F00886

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	F00886

LOCALITY

State(s):	Alaska
General Locality:	Approaches to Kodiak Island, AK
Sub-locality:	Chiniak Bay, St. Paul Harbor, and Womens Bay

2023

CHIEF OF PARTY
CDR Meghan McGovern

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

F00886

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):	**Alaska**
General Locality:	**Approaches to Kodiak Island, AK**
Sub-Locality:	**Chiniak Bay, St. Paul Harbor, and Womens Bay**
Scale:	**5000**
Dates of Survey:	**06/27/2023 to 09/08/2023**
Instructions Dated:	**07/26/2023**
Project Number:	**OPR-P337-FA-23**
Field Unit:	**NOAA Ship *Fairweather***
Chief of Party:	**CDR Meghan McGovern**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/. Products created during office processing were generated in NAD83 UTM 5N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

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Descriptive Report to Accompany Survey F00886

Project: OPR-P337-FA-23

Locality: Approaches to Kodiak Island, AK

Sublocality: Chiniak Bay, St. Paul Harbor, and Womens Bay

Scale: 1:5000

June 2023 - September 2023

NOAA Ship *Fairweather*

Chief of Party: CDR Meghan McGovern

A. Area Surveyed

Kodiak Island, Alaska

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
57° 47' 23.79" N 152° 33' 13.31" W	57° 41' 34.13" N 152° 12' 49.7" W

Table 1: Survey Limits

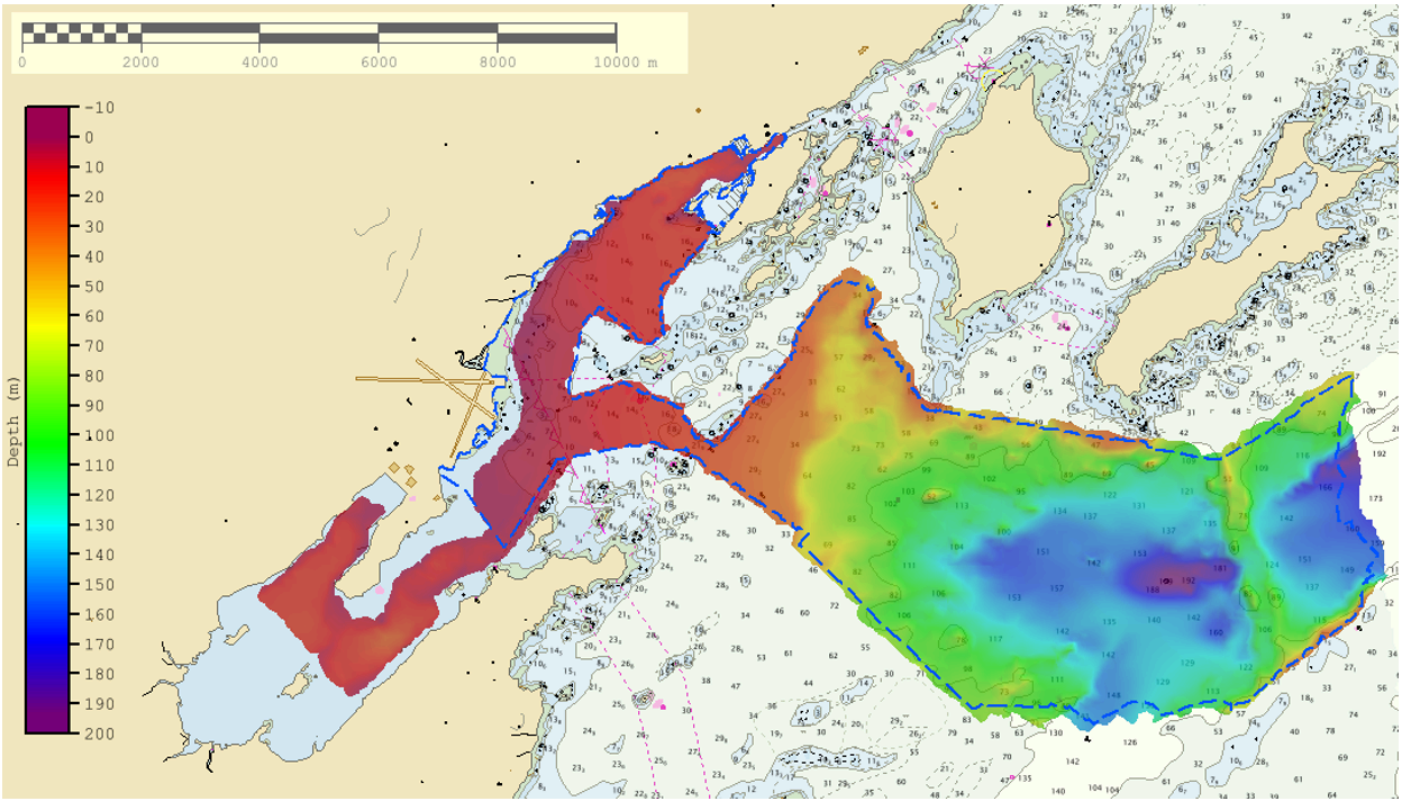


Figure 1: F00886 coverage and sheet limits (in blue) overlaid on chart US4AK5PM

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the 2022 NOS Hydrographic Surveys Specifications and Deliverables (HSSD). Coverage acquired in F00886 is shown in figure above. In all areas where the 3.5 meter depth contour or the sheet limits were not met, the Navigable Area Limit Line (NALL) was defined as the inshore limit of bathymetry due to the risks of maneuvering the survey vessel in close proximity to the steep and rocky shoreline, an area deemed not navigable due to kelp, or inside of harbors. An example of such areas is shown in figures below. Additional data were acquired past the assigned sheet limits and included for coverage of the "buoy run" into Womens Bay, shown in a figure below.

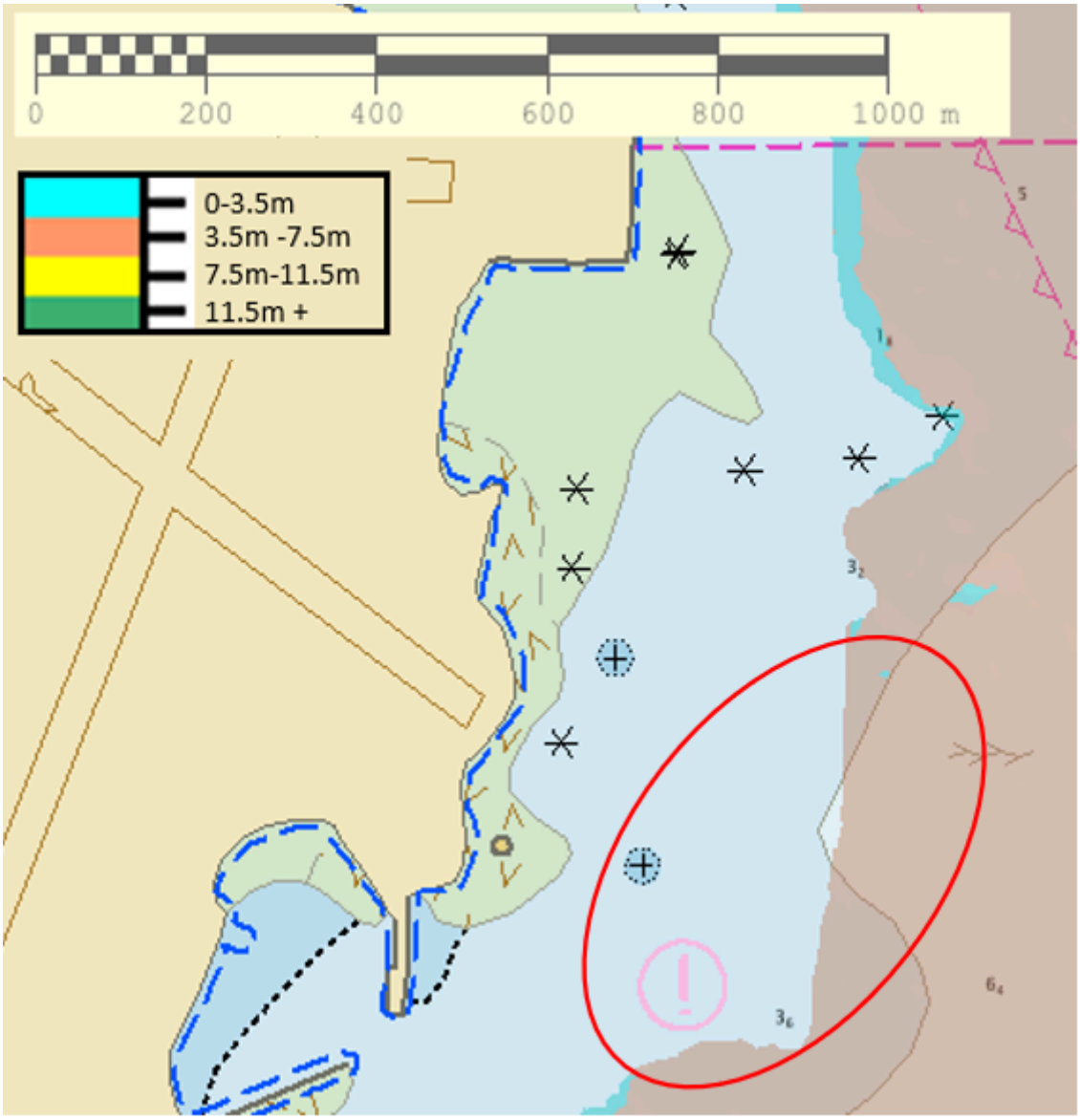


Figure 2: Area where NALL was defined by close proximity to rocky shoreline

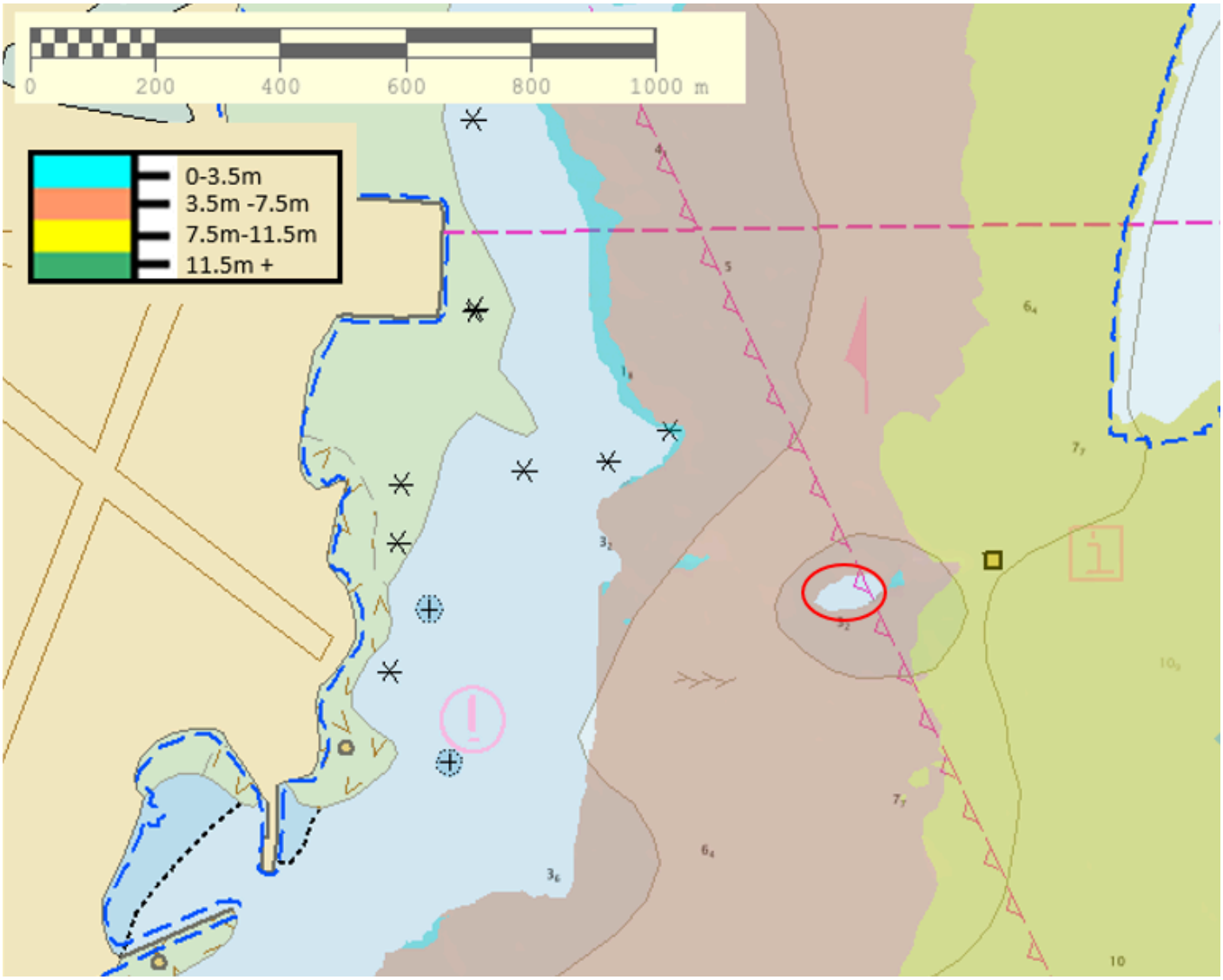


Figure 3: Area where NALL was defined by presence of kelp

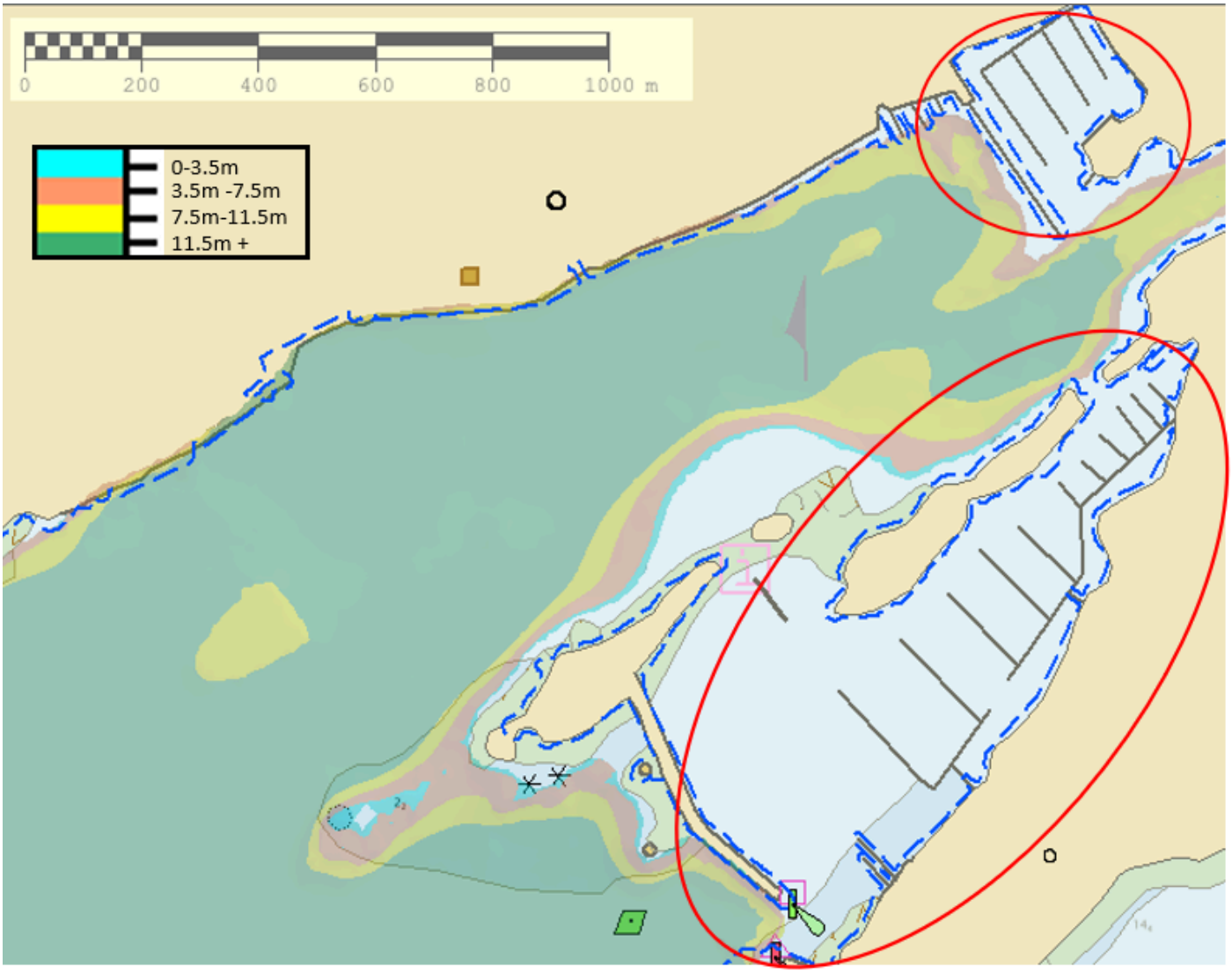


Figure 4: Area where NALL was defined by high traffic harbors

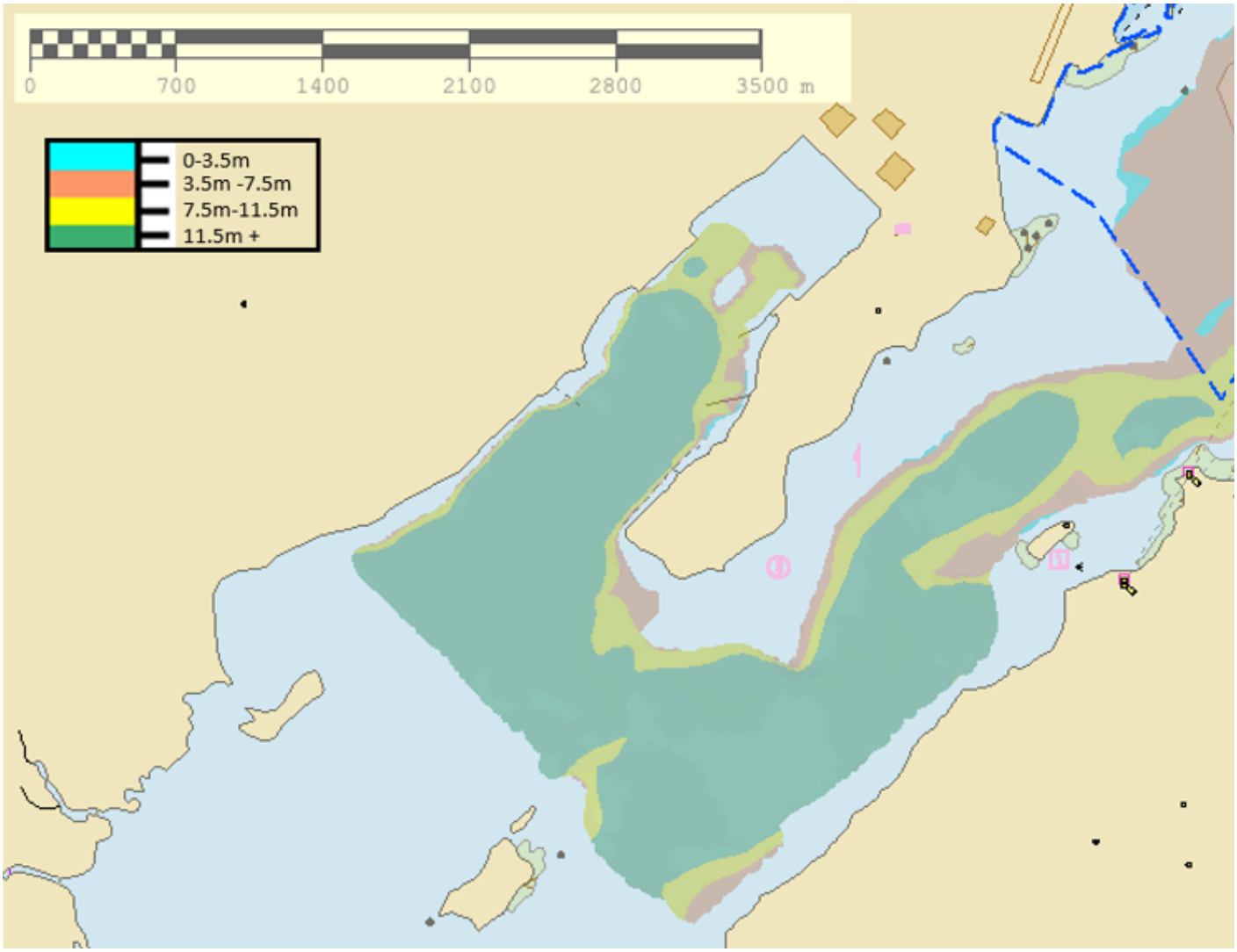


Figure 5: Additional acquisition of Womens Bay

A.2 Survey Purpose

The purpose of this field examination is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. The survey includes the St. Paul Harbor, Womens Bay, USCG Kodiak Piers, and Chinak Bay. This area is a high density traffic area, frequently transited by large Coast Guard ships, fishing vessels, cargo vessels, and now by large US Navy vessels. St. Paul accounts for one third of Kodiak's vessel traffic and serves as the major port of the islands economy. Access to the bases piers and fueling station can only be achieved through the Womens Bay buoy run.
This area was chosen to survey due to its opportunistic location. The Fairweather was anchored in Womens Bay due to mechanical issues and operationally unavailable to resume survey operations in intended offshore survey limits of the Seascape Project. F00886 was added to the project to allow launch survey to occur while awaiting the ship's repair.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in assigned sheet limits of F00886 meet multibeam echo sounder (MBES) coverage requirements for complete coverage as required by the HSSD. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.10), and density requirements (see Section B.2.11). Crosslines were only acquired in assigned sheet limits. Additional data in Womens Bay meet all requirements, except crosslines. The crosslines are 4.15% of assigned sheet mainscheme data, and 3.3% of F00886 combined with additional mainscheme data.

A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
All waters in survey area	Complete Coverage

Table 2: Survey Coverage

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

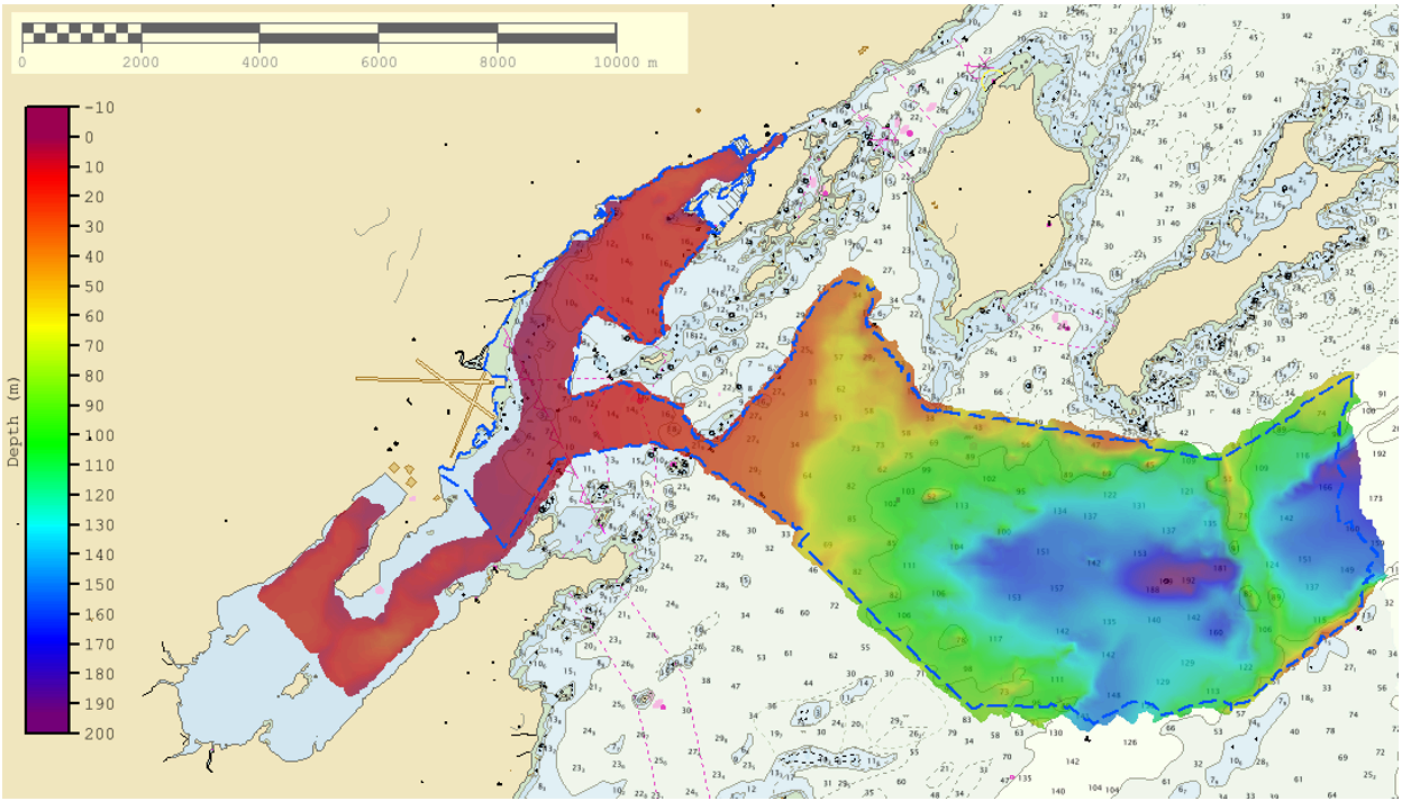


Figure 6: F00886 survey coverage overlaid on Chart US4AK5PM

A.6 Survey Statistics

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

	HULL ID	*2805*	*2806*	*2807*	*2808*	*Total*
LNM	**SBES Mainscheme**	0.0	0.0	0.0	0.0	0.0
	MBES Mainscheme	221.42	78.77	45.38	73.05	419.05
	Lidar Mainscheme	0.0	0.0	0.0	0.0	0.0
	SSS Mainscheme	0.0	0.0	0.0	0.0	0.0
	SBES/SSS Mainscheme	0.0	0.0	0.0	0.0	0.0
	MBES/SSS Mainscheme	0.0	0.0	0.0	0.0	0.0
	SBES/MBES Crosslines	1.83	10.0	0.0	2.12	13.93
	Lidar Crosslines	0.0	0.0	0.0	0.0	0.0
Number of Bottom Samples						0
Number Maritime Boundary Points Investigated						0
Number of DPs						0
Number of Items Investigated by Dive Ops						0
Total SNM						19.01

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
05/19/2023	139
06/27/2023	178

Survey Dates	Day of the Year
06/28/2023	179
09/01/2023	244
09/02/2023	245
09/03/2023	246
09/04/2023	247
09/05/2023	248
09/06/2023	249
09/07/2023	250
09/08/2023	251

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	*2805*	*2806*	*2807*	*2808*
LOA	8.6 meters	8.6 meters	8.6 meters	8.6 meters
Draft	1.1 meters	1.1 meters	1.1 meters	1.1 meters

Table 5: Vessels Used

Figure 7: Example of HSL used in acquisition

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040	MBES
Sea-Bird Scientific	SBE 19plus V2	Conductivity, Temperature, and Depth Sensor
Teledyne RESON	SVP 71	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System

Table 6: Major Systems Used

All launches utilize the Kongsberg EM 2040 MBES, a POS M/V v5 system for position and attitude, SVP 71 surface sound speed sensors, and Sea-Bird SBE 19plus v2 CTDs for conductivity, temperature, and depth casts.

B.2 Quality Control

B.2.1 Crosslines

Crosslines were collected, processed and compared in accordance with Section 5.2.4.2 of the HSSD. For adequate comparison, 4.15% of crossline to MBES data was acquired within assigned sheet limits in F00886. With additional data of Womens Bay, 3.13 % of crossline to mainscheme data was acquired. To evaluate crosslines, a surface generated via data strictly from mainscheme lines and a surface generated via data strictly from crosslines were created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated. Statistics show the mean difference between the depths derived from mainscheme data and crossline data was 0.00 meters and 95% of nodes falling within 0.10 meters. For the respective depths, the difference surface was compared to the allowable NOAA uncertainty standards. In total, 99.5%+ of the depth differences between F00886 mainscheme and crossline data were within allowable NOAA uncertainties.

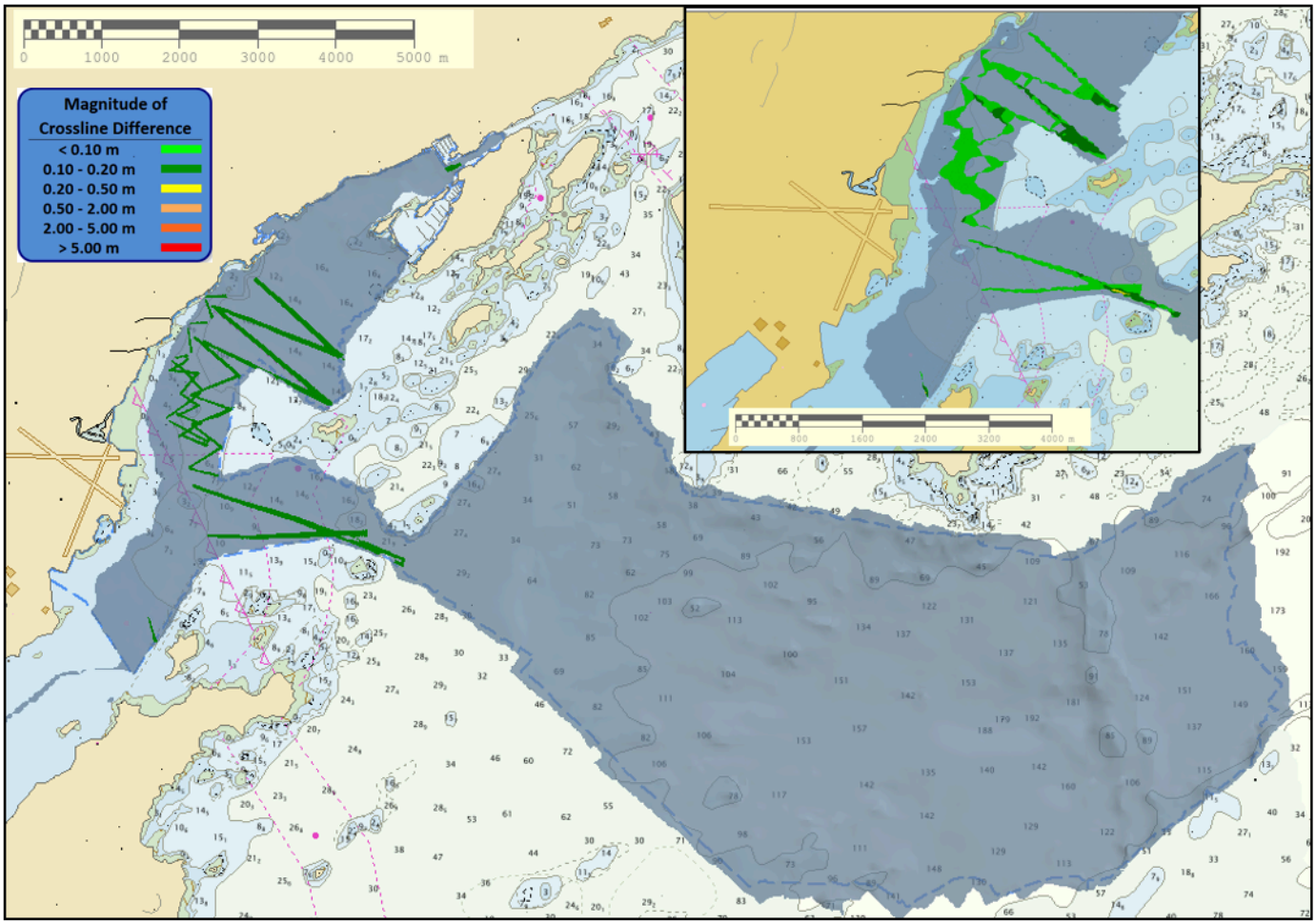


Figure 8: Overview of F00886 cross lines

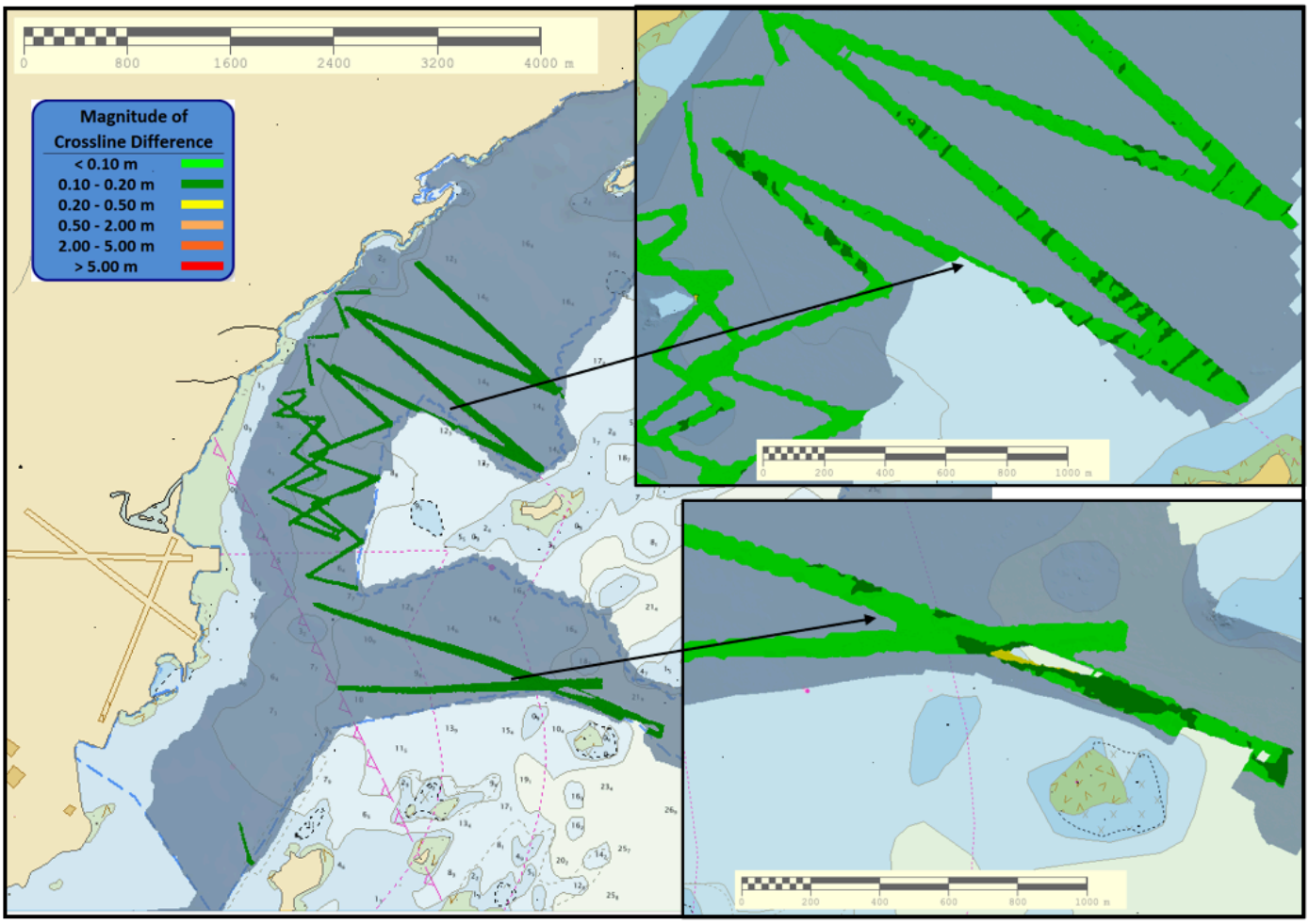
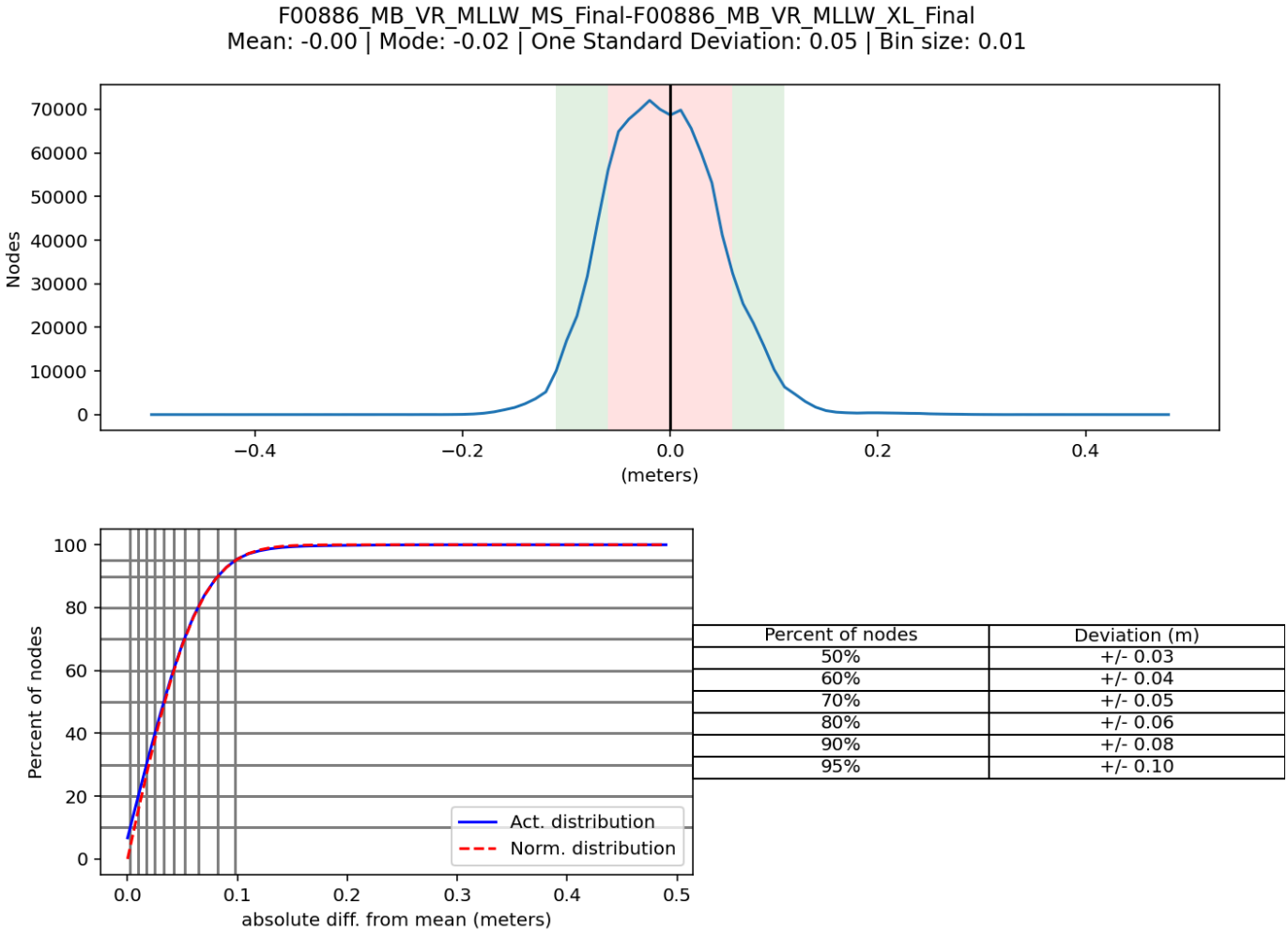


Figure 9: Zoomed images of F00886 crosslines



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

Figure 10: F00886 crossline and mainscheme differences statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via ERTDM	N/A	16.0 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
280x (all launches)	2 meters/second	N/A	N/A	0.50 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

In addition to the usual a priori estimates of uncertainty via device models for vessel motion and ERTDM/ VDATUM/TCARI, real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey F00886. Real-time uncertainties were provided via EM 2040 MBES data and Applanix Delayed Heave RMS. Following post-processing of the real-time vessel motion, recomputed uncertainties of vessel roll, pitch, gyro and navigation were applied in CARIS HIPS and SIPS via a Smoothed Best Estimate of Trajectory (SBET) RMS file generated in Applanix POSPac.

B.2.3 Junctions

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

There were no conditions or deficiencies that affected equipment operational effectiveness.

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Casts were conducted at a minimum of one every four hours during launch acquisition. Casts were conducted more frequently in areas where the influx of freshwater had an effect on the speed of sound in the water column and when there was a change in surface sound speed greater than two meters per second. All sound speed methods were used as detailed in the DAPR.

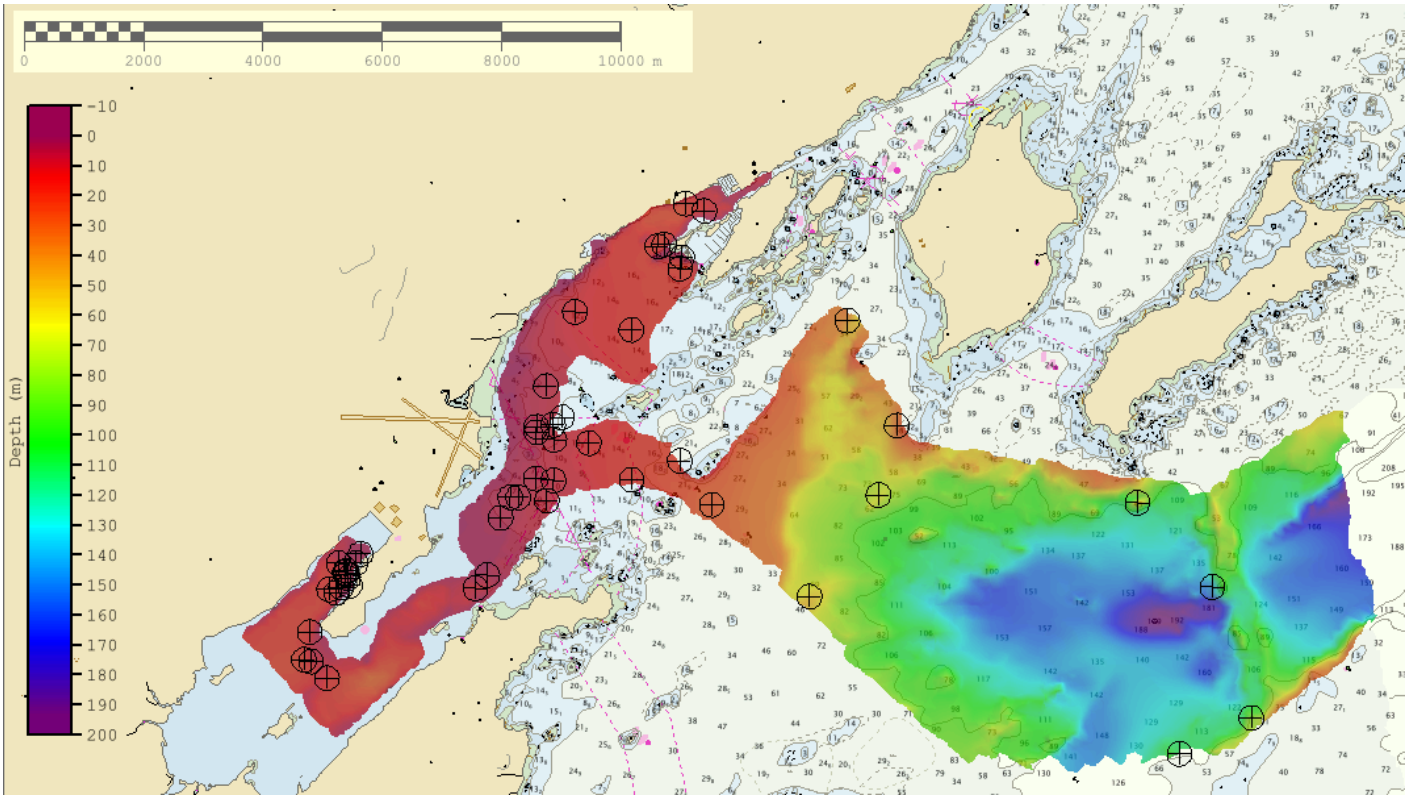


Figure 11: Cast locations in F00886

B.2.8 Coverage Equipment and Methods

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

B.2.9 Holidays

F00886 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. Fourteen holidays which meet the definition described in the HSSD for complete coverage were identified via HydrOffice QC Tools Holiday Finder tool. This tool automatically scans the surface for holidays as defined in the HSSD and was run in conjunction with a visual inspection of the surface by the hydrographer.

Eight of the areas flagged are gaps in coverage due to NALL being reached. Reasonable attempts were made to cover all gaps in coverage that resulted from lack of coverage over the tops of features and underwater rocks when it was safe and prudent to do so. For areas where it was unsafe to do so the features were added or updated accordingly in the Final Feature File accompanying this submission. An example of the area is shown in a figure below.

Two holidays are in the additional coverage of Womens Bay. Four holidays exist within the sheet limits of F00886 and are due to a line removed from HIPs file due to error of POS logging.

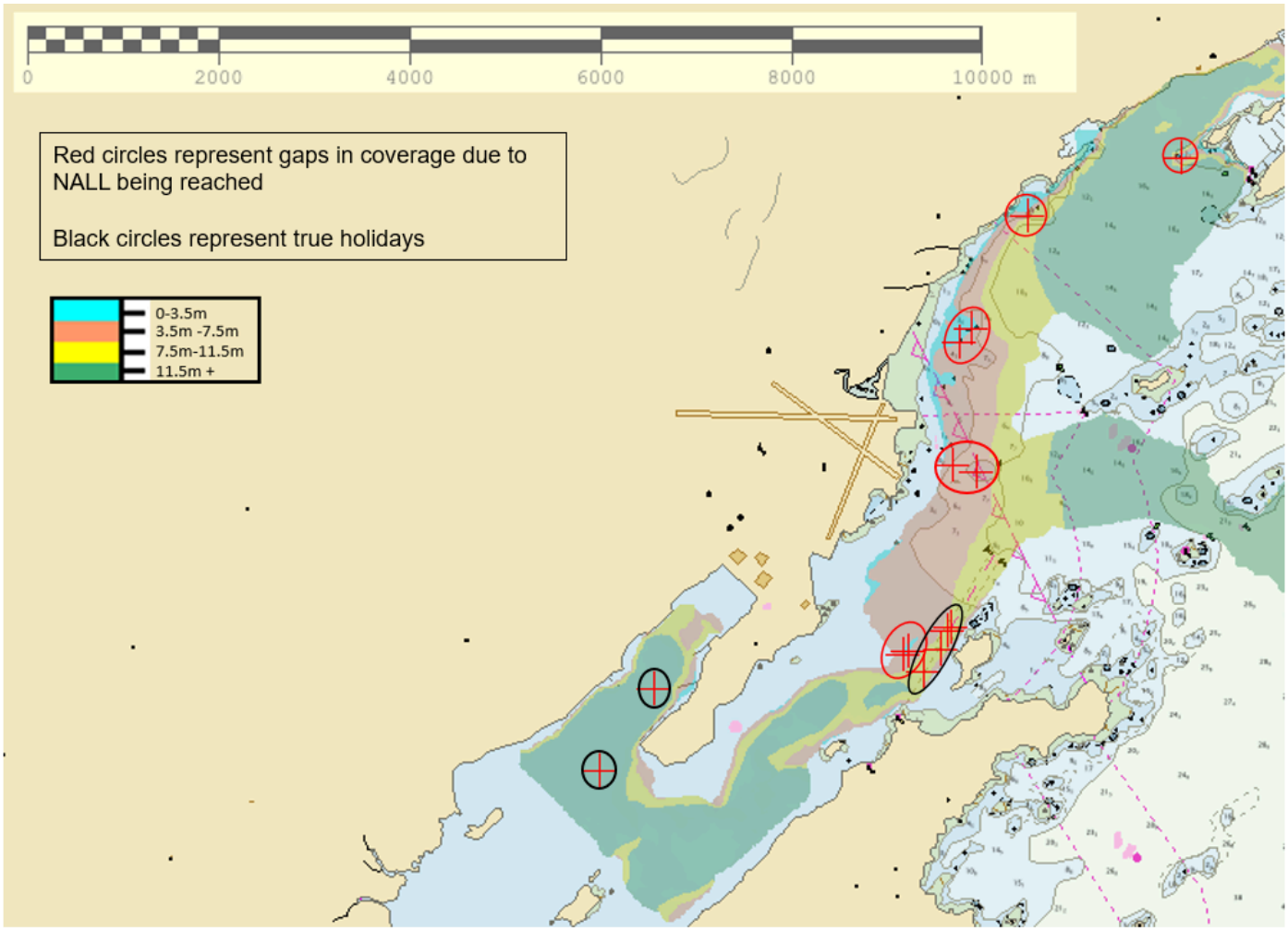


Figure 12: Holidays present in F00886. Red circles represent gaps in coverage due to reaching the NALL. Black circles represent true holidays.

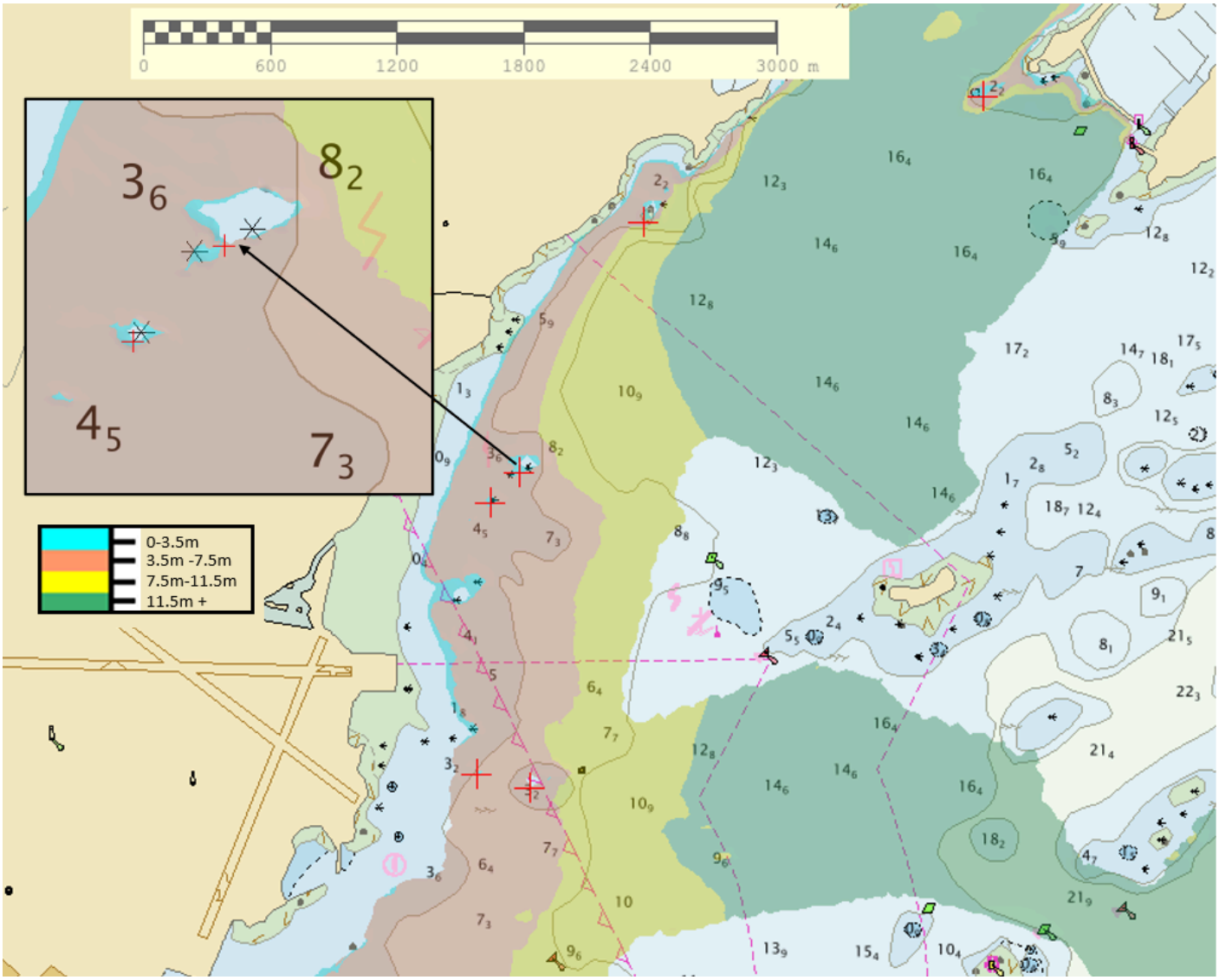


Figure 13: Example of gap in coverage over top of feature that is updated in FFF

B.2.10 Removed lines due to POS logging errors

Some crosslines and one line in mainscheme had to be removed from HIPs file and surface due to a human error of logging POS incorrectly. The majority of the removed mainscheme line existed in the additional coverage on "buoy run" in Womens Bay and created holidays. The removed crosslines existed in the assigned sheet limits of F00886.

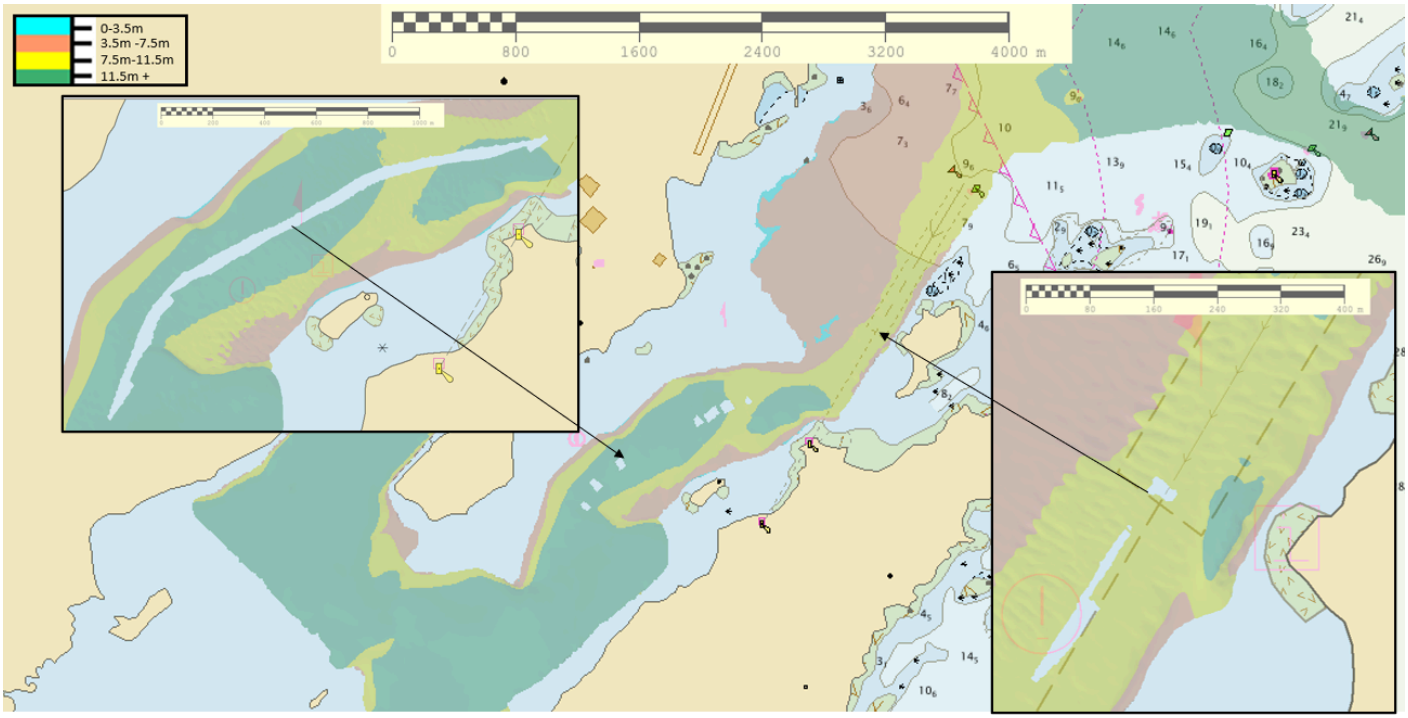


Figure 14: Mainscheme line removed from F00886

B.2.11 NOAA Allowable Uncertianty

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Overall, 99.5+% of nodes within the surface meet NOAA Allowable Uncertainty specifications for F00886

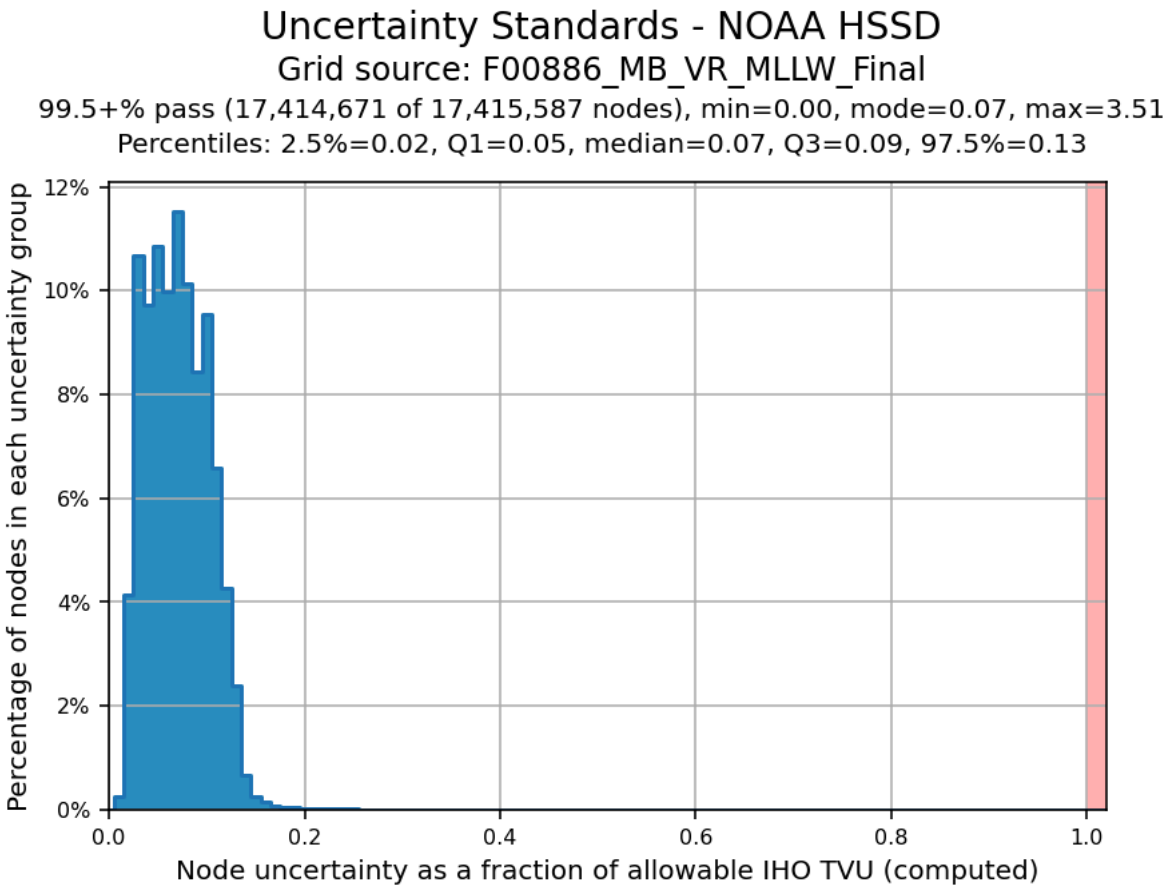


Figure 15: F00886 allowable uncertainty statistics

B.2.12 Density

The surface was analyzed using the HydrOffice QC Tools Grid QA feature to determine compliance with specifications. Density requirements for F00886 were achieved with at least 99.5+% of surface nodes containing five or more soundings as required by HSSD Section 5.2.2.3

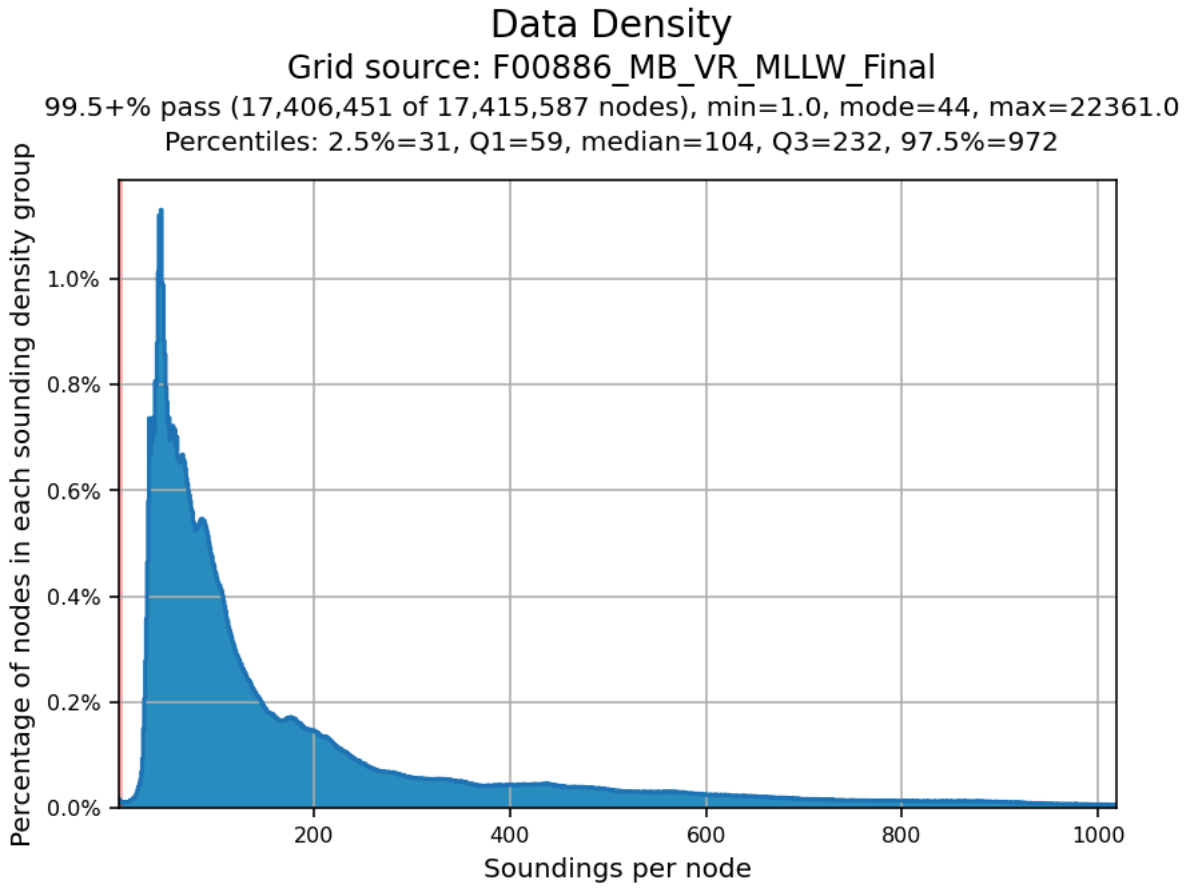


Figure 16: F00886 Density Statistics

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw backscatter data were stored in the .all file for Kongsberg systems. All backscatter were processed to GSF files and 4 floating point mosaics were created by the field unit via Fledermaus FMGT 7.10.2. See Figure below for a greyscale representation of the complete mosaics. Four separate backscatter mosaics were created at 2m resolution based on the specifications for a 300kHz system. The backscatter mosaics shown in the figure below contain artifacts which were created during processing in FMGT and are not reflective of the of the multibeam data. All equipment and survey methods were used as detailed in the DAPR.

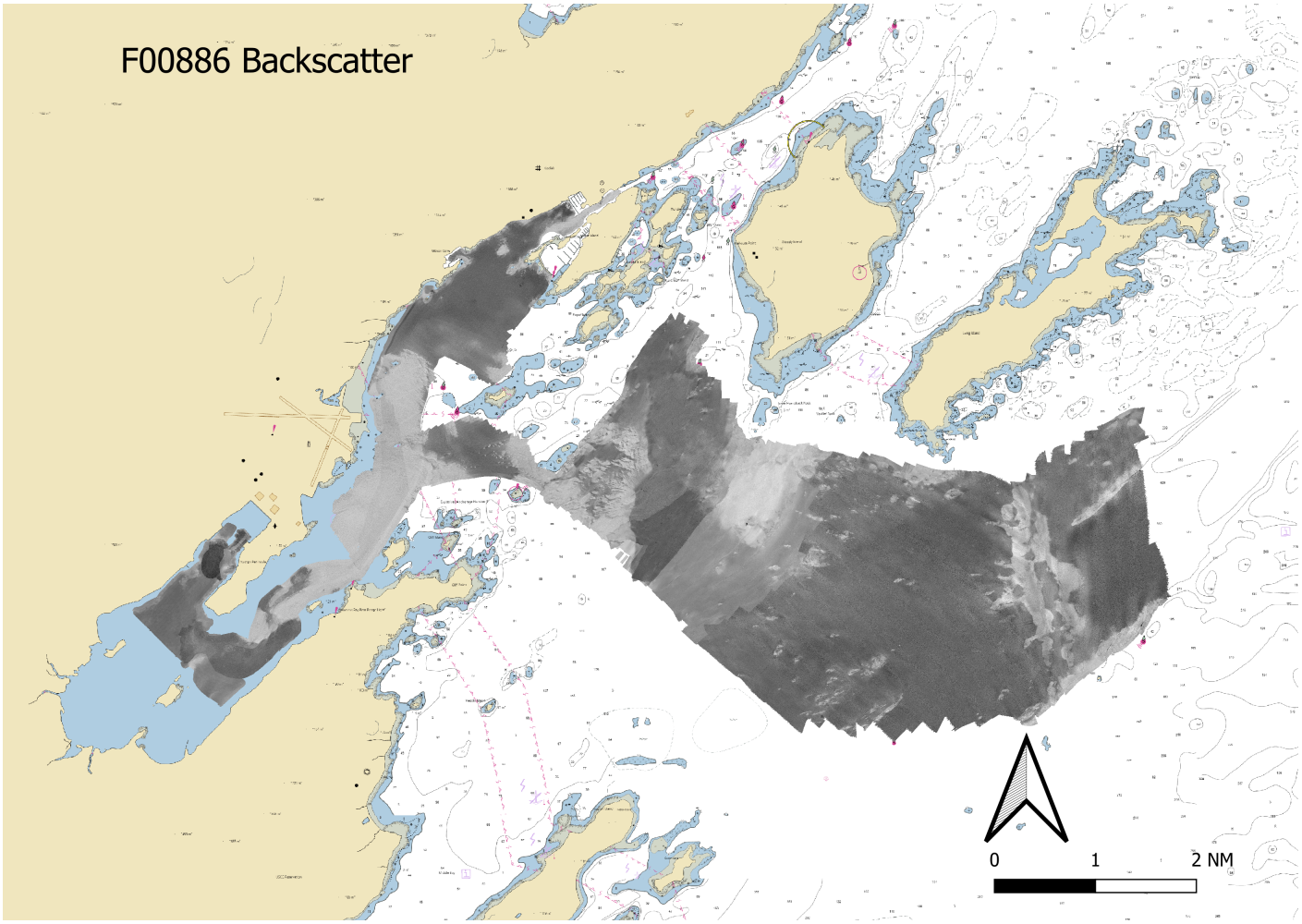


Figure 17: Multi-beam acoustic backscatter of F00886

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
CARIS	HIPS and SIPS	11.4

Table 9: Primary bathymetric data processing software

The following software program was the primary program used for imagery data processing:

Manufacturer	Name	Version
QPS	Fledermaus	7.10.2

Table 10: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2023.

B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00886_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	-0.4 meters - 194.6 meters	NOAA_VR	Complete MBES
F00886_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	-0.4 meters - 194.6 meters	NOAA_VR	Complete MBES

Table 11: Submitted Surfaces

The NOAA CUBE parameters defined in the HSSD were used for the creation of all CUBE surfaces for F00886. The surfaces have been reviewed where noisy data, or "fliers" are incorporated into the gridded solutions causing the surface to be shoaler or deeper than the true sea floor. Where these spurious soundings cause the gridded surface to vary from the reliably measured seabed by greater than the maximum allowable Total Vertical Uncertainty at that depth, the noisy data have been rejected by the hydrographer and the surface recomputed. Flier Finder, part of the QC Tools package within HydrOffice, was used to assist the search for spurious soundings following gross cleaning. Flier Finder was run iteratively until all remaining flagged fliers were deemed to be valid aspects of the surface.

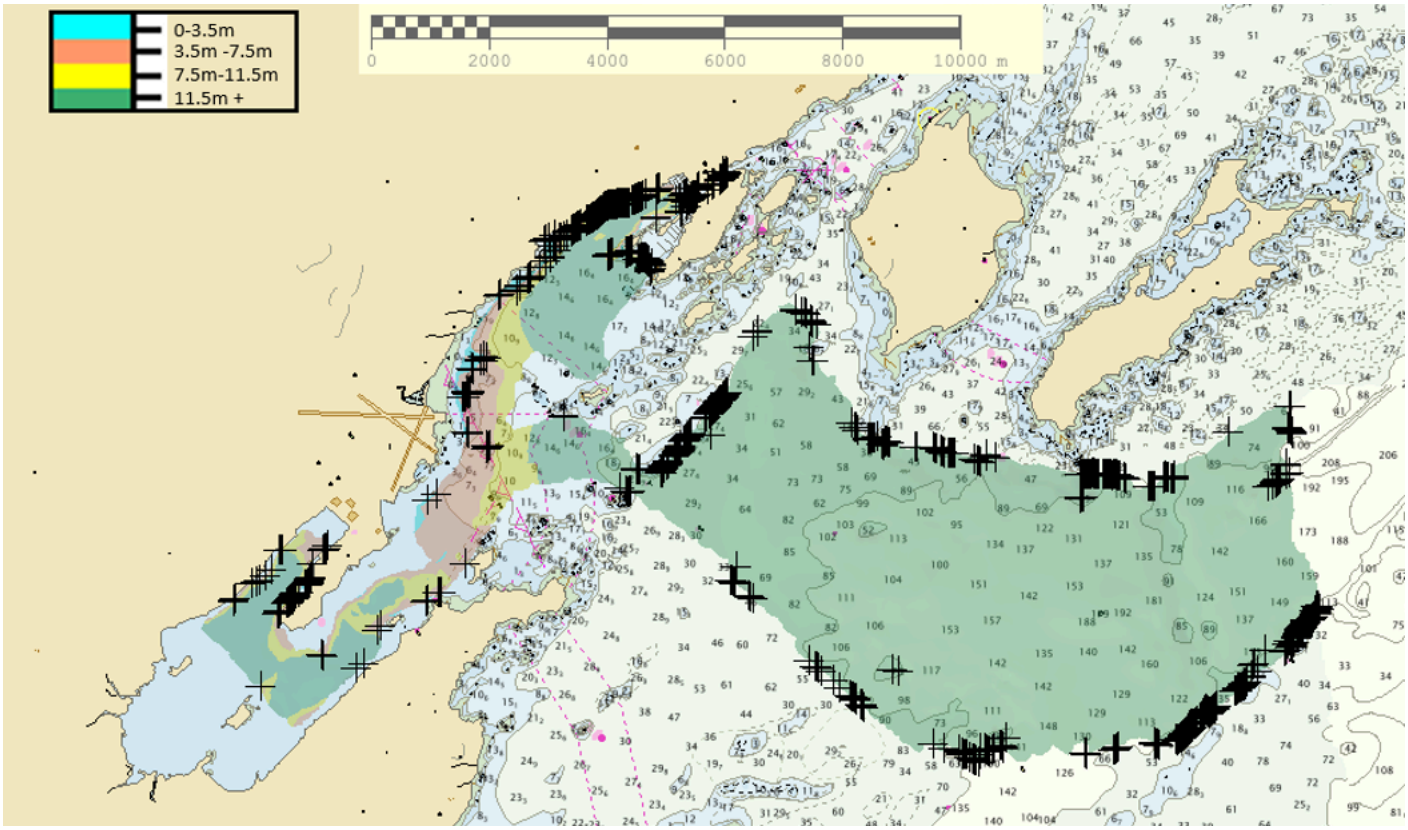


Figure 18: Remaining areas flagged as fliers that were deemed as valid aspects of the surface

B.5.3 Designated Soundings

F00886 contains one designated sounding selected to accurately represent the seafloor. This sounding was in the location of a charted obstruction at 191m depth where the CUBE surface did not accurately depict the true seafloor. The figure below shows the location of the designated sounding. The designated sounding was in the area of an assigned feature which was investigated and updated with a new least depth.

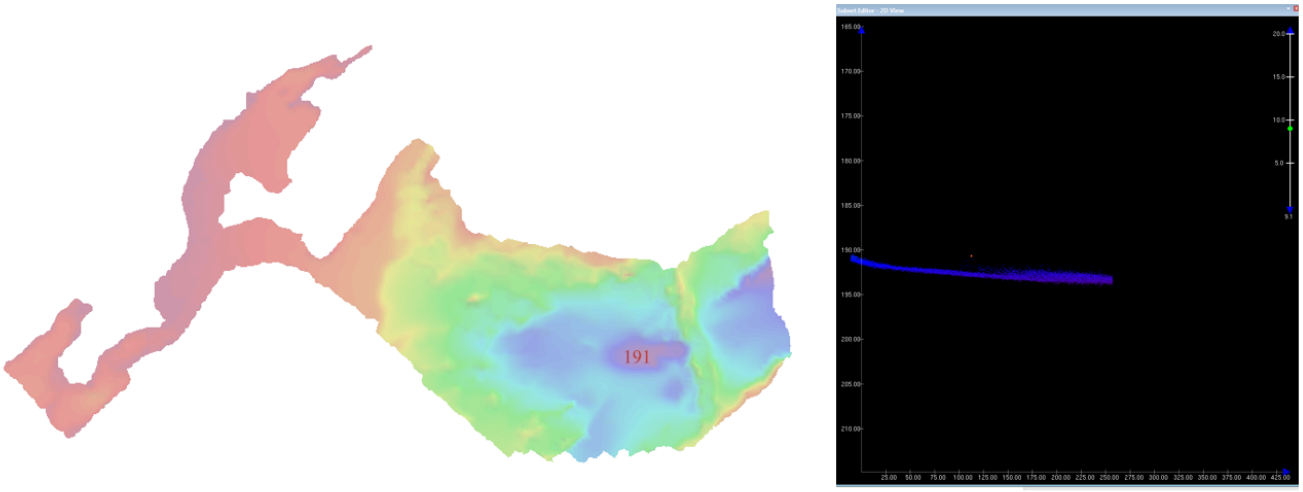


Figure 19: Location of designated sounding

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

ERS Datum Transformation

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

Method	Ellipsoid to Chart Datum Separation File
ERS via ERTDM	OPR-P377-KR-18_AK_AOI_updated_NAD83_2011-MLLW

Table 12: ERS method and SEP file

ERS methods were used as the final means of reducing F00886 to MLLW for submission.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 5.

The following PPK methods were used for horizontal control:

- RTX

Vessel kinematic data were post-processed using Applanix POSPac processing software and RTX positioning methods described in the DAPR. Smoothed Best Estimate of Trajectory (SBET) and associated error (RMS) data were applied to all MBES data in CARIS HIPS and SIPS.

WAAS

During real-time acquisition, all platforms received correctors from the Wide Area Augmentation System (WAAS) for increased accuracies similar to USCG DGPS stations. WAAS and SBETs were the sole methods of positioning for F00886, as no DGPS stations were available for real-time horizontal control.

D. Results and Recommendations

D.1 Chart Comparison

Chart comparison between ENC and soundings from collected data. The soundings from F00886 are generally in agreement with ENCs , US5AK6PY, US5AK6OZ, and US5AK6OY, and US4AK5PM.

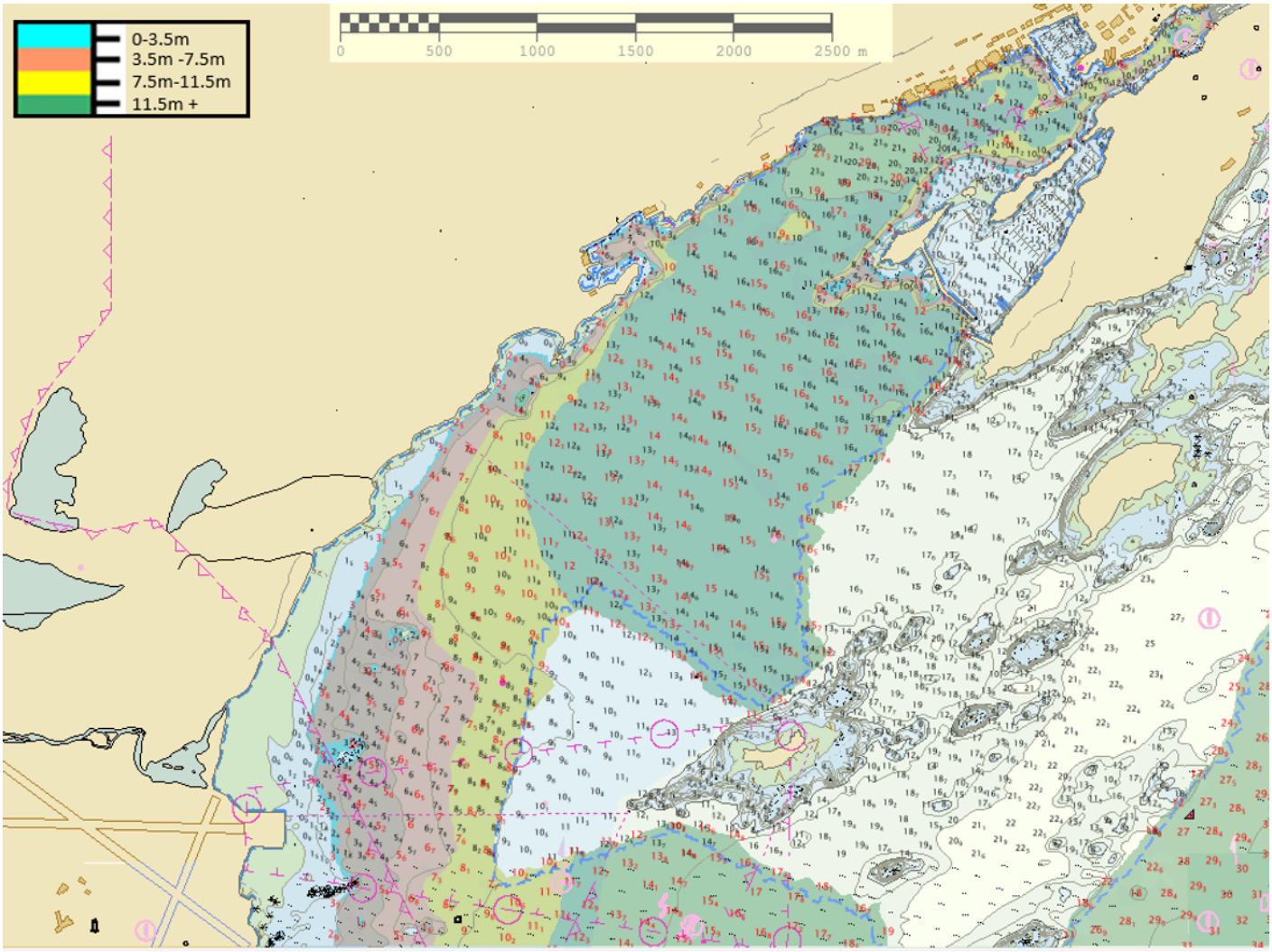


Figure 20: F00886 survey soundings (in red) compared with soundings from ENC US5AK6PY

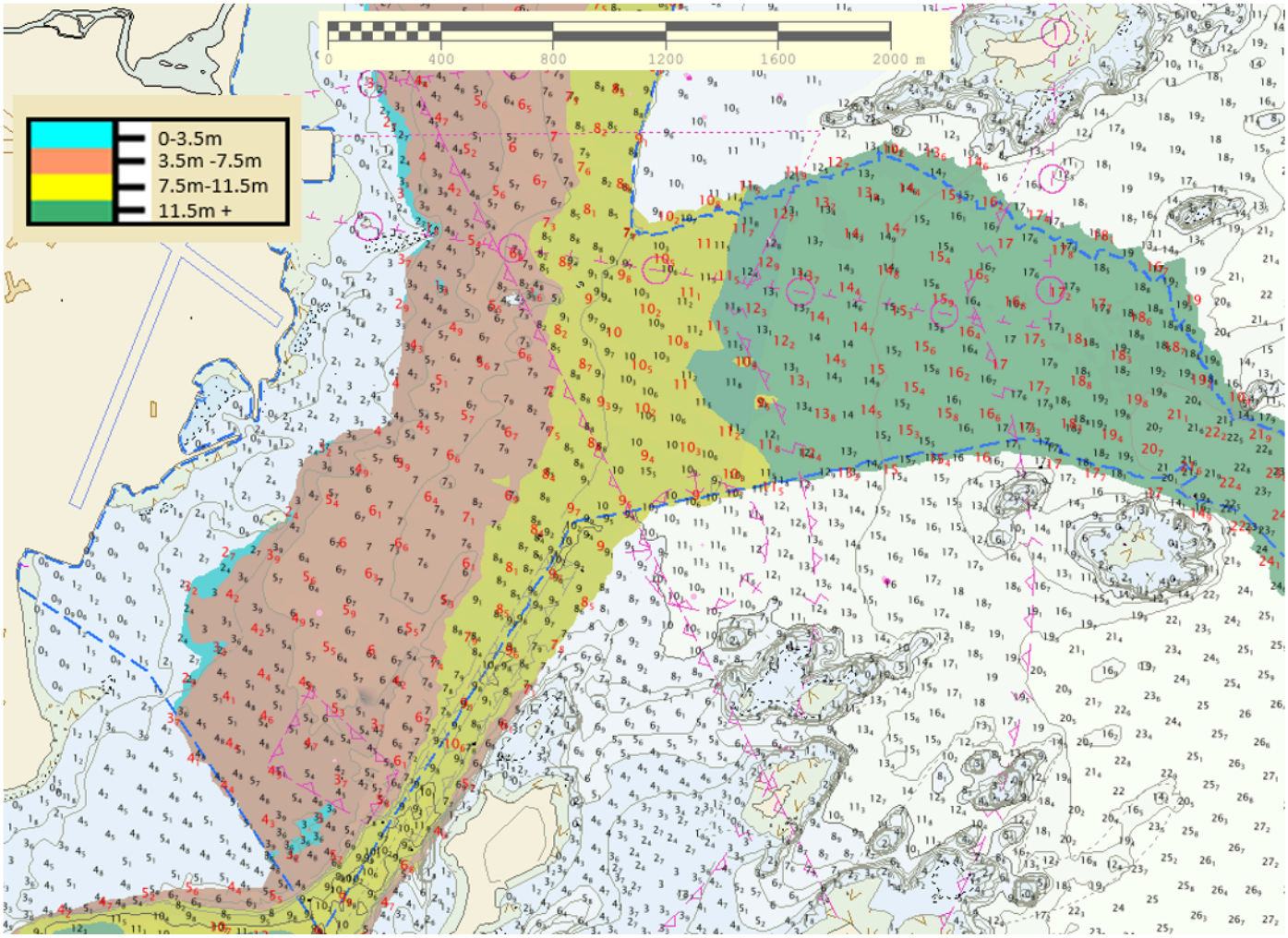


Figure 21: F00886 survey soundings (in red) compared with soundings from ENC US5AK6OY and US5AK6OZ

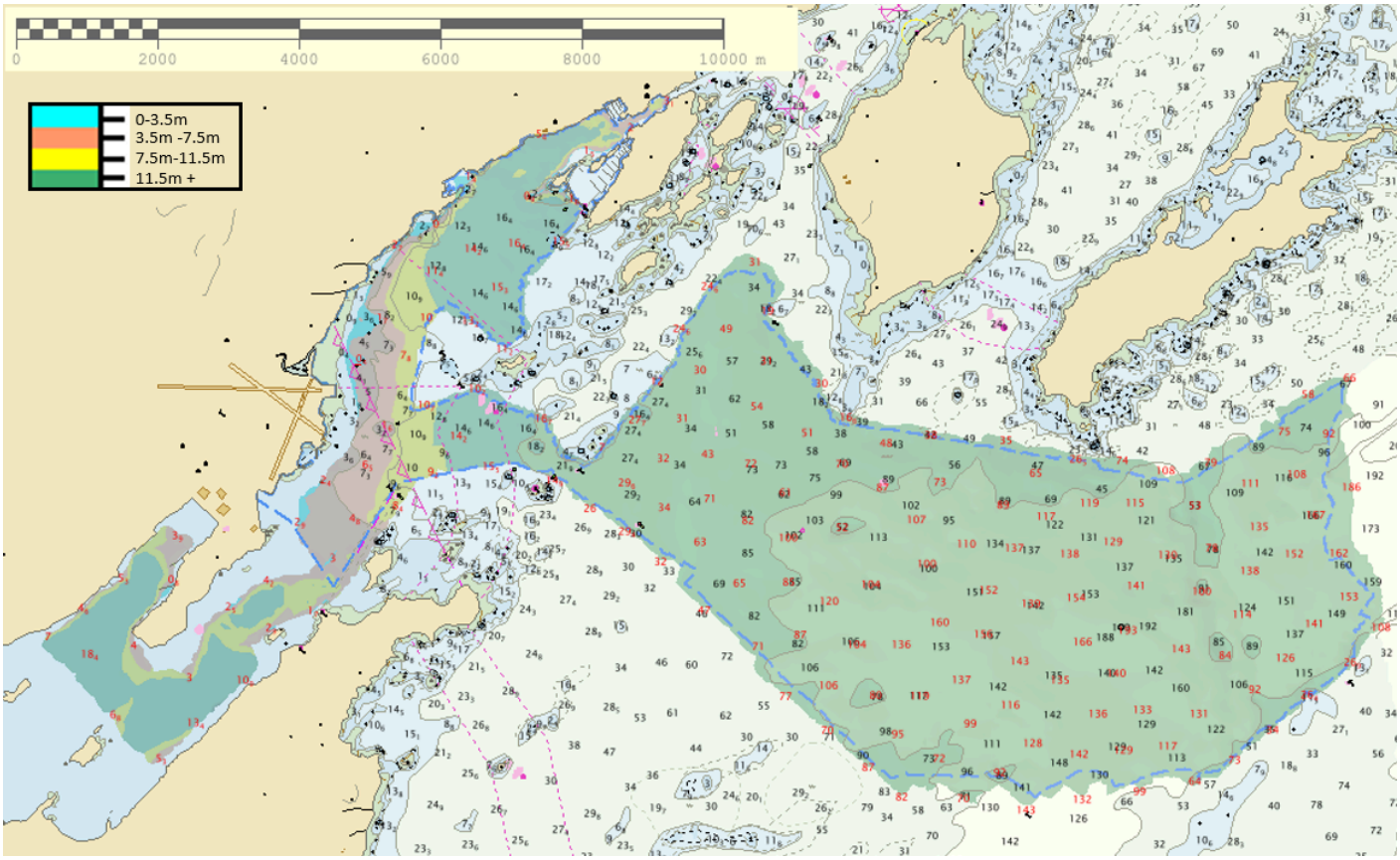


Figure 22: F00886 survey soundings (in red) compared with soundings from ENC US4AK5PM

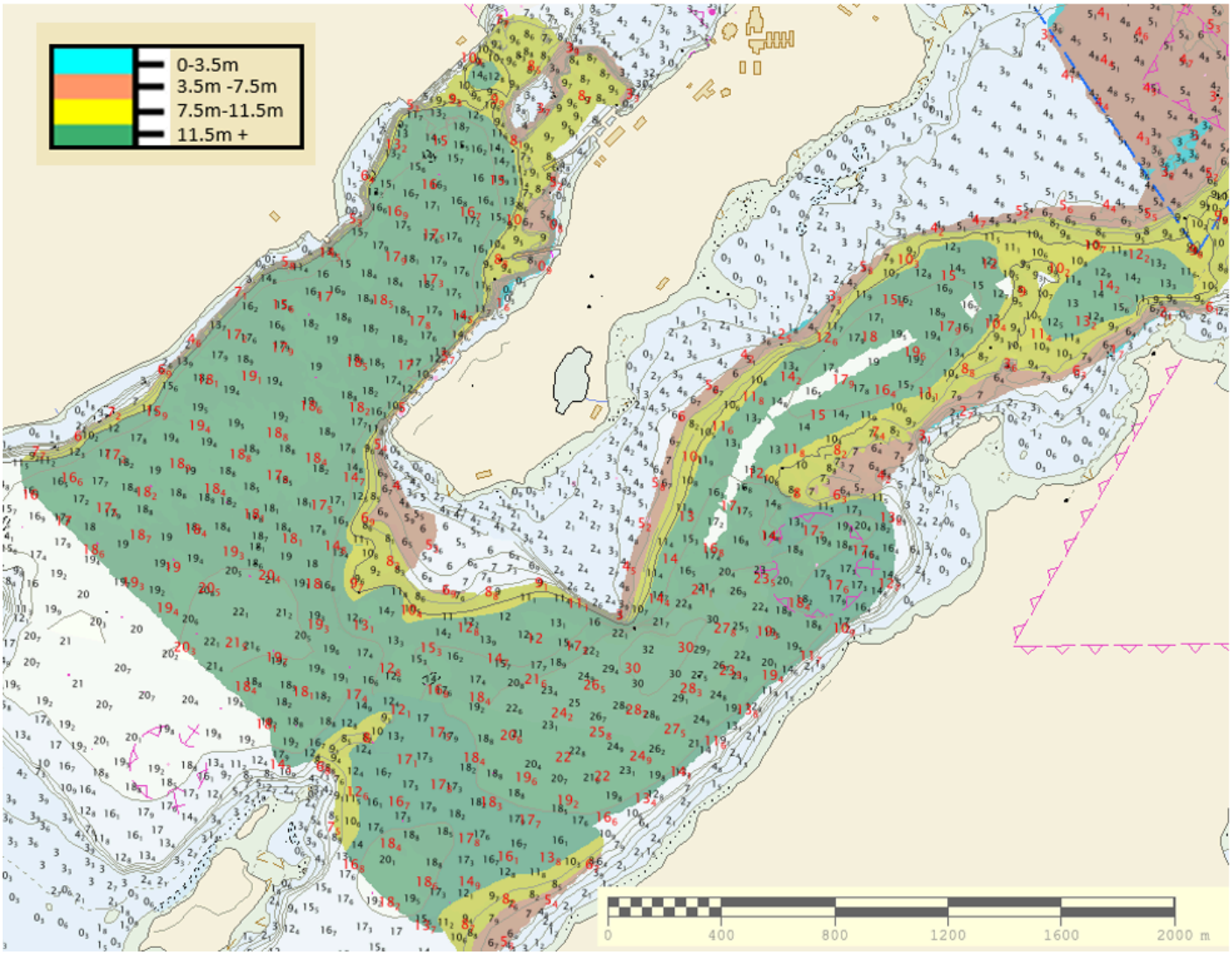


Figure 23: F00886 survey soundings (in red) compared with soundings from ENC US5AK6OY

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date
US5AK6PY	1:10000	4	08/01/2023	08/01/2023
US5AK6OY	1:10000	4	08/01/2023	08/01/2023
US4AK5PM	1:78900	21	10/05/2023	10/05/2023
US5AK6OZ	1:20000	4	06/02/2023	06/02/2023

Table 13: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.3 Charted Features

All assigned charted features are attributed in the Final Feature File.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Channels

No channels exist within the survey limits.

D.2 Additional Results

D.2.1 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

No bottom samples were required for this survey.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

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

D.2.10 New Survey Recommendations

More surveys of Womens Bay and Chiniak Bay are recommended due to increase presence of ship activity by the US Navy.

D.2.11 ENC Scale Recommendations

No new ENC scales are recommended for this area.

E. Approval Sheet

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

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

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

Approver Name	Approver Title	Approval Date	Signature
CDR Meghan McGovern	Chief of Party	12/06/2023	Meghan McGovern Digitally signed by MCGOVERN.MEGHAN.ELIZABETH.1284020495 Date: 2024.02.19 11:32:15 -08'00'
LT Taylor Krabiel	Operations Officer	12/06/2023	KRABIEL.TAYLOR.ALAN.1539169935 Digitally signed by KRABIEL.TAYLOR.ALAN.1539169935 Date: 2024.02.19 11:14:12 -08'00'
HSST Sara Ober	Sheet Manager	12/06/2023	OBER.SARA.ELIZABETH.1615474360 Digitally signed by OBER.SARA.ELIZABETH.1615474360 Date: 2024.02.19 11:15:11 -08'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously Operating Reference Station
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File