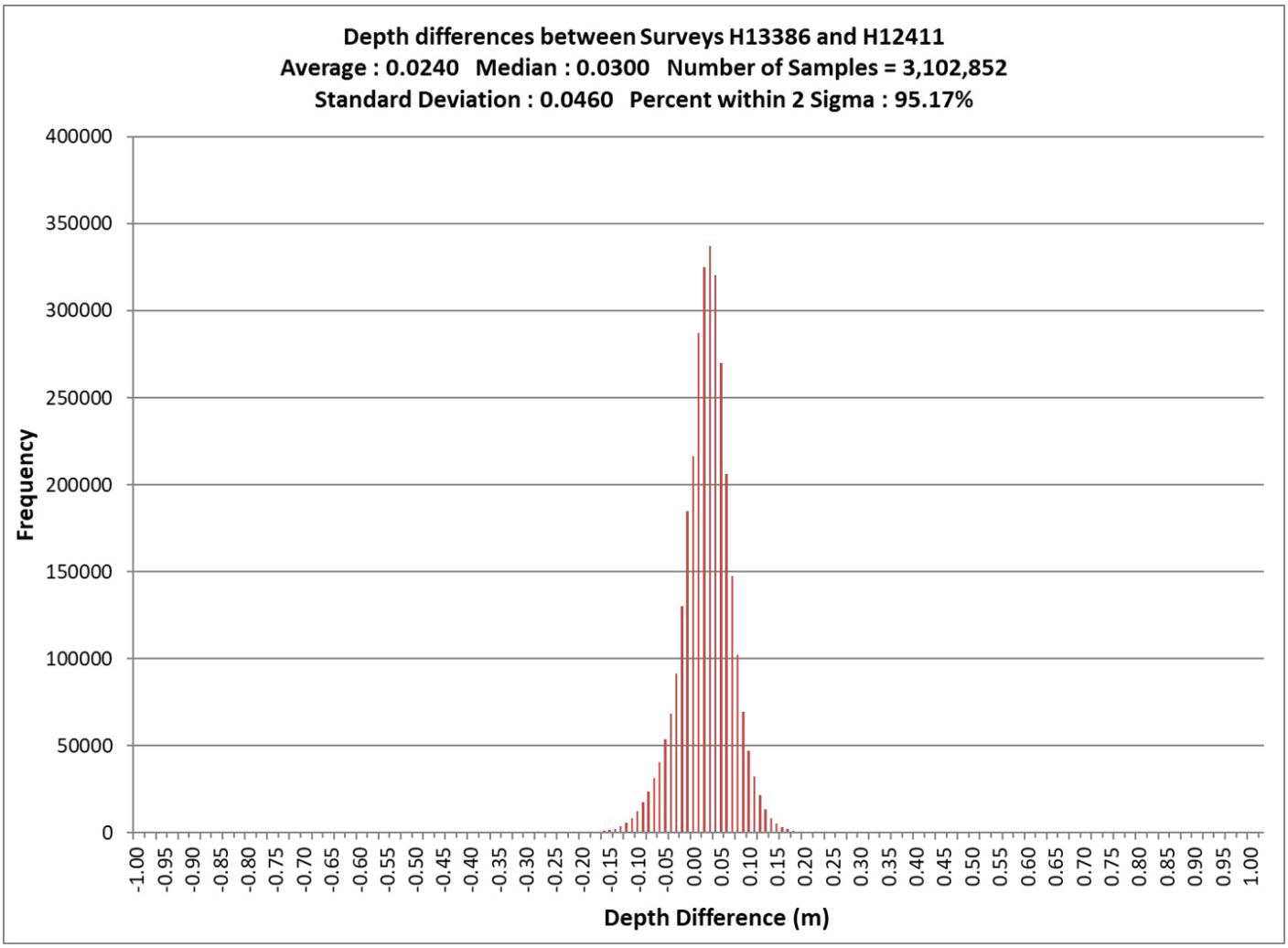

Figure 6: Surface-to-surface difference histogram comparing Surveys H13386 and H12411.

