F00785

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	F00785

LOCALITY

State(s):	Washington
General Locality:	Commencement Bay, WA
Sub-locality:	Approach to Tacoma

2019

CHIEF OF PARTY
Michelle M. Levano, LTJG/NOAA

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**F00785**

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):	**Washington**
General Locality:	**Commencement Bay, WA**
Sub-Locality:	**Approach to Tacoma**
Scale:	**10000**
Dates of Survey:	**10/17/2019 to 10/28/2019**
Instructions Dated:	**08/20/2019**
Project Number:	**S-N906-NRT3-19**
Field Unit:	**Navigation Response Team Seattle**
Chief of Party:	**Michelle M. Levano, LTJG/NOAA**
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:

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey F00785

Project: S-N906-NRT3-19

Locality: Commencement Bay, WA

Sublocality: Approach to Tacoma

Scale: 1:10000

October 2019 - October 2019

Navigation Response Team Seattle

Chief of Party: Michelle M. Levano, LTJG/NOAA

A. Area Surveyed

This hydrographic survey was acquired in accordance with the requirements defined in the Project Instructions S-N906-NRT3-19. F00785 survey area includes the approach to main shipping channels for the Port of Tacoma Harbor in Commencement Bay (Figure 1).

Three requested areas were surveyed and submitted in addition to the assigned area. The Puget Sound Pilots requested two areas within the Hylebos Waterway and Blair Waterway (Figure 2). The United States Army Corps requested a continuation of the assigned survey area to the south of the sheet limits (Figure 3). This data is submitted with F00785 survey data.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
47° 17' 55.67" N 122° 26' 18.07" W	47° 15' 31.54" N 122° 22' 54.92" W

Table 1: Survey Limits

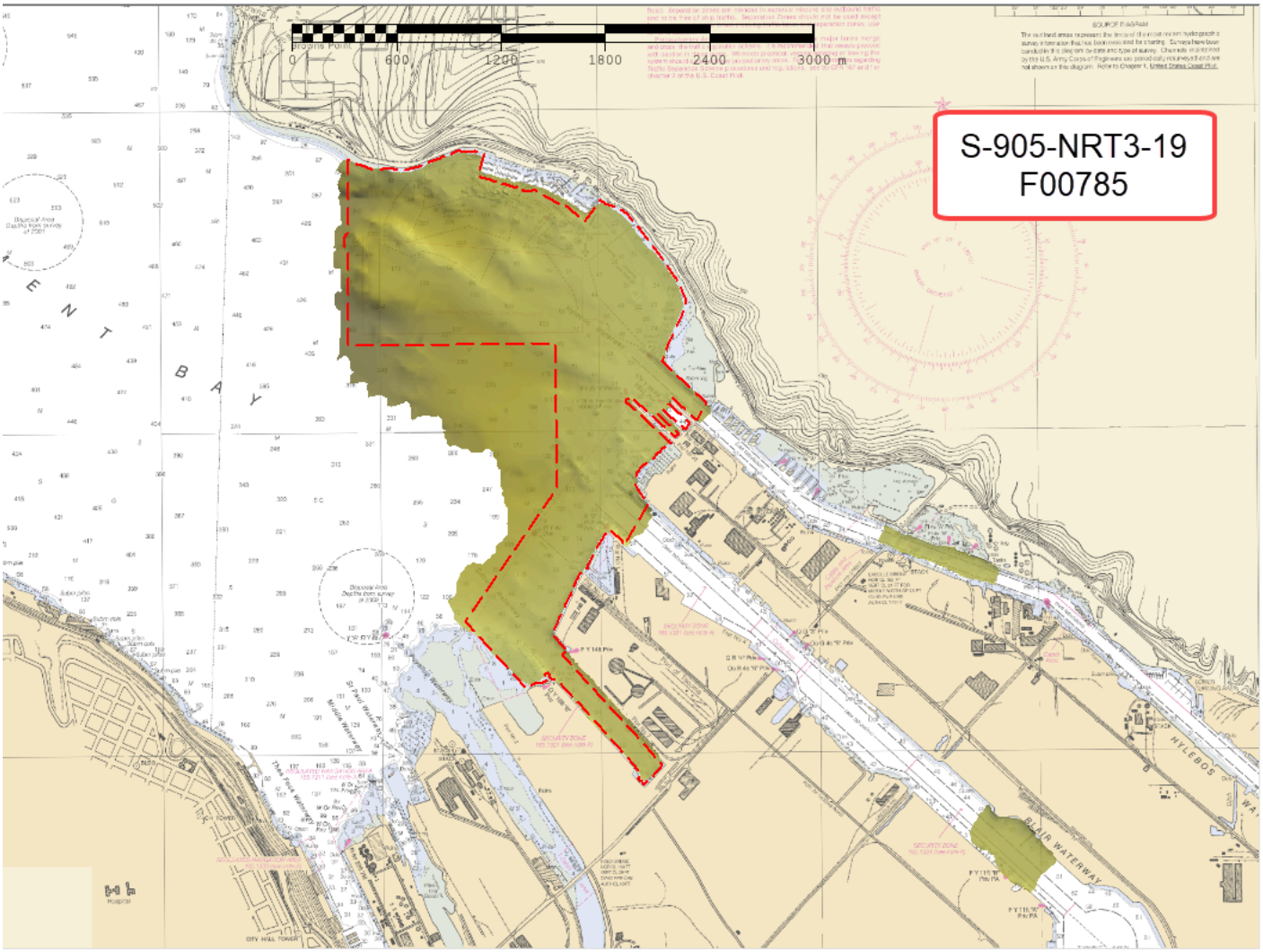


Figure 1: F00785 assigned sheet limits (in red) and survey coverage overlaid onto NOAA chart 18453.

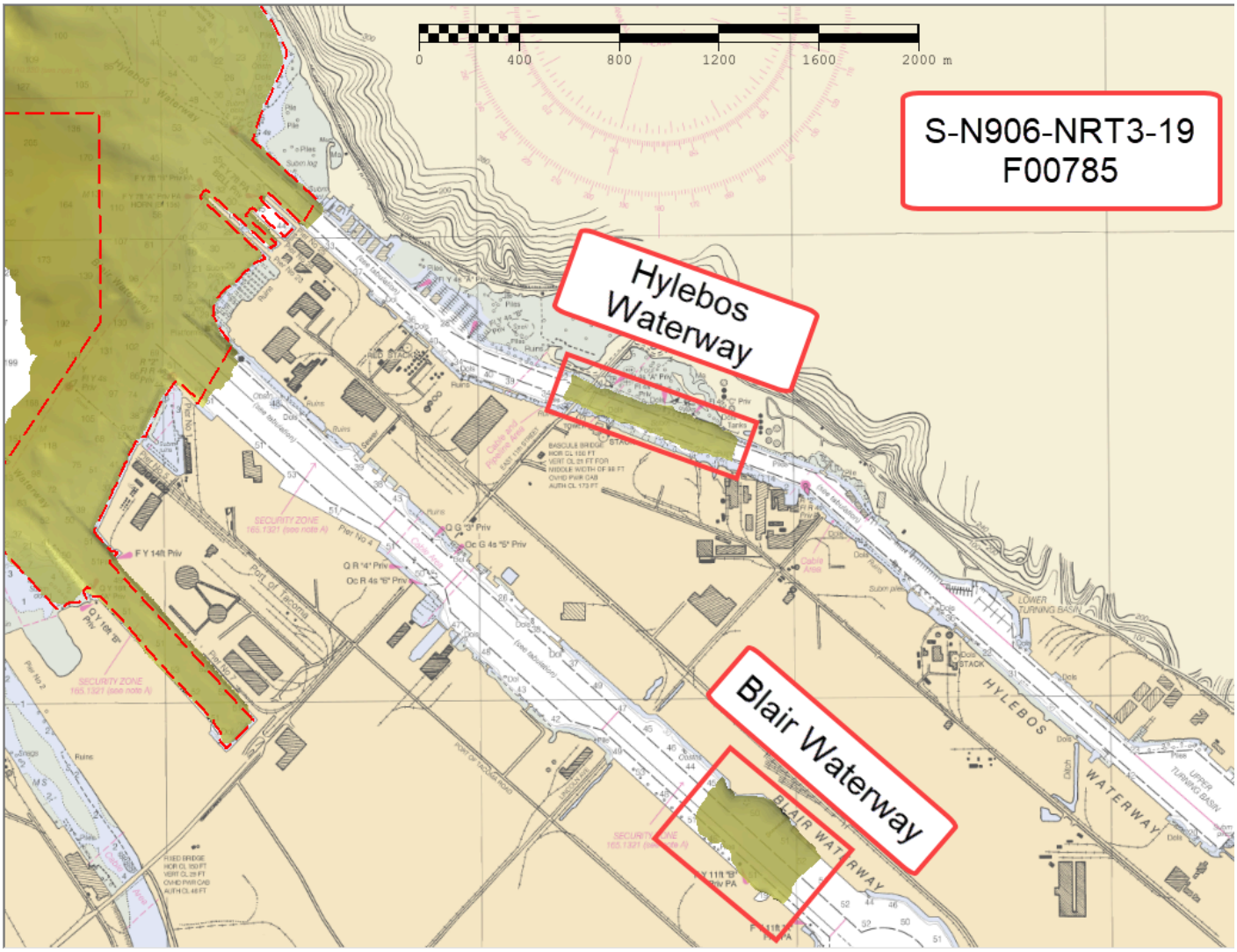


Figure 2: Two areas were surveyed at the request of the Puget Sound Pilots and submitted with F00785 survey data.

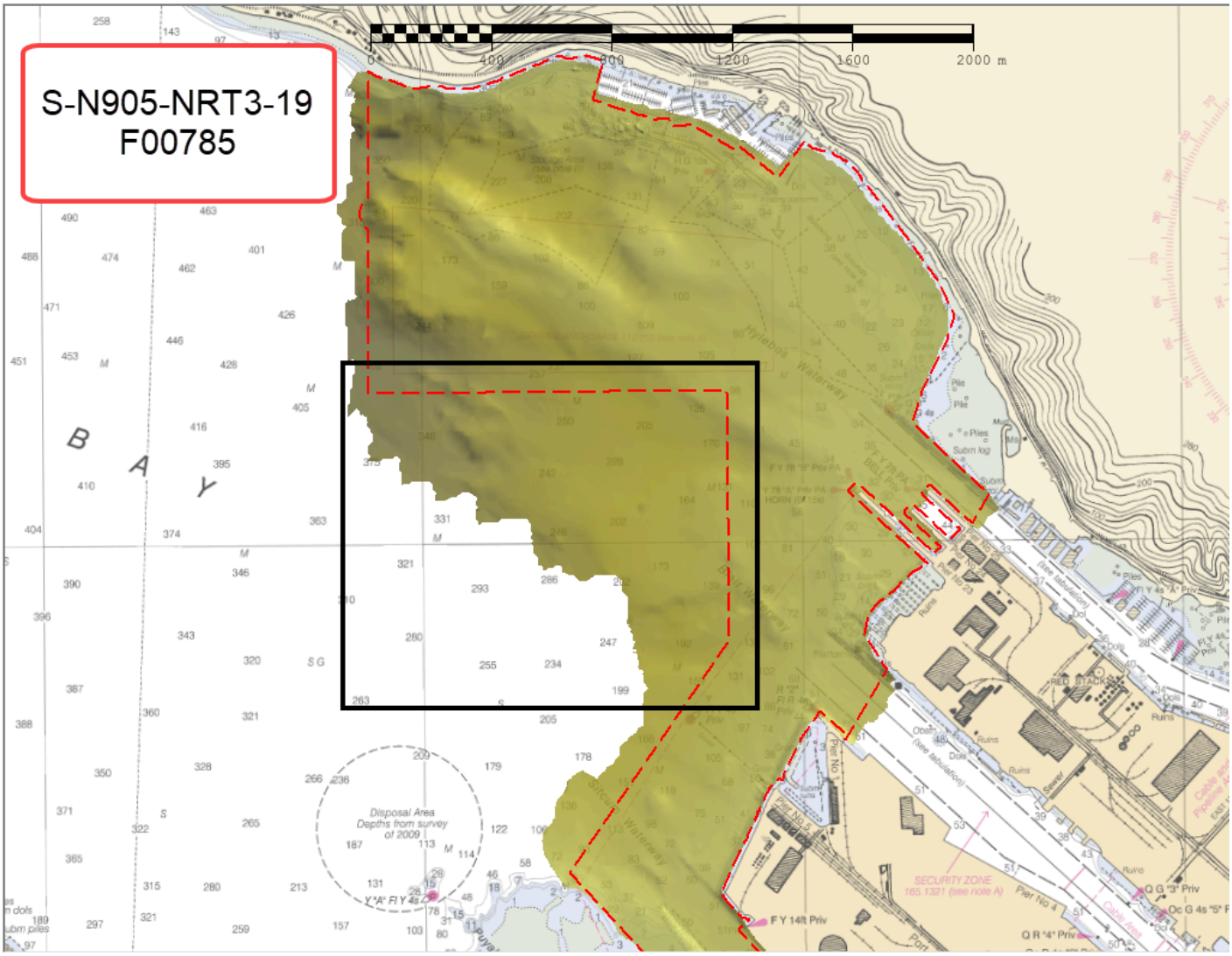


Figure 3: The United States Army Corps requested that the field unit continue survey just south of the assigned area.

Data were acquired within survey limits in accordance with the requirement in the Project Instructions S-N906-NRT3-19 and 2019 Hydrographic Survey Specifications and Deliverables (HSSD).

A.2 Survey Purpose

The Puget Sound Pilots have requested a hydrographic survey for updated bathymetry to the Approach to Tacoma. This area is variable due to the sediment outflow from the Puyallup River, and there is concern for the areas outside of the main channels. Survey data from this project is intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired in F00785 meets multibeam echo sounder (MBES) coverage requirements for object detection, as required by the 2019 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).

The surface was analyzed using the HydroOffice QC Tools Grid QC feature (Figure 4). Density requirements for F00785 were achieved with at least 99.5% of surface nodes containing five or more soundings as required by HSSD 5.2.2.2. The depth distribution per node was highest at 15 meters, with 2.5% of nodes in each depth group (Figure 5).

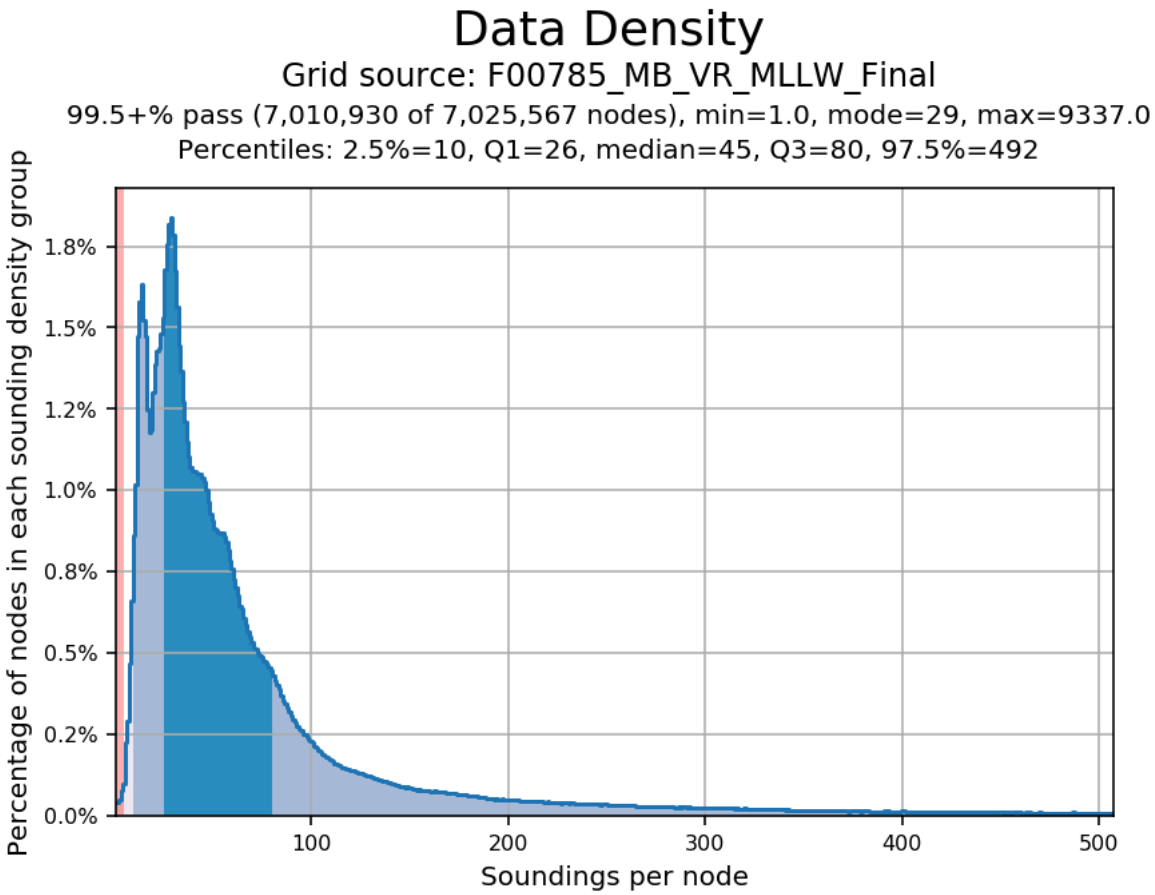


Figure 4: Pydro QC tools derived histogram plot showing HSSD object detection compliance for F00785 MBES within the finalized CUBE surface.

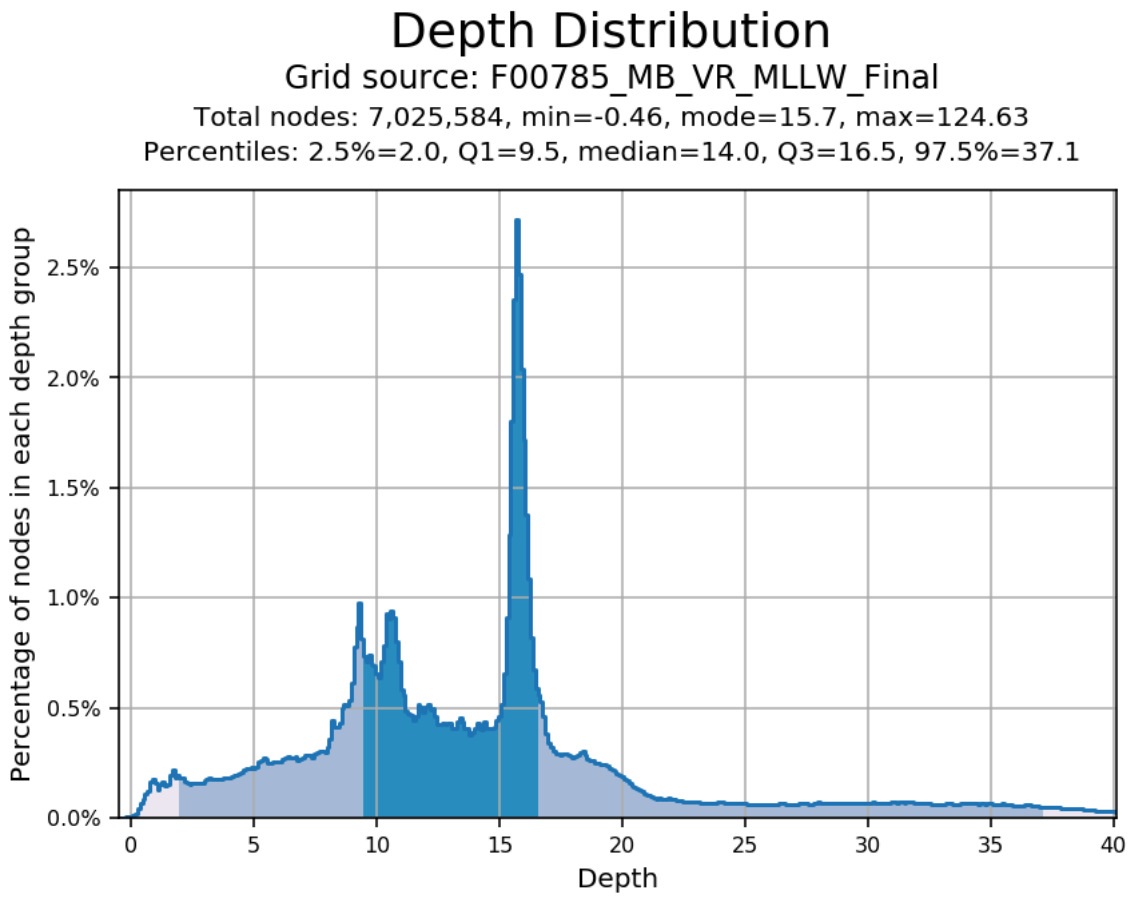


Figure 5: Pydro QC tools derived plot showing the percentage of nodes per the depth distribution for F00785 MBES within the finalized CUBE surface.

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	Object Detection Coverage (Refer to HSSD Section 5.2.2)

Table 2: Survey Coverage

The entirety of F00785 was acquired within object detection coverage, meeting the requirements listed above and in section 5.2.2.1 of the 2019 HSSD (Figure 6). The field unit was unable to complete coverage between Pier 25 and Pier 24 due to a boom that we were unable to receive entry to (Figure 7).

F00785 data was reviewed in CARIS HIPS and SIPS for holidays in accordance with section 5.2.2.2 of the HSSD. 26 holidays were identified via HydrOffice QC Tools Holiday Finder program. This program

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. 24 of these holidays were along pier faces, jetties, or permanent breakwaters (Figure 8).

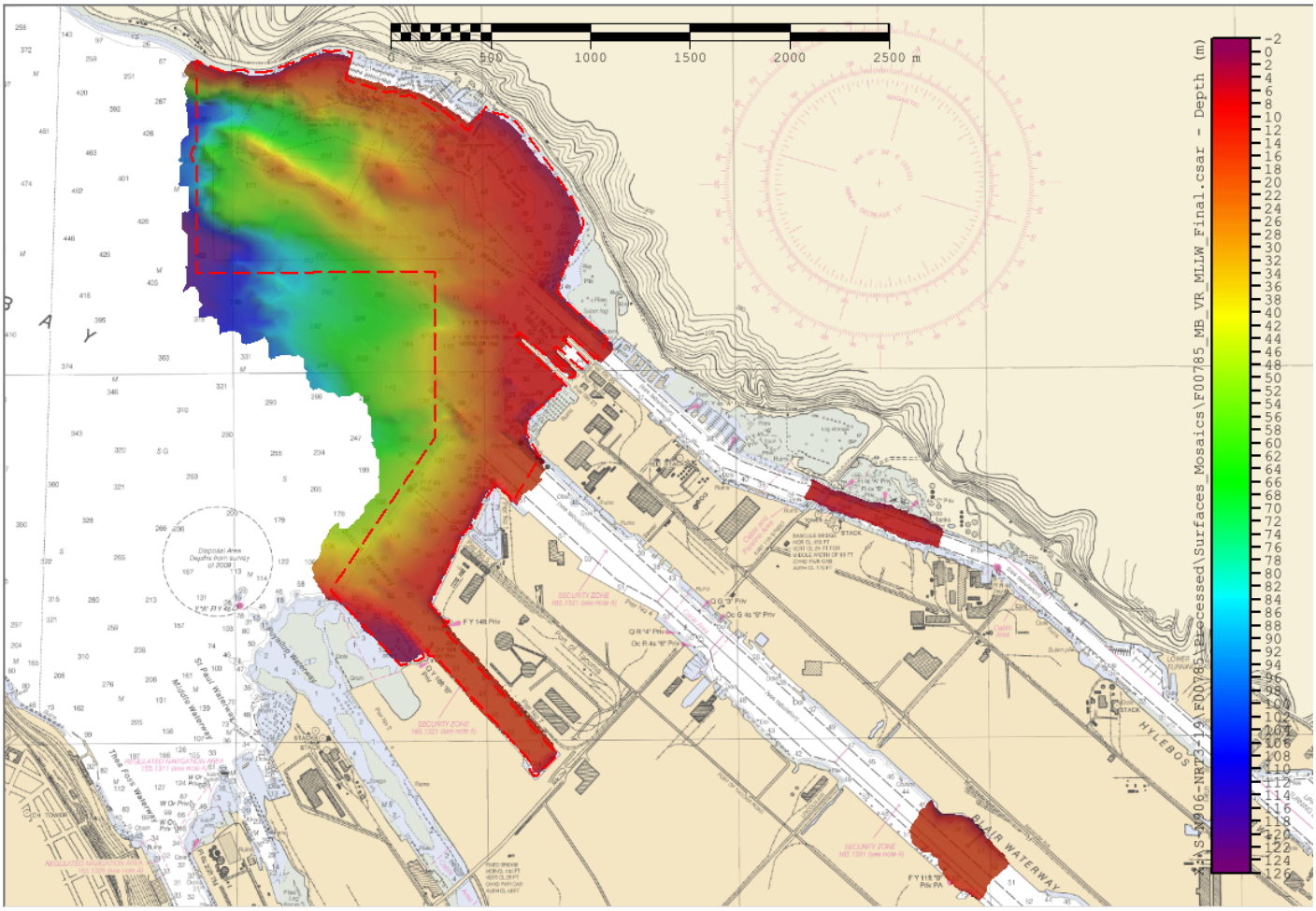


Figure 6: F00785 survey coverage overlaid onto NOAA Chart 18453

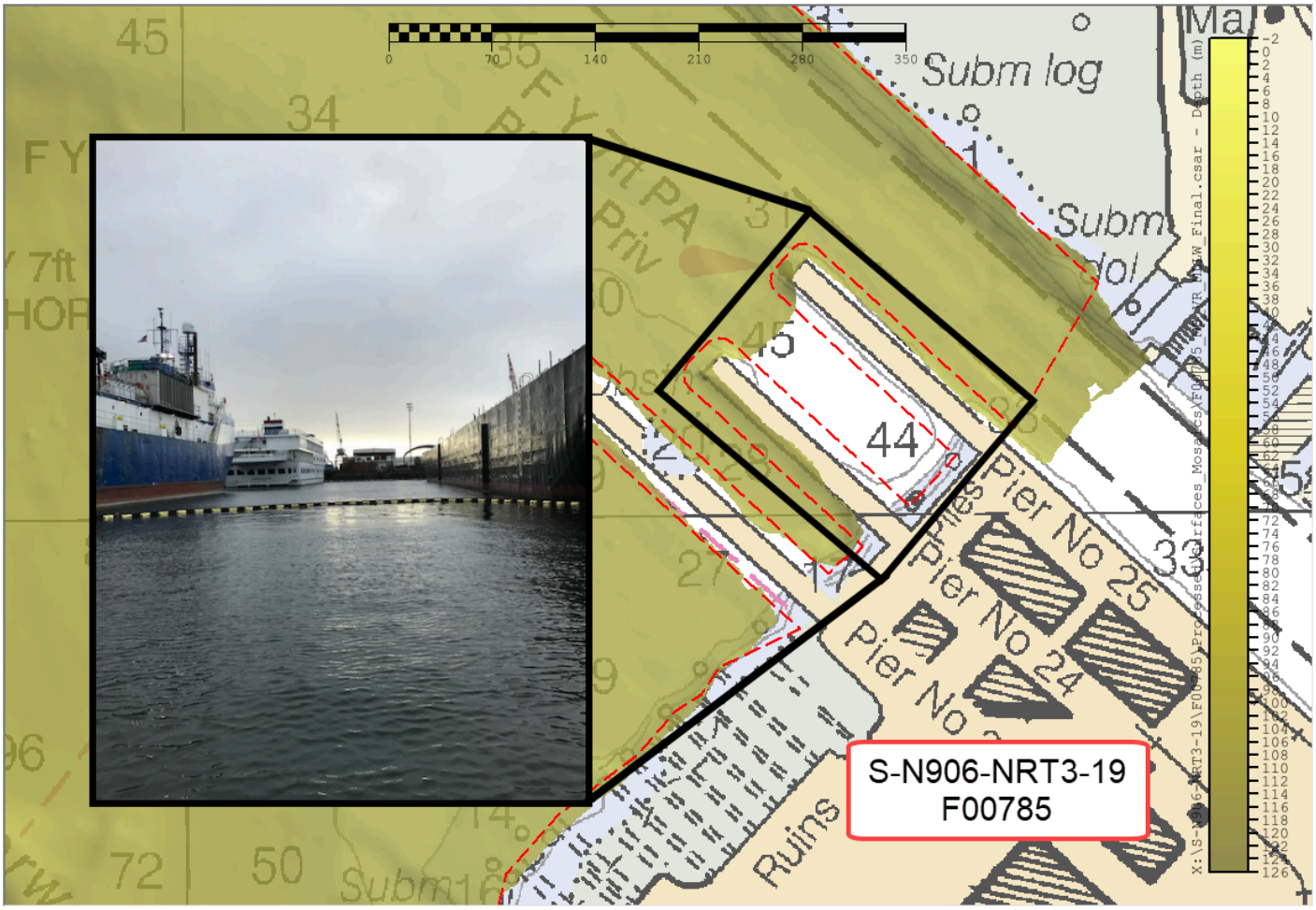


Figure 7: Area between Pier 25 and Pier 24 due to a boom that the field unit was not granted access to.

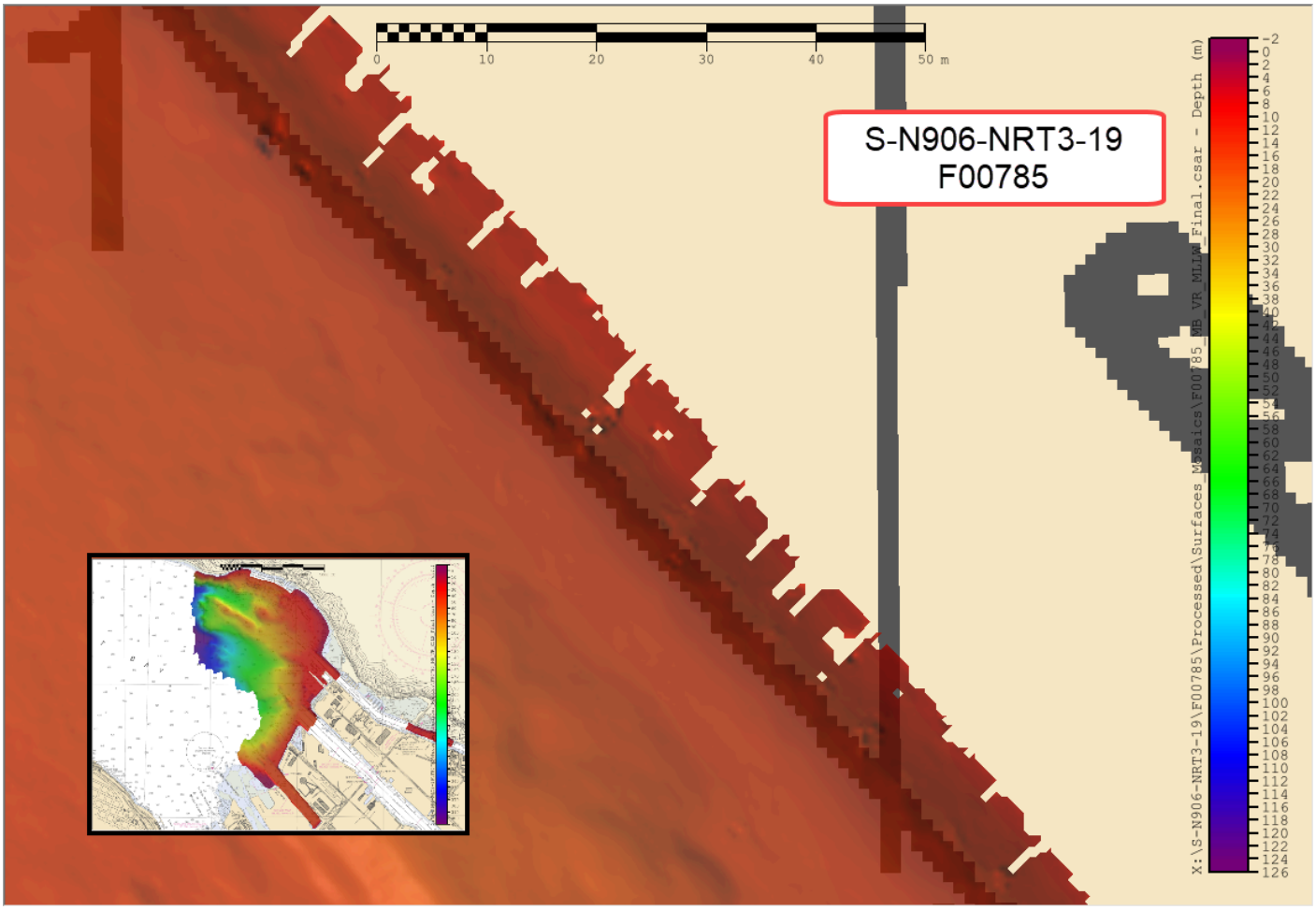


Figure 8: Examples of holidays identified in HydrOffice Holiday Finder along survey edge and pier faces.

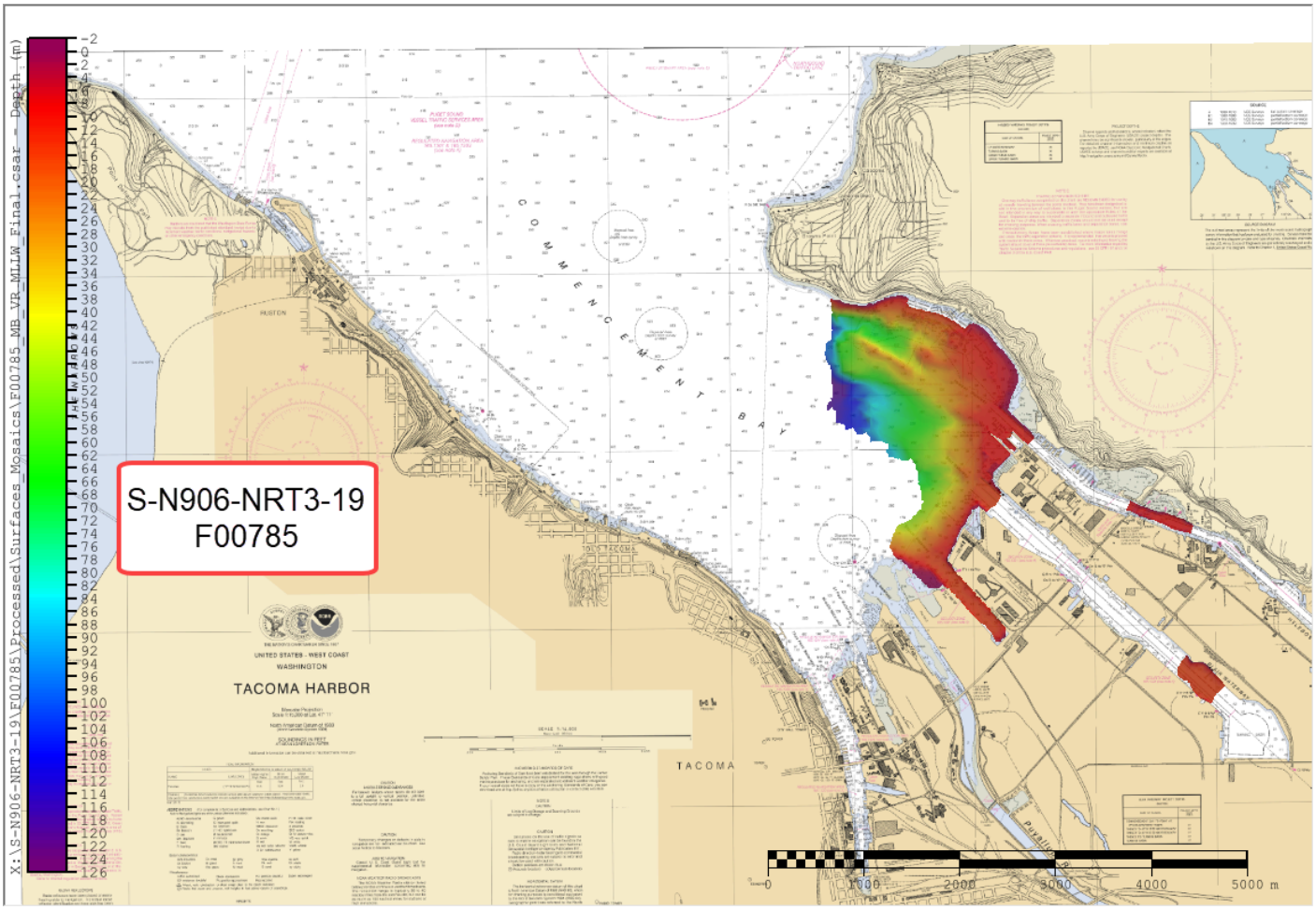


Figure 9: F00785 is located in the north eastern section of Commencement Bay and includes the approaches to the Port of Tacoma.

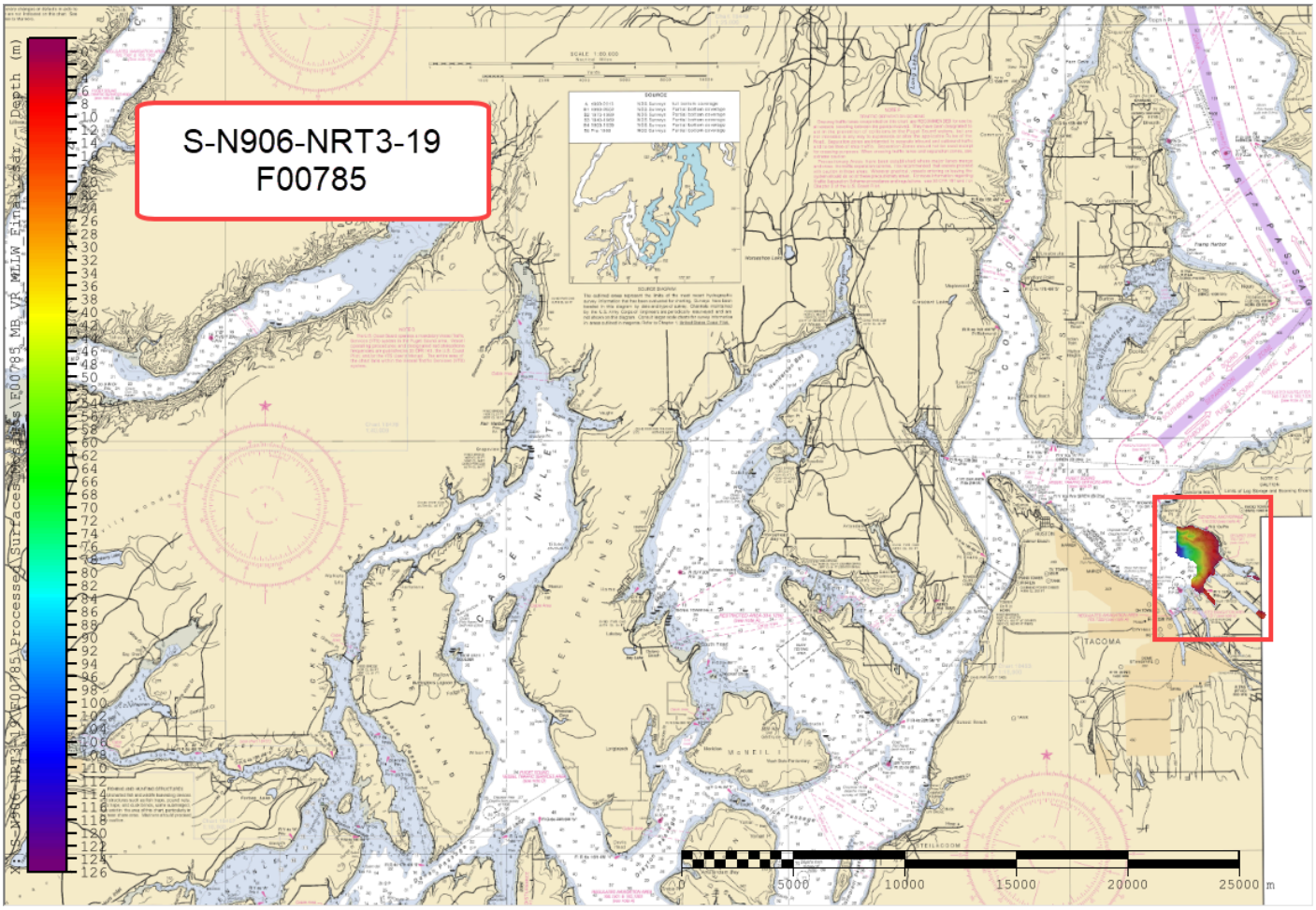


Figure 10: Commencement Bay is located at the southern end of the Puget Sound traffic separation scheme.

A.6 Survey Statistics

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

	HULL ID	*S3006*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	60.6011	60.6011
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	0	0
	SBES/MBES Crosslines	5.3899	5.3899
	Lidar Crosslines	0	0
Number of Bottom Samples			1
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			1.15

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
10/17/2019	290
10/18/2019	291

Survey Dates	Day of the Year
10/19/2019	292
10/21/2019	294
10/22/2019	295
10/24/2019	297
10/27/2019	300

Table 4: Dates of Hydrography

This survey data was collected from October 17 to October 27, 2019 with the assistance of LT Shunika Johnson of United States Navy Sleet Survey Team and LTJG Nicolas Azzopardi of NOAA Ship RAINIER.

Figure 11: S3006 with the Point Defiance ferry

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	***S3006***
LOA	34 feet
Draft	4 feet

Table 5: Vessels Used

Figure 12: S3006

All data was collected by S3006 (Figure 12). The vessel acquired multibeam depth soundings, sound speed profiles, and bottom samples.

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040C	MBES
AML Oceanographic	MicroX SVS	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System
YSI	CastAway-CTD	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

The equipment was installed on S3006. The vessel is equipped with POS MV v5 system for positioning and attitude, Kongsberg EM 2040C for MBES, AML Oceanographic MicroX SVS surface sound speed sensor, and YSI CastAway-CTD casts.

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 8.89% of mainscheme acquisition.

Multibeam crosslines were collected by S3006 across a variety of depth ranges, water masses, and days (Figure 13).

Crosslines were collected, processed and compared in accordance with Section 5.2.4.2 of the HSSD. A Variable Resolution (VR) surface was created of only mainscheme lines, and a second VR surface was created of only crosslines. A difference surface was generated in Pydro Explorers Compare Grids tool by subtracting the crossline only surface from the mainscheme surface (mainscheme- crosslines= difference surface). From the difference surface, the following statistics were derived. The mainshceme only, crossline only, and difference surface are included in the submission of this survey as Digital Data. The coloring represents areas where the TVUmax error tolerance in exceeded; red, orange and yellow colors represent areas where mainscheme data is deeper than crossline data; the blue shades represent where crossline data is deeper than mainscheme data (Figure 14). In total, 99.5% of the total number of nodes pass the TVUmax test between F00785 mainscheme and crossline data (Figure 15). For F00785 respective depths, the difference surface was compared to the allowable NOAA uncertainty standards (Figure 16 and 17). Statistics show the mean difference between the depths derived from mainscheme F00785 data and crossline data was 0.12 meters, with mainscheme data being deeper.

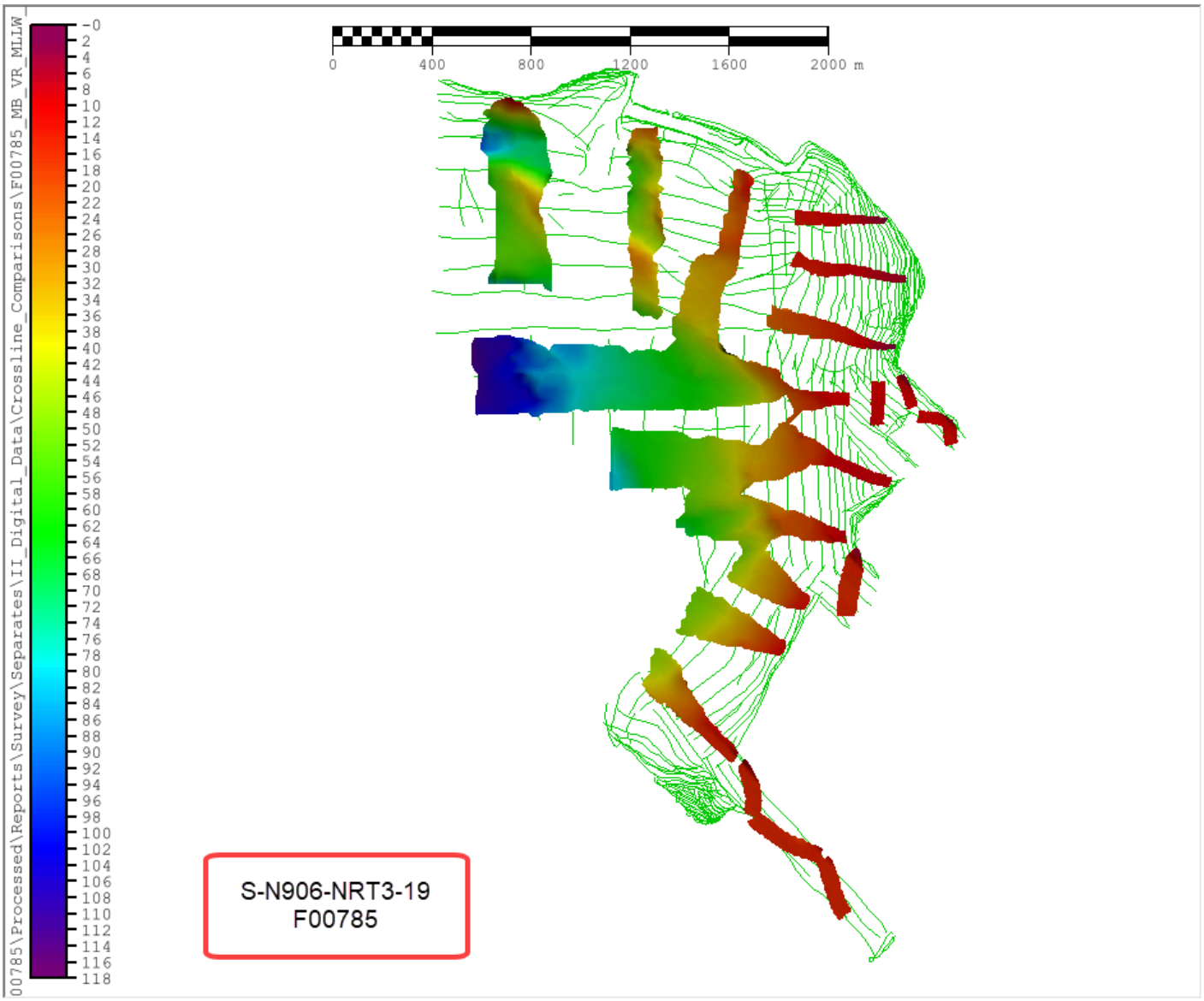


Figure 13: F00785 crossline surface overlaid on mainscheme tracklines showing good temporal and geographic distribution.

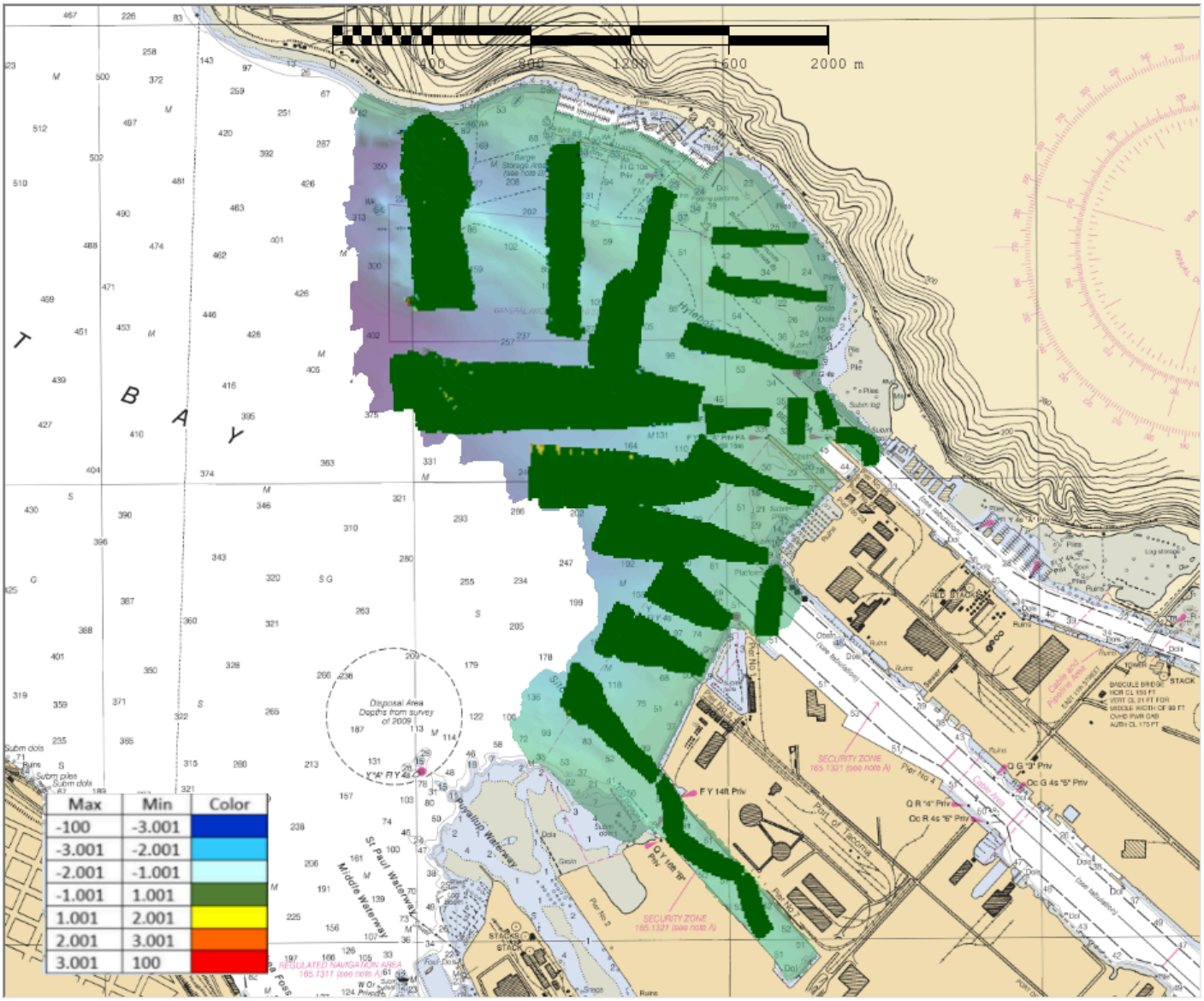


Figure 14: Depth differences between F00785 mainscheme and crossline data as compared to NOAA allowable uncertainty standards for associated depths.

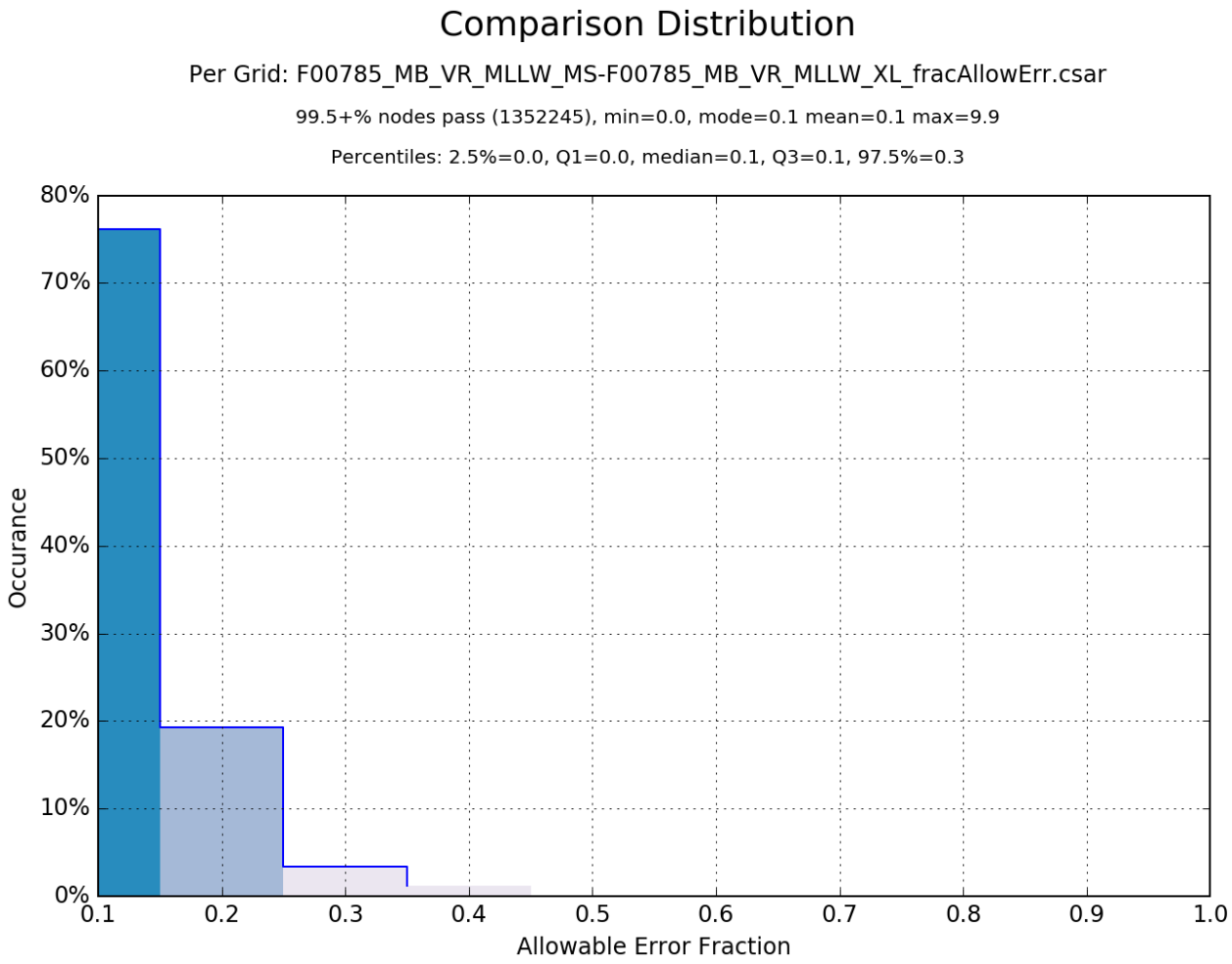
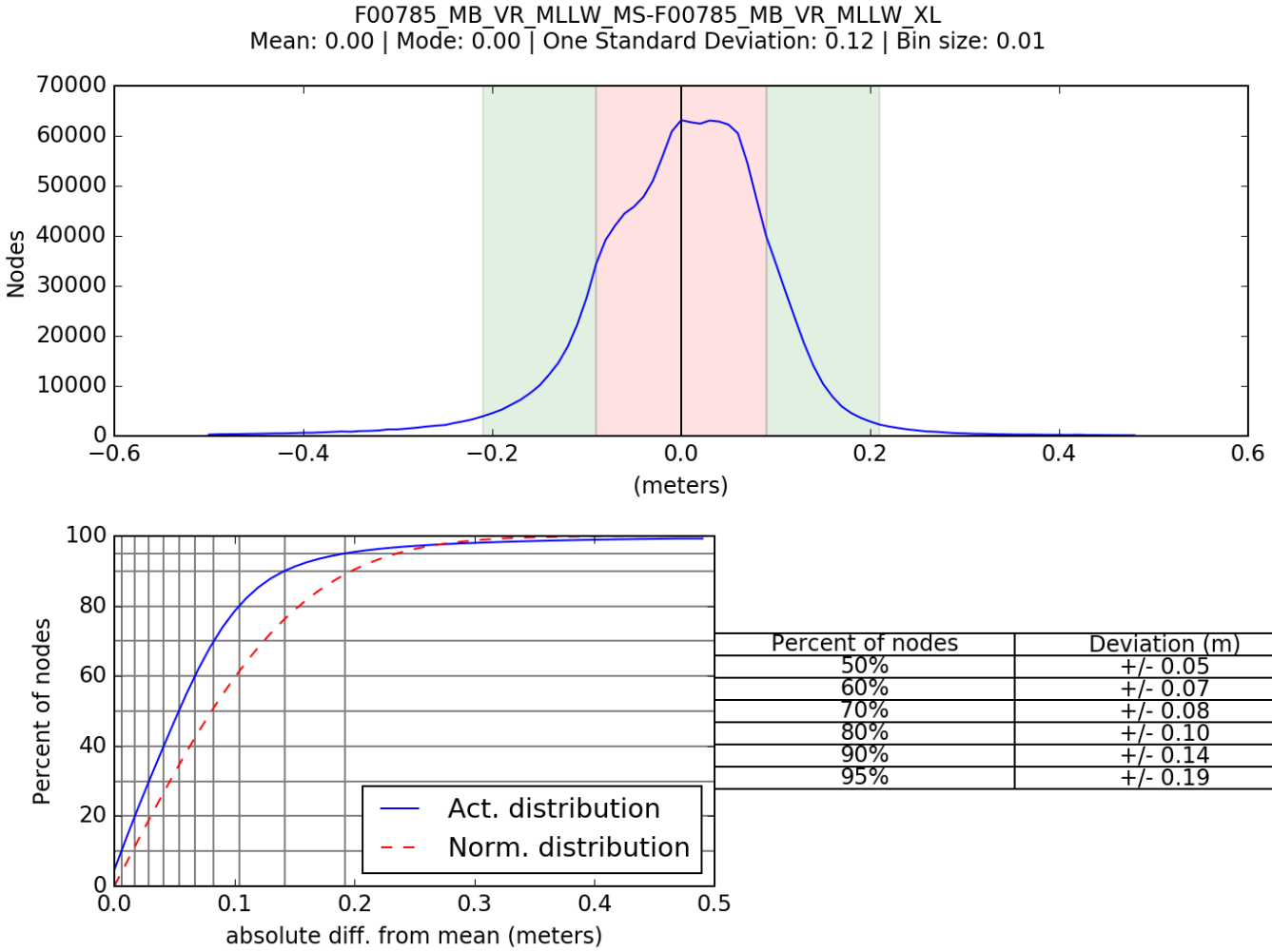


Figure 15: Histogram plot utilizing the magnitude (absolute value) of the Allowable Error Fraction to show the indication of what percentage of the total number of the comparisons pass the TVUmax test.



Percent of nodes	Deviation (m)
50%	+/- 0.05
60%	+/- 0.07
70%	+/- 0.08
80%	+/- 0.10
90%	+/- 0.14
95%	+/- 0.19

Figure 16: The statistical distribution summary plot of the difference between F00785 mainscheme and crossline data

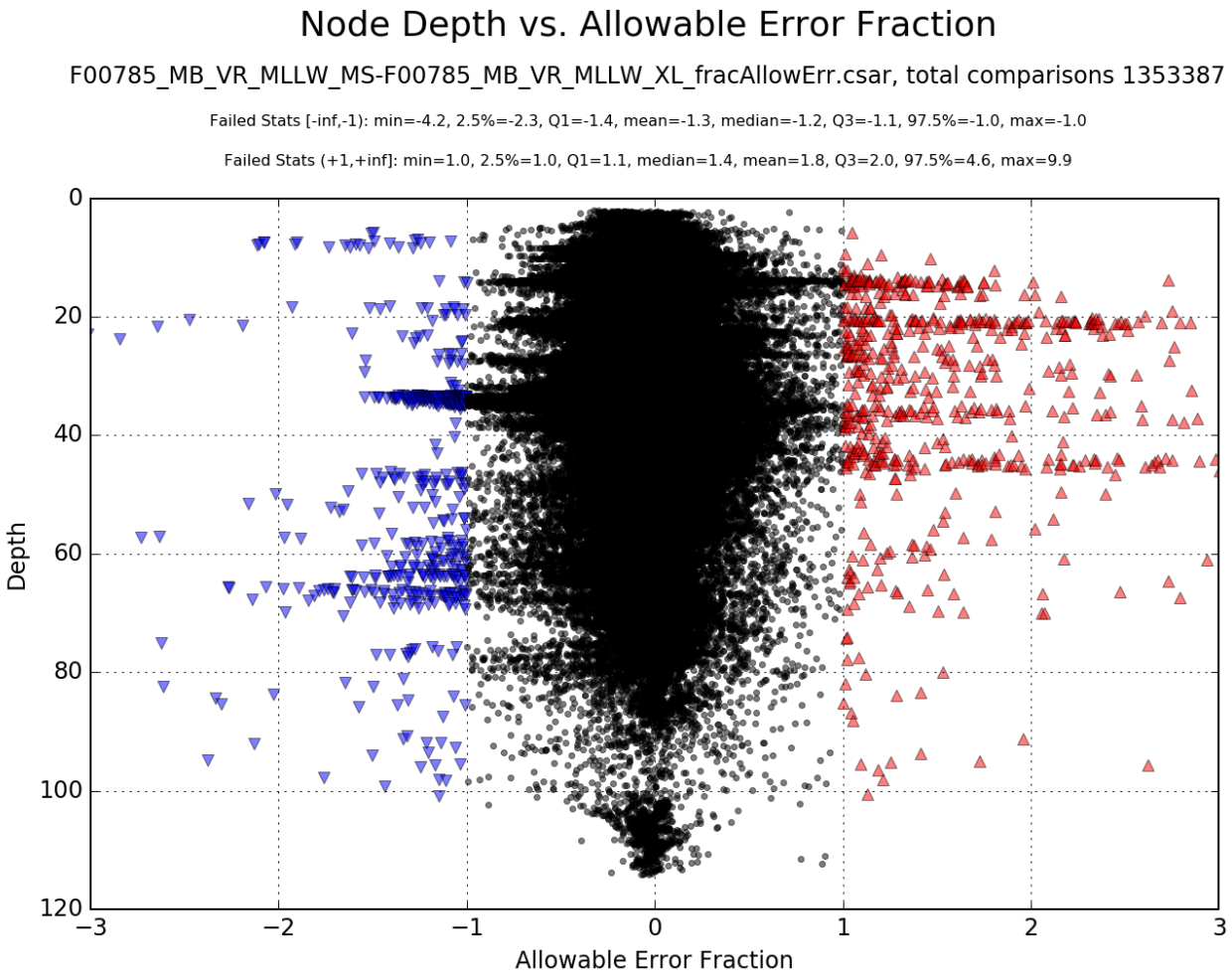


Figure 17: The depth dependent plot of the Allowable Error Fraction, with values between and including +/- 1 representing comparisons.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.0 centimeters	9.5 centimeters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
S3006	4.0 meters/second	N/A meters/second	N/A meters/second	0.15 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

The uncertainty statistics were calculated using Pydro Explorer's QC Tool's Finalized CSAR QA application. Total Propagated Uncertainty (TPU) values for F00785 were derived from a combination of fixed values for equipment and vessel characteristics, as well as field assigned values for sound speed uncertainties. The uncertainty for the VDatum model was provided to the field unit.

In addition to the usual a priori estimates of uncertainty, some real time and post processed uncertainty sources were also incorporated into the depth estimates of the survey. Real-time uncertainties from the Kongsberg MBES sonars were incorporated and applied during post processing. Uncertainties associated with vessel roll, gyro, and navigation were applied real-time. F00785 utilized kinematic (RTK) positioning service. The recorded delayed heave Applanix files included an estimate of the heave uncertainty and were applied during post processing. All of the aforementioned uncertainties were applied in CARIS. F00785 is an ellipsoidally referenced survey (ERS) and the tidal component was accomplished via separation model.

Additional information about RTK and the separation model are located in section C.1 and C.2 of this document. 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 outlined in Section 5.1.3 of the 2019 HSSD for F00785 (Figure 18).

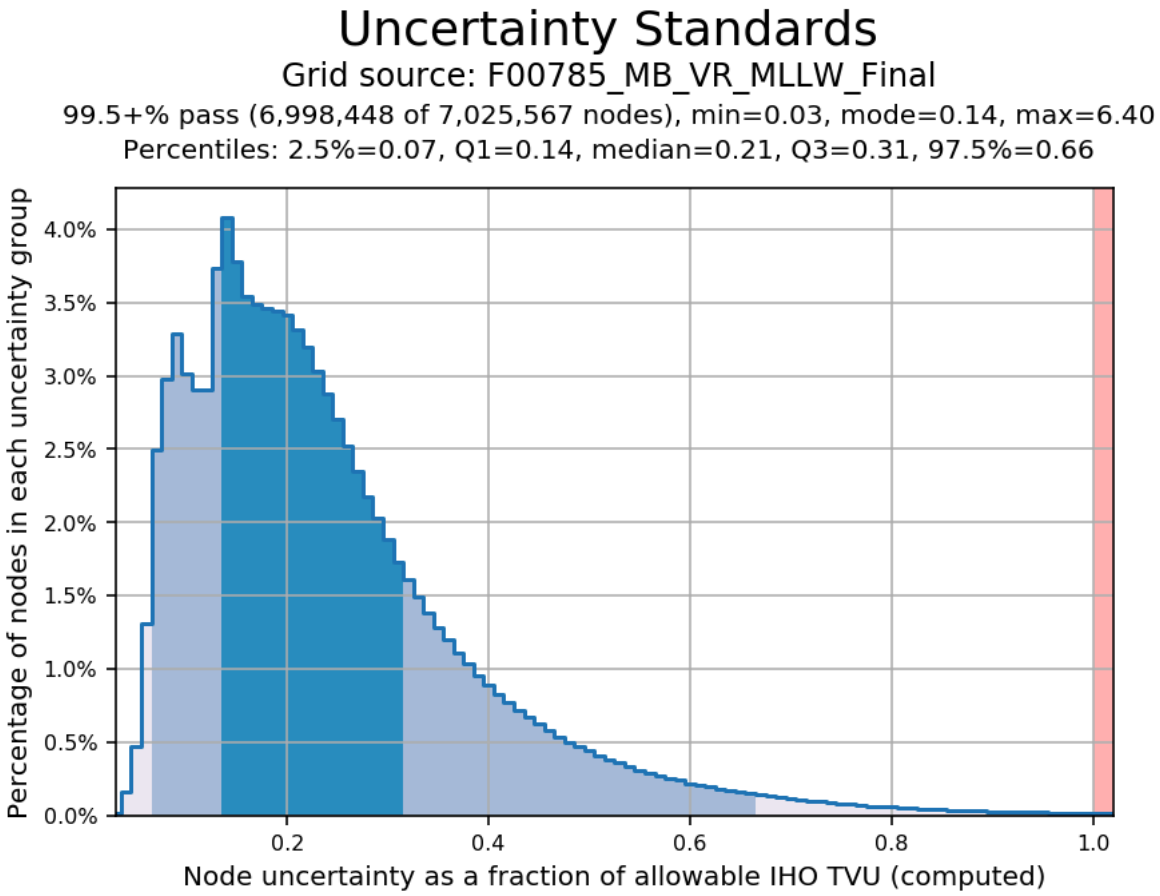


Figure 18: Pydro QC tools derived histogram plot showing HSSD uncertainty standards compliance for F00785 finalized VR surface.

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: At least every 4 hours

SoundSVP casts were taken at least once every four hours with sufficient frequency, density, depth and accuracy as outlined in section 5.2.3.3 of the 2019 HSSD (Figure 19). The SVP casts were applied to the MBES lines in CARIS using the "nearest in distance within time of 4 hours" method.

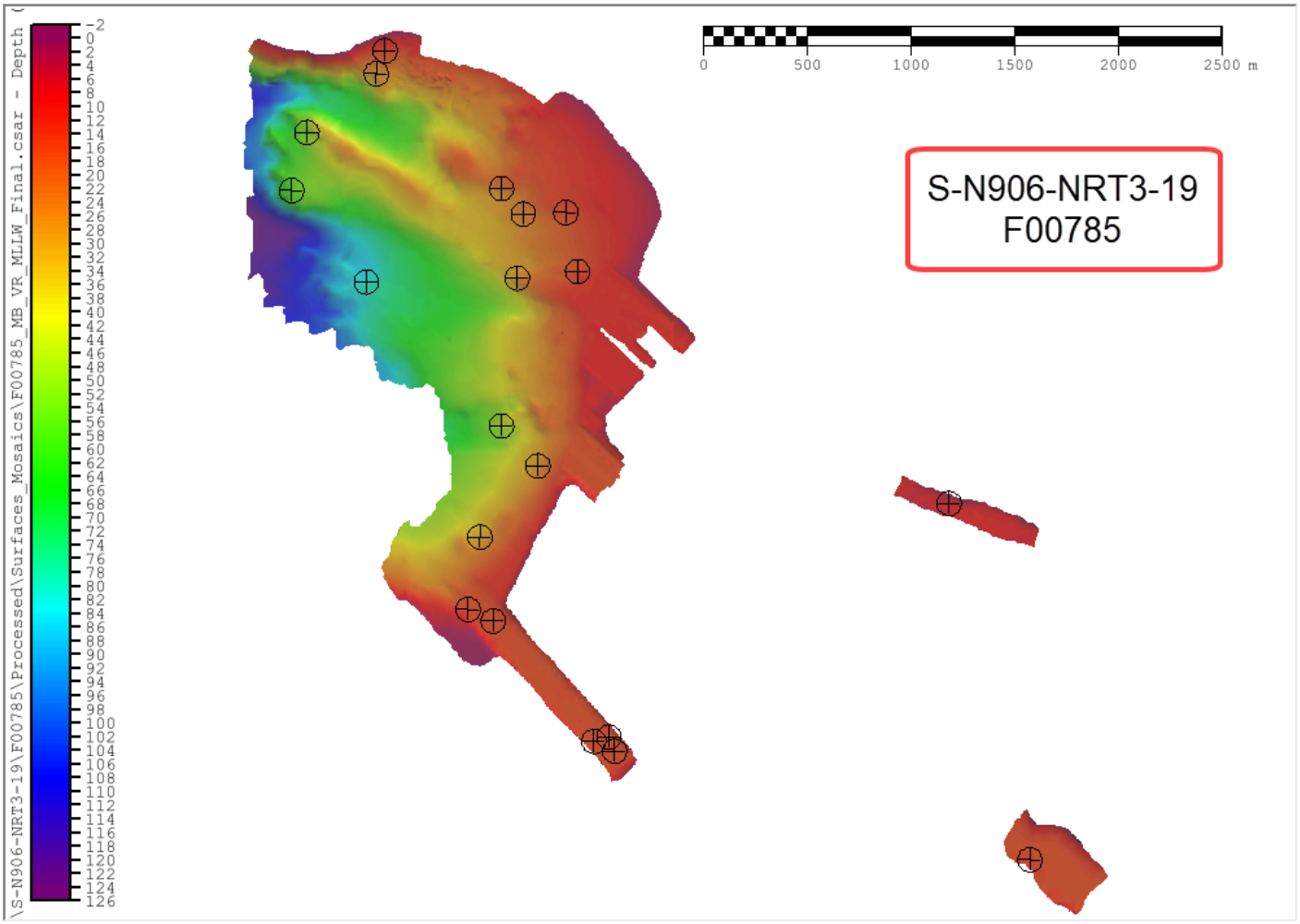


Figure 19: F00785 sound speed cast locations showing good spatial distribution.

B.2.8 Coverage Equipment and Methods

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

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Raw backscatter data is logged as .all file for delivery to NOAA's Pacific Hydrographic Branch. NOAA's Navigation Response Branch field units are waived from producing backscatter mosaics for the 2018 and 2019 field season. All equipment and survey methods were used as detailed in the DAPR.

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/SIPS	11.1.6

Table 9: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files 2019 V2.

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
F00785_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	-0.5 meters - 124.6 meters	NOAA_VR	Object Detection

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00785_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	-0.5 meters - 124.6 meters	NOAA_VR	Object Detection

Table 10: Submitted Surfaces

The survey was carried out to meet the Object Detection MBES Coverage requirements as defined by Section 5.2.2 of the 2019 Hydrographic Survey Specifications and Deliverables.

QC Tools in Pydro Explorer was used to analyze the surface for fliers. There were 18 fliers identified on the finalized surface. Upon review, the fliers identified were primarily on underwater wrecks (Figure 20).

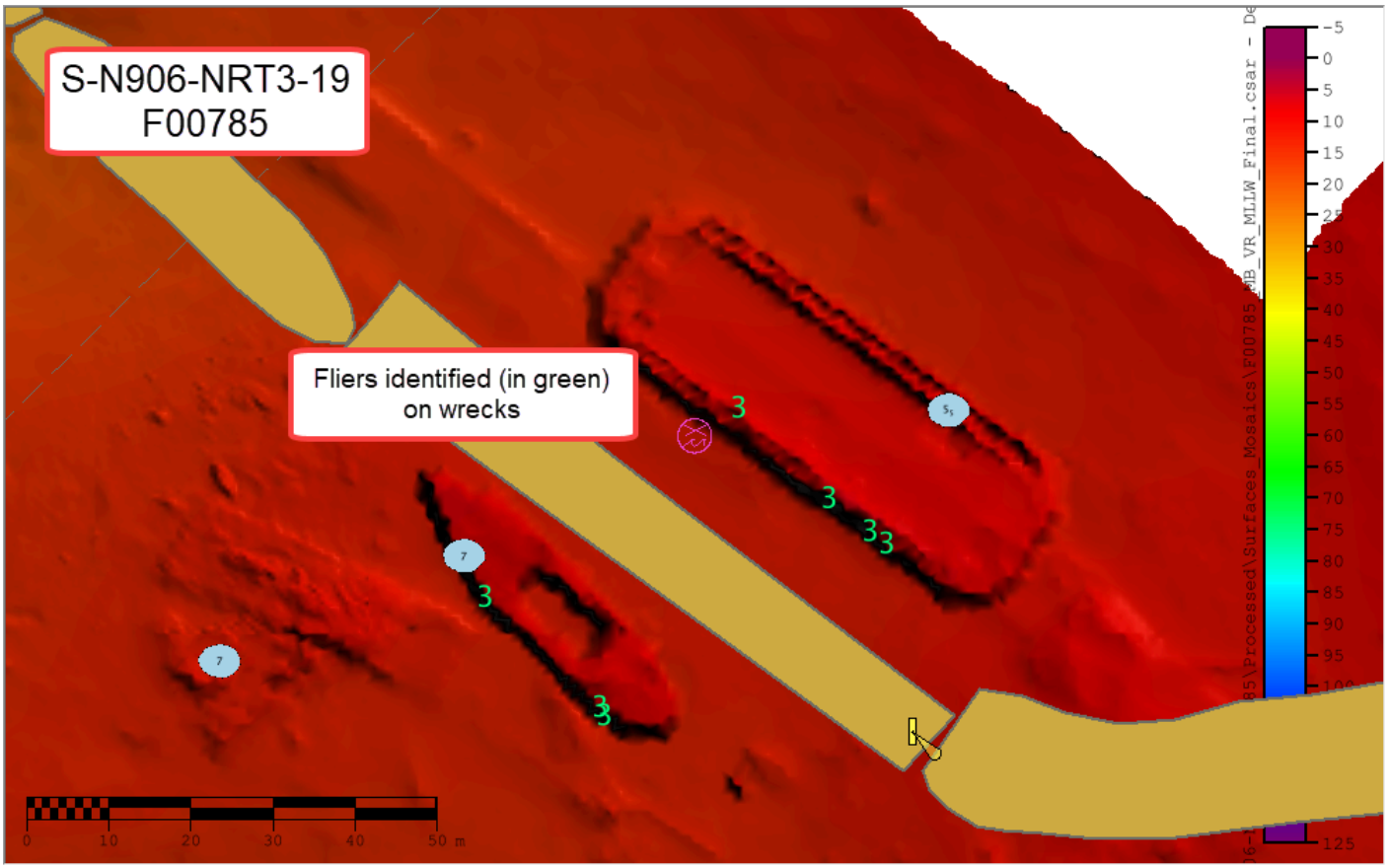


Figure 20: Fliers identified with QC tools "Flier Finder" that are on wrecks.

C. Vertical and Horizontal Control

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

C.1 Vertical Control

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

ERS Datum Transformation

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

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	S-N906_VDatumLimits_100m_NAD83-MLLW_geoid12b

Table 11: ERS method and SEP file

Sounding elevations relative to the ellipsoid were collected through Ellipsoidal Referenced Survey (ERS) with post-processing of the daily logger POSPac data to create a statistical best estimate of trajectory (SBET) file, as detailed in the DAPR. All F00785 meets HSSD vertical accuracy requirements.

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 10.

The following PPK methods were used for horizontal control:

- RTX

Precise Positioning-Real Time Extended (PP-RTX) processing methods were used in Applanix POSpac MMS 8.3 software to produce SBETs for post-processing horizontal correction. All of F00785 meets HSSD horizontal accuracy requirements.

WAAS

The Wide Area Augmentation System (WAAS) was used for real-time horizontal control during data acquisition.

D. Results and Recommendations

D.1 Chart Comparison

A comparison was performed between survey F00785 and ENC US5WA22M using CARIS HIPS sounding and contour layers derived from the finalized VR surface. The contours and soundings were overlaid on the charts to assess differences between the surveyed soundings and charted depths. ENCs were compared by extracting all soundings from the chart for general agreement and to identify areas of significant change. All data from F00785 should supersede charted data. In general, surveyed soundings agree with the majority of charted depths. A discussion of several of the disagreements in section D 1.1 of this report.

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	Preliminary?
US5WA22M	1:15000	40	03/19/2019	03/19/2019	NO

Table 12: Largest Scale ENCs

US5WA22M

ENC US5WA22M extends from the mouth of Commencement Bay to the south eastern portion of Blair and Hylebos waterways in the vicinity of Tacoma, WA. Contoured depths of ENC US5WA22M that apply to F00785 survey area are 0.0, 1.8, 3.6, 5.4, and 9.1 meters.

Derived contours from F00785 survey data were generally less conservative then charted contours (Figure 21). The 9.1 meter contour between the Blair waterway and pier number 23 showed drastic differences (Figure 22).

The soundings derived from F00785 survey data generally agreed with ENC US5WA22M within 2 meters in depths greater than 30 meters (Figure 23). Hydrographer recommends utilizing F00785 survey data to replace current ENC US5WA22M data.

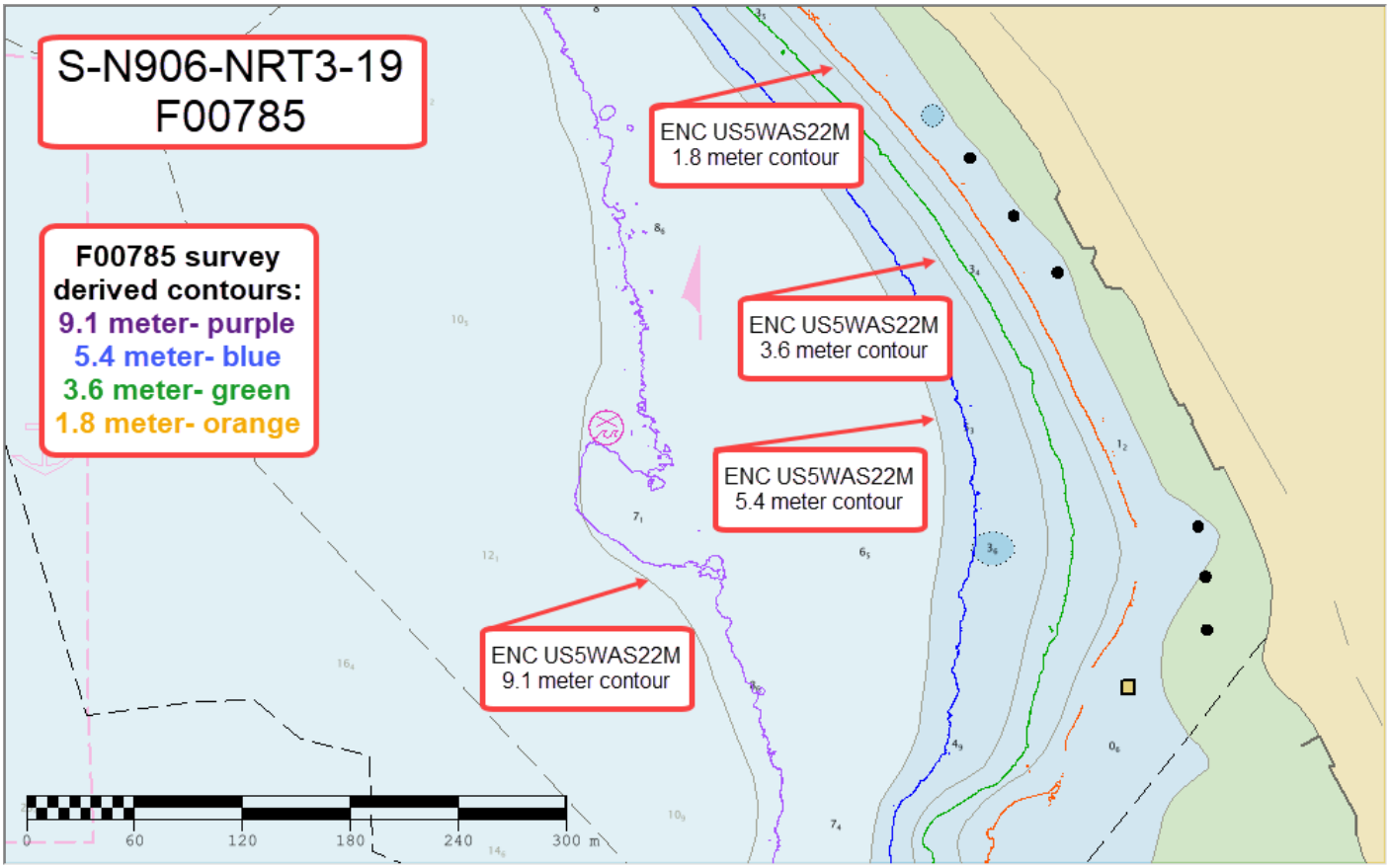


Figure 21: Comparison of US5WA22M charted contours and F00785 survey derived contours. Charted contours are generally more conservative that survey derived data.

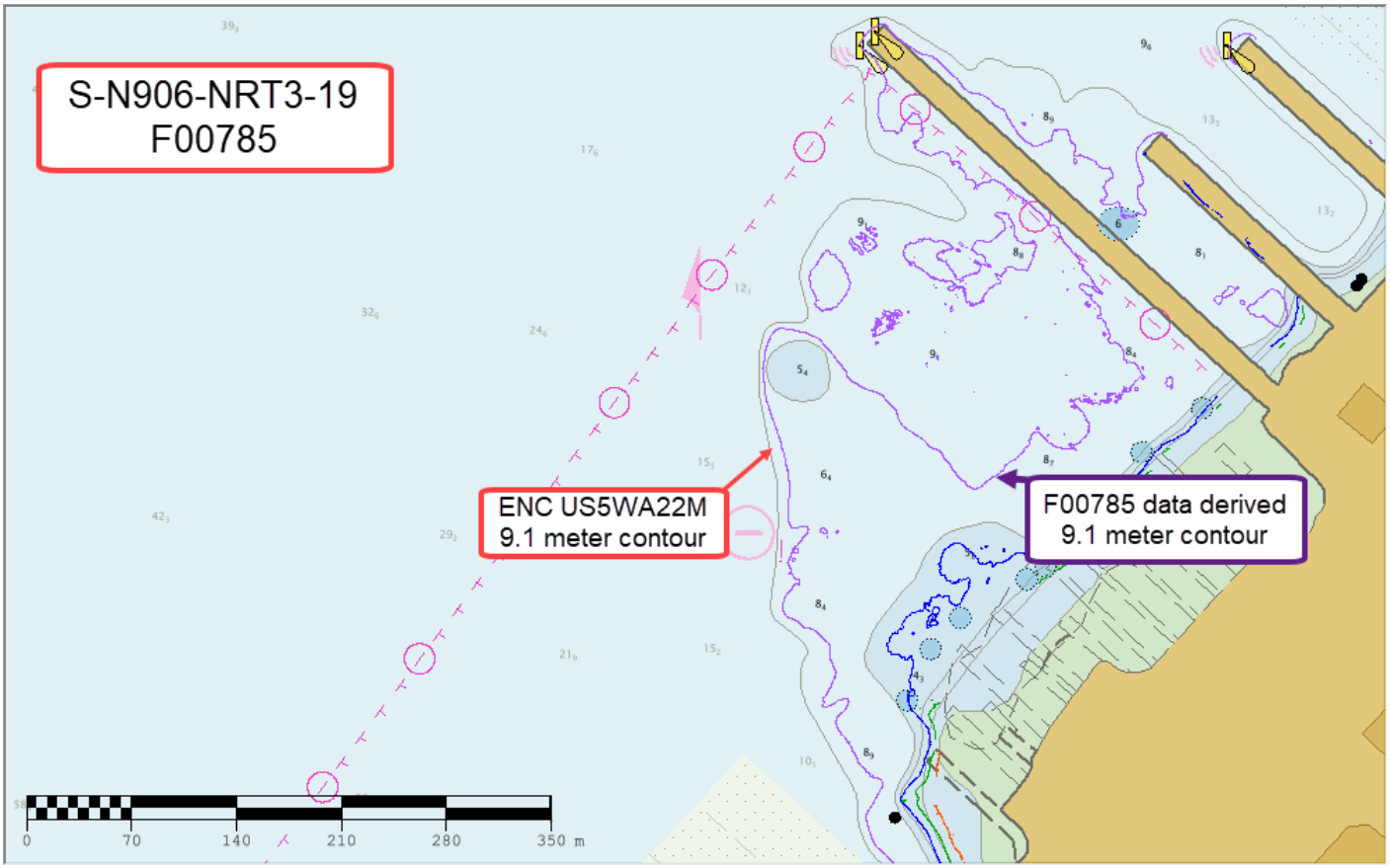


Figure 22: F00785 9.1 meter contour (in purple) derived from survey data compared to ENC US5WA22M charted 9.1 meter contour line.

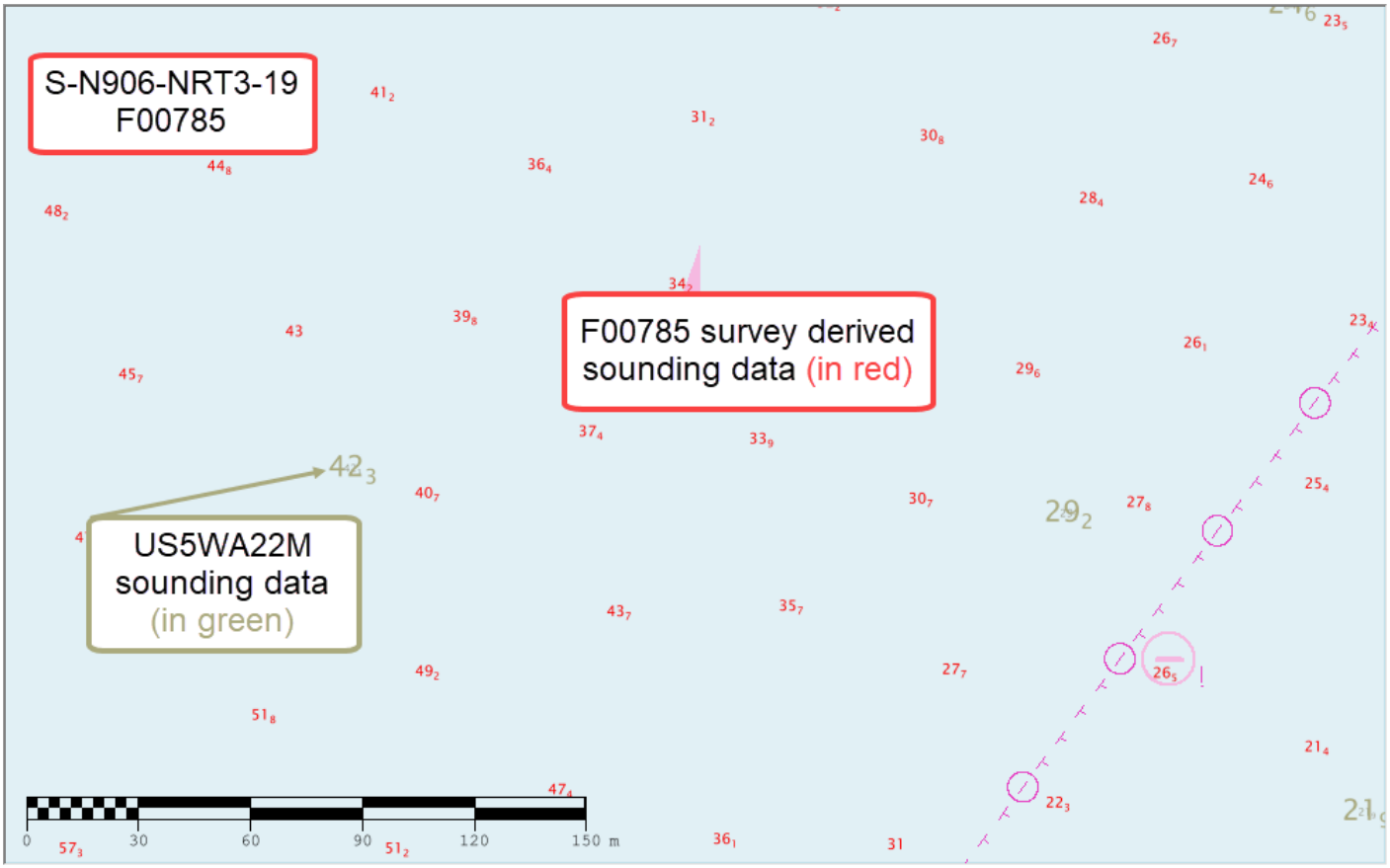


Figure 23: Sounding data from derived from F00785 survey data compared from to US5WA22M charted soundings.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

No charted features exist for this survey.

D.1.4 Uncharted Features

The Port of Tacoma supports international trade valued at $52.1 billion a year, the Washington State Ferry system, maritime construction, and recreational traffic. There were numerous new features, specifically in the Tyee Marina vicinity, derived from the F00785 survey data that are detailed in the Final Feature file (Figure 24).

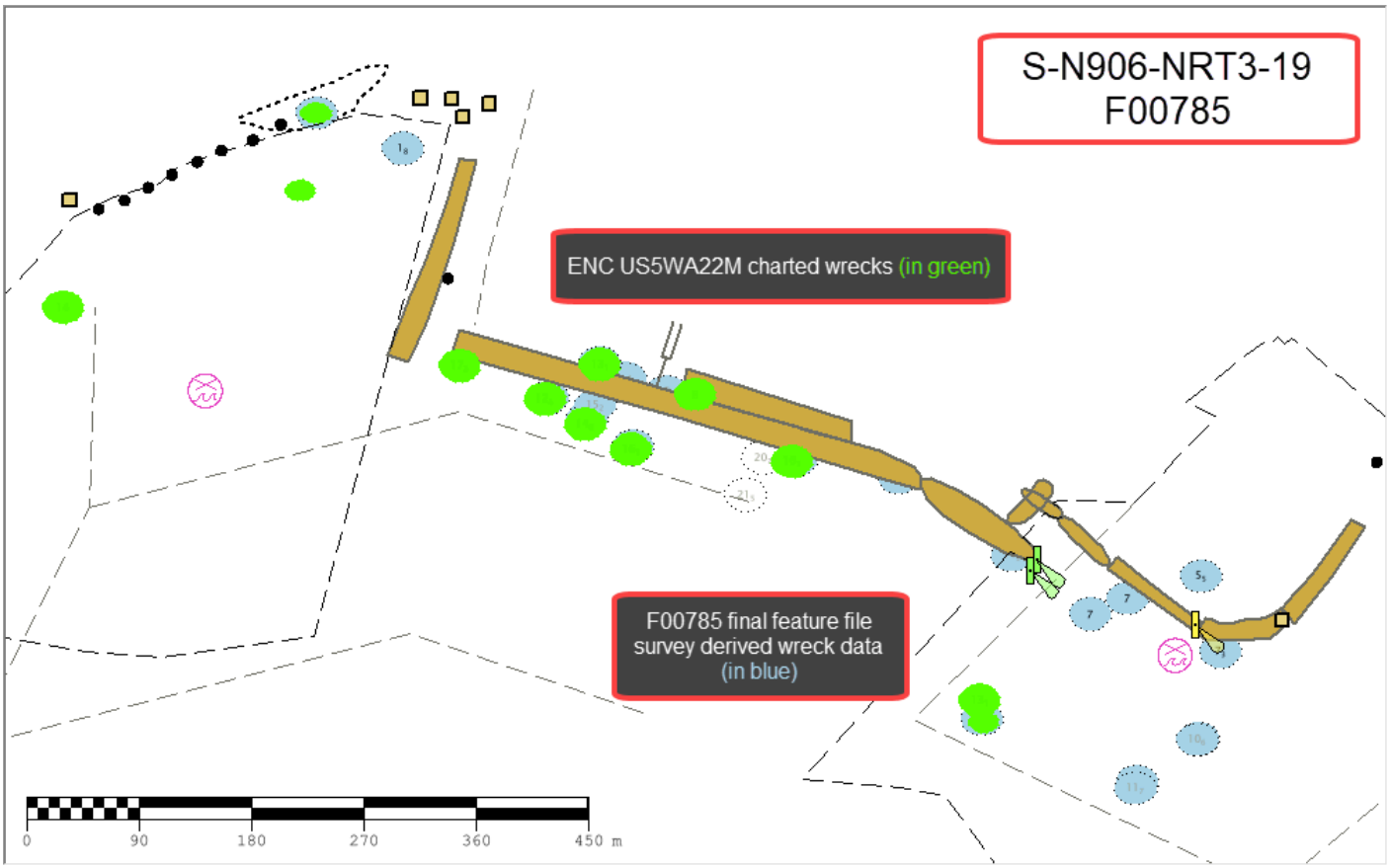


Figure 24: Please refer to the final feature file for new and updated feature locations derived from F00785 survey data.

D.1.5 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.6 Channels

F00785 survey data included the Sitcum Waterway and approaches to two federal maintained channels: Blair Waterway and Hylebos Waterway (Figure 25). Soundings from F00785 data found the channel depth to be greater than or equal to the charted channel depth on the chart (Figure 26 and 27).

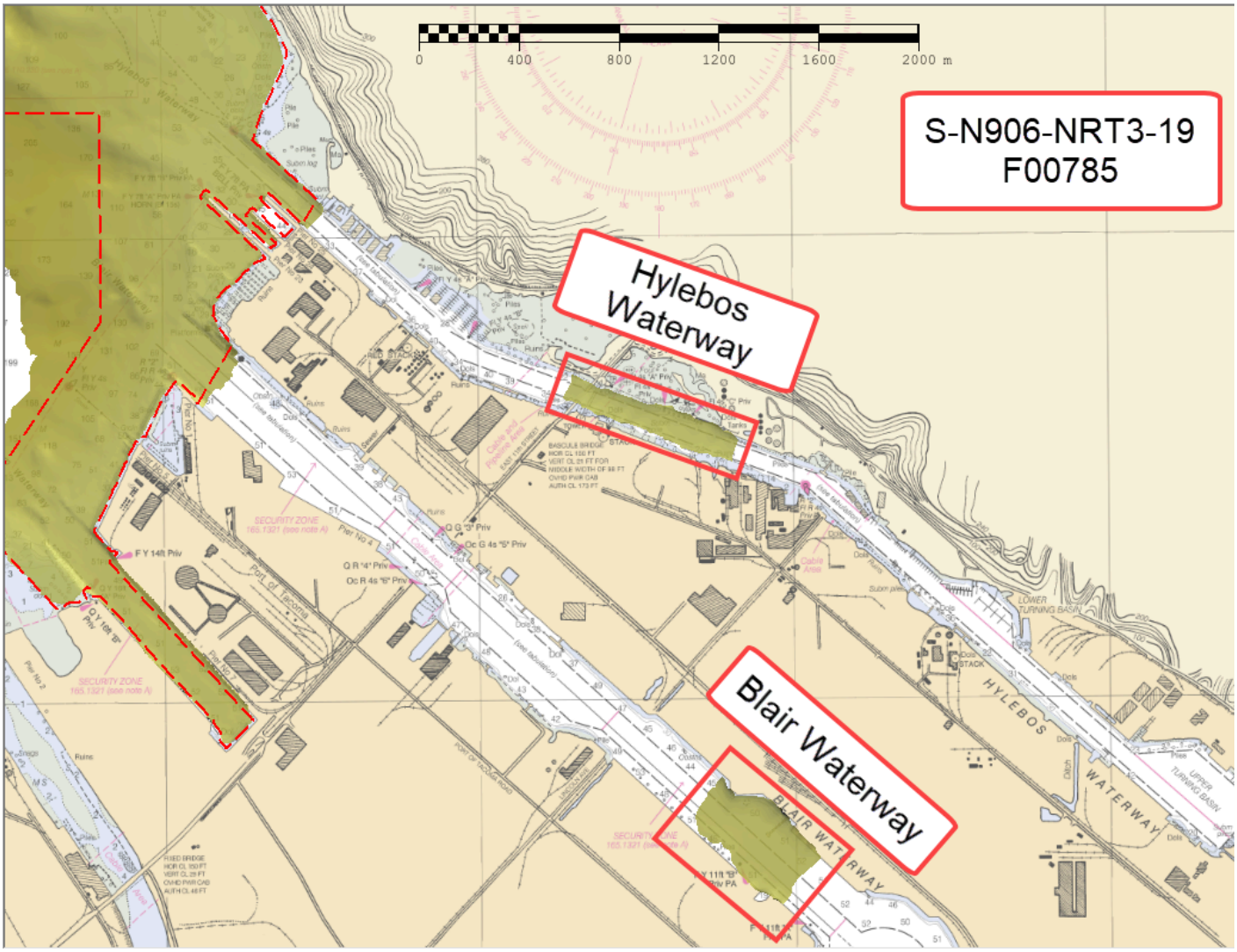


Figure 25: Selected areas of the federal maintained channel included with F00785 survey data.

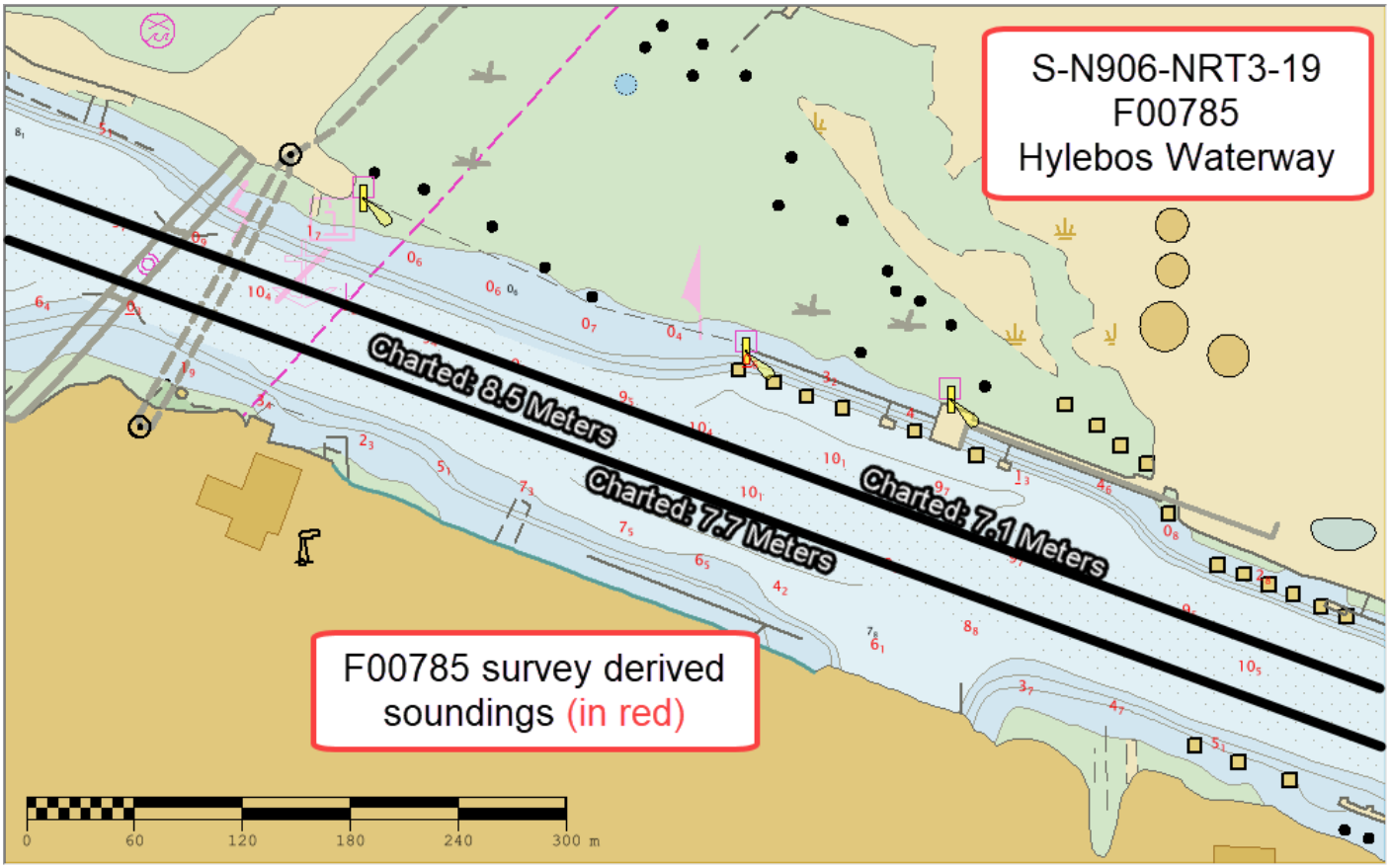


Figure 26: Soundings comparisons from F00785 survey derived soundings and ENC US5WA22M charted soundings in Hylebos waterway.

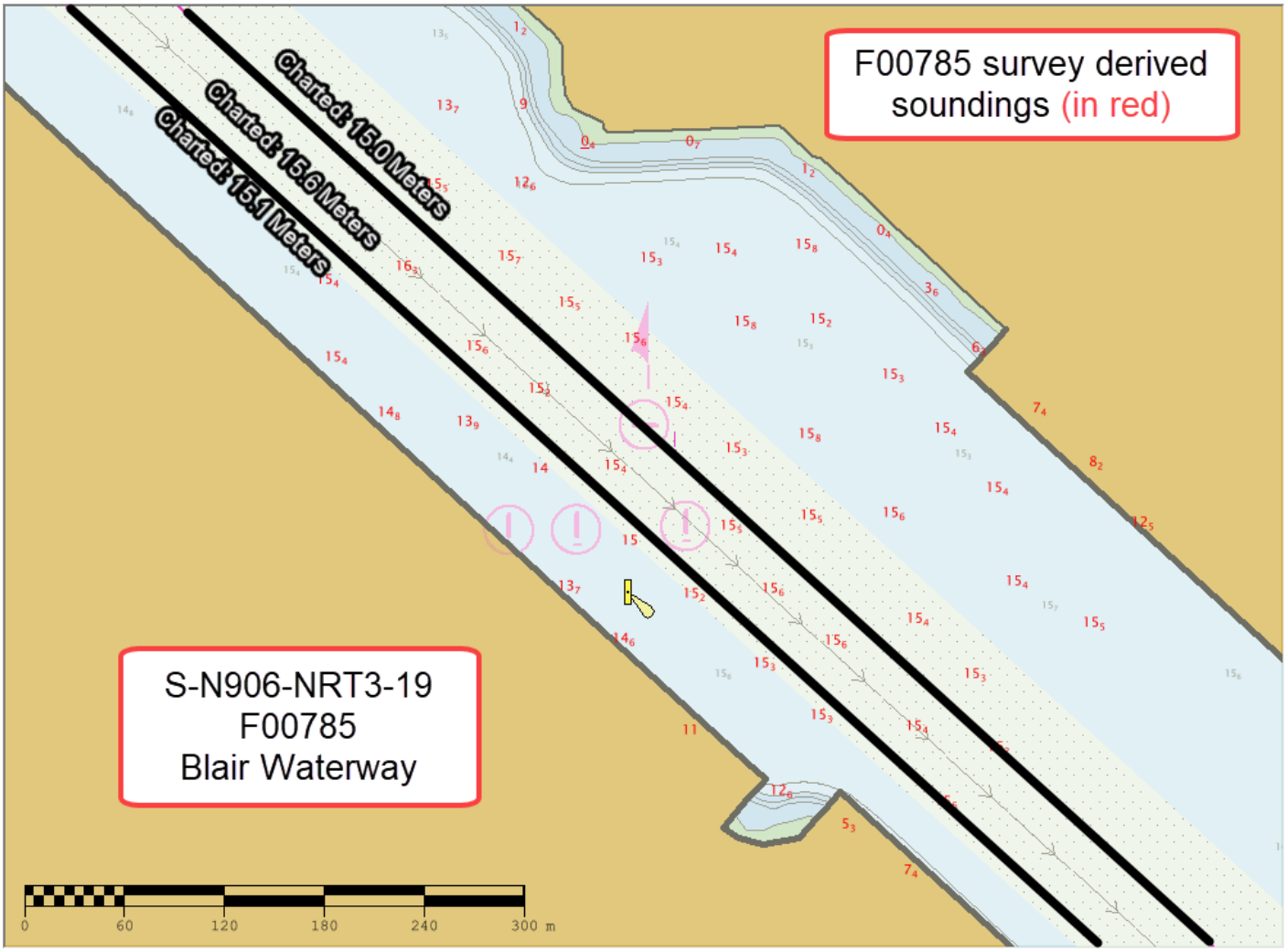


Figure 27: Soundings comparisons from F00785 survey derived soundings and ENC US5WA22M charted soundings in Blair waterway

D.1.7 Bottom Samples

One bottom sample was assigned and acquired in accordance with the Project Instructions for survey F00785 (Figure 28). There are no drop camera images submitted with these bottom samples. All bottom samples results are included in the F00785 Final Feature File submitted with this survey.

Figure 28: A bottom sample taken within the F00785 survey area.

D.2 Additional Results

D.2.1 Shoreline

NRT-3 personnel conducted limited shoreline verification and reconnaissance, utilizing traditional shoreline methods, at times near predicted negative or low tides within the survey limits. Inaccessible features inshore of the NALL were attributed in the Final Feature File with the description of “Not Addressed” and remarks of “Retain as charted, not investigated due to being inshore of NALL” as per HSSD Section 7.3.1 using the Composite Source File (CSF) and Project Preference File (PRF). Shoreline verification procedures for F00785 conform to those detailed in the DAPR.

D.2.2 Aids to Navigation

Four aids to navigation were assigned and investigated in the survey area for F00785. These aids were observed serving their intended purpose, and three of the four were on station. One private aid to navigation, Tyee Marina Entrance Light U.S. Coast Guard Light List #:17210, positioned incorrectly on the chart by 10 meters. The aids to navigation discrepancy report form is included in the Appendix, Section II: Supplemental Survey Records and Correspondence. Corrected location for this feature is updated within the final feature file submitted with F00785 survey data.

The structures were all observed but the light characteristics were not observed due to day time operations (Figure 29).

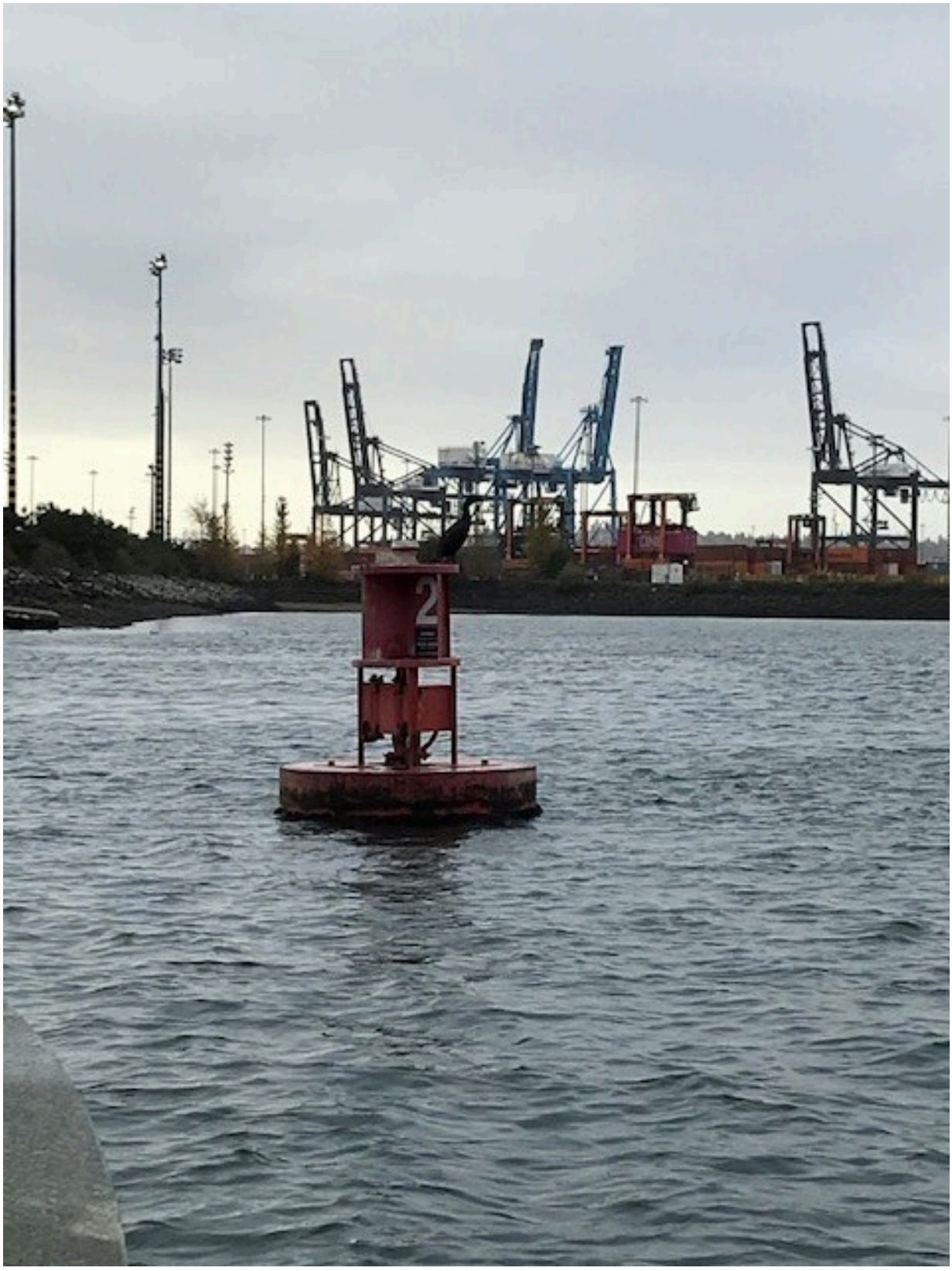


Figure 29: One of the ATONS investigated and submitted with F00785 data.

D.2.3 Overhead Features

No overhead features exist for this survey.

D.2.4 Submarine Features

One sewer pipeline existed and was investigated as part of the F00785 survey data. This information is included in the final feature file.

D.2.5 Platforms

No platforms exist for this survey.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.8 Construction and Dredging

Present and/or planned construction or dredging exists within the survey limits, but was not investigated. The United States Army Corps operates out of Pier No. 23 in the Port of Tacoma, and is routinely conducting dredging and single beam survey operations to maintain channel depths.

D.2.9 New Survey Recommendation

The Puyallup waterway is constantly discharging water into Commencement Bay and modifying the sea floor surrounding the mouth. During the team's time in the survey area there were several inquires from boaters about any future surveys and chart updates to the Foss Waterway and Browns Point area.

D.2.10 Inset Recommendation

No new insets 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
Michelle M. Levano, LTJG/NOAA	Chief of Party	01/10/2020	Digitally signed by LEVANO.MICHELLE.MARIE.1516645888 Date: 2020.01.08 12:28:08 -08'00'
PST Timothy Wilkinson	Hydrographer	01/10/2020	WILKINSON.TIMOTHY.DAVID.1383074440 Digitally signed by WILKINSON.TIMOTHY.DAVID.1383074440 Date: 2020.01.08 12:57:09 -08'00'

Local Notice to Mariners

- LNMs by CG District
- Daily LNM Discrep & Temp Chgs
- LNM Archives (zipped files)
- Report an ATON Discrepancy
- District Boundaries & Contact Information
- Chart Ordering Info
- Frequently Asked Questions
- Light Lists Corrections
- Weekly Light Lists (XML and PDF)
- Email Message Subscriptions (Free)

Maritime Safety Data

- Broadcast Notice to Mariners
- Daily LNM Discrep & Temp CH File
- Daily LNM File Description
- N. American Iceberg KML File
- DGPS Site Configurations
- Weekly Light Lists (XML and PDF)

Mission Areas

- AIS - Are You In Compliance?
- AIS Data Request
- Global Positioning System (Civil Support)
- AIS - Types, Messages, Etc.
- CGSIC Information
- Long Range Identification and Tracking
- Nationwide DGPS
- LORAN C (archive)

Maritime Safety Information

- Local Notices to Mariners
- Light List Volumes
- Navigation Rules - Amalgamated
- Maritime Telecommunications
- PAWSA
- International Ice Patrol (IIP)
- Public Notices for Bridges
- Nav Pubs and Documents
- Vessel Traffic Services
- USCG Homeport Website
- Coast Guard Safety Alerts (uscg.mil)

Subscribe / Report (free)

- Subscription Services / RSS (free)
- Report an ATON Discrepancy
- Report a GPS Problem
- Report an NDGPS Problem
- Report an LRIT Problem
- Report an AIS Problem
- Contact Our Watch or SME

ATON DISCREPANCY REPORT FORM

Navigation Center Website Privacy Act Statement

Authority: 5 U.S.C 301; 14 U.S.C. 93(a) and (c); 14 U.S.C 632; 33 U.S.C 1223

Purpose: The Coast Guard Navigation Center will use this information to disseminate navigation safety notices and updates to individuals upon request and to receive reports of aid to navigation outages, issues or discrepancies.

Routine Uses: Coast Guard personnel will use this information to disseminate safety notices and updates and to aid in the repair or investigate reports of navigation outages, issues or discrepancies. Any external disclosures of data within this record will be made in accordance with DHS/ALL-002, Department of Homeland Security General Contact Lists, 73 Federal Register 71659, November 25, 2008, and DHS/USCG-013, Marine Information for Safety and Law Enforcement System of Records, 74 Federal Register 30305, June 25, 2009.

Disclosure: Furnishing this information is voluntary; however, failure to furnish the requested information may hinder your request for navigation safety related information.

* Denotes a required field

Your Name:* (Our Privacy Policy)	LTJG Michelle Levano
Your Email Address:*	ocs.nrt3@noaa.gov
Your Phone number:	206-526-6873
Waterway/Area:*	Commencement Bay- Tyee Marina State:* Select State
Your Vessel's Name:	S3006, Navigation Response Team-Seattle
Type of Vessel:	Alum. Survey Vessel
DOC#/ HIN / VIN / State #:	
AID Name (from Light List):	
Light List Number (LLNR):	17210
Structure Discrepancy:*	Destroyed: Damaged: Leaning: Missing Dayboards: None:
or *Buoy Discrepancy:	Missing: Off Station: Sinking: Adrift: AIS ATON: None:
or *Lighted ATON Discrepancy:	Extinguished: Improper Characteristic: Burning Dim: None:
or *Other type of discrepancy:	Structure Discrepancy- Off station
* Does a hazard to navigation exist?	Yes: No:

Please enter any additional comments or suggestions:

Tyee Marina private entrance light was surveyed 10 meters off charted location, positioned at 47-17-40.174535N 122-25-11.567446W

Remaining Characters 2871

Enter displayed code

2871

Send Reporting Form Clear This Form

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

APPROVAL PAGE

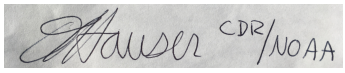
F00785

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- Bottom samples
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.



Digitally signed by HAUSER.OLIVIA.A.1275636009
Date: 2020.05.08 15:59:24 -07'00'

Approved:_____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch