H13672

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H13672

LOCALITY

State(s):	New York
General Locality:	Lake Erie and Lake Ontario
Sub-locality:	6NM North of Oswego

2022

CHIEF OF PARTY
Matthew J. Jaskoski, CDR/NOAA

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Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13672**

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):	**New York**
General Locality:	**Lake Erie and Lake Ontario**
Sub-Locality:	**6NM North of Oswego**
Scale:	**40000**
Dates of Survey:	**10/05/2022 to 10/11/2022**
Instructions Dated:	**08/02/2022**
Project Number:	**OPR-W386-TJ-22**
Field Unit:	**NOAA Ship *Thomas Jefferson***
Chief of Party:	**Matthew J. Jaskoski, CDR/NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Low Water Datum IGLD-1985**

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 17N, LWD - IGLD 1985. 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 H13672

Project: OPR-W386-TJ-22

Locality: Lake Erie and Lake Ontario

Sublocality: 6NM North of Oswego

Scale: 1:40000

October 2022 - October 2022

NOAA Ship *Thomas Jefferson*

Chief of Party: Matthew J. Jaskoski, CDR/NOAA

A. Area Surveyed

Survey H13672, located in Lake Ontario within the sub locality 6 NM North of Oswego, NY, was conducted in accordance with coverage requirements set forth in the Project Instructions OPR-W386-TJ-22 dated August 8, 2022 (Figure 1).

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
44° 37' 26.4" N 76° 38' 9" W	43° 29' 21" N 76° 21' 0.6" W

Table 1: Survey Limits

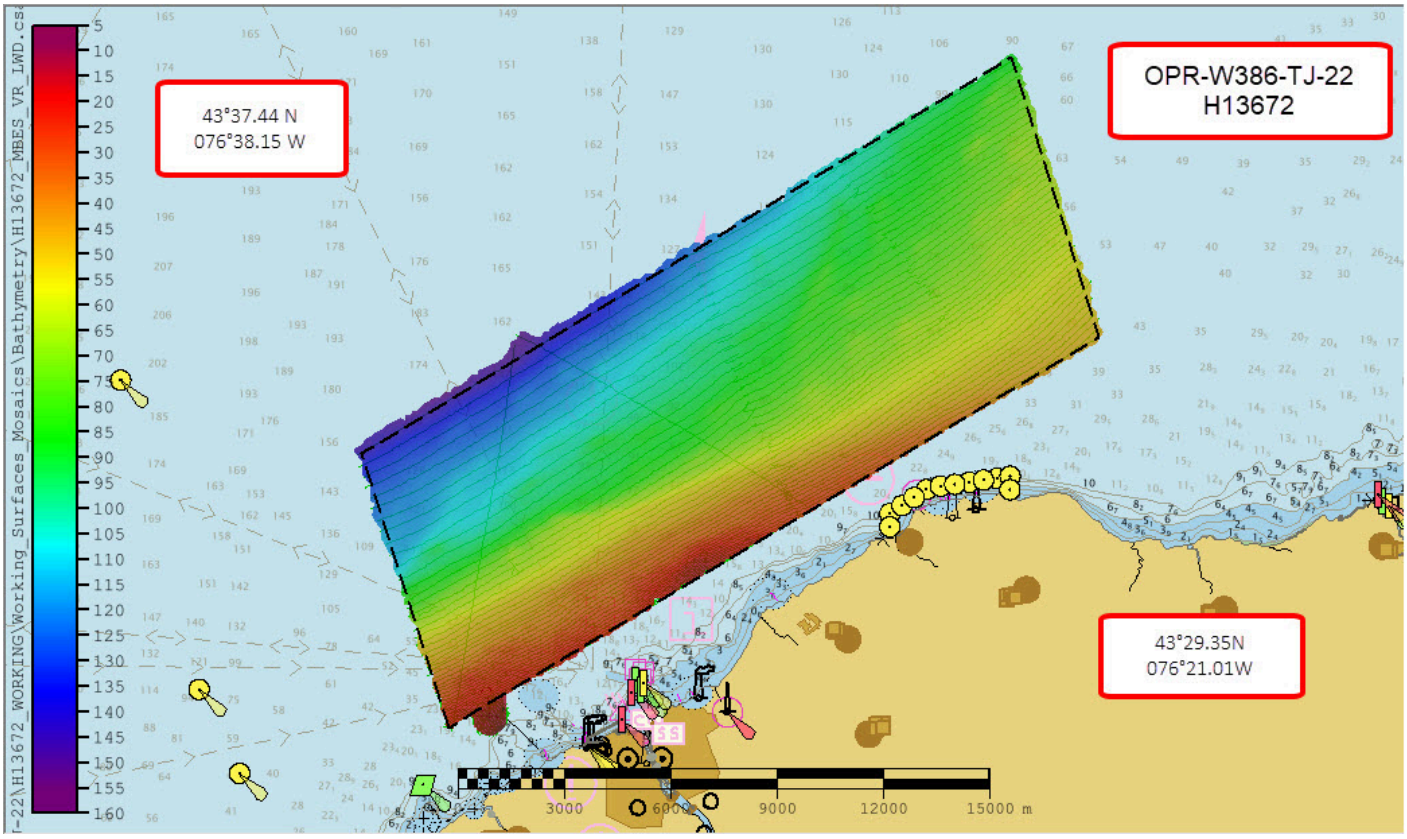


Figure 1: Survey layout for H13672, plotted over ENC US4NY22M. Black outline represents survey limits set forth by the Project Instructions.

Survey data were acquired in accordance with the requirements set forth by the Project Instructions and the 2022 Hydrographic Survey Specifications and Deliverables (HSSD).

A.2 Survey Purpose

This survey is to support the proposed Lake Ontario National Marine Sanctuary (NMS) that would encompass over 1,700 square miles of eastern Lake Ontario. Originally nominated by four Lake Ontario counties, with support from New York State, the sanctuary would manage and protect underwater cultural resources. When designated (estimated in Fall of 2023), NOAA will start implementing its Management Plan. The plan includes surveying, inventorying, and documenting cultural resources; installing mooring buoys at some shipwreck sites; developing education and interpretive programs for schools and the public; creating a NOAA “presence” in the Lake Ontario communities; and promoting this area for tourism and economic development. As all Great Lakes waters are state-owned, NOAA will co-manage this with the State of New York.

The Lake Ontario NMS would be the third NMS in the Great Lakes, following Thunder Bay in Lake Huron (designation 2000) and Wisconsin Shipwreck Coast in Lake Michigan (designated in 2021). These three

areas provide an amazing opportunity to interpret the history of the Great Lakes and how it contributed to the growth of our nation.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Complete coverage requirements were met utilizing 100% multibeam echo sounder (MBES) coverage as specified by the 2022 HSSD. Data acquired in H13672 meets survey quality standards specified in the 2022 HSSD, including crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.10), and density requirements (see Section B.2.11).

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 acquistions (Refer to HSSD Section 6.2)

Table 2: Survey Coverage

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

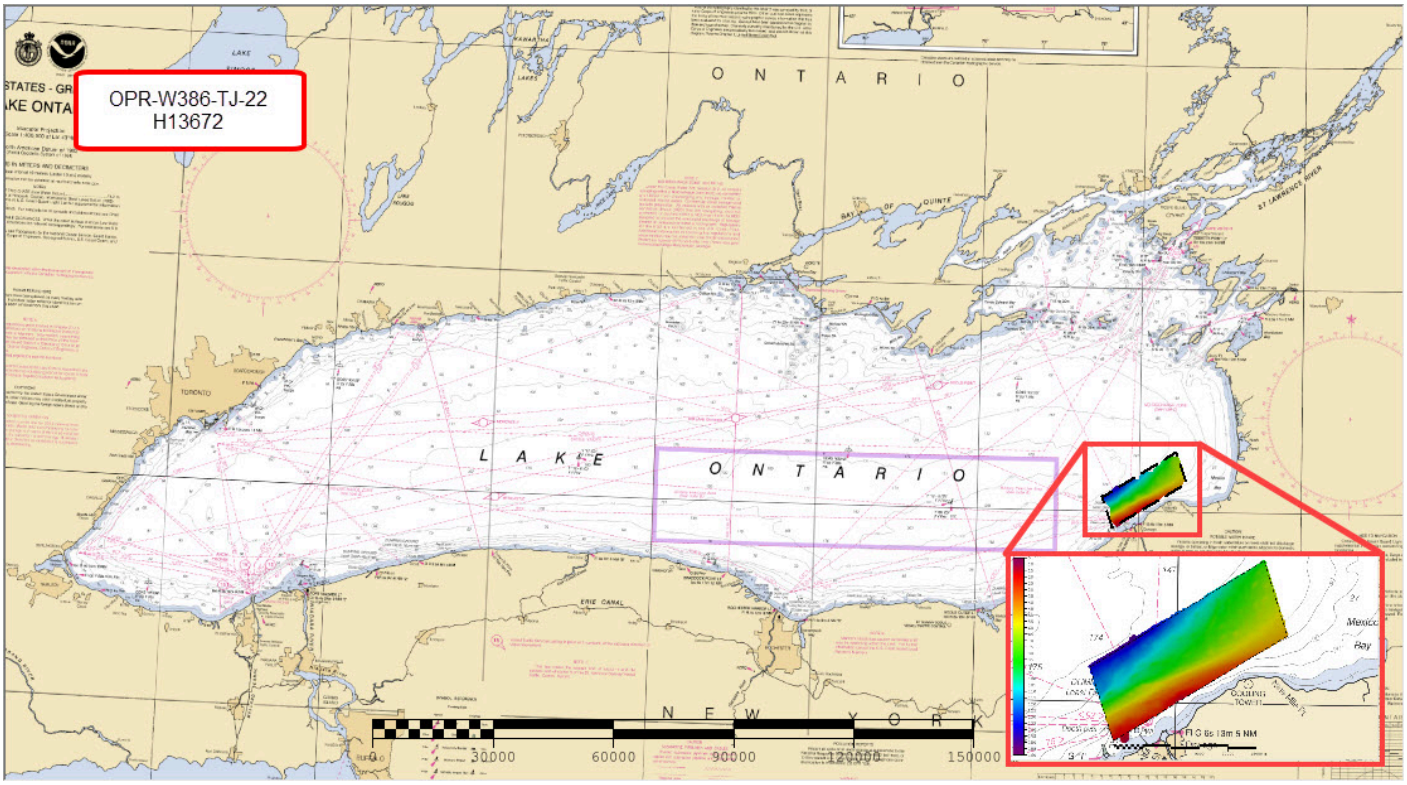


Figure 2: H13672 survey coverage overlaid onto RNC 14800.

A.6 Survey Statistics

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

	HULL ID	*S-222*	*2903*	*2904*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0	0.0	0.0
	MBES Mainscheme	25.48	249.3	252.41	527.19
	Lidar Mainscheme	0.0	0.0	0.0	0.0
	SSS Mainscheme	0.0	0.0	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0	0.0	0.0
	SBES/MBES Crosslines	0.0	11.21	0.0	11.21
	Lidar Crosslines	0.0	0.0	0.0	0.0
Number of Bottom Samples					4
Number Maritime Boundary Points Investigated					0
Number of DPs					0
Number of Items Investigated by Dive Ops					0
Total SNM					51.82

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
10/05/2022	278
10/06/2022	279

Survey Dates	Day of the Year
10/08/2022	281
10/10/2022	283
10/11/2022	284

Table 4: Dates of Hydrography

H13672 data was acquired using S-222, TJ 2903 and TJ 2904 over five days.

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	***S-222***	***2903***	***2904***
LOA	63.4 meters	8.5 meters	8.5 meters
Draft	4.6 meters	1.2 meters	1.2 meters

Table 5: Vessels Used

Figure 3: NOAA Ship Thomas Jefferson (S-222)

Figure 4: NOAA Ship Thomas Jefferson launch 2904

Figure 5: NOAA Ship Thomas Jefferson launch 2903 and 2904

S-222, 2903, and 2904 are Hydrographic Survey Vessels operated by the National Oceanic Atmospheric Administration and are home ported in Norfolk, VA (Figures 3, 4, and 5).

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040	MBES
Kongsberg Maritime	EM 2040	MBES Backscatter
Sea-Bird Scientific	SBE 19plus V2	Conductivity, Temperature, and Depth Sensor
AML Oceanographic	MVP200	Conductivity, Temperature, and Depth Sensor
Teledyne RESON	SVP 70	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System
Valeport	Thru-Hull SVS	Sound Speed System
AML Oceanographic	MVP-X	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

Vessel configurations, equipment operations, data acquisition, and processing were consistent with specifications described in the DAPR.

B.2 Quality Control

B.2.1 Crosslines

HSL 2903 collected 11.21 linear nautical miles of MBES crosslines, or 2.12% of mainscheme MBES data. LNM. A variable resolution (VR) Combined Uncertainty and Bathymetry Estimator (CUBE) surface of mainscheme data and a VR CUBE surface of crossline data were differenced using the "Compare Grids" tool in Pydro Explorer 19 (Figure 6). The resulting mean was 0.08 meters with a standard deviation of 0.23 meters (Figure 7). Over 99.5% of nodes were compliant with IHO fraction of allowable error standards (Figure 8). A visual inspection of the difference surface indicated no systematic issues.

Due to operational time constraints the 2022 HSSD 5.2.4.2 crosslines requirement of approximately 4% of mainscheme mileage was not met. Crosslines that were collected show good temporal and geographic distribution across a variety of depth ranges, vessels, and water masses.

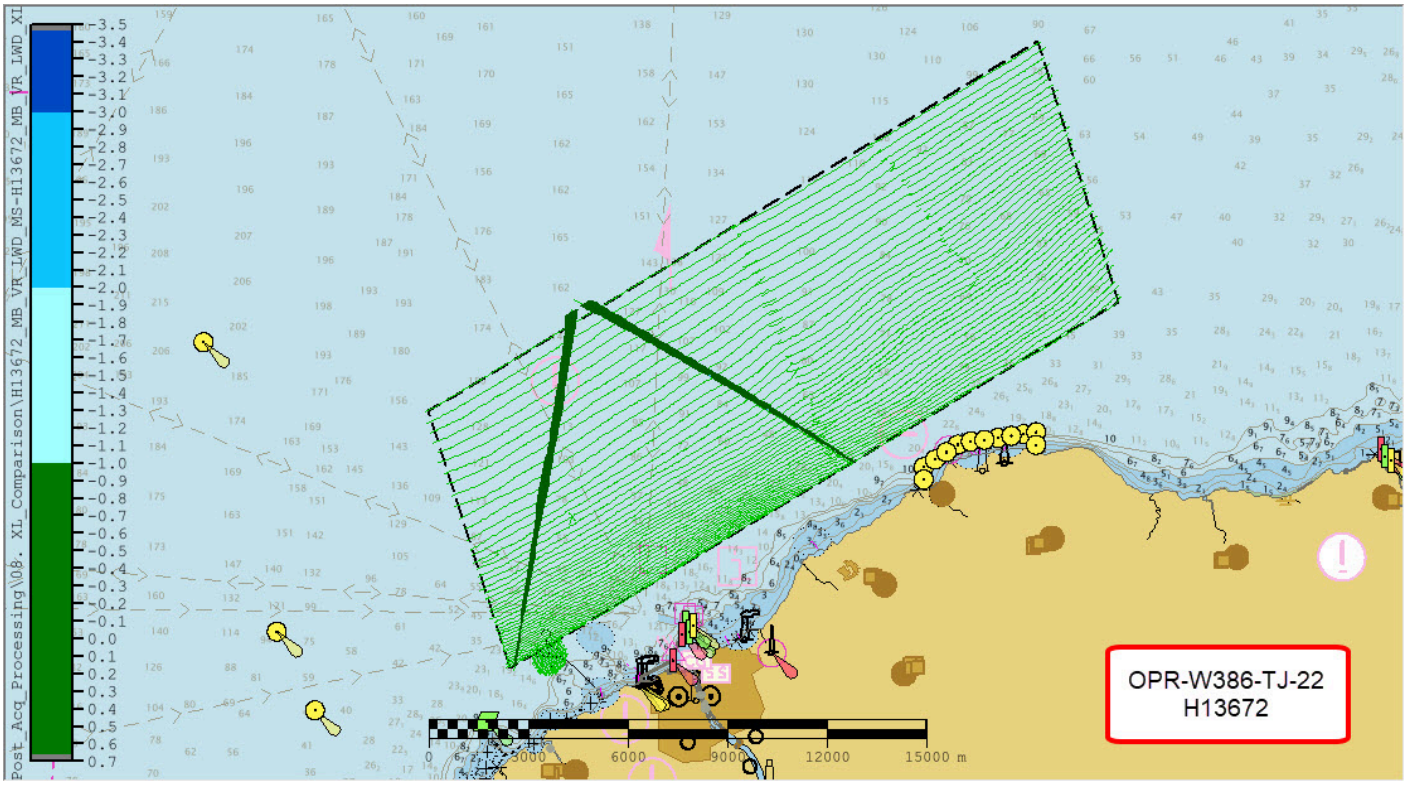
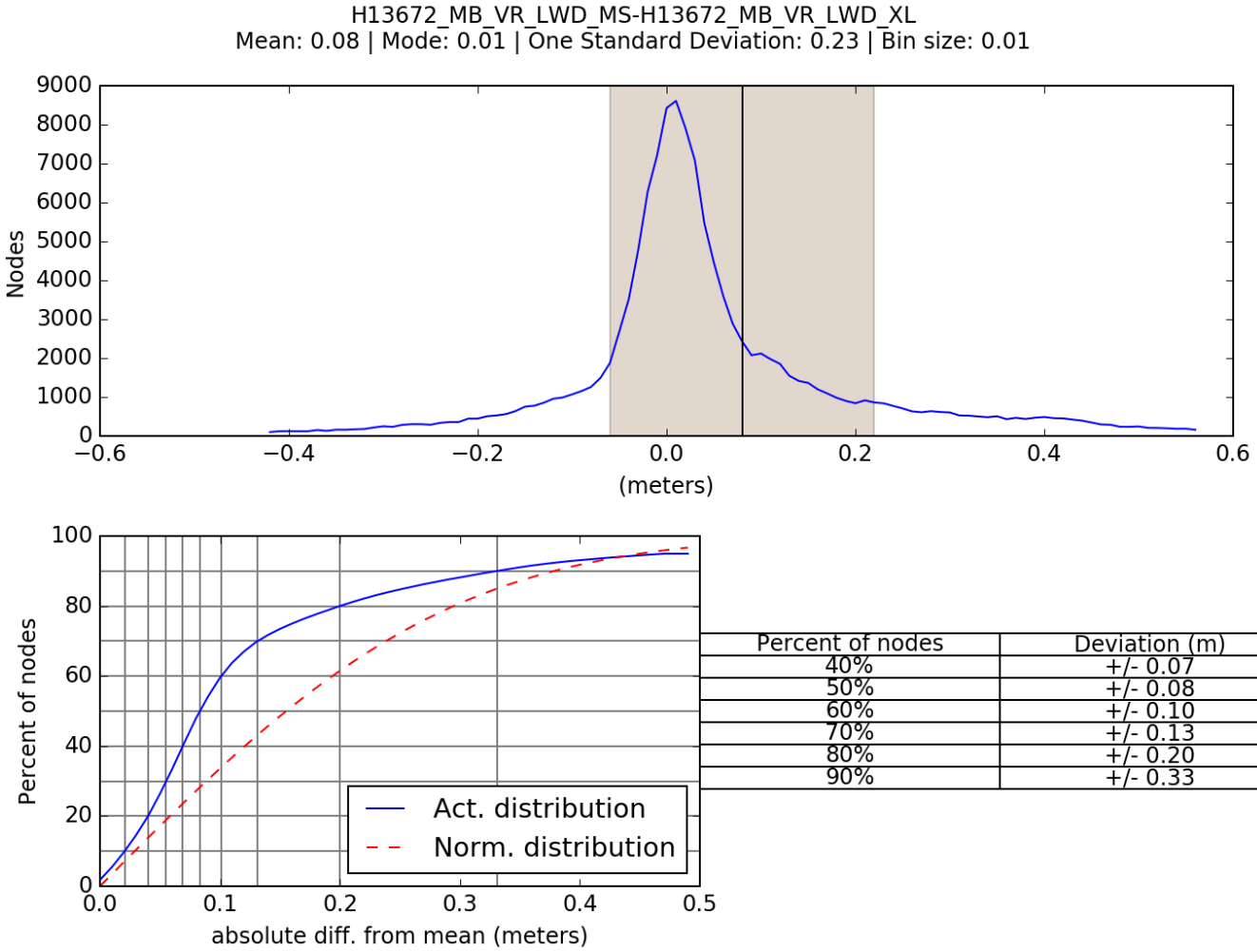


Figure 6: An overview of H13672's crosslines overlaid on the survey tracklines and ENC US4NY22M showing good spatial distribution



Percent of nodes	Deviation (m)
40%	+/- 0.07
50%	+/- 0.08
60%	+/- 0.10
70%	+/- 0.13
80%	+/- 0.20
90%	+/- 0.33

Figure 7: H13672 crossline/mainscheme comparison statistics

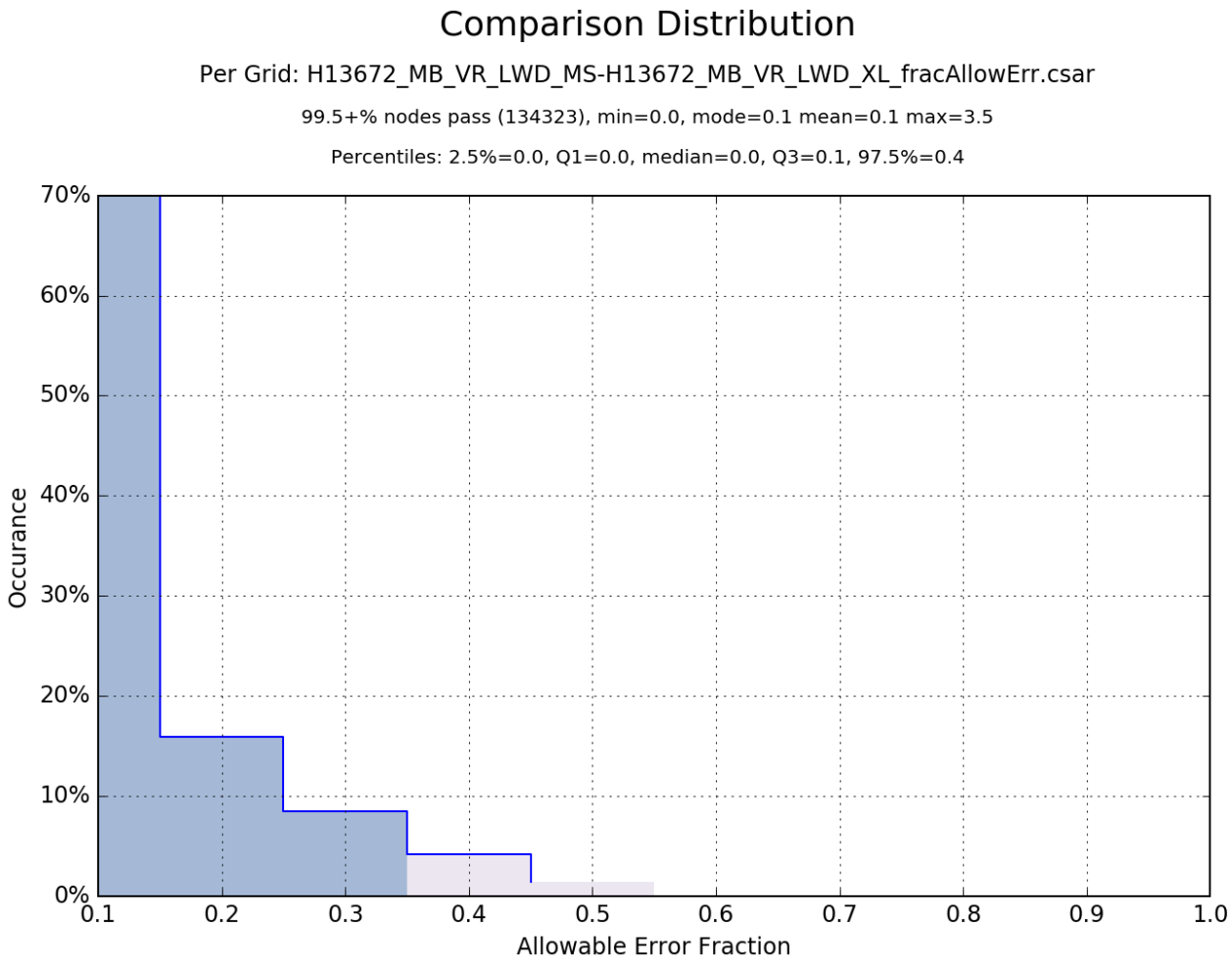


Figure 8: H13672 crossline fraction of allowable error statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 meters	0.045 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S-222	N/A meters/second	4.0 meters/second	N/A meters/second	0.2 meters/second
2903/2904	4.0 meters/second	N/A meters/second	N/A meters/second	0.2 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The bathymetric surface's uncertainty layer is compliant with 2022 HSSD uncertainty standards. Over 99.5% of all nodes pass uncertainty standards (Figure 9).

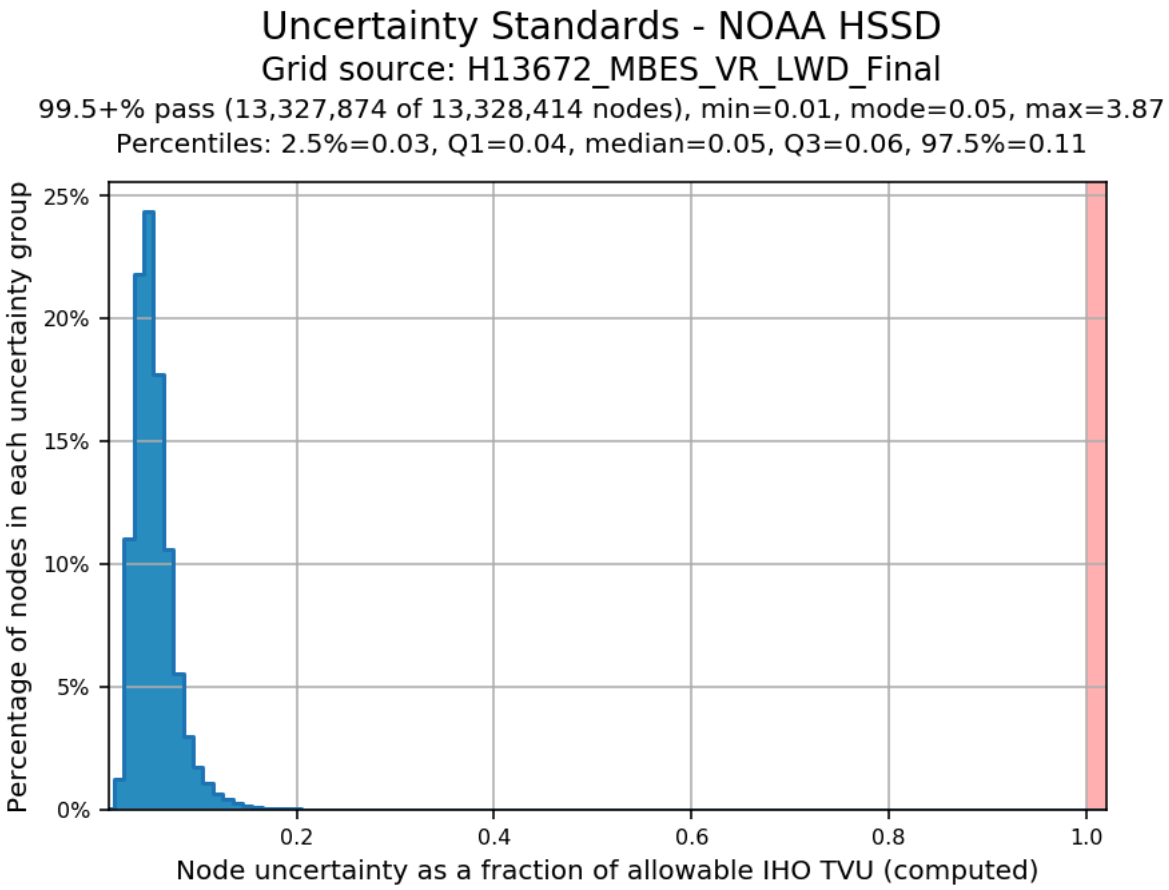


Figure 9: H13672 Uncertainty standards

B.2.3 Junctions

H13672 junctions with two contemporary surveys conducted by NOAA Ship THOMAS JEFFERSON within project OPR-W386-TJ-22 (Figure 10).

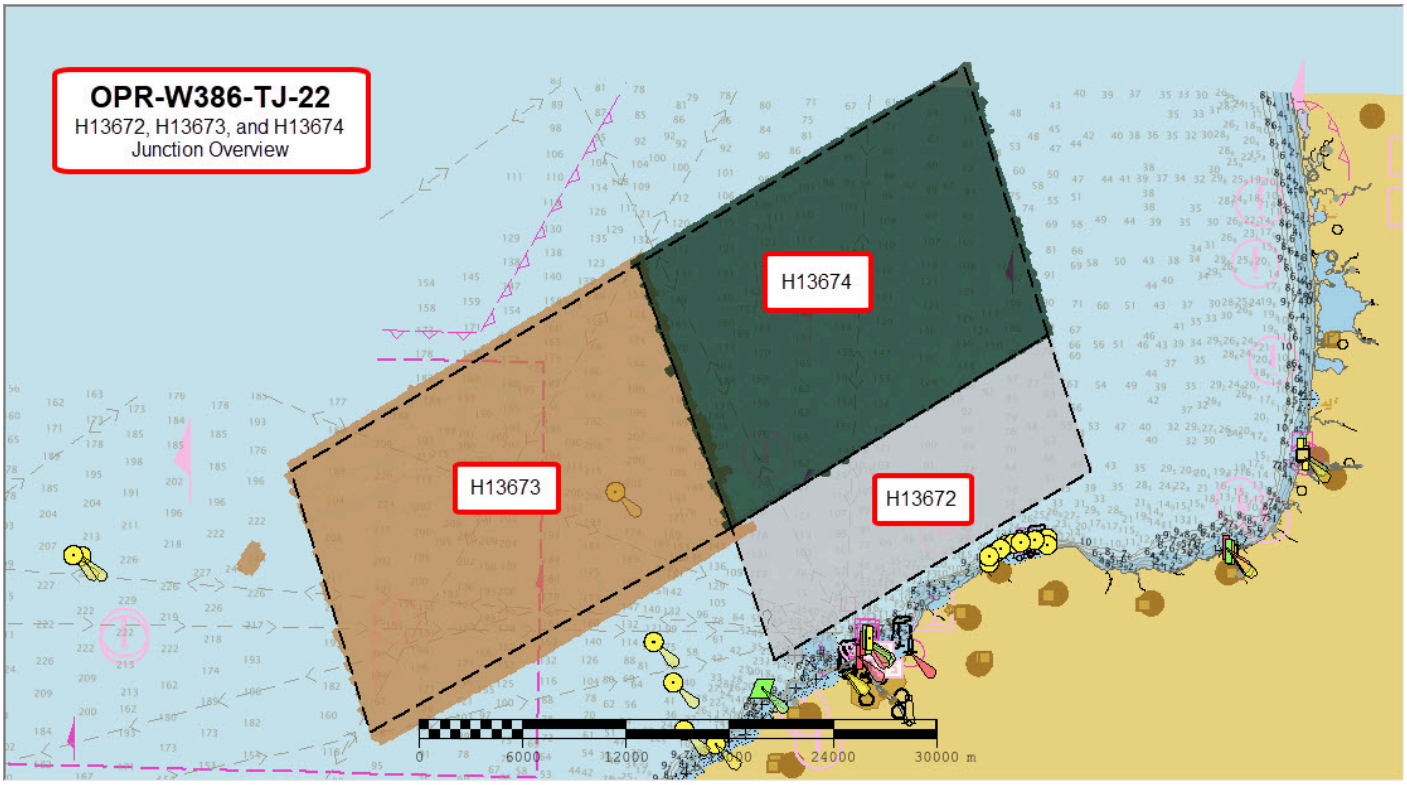


Figure 10: Overview of the contemporary survey junctions for H13672. Two surveys junction with this area, H13673 and H13674.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13674	1:40000	2022	NOAA Ship THOMAS JEFFERSON	N
H13673	1:40000	2022	NOAA Ship THOMAS JEFFERSON	NW

Table 9: Junctioning Surveys

H13674

Please refer to the descriptive report for OPR-W386-TJ-22 H13674 for the junction analysis.

H13673

Please refer to the descriptive report for OPR-W386-TJ-22 H13673 for the junction analysis.

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: Static conductivity, temperature, and depth (CTD) casts were conducted at the start of acquisition each day and at a minimum of one every four hours during acquisition using a MVP 200 and Sea-bird Seacat 19+ V2 CTD. Cast frequency was increased in areas where a change in surface sound speed great than two meters per second existed. All sound speed methods used are detailed in the DAPR.

A total of 27 sound speed profiles were collected as part of the acquisition of H13672 and display spatial and depth diversity (Figure 11). MVP casts on S-222 were conducted at an average interval of 90 minutes, guided by observation of the surface sound speed and targeted to deeper areas.

All sound speed methods were used as detailed in the DAPR. Five of these casts were located outside the sheet limits. One cast is 1664 meters away from the assigned survey limits, to represent the deepest part of the survey area. Sound Speed Profiles acquired are representative of the entire survey area. All sound

speed profile data were concatenated into a master file for the sheet. MBES data were corrected by applying profiles nearest in distance in time (4 hours) using this master file.

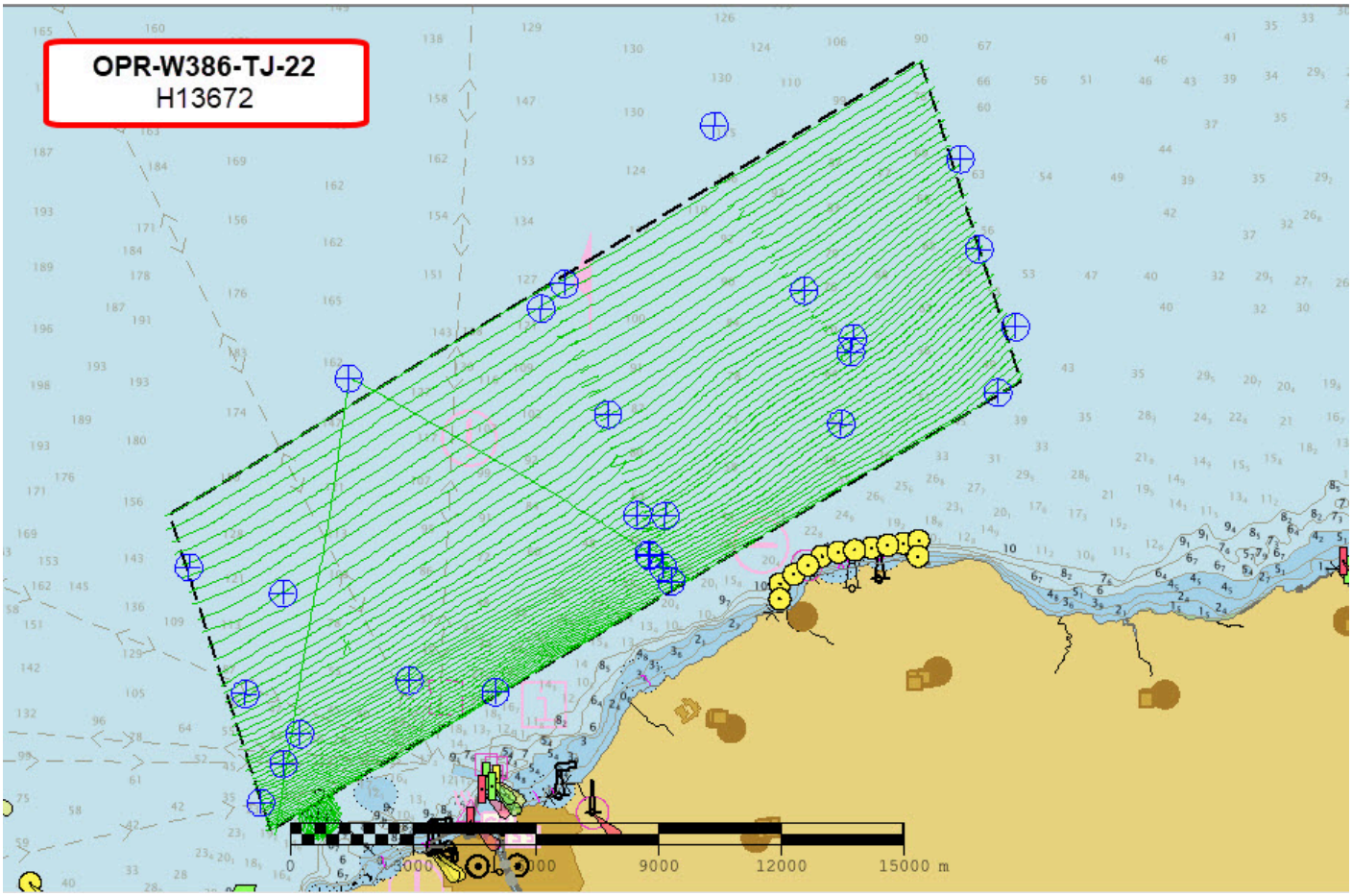


Figure 11: Overview of all sound speed casts collected on H13672 on chart US4NY22M. Cast locations shown as blue targets overlaid on survey tracklines.

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

All equipment and survey methods were used as detailed in the DAPR. Raw MBES backscatter was logged as part of the .all file of the Kongsberg EM2040 systems acquired by 2903, 2904, and S-222. Backscatter was processed in QPS Fledermaus GeoCoder Toolbox (FMGT) software, and exported geotiff's are included in the final processed data package (Figure 12)

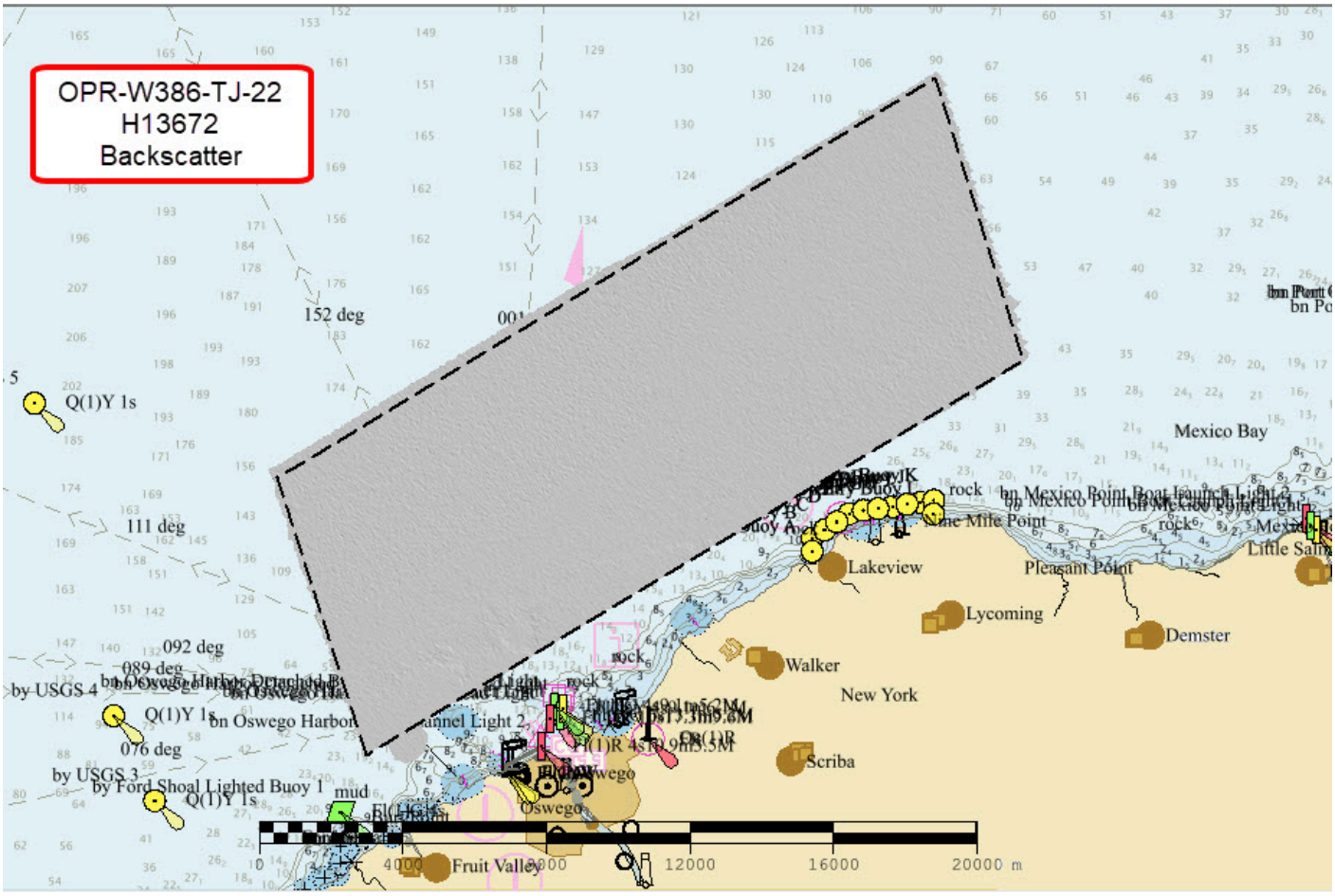


Figure 12: 200 kHz backscatter mosaic from data acquired by 2903, 2904, and S-222.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: NOAA Profile Verison 2022.

Feature Object Catalog NOAA Profile Version 2022 was used for all S-57 attribution in the Final Feature File (FFF). All other software used is as detailed in the DAPR.

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
H13672_MB_VR_LWD	CARIS VR Surface (CUBE)	Variable Resolution	8.4 meters - 156.4 meters	NOAA_VR	Complete MBES
H13672_MB_VR_LWD_Final	CARIS VR Surface (CUBE)	Variable Resolution	8.4 meters - 156.4 meters	NOAA_VR	Complete MBES
H13672_MBAB_2m_2903_300kHz_1of4	MB Backscatter Mosaic	2 meters	-	N/A	Complete MBES
H13672_MBAB_2m_2903_400kHz_2of4	MB Backscatter Mosaic	2 meters	-	N/A	Complete MBES
H13672_MBAB_2m_2904_300kHz_3of4	MB Backscatter Mosaic	2 meters	-	N/A	Complete MBES
H13672_MBAB_2m_S222_300kHz_4of4	MB Backscatter Mosaic	2 meters	-	N/A	Complete MBES

Table 10: Submitted Surfaces

H13672_MB_VR_LWD_Final uncertainty layer is resolved from the maximum H13672_MB_VR_LWD nodal TVU uncertainty values. Complete Coverage requirements were met by 100% Multibeam Beam Echo Sounder (MBES) coverage as specified under section 5.2.2.2 of the 2022 HSSD. There are no holidays present in the coverage achieved. All bathymetric grids for H13672 meet density requirements per the 2022 HSSD (Figure 13).

At the south eastern corner of this survey, there was an unverified charted feature outside the sheet limits that the field unit had time to acquire a complete coverage search area for (Figure 14). There are no holidays or coverage gaps in this survey.

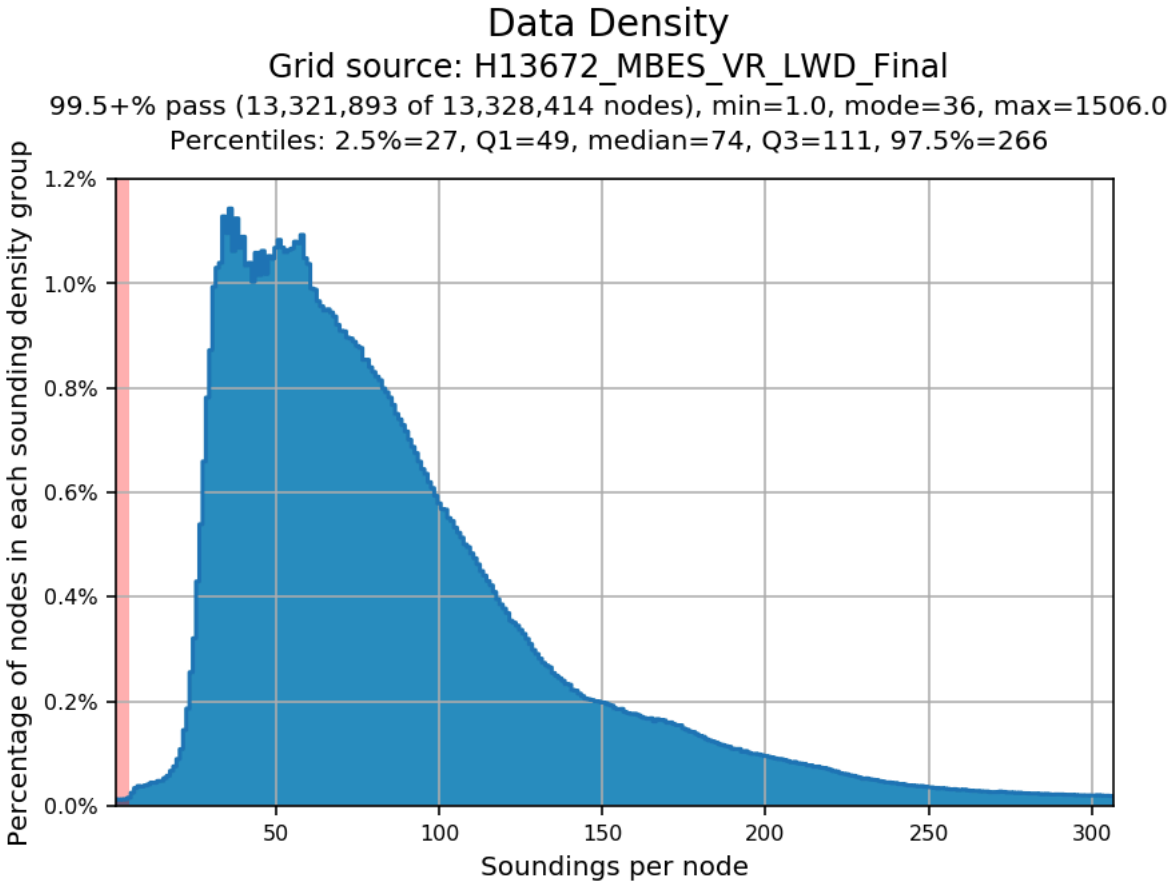


Figure 13: H13672 Data Density.

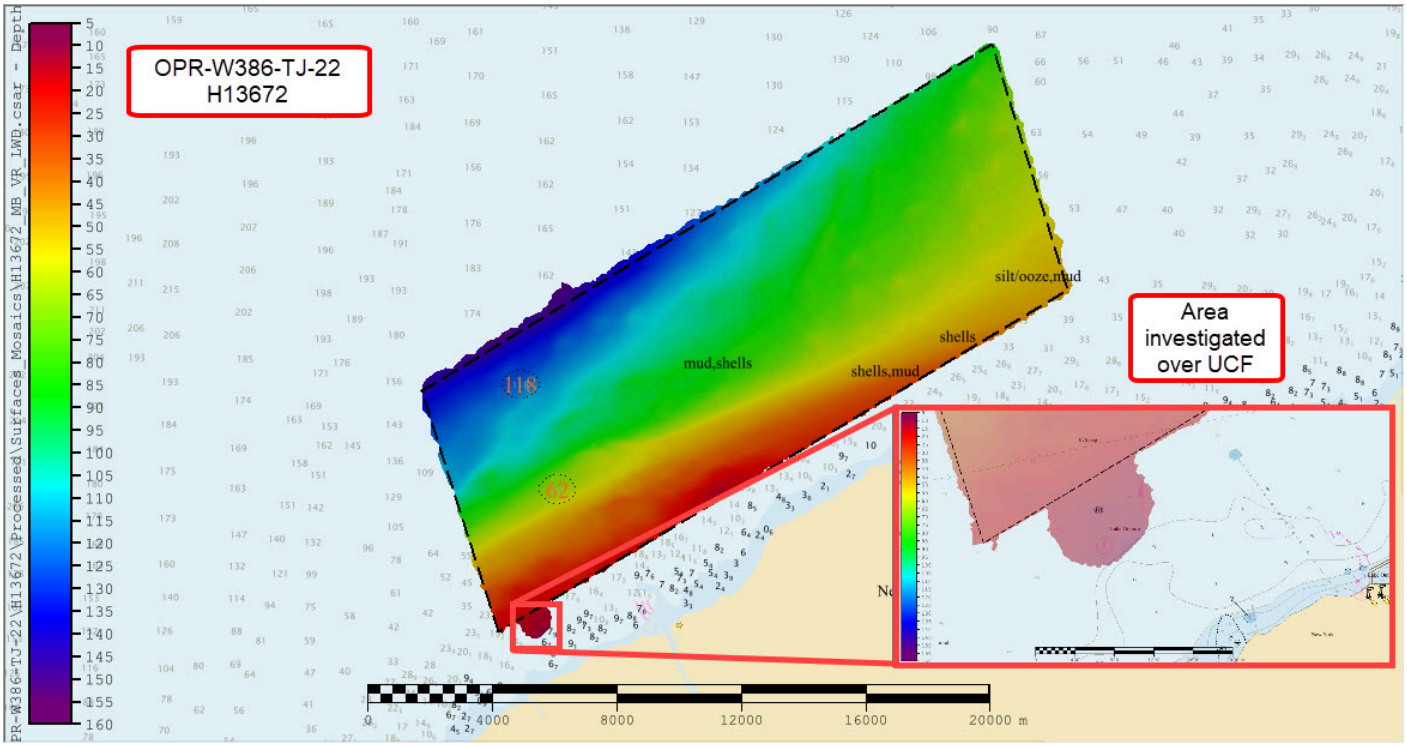


Figure 14: Overview of Unverified Charted Feature investigated outside assigned survey sheet limits.

C. Vertical and Horizontal Control

Field installed tide and GPS stations were not utilized for this survey. There is no HVCR report included with the submission of H13672.

C.1 Vertical Control

The vertical datum for this project is Low Water Datum IGLD-1985.

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	OPR-W386-TJ-22_NAD83_2011_VDatum_LWD_IGLD85

Table 11: ERS method and SEP file

All soundings submitted for H13672 are reduced to LWD IGLD-85 using VDatum techniques as outlined in the DAPR.

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.

RTK

Trimble PP-RTX service was used with an Applanix POS MV v5 system and POSPac MMS software for ERS control in accordance with the 2022 HSSD for H13672 MBES data from S-222, 2903, and 2904.

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

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
US4NY22M	1:80000	120	06/15/2021	06/15/2021

Table 12: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

Surveyed soundings and contours were compared against previously charted data on ENC US4NY22M. Depth values were found to be in general agreement with previously charted soundings. The hydrographer believes the surveyed soundings do not pose a hazard to navigation.

Two newly discovered features are included in the FFF and none were considered to be navigational hazards. No danger of navigation reports were submitted for this survey. All data acquired on H13672 are recommended to supersede prior data.

D.1.3 Charted Features

No features were assigned for investigation within this survey area. Three features and four bottom samples make up the final feature file submitted with this survey, including a Unverified Charted Feature (UCF) outside the survey sheet limits.

D.1.4 Uncharted Features

Two uncharted features were identified and investigated. Neither of the features were considered dangerous to navigation. Reference the FFF included with the submission of this project for further information.

D.1.5 Channels

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

D.2 Additional Results

D.2.1 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey. An uncharted weather buoy within the survey area was reported to the USCG during field acquisition and reported as a navigational hazard. The USCG corrected the issue during field acquisition and the weather buoy is no longer a hazard.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

Five Bottom Samples were assigned in the OPR-W386-TJ-22 Project Reference File (PRF). Four bottom samples were collected, investigated, and are included in the FFF (Figure 15 and 16). Acquisition of the fifth sample was attempted three times, but produced no result.

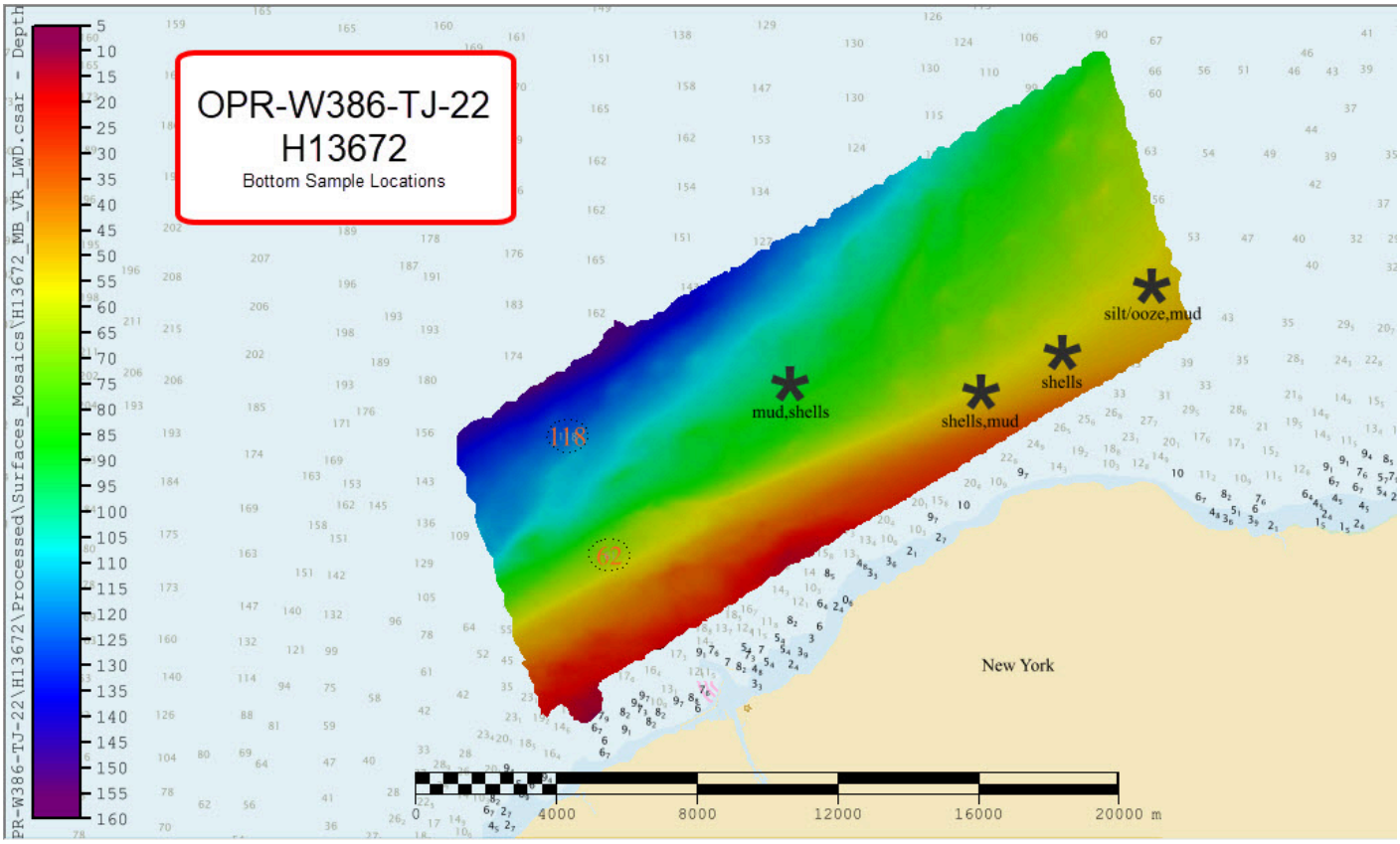


Figure 15: Approximate bottom sample collection locations for H13672.

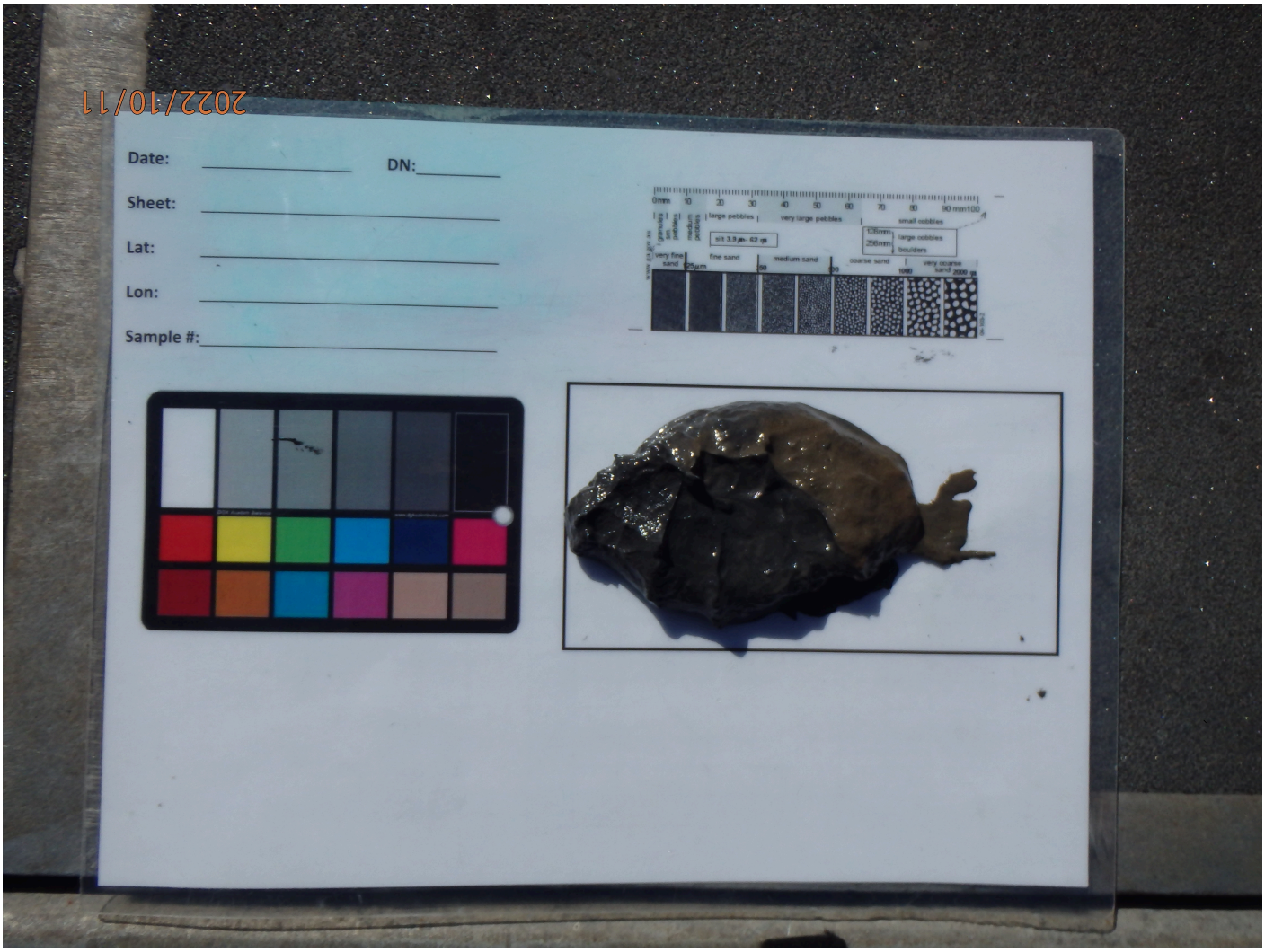


Figure 16: Example of a bottom sample collected in the H13672 survey area.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendations

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

D.2.11 ENC Scale Recommendations

No new ENC scales are recommended for this area.

E. Approval Sheet

As Chief of Party, field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys Specifications and Deliverables, Field Procedures Manual, Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Approver Name	Approver Title	Approval Date	Signature
Matthew J. Jaskoski, CDR/NOAA	Chief of Party	01/09/2023	JASKOSKI.MATTHEW.JACOB.1275636262 2023.01.10 09:09:14 -05'00'
Michelle M. Levano, LT/NOAA	Field Operations Officer	01/09/2023	Digitally signed by LEVANO.MICHELLE.MARIE.1516645888 Date: 2023.01.09 15:15:08 -05'00'
Erin K. Cziraki	Chief Survey Technician	01/09/2023	CZIRAKI.ERIN.KAYE.1550015338 Digitally signed by CZIRAKI.ERIN.KAYE.1550015338 Date: 2023.01.09 21:19:16 -05'00'

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