

H13087

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area

Registry Number: H13087

LOCALITY

State(s): California

General Locality: California

Sub-locality: West Bechers Bay and vicinity

2018

CHIEF OF PARTY
Benjamin K. Evans, CDR/NOAA

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H13087

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): **California**

General Locality: **California**

Sub-Locality: **West Bechers Bay and vicinity**

Scale: **20000**

Dates of Survey: **09/25/2018 to 10/27/2018**

Instructions Dated: **08/17/2018**

Project Number: **OPR-L397-RA-18**

Field Unit: **NOAA Ship *Rainier***

Chief of Party: **Benjamin K. Evans, CDR/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:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via <http://www.ncei.noaa.gov/>.

Table of Contents

A. Area Surveyed.....	1
A.1 Survey Limits.....	1
A.2 Survey Purpose.....	3
A.3 Survey Quality.....	3
A.4 Survey Coverage.....	5
A.5 Survey Statistics.....	7
B. Data Acquisition and Processing.....	9
B.1 Equipment and Vessels.....	9
B.1.1 Vessels.....	9
B.1.2 Equipment.....	11
B.2 Quality Control.....	11
B.2.1 Crosslines.....	11
B.2.2 Uncertainty.....	14
B.2.3 Junctions.....	16
B.2.4 Sonar QC Checks.....	23
B.2.5 Equipment Effectiveness.....	23
B.2.6 Factors Affecting Soundings.....	24
B.2.7 Sound Speed Methods.....	24
B.2.8 Coverage Equipment and Methods.....	26
B.2.9 Detect Fliers.....	26
B.2.10 Holiday Finder.....	26
B.3 Echo Sounding Corrections.....	28
B.3.1 Corrections to Echo Soundings.....	28
B.3.2 Calibrations.....	28
B.4 Backscatter.....	28
B.5 Data Processing.....	29
B.5.1 Primary Data Processing Software.....	29
B.5.2 Surfaces.....	30
C. Vertical and Horizontal Control.....	31
C.1 Vertical Control.....	31
C.2 Horizontal Control.....	32
D. Results and Recommendations.....	32
D.1 Chart Comparison.....	32
D.1.1 Electronic Navigational Charts.....	33
D.1.2 Maritime Boundary Points.....	35
D.1.3 Charted Features.....	36
D.1.4 Uncharted Features.....	36
D.1.5 Shoal and Hazardous Features.....	36
D.1.6 Channels.....	36
D.1.7 Bottom Samples.....	36
D.2 Additional Results.....	36
D.2.1 Shoreline.....	36
D.2.2 Prior Surveys.....	36

D.2.3 Aids to Navigation	36
D.2.4 Overhead Features	37
D.2.5 Submarine Features	37
D.2.6 Platforms	38
D.2.7 Ferry Routes and Terminals	38
D.2.8 Abnormal Seafloor and/or Environmental Conditions	38
D.2.9 Construction and Dredging	38
D.2.10 New Survey Recommendation	38
D.2.11 Inset Recommendation	38
E. Approval Sheet	39
F. Table of Acronyms	40

List of Tables

Table 1: Survey Limits	1
Table 2: Survey Coverage	5
Table 3: Hydrographic Survey Statistics	8
Table 4: Dates of Hydrography	9
Table 5: Vessels Used	9
Table 6: Major Systems Used	11
Table 7: Survey Specific Tide TPU Values	14
Table 8: Survey Specific Sound Speed TPU Values	15
Table 9: Junctioning Surveys	17
Table 10: Primary bathymetric data processing software	30
Table 11: Primary imagery data processing software	30
Table 12: Submitted Surfaces	30
Table 13: NWLON Tide Stations	31
Table 14: Water Level Files (.tid)	31
Table 15: Tide Correctors (.zdf or .tc)	31
Table 16: Largest Scale ENCs	33

List of Figures

Figure 1: H13087 assigned survey area (Chart 18728)	2
Figure 2: Pydro derived plot showing HSSD density compliance of H13087 finalized VR MBES data	4
Figure 3: Pydro derived plot showing HSSD full coverage compliance of H13087 finalized variable-resolution MBES data	5
Figure 4: Example of Navigable Area Limit Line (NALL) determination; the black dashed line indicates assigned sheet limits. NALL was determined by the 3.5 meter limit (yellow area), thick kelp, and breaking waves nearshore	6
Figure 5: H13087 MBES coverage and assigned survey limits (Chart 18278)	7
Figure 6: NOAA Ship RAINIER in Channel Islands with survey launches 2701 (RA-2), 2801 (RA-4), and 2804 (RA-6)	10
Figure 7: H13087 crossline VR surface overlaid on mainscheme tracklines	12

Figure 8: Pydro derived plot showing percentage-pass value of H13087 mainscheme to crossline data.....	13
Figure 9: Pydro derived plot showing absolute difference statistics of H13087 mainscheme to crossline data.....	14
Figure 10: Pydro derived plot showing TVU compliance of H13087 finalized variable-resolution MBES data.....	16
Figure 11: H13087 junctions with surveys H13086 and H13205.....	17
Figure 12: H13087 and H13086 junction difference surface.....	18
Figure 13: Pydro derived plot showing percentage-pass value of the junction between surveys H13086 and H13087.....	19
Figure 14: Pydro derived plot showing absolute difference statistics of the junction between surveys H13086 and H13087.....	20
Figure 15: Overview of survey junction between H13087 and H13205.....	21
Figure 16: Pydro derived plot showing allowable error between H13087 and H13205.....	22
Figure 17: Pydro derived plot showing H13087 and H13205 comparison statistics.....	23
Figure 18: Pydro derived plot showing change to H13087 uncertainty after roll bias adjustment (original plot left, adjusted plot right).....	24
Figure 19: H13087 sound speed cast locations overlaid on MBES data.....	25
Figure 20: Holiday caused by acoustic shadow and thick kelp limiting surveying to the NALL.....	27
Figure 21: Holiday detected by Pydro QC Tools 2 outside of H13087 sheet limits.....	28
Figure 22: H13087 Backscatter Mosaic.....	29
Figure 23: H13087 overlaid on ENC US5CA66M showing offsets in 20 and 50 fathom curves.....	34
Figure 24: H13087 overlaid on ENC US5CA66M showing offsets in the 10 fathom curve.....	35
Figure 25: On the east side of Santa Rosa Island, ATONs on the end of the pier in Bechers Bay. The ATONs on this pier are privately maintained.....	37

Descriptive Report to Accompany Survey H13087

Project: OPR-L397-RA-18

Locality: California

Sublocality: West Bechers Bay and vicinity

Scale: 1:20000

September 2018 - October 2018

NOAA Ship *Rainier*

Chief of Party: Benjamin K. Evans, CDR/NOAA

A. Area Surveyed

This survey area is referred to as H13087, "West Bechers Bay and vicinity" (sheet 3) within the Project Instructions. The survey area encompasses approximately 16.3 square nautical miles of Santa Rosa's northeastern coast within the Channel Islands National Marine Sanctuary (CINMS), California.

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
34° 5' 40.61" N 120° 5' 55.35" W	33° 59' 4.59" N 120° 0' 47.89" W

Table 1: Survey Limits

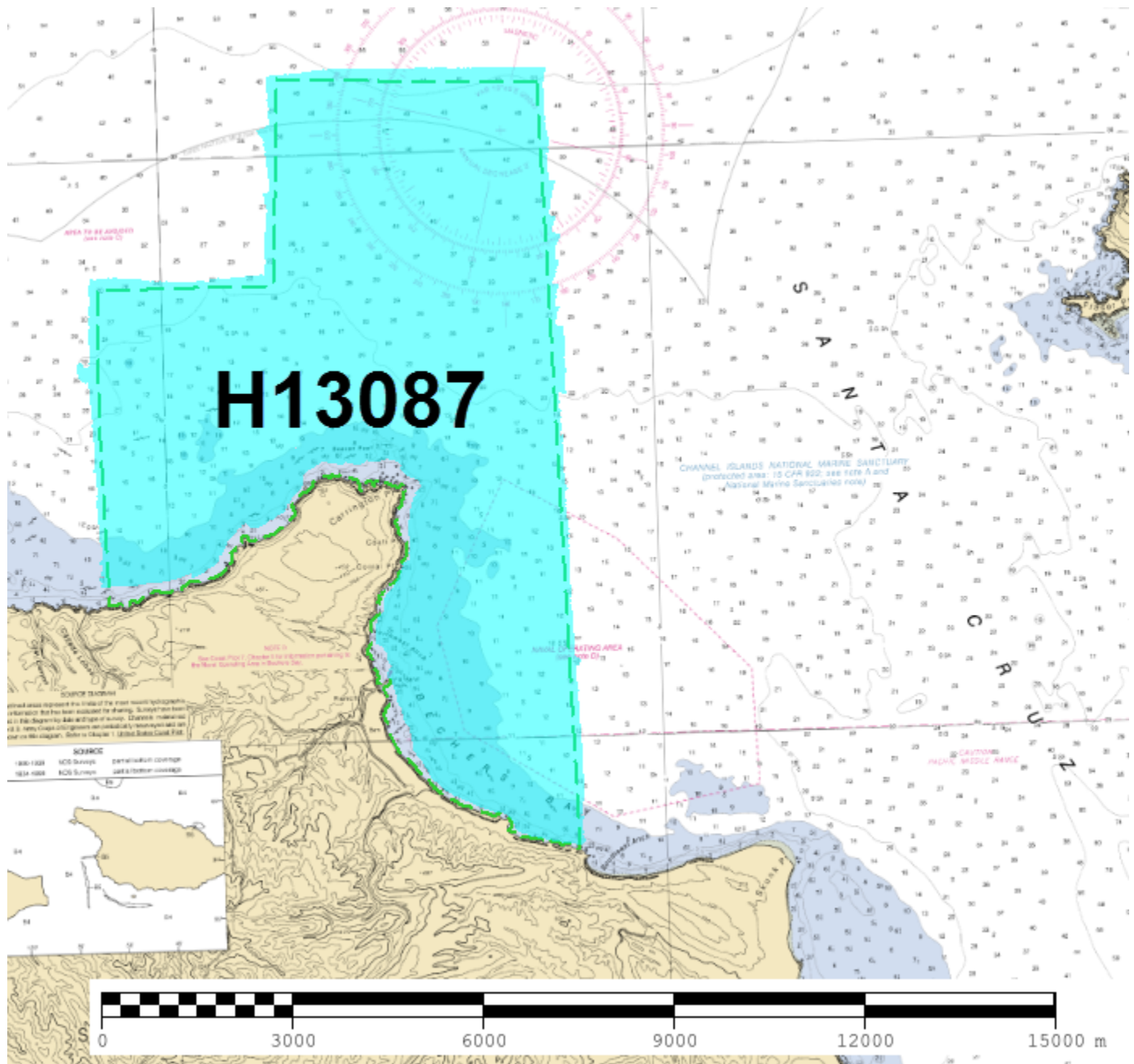


Figure 1: H13087 assigned survey area (Chart 18728).

Data were acquired within the assigned survey limits as required in the Project Instructions and HSSD unless otherwise noted in this report.

A.2 Survey Purpose

The harbors around the Channel Islands National Marine Sanctuary (CINMS) are home to a highly productive abundance of sea life and aquatic habitats that drive a thriving recreational and commercial fishing industry. The sanctuary also regularly hosts kayakers, divers, surfers, sightseers, whale watchers, researchers, and Channel Islands National Park concessionaires, all of whom access the sanctuary via boats. Additionally, large cargo and tanker vessels transiting from Los Angeles and Long Beach, CA are routed close to CINMS boundaries. Most of the nautical chart data date back to 1930s lead line or single beam echo sounder surveys. Vessel traffic is highest in shallow water (<40m) which has not been surveyed to modern standards, posing a risk to life, property, and ecosystems. The area encompassing survey H13087 on the northeast side of Santa Rosa Island is exposed to winds and seas and is home to pinniped and seabird populations and rare species of flora. In addition to providing data for crucial nautical chart updates, this survey will also generate backscatter data that will be used in habitat mapping and substrate analysis. The multibeam and backscatter data collected in this survey will enhance marine navigational safety and aid sanctuary managers, planners, and researchers in their conservation efforts.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Pydro QC Tools 2 Grid QA was used to analyze H13087 multibeam echsounder (MBES) data density. The submitted H13087 finalized variable-resolution (VR) surface met HSSD density and full coverage requirements as shown in the histograms below.

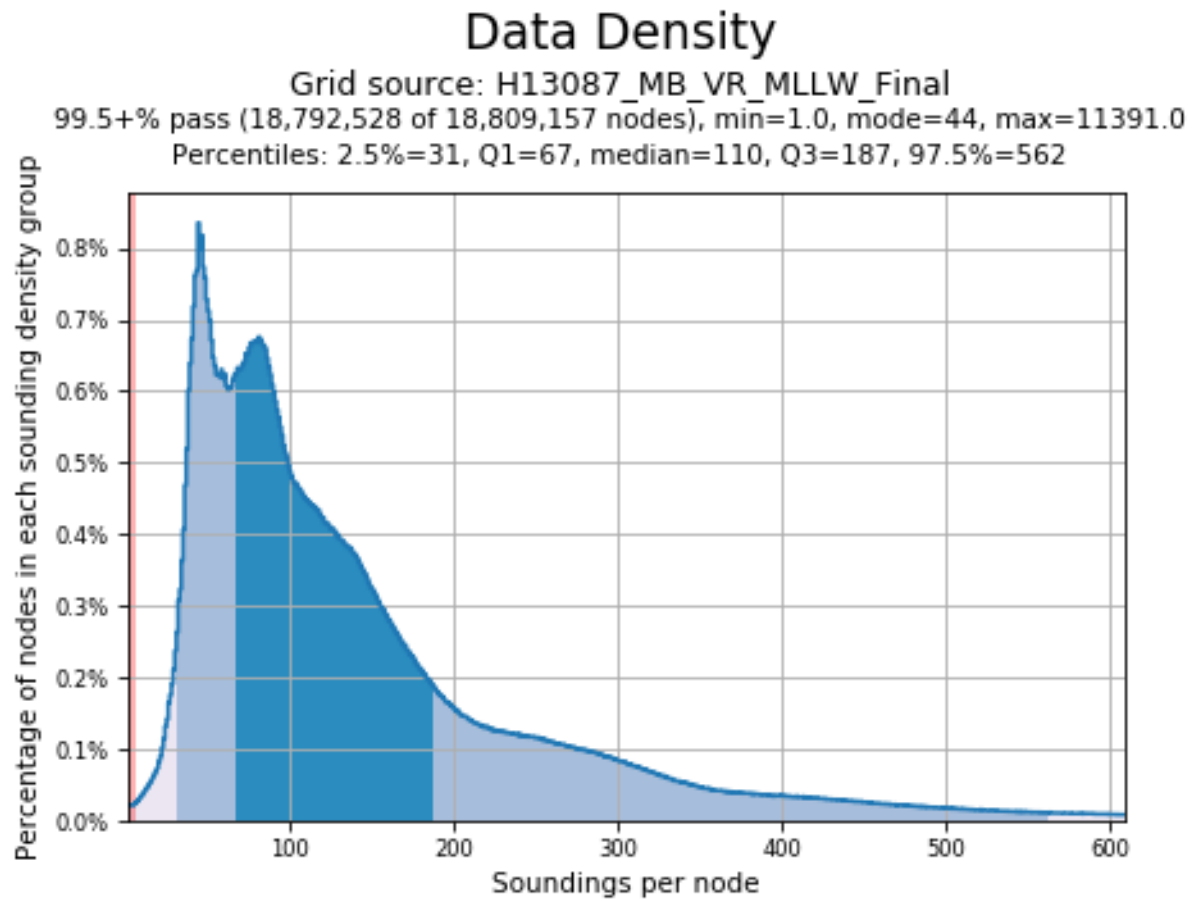


Figure 2: Pydro derived plot showing HSSD density compliance of H13087 finalized VR MBES data.

