H13990

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13990

LOCALITY

State(s):	Massachusetts
General Locality:	Northern Massachusetts Bay
Sub-locality:	Boston Harbor

2025

CHIEF OF PARTY
John R. Bean

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13990**

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:	**Northern Massachusetts Bay**
Sub-Locality:	**Boston Harbor**
Scale:	**5000**
Dates of Survey:	**09/25/2024 to 03/28/2025**
Instructions Dated:	**08/01/2024**
Project Number:	**OPR-A325-KR-24**
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 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 H13990

Project: OPR-A325-KR-24

Locality: Northern Massachusetts Bay

Sublocality: Boston Harbor

Scale: 1:5000

September 2024 - March 2025

Ocean Surveys

Chief of Party: John R. Bean

A. Area Surveyed

This survey provides hydrographic data for waters in Northern Massachusetts Bay. 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
42° 23' 57.28" N 71° 4' 49.93" W	42° 14' 8.12" N 70° 51' 29.66" 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 waters in and around the ports of Boston and Gloucester in Northern Massachusetts Bay are some of the most heavily used in the US by commercial and recreational boating traffic. The Port of Boston sees more than 16 million tons of cargo movement annually*, and thousands of vessels travel into, out of, and within Boston Harbor every year. Boston, Gloucester and Rockport are also major fishing ports, with average yearly landings of over 40 million pounds worth over $80 million**.

This project will also provide an analysis of the feasibility of using inshore bathymetric lidar data for identifying and updating features, in concert with new multibeam sonar data collection.

The prior survey data in much of the survey area is over 20 years old, and several areas have data that is from the 1940s. The survey area has an extensive coastline, and has been heavily trafficked by humans for almost 400 years; there have been extensive and poorly documented effects and changes to the seafloor by human activity***. This survey will address this by collecting modern high resolution bathymetry for updating NOAA nautical charting products improving the safety of maritime traffic and commerce as well as supporting the Seabed 2030 global mapping initiative. Survey data from this project is intended to supersede all prior survey data in the common area.

*Massachusetts Port Authority Statistics 2022
**2022 NMFS Landing Statistics https://www.fisheries.noaa.gov/national/sustainable-fisheries/commercial-fisheries-landings
***https://www.sec.state.ma.us/divisions/cis/historical/historical-sketch.htm
and https://stellwagen.noaa.gov/maritime/maritimehistory.html

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 within ACHARE feature in PRF	Object Detection Coverage (Refer to HSSD Section 5.2.2.2)
All Other Waters in Survey Area	Complete Coverage (Refer to HSSD Section 5.2.2.3)

Table 2: Survey Coverage

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

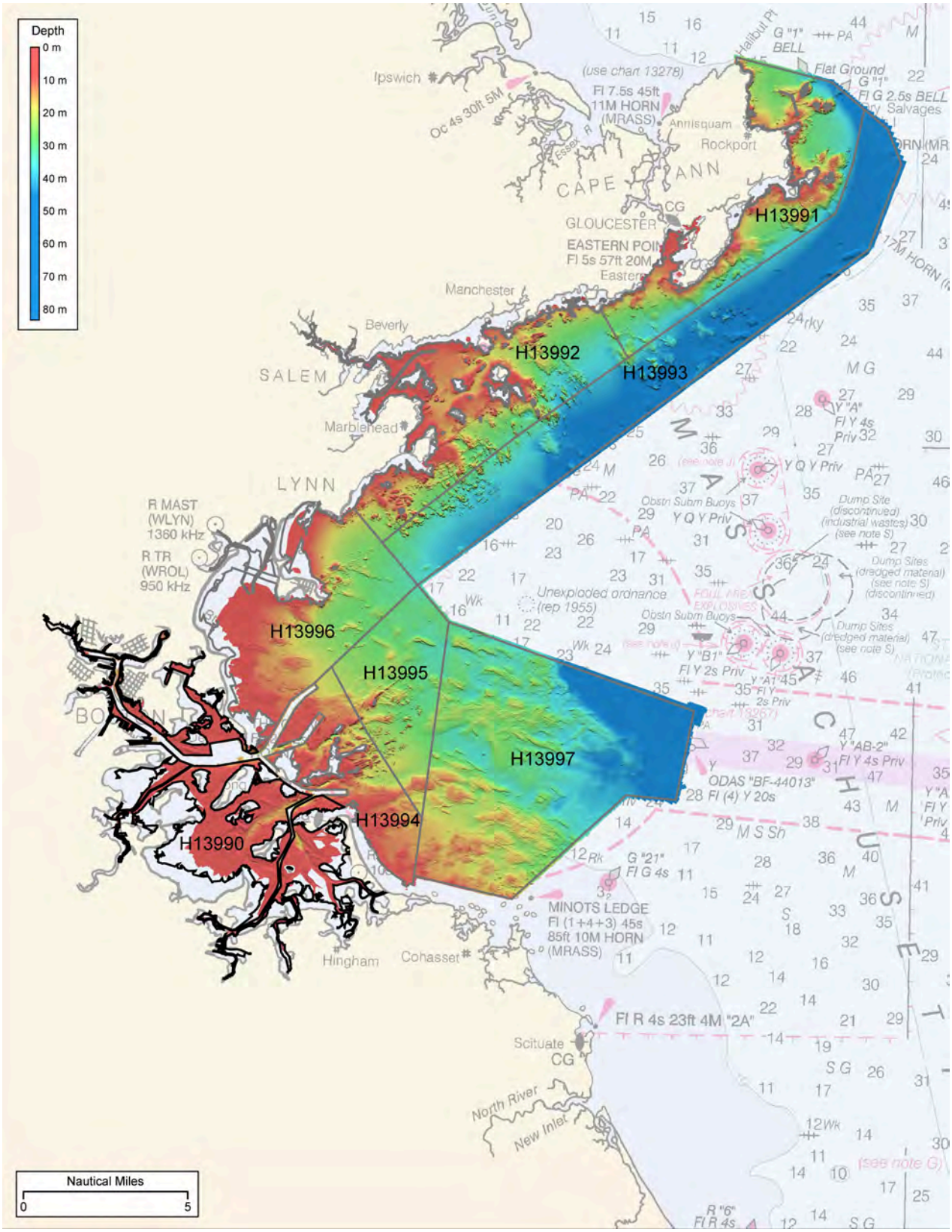


Figure 1: Project OPR-A325-KR-24 coverage with H13990 emphasized.

A.6 Survey Statistics

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

	HULL ID	*RV North Cove*	*RV South Cove*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0	0.0
	MBES Mainscheme	749.3	1268.2	2017.5
	Lidar Mainscheme	0.0	0.0	0.0
	SSS Mainscheme	0.0	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0	0.0
	SBES/MBES Crosslines	19.3	82.8	102.1
	Lidar Crosslines	0.0	0.0	0.0
Number of Bottom Samples				0
Number Maritime Boundary Points Investigated				0
Number of DPs				0
Number of Items Investigated by Dive Ops				0
Total SNM				16.5

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/25/2024	269
09/26/2024	270
10/01/2024	275
10/03/2024	277
10/04/2024	278
10/06/2024	280
10/07/2024	281
10/08/2024	282
10/09/2024	283
10/10/2024	284
10/11/2024	285
10/13/2024	287
10/14/2024	288
10/15/2024	289
10/16/2024	290
10/17/2024	291
10/18/2024	292
10/19/2024	293
10/20/2024	294
10/21/2024	295
10/22/2024	296
10/23/2024	297
10/24/2024	298
10/25/2024	299
10/26/2024	300
10/27/2024	301
10/28/2024	302
10/29/2024	303
10/30/2024	304
10/31/2024	305
11/01/2024	306

Survey Dates	Day of the Year
11/02/2024	307
11/03/2024	308
11/04/2024	309
11/05/2024	310
11/06/2024	311
11/07/2024	312
11/08/2024	313
11/10/2024	315
11/11/2024	316
11/13/2024	318
11/14/2024	319
11/15/2024	320
11/16/2024	321
11/17/2024	322
11/18/2024	323
11/19/2024	324
03/16/2025	75
03/17/2025	76
03/18/2025	77
03/19/2025	78
03/20/2025	79
03/24/2025	83
03/25/2025	84
03/26/2025	85
03/27/2025	86
03/28/2025	87

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 North Cove*	*RV South Cove*
LOA	11.1 meters	9.4 meters
Draft	0.8 meters	0.8 meters

Table 5: Vessels Used

Figure 2: RV North Cove configured for survey operations.

Figure 3: RV South Cove configured for survey operations.

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
Trimble	NetR9	Positioning System
AML Oceanographic	Micro SV-Xchange	Sound Speed System
AML Oceanographic	AML-3 LGR	Conductivity, Temperature, and Depth Sensor
Velodyne LiDAR	VLP-16	Lidar System

Table 6: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crossline mileage in H13990 totaled 5.1% of the mainscheme survey miles. Agreement between crosslines and mainscheme bathymetry was very good, with a mean difference of 0.01m in the 50cm resolution surface.

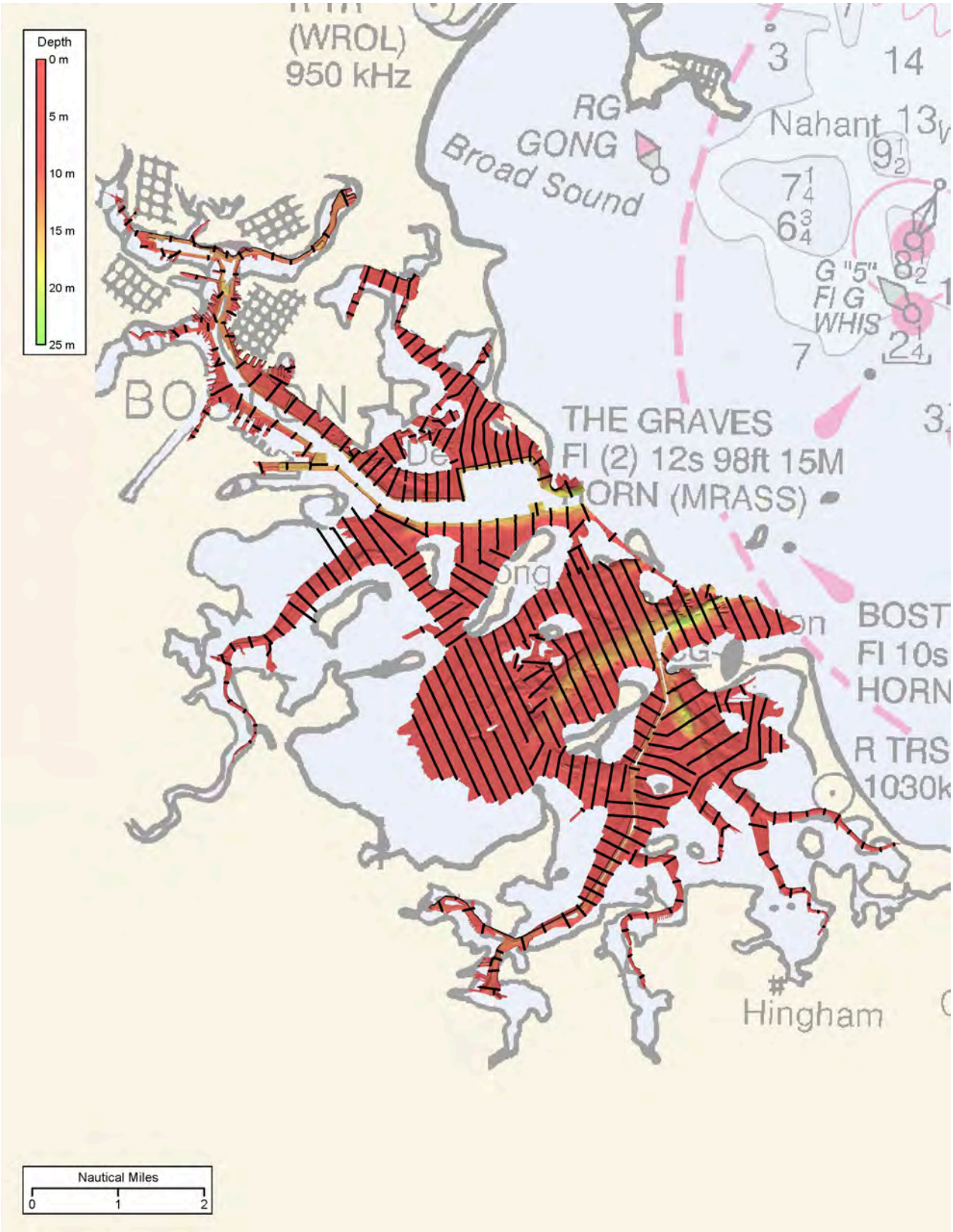
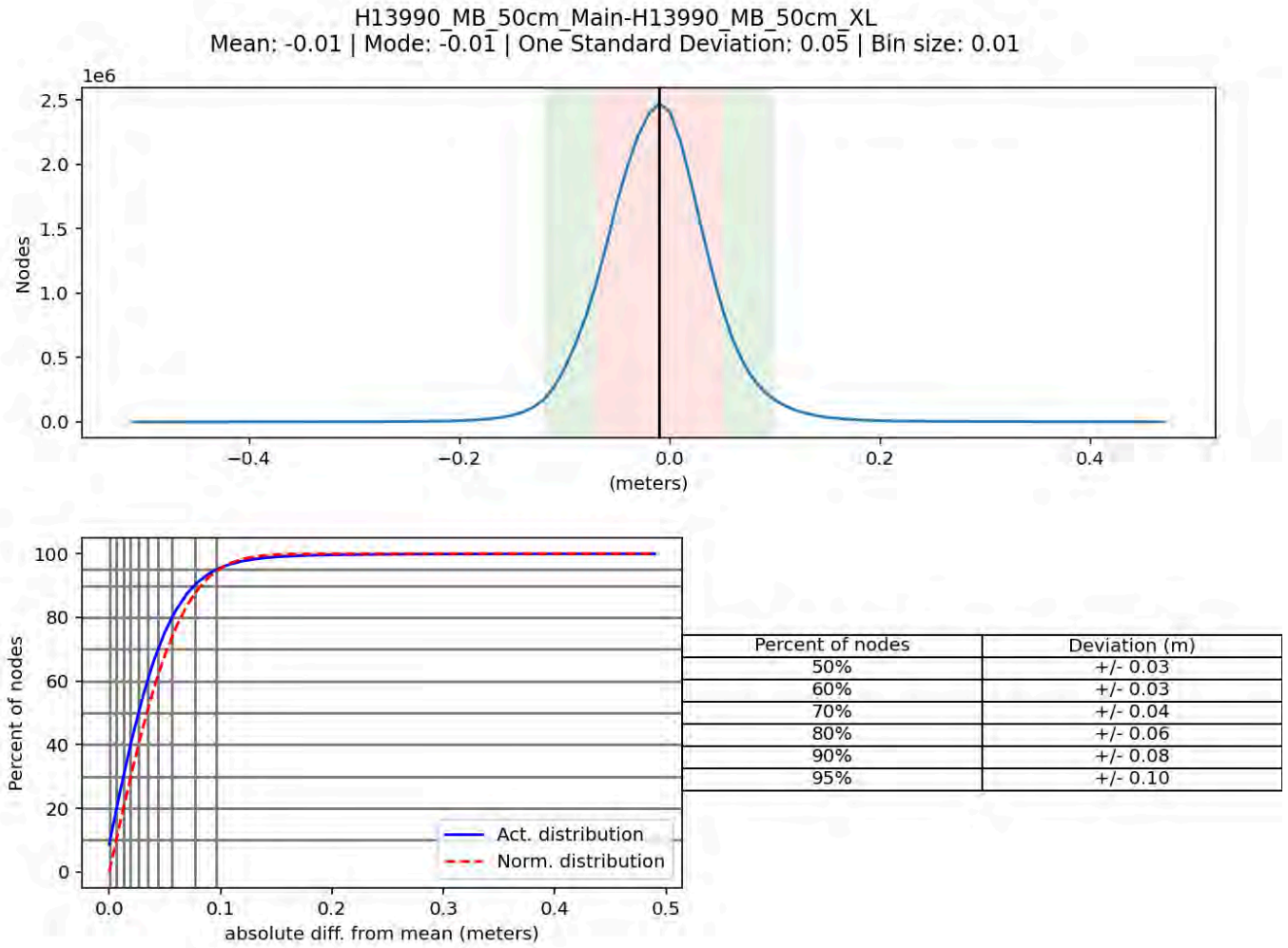


Figure 4: Crossline tracks overlaid on a coverage surface.



Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.03
70%	+/- 0.04
80%	+/- 0.06
90%	+/- 0.08
95%	+/- 0.10

Figure 5: Depth differences between mainscheme and crossline data.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	N/A	0.13 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
RV North Cove	4 meters/second	N/A	N/A	2 meters/second
RV South Cove	4 meters/second	N/A	N/A	2 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The NOAA Pydro QC Tools application was used to calculate TVU QC, determined by a ratio of uncertainty to the allowable error per NOAA and IHO specification. A pair of surfaces was finalized in CARIS HIPS using the "uncertainty" option to select the combination of a priori and realtime uncertainty estimates as the surface TVU source. The surfaces represented areas of object detection coverage at different resolutions as appropriate for the water depths; graphs are shown for both surfaces. All surfaces passed the uncertainty check, with 96% and 99.5+% of nodes meeting the uncertainty standards.

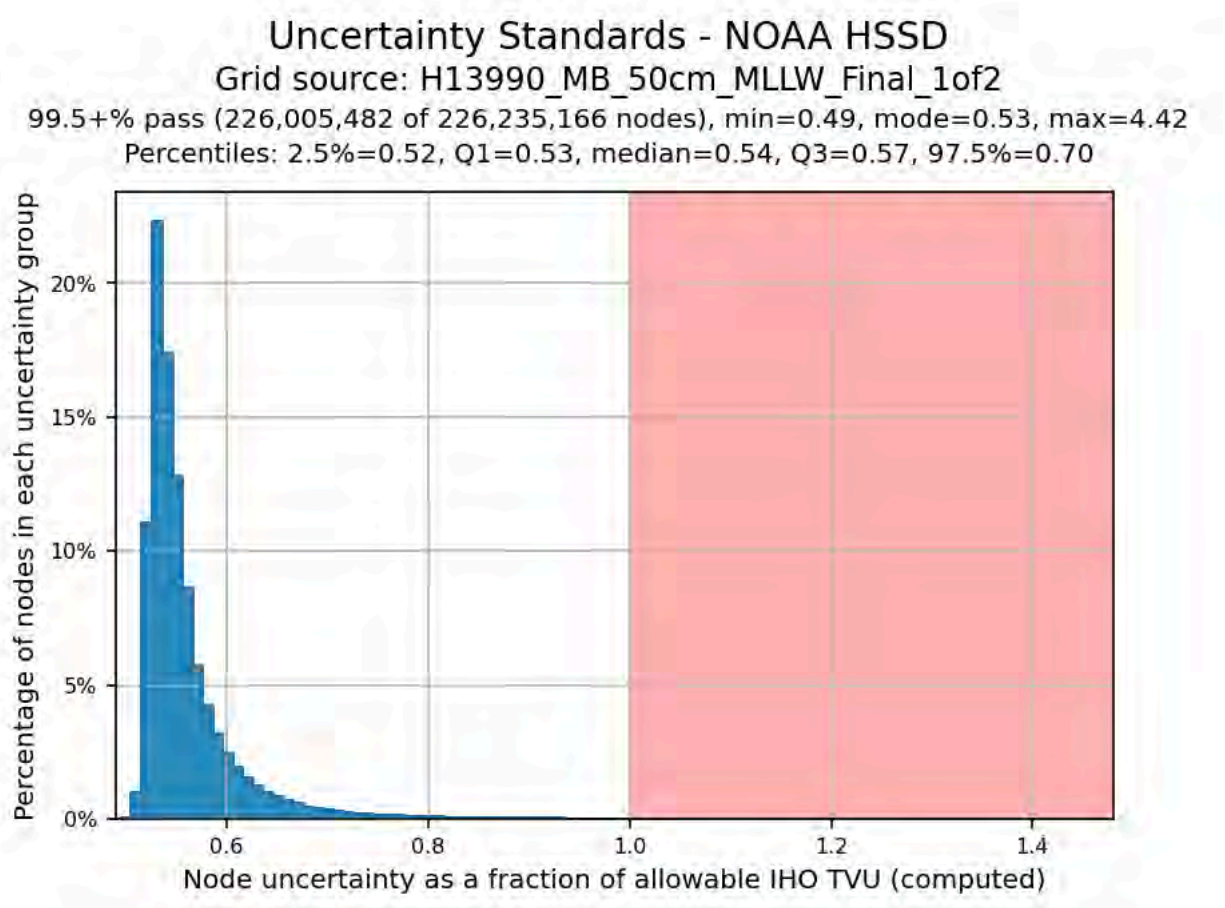


Figure 6: Uncertainty standards, 50cm resolution surface.

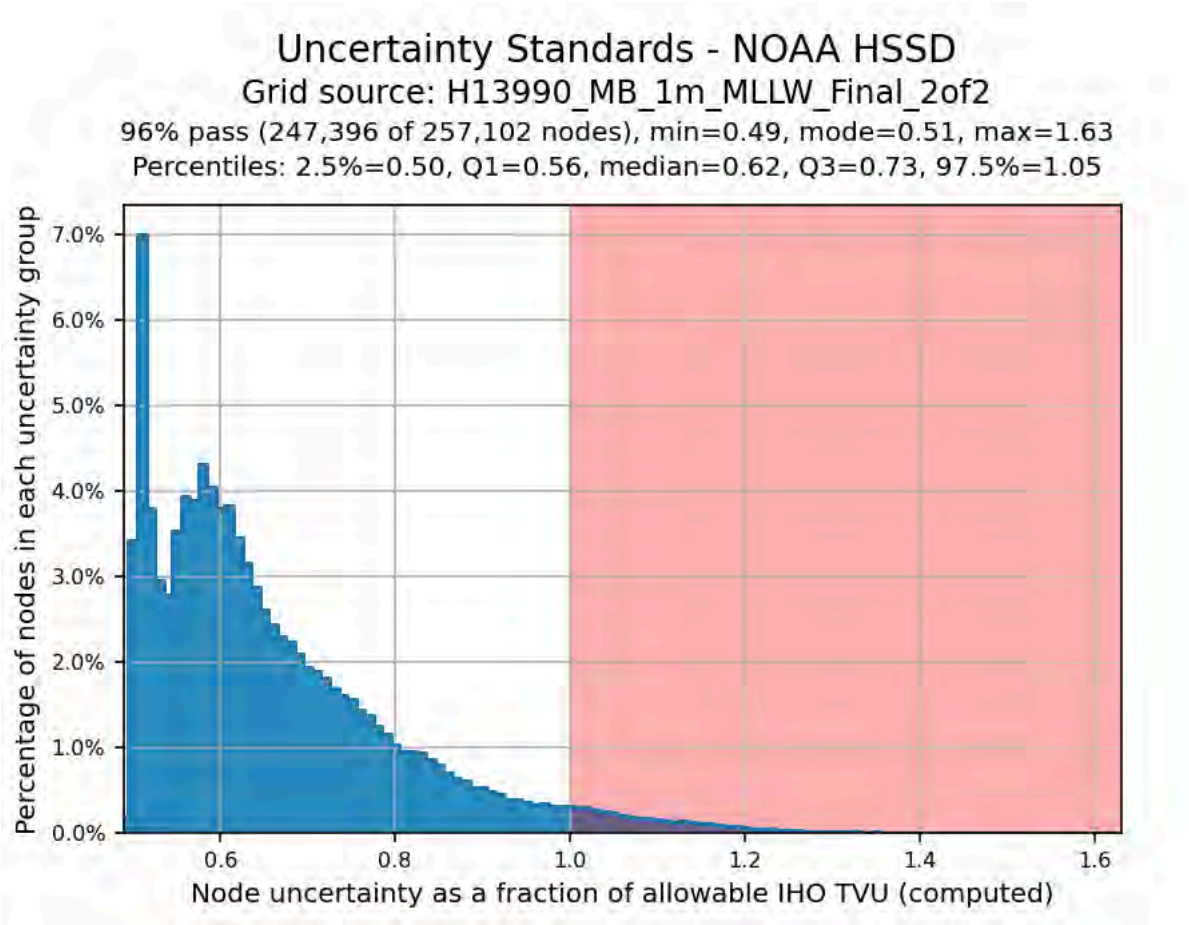


Figure 7: Uncertainty standards,1m resolution surface.

B.2.3 Junctions

H13990 junctions with contemporary surveys H13994 and H13996 at its eastern end. A lidar junction assigned in the PI was contingent upon availability of the survey, which was undergoing review at the time of the PI; however, it was not available in time for use as a junction comparison for this DR.

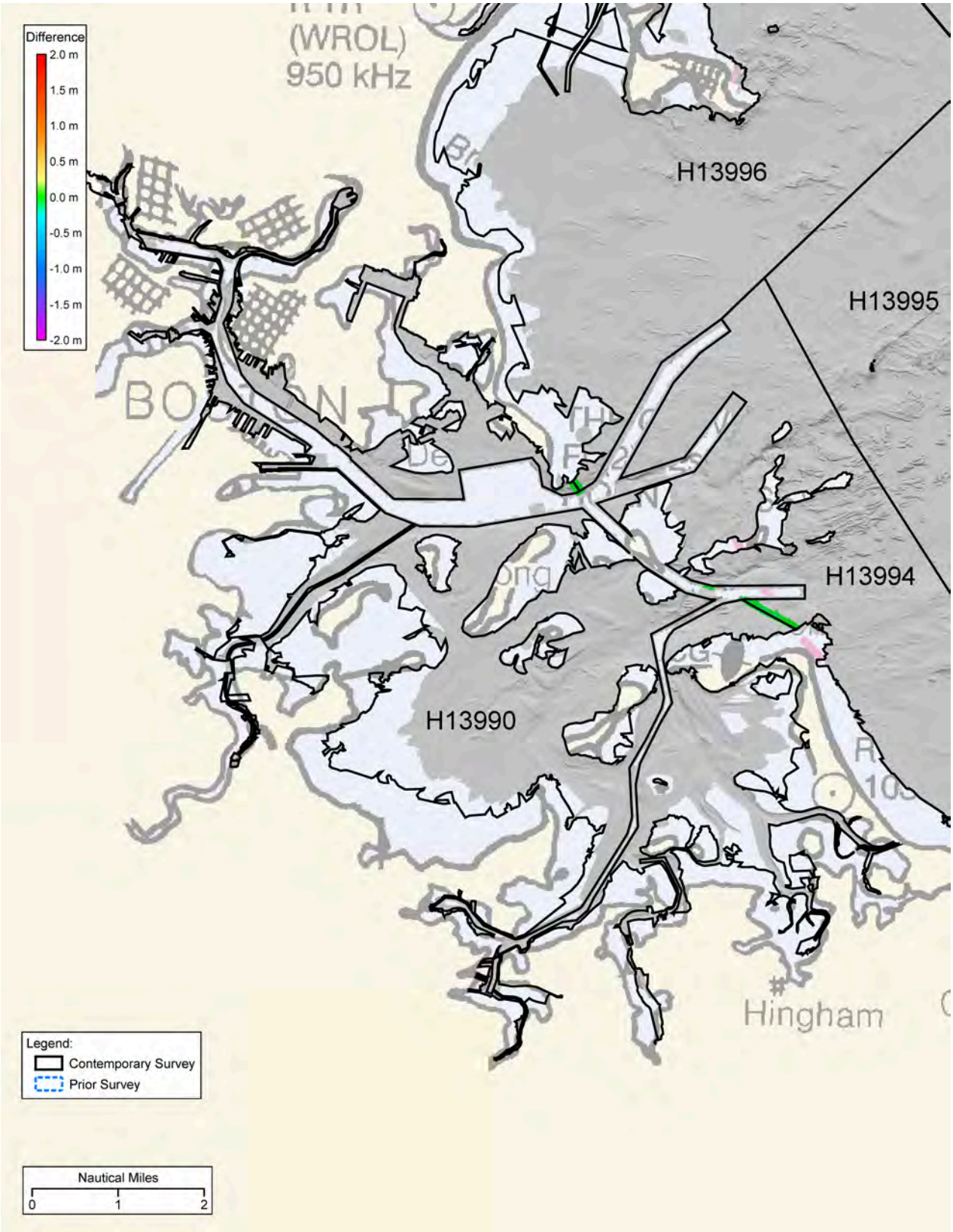


Figure 8: H13990 junction map with junction area depth differences.

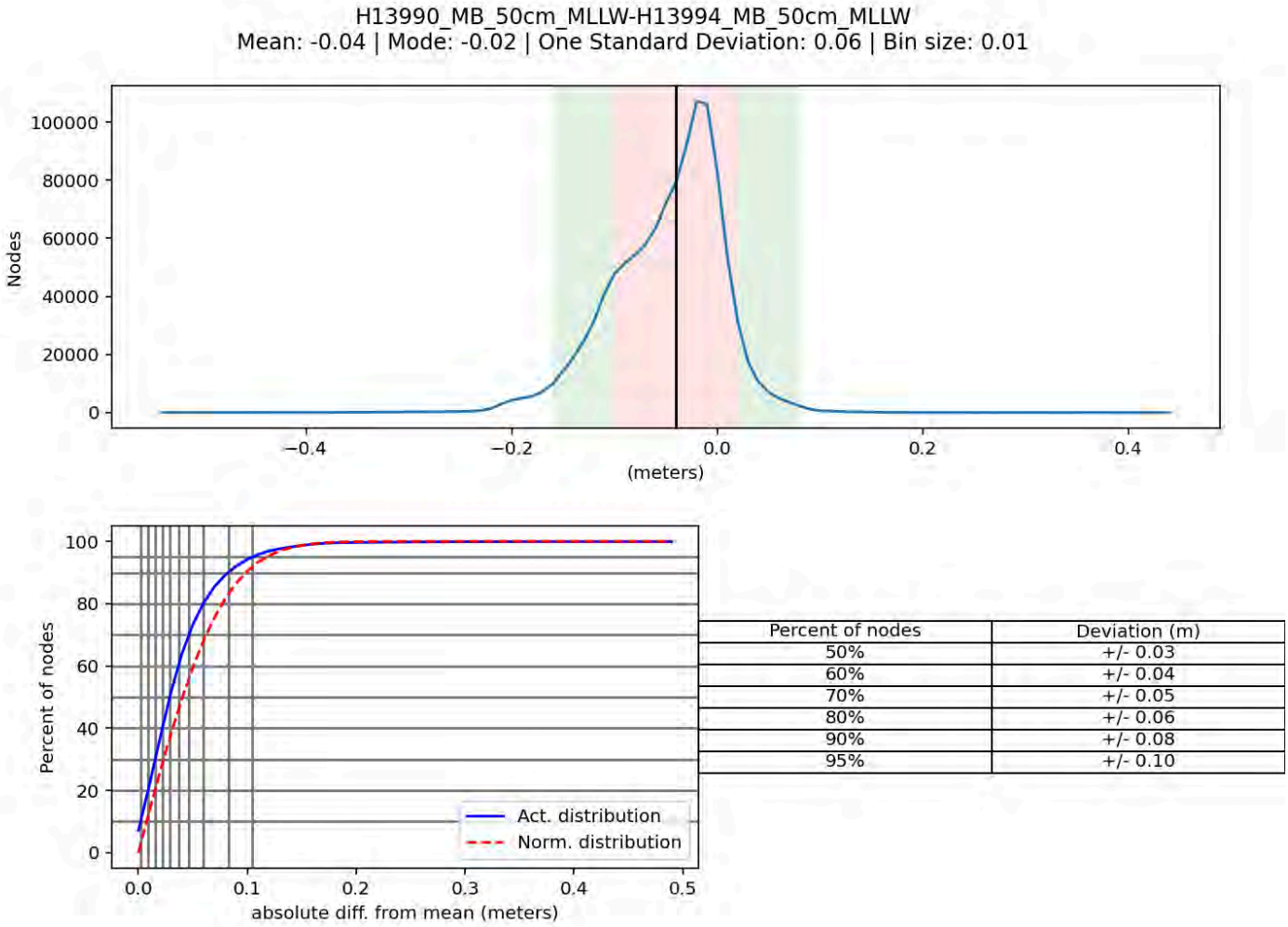
The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13994	1:5000	2025	OSI	E
H13996	1:5000	2025	OSI	E

Table 9: Junctioning Surveys

H13994

Part of the area between surveys H13990 and H13994 is buffered by an unassigned channel, so the area of data overlap is reduced to a 1.5km long border to the south of this channel. There is also a small section of overlap where a search radius for a disproved feature in H13990 extended across the unassigned channel and into H13994; this area is approximately 100m by 200m. Agreement between the two surveys was very good, with a mean difference of 0.02m.

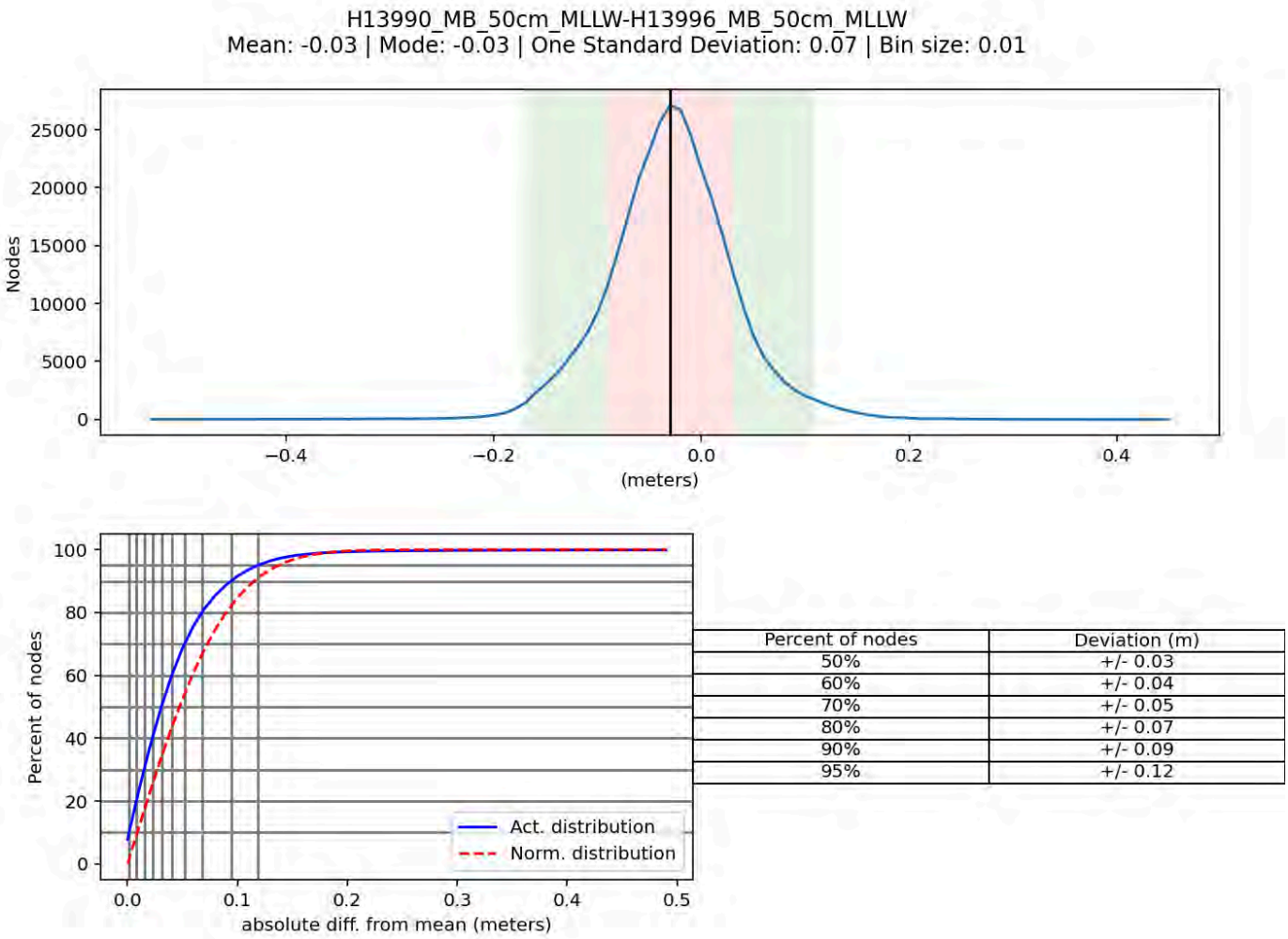


Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.04
70%	+/- 0.05
80%	+/- 0.06
90%	+/- 0.08
95%	+/- 0.10

Figure 9: Depth differences between surveys H13990 and H13994.

H13996

The junction between surveys H13990 and H13996 is a short section on the north side of the Boston Harbor main ship channel; the shared border is less than 400m long. Agreement between the two surveys here was very good, with a mean difference of 0.03m.



Percent of nodes	Deviation (m)
50%	+/- 0.03
60%	+/- 0.04
70%	+/- 0.05
80%	+/- 0.07
90%	+/- 0.09
95%	+/- 0.12

Figure 10: Depth differences between surveys H13990 and H13996.

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

Sound Speed Variation

Sound speed variations were observed throughout the survey area, correlating to factors including the tide, weather, water depth, and bathymetric features, such as slopes or sand waves. In data processing, sound speed profiles that did not adequately reflect the surrounding water mass were identified and removed, edited, or replaced. Sound speed casts were primarily applied using the CARIS HIPS "Nearest in Distance within Time" method, therefore, removing a profile collected on a steep slope would allow deeper and shoaler casts on either side to be applied instead. Casts that were empirically found to represent a large water zone were added at additional locations within that zone to ensure proper corrections given the cast selection options available in the CARIS sound speed tools. Bathymetry, uncertainty, and standard deviation surfaces were used to direct editing and determine the accuracy of sound speed cast selection.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: RV North Cove and RV South Cove acquired AML3 casts at intervals of approximately 60 minutes.

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.

OSI submitted a data package titled "SOUND VELOCITY collected from MV Northstar Challenger, RV North Cove, RV South Cove, RV Twister, and RV West Cove II in North Atlantic Ocean, Northern Massachusetts Bay from 2024-08-03 to 2025-03-28" in NetCDF format to the National Centers for Environmental Information (NCEI) on May 5, 2025.

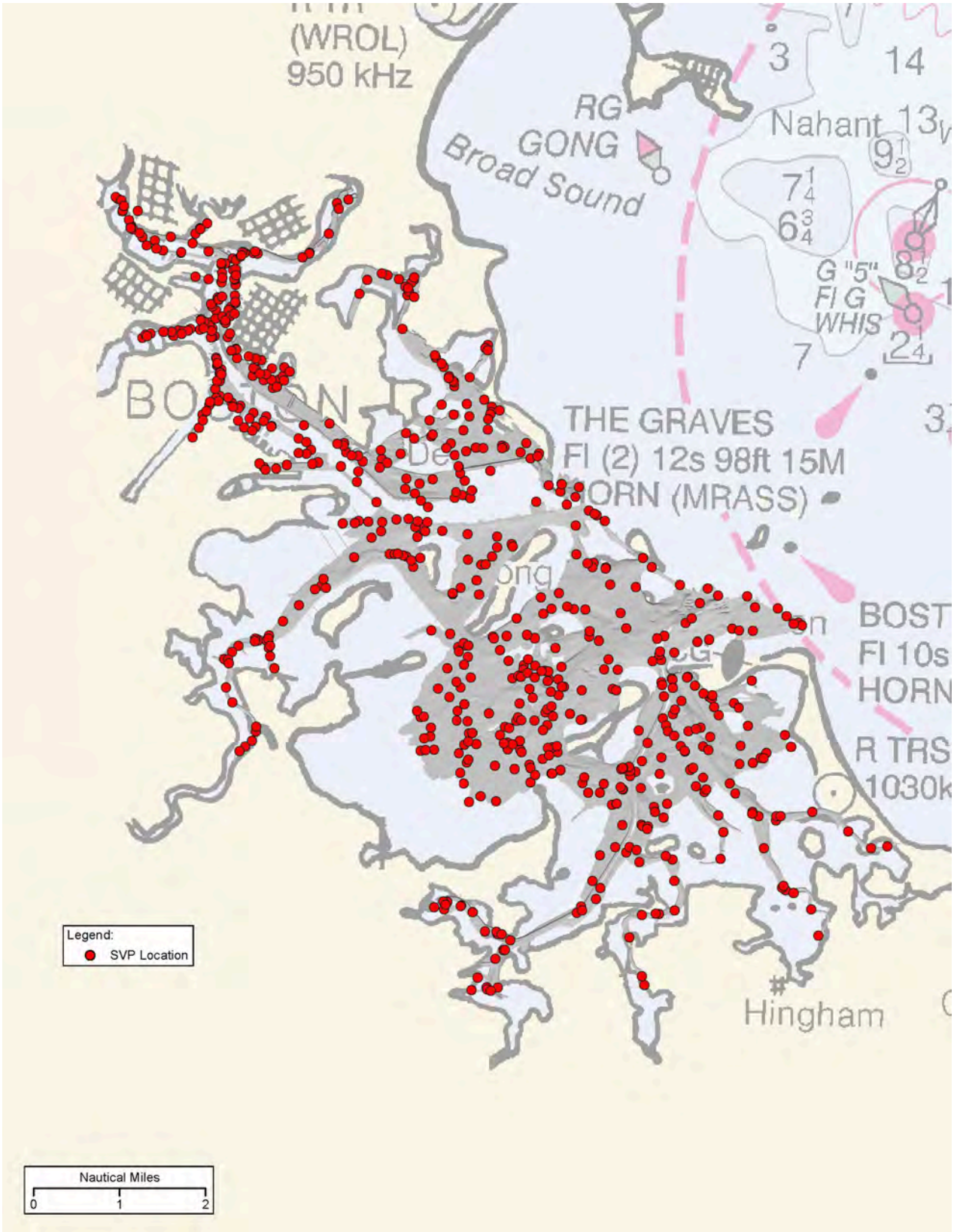


Figure 11: H13990 Sound speed cast locations.

B.2.8 Coverage Equipment and Methods

This survey was conducted to achieve Object Detection Coverage with multibeam, as specified in HSSD 5.2.2.2, Option A. The survey methods used to meet coverage requirements did not deviate from those described in the DAPR.

The NOAA Pydro QC Tools application was used to verify that the multibeam data met the density coverage requirements for each of the finalized grids submitted for the survey. Both surfaces passed the density check, with 99.5+% of nodes populated with at least 5 soundings.

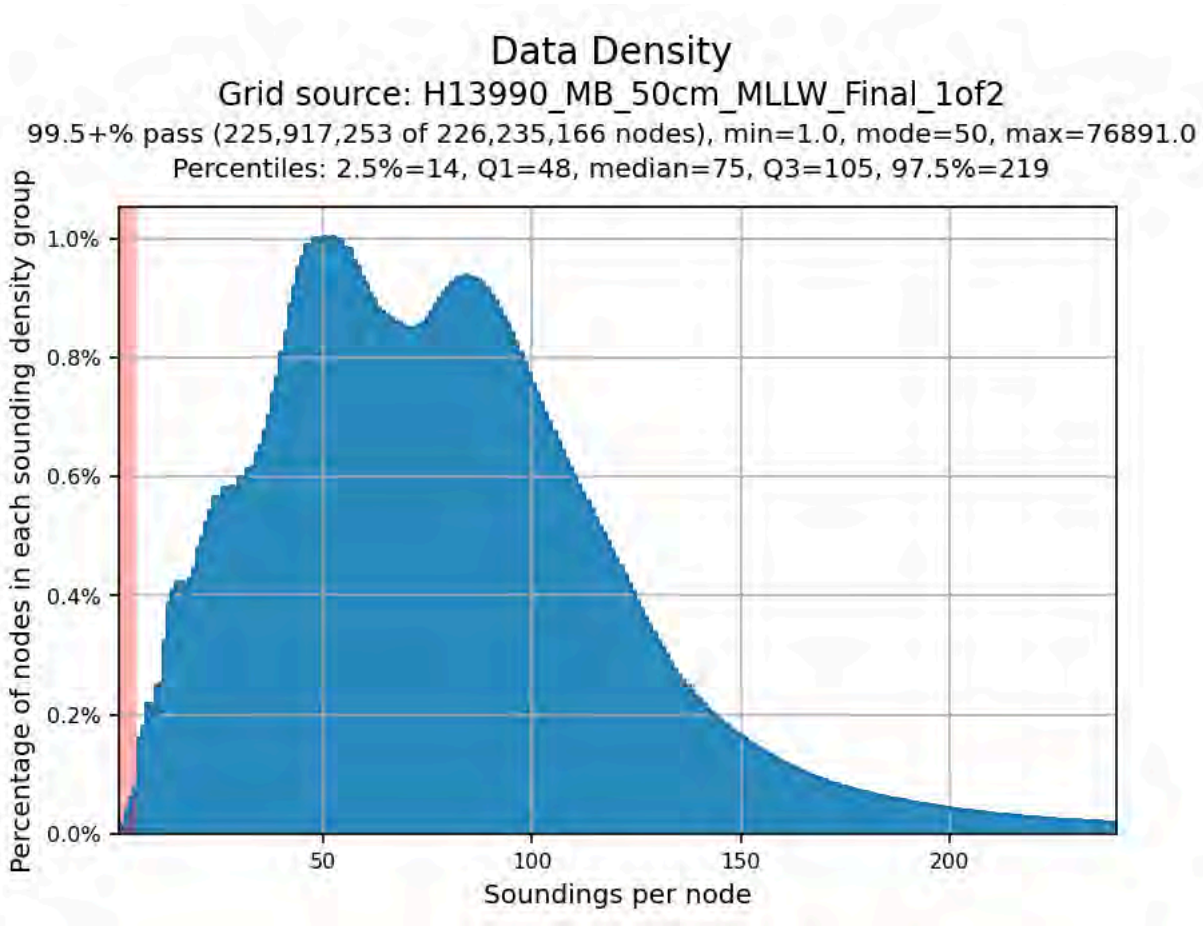


Figure 12: Data density, 50cm resolution surface.

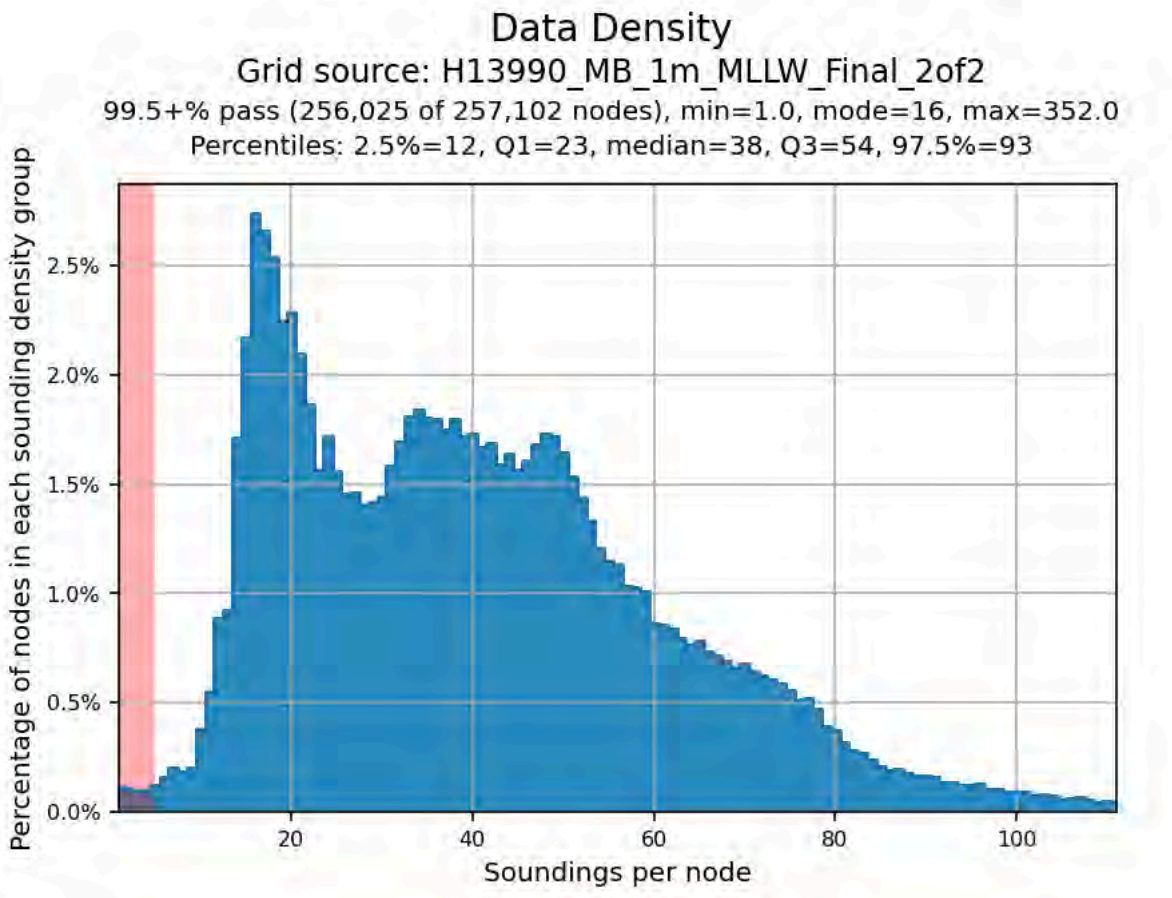


Figure 13: Data density, 1m resolution surface.

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.

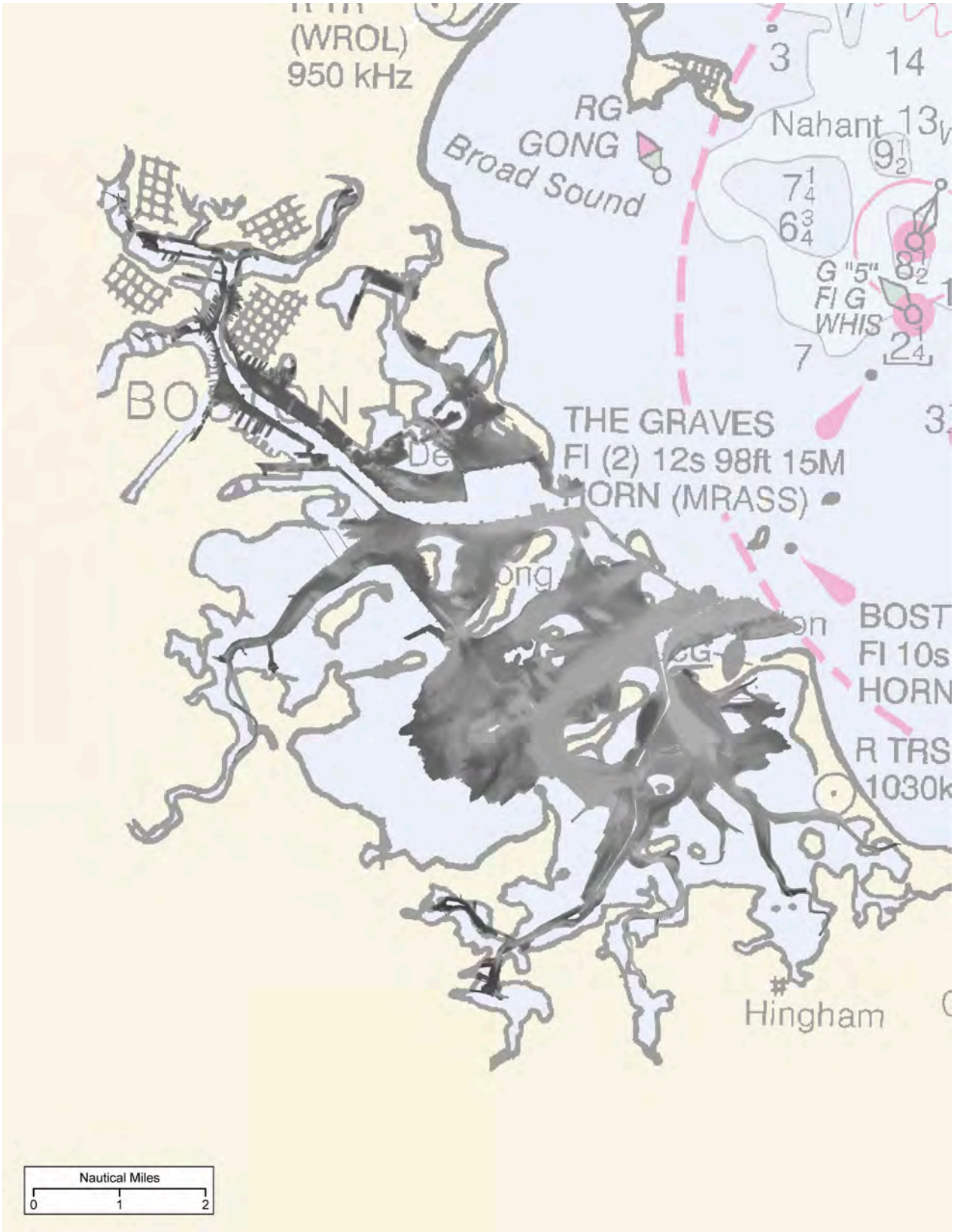


Figure 14: H13990 multibeam backscatter mosaic.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile Version 2024.

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
H13990_MB_50cm_MLLW_Final_1of2	CARIS Raster Surface (CUBE)	0.5 meters	-2.3 meters - 20.0 meters	NOAA_0.5m	Object Detection
H13990_MB_1m_MLLW_Final_2of2	CARIS Raster Surface (CUBE)	1 meters	18.0 meters - 22.8 meters	NOAA_1m	Object Detection
H13990_MB_50cm_MLLW_1of2	CARIS Raster Surface (CUBE)	0.5 meters	-1.8 meters - 22.9 meters	NOAA_0.5m	Source
H13990_MB_1m_MLLW_2of2	CARIS Raster Surface (CUBE)	1 meters	-1.8 meters - 22.8 meters	NOAA_1m	Source
H13990_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	OPR-A325-KR-24_NAD83(2011)-MHW.csar OPR-A325-KR-24_NAD83(2011)-MLLW.csar OPR-A325-KR-24_NAD83(2011)-NPL.csar

Table 11: ERS method and SEP file

C.2 Horizontal Control

The horizontal datum for this project is North American Datum 1983 (2011).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 19.

The following PPK methods were used for horizontal control:

- Smart Base
- Single Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
Putnam	CTPN
Milton	MAMI
Plymouth	MAPL
Salisbury	MASA
Sturbridge	MASB
Tewksbury	MATB
Wrentham	MAWR
Machias	MEMA
Newport, RI	N001
U New Hampshire	NHUN
U of RI Coop	URIL
Westford	WES2
Boston WAAS 1	ZBW1

Table 12: CORS Base Stations

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
Ocean Surveys Gloucester	OSGL

Table 13: User Installed Base Stations

D. Results and Recommendations

D.1 Chart Comparison

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
US5BOSBE	1:22000	3	02/19/2025	02/19/2025
US5BOSBF	1:22000	3	02/19/2025	02/19/2025
US5BOSCC	1:12000	4	02/25/2025	02/25/2025
US5B0SCD	1:12000	4	02/25/2025	02/25/2025
US5BOSCE	1:22000	4	02/19/2025	02/19/2025
US5BOSDC	1:12000	4	02/25/2025	02/25/2025
US5BOSDD	1:12000	4	02/25/2025	02/25/2025
US5MA1OE	1:22000	3	02/26/2025	02/26/2025
US5MA1OF	1:22000	5	02/26/2025	02/26/2025

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

Numerous potentially hazardous features were surveyed in H13990 and DTON reports were submitted for 20 features. These DTONS consisted of wrecks, shoal soundings, and obstructions associated with ruined piers, with approximately equal frequency of each.

D.1.3 Charted Features

More than 3200 features were assigned in H13990. Many were inshore of NALL and not investigated, but over 1000 are addressed in the FFF. In some areas, full multibeam coverage was obtained over unassigned charted features. These features are also included in the FFF with appropriate attribution.

D.1.4 Uncharted Features

Hundreds of uncharted features were found throughout the survey area. New wrecks, obstructions, and areas of submerged ruins were common, as were new or repositioned docks, dolphins, and pilings. See the FFF for details.

D.1.5 Channels

The Boston Harbor area contains many charted channels, and the assigned survey limits specifically exclude these channels. Any channel coverage was obtained incidentally, such as along the edges of channels at the survey boundaries or in narrow waterways where it was impractical to obtain coverage without including the channels. An investigation of channel depths was not conducted; however, maintained channels in the Boston Harbor area were generally at or below their charted depths. Some channels, such as the John Fitzgerald Kennedy Channel and the Squantum Channel in Dorchester Bay, are charted as unmaintained and were surveyed to be shoaler than the charted depths.

D.2 Additional Results

D.2.1 Aids to Navigation

More than 300 ATONS were charted within the assigned survey limits, and the majority were observed to be present as charted. A group of private aids near Spectacle Island were not observed; some of them are listed as seasonal aids. A pair of hazard buoys, Nantasket Roads DRC Lighted Hazard Buoys C and D, were also not present but were already listed as missing in the U.S. Coast Guard Light List. No reports were made to the US Coast Guard for this survey area.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

No overhead features were found to be incorrectly positioned and no overhead clearance reports were submitted for this survey.

D.2.5 Submarine Features

An exposed cable was visible in a charted cable area, on the north side of Georges Island leading to the fog signal on Gallop Island Light 7. There were also 5 visible pipeline segments reported in the Exposed Pipeline Report, 1 of which was not near a charted pipeline. These pipeline segments are included in the FFF.

D.2.6 Platforms

Platform features exist for this survey, but were not categorized as drilling structures, production platforms, or well heads. Platforms are addressed in the FFF.

D.2.7 Ferry Routes and Terminals

Seasonal ferry routes exist for this survey, but the routes are not on the chart.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

The bridge at the Charles River Dam was undergoing construction at the time of the survey. Caution areas for this construction are present on the current ENCs.

D.2.10 New Survey Recommendations

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

D.2.11 ENC Scale Recommendations

Larger scale ENCs would be appropriate for the northwest portion of this survey which includes the city of Boston.

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
John R. Bean	Chief of Party	06/05/2025	Digitally signed by John R. Bean
David T. Somers	Data Processing Manager	06/05/2025	Digitally signed by David T. Somers

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