W00410

Survey H13386 surrounds Survey W00410 on 3 sides, with overlap on the northern, western, and southern boundaries of Survey W00410. The approximate lengths of these borders are 14.2km, 7.1km, and 10.4km, respectively. The width of overlap is approximately 200m to 400m, and a wider area of overlap is present at the eastern edge of the southern border. The two surveys have good depth agreement, with less than 0.1% of nodes having a depth difference greater than the allowable TVU. There is no geographic pattern to the depth differences between the surveys.

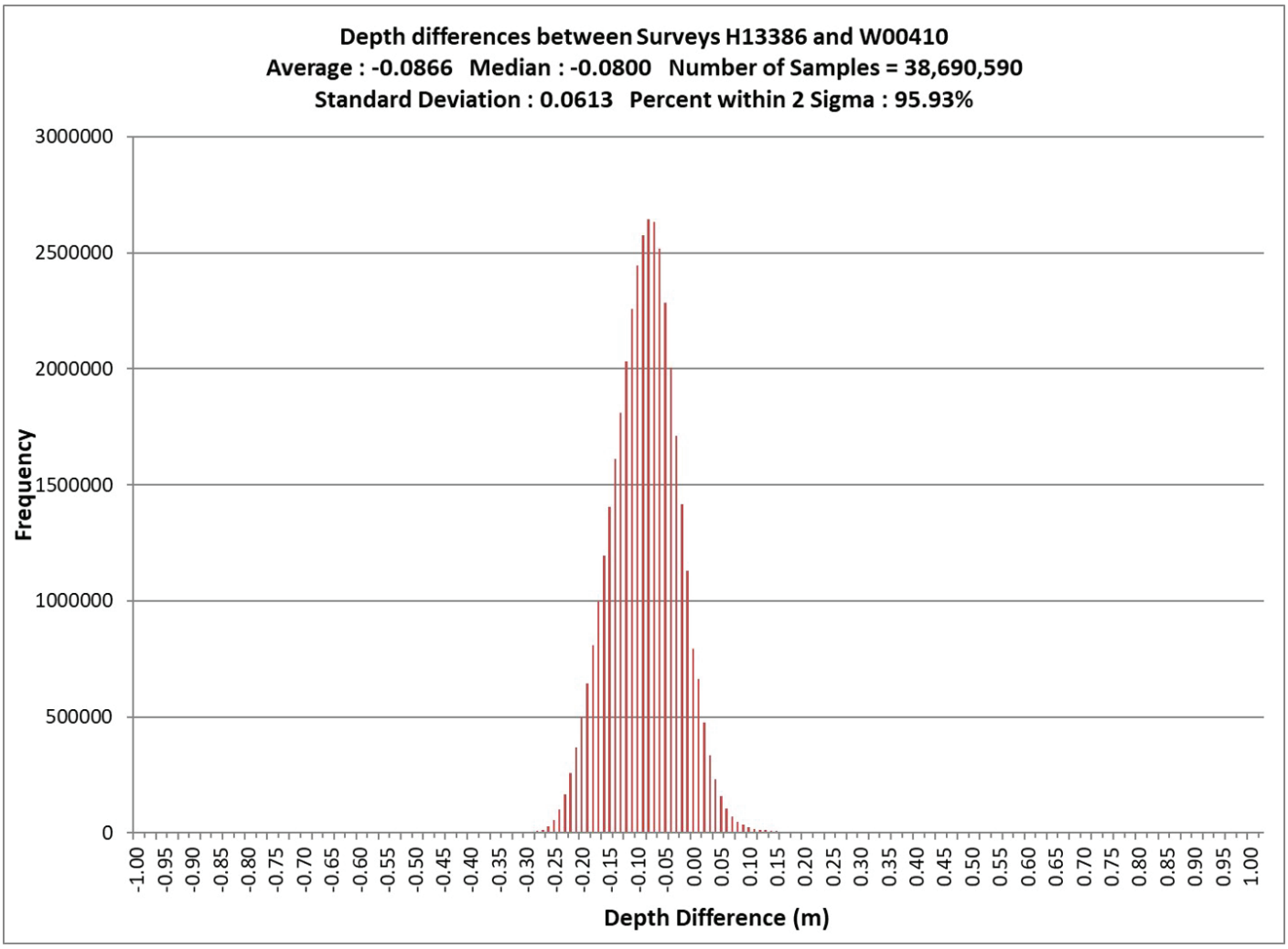

Figure 7: Surface-to-surface difference histogram comparing Surveys H13386 and W00410.

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: Sound speed profile data were acquired with the AML Base-X or AML Base-X2 at intervals of approximately 1-2 hours.

Hydrographers acquired more frequent sound speed profiles if high variability was noted in the surface sound speed from the AML Micro-X installed on the head of the transducer, or when the surface sound speed comparison threshold was exceeded (>2m/s change) between the profile reading at the draft of the transducer and the Micro-X. All MBES lines were sound speed corrected using CARIS HIPS' "Nearest in Time" method.

OSI submitted sound speed data in NetCDF format to the National Centers for Environmental Information (NCEI) on March 23, 2021 via the S2N tool.

B.2.8 Coverage Equipment and Methods

This survey was conducted to achieve Complete Coverage with multibeam, as specified in HSSD 5.2.2.3, Option A. This calls for 100% bathymetric bottom coverage with multibeam sonars, and complete coverage multibeam developments of features. The survey methods used to meet coverage requirements did not deviate from those described in the DAPR.

The HydrOffice "QC Tools" application was used to verify that the grid nodes met the density coverage requirements, with 99.5+% of the nodes meeting the requirement (Figure 8).

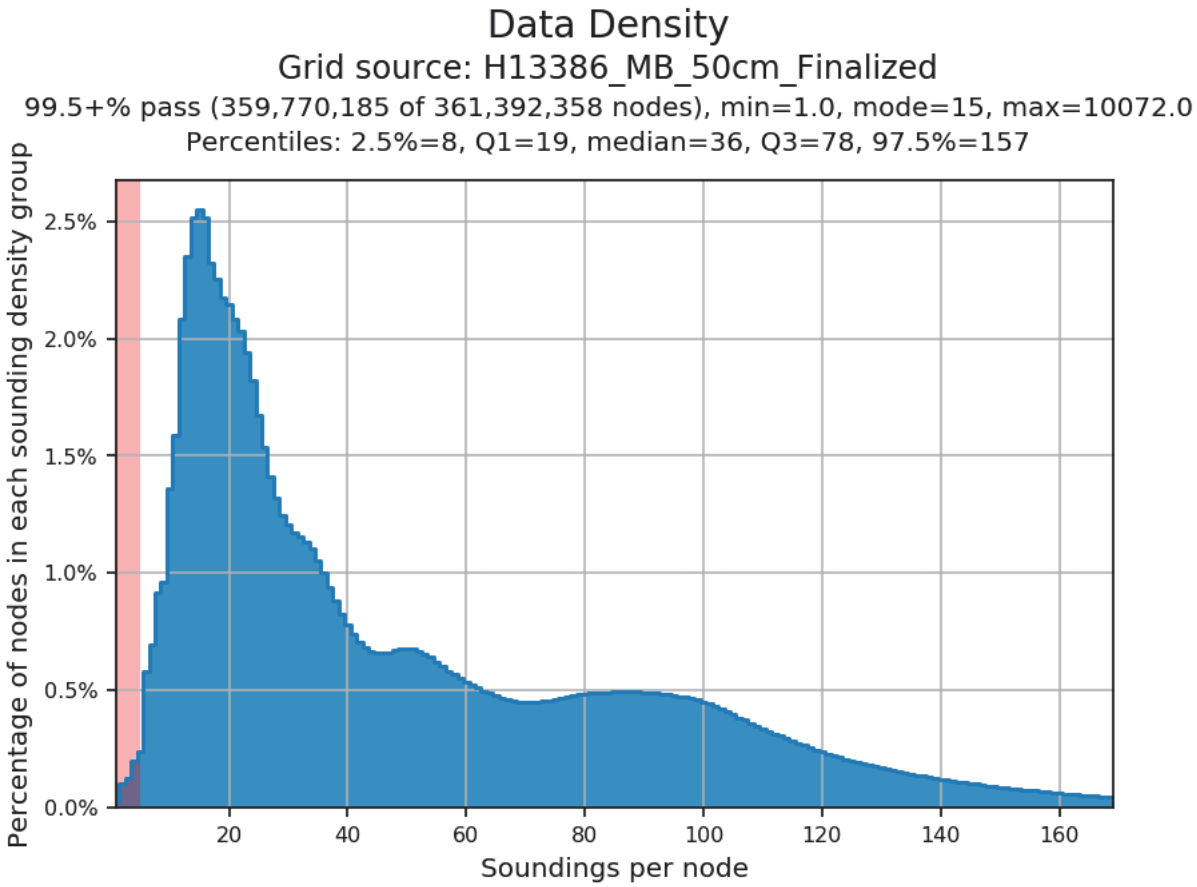

Figure 8: H13386 MBES surface data density statistics

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.

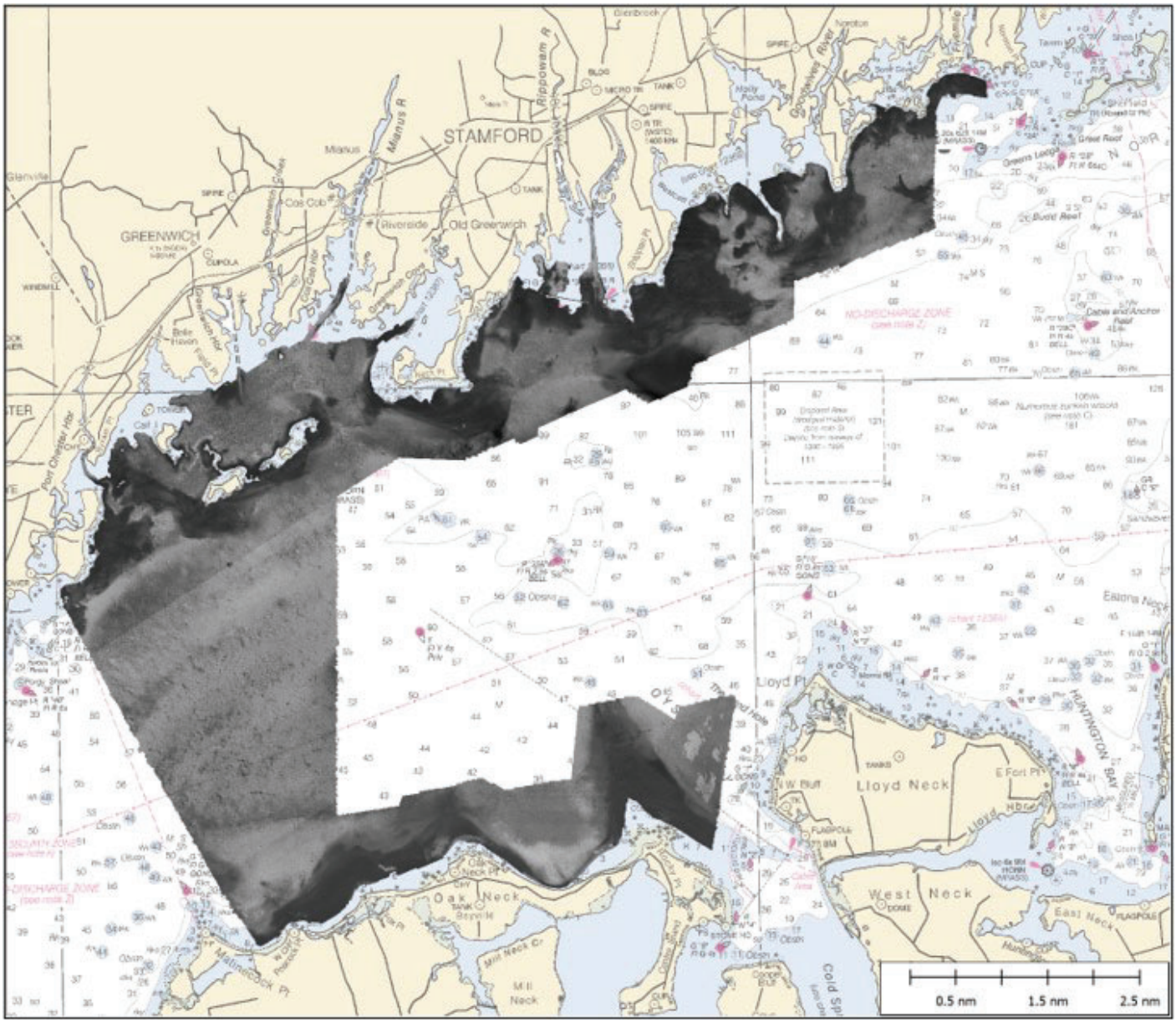

Figure 9: Survey H13386 backscatter mosaic overlaid on a composite of RNCs.

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
H13386_MB_50cm_MLLW_Final.csar	CARIS Raster Surface (CUBE)	0.5 meters	-0.418 meters - 31.674 meters	NOAA_0.5m	Complete MBES
H13386_MB_50cm_MLLW.csar	CARIS Raster Surface (CUBE)	0.5 meters	-0.418 meters - 31.674 meters	NOAA_0.5m	Complete MBES
H13386_MBAB_2m_400kHz_1of1	MB Backscatter Mosaic	2 meters	-	N/A	Processed Backscatter

Table 10: Submitted Surfaces

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	buffer_newVdatum2_Merge_Diss_100m_NAD83-MLLW_geoid12b.csar buffer_newVdatum2_Merge_Diss_100m_NAD83-MHW_geoid12b.csar

Table 11: 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 18.

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
Central Islip	NYCI
Valhalla	NYVH
Darien	CTDA
Brooklyn Pier	NYBR
NJ Inst of Tech 2	NJI2
New York WAAS 1	ZNY1
Lake Carmel	NYLC
Riverhead	NYRH
Brookfield	CTBR
NJMT	NJMT
Neptune Township	NJNT
Guilford	CTGU

Table 12: CORS Base Stations

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
Ocean Surveys New Rochelle	OSNR

Table 13: User Installed Base Stations

D. Results and Recommendations

D.1 Chart Comparison

During the course of survey data collection and analysis, the Office of Coast Survey was actively implementing ENC rescheming in western Long Island Sound. The ENCs listed below provide complete coverage of the survey area and were the most recent charts available as of February 23, 2021. After this date, newly released ENCs were no longer considered in the chart comparison analysis for this survey.

Surveyed bathymetry trended deeper than charted bathymetry, with the areas of greatest difference found in the northern section of the survey area.

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
US5CT1AA	1:20000	1	02/04/2021	02/04/2021
US5HEPCB	1:20000	1	02/04/2021	02/04/2021
US5CN11M	1:20000	30	11/17/2020	02/04/2021
US5NY14M	1:20000	24	12/22/2020	02/04/2021
US5NY16M	1:20000	35	02/04/2021	02/04/2021

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

There were 17 rocks accepted as DTONS for Survey H13386, all of which are included in the FFF. The rocky nature of the seafloor and the high vessel traffic have given this area a large number of potentially dangerous rocks and submerged obstructions. Foul area obstructions are common within this survey, and their extents were not often covered with survey data due to their shallow depths. An evaluation of foul area obstructions based on aerial LiDAR data is recommended.

D.1.3 Charted Features

More than 1600 charted features were assigned in Survey H13386. The majority of these were outside the survey coverage and not addressed; those that were addressed were primarily underwater rocks. The charted rocks often did not reflect the surveyed rocks, and evaluation of rocky areas considering both the bathymetry and the rock features is advised. See the FFF for details.

D.1.4 Uncharted Features

Uncharted features in Survey H13386 included 15 new wrecks and 28 obstructions. New features were not created for non-DTON rocks which were adequately represented by the bathymetry grid; however, significant baring or exposed rocks found with vessel mounted lidar were included. See the FFF for details.

D.1.5 Channels

There were 9 channels assigned in the CSF for Survey H13386. Only 3 of these channels had substantial coverage with survey data and the remaining 6 were beyond the NALL. The channel sections addressed are:

Reach A of the Port Chester Harbor Channel, the 12-Foot Channel Outer Reach of the Greenwich Harbor Channel, and the Entrance Channel of the Stamford Harbor Channel.

Most surveyed depths in Reach A of the Port Chester Harbor Channel are below the maintained depth. The exception to this is an area near Port Chester Harbor Channel Buoy 6, where for approximately 100m to the north and south of the buoy the channel is up to 0.5m shoaler than charted. In the MH of the channel the difference is less than 0.2m, and in the LOQ the difference is up to 0.5m, particularly around a charted pontoon that extends into the channel.

Approximately 600m of the 1350m-long Greenwich Harbor 12-foot Channel Outer Reach is covered by surveyed data. The maintained depth is 2m and the surveyed data is all deeper than 3m.

Survey data covers approximately 2km of the Stamford Harbor Entrance Channel, and at no point was surveyed data shoaler than the maintained depth.

D.2 Additional Results

D.2.1 Aids to Navigation

All but 1 ATON within the survey coverage area were observed to be on station and serving as intended, and are documented in the FFF. There was 1 ATON reported to the USCG as missing; a buoy in Greenwich Cove. The Light List states that this ATON is maintained seasonally, and data was collected in this area during times it should have been present. Correspondence regarding the missing buoy is in Appendix II. An uncharted danger buoy was present in Greenwich Cove near the site of the missing buoy, but it was outside the survey coverage and not addressed in the FFF.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

The 7 assigned bottom samples for Survey H13386 are documented in the FFF.

D.2.4 Overhead Features

Overhead features were assigned for this survey, but were not investigated. All overhead features were beyond the NALL.

D.2.5 Submarine Features

The Iroquois Gas Transmission System pipeline is present as charted and runs approximately 3.3km through the center of the survey area in an east-west direction. A trench is visible in the bathymetry, but at no point did the pipeline itself appear exposed. There were 2 other charted pipelines assigned, both of which were beyond the survey limits and not investigated. No other pipelines or cables were observed.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

Charted ferry routes exists for this survey, but were not specifically investigated. A ferry was observed by the field crew during survey operations near a charted ferry route, and pier structures at the ends of the ferry routes were captured with lidar data. No uncharted ferry routes or terminals were observed during the course of field operations.

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 construction or dredging was observed 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

Based on the complexity of the shoreline and rocky areas, and the high traffic of recreational watercraft, OSI recommends that all charts within this survey be released at a 10,000 scale instead of the current 20,000 scale.

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 (2020), Field Procedures Manual (2014), 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
John R. Bean	Chief of Party	05/27/2021	John R. Bean 2021.05.27 14:54:26 -04'00'
David T. Somers	Data Processing Manager	05/27/2021	David T. Somers 2021.05.27 14:54:42 -04'00'

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