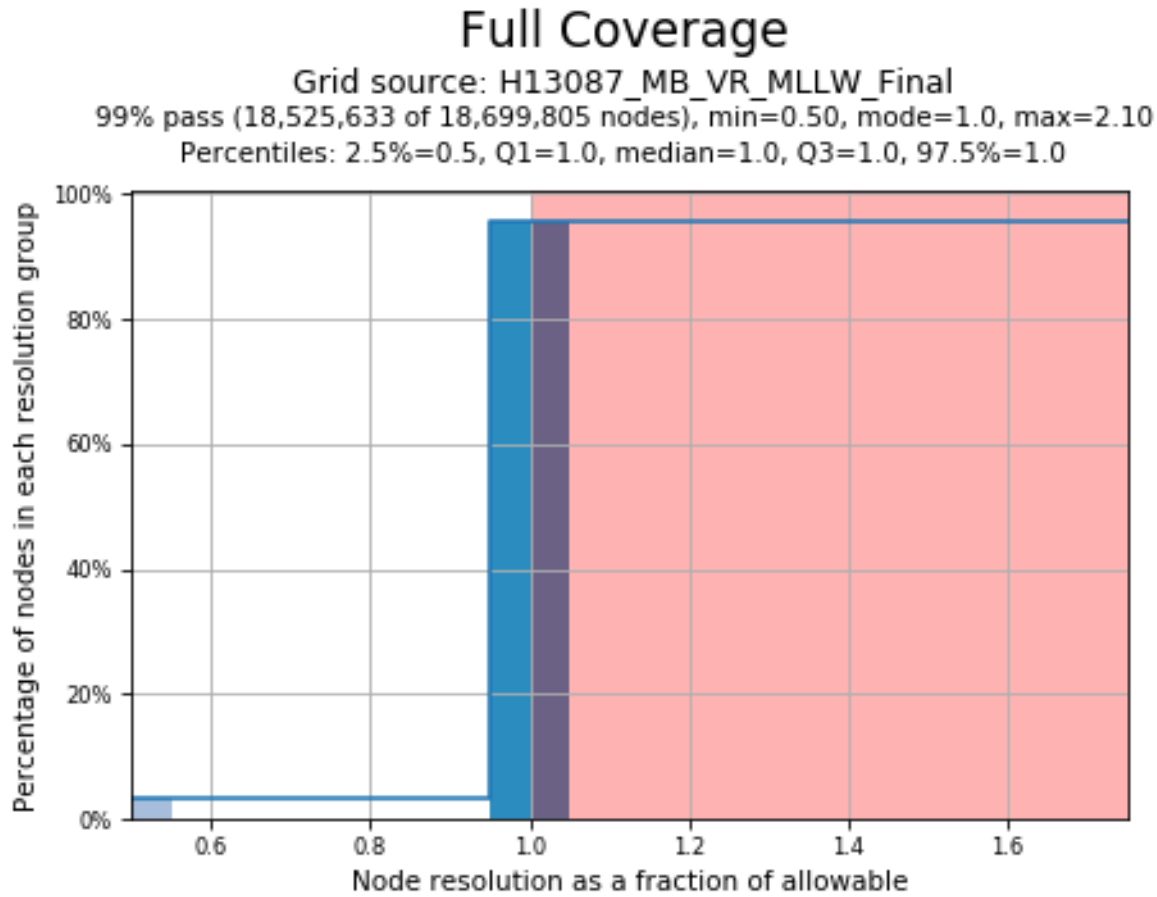


Figure 3: Pydro derived plot showing HSSD full coverage compliance of H13087 finalized variable-resolution MBES data.

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 (Refer to HSSD Section 5.2.2.3)
All waters in survey area	Acquire backscatter data during all multibeam data acquisition (Refer to HSSD Section 6.2)

Table 2: Survey Coverage

Complete multibeam echosounder coverage was acquired to the inshore limit of hydrography, the Navigable Area Limit Line. The NALL is defined as the most seaward of the following: the surveyed 3.5-meter depth contour, the line defined by the distance seaward from the observed MHW line which is equivalent to 0.8 millimeters at chart scale (the assigned sheet limits closely reflect this) or the inshore limit of safe navigation

(Figure 4). Much of the shoreline in the H13087 survey area was unapproachable due to kelp or breakers. In these areas the NALL was defined by the inshore limit of safe navigation rather than depth or distance from shore. Examples of these areas are shown in Figure 4.

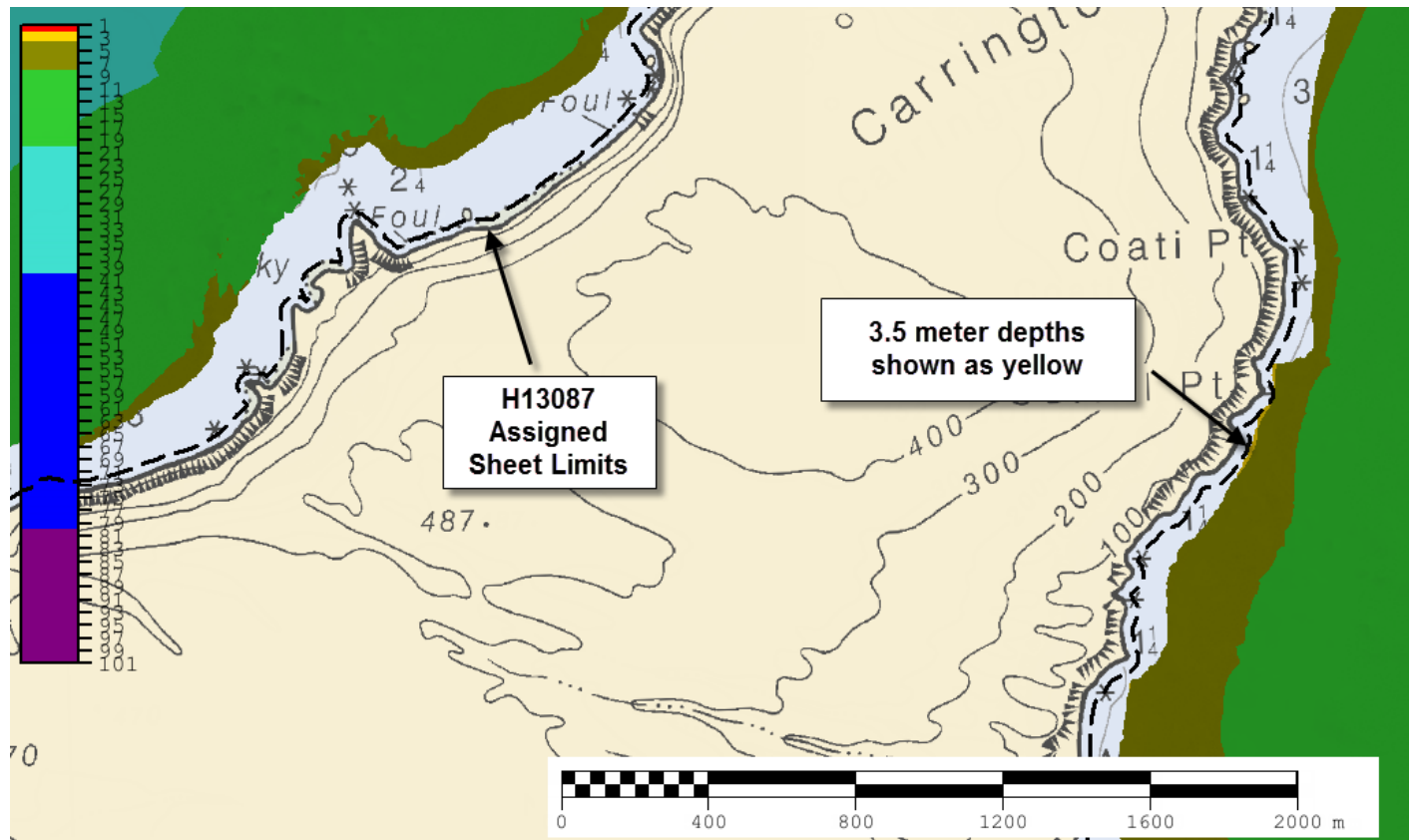


Figure 4: Example of Navigable Area Limit Line (NALL) determination; the black dashed line indicates assigned sheet limits. NALL was determined by the 3.5 meter limit (yellow area), thick kelp, and breaking waves nearshore.

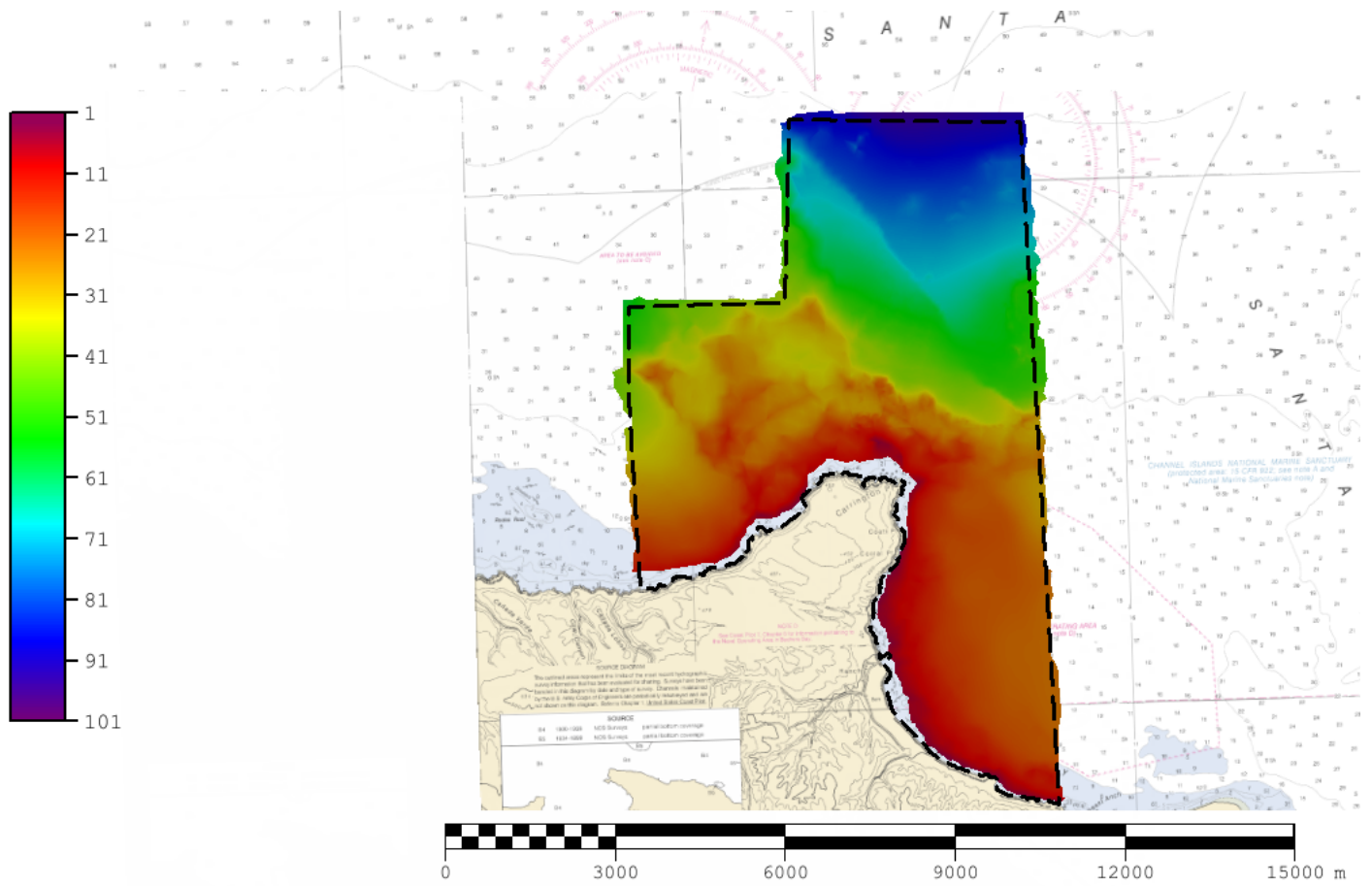


Figure 5: H13087 MBES coverage and assigned survey limits (Chart 18278).

A.5 Survey Statistics

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

	HULL ID	<i>2801</i>	<i>2802</i>	<i>2803</i>	<i>2804</i>	<i>Total</i>
LNM	SBES Mainscheme	0	0	0	0	0
	MBES Mainscheme	158.888	192.754	34.319	25.884	411.845
	Lidar Mainscheme	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0	0
	MBES/SSS Mainscheme	0	0	0	0	0
	SBES/MBES Crosslines	1.17	4.36	0	16.721	22.251
	Lidar Crosslines	0	0	0	0	0
Number of Bottom Samples						0
Number Maritime Boundary Points Investigated						0
Number of DPs						0
Number of Items Investigated by Dive Ops						0
Total SNM						16.30

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/26/2018	269
09/27/2018	270

Survey Dates	Day of the Year
09/28/2018	271
09/29/2018	272
10/01/2018	274
10/02/2018	275
10/03/2018	276
10/04/2018	277
10/05/2018	278
10/06/2018	279
10/08/2018	281
10/09/2018	282
10/10/2018	283
10/19/2018	292
10/26/2018	299
10/27/2018	300

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	2801	2802	2803	2804	2701	1905	1907
LOA	8.8 meters	8.8 meters	8.8 meters	8.8 meters	7.62 meters	5.7 meters	5.7 meters
Draft	1.1 meters	1.1 meters	1.1 meters	1.1 meters	0.47 meters	0.35 meters	0.35 meters

Table 5: Vessels Used



Figure 6: NOAA Ship RAINIER in Channel Islands with survey launches 2701 (RA-2), 2801 (RA-4), and 2804 (RA-6).

All multibeam data for H13087 were acquired by NOAA Ship RAINIER launches 2801 (RA-4), 2802 (RA-5), 2803 (RA-3), and 2804 (RA-6). These vessels acquired depth soundings, backscatter, and sound speed profiles. Shoreline verification was conducted from RAINIER launch 2701 (RA-2) and RAINIER skiffs 1905 (RA-8) and 1907 (RA-7).

B.1.2 Equipment

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

Manufacturer	Model	Type
Applanix	POS MV 320 v5	Positioning and Attitude System
Kongsberg Maritime	EM 2040	MBES
Teledyne RESON	SVP 70	Sound Speed System
Sea-Bird Scientific	SBE 19plus	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

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

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 5.40% of mainscheme acquisition.

RAINIER launches 2801 (RA-4), 2802 (RA-5), and 2804 (RA-6) acquired 22.25 nautical miles of multibeam crosslines. H13087 crossline data is adequate for verifying and evaluating the internal consistency of survey data. The Compare Grids function in Pydro Explorer analyzed a finalized VR surface of H13087 crossline only data and mainscheme-only data. In the difference surface, 99.5% of nodes met IHO allowable Total Vertical Uncertainty (TVU) standards. Figures 7-9 provide additional results.

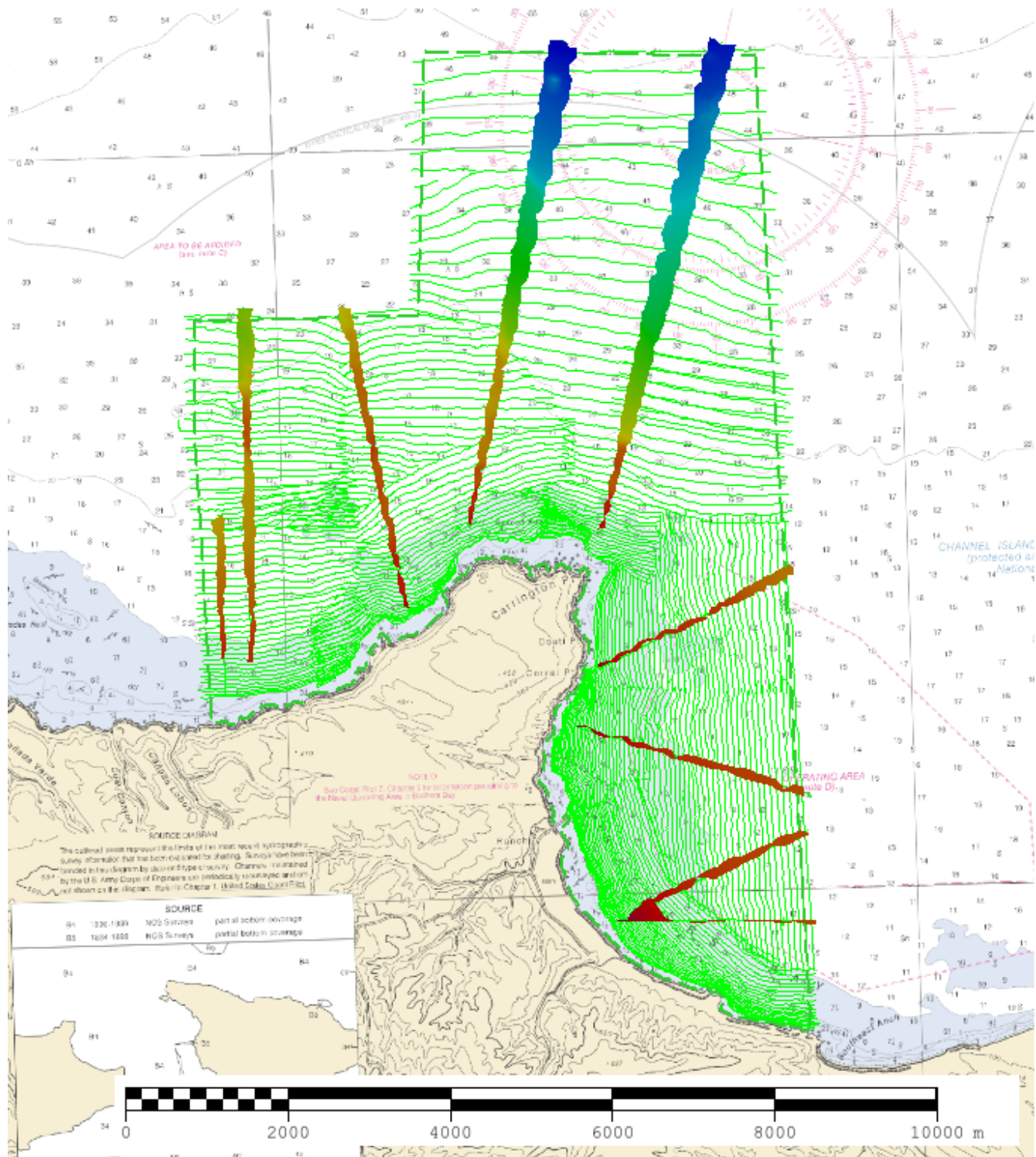


Figure 7: H13087 crossline VR surface overlaid on mainscheme tracklines.

Comparison Distribution

Per Grid: H13087_MLLW_VR_MSonly-H13087_MLLW_VR_XLonly_fracAllowErr.csar

99.5+% nodes pass (1158552), min=0.0, mode=0.1 mean=0.1 max=7.9

Percentiles: 2.5%=0.0, Q1=0.0, median=0.1, Q3=0.1, 97.5%=0.3

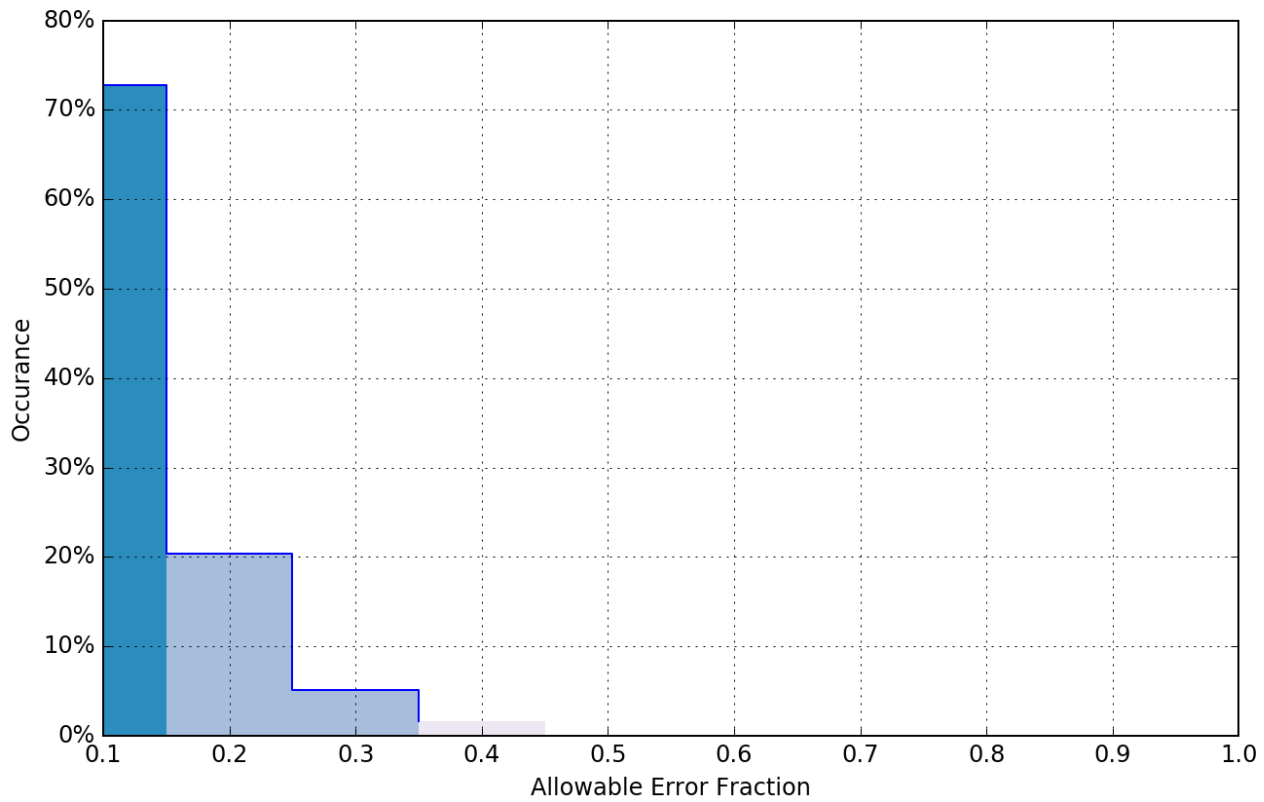


Figure 8: Pydro derived plot showing percentage-pass value of H13087 mainscheme to crossline data.

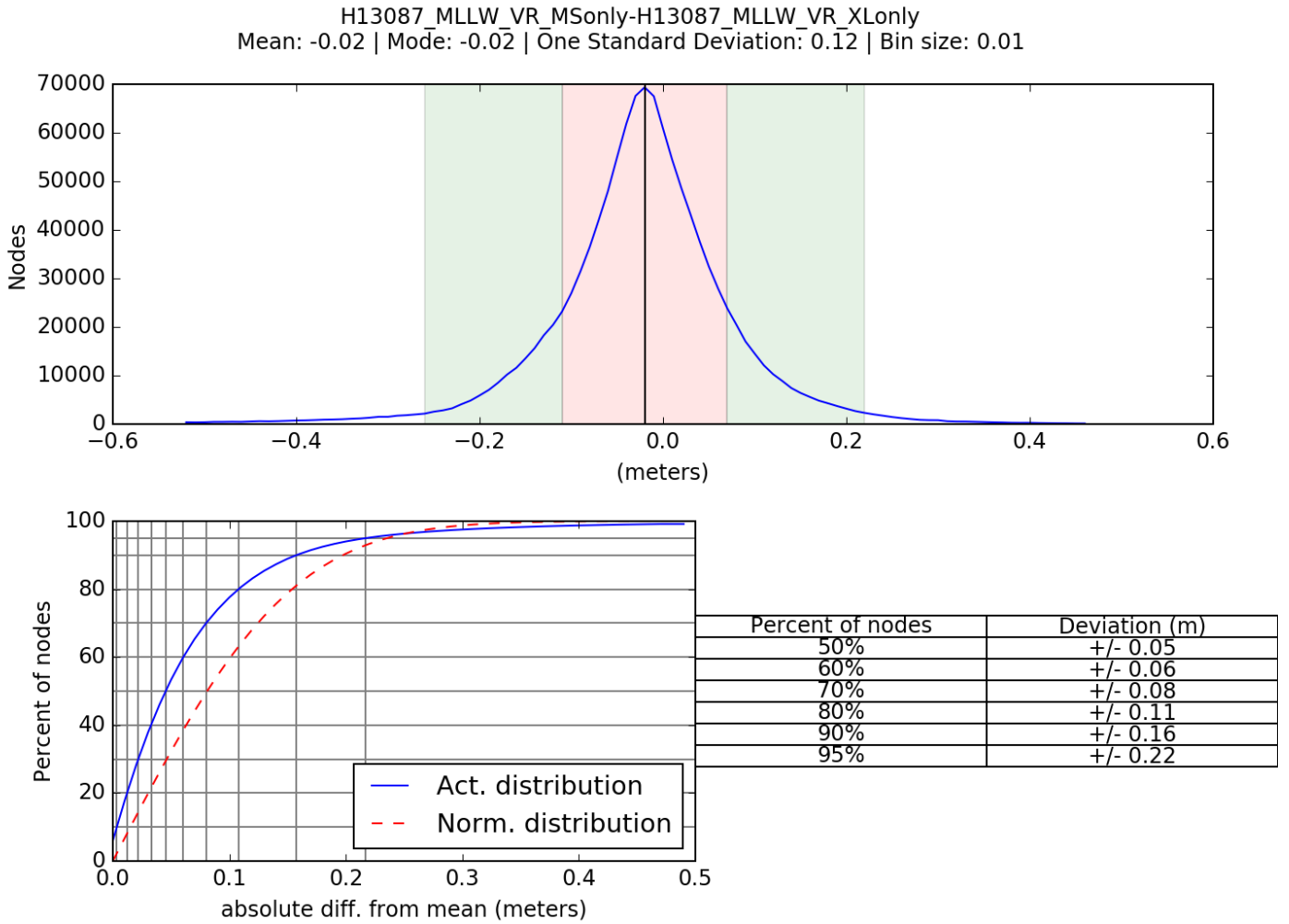


Figure 9: Pydro derived plot showing absolute difference statistics of H13087 mainscheme to crossline data.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0 meters	0.082867 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Surface
2801, 2802, 2803, 2804	3 meters/second	N/A meters/second	0.05 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

Total Propagated Uncertainty (TPU) values for survey H13087 were derived from a combination of fixed values for equipment and vessel characteristics, as well as from field assigned values for sound speed uncertainties. The uncertainty value of NOAA's Vertical Datum (VDatum) transformation model was documented in metadata that accompanied the VDatum model.

In addition to the usual a priori estimates of uncertainty, some real-time and post-processing uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties from Kongsberg MBES sonars were recorded and applied in post-processing. Applanix TrueHeave (POS) files, which record estimates of heave uncertainty, were applied during post-processing. Finally, the postprocessed uncertainties associated with vessel roll, pitch, yaw, and position were applied in Caris HIPS using SBET and RMS files generated using POSpac MMS software.

Uncertainty values of the submitted finalized grid was calculated in Caris using "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). Grid QA v5 within Pydro QC Tools 2 was used to analyze H13087 TVU compliance (Figure 10).

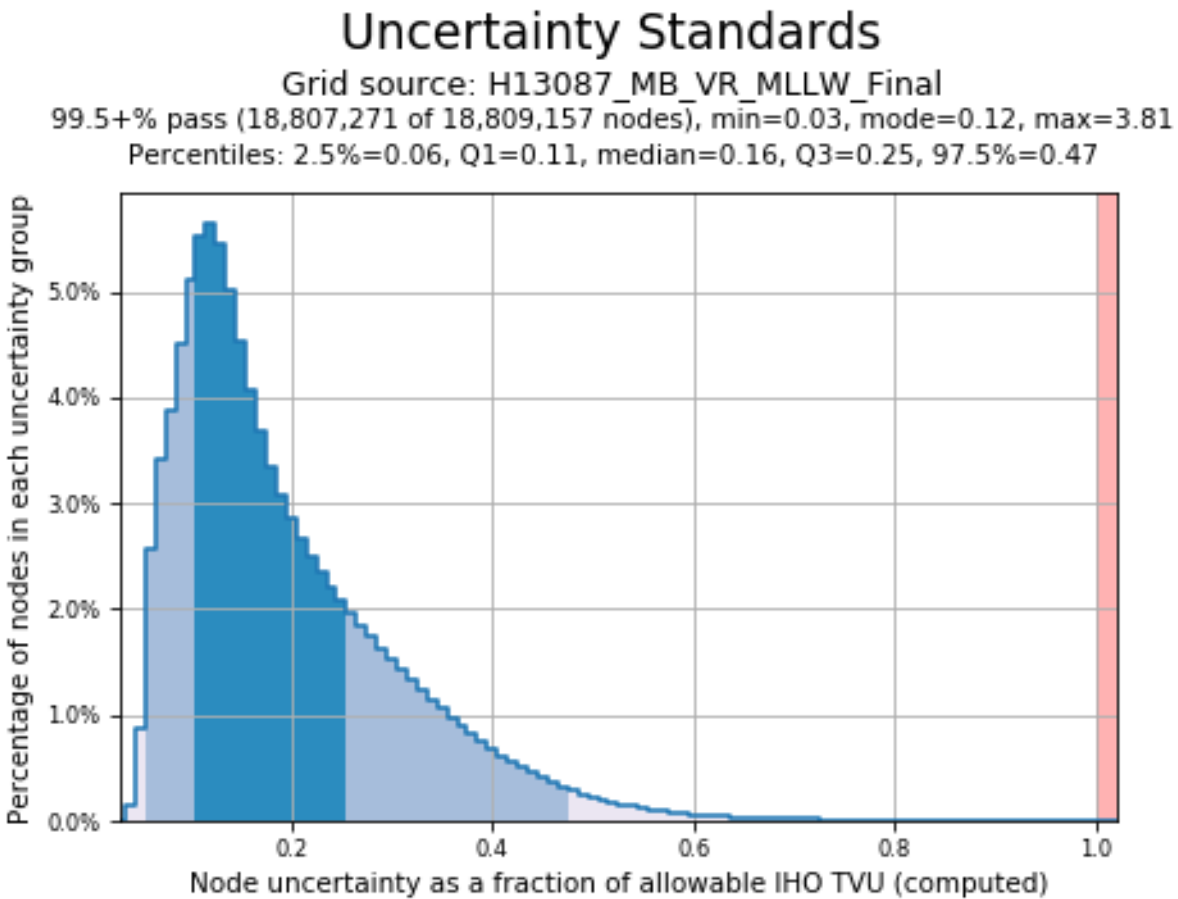


Figure 10: Pydro derived plot showing TVU compliance of H13087 finalized variable-resolution MBES data.

B.2.3 Junctions

Two junction comparisons were completed for survey H13087. Surveys H13086 and H13205 were acquired concurrently with this survey. Comparisons were made using the "Compare Grids" program within Pydro Explorer.

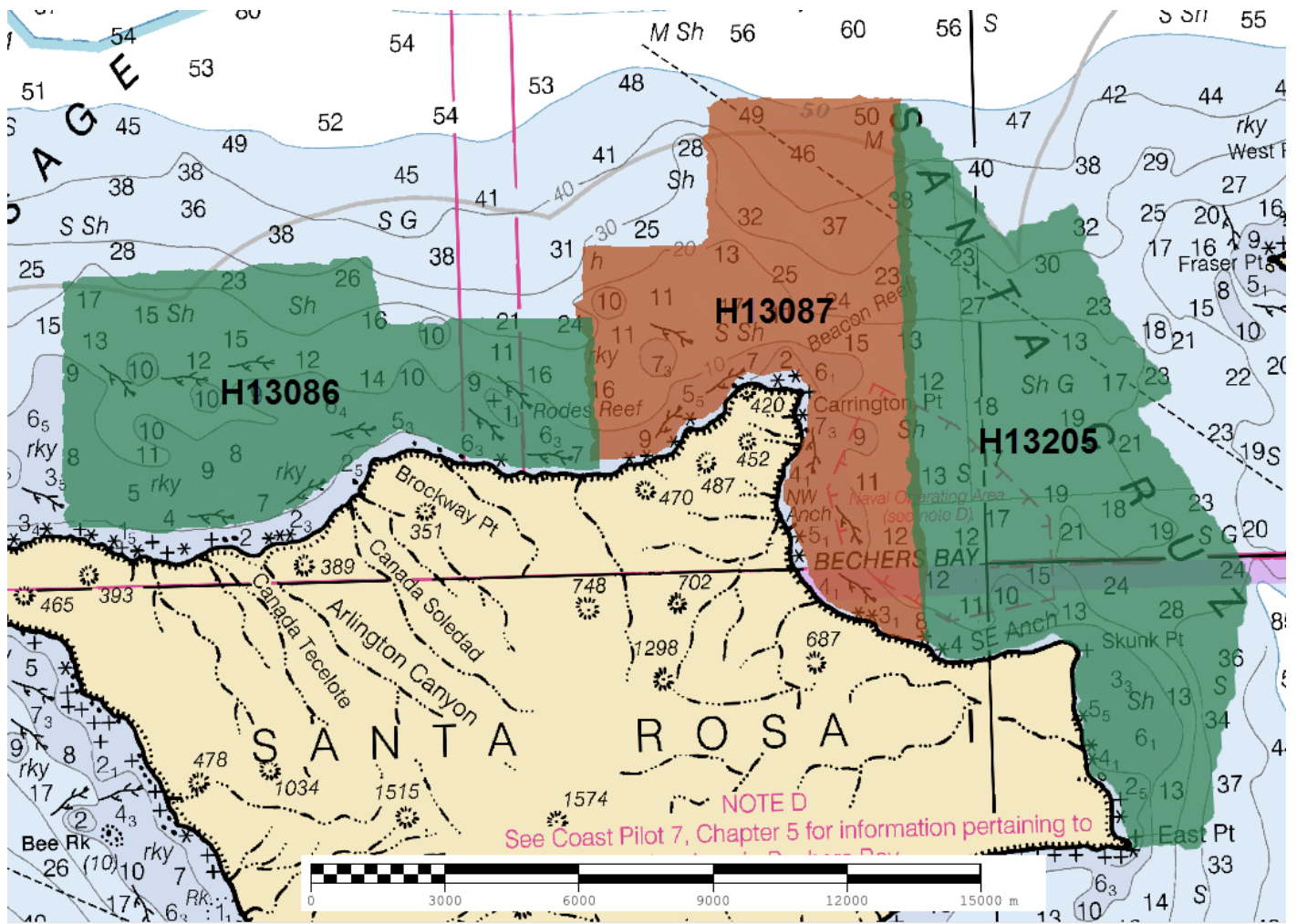


Figure 11: H13087 junctions with surveys H13086 and H13205.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13086	1:20000	2018	NOAA Ship RAINIER	W
H13205	1:20000	2018	NOAA Ship RAINIER	E

Table 9: Junctioning Surveys

H13086

The junction with survey H13086 encompasses 0.20 square nautical miles along the western boundary of survey H13087. The Compare Grids function of Pydro Explorer derived a difference surface from the variable-resolution CUBE surfaces of each survey for comparison. Analysis of the difference surface

indicated that survey H13087 is an average of 0.02 meters deeper than survey H13086 with a standard deviation of 0.10 meters.

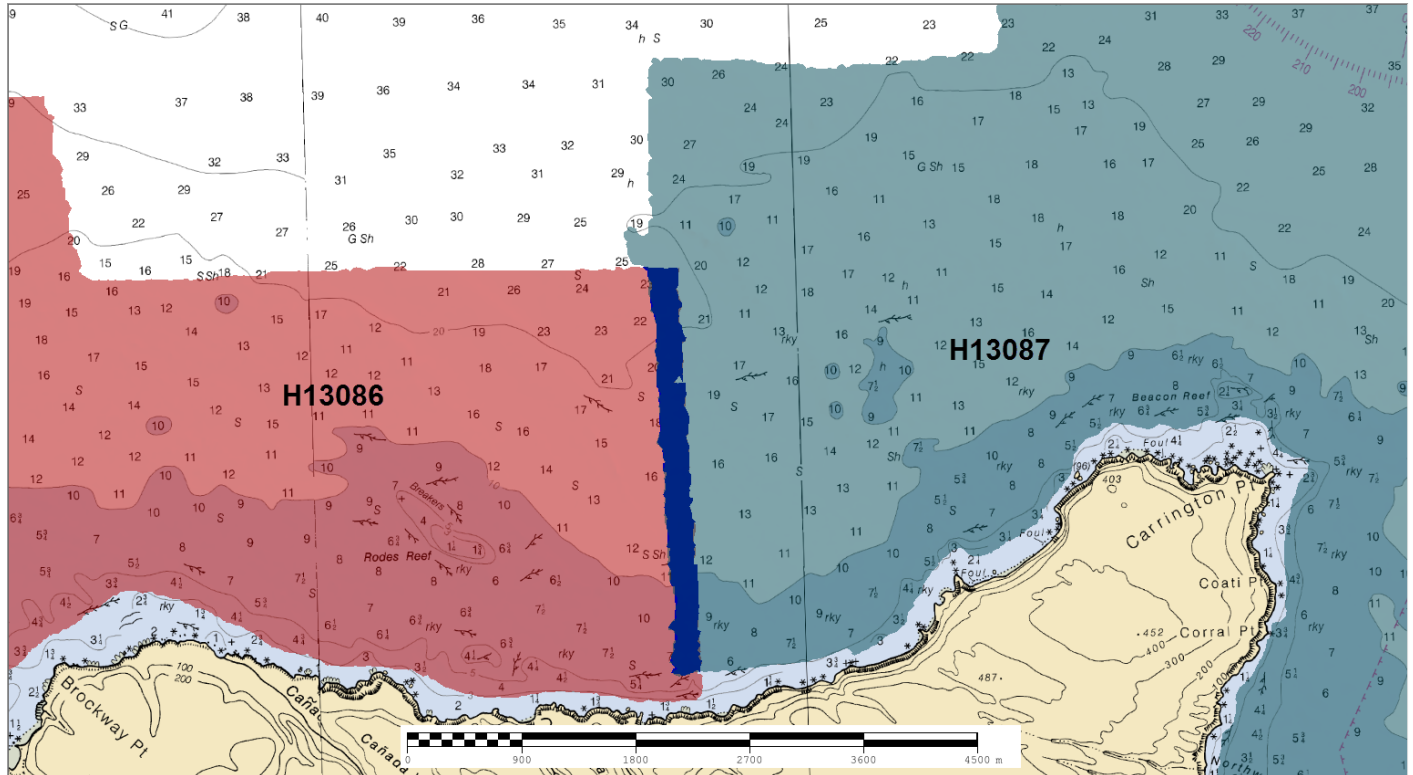


Figure 12: H13087 and H13086 junction difference surface.

Comparison Distribution

Per Grid: H13087_MB_VR_MLLW_Final-H13086_MB_VR_MLLW_Final_fracAllowErr.csar

99.5+% nodes pass (251586), min=0.0, mode=0.1 mean=0.1 max=1.3

Percentiles: 2.5%=0.0, Q1=0.0, median=0.1, Q3=0.1, 97.5%=0.3

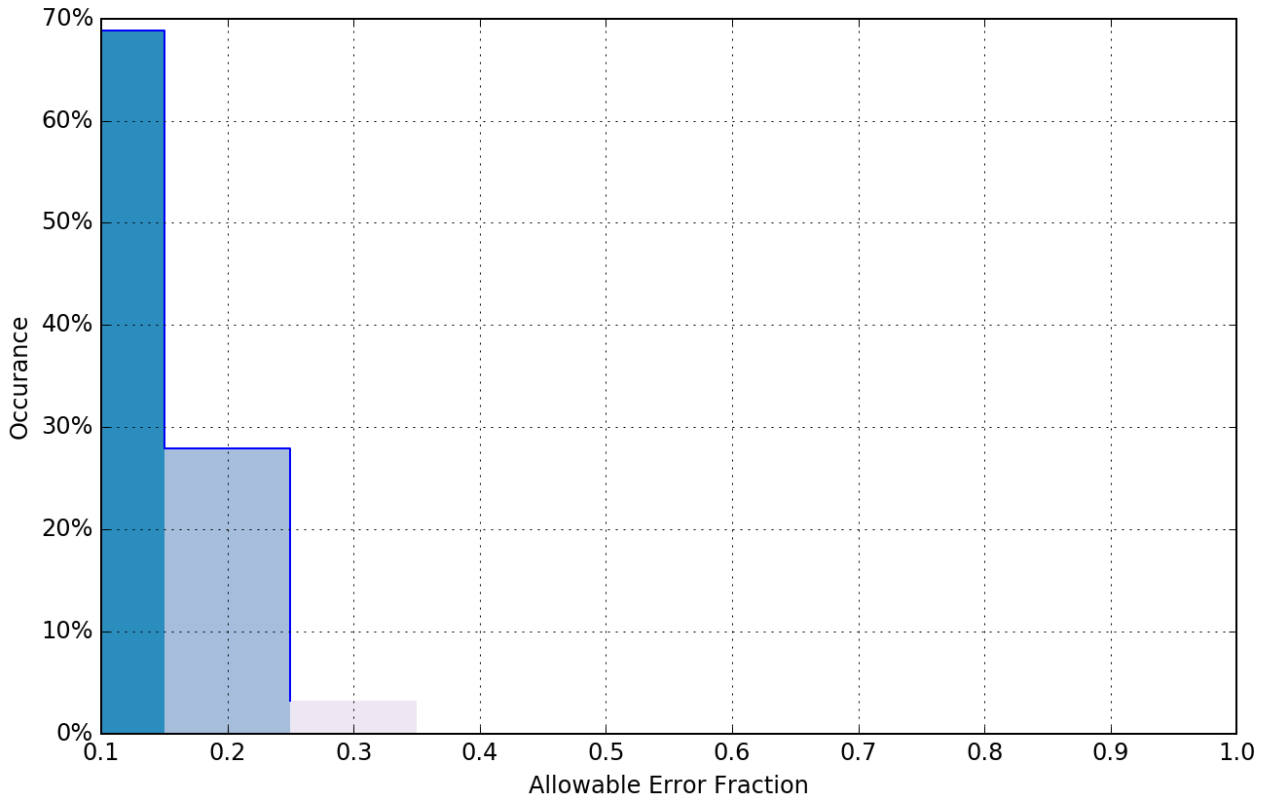


Figure 13: Pydro derived plot showing percentage-pass value of the junction between surveys H13086 and H13087.

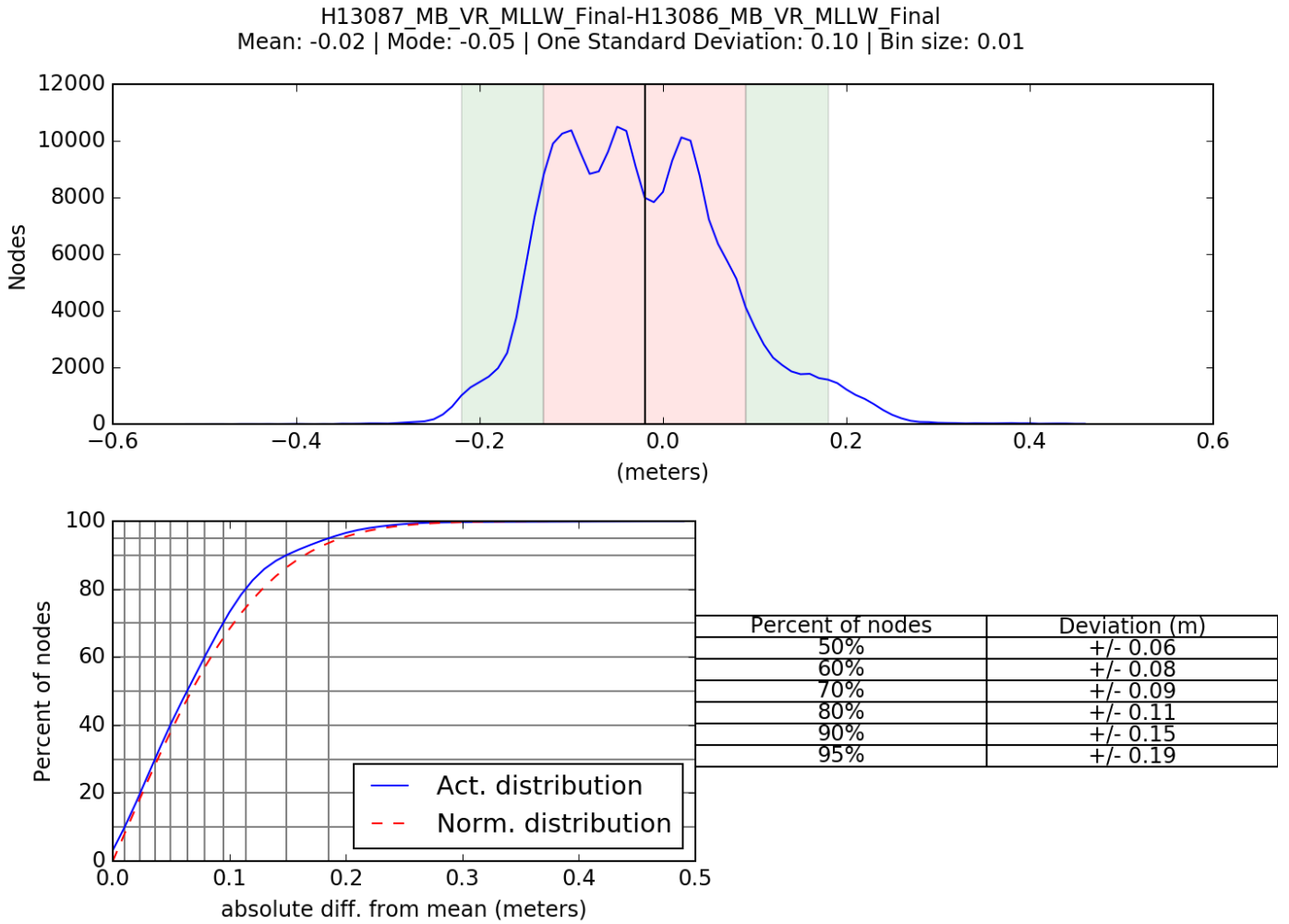


Figure 14: Pydro derived plot showing absolute difference statistics of the junction between surveys H13086 and H13087.

H13205

The junction with survey H13205 encompassed approximately 0.9 square nautical miles along the eastern boundary of H13087. Pydro's Compare Grids results showed that 99.5+% of nodes in the common area met NOAA allowable error standards. Analysis of the difference surface indicated that survey H13087 is an average of 0.01 meters shallower than survey H13205 with a standard deviation of 0.10 meters.

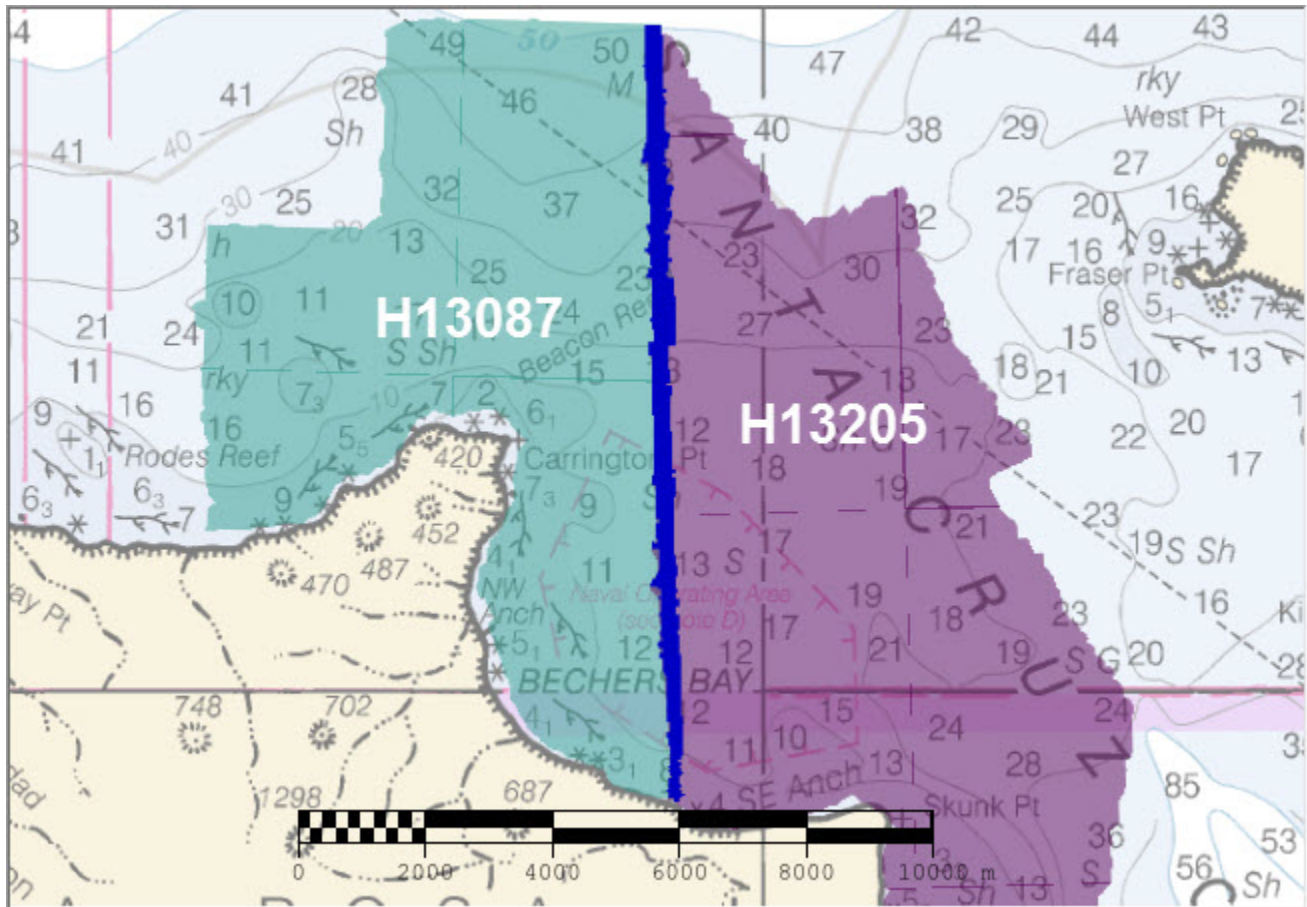


Figure 15: Overview of survey junction between H13087 and H13205.

Comparison Distribution

Per Grid: H13087_MB_VR_MLLW_Final-H13205_MB_VR_MLLW_final_fracAllowErr.csar

99.5+% nodes pass (578079), min=0.0, mode=0.1 mean=0.1 max=5.2

Percentiles: 2.5%=0.0, Q1=0.0, median=0.1, Q3=0.1, 97.5%=0.2

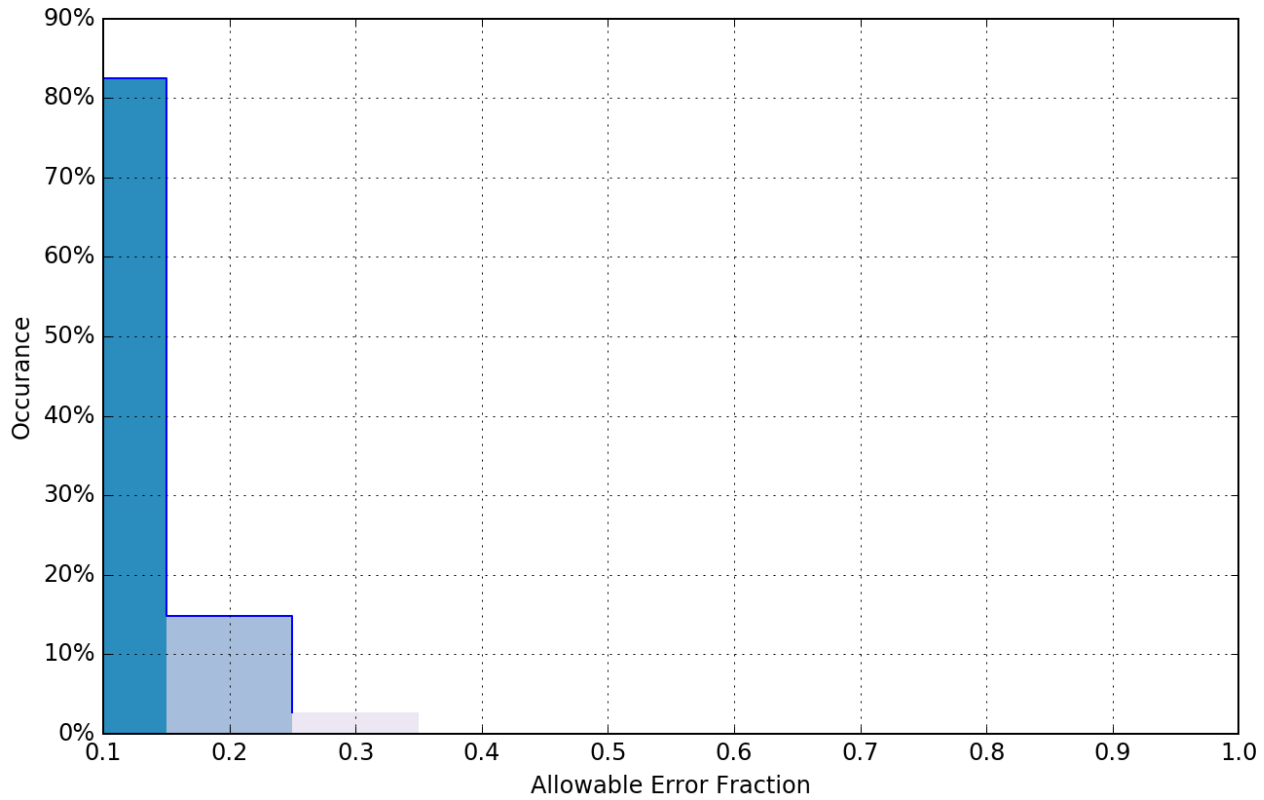


Figure 16: Pydro derived plot showing allowable error between H13087 and H13205.

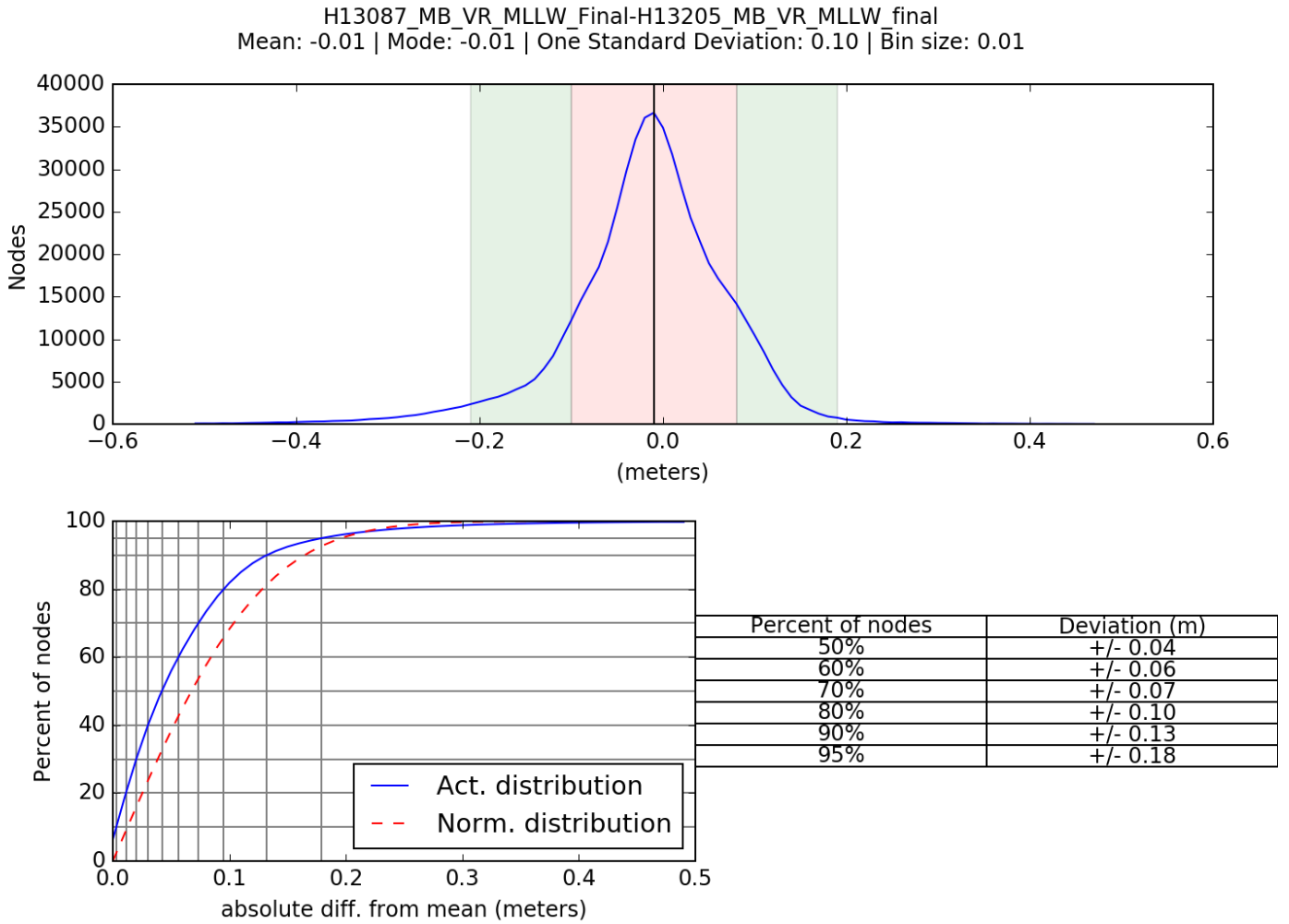


Figure 17: Pydro derived plot showing H13087 and H13205 comparison statistics.



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

Survey Launch RA-4 (2801) Roll Offset Error

An intermittent roll bias was noted on some of H13087 2801 MBES data. Numerous possible equipment and software related issues were investigated, however at the time of this report, a conclusive cause of the offset has yet to be determined. A value of -0.223 degree roll was added to 2801_EM2040.hvf in order to address

this error. All submitted H13087 MBES data meets HSSD specifications. TPU and crossline comparison analysis also indicates an improvement in data quality, however visual changes in the surface are minute.

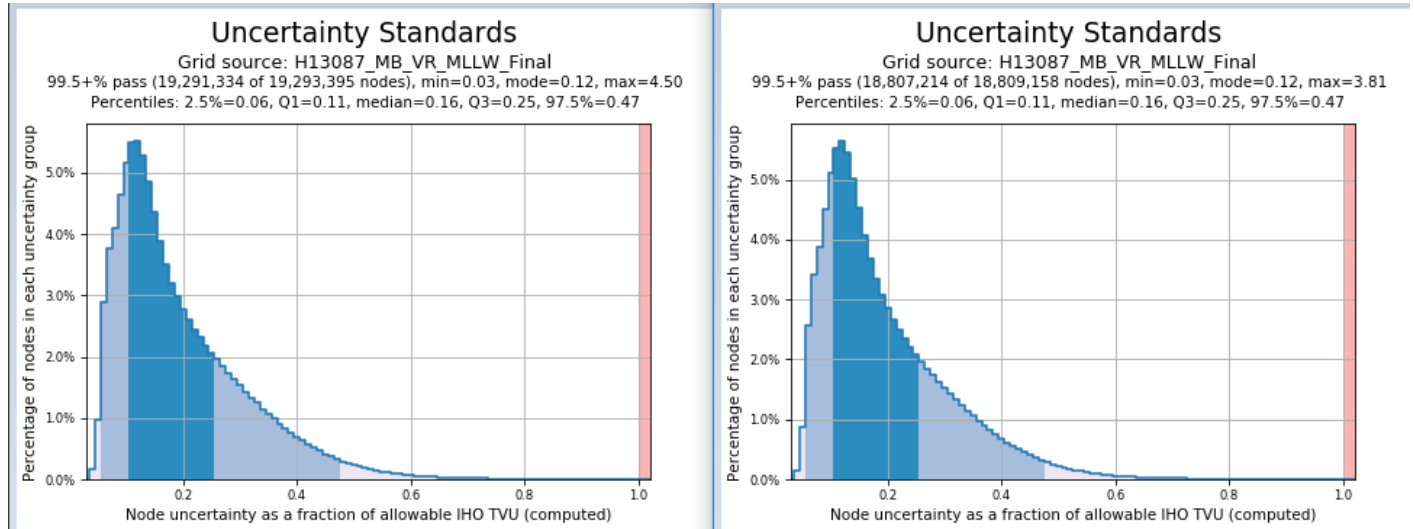


Figure 18: Pydro derived plot showing change to H13087 uncertainty after roll bias adjustment (original plot left, adjusted plot right)

B.2.6 Factors Affecting Soundings

Suboptimal Sound Speed Correction

Due to water column variations such as thermal layering and salinity differences, a distinct demarcation of water masses was sometimes encountered in the field. At times this proved problematic in the acquisition and application of optimal sound speed correction data. Despite the best efforts of the hydrographers to conduct sufficient sound speed casts distributed spatially and temporally, in some areas sound speed correction was suboptimal. This was evidenced by the appearance of systematic artifacts in the survey grid and characteristic "smiles" or "frowns" of MBES data when viewed in subset editor. To address this issue, the Hydrographer rejected outer beam soundings obviously in error in an attempt to produce a surface that best represented the sea floor. All examined sound speed related offsets were determined to be within NOAA HSSD standards.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Launches took casts at least once every four hours (before MBES acquisition, middle of the day, and near the end of the day). A total of 45 cast were completed on H13087.

Additional casts were taken when significant changes to surface sound speed were observed or when operating in a new area. Sound speed profiles were acquired using Sea-Bird 19plus SEACAT Profilers. All casts were concatenated into a master file and applied to MBES data in Caris HIPS using the "Nearest in distance within time (4 hours)" profile selection method. Some casts were deployed outside of sheet limits, this may be due to currents or winds moving the vessel during the deployment of the CTD.

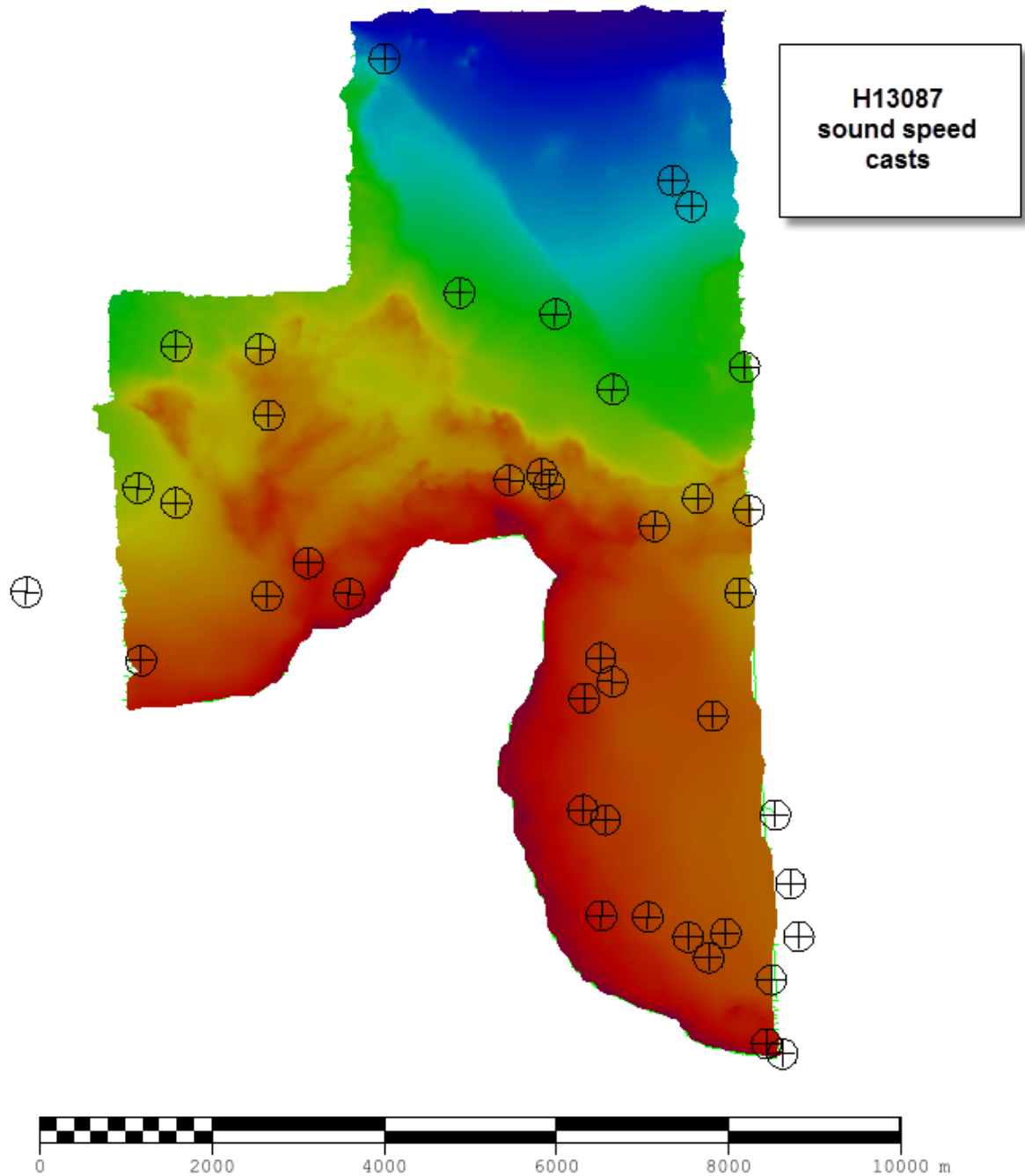


Figure 19: H13087 sound speed cast locations overlaid on MBES data.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Detect Fliers

Pydro QC Tools 2 "Detect Fliers" was used to find fliers in the finalized VR surface. The following are the settings used for Detect Fliers: (1) Force flier heights left blank (2) Checks - #1 and #6 unchecked, # 2 #3 #4 and #5 checked (3) Filters - Distance \leq 1.0 nodes, Delta Z \leq 0.01 meters, #1 and #2 unchecked.

Obvious noise was rejected by the hydrographer in Caris subset editor. After data cleaning, Detect Fliers listed 2 potential fliers. All potential fliers were investigated by the hydrographer in CARIS subset editor and were found to be false positives or edge fliers. The results of the Detect Fliers tool are included as a .000 file in Appendix II of this report.

B.2.10 Holiday Finder

Pydro QC Tools 2 v2.7.0 "Holiday finder" v4 was used to detect holidays in the finalized variable resolution surface. Holiday finder parameters were set to Full coverage settings and detected two holidays on the finalized VR surface. One holiday was detected in the most nearshore coverage on the north side of Santa Rosa Island and due to unsafe survey conditions was not reacquired. The holiday outside the west boundry of H13087 sheet limits has full MBES coverage from H13086 survey data.

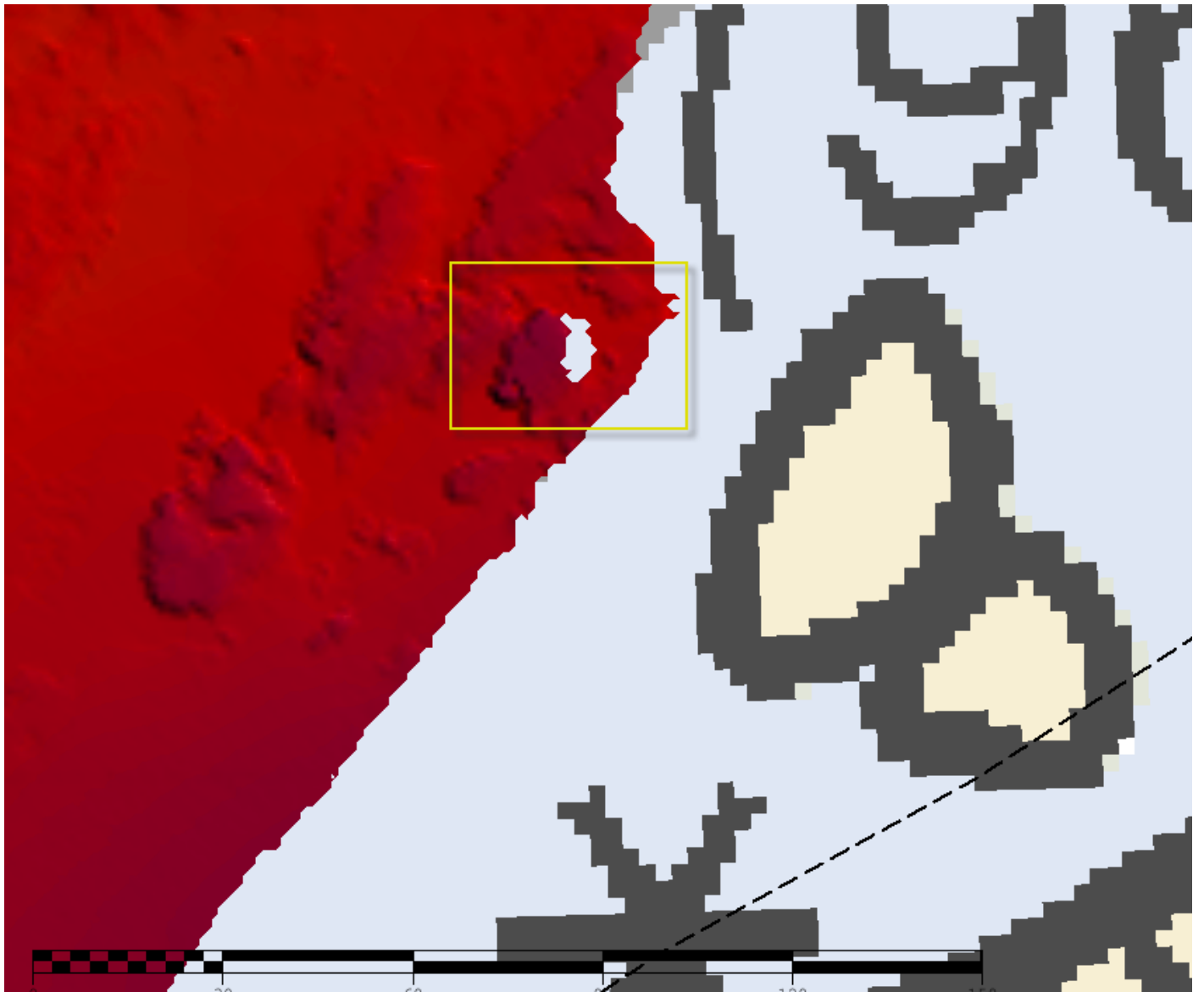


Figure 20: Holiday caused by acoustic shadow and thick kelp limiting surveying to the NALL.

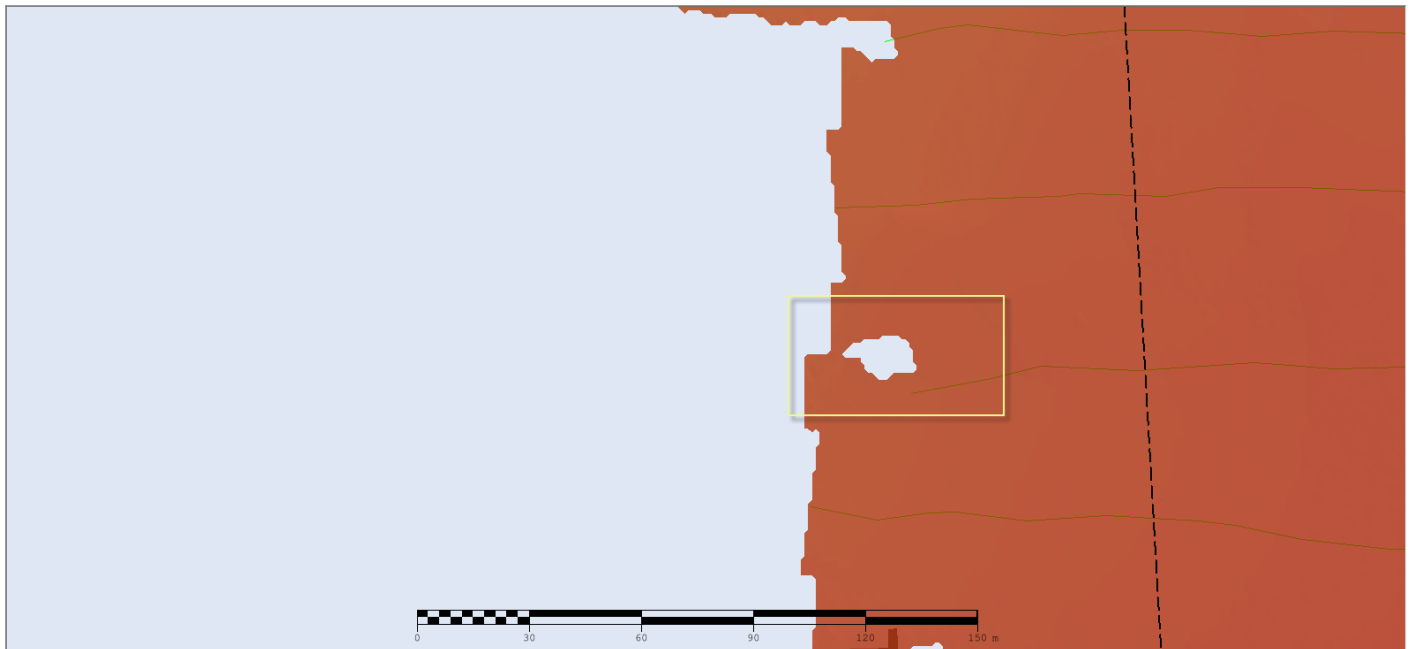


Figure 21: Holiday detected by Pydro QC Tools 2 outside of H13087 sheet limits.

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 was acquired as .all files logged during MBES operations and subsequently processed by the field unit aboard RAINIER. The .GSF files created during processing and one mosaic per vessel per frequency have been delivered with this report. All backscatter processing procedures utilized follow those detailed in the DAPR.

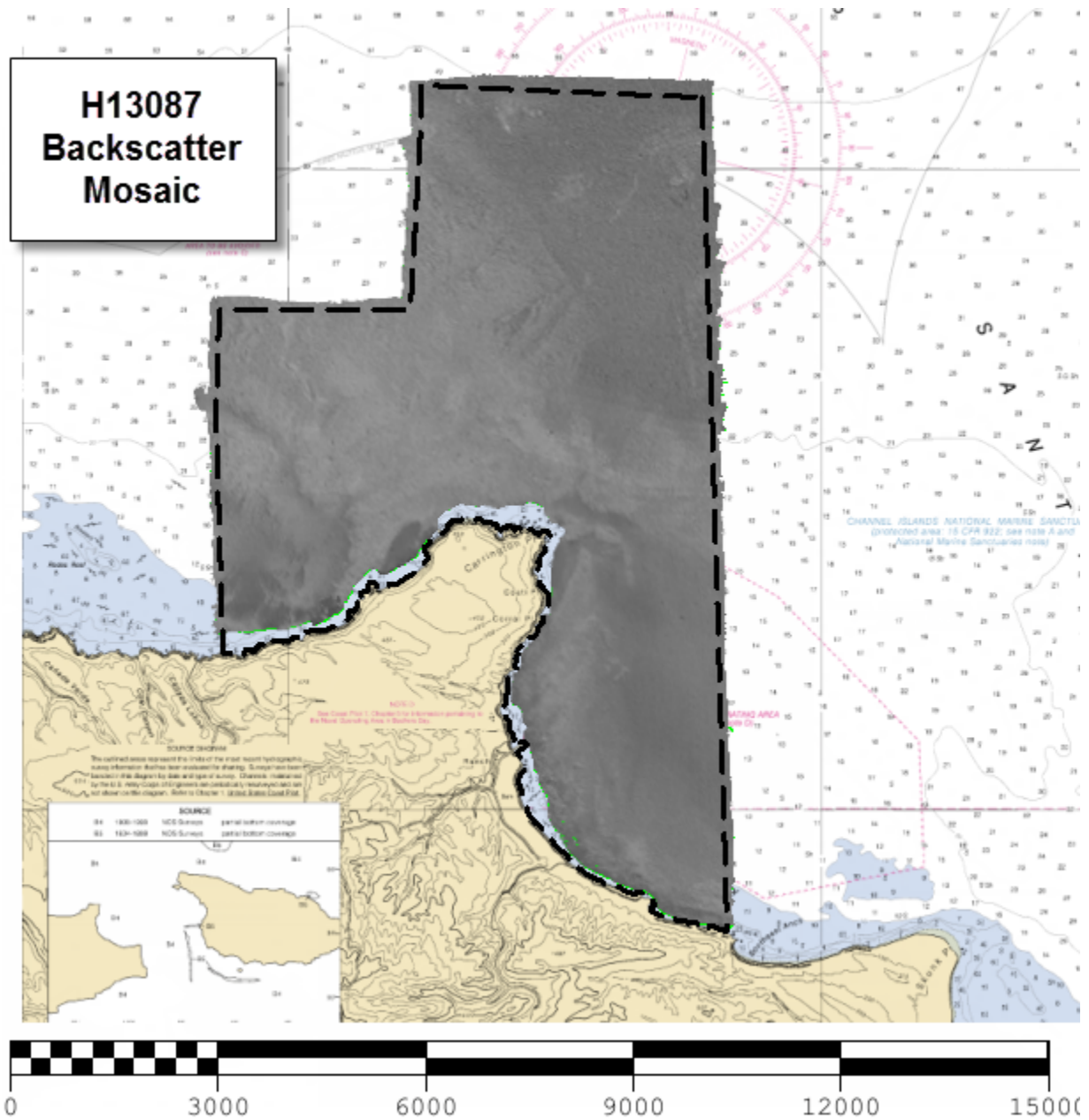


Figure 22: H13087 Backscatter Mosaic.

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	10.3

Table 10: Primary bathymetric data processing software

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

Manufacturer	Name	Version
QPS	Fledermaus Geocoder Tool Box (FMGT)	7.8.1

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute File V_5_7.

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
H13087_MB_VR_MLLW	CARIS VR Surface (CUBE)	Variable Resolution	2.4 meters - 103.4 meters	NOAA_VR	Complete MBES
H13087_MB_VR_MLLW_Final	CARIS VR Surface (CUBE)	Variable Resolution	2.4 meters - 103.4 meters	NOAA_VR	Complete MBES

Table 12: Submitted Surfaces

Submitted surfaces were generated using the recommended parameters for "Ranges" style variable resolution bathymetric grids as specified in HSSD 2018. No soundings were designated in this survey and no Dangers to Navigation (DTONs) were detected throughout the survey area.

C. Vertical and Horizontal Control

Additional information discussing the vertical and horizontal control for this survey can be found in the accompanying 2018 DAPR

C.1 Vertical Control

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

Traditional Methods Used:

TCARI

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Los Angeles, CA	9410660
Santa Monica, CA	9410840
Santa Barbara, CA	9411340
Oil Platform Harvest, CA	9411406
Port San Luis, CA	9412110
Monterey, CA	9413450

Table 13: NWLON Tide Stations

File Name	Status
H13087_TCARI_Features.tid	Final Approved

Table 14: Water Level Files (.tid)

File Name	Status
L397RA2018.tc	Final

Table 15: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 10/28/2018. The final tide note was received on 01/29/2019.

H13087 shoreline features were reduced to chart datum (MLLW) using a .tid file created in Pydro utilizing the "TCARI TID file via S-57" function, then loaded in Caris Notebook. H13087 MBES data were reduced to MLLW using ERS via VDATUM processing methods. See Supplemental Correspondence regarding approval of traditional tides for use in determining feature heights.

ERS Methods Used:

ERS via VDATUM

Ellipsoid to Chart Datum Separation File:

OPR_L397_RA_18_lgECpoly_xyNAD83-MLLW_geoid12b.csar

C.2 Horizontal Control

The horizontal datum for this project is North American Datum 1983 (NAD83).

The projection used for this project is Universal Transverse Mercator (UTM) 10N.

Post Processed-Real-Time Extended (PP-RTX) processing methods were used in Applanix POSPac MMS 8.2.1 software to produce SBETs for post-processing horizontal correction.

D. Results and Recommendations

D.1 Chart Comparison

H13087 survey data was compared with Electronic Navigation Chart (ENC) US5CA66M using a variable resolution CUBE surface, selected soundings, and contours created in CARIS.

D.1.1 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5CA66M	1:40000	4	08/24/2017	08/24/2017	NO

Table 16: Largest Scale ENC's

US5CA66M

H13087 survey data shows some inconsistencies with the 10, 20, and 50 fathom curves, at some points varying 150 to 800 meters inshore of its charted depth contour.

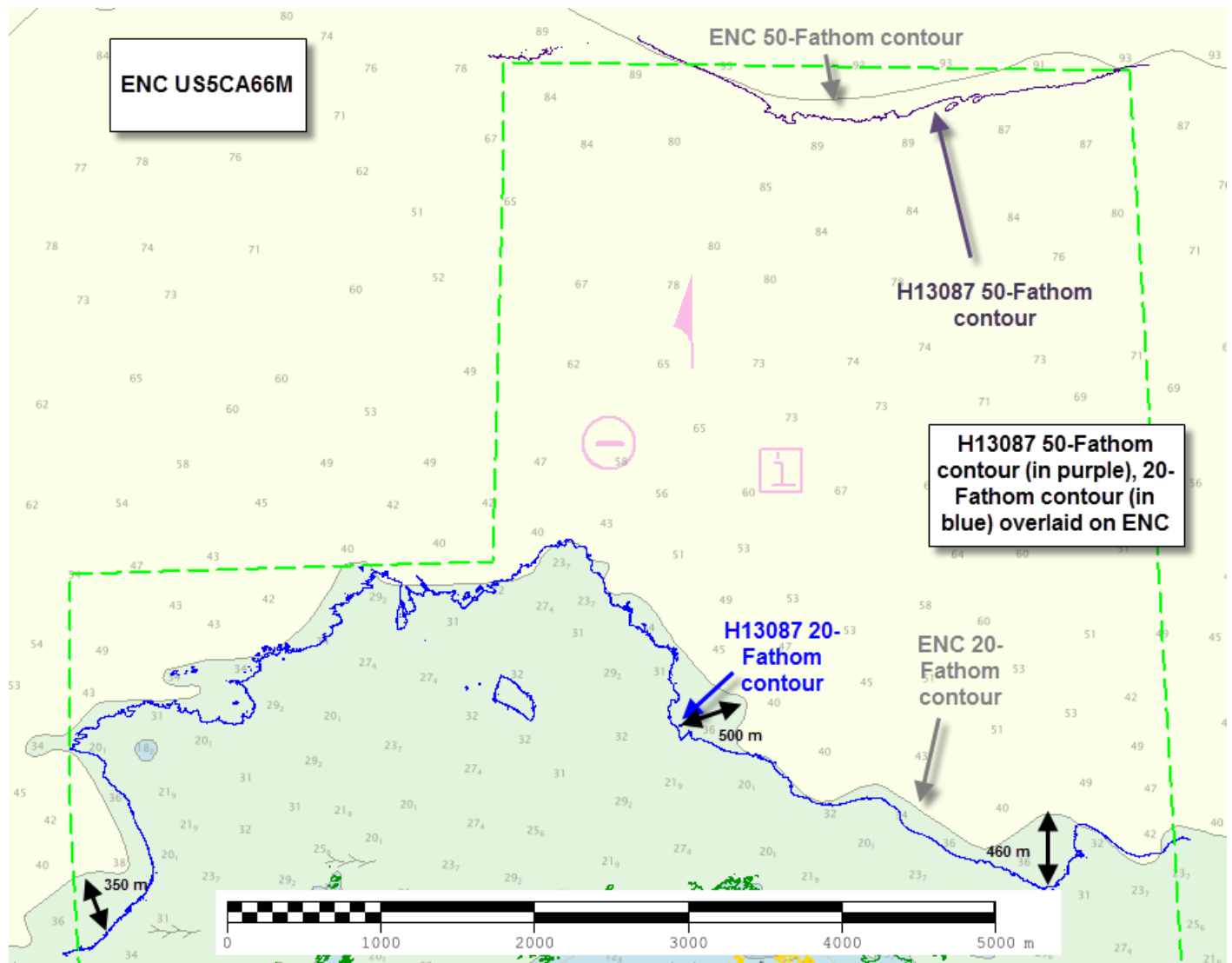


Figure 23: H13087 overlaid on ENC US5CA66M showing offsets in 20 and 50 fathom curves.

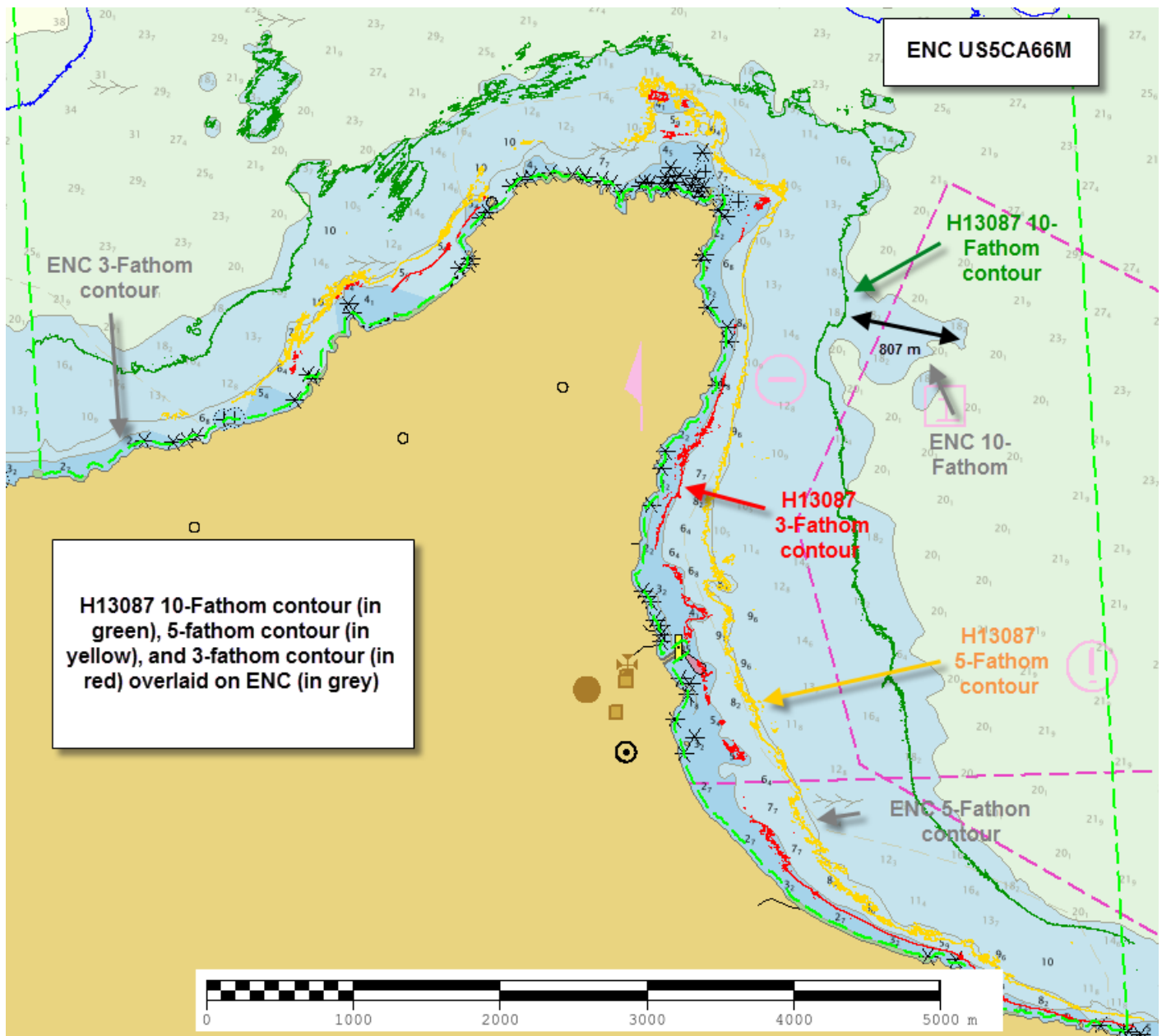


Figure 24: H13087 overlaid on ENC US5CA66M showing offsets in the 10 fathom curve.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

See Final Feature File for more information.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.6 Channels

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

D.1.7 Bottom Samples

No bottom samples were required for this survey.

D.2 Additional Results

D.2.1 Shoreline

Limited shoreline verification was conducted in accordance with applicable sections of NOAA HSSD and FPM using the Project Reference File (PRF) and Composite Source File (CSF) provided with the Project Instructions. In the field, all assigned features that were safe to approach were addressed as required with S-57 attribution and recorded in the H13087_FFF to best represent the features at chart scale. This file also includes new features found in the field as well as recommendations to update, retain or delete assigned features.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

The ATONs surveyed in H13087 were update to include three ATONs on the Bechers Bay pier which was previously charted only displaying one ATON. The ATONs on the pier are privately maintained.



Figure 25: On the east side of Santa Rosa Island, ATONs on the end of the pier in Bechers Bay. The ATONs on this pier are privately maintained.

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

A couple times a week a small ferry from Ventura Harbor services the island.

D.2.8 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/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 Recommendation

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

D.2.11 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
Benjamin K. Evans, CDR/NOAA	Commanding Officer	04/18/2019	 Digitally signed by EVANS.BENJAMIN.K.1237217094 Date: 2019.04.23 19:50:49 -07'00'
Hadley A. Owen , LT/NOAA	Field Operations Officer	04/18/2019	 Digitally signed by OWEN.HADLEY.ANNE.1410967070 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=NOAA, cn=OWEN.HADLEY.ANNE.1410967070 Date: 2019.04.22 19:28:00 -07'00'
James B. Jacobson	Chief Survey Technician	04/18/2019	 JACOBSON.JAMES.BRYAN.1269664017 I have reviewed this document 2019.04.24 06:21:23 -07'00'
Jonathan A. Witmer	Sheet Manager	04/18/2019	Jonathan Witmer Digitally signed by Jonathan Witmer Date: 2019.04.22 19:19:59 -07'00'

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	Continually 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
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
HSSD	Hydrographic Survey Specifications and Deliverables

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
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
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	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
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
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
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positioning System timing message
ZDF	Zone Definition File



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service
Silver Spring, Maryland 20910

PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : December 6, 2018

HYDROGRAPHIC BRANCH: Pacific

HYDROGRAPHIC PROJECT: OPR-L397-RA-2018

HYDROGRAPHIC SHEET: H13087

LOCALITY: West Bechers Bay and Vicinity
California

TIME PERIOD: September 26 - October 27, 2018

TIDE STATION USED: Los Angeles, CA 9410660

Lat. 33° 43.2' N Long. 118° 16.4' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.448 meters

TIDE STATION USED: Santa Monica, CA 9410840

Lat. 34° 0.5' N Long. 118° 30.0' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.428 meters

TIDE STATION USED: Santa Barbara, CA 9411340

Lat. 34° 24.2' N Long. 119° 41.6' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.415 meters

TIDE STATION USED: Oil Platform Harvest, CA 9411406

Lat. 34° 28.1' N Long. 120° 40.9' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.373 meters

TIDE STATION USED: Port San Luis, CA 9412110

Lat. 35° 10.1' N Long. 120° 45.2' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.408 meters

TIDE STATION USED: Monterey, CA 9413450

Lat. 36° 36.3' N Long. 121° 53.3' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters

HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.412 meters



REMARKS: RECOMMENDED Grid

Please use the TCARI grid "L397RA2018.tc" as the final grid for project OPR-L397-RA-2018, H13087, during the time period between September 26 and October 27, 2018.

Refer to attachments for grid information.

Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

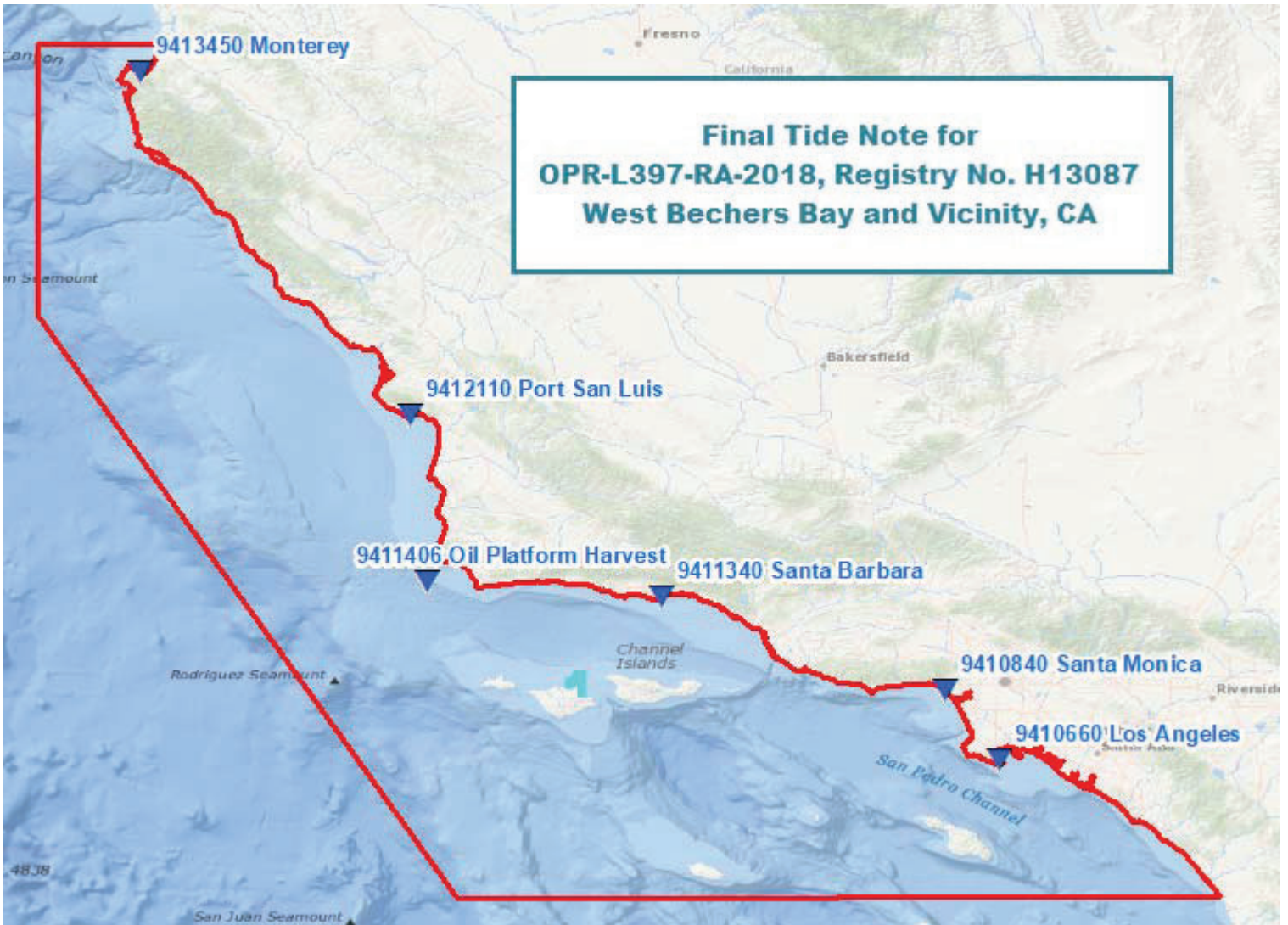
Note 2: Annual leveling for Santa Barbara, CA (9411340), Oil Platform Harvest, CA (9411406), and Monterey, CA (9413450) was not completed in FY18. A review of the verified leveling records from November 2007 - 2017 shows the tide station benchmark networks to be stable within an allowable 0.009 m tolerance. This Tide Note may be used as final stability verification for survey OPR-L397-RA-2018, H13085. CO-OPS will immediately provide a revised Tide Note should subsequent leveling records indicate any benchmark network stability movement beyond the allowable 0.009 m tolerance.

FANELLI.COLLEEN.M
EGHAN.1369720100

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Date: 2018.12.12 15:47:48 -05'00'

ACTING CHIEF, PRODUCTS AND SERVICES BRANCH

**Final Tide Note for
OPR-L397-RA-2018, Registry No. H13087
West Bechers Bay and Vicinity, CA**



APPROVAL PAGE

H13087

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
- 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.

Approved: _____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch