

W00593

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: W00593

LOCALITY

State(s): Maine

General Locality: Gulf of Maine

Sub-locality: Matinicus Roads

2020

CHIEF OF PARTY
Benjamin Kraun

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

W00593

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): **Maine**

General Locality: **Gulf of Maine**

Sub-Locality: **Matinicus Roads**

Scale: **20000**

Dates of Survey: **07/06/2020 to 09/10/2020**

Instructions Dated: **N/A**

Project Number: **ESD-AHB-21**

Field Unit: **State of Maine**

Chief of Party: **Benjamin Kraun**

Soundings by: **Kongsberg Maritime EM 2040C (MBES)**

Imagery by: **N/A**

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.

DESCRIPTIVE REPORT MEMO

January 17, 2023

MEMORANDUM FOR: Atlantic Hydrographic Branch

FROM: Report prepared by AHB on behalf of field unit; Benjamin Kraun, Project Hydrographer, Contractor to the State of Maine Coastal Program

SUBJECT: Submission of Survey W00593

This survey was conducted by the Maine Coastal Program's Maine Coastal Mapping Initiative (MCMI) as part of a multi-agency cooperative agreement to help inform policy decision-making related to Maine's coastal waters by increasing the volume of high quality bathymetric data sets.

The following final deliverables for MCD and NCEI Archival were created during the HDR: survey outline, MLLW BAGs, 4-meter GeoTiff, and GeoImage PDF.

All soundings were reduced to Mean Lower Low Water using TCARI. 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.

There is no DAPR for this survey.

All data were reviewed for DTONs and none were identified in this survey.

Maine Coastal Program acquired the data outlined in this report. Additional documentation from the data provider may be attached to this report.

This survey does meet charting specifications and is adequate to supersede prior data.

2020 Descriptive Report of Seafloor Mapping: Vicinity of Casco Bay, Mid-coast Maine, Vicinity of Matinicus Island

Chief of Party – Benjamin Kraun, Project Hydrographer, Contractor to the Maine Coastal Program

Program Manager – Claire Enterline, Research Coordinator, Maine Coastal Program



Maine Coastal Mapping Initiative, May 2021

Disclaimer

These data and information published herein are accurate to the best of our knowledge. Data synthesis, summaries and related conclusions may be subject to change as additional data are collected and evaluated. While the Maine Coastal Program makes every effort to provide useful and accurate information, investigations are site-specific and (where relevant) results and/or conclusions do not necessarily apply to other regions. The Maine Coastal Program does not endorse conclusions based on subsequent use of the data by individuals not under their employment. The Maine Coastal Program disclaims any liability, incurred as a consequence, directly or indirectly, resulting from the use and application of any of the data and reports produced by staff. Any use of trade names is for descriptive purposes only and does not imply endorsement by The State of Maine.

For an overview of the Maine Coastal Mapping Initiative (MCMI) information products, including maps, data, imagery, and reports visit: <https://www.maine.gov/dmr/mcp/planning/mcmi/index.htm>.

Acknowledgements

The Maine Coastal Mapping Initiative would like to acknowledge the efforts of the University of Maine sediment laboratory personnel, Hodgdon Vessel Services, and Maine Coastal Mapping Initiative team for contributing to the success of the 2020 survey season. The individual contributions made by many were an integral part of sampling, analysis, and synthesis of data collected for this project. Funding for this study was provided by provided by the National Oceanic and Atmospheric Administration Office of Coastal Management (award numbers NA18NOS4190097, NA18NOS4190097) the Maine Department of Marine Resources Bureau of Science, The Nature Conservancy, Maine Inland Fisheries & Wildlife and the State Wildlife Grant Program, and the Maine Outdoor Heritage Fund.

Maine Coastal Mapping Initiative
Maine Coastal Program
Department of Marine Resources

DESCRIPTIVE REPORT

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LOCALITY

State(s): Maine

General Locality: Gulf of Maine

Sub-Localities: Vicinity of Casco Bay, Mid-coast Maine,
Vicinity of Matinicus Island

2020

CHIEF OF PARTY

Benjamin Kraun, Hydrographer, Contractor to the State of Maine

LIBRARY & ARCHIVES

Date:

MAINE COASTAL MAPPING INITIATIVE MAINE COASTAL PROGRAM	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	
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):	Maine
General Locality:	Gulf of Maine
Sub-Locality:	Vicinity of Casco Bay, Mid-coast Maine, Vicinity of Matinicus Island
Scale:	
Dates of Survey:	04/15/2020 to 11/19/2020
Instructions Dated:	
Project Number:	
Field Unit:	<i>Amy Gale</i>
Chief of Party:	Benjamin Kraun, Hydrographer, Contractor to the State of Maine
Soundings by:	Multibeam Echo Sounder
Imagery by:	Multibeam Echo Sounder Backscatter
Verification by:	
Soundings in:	meters at Mean Lower Low Water
Remarks:	

Table of Contents

Acknowledgements.....	iii
ABSTRACT.....	1
1.0 Area Surveyed.....	2
1.1 Survey Purpose	7
1.2 Survey Quality	8
1.3 Survey Coverage.....	8
2.0 Data Acquisition	8
2.1 Survey Vessel.....	8
2.2 Acquisition Systems.....	9
2.3 Vessel Configuration Parameters.....	9
2.4 Survey Operations.....	11
2.5 Survey Planning	12
2.6 Calibrations	12
3.0 Quality Control	12
3.1 Crosslines.....	12
3.2 Junctions	12
3.3 Equipment Effectiveness.....	19
3.4 Sound Speed Methods.....	19
4.0 Data Post-processing.....	19
4.1 Horizontal Datum.....	19
4.2 Vertical Datum and Water Level Corrections.....	19
4.3 Processing Workflow.....	20
4.4 Final Surfaces.....	21
4.5 Backscatter	22
5.0 Results.....	27
5.1 Charts Comparison.....	27
5.2 Uncharted Features	37
5.3 Bottom Samples	38
6.0 Summary	41
References.....	42
Appendix A – Specific dates of data acquisition for surveys	43

Appendix B – 2020 Configuration settings for Seapath 330	44
Appendix C – Template database settings in Qinsy (for acquisition).....	69
Appendix D – Configuration settings for Qinsy EM controller.....	97

Suggested citation:

Kraun, B.S., 2021. 2020 Descriptive report of seafloor mapping: vicinity of Casco Bay, mid-coast Maine, vicinity of Matinicus Island. Maine Coastal Mapping Initiative, Maine Coastal Program, West Boothbay Harbor, ME. 99 p.

ABSTRACT

During the survey season (April - November) of 2020 the Maine Coastal Mapping Initiative (MCMI) conducted hydrographic surveying using a multibeam echosounder (MBES) in the waters off Casco Bay, mid-coast Maine, and Penobscot Bay, Maine. The surveying was conducted in part to support the Maine Department of Marine Resources' (DMR) efforts to enhance coastal resiliency through identification, characterization, and protection of fisheries critical to the state's marine environment and economy. The surveys also coincide with state and federal efforts to update coastal data sets and increase high resolution bathymetric coverage for Maine's coastal waters. A total of approximately 45 mi² (117 km²) of high-resolution multibeam data were collected. 39 mi² (101 km²) were collected in the "mainscheme" area of federal (18 mi²) and state (21 mi²) coastal marine waters. Approximately 6 mi² (16 km²) were collected in nearshore waters for the purposes of assessing nearshore and riverine sand movement. During the 2020 survey season the MCMI also collected sediment samples, water column data, and video in 42 locations, 30 samples of which coincide with areas summarized in this report.

1.0 Area Surveyed

The 2020 mainscheme survey areas were located off Maine's southern and mid-coast regions in the Gulf of Maine, with sub-localities of the vicinity of Casco Bay, west of Monhegan Island, west of Matinicus Island, and sections of the Sheepscot River and Back River, Maine as shown in Figures 1 through 5. The approximately 45 mi² (117 km²) combined survey areas adjoin the eastern and northeastern extents of the areas mapped by MCFI in 2017 and 2019 (2017 MCFI data accepted by NOAA, who lists the surveys as W00450) as well as the southern extent of NOAA survey H12477 (mapped in 2012 by Williamson & Associates, Inc. in 2012) (Figures 9-12). These data were not collected in direct accordance with the *NOS Hydrographic Surveys Specifications and Deliverables* and the *Field Procedures Manual* requirements; however, both documents were referenced during acquisition for guidance.

Survey limits of each main sub-locality are listed in Table 1. Specific dates of data acquisition for the mainscheme survey are listed in Appendix A.

Table 1 – 2020 mainscheme survey limits

Casco Bay

Southwest Limit	Northeast Limit
43° 29' 13" N	43° 33' 13" N
69° 59' 5" W	69° 50' 38" W

Mid-coast Region, Inshore

Southwest Limit	Northeast Limit
43° 50' 57" N	44° 0' 4" N
69° 43' 57" W	69° 39' 32" W

Monhegan Island

Southwest Limit	Northeast Limit
43° 43' 59" N	43° 47' 52" N
69° 23' 3" W	69° 19' 55" W

Matinicus Island

Southeast Limit	Northwest Limit
43° 49' 27" N	43° 53' 5" N
68° 53' 53" W	68° 57' 30" W

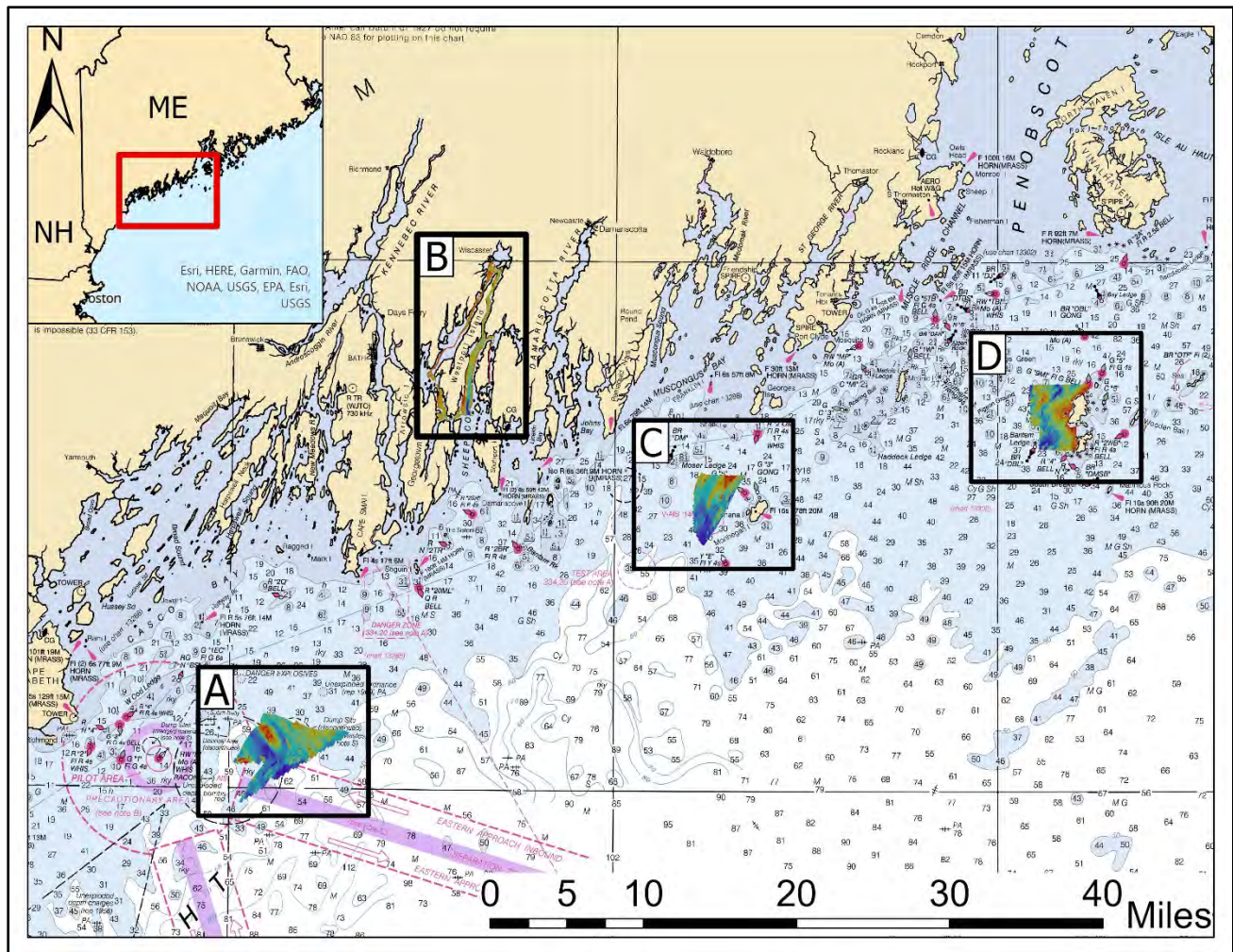


Figure 1 – General localities of 2020 mainscheme and inshore survey coverage off southern, mid-coast, and Penobscot Bay, Maine.

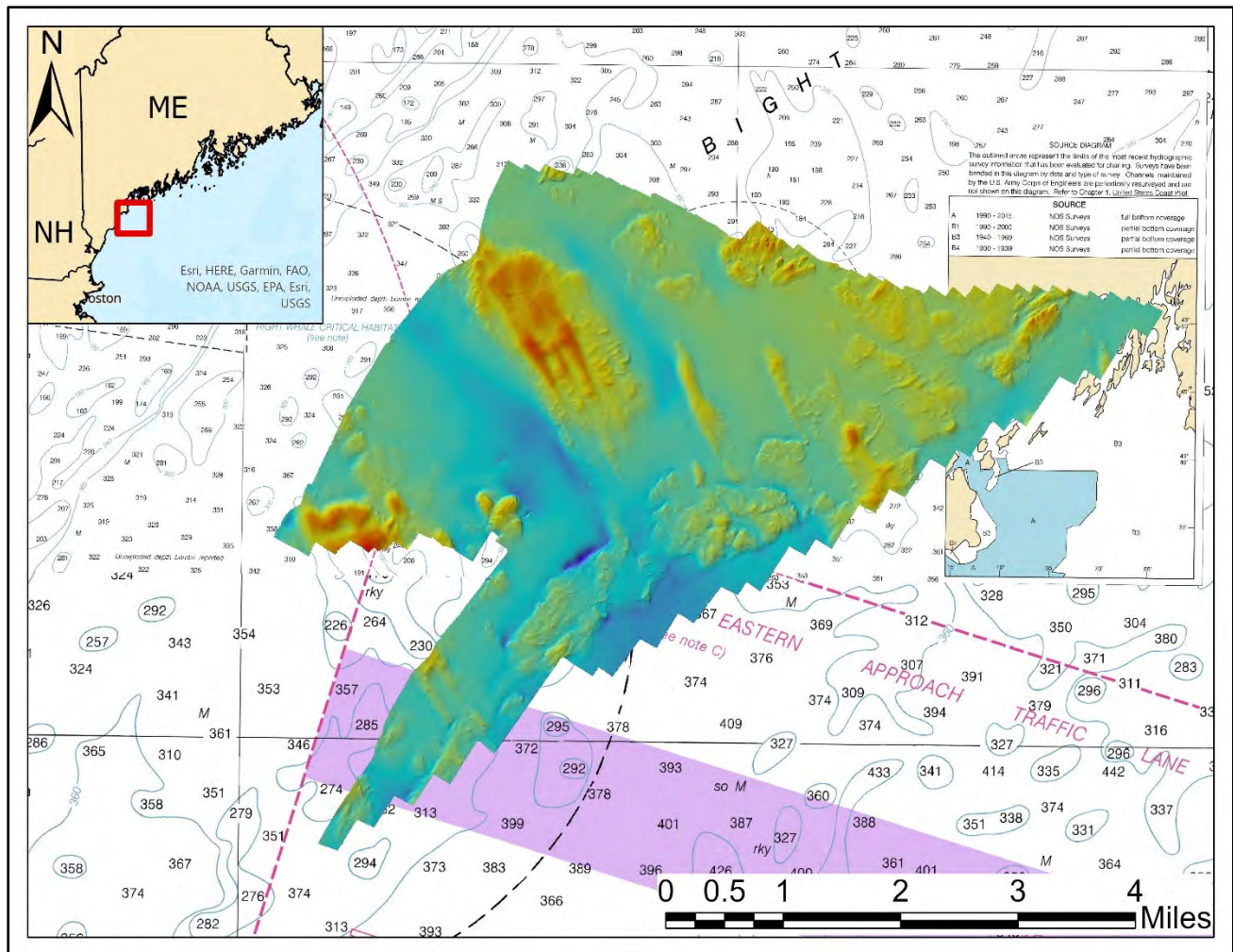


Figure 2 – General locality of survey coverage off Casco Bay, Maine, shown in box A in figure 1. Shaded relief bathymetry is overlain on NOAA nautical chart 13290.

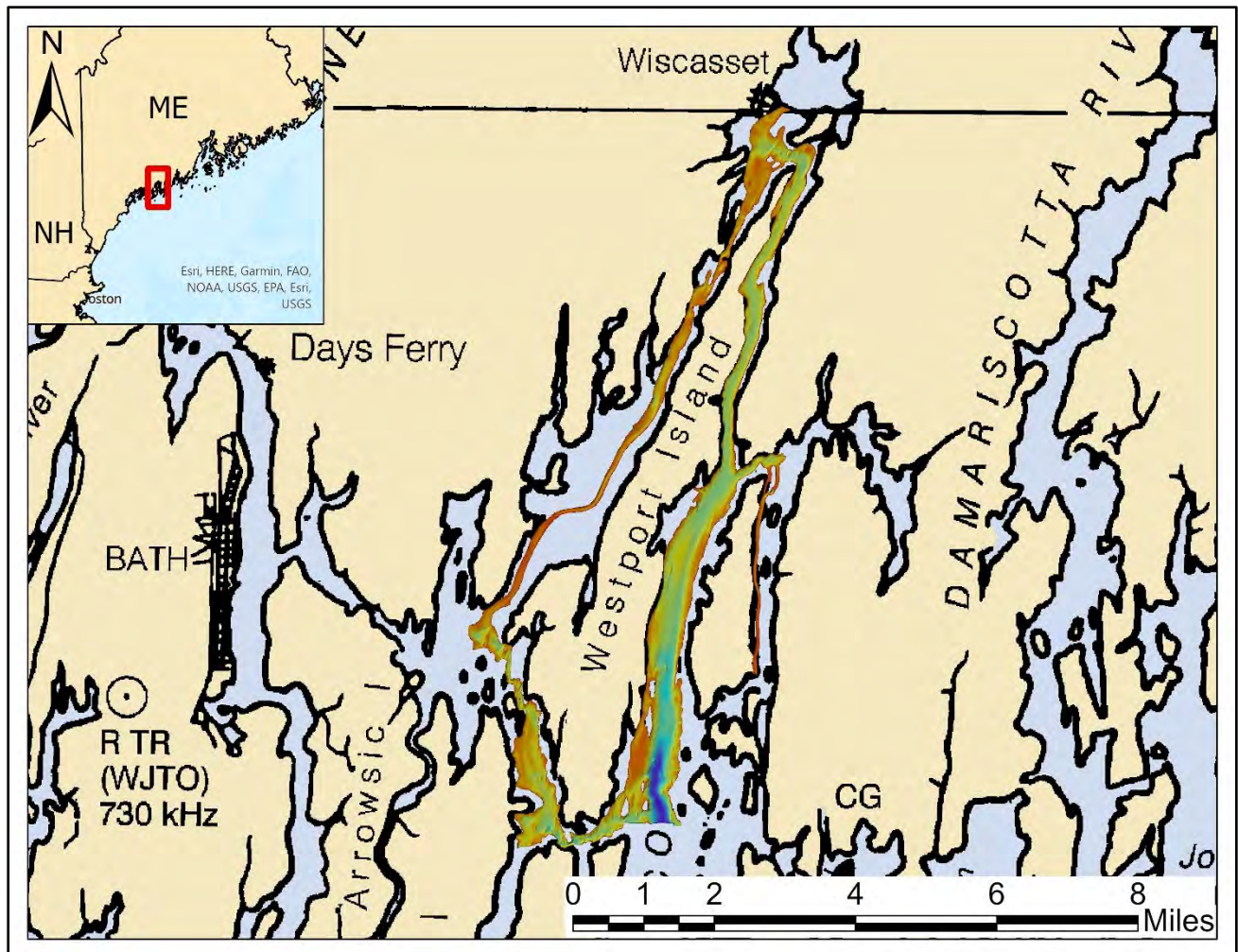


Figure 3 – General locality of inshore survey coverage within sections of the Sheepscot River and Back Rivers in mid-coast Maine, shown in box B in figure 1. Shaded relief bathymetry is overlain on NOAA nautical chart 13260.

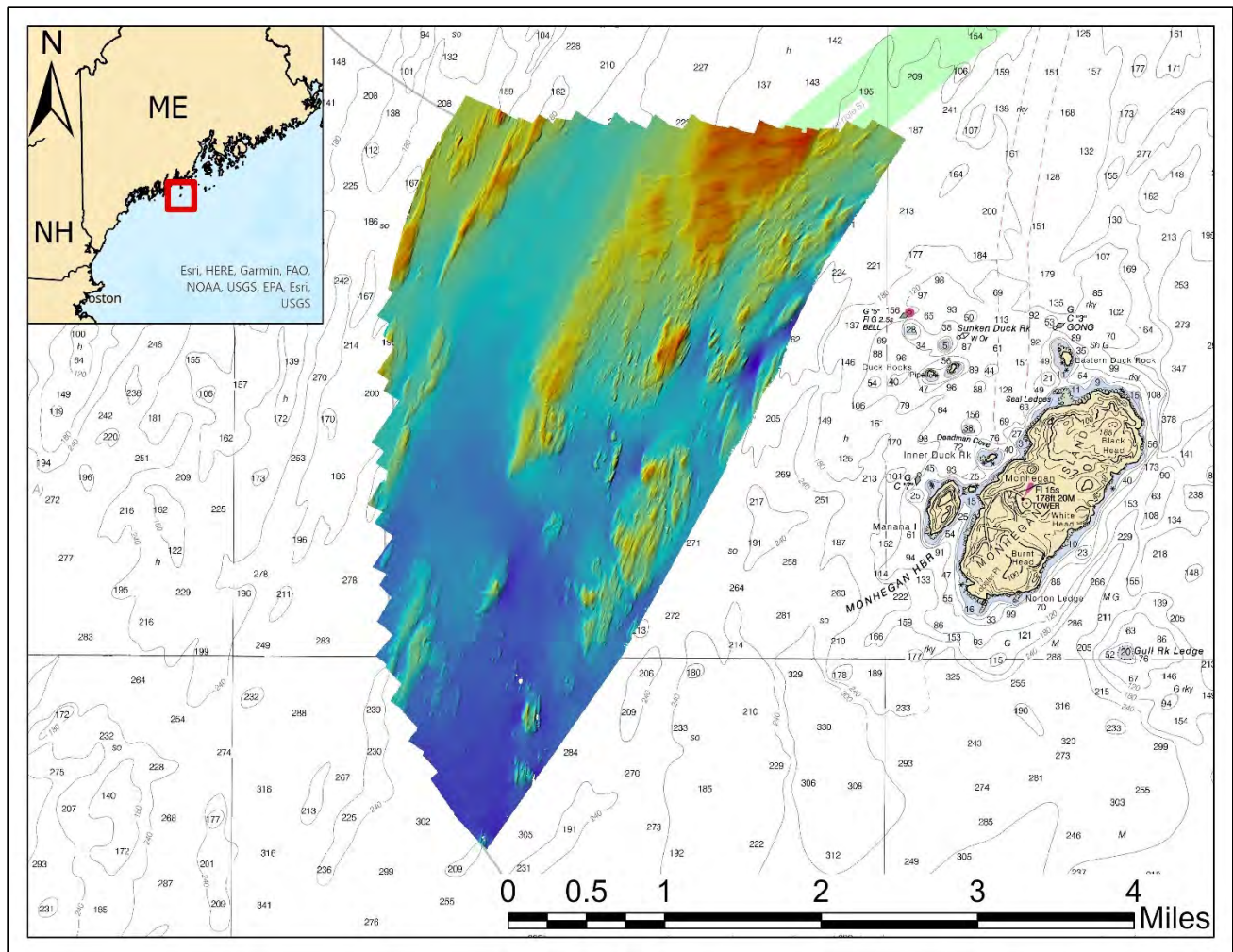


Figure 4 – General locality of survey coverage off Monhegan Island, Maine. Area is shown in box C in figure 1. Shaded relief bathymetry is overlain on NOAA nautical chart 13301.

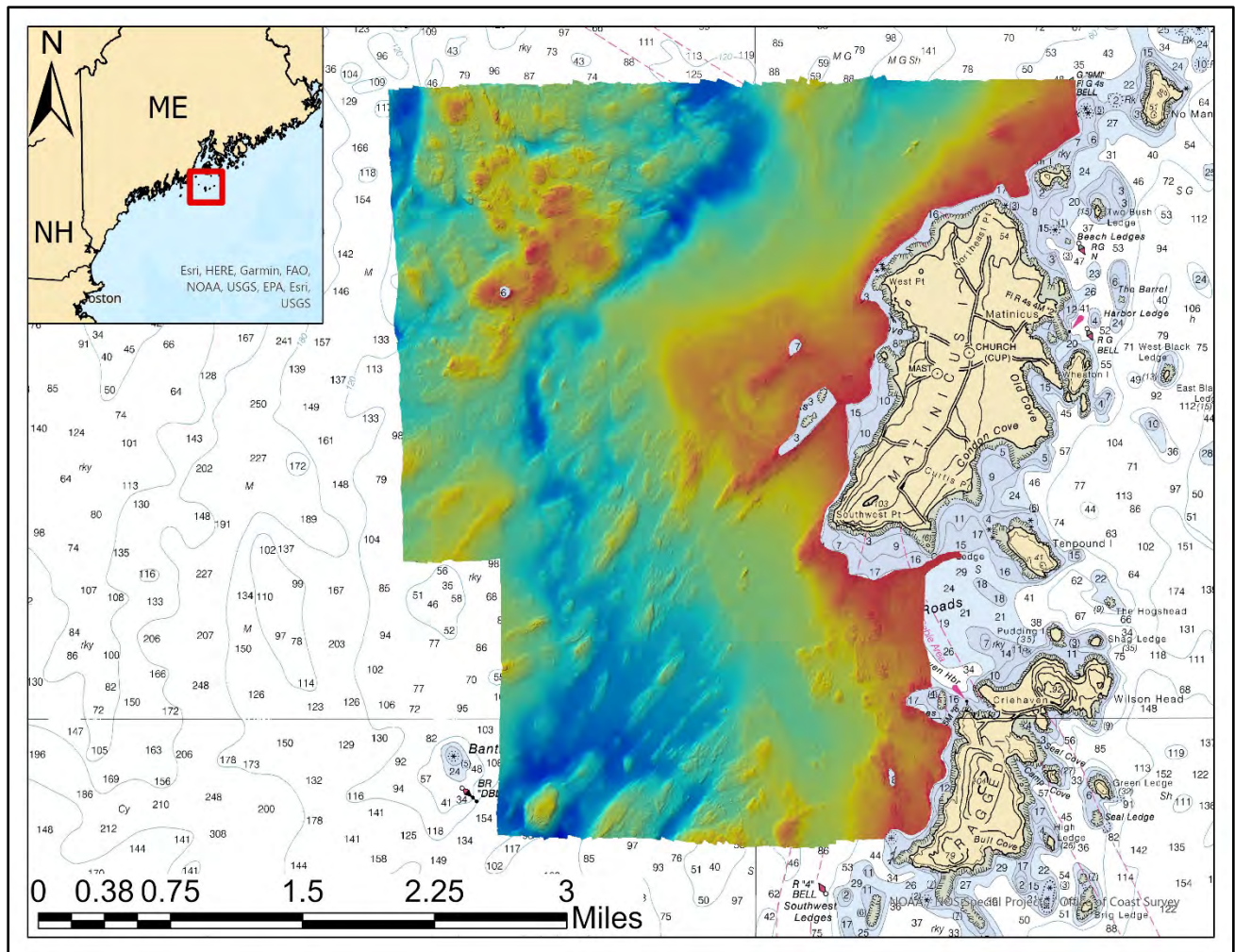


Figure 5 – General locality of survey coverage off Matinicus Island, Maine. Area is shown in box D in figure 1. Shaded relief bathymetry is overlain on NOAA nautical chart 13303.

1.1 Survey Purpose

This survey was conducted by the Maine Coastal Program’s Maine Coastal Mapping Initiative (MCMI) as part of a multi-agency cooperative agreement partially funded by the National Oceanic and Atmospheric Administration (NOAA) Office of Coastal Management, the Maine Department of Marine Resources (DMR), The Nature Conservancy (TNC), Maine Inland Fisheries & Wildlife’s State Wildlife Grant, and the Maine Outdoor Heritage Fund. The purpose of this project was to help inform policy decision-making related to Maine’s coastal waters by increasing the volume of available high-quality bathymetric, benthic habitat, geochemical, and geologic datasets as well as providing new data in the areas covered by several NOAA nautical charts: 13286, 13288, 13290, 13293, 13296, 13301, 13302, and 13303. These data were acquired and processed to meet Office of Coast Survey bathymetry standards as best as possible and were shared with the NOAA Office of Coast Survey (OCS) for review.

1.2 Survey Quality

The entire survey should be adequate to supersede previous data.

1.3 Survey Coverage

Numerous small holidays (gaps in MBES coverage) exist within the surveyed area, and normally occurred as sonic shadows in areas of locally high relief and/or highly irregular bathymetry. Analyses of bathymetric data show that the least depths were achieved over all features, and that holidays have not compromised data integrity.

2.0 Data Acquisition

The following sub-sections contain a summary of the systems, software, and general operations used for acquisition and preliminary processing during the 2020 survey season.

2.1 Survey Vessel

All data were collected aboard the Research Vessel (R/V) Amy Gale (length = 10.7 m, width = 3.81 m, draft = 0.93 m) (Figure 6), a former lobster boat converted to a survey vessel and contracted to the MCMI. The vessel was captained by Caleb Hodgdon of Hodgdon Vessel Services. Surveys were based out of ports in Boothbay Harbor and South Portland, ME. The EM2040C transducer, motion reference unit (MRU), AML MicroX surface sound speed probe, and dual GNSS antennas were pole-mounted to the bow; pole raised (for transit) and lowered (for survey) via a pivot point at the edge of the bow. The main cabin of the vessel served as the data collection center and was outfitted with four display monitors for real time visualization of data during acquisition.



Figure 6 – R/V Amy Gale shown with pole-mounted dual GPS antennas, Kongsberg EM2040C multibeam sonar, MRU (not visible), and surface sound speed probe (not visible) in acquisition mode

2.2 Acquisition Systems

The real-time acquisition systems used aboard the R/V Amy Gale during the 2020 surveys are outlined in Table 2. Data acquisition was performed using the Quality Positioning Services (QPS) Qinsy (Quality Integrated Navigation System; v.8.18.2 to start season and v.9.2.2 later) acquisition software. The modules within Qinsy integrated all systems and were used for real-time navigation, survey line planning, data time tagging, data logging, and visualization.

Table 2 – Major systems used aboard R/V Amy Gale

Sub-system	Components
Multibeam Sonar	Kongsberg EM2040C and processing unit
Position, Attitude, and Heading Sensor	Seapath 330 processing unit, HMI unit, dual GPS/GLONASS antennas, MRU 5 motion reference unit (subsea bottle), Fugro 3610 Receiver and AD-341 antenna
Acquisition Software and Workstation	Qinsy software v.9.2.2 and 64-bit Windows 10 PC console
Surface Sound Velocity (SV) Probe	AML Micro X with SV Xchange
Sound Velocity Profiler (SVP)	Teledyne Odom Digibar S sound speed profiler
Ground-truthing/Sediment Sampling Platform	Ponar grab sampler, GoPro Hero 3+ video camera, dive light, dive lasers, YSI Exo I sonde

2.3 Vessel Configuration Parameters

In 2017, the MCMC contracted Doucet Survey, Inc. to perform high-definition (precision $\pm 5\text{mm}$) 3D laser scanning of the Amy Gale and all external MBES system components (e.g. MRU, GPS antennas, and EM2040C) (Figures 6 and 7). The purpose of the laser scan survey was to refine and or verify the precision of hand-made vessel reference frame measurements for future surveys. All points were referenced to the center point of the base of the MRU (mounted inside the pole and directly atop the EM2040C transducer) (Figure 8), which served as the origin (e.g. 0,0,0), where ‘x’ was positive forward, ‘y’ was positive starboard, and ‘z’ was positive down. The laser scan survey results only differed from hand-made measurements by $\leq 3\text{mm}$ for all nodes of interest. Reference measurements for each component were entered into the Seapath 330 Navigation Engine (Table 3) and converted so all outgoing datagrams would be relative to the location of the EM2040C transducer (e.g. EM2040C was used as the monitoring point for all outgoing datagrams being received by Qinsy during acquisition). Additional configuration and interfacing of all systems were established during the creation of a template database in the Qinsy console.

These offset values were not changed for the 2020 survey season. See appendices for specific settings as entered in the Seapath 330 Navigation Engine (Appendix B) and for the template database (Appendix C) used during data acquisition while online in Qinsy. Configuration settings of the EM2040C were assigned in the EM Controller module of Qinsy (Appendix D).

Table 3 – 2017 equipment reference frame measurements for Seapath 330

Equipment	x (m)	y (m)	z (m)
MRU	0.000	0.000	0.00
Antenna 1 (port)	0.158	-1.245	-3.000
Antenna 2 (starboard)	0.158	1.252	-3.035
EM2040C	0.036	0.000	0.133

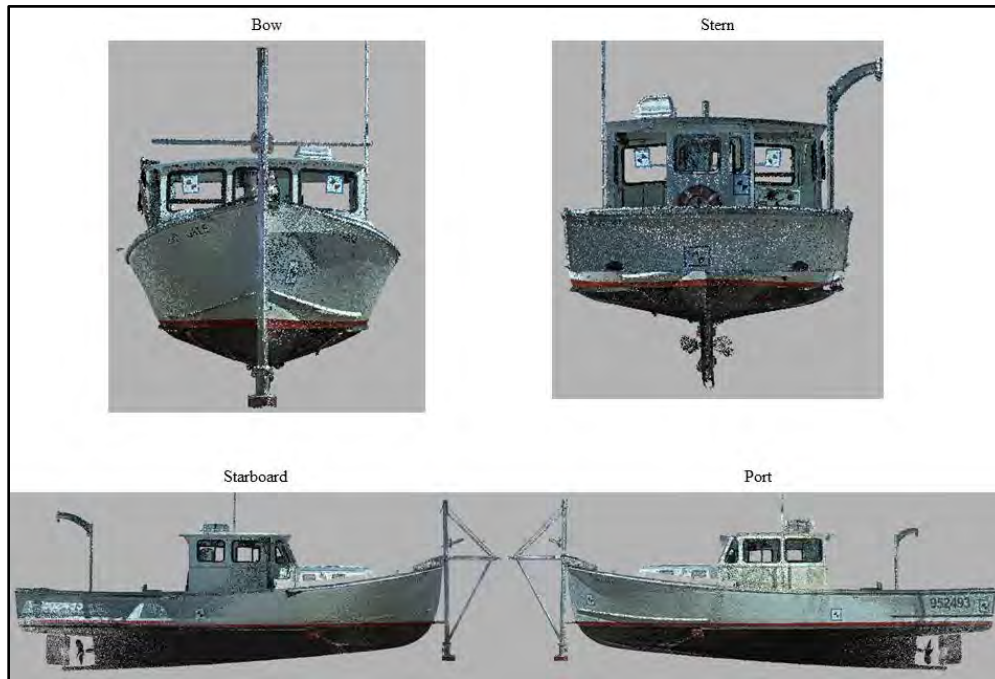


Figure 7 – Amy Gale RGB color images generated from 3D laser scan survey (GPS antennas and external cabling not included in survey) data (.pts file converted to .las for visualization)



Figure 8 – Amy Gale origin (point 201 in RGB images) for vessel reference frame(s); origin is center point within the base of the pole (center point of base within internally-mounted motion reference unit (MRU) point 201 in images above)

2.4 Survey Operations

The following is a general summary of daily survey operations. Once the survey destination was reached, the sonar pole mount was lowered into survey position and its bracing rods were fastened securely to the hull of the ship via heavy-duty ratchet straps. Electric power to all systems was provided by a 2000-watt Honda *eu2000i* generator. Occasionally two *eu2000i* generators were simultaneously used if any auxiliary equipment needed additional electricity. Immediately following power-up, all interfacing instruments were given time to stabilize (e.g. approximately 30-45 minutes for Seapath to acquire time tag for GPS). Next, the desired Qinsy project (e.g. mainscheme, inshore, etc.) was selected for data acquisition. All files (e.g. raw sonar files, sound speed profiles, grid files, etc.) were recorded and stored within their respective project subfolders on a local drive. Prior to surveying, a sound speed cast was taken and imported into the ‘imports’ folder of the current project. After confirming a close match between the upcast and downcast data, the profile was applied to the sonar (EM2040C) in the Qinsy Controller module. Data were gridded at 0.5 to 4 meters for real-time visualization, depending on expected water depth range. Raw sonar files were logged in the Qinsy Controller module in .db format and saved directly onto the hydrographic workstation computer. All data were backed up daily on an external hard drive. At the end of each day’s survey, sonar and navigation systems were powered down and the pole mount was raised and fastened for transit back to port. Upon arriving at the dock, all external instruments/hardware were visually inspected and rinsed with freshwater to prevent corrosion.

2.5 Survey Planning

Line planning and coverage requirements were designed to meet requirements for NOAA hydrographic standards (NOAA Field Procedures Manual, 2017). In the mainscheme area, parallel lines were mostly planned several days prior to surveying and run in a NE-SW or E-W pattern, depending on the location. Lines were spaced at consistent intervals to obtain a minimum of 20% overlap between full swaths. Soundings from beam angles outside of ± 60 degrees from the nadir were blocked from visualization during acquisition, thus increasing the true minimum full-swath overlap. This online blocking filter was recommended by QPS field engineers with the intent of eliminating noisy outer beams from the final product, thereby increasing the overall contribution of higher quality soundings. All data was acquired at approximately 6 - 6.5 knots, although some areas required slower speeds to ensure safe operation of the vessel around obstructions (e.g. fishing gear, docks, ledges, etc.).

2.6 Calibrations

Several patch tests were conducted aboard the R/V Amy Gale at the beginning of the 2020 survey season to correct for alignment offsets. After an initial application of patch test values data not tide-corrected, a second patch test was applied once verified tide data was available from NOAA. During the test, a series of lines were run to determine the latency, pitch, roll, and heading offset. The patch test data were processed using the Qimera (v.2.1.1) patch test tool. After calibration was complete, offsets (Tables 4) were entered into the template database in Qinsy. Full built-in self-tests (BIST) were performed at semi-regular intervals throughout the season to determine if any significant deviations in background noise were present at the chosen survey frequency of 300KHz.

Table 4 – 2020 patch test calibration offsets for EM2040C

Type	Offset
Roll (degrees)	0.332
Pitch (degrees)	0.279
Heading (degrees)	-0.181

3.0 Quality Control

3.1 Crosslines

Due to unforeseen scheduling conflicts, crosslines were not run during the 2020 field season. For other quality control information, see section 3.2 of this report regarding 2020 data junctions with past MCMI and NOAA surveys.

3.2 Junctions

The following junctions were made with this survey. The Maine Coastal Program's Mapping Initiative conducted ongoing surveys in the areas of Saco Bay and Monhegan Island aboard the R/V Amy Gale from 2018 to 2019. The areas of overlap between the 2020 survey and the 2018-2019 junction survey were evaluated for sounding agreement by performing surface (4-meter resolution) difference tests in Fledermaus (v.7.8.6, 64-bit), where the junctioning surface (2018-2019) was subtracted from the new 2020 surface. A summary of surface details is shown in Table 5. Surface difference test results are shown in Table 6. The extents of overlap

between the 2018-2019 base surface and the corresponding 2020 junction surface are illustrated in Figures 9 and 10. The surfaces used for these tests are submitted with the data in these surveys.

Survey ID W00450 was conducted by the Maine Coastal Program’s Mapping Initiative aboard the R/V Amy Gale in 2017 and accepted by NOAA. The areas of overlap between the 2020 survey and the 2017 junction survey were evaluated for sounding agreement by performing surface (4-meter resolution) difference tests in Fledermaus (v.7.8.6, 64-bit), where the junctioning surface (2017) was subtracted from the new 2020 surface. A summary of surface details is shown in Table 5. Surface difference test results are shown in Table 6. The extent of overlap between the 2017 base surface and the corresponding 2020 junction surface is illustrated in Figure 10. The surfaces used for these tests are submitted with the data in these surveys.

Survey ID W00448 was conducted by the Maine Coastal Program’s Mapping Initiative aboard the R/V Amy Gale in 2016 and accepted by NOAA. The areas of overlap between the 2020 survey and the 2016 junction survey were evaluated for sounding agreement by performing surface (2-meter resolution) difference tests in Fledermaus (v.7.8.6, 64-bit), where the junctioning surface (2016) was subtracted from the new 2020 surface. A summary of surface details is shown in Table 5. Surface difference test results are shown in Table 6. The extent of overlap between the 2016 base surface and the corresponding 2020 junction surface is illustrated in Figure 11. The surfaces used for these tests are submitted with the data in these surveys.

Survey ID H12477 was conducted by Williamson & Associates, Inc in 2012 and accepted by NOAA. The areas of overlap between the 2020 survey and the 2012 junction survey were evaluated for sounding agreement by performing surface (8-meter resolution) difference tests in Fledermaus (v.7.8.6, 64-bit), where the junctioning surface (2012) was subtracted from the new 2020 surface. A summary of surface details is shown in Table 5. Surface difference test results are shown in Table 6. The extent of overlap between the 2012 base surface and the corresponding 2020 junction surface is illustrated in Figure 12. The surfaces used for these tests are submitted with the data in these surveys.

Table 5 – 2020 Survey Junctions

Registry Number/Surface Name	Grid Resolution	Area	Year	Field Unit	Relative Location(s)
MCFI	4 meters	Casco Bay	2018-2019	R/V Amy Gale	W and S
MCFI	4 meters	Monhegan Island	2018-2019	R/V Amy Gale	W
MCFI (NOAA W00450)	4 meters	Monhegan Island	2017	R/V Amy Gale	W and N

MCMI (NOAA W00448)	2 meters	Inshore (Sheepscot River)	2016	R/V Amy Gale	S
NOAA H12477	8 meters	Matinicus Island	2012	M/V Nooit Volmaakt R/V Resolution	N

Table 6 – Summary of surface difference test results for overlapping (junction) surveys

Junction Surface ID	New (2020) Surface ID	Median (m)	Mean (m)	Std. Dev. (m)
MCMI_2018_2019_SacoBay_4m_mllw	MCMI_2020_CascoBay_4m_mllw	0.15	0.16	0.44
MCMI_2018_2019_Monhegan_4m_mllw	MCMI_2020_Monhegan_4m_mllw	-0.05	-0.06	0.25
MCMI_2017_mainscheme_4m_mllw	MCMI_2020_Monhegan_4m_mllw	-0.03	-0.04	0.65
MCMI_2016_inshore_2m_mllw	MCMI_2020_Inshore_2m_mllw	-0.01	0.04	0.46
H12477_MB_8m_MLLW_Combined	MCMI_2020_Matinicus_8m_mllw	-0.46	-0.38	0.17

Several factors are thought to contribute to the high standard deviation in several of the overlapping surveys (particularly the Monhegan Island area): poor agreement in rocky areas, filtering procedures, and survey conditions (e.g. weather and sea state). The most disagreement between surfaces was in areas with a steep, rocky seabed.

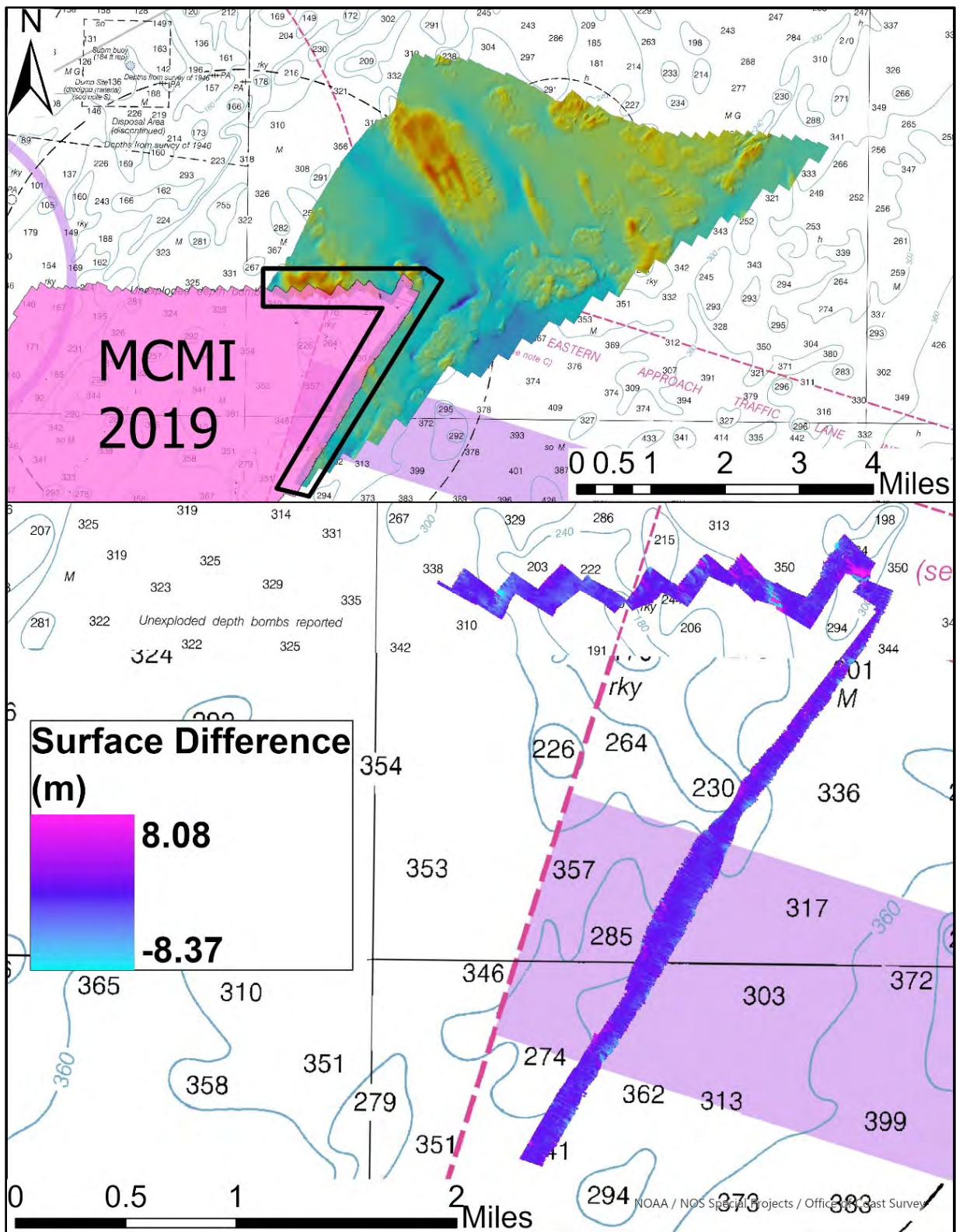


Figure 9 – Junctioning area between 2020 survey and MCMCI 2018-2019 Saco Bay survey (top pane). 4-meter surfaces shown as surface difference results in lower pane.

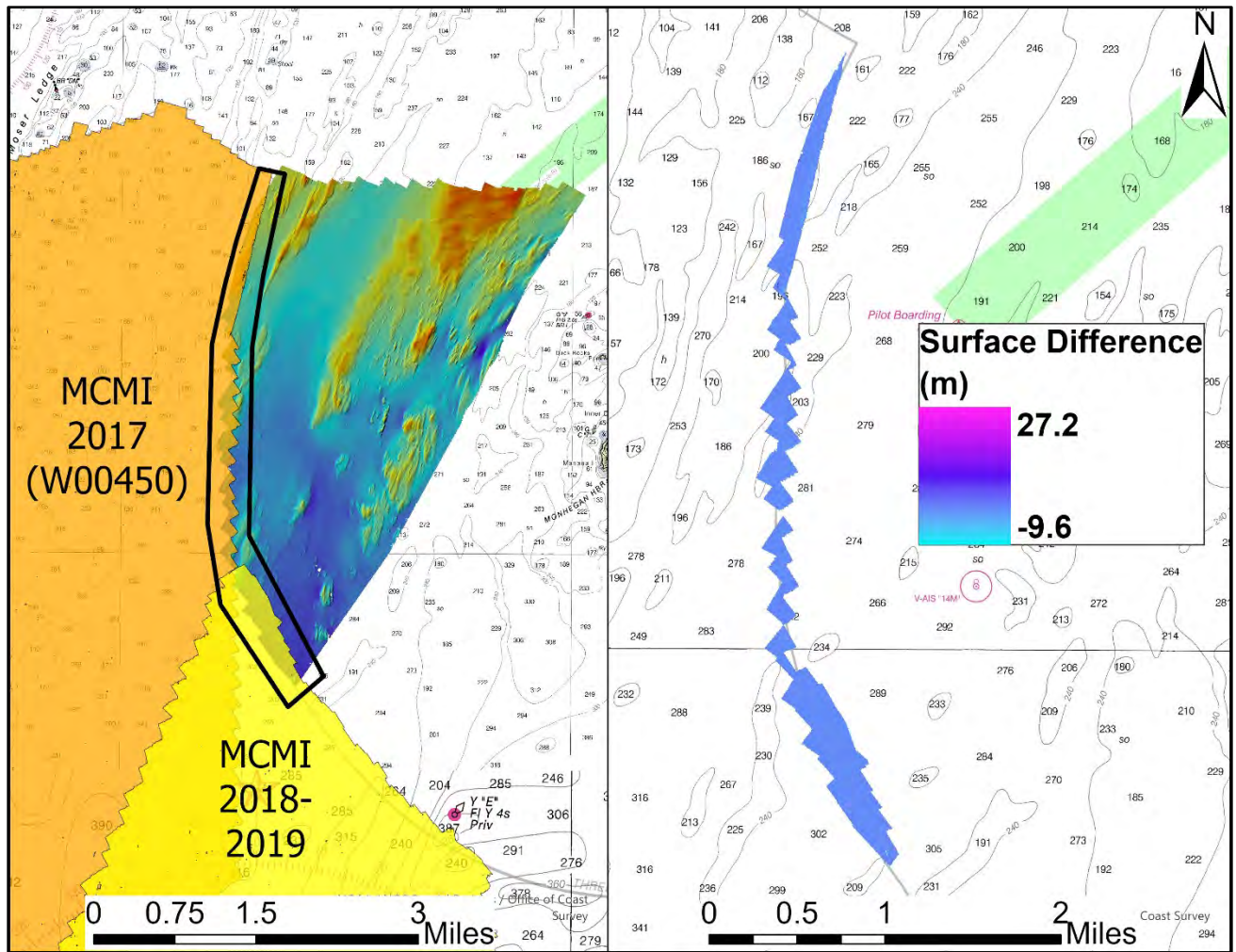


Figure 10 – Junctioning areas between 2020 survey and NOAA OCS survey W00450 (orange) and MCMCI 2018-2019 Monhegan Island survey (yellow). 4-meter surfaces shown as surface difference results in right pane.

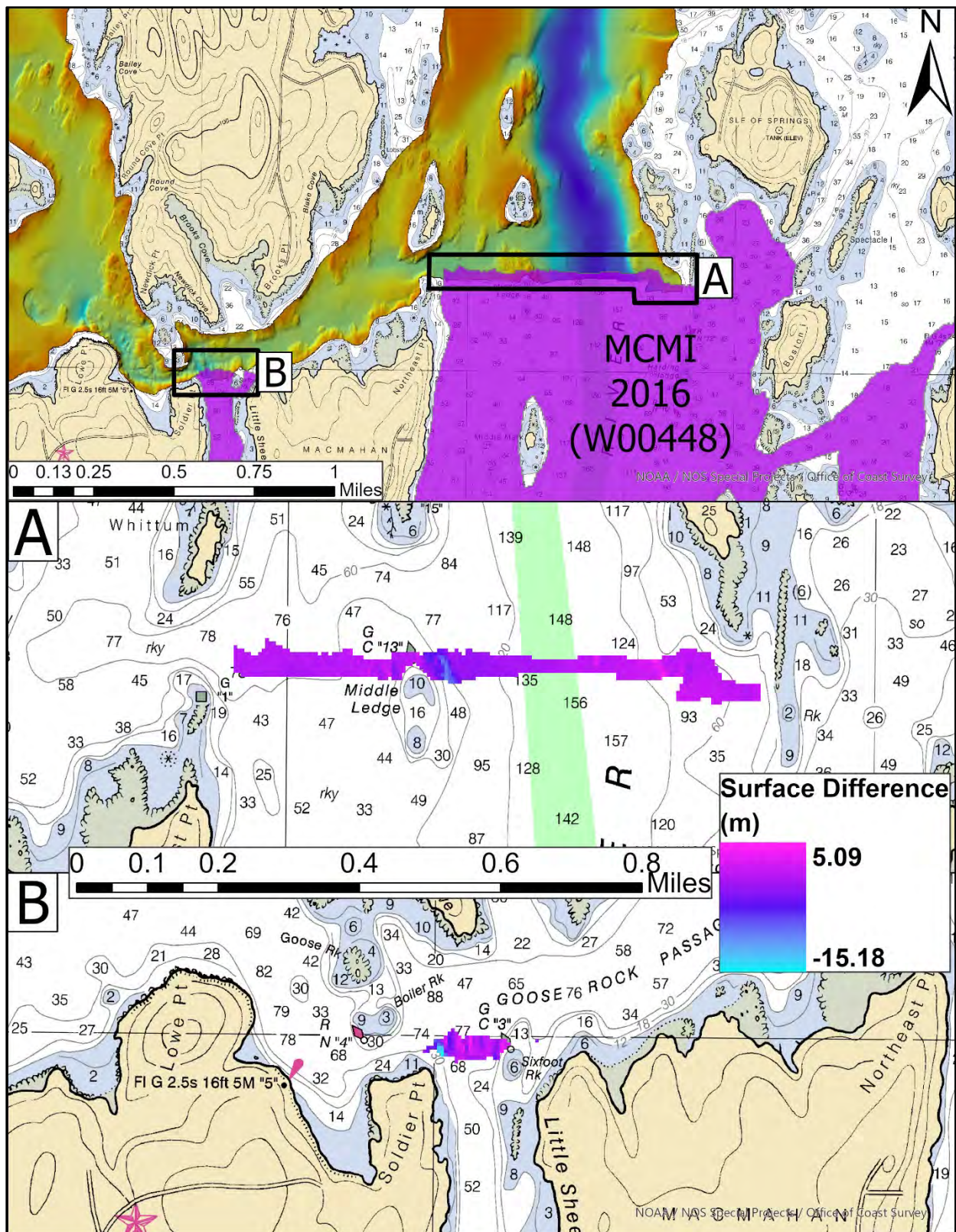


Figure 11 – Junctioning areas between 2020 survey and NOAA OCS survey W00448 (top pane). 2-meter surfaces shown as surface difference results in middle and bottom panes.

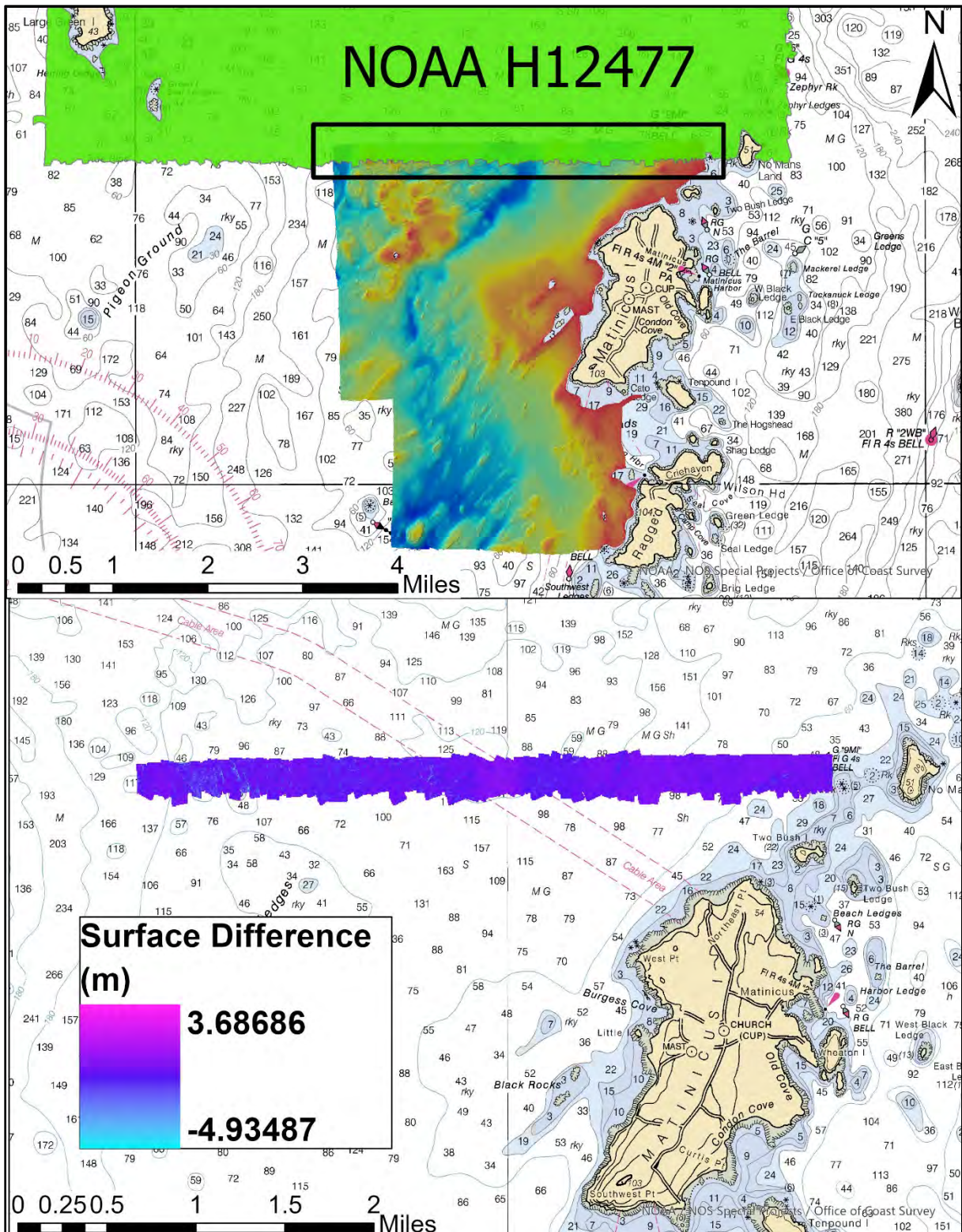


Figure 12 – Junctioning area between 2020 survey and NOAA OCS survey H12477 (top pane). 8-meter surfaces shown as surface difference results in lower pane.

3.3 Equipment Effectiveness

Sonar

Sonar data were acquired with a Kongsberg EM2040C set to a survey frequency of 300 kHz, high-density beam forming, with 400 beams per ping. Although the EM2040C allowed full swath widths at this frequency, lines from previous year's survey run at comparable depths contained considerable noise in outer beams ($> \pm 60$ degrees from the nadir as identified by QPS engineers). As a result (and as per QPS recommendation), soundings greater than ± 60 degrees from the nadir were not included in final bathymetric surfaces.

3.4 Sound Speed Methods

Sound speed cast frequency: A total of 107 sound speed casts were taken within the boundaries of the 2020 surveys. All sound speed cast measurements were collected using the Teledyne Odom Digibar S profiler. Sound speed casts were taken as needed throughout the survey, which was generally when the observed surface sound speed (monitored and visualized in real-time using the AML MicroX SV sensor) differed from the surface sound speed in the active profile by more than 2 meters per second. In certain instances, supplemental casts were taken when there was reason to suspect significant changes in the water column (e.g. change in tide, abrupt changes in seafloor relief, etc.). During the collection of sound speed casts, logging was stopped to download and apply the new cast and was resumed when the boat circled around and came back on the survey line. Throughout the duration of the survey, the surface sound speed was observed in real-time (by the AML Micro X SV probe). Although sound speed data were recorded in raw sonar files, the raw sound velocity profiles (.csv) were also submitted with the survey data.

A quality comparison between the AML Micro X SV sensor and the Teledyne Odom Digibar S profiler was not performed. However, real-time comparisons between surface sound speed observed by the AML Micro X SV and the surface sound speed entry in the Digibar S profile suggested these instruments agreed.

4.0 Data Post-processing

The following is a summary of the procedures used for post-processing and analysis of survey data using Qimera (v.2.1.1, 64-bit edition) and Fledermaus (v.7.8.6, 64-bit edition) software.

4.1 Horizontal Datum

The horizontal datum for these data is WGS 84 projected in UTM zone 19N (meters).

4.2 Vertical Datum and Water Level Corrections

The vertical datum for these data is mean lower-low water (MLLW) level in meters. A tidal zoning file ("Maine_Tide_Zoning.zdf") containing time and range corrections for verified tide station data was provided by NOAA OCS to MCMI in May 2020. This file was used to apply time corrections, tide height offsets, and tide scale (range) for collected data in each zone listed in Table 7.

Table 7 – Tide zones and corrections referenced to verified Wells, ME (8419317) and Portland, ME (8418150) tide station data

Survey Area	Tide Station	Zone ID	Time Correction (mins.)	Tide Scale
Casco Bay	8419317	NA7	-12	0.99
Monhegan Island	8418150	NA6	-6	0.96
Inshore	8418150	ME30	18	1.0
		ME31	6	0.99
		ME38	36	0.99
		ME61	6	1.0
		ME65	6	0.99
		ME70	12	0.96
		ME74	30	0.96
		ME84	6	0.96
		ME86	0	0.98
		ME96	18	0.96
Matinicus Island	8418150	NA17	-6	0.98

4.3 Processing Workflow

The general post-processing workflow in Qimera was as follows:

1. Create project
2. Add raw sonar files (e.g. metadata extracted and processed bathymetry data converted to .qpd, including vessel configuration and sound velocity)
3. Add tide zoning file (.zdf) and associated tide data and integrate into raw files
4. Create dynamic surface with NOAA CUBE settings enabled for desired resolution (e.g. 2-meter, 4 meter)
5. Review and edit soundings/clean surface with slice editor tool, 3D editor tool, and available filters
6. Duplicate surfaces at other grid sizes, if desired
7. Export final surface to .BAG file and CUBE surface
8. Export processed data in. GSF format for backscatter processing

CUBE

A CUBE (Combined Uncertainty and Bathymetry Estimator) surface was created for editing and as a starting point for final products. The corresponding NOAA cube setting (e.g. “NOAA_4m” configuration, Figure 13) was selected for each surface depending on the grid size of the surface.

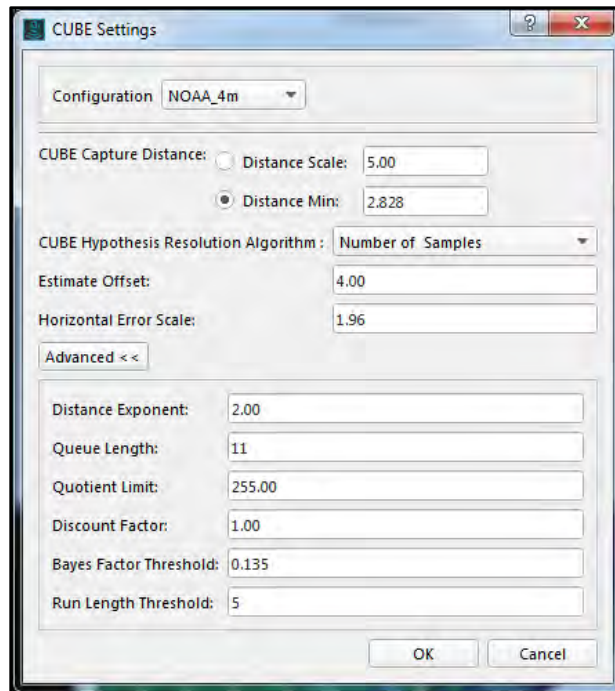


Figure 13 – CUBE settings parameters window shown with settings for NOAA 4-meter grid resolution

4.4 Final Surfaces

The following surfaces and BAGs were submitted with the survey data.

Table 8 – Surfaces submitted with 2020 survey data

Surface Name	Resolution (m)	Depth Range (m)	Surface Parameter
MCFI_2020_CascoBay_2m_mllw	2	51.8 – 134.0	N/A
MCFI_2020_CascoBay_4m_mllw	4	51.9 – 133.5	N/A
MCFI_2020_CascoBay_8m_mllw	8	52.0 – 132.8	N/A
MCFI_2020_Monhegan_2m_mllw	2	43.6 – 97.4	N/A
MCFI_2020_Monhegan_4m_mllw	4	43.7 – 97.2	N/A
MCFI_2020_Monhegan_8m_mllw	8	43.9 – 97.2	N/A
MCFI_2020_Inshore_2m_mllw	2	0.1 – 45.8	N/A

MCFI_2020_Inshore_4m_mllw	4	0.1 – 45.6	N/A
MCFI_2020_Matinicus_1mgrid_0_to_30m_clip_mllw	1	0.8 – 30.0	N/A
MCFI_2020_Matinicus_2m_mllw	2	3.0 – 56.9	N/A
MCFI_2020_Matinicus_4m_mllw	4	3.1 – 56.8	N/A
MCFI_2020_Matinicus_8m_mllw	8	3.3 – 56.7	N/A

4.5 Backscatter

Backscatter was logged in the raw .db files. The .db files also hold the navigation record and bottom detections for all lines of surveys. Processed sonar files containing multibeam backscatter data (snippets and beam-average) were exported from Qimera v.2.1.1. in .GSF format. QPS Fledermaus Geocoder Toolbox (FMGT; v.7.8.6, 64-bit edition) was used to import, process, and mosaic time-series backscatter data. Default backscatter processing settings were used to create the mosaic, except for the Angle Varied Gain (AVG) filter and AVG window size, which were set to ‘Adaptive’ and ‘100’, respectively. Backscatter mosaics of the data were gridded at 2-meter and 4-meter resolution and exported in greyscale (files ending in “gs”) and floating-point (files ending in “db”) GeoTIFF format. The mosaics are shown in Table 9 and Figures 14 through 17. The GSF files containing the extracted were submitted with the data in this survey.

Table 9 – Backscatter mosaics submitted with 2020 survey data

Mosaic Name	Pixel Size (m)
MCFI_2020_CascoBay_backscatter_2m_db	2
MCFI_2020_CascoBay_backscatter_4m_db	4
MCFI_2020_Monhegan_backscatter_2m_db	2
MCFI_2020_Monhegan_backscatter_4m_db	4
MCFI_2020_Inshore_backscatter_2m_db	2
MCFI_2020_Inshore_backscatter_4m_db	4
MCFI_2020_Matinicus_backscatter_2m_db	2
MCFI_2020_Matinicus_backscatter_4m_db	4

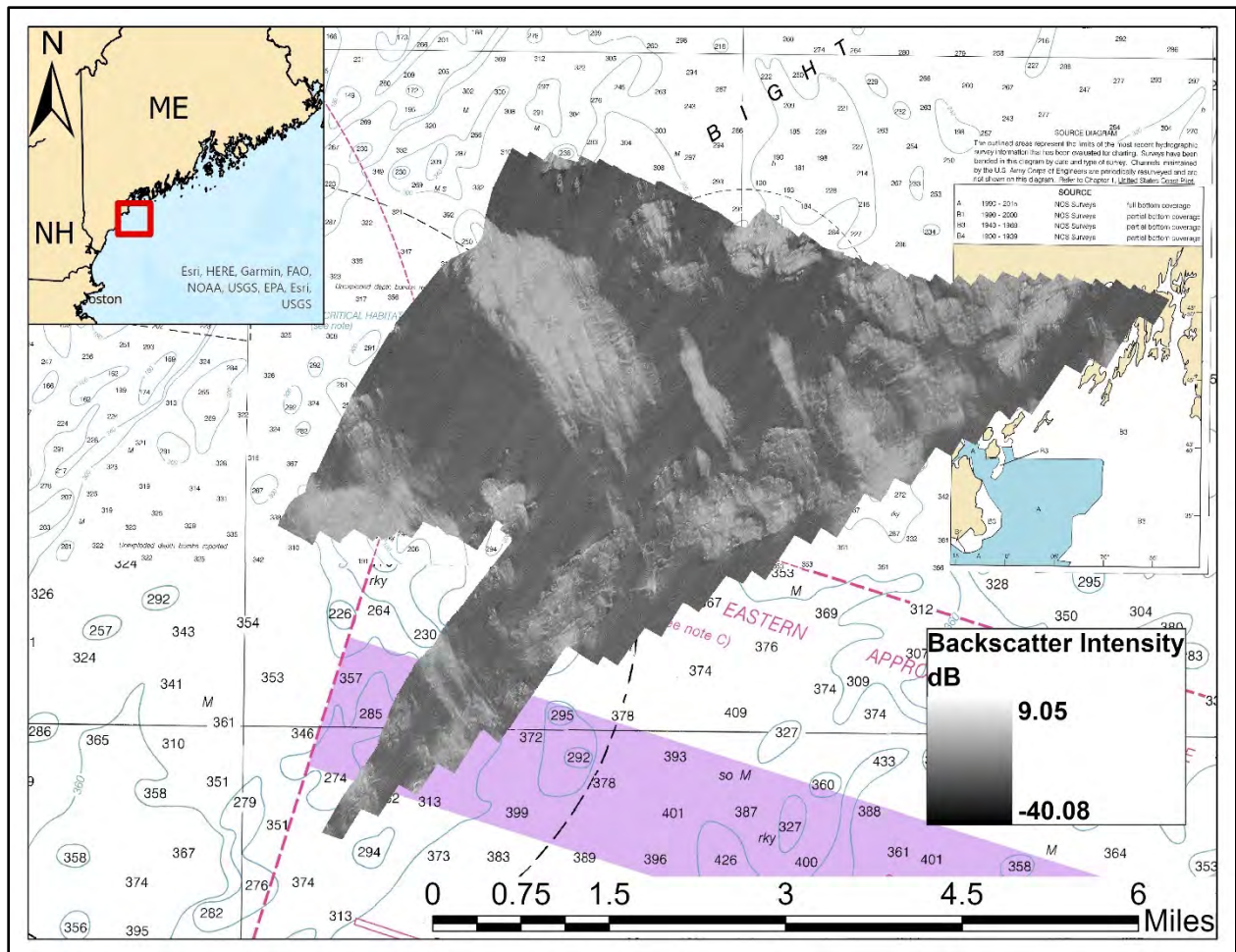


Figure 14 – Backscatter mosaic (4-meter pixel size) of 2020 Casco Bay survey area.

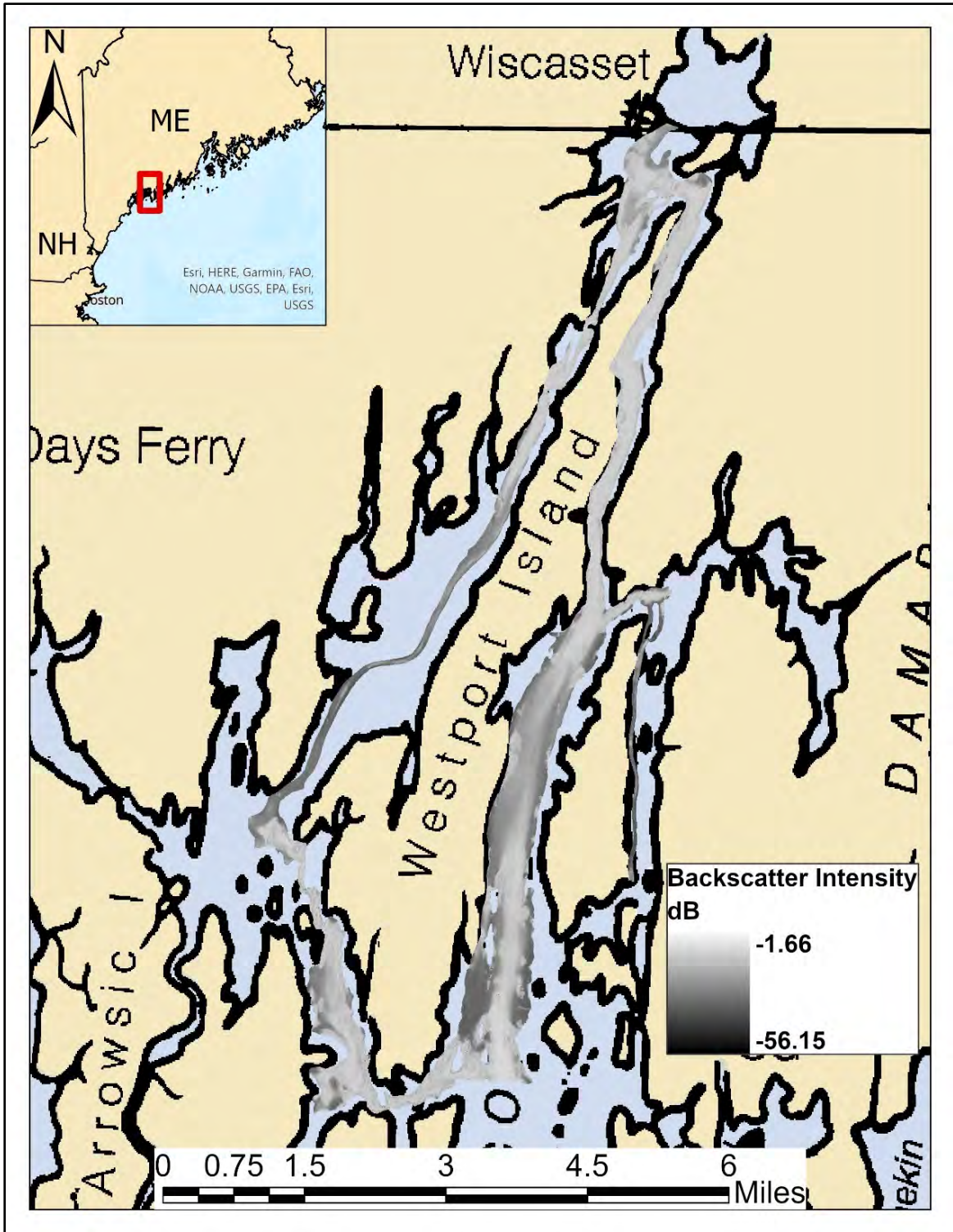


Figure 15 – Backscatter mosaic (2-meter pixel size) of 2020 Inshore survey area.

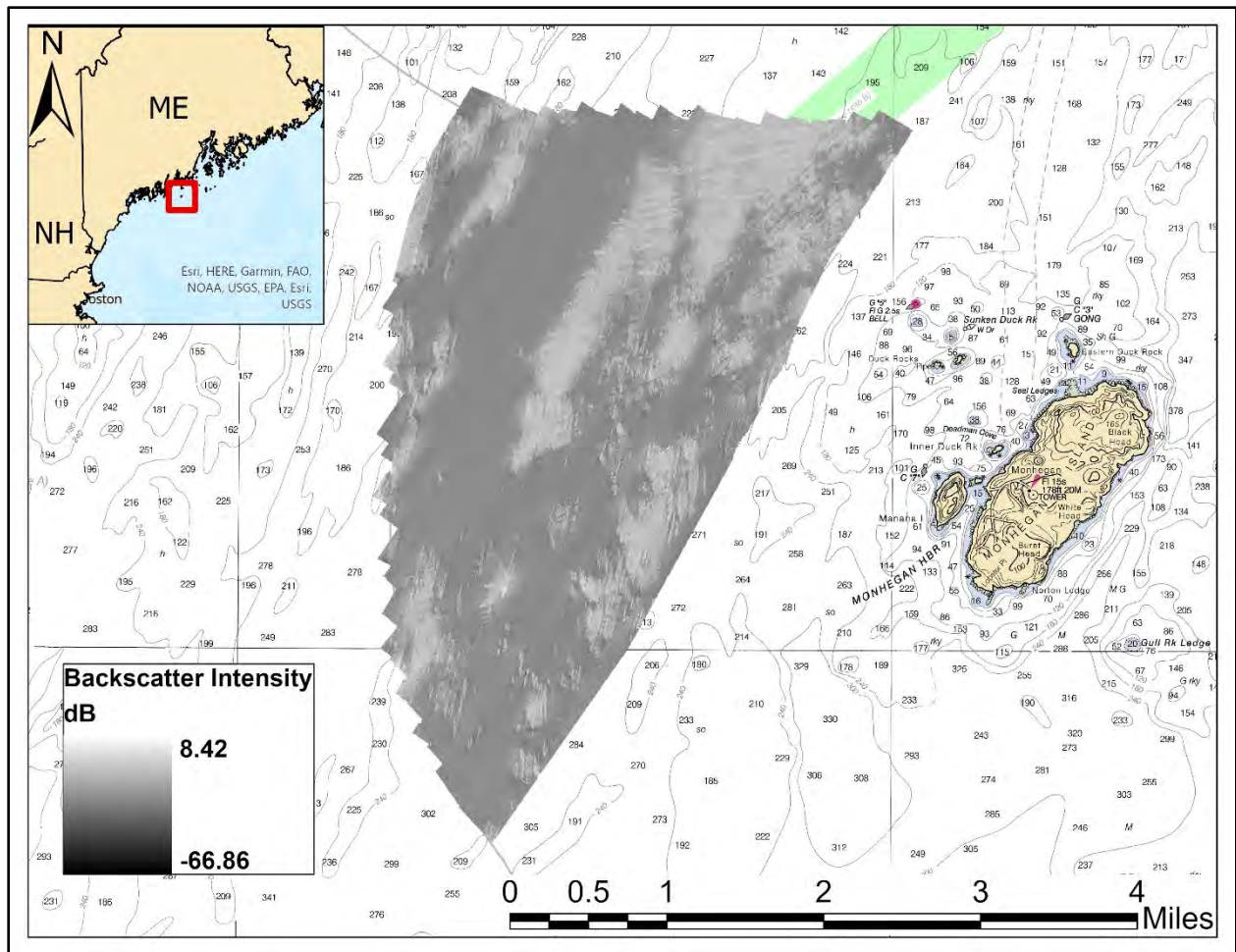


Figure 16 – Backscatter mosaic (4-meter pixel size) of 2020 Monhegan Island survey area.

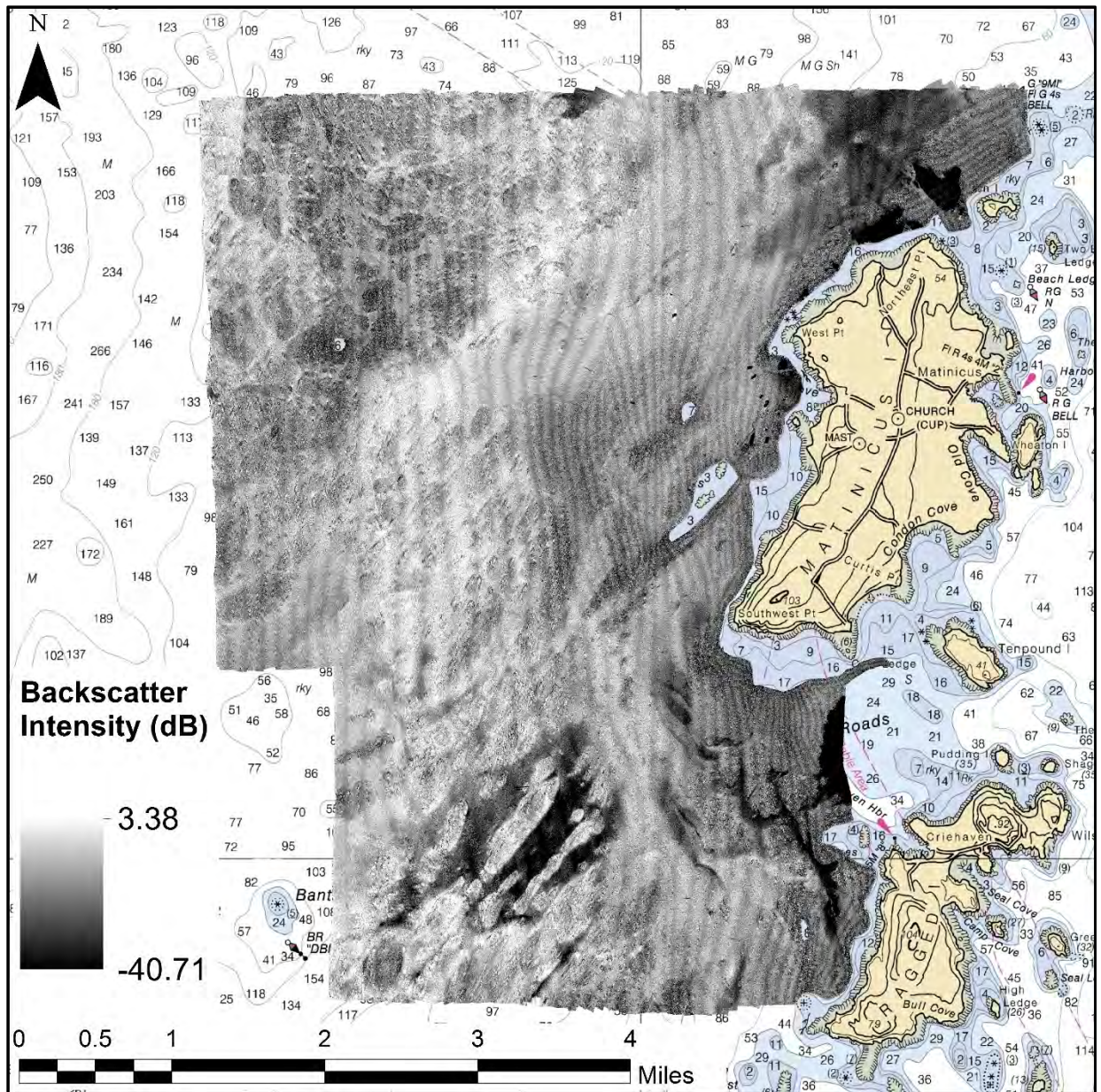


Figure 17 – Backscatter mosaic (4-meter pixel size) of 2020 Matinicus Island survey area.

5.0 Results

5.1 Charts Comparison

The hydrographer conducted a qualitative comparison of reclassified bathymetry data and depth contours from the surveyed area to the charted soundings and contours. The largest scale (i.e. greater than 1:100,000) raster navigational charts which cover the survey areas are listed in Table 10. Prior hydrographic surveys in the vicinity were conducted by NOAA between 1854 and 1954 and some consisted only of partial bottom coverage. These data were not compared with data collected by the MCMI.

Table 10 – Largest scale raster charts in survey area

Chart	Scale	Source Edition	Source Date	Most Recent NTM Date
13286	1:80,000	34	3/1/2019	10/15/2020
13288	1:80,000	44	2/1/2016	5/6/2021
13290	1:40,000	41	10/1/2019	5/6/2021
13293	1:40,000	36	3/1/2016	4/1/2021
13296	1:15,000	26	1/1/2012	6/25/2020
13301	1:40,000	22	12/1/2018	5/20/2021
13302	1:80,000	25	4/1/2019	1/21/2021
13303	1:40,000	15	3/1/2017	6/18/2020

Chart 13286

The entire Casco Bay survey area coincides with chart 13286. Charts with scales 1:80,000 (and smaller) inherently contain very generalized contours. As shown in Figure 18, the agreement between chart contours and new survey data (reclassified at 60 feet intervals; same as chart) is generally good at depths less than 360 feet (110 meters).

Chart 13288

The entire Casco Bay, Monhegan Island, and inshore survey areas coincide with chart 13288. The majority of the inshore survey area is generalized beyond comparison, however. Charts with scales 1:80,000 (and smaller) inherently contain very generalized contours. As shown in Figures 19 through 20, the agreement between chart contours and new survey data (reclassified at 60 feet intervals; same as chart) is generally good at depths less than 300 feet (91 meters). Agreement becomes increasingly poor at depths beyond 300 feet throughout the surveyed areas, particularly in the Monhegan Island area (Figure 21). This disagreement is likely due to the low resolution and lack of full bottom coverage during prior surveys rather than over

generalization. It is recommended that contours within the survey area be revised; though since only a relatively small total surface area deeper than 300 feet exists in the survey area, this disagreement could also be considered negligible.

Chart 13290

The majority of the Casco Bay survey area coincides with chart 13290. As shown in Figure 22, the agreement between chart contours and new survey data (reclassified at 60 foot intervals; same as chart) is generally good at depths less than 360 feet (110 meters).

Chart 13293

The entire inshore survey area coincides with chart 13293. Surveyed depths have good overall agreement with charted contours and soundings (Figure 23), although individual soundings may disagree at any given location.

Chart 13296

The majority of the inshore survey area coincides with chart 13296. Surveyed depths have good overall agreement with charted contours and soundings (Figure 24), although individual soundings may disagree at any given location.

Chart 13301

The entire Monhegan Island survey area coincides with chart 13301. As shown in Figure 25, the agreement between chart contours and new survey data (reclassified at 60 foot intervals; same as chart) is generally good at depths less than 300 feet (91 meters).

Chart 13302

The entire Matinicus Island survey area coincides with chart 13302. Charts with scales 1:80,000 (and smaller) inherently contain very generalized contours. As shown in Figure 26, the agreement between chart contours and new survey data (reclassified at 60 foot intervals; same as chart) is generally good at depths less than 120 feet (37 meters). Agreement becomes increasingly poor at depths beyond 120 feet throughout the surveyed area. This disagreement is likely due to the low resolution and lack of full bottom coverage during prior surveys rather than over generalization. It is recommended that contours within the survey area be revised.

Chart 13303

The entire Matinicus Island survey area coincides with chart 13303. As shown in Figure 27, the agreement between chart contours and new survey data (reclassified at 60 foot intervals; same as chart) is generally good at depths less than 120 feet (37 meters). Agreement becomes increasingly poor at depths beyond 120 feet throughout the surveyed area, though less so than for chart 13302.

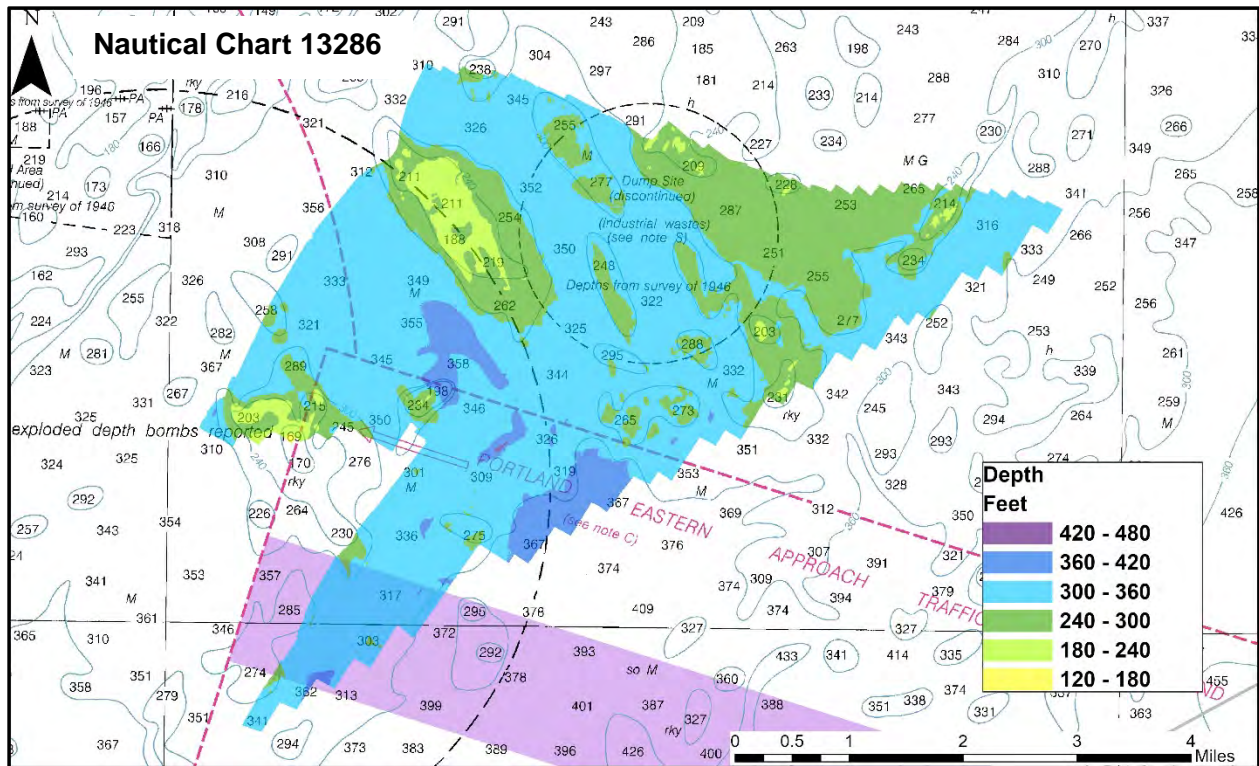


Figure 18 – Comparison between surveyed depth in Casco Bay area (reclassified at 60-foot intervals, by color) and chart 13286 (scale: 1:80,000, 60-foot contour intervals).

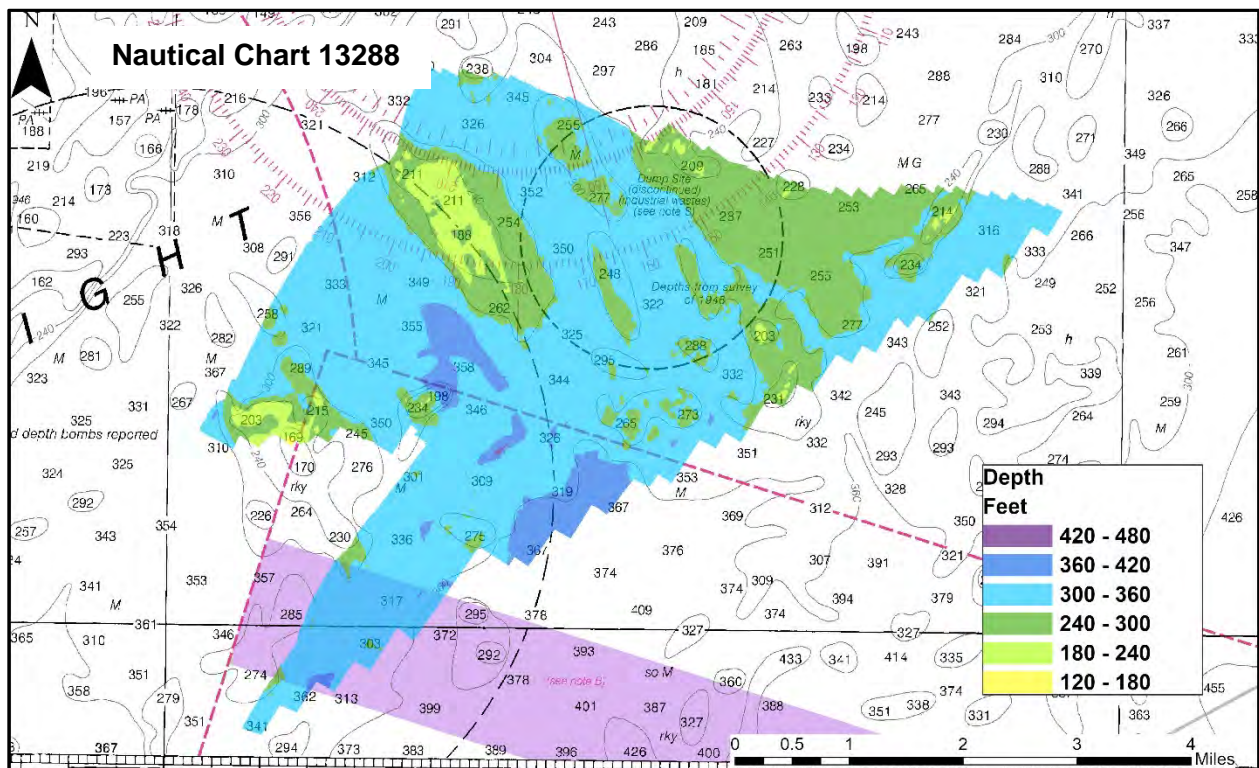


Figure 19 – Comparison between surveyed depth in Casco Bay area (reclassified at 60-foot intervals, by color) and chart 13288 (scale: 1:80,000, 60-foot contour intervals).

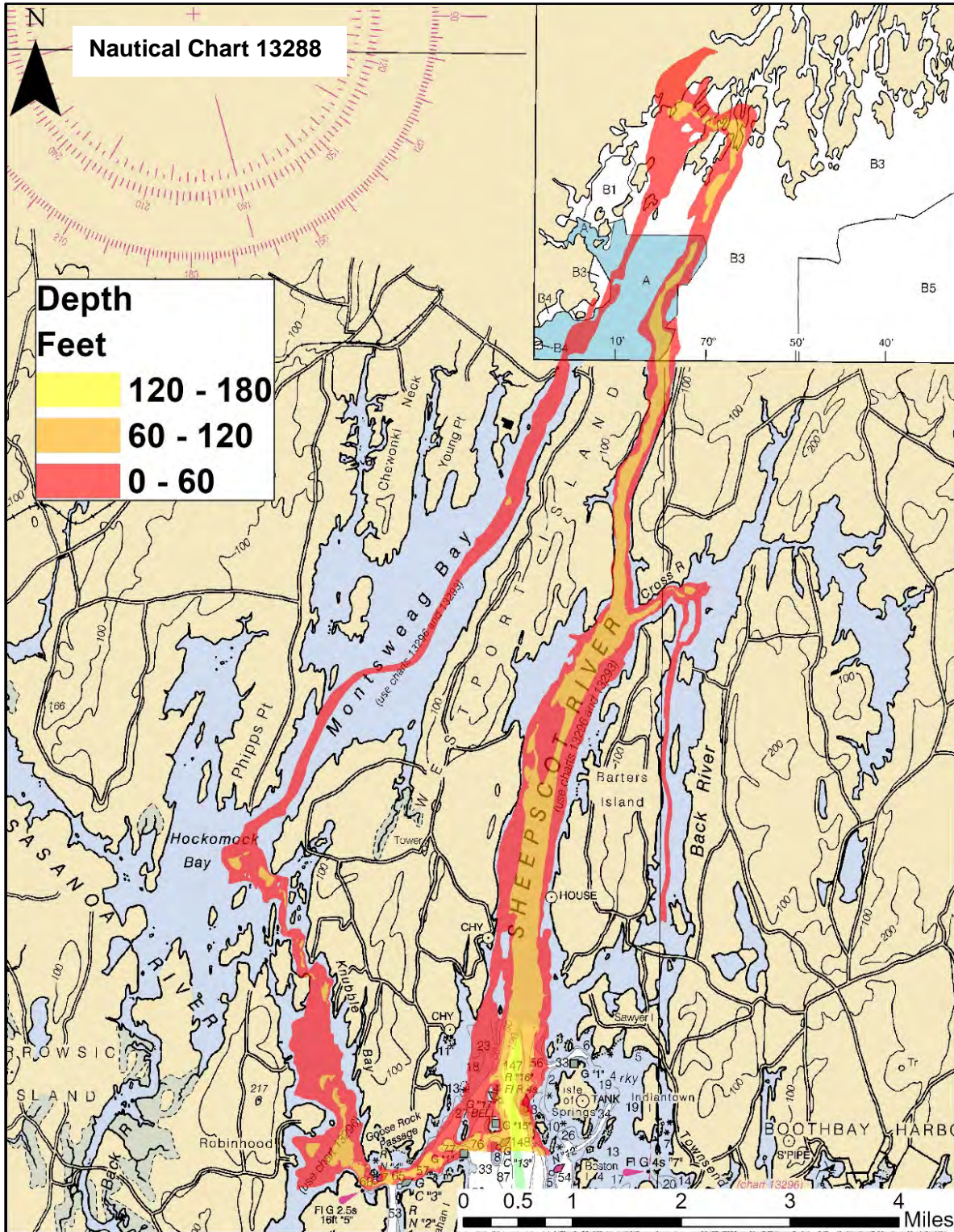


Figure 20 – Comparison between surveyed depth in inshore area (reclassified at 60-foot intervals, by color) and chart 13288 (scale: 1:80,000, 60-foot contour intervals).

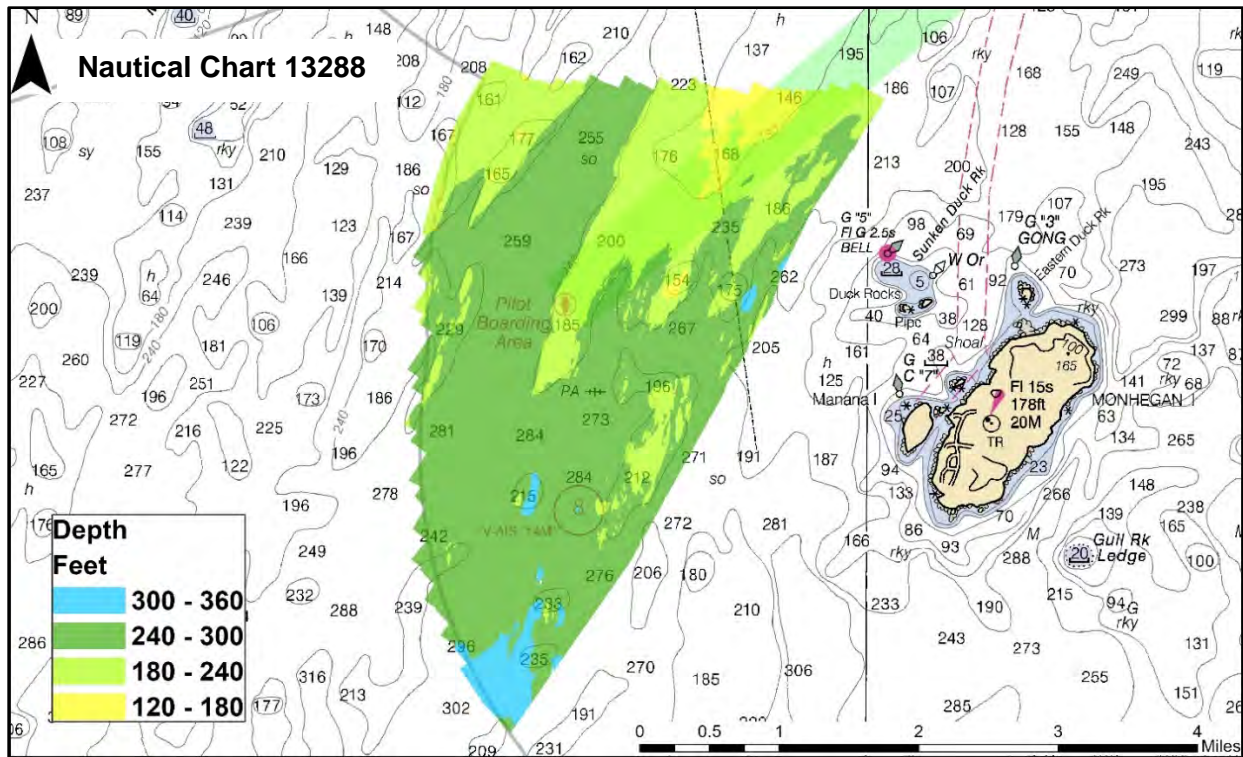


Figure 21 – Comparison between surveyed depth in Monhegan Island area (reclassified at 60-foot intervals, by color) and chart 13288 (scale: 1:80,000, 60-foot contour intervals).

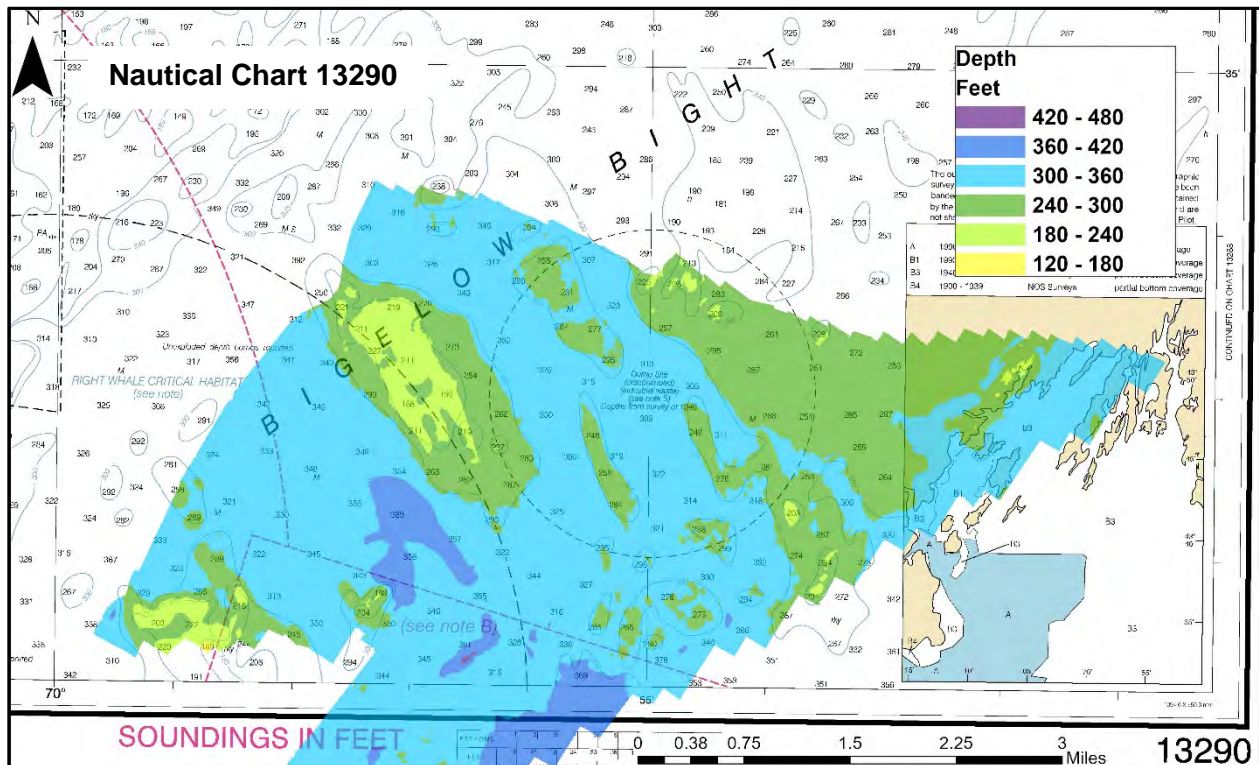


Figure 22 – Comparison between surveyed depth in Casco Bay area (reclassified at 60-foot intervals, by color) and chart 13290 (scale: 1:40,000, 60-foot contour intervals).

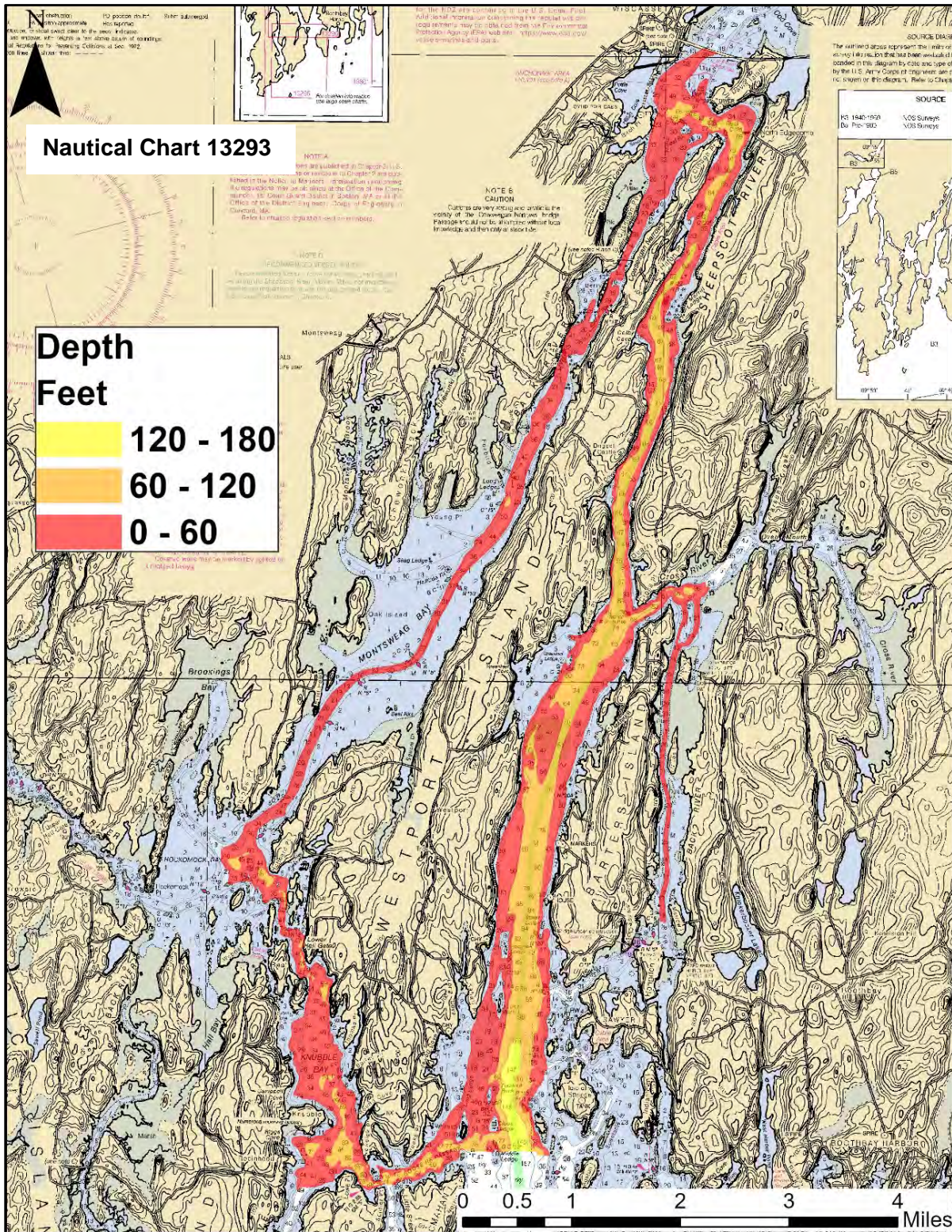


Figure 23 – Comparison between surveyed depth in inshore area (reclassified at 60-foot intervals, by color) and chart 13293 (scale: 1:40,000, 60-foot contour intervals).

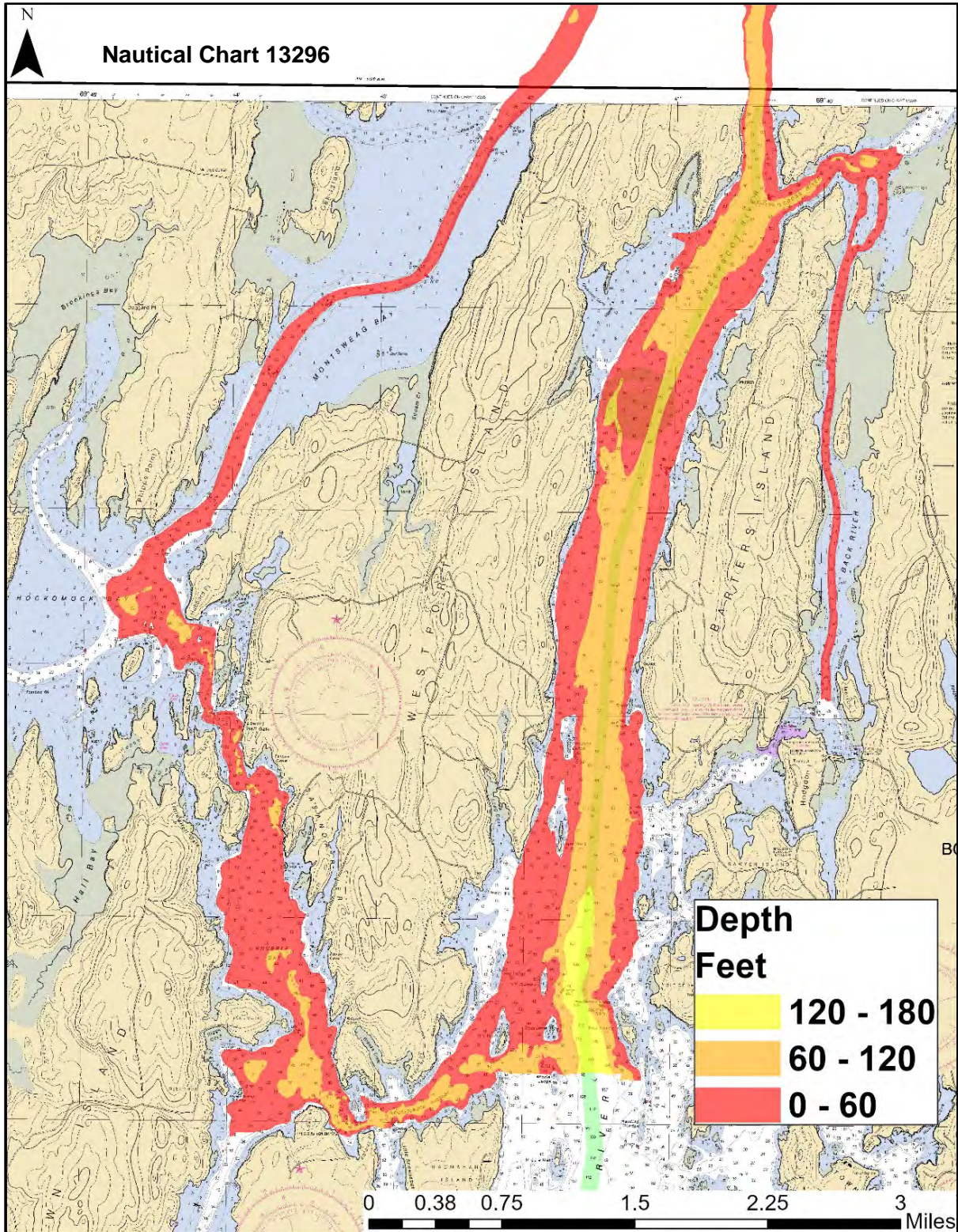


Figure 24 – Comparison between surveyed depth in inshore area (reclassified at 60-foot intervals, by color) and chart 13296 (scale: 1:15,000, 60-foot contour intervals).

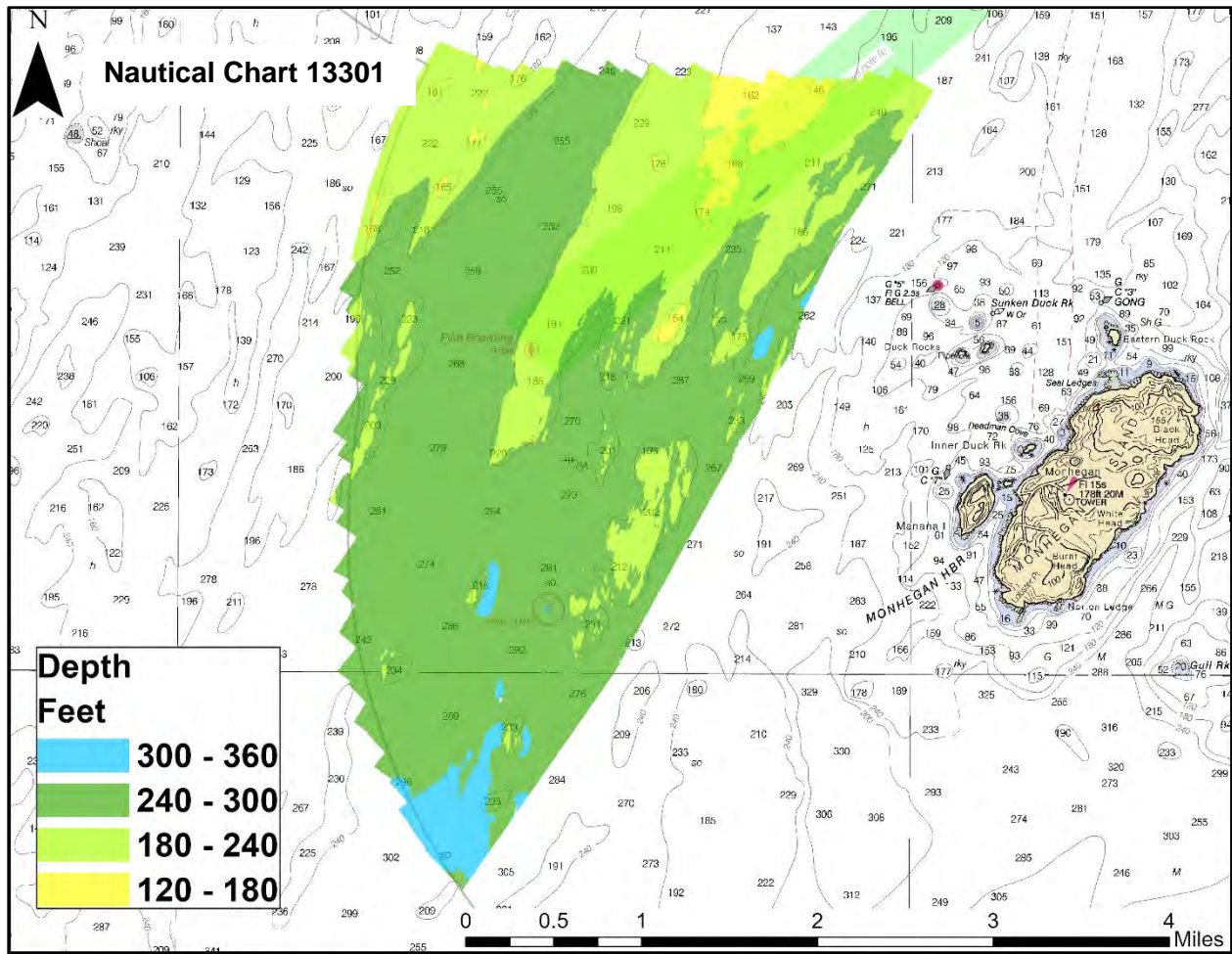


Figure 25 – Comparison between surveyed depth in Monhegan Island area (reclassified at 60-foot intervals, by color) and chart 13301 (scale: 1:40,000, 60-foot contour intervals).

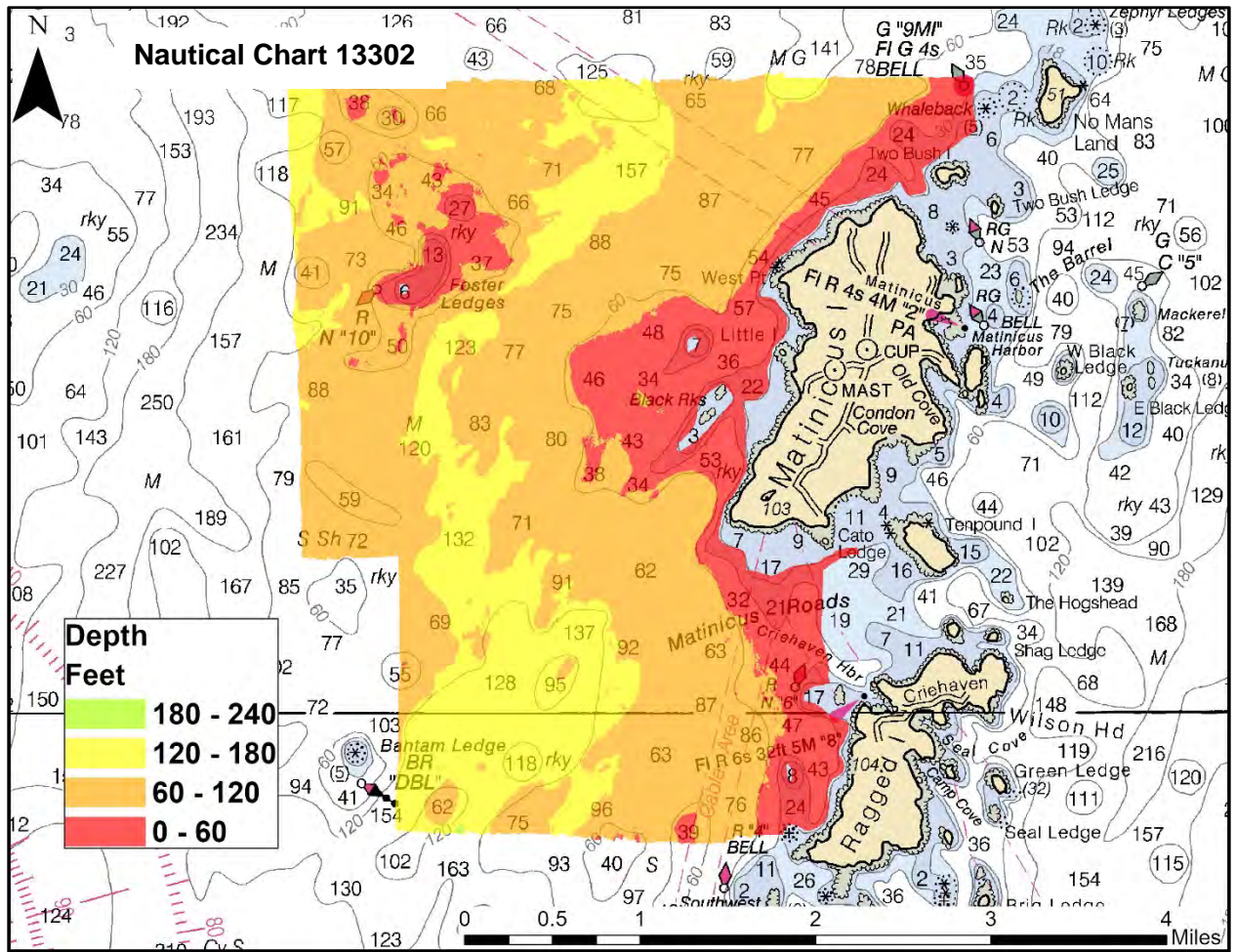


Figure 26 – Comparison between surveyed depth in Matinicus Island area (reclassified at 60-foot intervals, by color) and chart 13302 (scale: 1:80,000, 60-foot contour intervals).

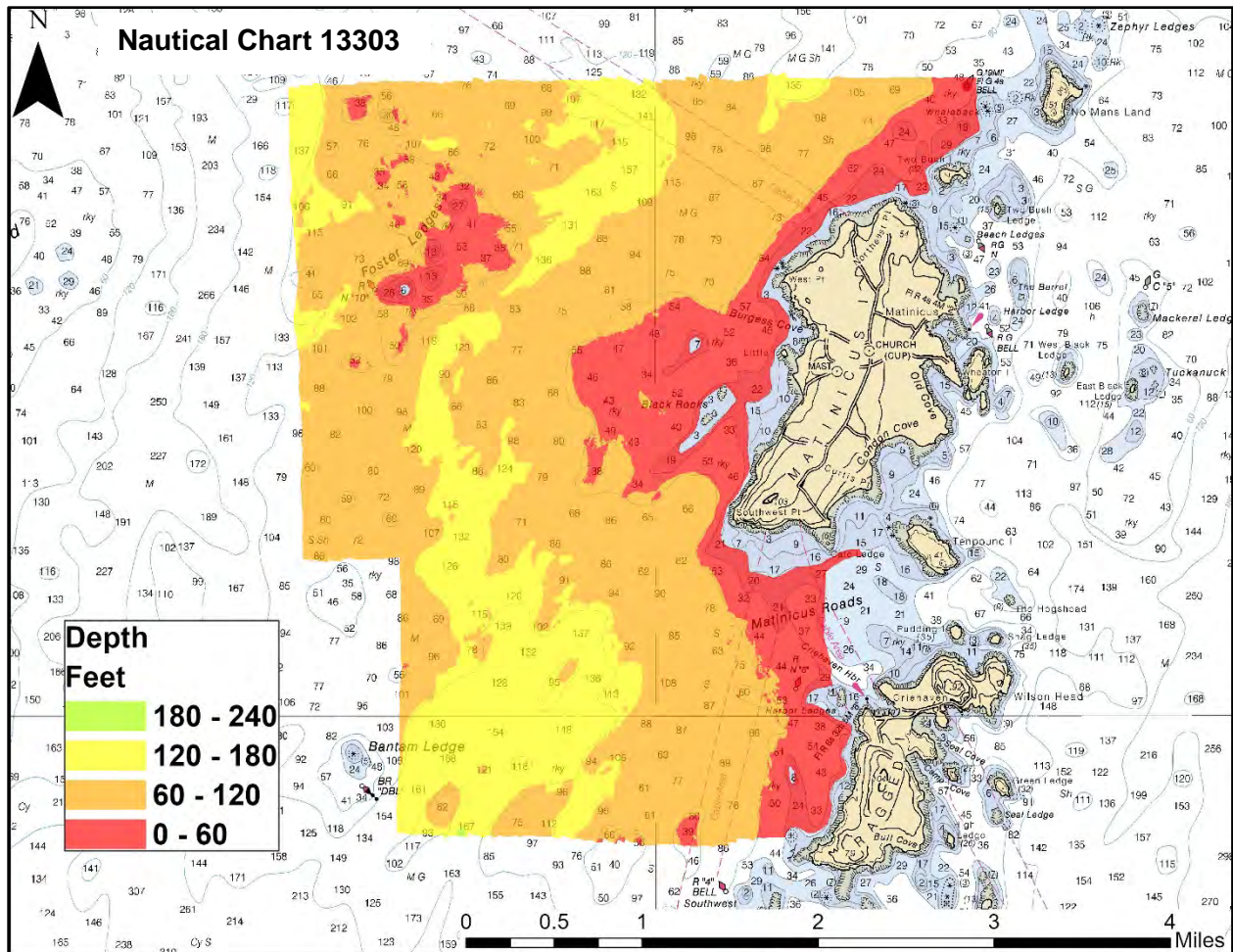


Figure 27 – Comparison between surveyed depth in Matinicus Island area (reclassified at 60-foot intervals, by color) and chart 13303 (scale: 1:40,000, 60-foot contour intervals).

5.2 Uncharted Features

An uncharted wreck was found in the Sheepscot River off Birch Point in/near the town harbor of Wiscasset, Maine (Figure 28). The object was identified in real-time by the hydrographer on November 4, 2020. An additional 0.5-meter surface was created to visualize and illustrate the feature at finer resolution (insets of Figures 28 and 29).

The depth of this feature was approximately 0 to 8 meters. A mast is clearly visible coming out of the water from the wreck (Figure 29). Coordinates and additional attributes are listed in Table 11. The wreck was surveyed through normal line coverage, and two additional lines were run over the wreck with water column data collection enabled in Qinsy (Table 12). The suspected wreck is oriented northeast (bow)-southwest (stern) and appears to be upright but slightly listing to port.

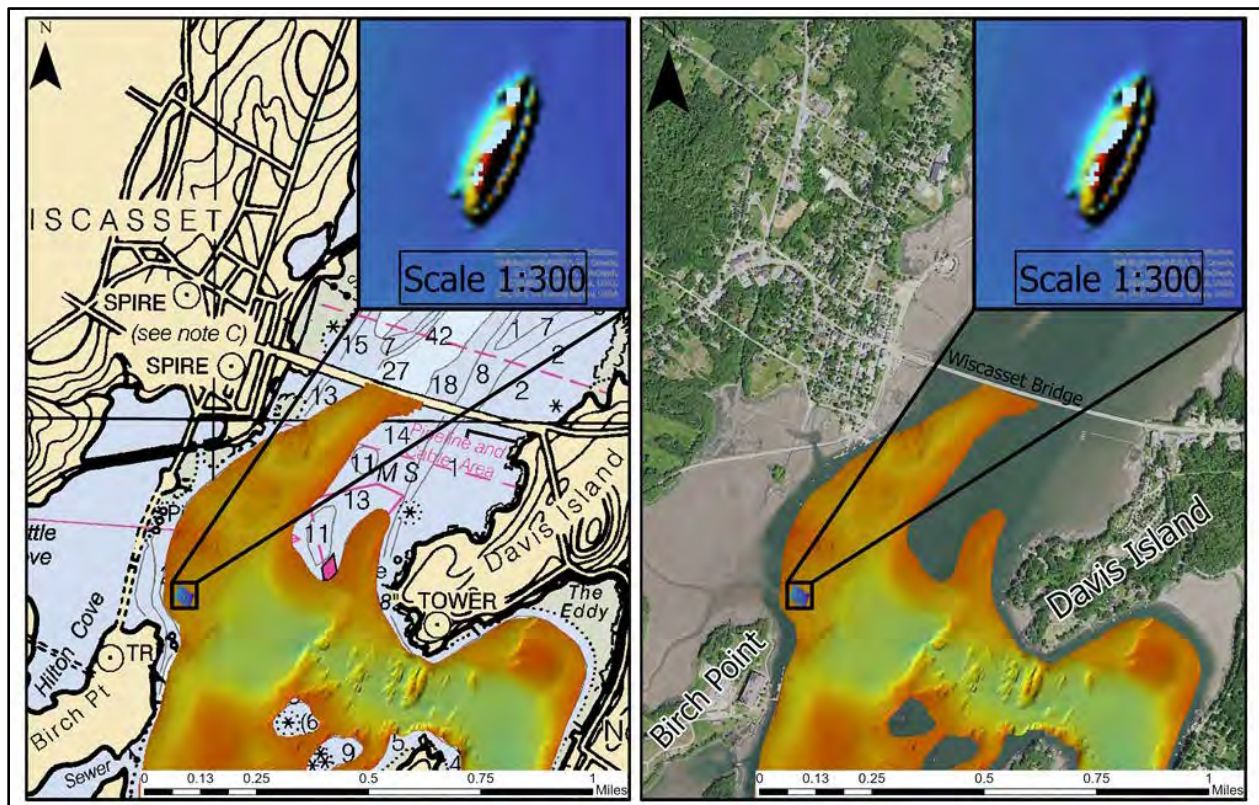


Figure 28 – Location of suspected uncharted wreck located in 2020 survey area, off Birch Point in the Sheepscot River. Inset shows 50-cm gridded data overlain on 2-meter gridded bathymetry data.

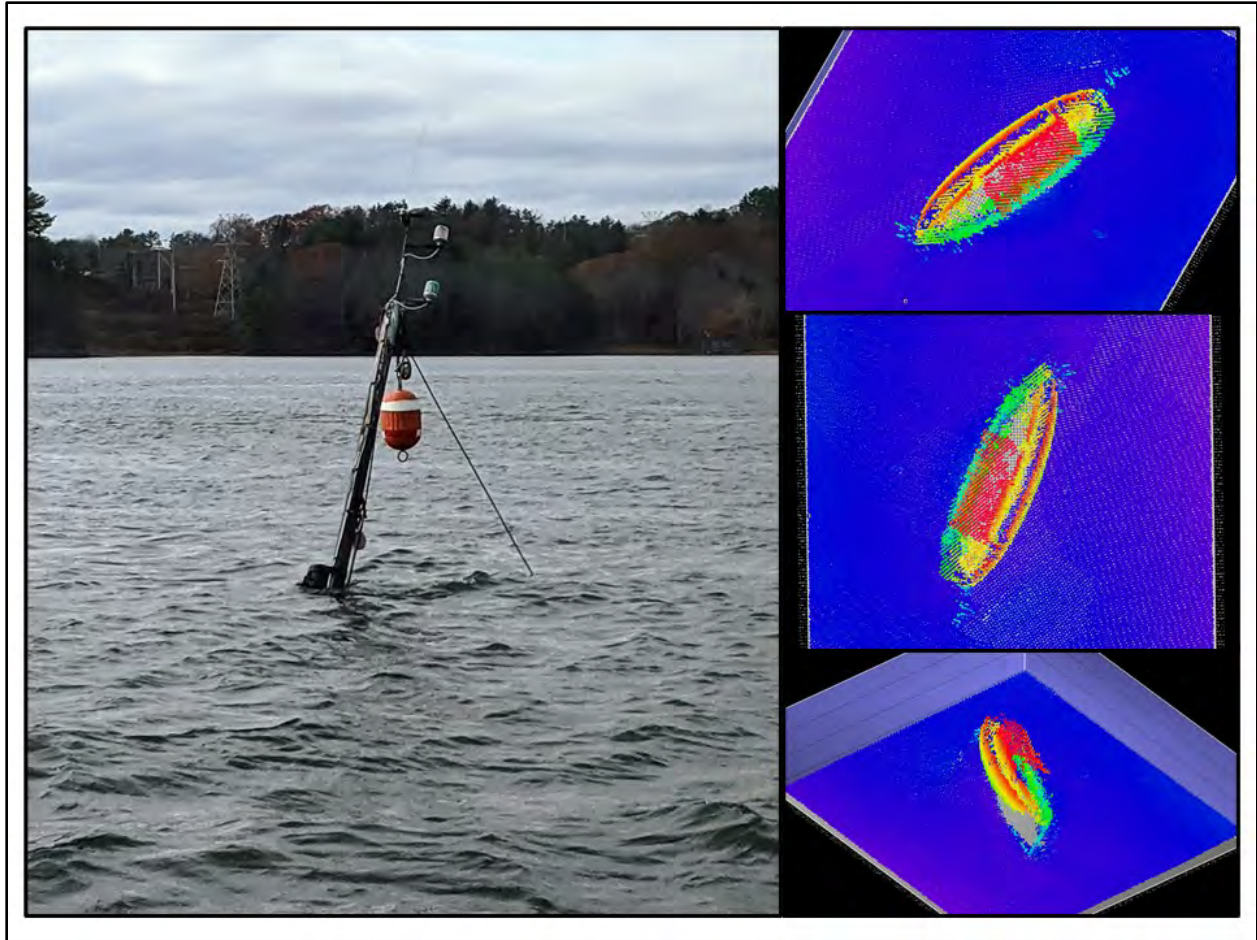


Figure 29 – Suspected uncharted wreck mapped in 2020 survey area. Photograph of exposed mast (left) taken in the field on day of survey. Qimera soundings view window (right panes) show clear structure of boat.

Table 11 – Coordinates and summary attributes of suspected uncharted wreck

Latitude	Longitude	Length (m)	Width (m)	Orientation
43° 59' 39.195" N	69° 41' 52.447" W	20.1	6.5	NE-SW

Table 12 – Additional storage file names containing wreck

Database filename

- 1417_110420_Amy Gale – 0001.db
- 1418_110420_Amy Gale – 0001.db

5.3 Bottom Samples

A total of 42 bottom samples, 30 in area summarized in this report and 12 outside the scope of this report, were collected in state waters to supplement existing sediment data collected previously by other agencies (Maine Geological Survey and University of Maine) in the Matinicus Island survey area (Figure 30). The results of grain-size and video analyses will be used to calibrate, refine, and digitize interpretations of

seafloor substrate. These data are also used to investigate how these data relate to benthic infauna in the survey area.

Additional details on the bottom samples are provided in Table 13. More detailed analysis of grain size composition of these samples and benthic fauna composition will be determined after laboratory processing is complete for the collected samples.

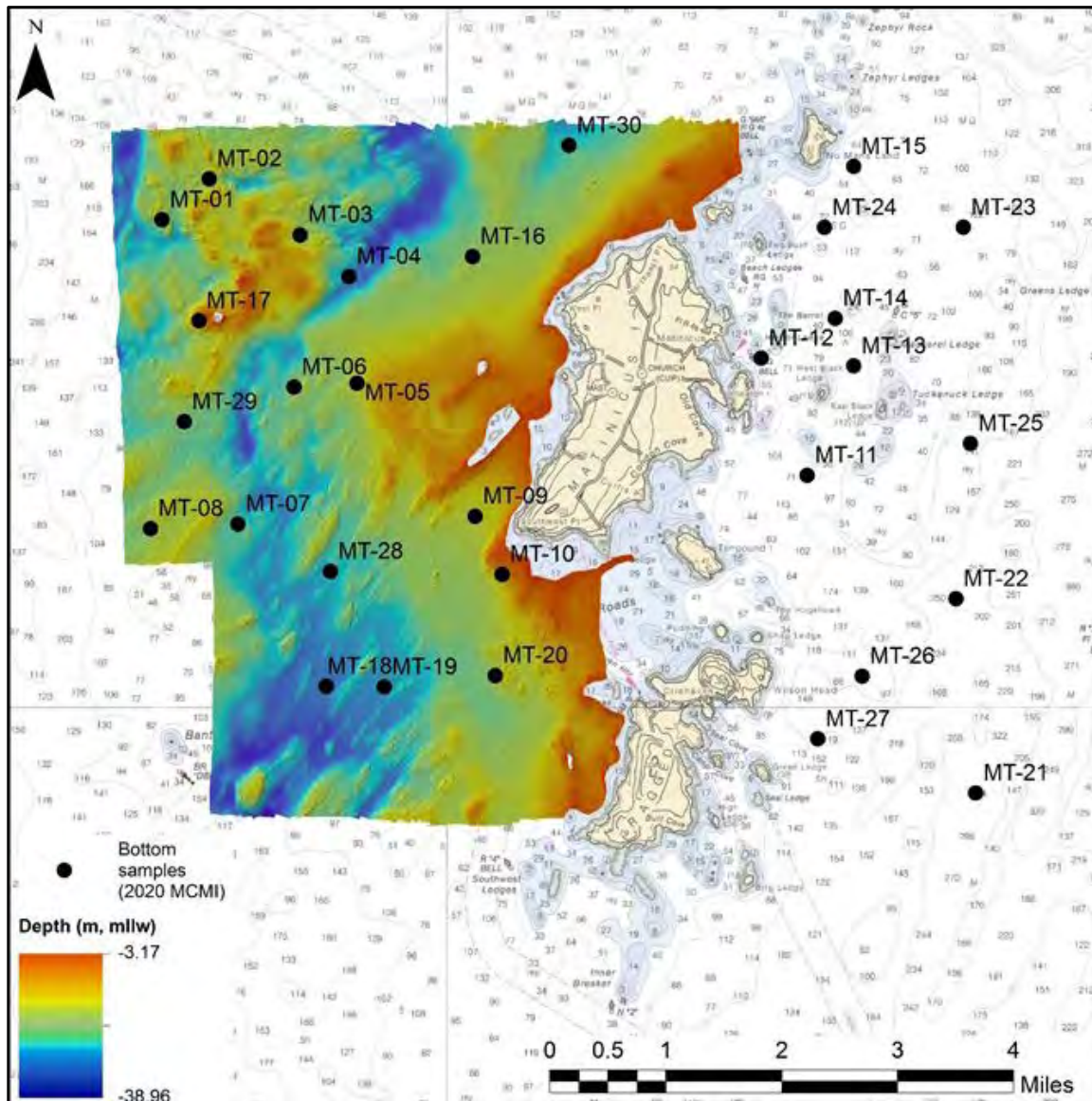


Figure 30 – Bottom sample locations collected near Matinicus Island.

Table 13 – Grab Sample Information

Site Name	Date	Latitude (decimal degrees N)	Longitude (decimal degrees W)	Depth (m)	Grain Size (field observation)	Backscatter Intensity (dB)	Kelp Present?
MT-01	7/21/20	43.877150	-68.952083	27.8	shell hash, trace fine gravel	-13.63	
MT-02	7/21/20	43.880817	-68.946200	26.5	shell hash	-12.37	
MT-03	7/21/20	43.875767	-68.934850	26.6	rock	-12.05	Y
MT-04	7/21/20	43.872050	-68.928767	46.3	mud with shell hash and some fine gravel	-8.27	
MT-05	7/21/20	43.862450	-68.927767	24.4	large rock in ponar	-9.85	
MT-06	7/21/20	43.862117	-68.935600	31.9	several cobbles 10-20 cm in length	-10.48	
MT-07	7/21/20	43.849800	-68.942617	38.7	mud with shell hash and some fine gravel	-9.53	
MT-08	7/21/20	43.849400	-68.953517	28.5	shell hash mixed with gravel, some mud	-11.74	
MT-09	7/24/20	43.850500	-68.913017	23.3	pebble-sized gravel and shell hash	-15.83	Y
MT-10	7/24/20	43.845283	-68.909667	16.2	rock with kelp	N/A	Y
MT-11	7/24/20	43.854183	-68.871617	27.4	mix of cobbles and shell hash, some gravel	N/A	
MT-12	7/24/20	43.864717	-68.877367	17.5	fine shell hash	N/A	Y
MT-13	7/24/20	43.864017	-68.865817	23.8	shell hash	N/A	Y
MT-14	7/24/20	43.868283	-68.868117	31.2	shell hash, trace mud	N/A	
MT-15	7/24/20	43.881933	-68.865817	22.6	rock	N/A	Y
MT-16	7/28/20	43.873833	-68.913333	29.3	muddy gravel and intact shells, some shell hash	-9.85	
MT-17	7/28/20	43.868083	-68.947483	13.3	rock with kelp	-8.90	Y
MT-18	7/28/20	43.835217	-68.931600	47.2	fine sandy mud, some shell fragments	-16.46	
MT-19	7/28/20	43.835167	-68.924350	43.7	mud	-15.83	
MT-20	7/28/20	43.836183	-68.910517	27.4	rock	-12.68	
MT-21	7/28/20	43.825633	-68.850583	79.6	mud	N/A	
MT-22	7/28/20	43.843083	-68.853067	63.1	mud with pebble-sized gravel intermixed	N/A	
MT-23	8/6/20	43.876467	-68.852133	38.7	sandy mud, some fine gravel	N/A	
MT-24	8/6/20	43.876450	-68.869467	25.1	gravel with shell hash, some mud	N/A	
MT-25	8/6/20	43.857050	-68.851250	46.0	rock	N/A	
MT-26	8/6/20	43.836133	-68.864750	48.2	rock	N/A	
MT-27	8/6/20	43.830500	-68.870300	54.1	muddy shell hash	N/A	
MT-28	8/6/20	43.845550	-68.931067	43.0	gravelly mud	-10.48	
MT-29	8/6/20	43.859000	-68.949300	34.2	mud with some shell hash	-8.27	
MT-30	8/6/20	43.883817	-68.901317	39.4	gravelly mud, some sand intermixed	-11.42	

6.0 Summary

From April to November of 2020, MCMI collected a total of approximately 45 mi² (117 km²) of high-resolution multibeam data. 39 mi² (101 km²) were collected in the “mainscheme” area of federal (18 mi²) and state (21 mi²) coastal marine waters. Approximately 6 mi² (16 km²) were collected in nearshore waters. Except for numerous small holidays, multibeam coverage was 100% in all areas surveyed. Survey data were processed with 4-meter grid resolution, although 2-meter and 8-meter surfaces were also generated for submission with this report. Comparisons between these survey data and the largest scale nautical charts in the immediate vicinity show good overall agreement except for in surveyed areas at depths greater than 120 feet (locality off Matinicus Island) and 300 feet (all other localities). Overall, these data are of sufficient quality to supersede previous data collected in the vicinity. It is recommended that the corresponding charts be updated to reflect these data.

MCMI has utilized final data products for high-resolution backscatter and bathymetry to refine existing seafloor sediment maps. When combined with existing geophysical (e.g. seismic reflection profiles and side-scan sonar) data, these data may also be used to refine interpretations of coastal/nearshore geomorphology and three-dimensional assessments of potential sediment resources/valley fill in the region. In addition, these data are a critical component of benthic habitat classification and modeling performed by MCMI. Overall, these data have a variety of applications and are an invaluable resource to public and private agencies who wish to manage and understand coastal and marine resources more effectively.

These data were acquired and processed to meet Office of Coast Survey bathymetry standards as best as possible and were shared with the NOAA Office of Coast Survey for review.

Please contact the Maine Coastal Program’s Research Coordinator for additional information or data requests.

References

NOAA, 2017. NOS hydrographic surveys specifications and deliverables: U.S Department of Commerce National Oceanic and Atmospheric Administration. 162 Pages.

U.S. Department of the Interior, 2014. Proposed geophysical and geological activities in the Atlantic OCS to identify sand resources and borrow areas north Atlantic, mid-Atlantic, and south Atlantic-Straits of Florida planning areas, *final environmental assessment*. OCS EIS/EA BOEM 2013-219 U.S. Department of the Interior Bureau of Ocean Energy Management Division of Environmental Assessment Herndon, VA, January 2014.

Appendix A – Specific dates of data acquisition for surveys

Dates (mm/dd/yy) of Data Acquisition for 2020 Surveys*

Mainscheme	Inshore
4/16/20	4/15/20
5/6/20	5/11/20
5/26/20	5/14/20
6/1/20	5/18/20
6/17/20	5/25/20
6/18/20	6/2/20
6/23/20	6/4/20
6/26/20	6/8/20
7/6/20	6/9/20
7/7/20	6/16/20
7/14/20	8/13/20
7/22/20	8/14/20
7/23/20	8/19/20
7/27/20	8/25/20
7/30/20	8/27/20
8/7/20	9/3/20
8/10/20	10/5/20
8/20/20	10/21/20
9/4/20	10/22/20
9/7/20	10/26/20
9/8/20	10/28/20
9/10/20	11/4/20
10/19/20	11/9/20
10/20/20	11/10/20
	11/12/20
	11/13/20

*Dates of surveys not summarized in this report not listed

Appendix B – 2020 Configuration settings for Seapath 330

NAV Engine Configuration

- Vessel
 - Geometry
 - Description
- Sensors
 - GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - DGNSS
 - SBAS
 - HP/XP/GZ
 - RTK
 - MRU
 - Geometry
 - Heave config
- Monitoring points
 - Geometry
- Communication interface
 - Input/Output
 - Serial port extender
 - Network
 - Data Pool

Show sensors Show monitoring points

Shape type: Use vessel drawing

Shape dimension		Origin location in drawing		Navigation reference point (NRP)		
Overall length	11.000 m	From stern	11.000 m	Origin to NRP X	0.000 m	
Overall width	3.700 m	From CL	0.000 m	Y	0.000 m	
Overall height	3.200 m	From keel	0.000 m	Z	0.000 m	

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP/XP/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
- [-] Monitoring points
 - [-] Geometry
- [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Vessel description

Vessel name:

Vessel owner: Country of origin:

Vessel ID:

MMSI: IMO number:

Connected to Seapath 330

NAV Engine Configuration

- Vessel
 - Geometry
 - Description
- Sensors
 - GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - DGNSS
 - SBAS
 - HP/P/G2
 - RTK
 - MRU
 - Geometry
 - Heave config
 - Monitoring points
 - Geometry
 - Communication interface
 - Input/Output
 - Serial port extender
 - Network
 - Data Pool

Show sensors Show monitoring points

Antenna configuration

Antenna type:

Antenna beam

Antenna location (from Origin)

	Position [m]		
	X	Y	Z
Antenna 1	0.158	-1.245	-3.000
Antenna 2	0.158	1.252	-3.035

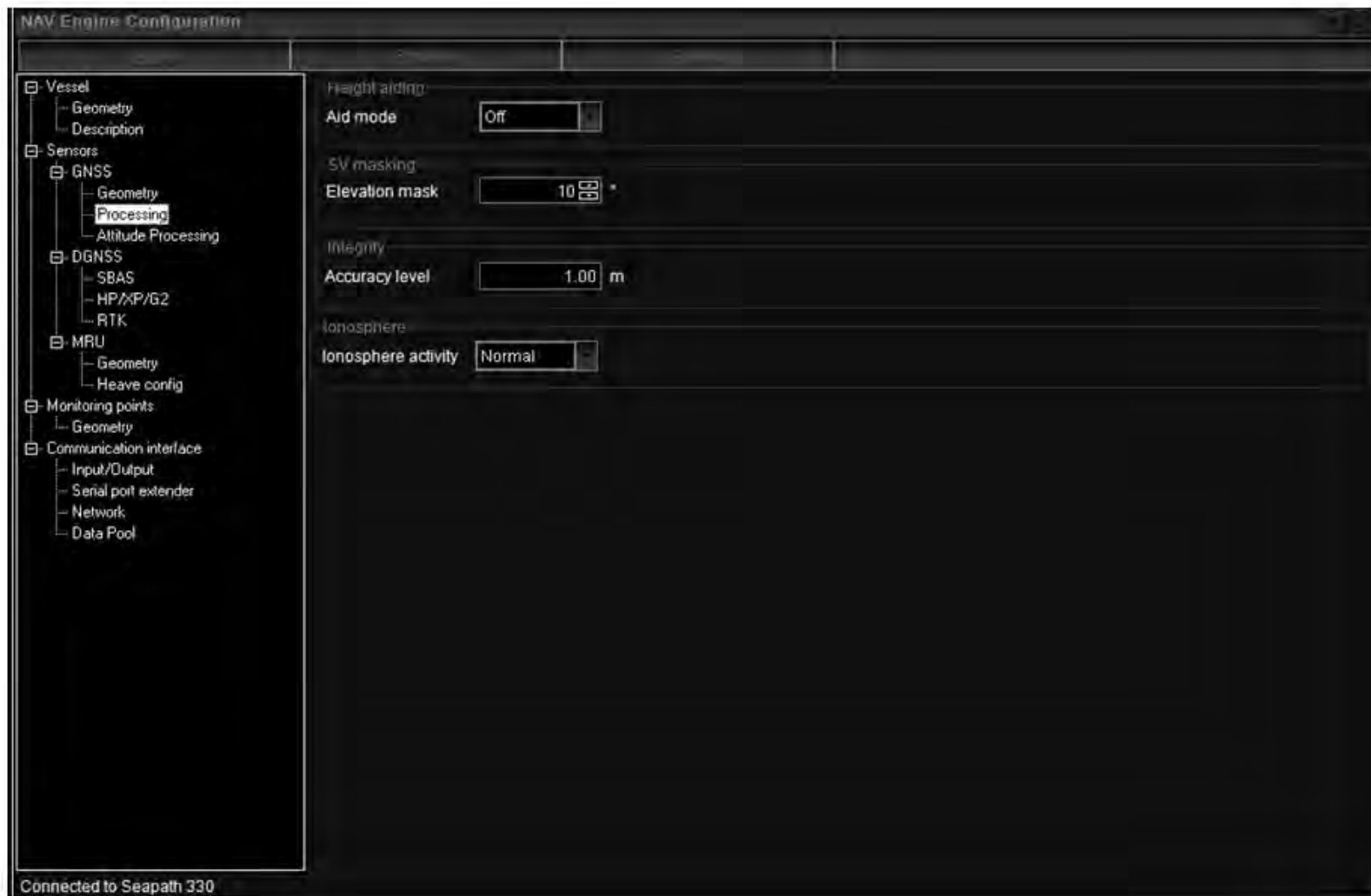
Antenna offset (from antenna 1 to antenna 2)

Baseline length: m

Heading offset: °

Height difference: m

Connected to Seapath 330



NAV Engine Configuration

- [-] Vessel
 - Geometry
 - Description
- [-] Sensors
 - [-] GNSS
 - Geometry
 - Processing
 - Attitude Processing
 - [-] DGNSS
 - SBAS
 - HP/XP/G2
 - RTK
 - [-] MRU
 - Geometry
 - Heave config
- [-] Monitoring points
 - Geometry
- [-] Communication interface
 - Input/Output
 - Serial port extender
 - Network
 - Data Pool

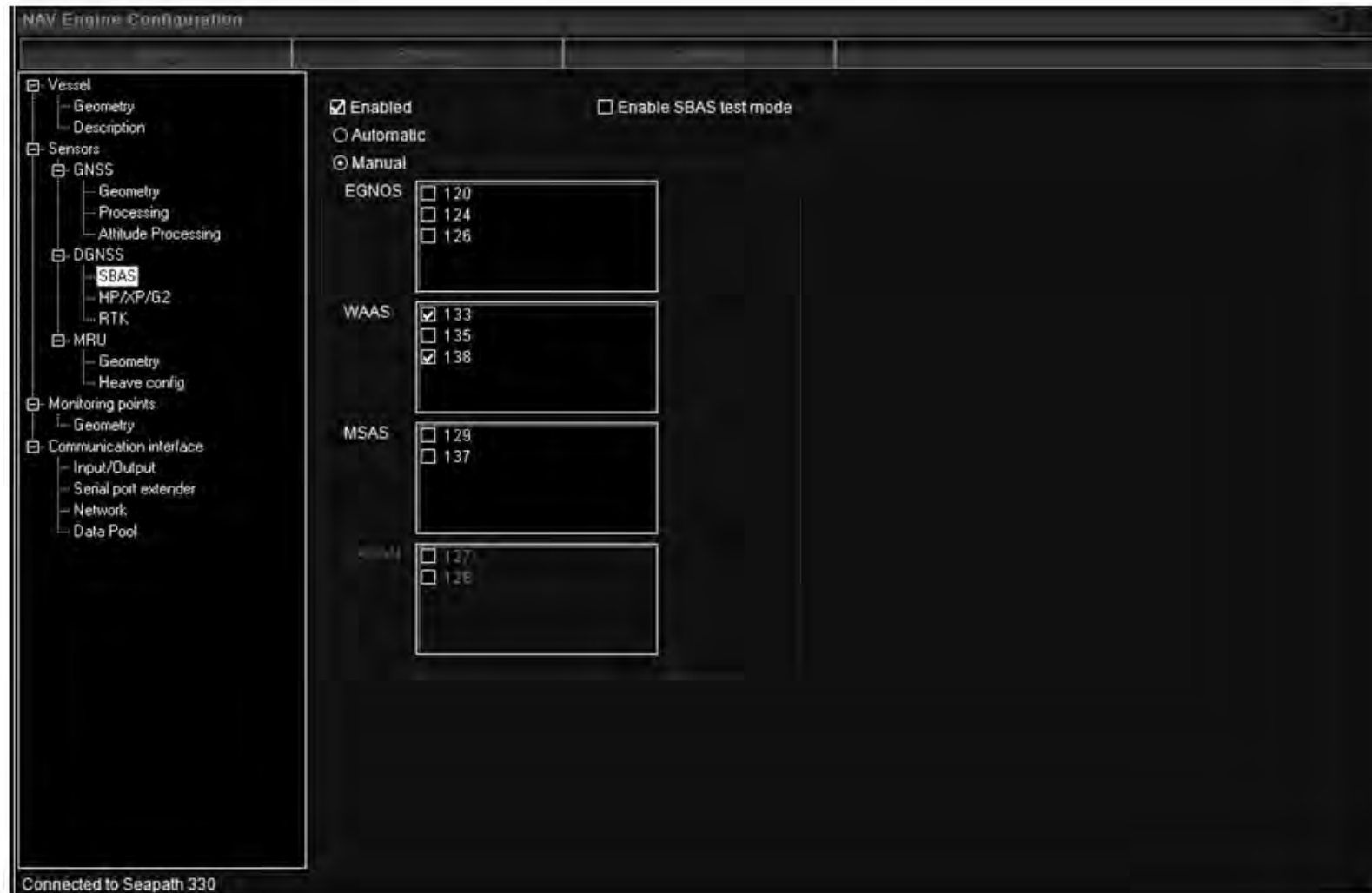
GNSS attitude processing settings

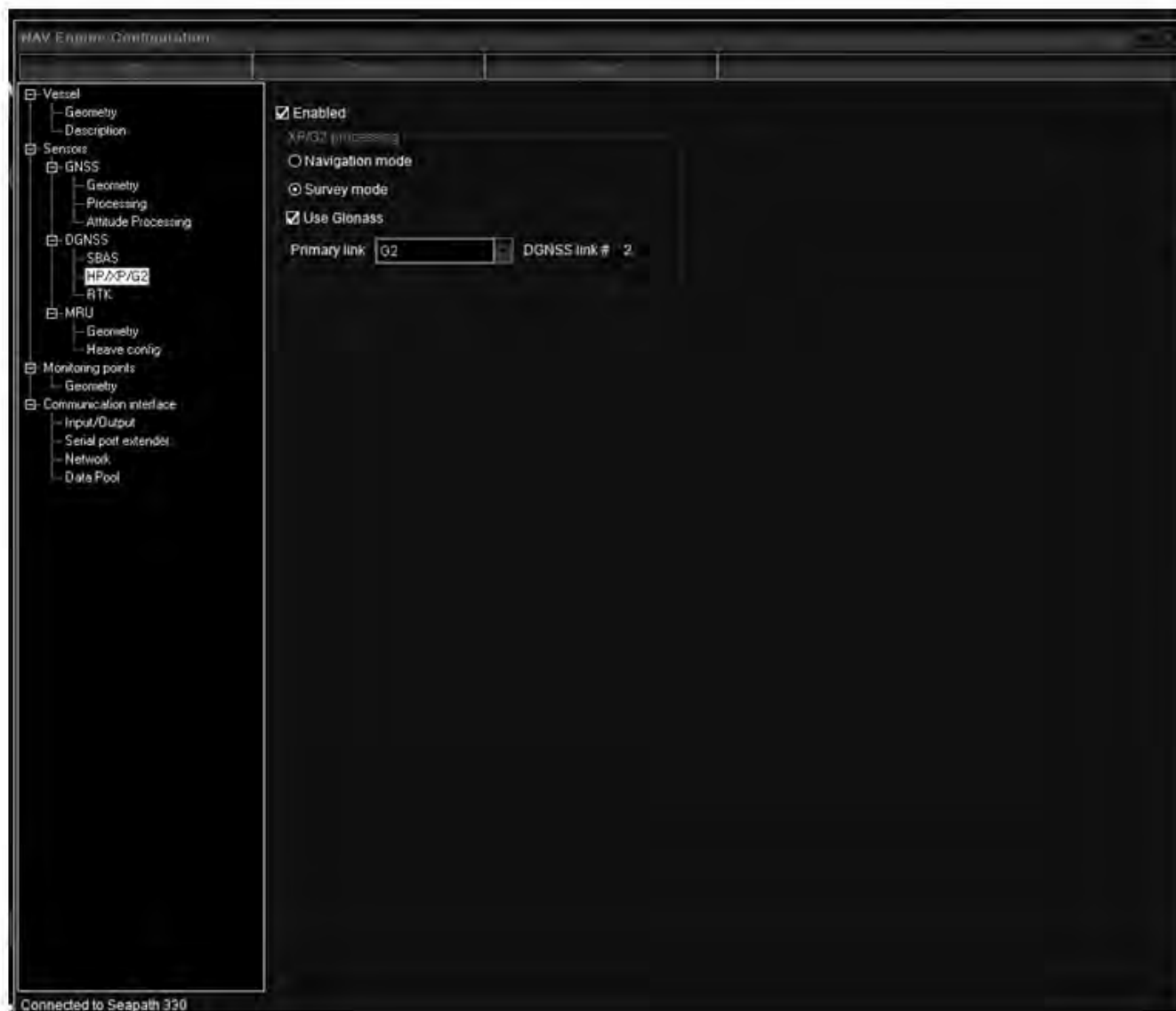
Max pitch and roll angles ° (default 15)

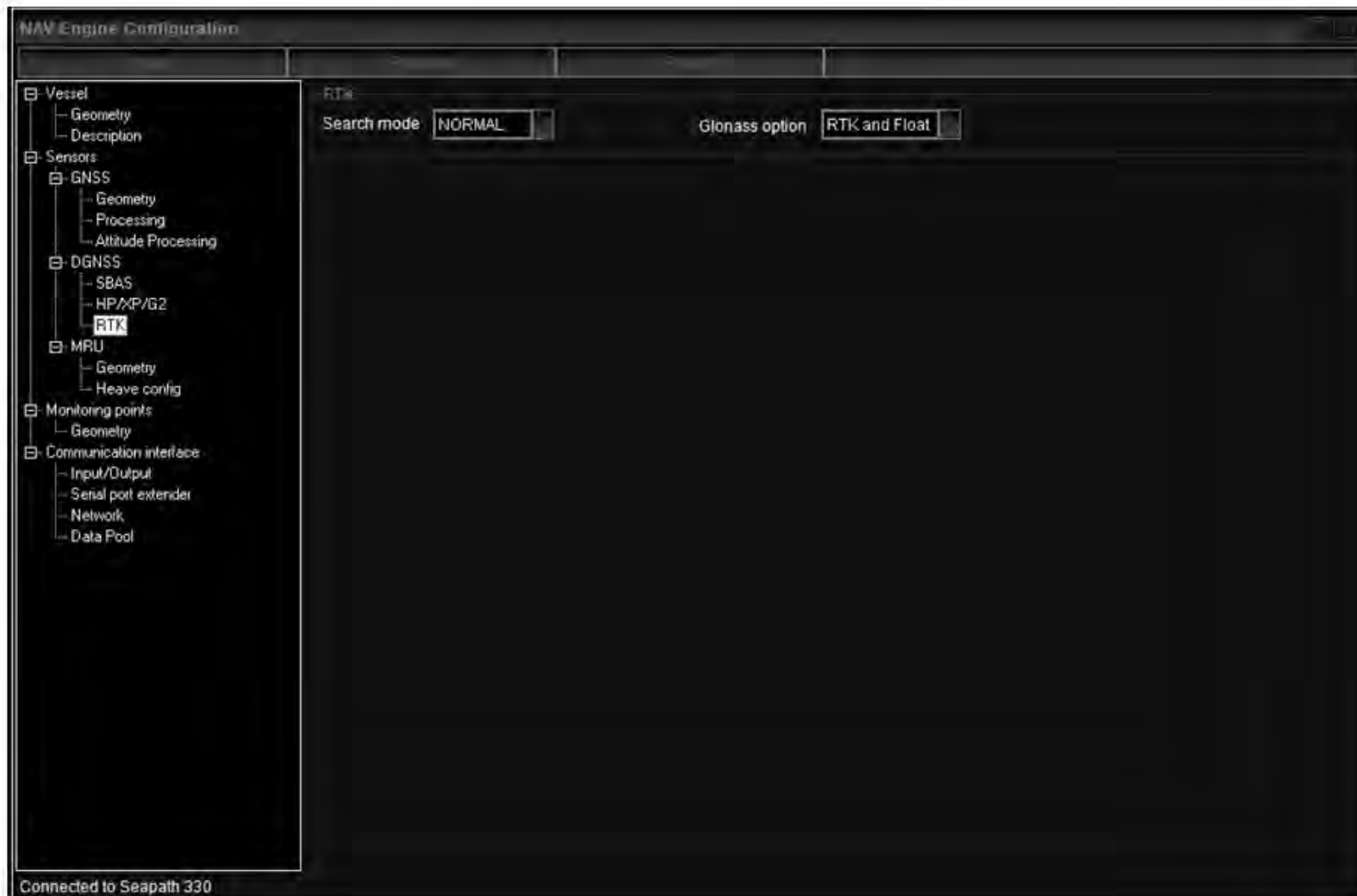
Average pitch and roll angles ° (default 7)

Glonass option

Connected to Seapath 330







NAV Engine Configuration

- Vessel
 - Geometry
 - Description
- Sensors
 - GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - DGNSS
 - SBAS
 - HP/XP/G2
 - RTK
 - MRU
 - Geometry
 - Heave config
- Monitoring points
 - Geometry
- Communication interface
 - Input/Output
 - Serial port extender
 - Network
 - Data Pool

Show sensors Show monitoring points

MRU location (from Origin)


X m Y m Z m

MRU mounting angles

Roll ° Pitch ° Yaw °

Physical mount

MRU Type



Connected to Seapath 330



NAV Engine Configuration

- Vessel
 - Geometry
 - Description
- Sensors
 - GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - DGNSS
 - SBAS
 - HP/XP/G2
 - RTK
 - MRU
 - Geometry
 - Heave config
 - Monitoring points
 - Geometry
 - Communication interface
 - Input/Output
 - Serial port extender
 - Network
 - Data Pool

Show sensors

ID	Name	Position [m]			
		X	Y	Z	
1	EM2040C		0.036	0.000	0.133

Monitoring points are entered relative to Origin

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Attitude Processing
 - [-] DGNS
 - [-] SBAS
 - [-] HPX/P/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
- [-] Monitoring points
 - [-] Geometry
- [-] Communication interface
 - [-] **Input/Output**
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
✓ GnsRec1	Serial	In/Out	GNSSA1 57600 n 8 1	Receiver #1
✓ GnsRec2	Serial	In/Out	GNSSB1 57600 n 8 1	Receiver #2
✓ MRU	Serial	In/Out	MRU 115200 n 8 1 rs-422	IMU #1
Gyro1	Serial	In	CDM11 9600 n 8 1 rs-232	Gyro #1
DgnssLink1	Serial	In	CDM11 38400 n 8 1	FUGRO 3610 PORT A
✓ DgnssLink2	Serial	In	CDM14 38400 n 8 1 rs-422	FUGRO 3610 PORT B
DgnssLink3	Serial	In	NONE	Link #3
DgnssLink4	Serial	In	NONE	Link #4
CorrectionRadio1			NONE	
CorrectionRadio2			NONE	
CorrectionRadio3			NONE	
✓ TelegramOut1	Serial	Out	CDMS 9600 n 8 1 rs-232	POSITION TO EM2040C
✓ TelegramOut2	Serial	Out	CDM10 19200 n 8 1 rs-232	SIMRAD EM3000 to EM2040C
✓ TelegramOut3	Ethernet	Out	UDP LAN3 3001 BROADCAST	ATTITUDE VELOCITY TO EM2...
✓ TelegramOut4	Serial	Out	CDM2 9600 n 8 1	POSITION and TIME to GINSy
✓ TelegramOut5	Ethernet	Out	UDP LAN4 13001 BROADCAST	ATTITUDE VELOCITY to GINSy
TelegramOut6	Ethernet	In	UDP LAN4 13000 BROADCAST	position to client
TelegramOut7		Out	NONE	Telegram Out #7
TelegramOut8		Out	NONE	Telegram Out #8
TelegramOut9		Out	NONE	Telegram Out #9
TelegramOut10		Out	NONE	Telegram Out #10
TelegramOut11		Out	NONE	Telegram Out #11
TelegramOut12		Out	NONE	Telegram Out #12
TelegramOut13		Out	NONE	Telegram Out #13
TelegramOut14		Out	NONE	Telegram Out #14
TelegramOut15		Out	NONE	Telegram Out #15
TelegramOut16		Out	NONE	Telegram Out #16
AnalogOut1	Analog	Out	Draw: 0.0000, alarm: 3.0000	AnalogOut #1
AnalogOut2	Analog	Out	Draw: 0.0000, alarm: 5.0000	AnalogOut #2
AnalogOut3	Analog	Out	Draw: 0.0000, alarm: 7.0000	AnalogOut #3

Disabled |
 OK |
 Warning |
 Error

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP/P/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
 - [-] Monitoring points
 - [-] Geometry
 - [-] Communication interface
 - Input/Output**
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input checked="" type="checkbox"/> GnssRec1	Serial	In/Out	GNSSA1 57600 n 8 1	Receiver #1
<input checked="" type="checkbox"/> GnssRec2	Serial	In/Out	GNSSB1 57600 n 8 1	Receiver #2
<input checked="" type="checkbox"/> MRU	Serial	In/Out	MRU 115200 n 8 1 rs-422	IMU #1
<input type="checkbox"/> Ixmt1	Serial	In	COM11 9600 n 8 1 r-232	Serial #1
<input type="checkbox"/> Ixmt2	Serial	In	COM12 9600 n 8 1 r-232	Serial #2

Disabled | OK | Warning | Error

Configure a sensor details

Name: I/O direction:

Type:

Data rate:

I/O properties

Port: Baud rate: Parity: Stop bits:

Advanced

Mode: Data bits: Stop bits:

Connected to Seapath 330

MAY Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP/XP/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
 - [-] Monitoring points
 - [-] Geometry
 - [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input checked="" type="checkbox"/> GnsRec1	Serial	In/Out	GNSSA1 57600 n 8 1	Receiver #1
<input checked="" type="checkbox"/> GnsRec2	Serial	In/Out	GNSSB1 57600 n 8 1	Receiver #2
<input checked="" type="checkbox"/> MRU	Serial	In/Out	MRU 115200 n 8 1 rs-422	IMU #1
<input type="checkbox"/> Gyro1	Serial	In	GYM11 9600 n 8 1 rs-422	Gyro #1
<input type="checkbox"/> Gyro2	Serial	In	GYM12 9600 n 8 1	Gyro #2
<input type="checkbox"/> Gyro3	Serial	In	GYM13 9600 n 8 1	Gyro #3
<input type="checkbox"/> Gyro4	Serial	In	GYM14 9600 n 8 1	Gyro #4

Disabled | OK | Warning | Error

Communication details:

|

Type:

Device ID:

I/O properties:

| Baud rate: | | |

| | Baud rate:

Connected to Seapath 330

MAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HPX/P/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
 - [-] Monitoring points
 - [-] Geometry
 - [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input checked="" type="checkbox"/> GnsRec1	Serial	In/Out	GNSSA1 57600 n 8 1	Receiver #1
<input checked="" type="checkbox"/> GnsRec2	Serial	In/Out	GNSSB1 57600 n 8 1	Receiver #2
<input checked="" type="checkbox"/> MRU	Serial	In/Out	MRU.115200 n 8 1 rs-422	IMU #1
<input type="checkbox"/> Gyro1	Serial	In	DDM1 115200 n 8 1 rs-422	Gyro IMU
<input type="checkbox"/> DigidataIMU	Serial	In	115200 3 data n 8 1	HUGBO 3IMU (DDM1)

Disabled |
 OK |
 Warning |
 Error

Name: Description:
 Type:
 Direction:

Name: Data rate: Direction:
 Name: Data rate: Stopbits:

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - Geometry
 - Description
- [-] Sensors
 - [-] GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - [-] DGNSS
 - SBAS
 - HP/XP/G2
 - RTK
 - [-] MRU
 - Geometry
 - Heave config
 - [-] Monitoring points
 - Geometry
 - [-] Communication interface
 - Input/Output**
 - Serial port extender
 - Network
 - Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input checked="" type="checkbox"/> MRU	Serial	In/Out	MRU 115200 n 8 1 rs-422	IMU #1
<input type="checkbox"/> Fuso	Serial	In	COM11 9600 n 8 1 rs-422	Sea #1
<input type="checkbox"/> LogRecorder	Serial	In	COM13 9600 n 8 1	FUGRO 3510 PORT A
<input checked="" type="checkbox"/> DgnssLink2	Serial	In	COM14 38400 n 8 1 rs-422	FUGRO 3610 PORT B
<input type="checkbox"/> DgnssLink3	Serial	In	None	DRU #2

Disabled | OK | Warning | Error

▼ Configuration details

Interface: Description:

Type:

Cable ID:

▼ I/O properties

Port: Baud rate: rs-232 rs-422

▶ Advanced

▼ DGNSS link properties

Interface: Name: Timeout [s]:

Format:

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNS
 - [-] SBAS
 - [-] HP/XP/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
- [-] Monitoring points
 - [-] Geometry
- [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input type="checkbox"/> ConsoleA (Active)			NONE	
<input type="checkbox"/> ConsoleB (Active)			NONE	
<input checked="" type="checkbox"/> TelegramOut1	Serial	Out	COM9 9600 n 8 1 rs-232	POSITION TO EM2040C
<input checked="" type="checkbox"/> TelegramOut2	Serial	Out	COM10 19200 n 8 1 rs-232	SIMRAD EM3000 to EM2040C
<input checked="" type="checkbox"/> TelegramOut3	Ethernet	Out	UDP LAN3 3001 BROADCAST	ATTITUDE VELOCITY TO EM2...

Disabled | OK | Warning | Error

▼ Configuration details

Interface: Description:

Type:

Cable ID:

▼ I/O properties

Port: Baud rate: rs-232 rs-422

▶ Advanced

▼ Telegram out properties

Format: Datum: Monitoring point:

NMEA selection:

Options:

NMEA talker ID: Log to file Time precision:

▼ Telegram timing

Interval [s]: Event driven Timer driven

Connected to Seapath 330

NAV Engine Configuration

- Vessel
 - Geometry
 - Description
- Sensors
 - GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - DGNSS
 - SBAS
 - HP/P/G2
 - RTK
 - MRU
 - Geometry
 - Heave config
 - Monitoring points
 - Geometry
 - Communication interface
 - Input/Output**
 - Serial port extender
 - Network
 - Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
CorrectionRawIn			NONE	
CorrectionRawOut			NONE	
TelegramOut1	Serial	Out	COM9 9600 n 8 1 rs-232	POSITION TO EM2040C
TelegramOut2	Serial	Out	COM10 19200 n 8 1 rs-232	SIMRAD EM3000 to EM2040C
TelegramOut3	Ethernet	Out	UDP LAN3 3001 BROADCAST	ATTITUDE VELOCITY TO EM2...

Disabled | OK | Warning | Error

▼ Configuration details

Interface: Description:

Type:

Cable ID:

▼ I/O properties

Port: Baud rate: rs-232 rs-422

► Advanced

▼ Telegram out properties

Format: Log to file Monitoring point:

Options:

▼ Telegram timing

Interval [s]: Event driven Timer driven

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP-X/P/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
 - [-] Monitoring points
 - [-] Geometry
 - [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input type="radio"/> CommsOut1			NONE	
<input type="radio"/> CommsOut2			NONE	
<input checked="" type="checkbox"/> TelegramOut1	Serial	Out	COM9 9600 n 8 1 rs-232	POSITION TO EM2040C
<input checked="" type="checkbox"/> TelegramOut2	Serial	Out	COM10 19200 n 8 1 rs-232	SIMRAD EM3000 to EM2040C
<input checked="" type="checkbox"/> TelegramOut3	Ethernet	Out	UDP LAN3 3001 BROADCAST	ATTITUDE VELOCITY TO EM2...

Disabled |
 OK |
 Warning |
 Error

▼ Configuration details

Interface: Description:

Type:

Cable ID:

▼ I/O properties

Broadcast
 Unicast
 Multicast

Local interface:

Remote port:

▼ Telegram out properties

Format: Datum: Monitoring point:

Options:

Log to file

▼ Telegram timing

Interval [s]: Event driven Timer driven

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP/A/P/G/2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
- [-] Monitoring points
 - [-] Geometry
- [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
TelegramOut1	Serial	Out	COM9 9600 n 8 1 rs-232	POSITION TO EM2040C
TelegramOut2	Serial	Out	COM10 19200 n 8 1 rs-232	SIMRAD EM3000 to EM2040C
TelegramOut3	Ethernet	Out	UDP LAN3 3001 BROADCAST	ATTITUDE VELOCITY TO EM2...
TelegramOut4	Serial	Out	COM2 9600 n 8 1	POSITION and TIME to QINSy
TelegramOut5	Ethernet	Out	UDP LAN4 13001 BROADCAST	ATTITUDE VELOCITY to QINSy

Disabled | OK | Warning | Error

▼ Configuration details

Interface: Description:

Type:

Cable ID:

▼ I/O properties

Port: Baud rate:

▶ Advanced

▼ Telegram out properties

Format:

NMEA selection:

Options:

NMEA talker ID: Log to file Time precision:

▼ Telegram limiting

Interval [s]: Event driven Timer driven

Connected to Seapath 330

NAV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Altitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP-X/P/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
 - [-] Monitoring points
 - [-] Geometry
 - [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Input/Output list

Interface	Type	Direction	I/O Properties	Description
<input checked="" type="checkbox"/> TelegramOut1	Serial	Out	COM9 9600 n 8 1 rs-232	POSITION TO EM2040C
<input checked="" type="checkbox"/> TelegramOut2	Serial	Out	COM10 19200 n 8 1 rs-232	SIMRAD EM3000 to EM2040C
<input checked="" type="checkbox"/> TelegramOut3	Ethernet	Out	UDP LAN3 3001 BROADCAST	ATTITUDE VELOCITY TO EM2...
<input checked="" type="checkbox"/> TelegramOut4	Serial	Out	COM2 9600 n 8 1	POSITION and TIME to QINSy
<input checked="" type="checkbox"/> TelegramOut5	Ethernet	Out	UDP LAN4 13001 BROADCAST	ATTITUDE VELOCITY to QINSy

Disabled |
 OK |
 Warning |
 Error

▼ Configuration details

Interface: Description:

Type:

Cable ID:

▼ I/O properties

Broadcast
 Unicast
 Multicast

Local interface:

Remote port:

▼ Telegram out properties

Format: Datum: Monitoring point:

Options:

Log to file

▼ Telegram timing

Interval [s]:
 Event driven
 Timer driven

Connected to Seapath 330

NMV Engine Configuration

- [-] Vessel
 - [-] Geometry
 - [-] Description
- [-] Sensors
 - [-] GNSS
 - [-] Geometry
 - [-] Processing
 - [-] Attitude Processing
 - [-] DGNSS
 - [-] SBAS
 - [-] HP/P/G2
 - [-] RTK
 - [-] MRU
 - [-] Geometry
 - [-] Heave config
- [-] Monitoring points
 - [-] Geometry
- [-] Communication interface
 - [-] Input/Output
 - [-] Serial port extender
 - [-] Network
 - [-] Data Pool

Address: 192.168.1.150 [Open configuration](#)

Type: Disabled

Connected to Seapath 330

NAV Engine Configuration

- Vessel
 - Geometry
 - Description
- Sensors
 - GNSS
 - Geometry
 - Processing
 - Altitude Processing
 - DGNSS
 - SBAS
 - HP/P/G2
 - RTK
 - MRU
 - Geometry
 - Heave config
- Monitoring points
 - Geometry
- Communication interface
 - Input/Output
 - Serial port extender
 - Network
 - Data Pool

Interface settings

Interface: LAN2

DHCP

IP address: 192.168.1.11

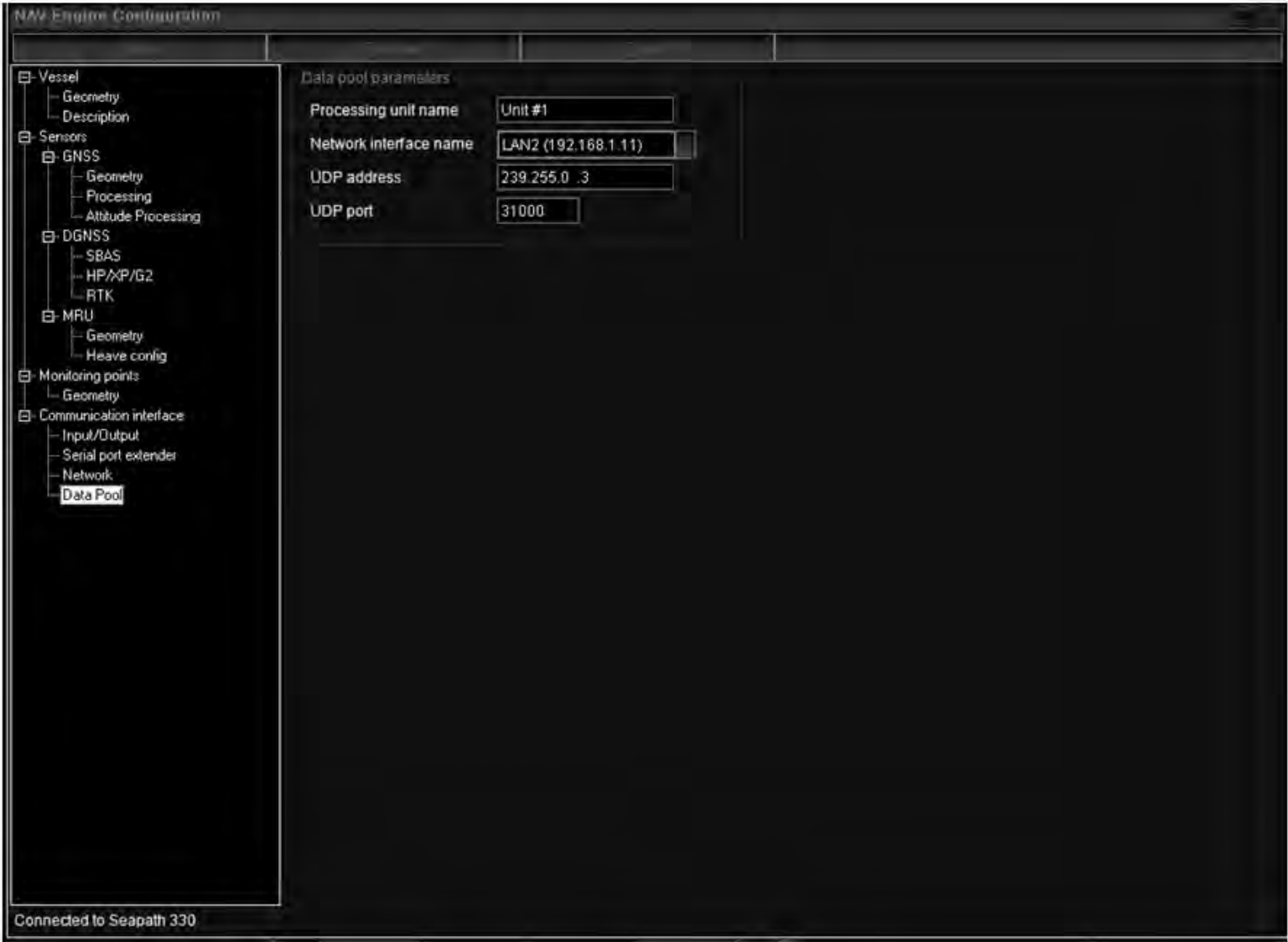
Subnet mask: 255.255.255.0

Gateway

Gateway interface: LAN2

Default gateway: . . .

Connected to Seapath 330



Appendix C – Template database settings in Qinsy (for acquisition)

Note: All template databases used for surveying in the 2020 season are identical except for EM2040C calibration offsets (e.g. pitch, roll, and heading). These differences are summarized in table 4 of report's main text.

Template database name: AmyGale_2020_Patch1_nonverifiedtides_2.db

Note: Disregard template database name. Verified tide files were used to run the patch test and update EM2040C offsets, however the template name was not properly changed to reflect this.

Qinsy uses the following reference frame conventions (these differ from those used by Seapath 330):

Pitch rotation: + bow up

Roll rotation: + heeling to starboard

Heave: + upwards

X: + to starboard

Y: + towards bow

Z: + up

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Information: General

Line name:	No line name
Line sequence number:	1
Line description:	N/A

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
- Datums
 - WGS84
- Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
- Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
- UTC to GPS Correction
- Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Geodetic

Predefined system:	Not Defined
Survey unit name:	Meters
Conversion factor to metres:	1.0000000000000000
WKT blob:	2
WKT string:	<pre> PROJCS["Universal Transverse Mercator (North Hemisphere)", GEOGCS["WGS84", DATUM["WGS84", SPHEROID["WGS 1984", 6378137, 298.257223563, UNIT["meter", 1, AUTHORITY["EPSG", "9001"]]], PRIMEM["Greenwich", 0, AUTHORITY["EPSG", "8901"]], UNIT["degree", 0.0174532925199433, AUTHORITY["EPSG", "9102"]]], PROJECTION_NAME["Universal Transverse Mercator (North Hemisphere)", AUTHORITY["EPSG", "9807"]], PROJECTION["Transverse Mercator", AUTHORITY["EPSG", "9807"]], PARAMETER["latitude_of_origin", 0, UNIT["degree", 0.0174532925199433, AUTHORITY["EPSG", "9102"]]], PARAMETER["central_meridian", -69, UNIT["degree", 0.0174532925199433, AUTHORITY["EPSG", "9102"]]], PARAMETER["false_easting", 500000, UNIT["meter", 1, AUTHORITY["EPSG", "9001"]]], PARAMETER["false_northing", 0, UNIT["meter", 1, AUTHORITY["EPSG", "9001"]]], PARAMETER["scale_factor", 0.9996, UNIT["unity", 1, AUTHORITY["EPSG", "9201"]]], UNIT["meter", 1, AUTHORITY["EPSG", "9001"]]], METADATA["WGS84", PARAMETER["version", 2], PARAMETER["timestamp", "20210225T035001.424000"]]] </pre>

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view under the 'Survey' root. The tree structure is as follows:

- Survey
 - General
 - Geodetic
 - Datums** (selected)
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

On the right is a configuration panel titled 'Datums: Datums' with the following settings:

Survey datum:	WGS84
Chart datum:	WGS84
Height file:	N/A
Height level:	No Level Correction
Height file:	N/A
Height offset:	0.000 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic
 - Datums**
 - WGS84**
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Datum: WGS84

Datum name:	WGS84
Spheroid name:	WGS 1984
Prime meridian:	Greenwich
Prime meridian:	0;00;00.000 E
Conversion factor to metres:	1.000000000000000
Semi-major axis (a):	6378137.000 m
Semi-minor axis (b):	6356752.314 m
Inverse flattening (1/f):	298.257223563000
Flattening (f):	0.003352810664747
First eccentricity (e):	0.081819190842621
First eccentricity squared (e**2):	0.006694379990141
Second eccentricity (e')	0.082094437949696
Second eccentricity squared (e'**2):	0.006739496742276

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
 - Datums
 - WGS84
 - Heights**
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
- Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Heights: Heights

Chart datum:	WGS84
Height file:	N/A
Height level:	No Level Correction
Height file:	N/A
Height offset:	0.000 m
MWL model:	Horizontal Datum
MWL file:	N/A
MWL level:	No Level Correction
MWL file:	N/A
MWL offset:	0.000 m
MWL st.dev.:	0.000 m
DTM mode:	Absolute DTMs
DTM datum:	WGS84
DTM file:	N/A
DTM level:	No Level Correction
DTM file:	N/A
DTM offset:	0.000 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
 - Datums
 - WGS84
 - Heights**
 - Chart Datum / Vertical Datum**
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Height Datum: Chart Datum / Vertical Datum

Chart datum: WGS84
 Height file: N/A
 Height level: No Level Correction
 Height file: N/A
 Height offset: 0.000 m

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
 - Datums
 - WGS84
 - Heights**
 - Chart Datum / Vertical Datum
 - Mean Water Level Model**
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

MWL Model: Mean Water Level Model

MWL model: Horizontal Datum
MWL file: N/A
MWL level: No Level Correction
MWL file: N/A
MWL offset: 0.000 m
MWL st.dev.: 0.000 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
 - Datums
 - WGS84
 - Heights**
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models**
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object**
 - Amy Gale**
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
- Auxiliary Systems**
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

DTM Mode: Digital Terrain Models

DTM mode: Absolute DTMs
 DTM datum: WGS84
 DTM file: N/A
 DTM level: No Level Correction
 DTM file: N/A
 DTM offset: 0.000 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections**
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
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 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
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 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
- Auxiliary Systems
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 - EM2040C Controller
 - ASCII Logger
- Fixed Node

Projections: Projections

Projection type:	0001
Projection name:	Universal Transverse Mercator (North Hemisphere)
Conversion factor to metres:	1.0000000000000000
Construction grid type:	Undefined

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view under the heading 'Survey'. The tree is expanded to show 'Geodetic' > 'Projections', where 'Universal Transverse Mercator (North Hemisphere)' is selected and highlighted in blue. Other items in the tree include 'Datums' (WGS84), 'Heights' (Chart Datum / Vertical Datum, Mean Water Level Model, Digital Terrain Models), 'Local Construction Grid', 'UTC to GPS Correction', 'Sound Velocity Profile', 'Object' (Amy Gale, System, EM2040C, Gyro, Pitch Roll Heave Sensor, Position Navigation System, Variable Node, Amy Gale MRU, RX, TX, Link), and 'Auxiliary Systems' (Time Sync, EM2040C Controller, ASCII Logger, Fixed Node).

On the right is a panel titled 'Projection: Universal Transverse Mercator (North Hemisphere)'. It contains a table of projection parameters:

Projection type:	0001
Projection name:	Universal Transverse Mercator (North Hemisphere)
Conversion factor to metres:	1.0000000000000000
UTM zone number:	19
UTM central meridian:	69;00;00.00000 W
Latitude of grid origin:	0;00;00.00000 N
Longitude of grid origin:	69;00;00.00000 W
Grid Easting at grid origin:	500000.000 m
Grid Northing at grid origin:	0.000 m
Scale factor at longitude of origin:	0.99960000000000

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic**
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections**
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid**
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- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Local Grid: Local Construction Grid

Construction grid type: Undefined

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The screenshot shows a software window titled "AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program". The window has a menu bar with "File", "Edit", "View", "Options", and "Help". Below the menu bar is a toolbar with various icons. The main area is split into two panes. The left pane contains a tree view with the following structure:

- Survey
 - General
 - Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction**
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
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 - Fixed Node

The right pane is titled "UTC to GPS Correction" and contains the text "UTC to GPS time correction: 18.000 s".

Qinsky 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view under the 'Survey' root, containing categories like Geodetic, Object, and Auxiliary Systems. The 'Sound Velocity Profile' item is selected and highlighted. On the right is a details panel for the selected item, showing various parameters such as Profile ID, latitude, longitude, date, time, units, and data standard deviations.

Sound Velocity Profile	
Profile ID:	1383
Profile latitude:	43;31;56.02287 N
Profile longitude:	70;20;08.58092 W
Profile date:	2020-06-04
Profile time:	13:07
Depth unit:	Meters
Velocity unit:	Meters / Second
SD depth data:	0.100 m
SD velocity data:	0.050 m/s
Number of entries:	17

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Object: Amy Gale

Object reference number:	1
Object type:	Vessel
Description of reference point:	Amy Gale MRU
Height above draft reference:	0.000 m
Squat model:	Not Defined
SD draft:	0.050 m
SD squat:	0.050 m
SD load:	0.050 m
SD tide:	0.100 m
Time latency navigation:	0.025 s
Time correction to GMT (UTC):	0.000 h
Time correction to master vessel's time:	0.000 s

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

System: EM2040C

Description:	EM2040C
Type:	Multibeam Echosounder
Driver:	Kongsberg EM2040/EM710/EM302/EM122
Executable and Cmdline:	DrvKongsbergEM.exe
Driver specific settings:	MANUFACTURER=2;MODEL=2045;RAW_BATHY=1;RAW_SNIP=1;RAW_WCD=1;
Port:	2001
Update rate:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	1
Manufacturer:	Kongsberg
Model:	EM2040C
Object location:	Amy Gale
Node name:	RX
X (Stbd = Positive)::	0.000 m
Y (Bow = Positive)::	-0.045 m
Z (Up = Positive)::	0.006 m
A-priori SD:	0.010 m
Roll offset:	0.332
Pitch offset:	0.279
Heading offset:	-0.181
Unit is roll stabilized:	No
Unit is pitch stabilized:	No
Unit is heave compensated:	No
Beam steering (flat transducer):	No
Beam angle width along:	1.500 m
Beam angle width across:	1.500 m
Maximum number of beams per ping:	800
Use sound velocity from unit:	Yes
Slot:	1
SD type:	Pulse, Sampling
SD pulse length:	0.150 ms
SD sampling length:	0.050 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Update rate:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	1
Manufacturer:	Kongsberg
Model:	EM2040C
Object location:	Amy Gale
Node name:	RX
X (Stbd = Positive)::	0.000 m
Y (Bow = Positive)::	-0.045 m
Z (Up = Positive)::	0.006 m
A-priori SD:	0.010 m
Roll offset:	0.332
Pitch offset:	0.279
Heading offset:	-0.181
Unit is roll stabilized:	No
Unit is pitch stabilized:	No
Unit is heave compensated:	No
Beam steering (flat transducer):	No
Beam angle width along:	1.500 m
Beam angle width across:	1.500 m
Maximum number of beams per ping:	800
Use sound velocity from unit:	Yes
Slot:	1
SD type:	Pulse, Sampling
SD pulse length:	0.150 ms
SD sampling length:	0.050 m
SD roll offset:	0.050 °
SD pitch offset:	0.050 °
SD heading offset:	0.500 °
SD roll stabilization:	0.000 °
SD pitch stabilization:	0.000 °
SD heave compensation:	0.000 m
SD sound velocity:	0.050 m/s

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

System: Gyro

Description:	Gyro
Type:	Gyro Compass
Driver:	Network - Seapath Binary Format 11 (Hdg) (With UTC)
Executable and Cmdline:	DrvQPSCountedUDP.exe SEAPATH_FMT11 PPS
Port:	13001
Update rate:	0.000 s
Latency:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view showing the project hierarchy. On the right is a detailed view of the selected 'Gyro' observation.

Tree View:

- Survey
 - General
 - Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Observation: Gyro

Observation description:	Gyro
Observation type:	Bearing (True)
'At' node:	Amy Gale MRU
Measurement unit code:	Degrees
System description:	Gyro
(C-O) option:	(C-O) offsets applied first
Scale factor:	1.000000000000
Fixed system (C-O):	0.0000000000
Variable (C-O):	0.00000000
A-priori SD:	0.5000

Qinsky 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view showing the project structure. On the right is a configuration panel for the selected 'Pitch Roll Heave Sensor'.

Tree View Structure:

- Survey
 - General
 - Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

System: Pitch Roll Heave Sensor Configuration:

Description:	Pitch Roll Heave Sensor
Type:	Pitch Roll Heave Sensor
Driver:	Network - Seapath MRU Binary Format 11 (With UTC)
Executable and Cmdline:	DrvQPSCountedUDP.exe SEAPATH_FMT11 PPS
Port:	13001
Update rate:	0.000 s
Latency:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0
Object:	Amy Gale
PRH sensor reference number:	1
Rotation convention pitch:	Positive bow up
Rotation convention roll:	Positive heeling to starboard
Angular variable measured:	HPR (roll first)
Angular measurement units:	Degrees
Sign convention heave:	Positive upwards
Measurement unit heave:	Meters
Conversion factor to degrees decimal:	N/A
Conversion factor to metres:	N/A
Quality indicator type pitch and roll:	No quality info recorded
Quality indicator type heave:	No quality info recorded
Description of quality indicator type:	N/A
Object location:	Amy Gale
Node name:	Amy Gale MRU
X (Stbd = Positive)::	0.000 m
Y (Bow = Positive)::	0.000 m
Z (Up = Positive)::	0.000 m
A-priori SD:	0.000 m
(C-O) roll offset:	0.000 °
(C-O) pitch offset:	0.000 °
(C-O) heave offset:	0.000 m
Heave time delay:	0.000 s

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Latency:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0
Object:	Amy Gale
PRH sensor reference number:	1
Rotation convention pitch:	Positive bow up
Rotation convention roll:	Positive heeling to starboard
Angular variable measured:	HPR (roll first)
Angular measurement units:	Degrees
Sign convention heave:	Positive upwards
Measurement unit heave:	Meters
Conversion factor to degrees decimal:	N/A
Conversion factor to metres:	N/A
Quality indicator type pitch and roll:	No quality info recorded
Quality indicator type heave:	No quality info recorded
Description of quality indicator type:	N/A
Object location:	Amy Gale
Node name:	Amy Gale MRU
X (Stbd = Positive)::	0.000 m
Y (Bow = Positive)::	0.000 m
Z (Up = Positive)::	0.000 m
A-priori SD:	0.000 m
(C-O) roll offset:	0.000 °
(C-O) pitch offset:	0.000 °
(C-O) heave offset:	0.000 m
Heave time delay:	0.000 s
Heave filter length:	N/A
SD roll and pitch:	0.050 °
SD heave (fixed):	0.050 m
SD heave (variable):	5.000 %
SD roll offset:	0.050 °
SD pitch offset:	0.050 °
SD heave offset:	0.050 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

System: Position Navigation System

Description:	Position Navigation System
Type:	Position Navigation System
Driver:	Network - Seapath Binary Format 11 (With UTC)
Executable and Cmdline:	DrvQPSCountedUDP.exe SEAPATH_FMT11 PPS
Port:	13001
Update rate:	0.000 s
Latency:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0
Satellite system name:	WGS84
Horizontal datum:	WGS84
Vertical datum:	WGS84
Height file:	N/A
Height level:	No Level Correction
Height file:	N/A
Height offset:	0.000 m
SD latitude:	0.250 m
SD longitude:	0.250 m
SD height:	0.250 m
Measurement unit:	Meters
Receiver description:	Position Navigation System
Receiver number:	0
Object location:	Amy Gale
Node name:	Amy Gale MRU
X (Stbd = Positive)::	0.000 m
Y (Bow = Positive)::	0.000 m
Z (Up = Positive)::	0.000 m
A-priori SD:	0.000 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Node: Amy Gale MRU

Object location:	Amy Gale
Node name:	Amy Gale MRU
X (Stbd = Positive)::	0.000 m
Y (Bow = Positive)::	0.000 m
Z (Up = Positive)::	0.000 m
A-priori SD:	0.000 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

Survey

- General
- Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object**
 - Amy Gale**
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node**
 - Amy Gale MRU
 - RX**
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Node: RX

Object location: Amy Gale
 Node name: RX
 X (Stbd = Positive):: 0.000 m
 Y (Bow = Positive):: -0.045 m
 Z (Up = Positive):: 0.006 m
 A-priori SD: 0.010 m

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view showing the project hierarchy. On the right is a details pane for the selected node.

Tree View Structure:

- Survey
 - General
 - Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX**
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

Node: TX Details:

Object location:	Amy Gale
Node name:	TX
X (Stbd = Positive)::	0.040 m
Y (Bow = Positive)::	0.004 m
Z (Up = Positive)::	0.006 m
A-priori SD:	0.010 m

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view showing the project structure. On the right is a configuration panel for the selected 'Time Sync' system.

Tree View Structure:

- Survey
 - General
 - Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync**
 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

System: Time Sync Configuration:

Description:	Time Sync
Type:	Time Synchronization System
Driver:	NMEA ZDA
Executable and Cmdline:	DrvPositionNMEA.exe
Port:	2
Baud rate:	9600
Data bits:	8
Stop bits:	1
Parity:	None
Byte frame length (time):	10 bits (1.042 ms)
Maximum data transfer rate:	960 bytes / second
Update rate:	0.000 s
Latency:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0
Use QPS PPS Adapter:	On COM1
PPS time tag pulse matching:	Automatic Matching
Windows System Time Synchronization:	Synchronization is enabled

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The interface is divided into two main sections. On the left is a tree view showing the project structure. On the right is a configuration panel for the selected system.

Tree View Structure:

- Survey
 - General
 - Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
 - Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
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 - RX
 - TX
 - Link
 - Auxiliary Systems
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 - EM2040C Controller
 - ASCII Logger
 - Fixed Node

System: EM2040C Controller

Description:	EM2040C Controller
Type:	Miscellaneous System
Driver:	Kongsberg EM2040 Compact (Single) Multibeam Controller
Executable and Cmdline:	DrvKongsbergEMCtrl.exe 2040C
Update rate:	0.000 s
Latency:	0.000 s
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0

Qinsy 9 For Help, press F1

AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program

File Edit View Options Help

The screenshot shows a software window titled "AmyGale_2020_Patch1_nonverified_tides_2.db - Database Setup Program". The window has a menu bar with "File", "Edit", "View", "Options", and "Help". Below the menu bar is a toolbar with various icons. The main area is split into two panes. The left pane shows a hierarchical tree view of the database structure. The right pane shows the configuration details for the selected "ASCII Logger" system.

System: ASCII Logger

Description:	ASCII Logger
Type:	Output System
Driver:	Generic ASCII Data Logger (Controller)
Executable and Cmdline:	DrvGenericLogger.exe
Update rate:	1.000 s
Latency:	0.000 s
Data output setting:	Enabled
Acquired by:	[Directly into Qinsy] (No additional time tags)
Observation time from:	N/A
Number of slots:	0

Survey

- General
- Geodetic
 - Datums
 - WGS84
 - Heights
 - Chart Datum / Vertical Datum
 - Mean Water Level Model
 - Digital Terrain Models
 - Projections
 - Universal Transverse Mercator (North Hemisphere)
 - Local Construction Grid
 - UTC to GPS Correction
 - Sound Velocity Profile
- Object
 - Amy Gale
 - System
 - EM2040C
 - Gyro
 - Gyro
 - Pitch Roll Heave Sensor
 - Position Navigation System
 - Variable Node
 - Amy Gale MRU
 - RX
 - TX
 - Link
 - Auxiliary Systems
 - Time Sync
 - EM2040C Controller
 - ASCII Logger**
 - Fixed Node

Appendix D – Configuration settings for Qinsy EM controller

The screenshot displays the 'EM Controller - EM2040C Controller' window. It is divided into three main sections: PU Status, Settings, and Events.

PU Status: This section shows the current operational state of the controller. The 'Status' is 'Active', 'Pinging' is '15308 @ 2.90 Hz', 'Clock Status' is 'Ok', and 'Errors' are 'All Ok'. There are buttons for 'Stop', 'Pu Info', and 'Options...'.

Parameter	Value
Status	Active
Pinging	15308 @ 2.90 Hz
Clock Status	Ok
Errors	All Ok

Settings: This section contains a list of 25 configuration parameters, each with a dropdown menu for selection.

Parameter	Value
Head1 Port Angle	65
Head1 Starboard Angle	65
Max. Port Coverage	300
Max. Starboard Coverage	300
Angular Coverage	Auto
Beam Spacing	High Density
Pitch Stabilization	On
Max. Ping Freq.(Hz)	50.00
Transmit Angle (deg)	0.0
Minimum Depth	0.00
Maximum Depth	200.00
Detector Mode	Normal
Slope Filter	On
Acreation Filter	Off
Interference Filter	Off
Penetration Filter	Off
Range Gate Size	Normal
Spike Filter Strength	Medium
Phase Ramp	Normal
Special Amp Detect	Off
Special TVG	Off
Normal Inci. Sector Angle	10
Lambert's law for intensity	Off
Ping Mode	300 KHz
Pulse Type	Auto
Transmit Power Level	Maximum
FM Enable	FM Enabled
3D Scanning - Scan Step	0.0

At the bottom of the Settings section, there are buttons for 'Apply', 'Settings...', 'Force...', and a checked 'Log Events' checkbox.

Events: This section shows a log of recent events with timestamps and descriptions.

Timestamp	Event Description
10:00:53.105	PU Clock is synchronized
10:00:53.963	Connection to PU (157.237.20.40) Established
10:00:53.963	Set Initial Settings
10:00:55.073	Command Accepted

EM Controller - EM2040C Controller

PU Status

Status	Active
Pinging	18646 @ 2.70 Hz
Clock Status	Ok
Errors	All Ok

Stop Pu Info Options...

Settings

Penetration Filter	Off
Range Gate Size	Normal
Spike Filter Strength	Medium
Phase Ramp	Normal
Special Amp Detect	Off
Special TVG	Off
Normal Inci. Sector Angle	10
Lambert's law for intensity	Off
Ping Mode	300 KHz
Pulse Type	Auto
Transmit Power Level	Maximum
FM Enable	FM Enabled
3D Scanning - Scan Step	0.0
3D Scanning - Min Angle	-5
3D Scanning - Max Angle	5
Dual Swath Mode	Off
Min. Swath Distance	0.0
Yaw Stabilization Mode	Off
Yaw Manual Angle	0.0
Heading Filter	Medium
WCD Sonar Mode	Off
WCD Passive Mode	Off
WC TVG LOG R	30.0
WC TVG dB	20.0
Special amplitude detection	Off
Sound Velocity Update Rate	3.0
Sound Velocity Min Change	0.5

Apply Settings... Force... Log Events

Events

10:00:53.105	PU Clock is synchronized
10:00:53.963	Connection to PU (157.237.20.40) Established
10:00:53.963	Set Initial Settings
10:00:55.073	Command Accepted

Options

PU Setup

System Type (from DbSetup)	EM2040C Single Transducer
Pu Ip Address	157.237.20.40
Simulation Mode	Off
External Triggering	Off
Control Port	2000
Enabled Output Ports	Output Port 1,2,3
Output Port 1 (Bathy)	2001
Output Port 2 (Bathy)	2002
Output Port 3 (Sidescan)	2003
ZDA/GGA Serial Port	Port 1 (default)
Use GGA	On
Baudrate ZDA/GGA	9600
Motion Serial Port	Port 2 (default)

Program Options

Start Pinging when QINSy Starts	Pinging On Startup
Synchronize Clock Interval(min.)	60
Sound Velocity Mode	From SoundVelocity C
Sound Velocity Observation	Sound Velocity
Popup window when error occurs	On
Allow HD beamspacing with Water Column Data	Not Allowed

Installation Parameters

RX1 Gain Offet	0
RX2 Gain Offet	0
Head1 Installation angles from	EM2040C
Head2 Installation angles from	Not Used
Velocity Sensor Number	Motion Sensor 1
Velocity Sensor UDP Port	3001
Velocity Sensor Ethernet Port	Ethernet Port 2 (if available)
Ethernet Port 2 IP Address	192.168.1.1
Ethernet Port 2 IP Mask	255.255.0.0

OK Cancel