H12800

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

# DESCRIPTIVE REPORT

| | |
|---|---|
| Type of Survey: | Navigable Area |
| Registry Number: | H12800 |

## LOCALITY

| | |
|---|---|
| State(s): | Alaska |
| General Locality: | Bering Strait and Vicinity |
| Sub-locality: | Southeastern Vicinity of Port Clarence |

**2017**

CHIEF OF PARTY
CDR Mark Van Waes, NOAA

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Date:

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

REGISTRY NUMBER:

# HYDROGRAPHIC TITLE SHEET

# H12800

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: | **Bering Strait and Vicinity** |
| Sub-Locality: | **Southeastern Vicinity of Port Clarence** |
| Scale: | **40000** |
| Dates of Survey: | **07/21/2017 to 08/23/2017** |
| Instructions Dated: | **06/09/2017** |
| Project Number: | **OPR-R365-FA-17** |
| Field Unit: | **NOAA Ship Fairweather** |
| Chief of Party: | **CDR Mark Van Waes, NOAA** |
| Soundings by: | **Multibeam Echo Sounder** |
| Imagery by: | **Side Scan Sonar, Side Scan Sonar** |
| 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/.***

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# Descriptive Report to Accompany Survey H12800

Project: OPR-R365-FA-17

Locality: Bering Strait and Vicinity

Sublocality: Southeastern Vicinity of Port Clarence

Scale: 1:40000

July 2017 - August 2017

**NOAA Ship Fairweather**

Chief of Party: CDR Mark Van Waes, NOAA

# A. Area Surveyed

The surveyed area is located within southeastern Port Clarence, AK.

## A.1 Survey Limits

Data were acquired within the following survey limits:

| Northwest Limit | Southeast Limit |
|---|---|
| 65° 13' 26.85" N<br>166° 39' 38.04" W | 65° 9' 8.02" N<br>166° 30' 25.83" W |

*Table 1: Survey Limits*

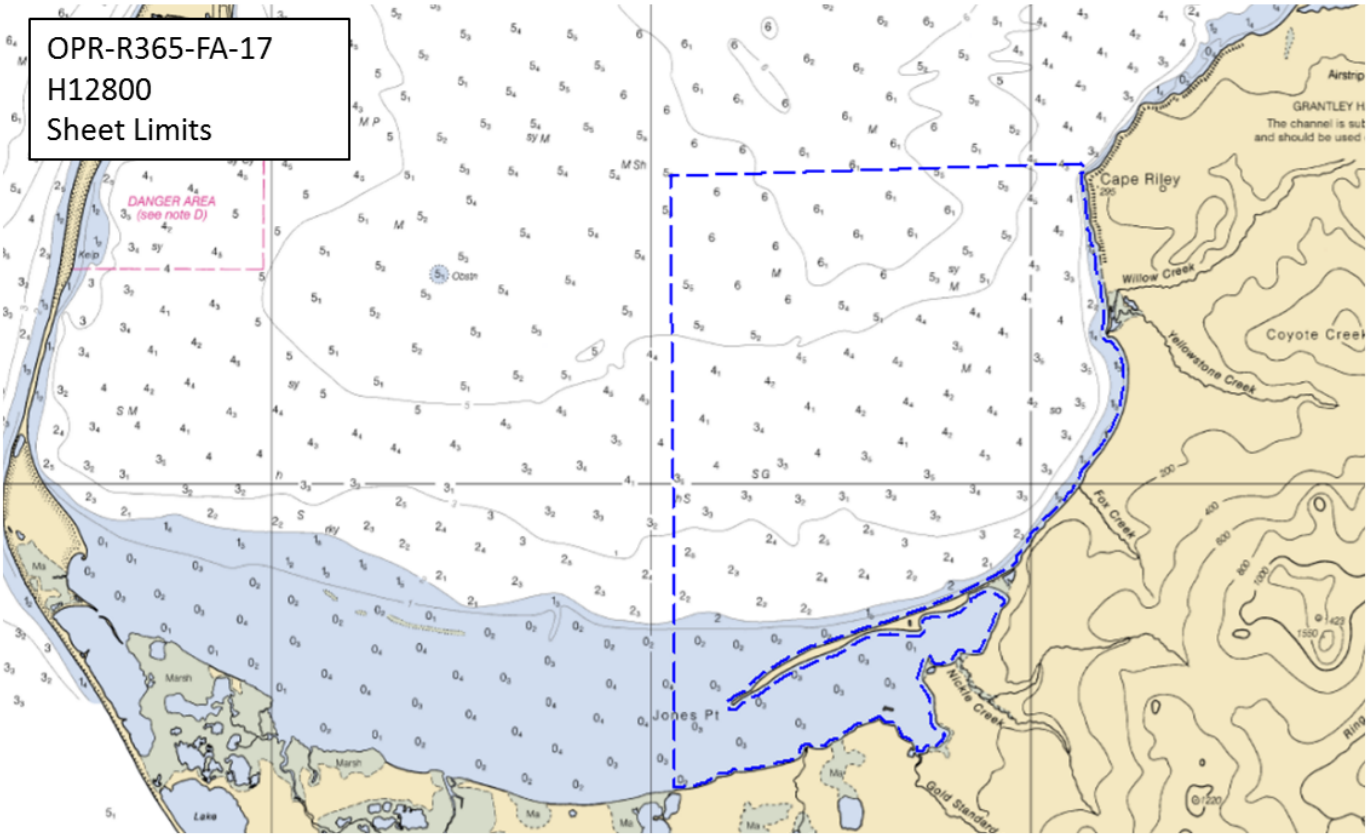



*Figure 1: H12800 Sheet Limits*

Data were acquired to the survey limits in accordance with the requirements in the Project Instructions and the March 2017 NOS Hydrographic Surveys Specification and Deliverables as shown in Figure 1.

## A.2 Survey Purpose

Alaska has more miles of coastline than any other state in the United States. As maritime shipping activity in the Arctic increases in use and feasibility, as natural resources are discovered, and access through previously ice-bound routes for shipping becomes more prevalent there is a need to determine a safe route for transit. The retreat of seasonal sea ice in the Arctic has facilitated the steady growth of vessel traffic from commercial shipping, cruise liners, research vessels, commercial and recreational fishing, and, in the long term, oil and gas exploration in the Bering Strait. Port Clarence, located just south of the Bering Strait, was last surveyed in 1951. Port Clarence is one of the only areas that offers protection from storms and is often used as a port of refuge by barge vessels hauling fuel and goods. When seeking refuge from storms, the most protected southern portions of Port Clarence are frequently avoided due to the unknown depths. Additionally, a high priority request was made on behalf of United States Coast Guard (USCG), Crowley Marine Corporation, and Alaska Marine Pilots because of grounding risk. This area has also been identified as a major development priority for Alaska and the Arctic region. H12800 encompasses 23 SNM and will

enable Coast Survey to create new, larger scale, nautical charts. 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 H12800 meets side scan sonar (SSS) with concurrent multibeam echo sounder (MBES) coverage requirements for complete coverage, as required by section 5.2.2 of the 2017 HSSD. This includes crosslines (see Section B.2.1), NOAA allowable uncertainty (see Section B.2.11), and density requirements (see Section B.2.12). Additional compliance statistics can be found in the Standards and Compliance Review located in Appendix II of this report.

***The Standards and Compliance statistics are attached to this report.***

## 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 |

The entirety of H12800 was acquired via 100% SSS with concurrent MBES, meeting the requirements listed above and in the 2017 HSSD. See Figure 2 for an overview of coverage. In areas where the charted depth falls between two sounding lines and is shallower than the adjacent survey soundings bathymetric splits were acquired per the HSSD section 5.2.2.1. Additionally, all possible contacts found in SSS imagery measured to be at least 1m in height were identified and developed via MBES as per section 5.2.2 in the HSSD. All investigated contacts are displayed in Figure 3.

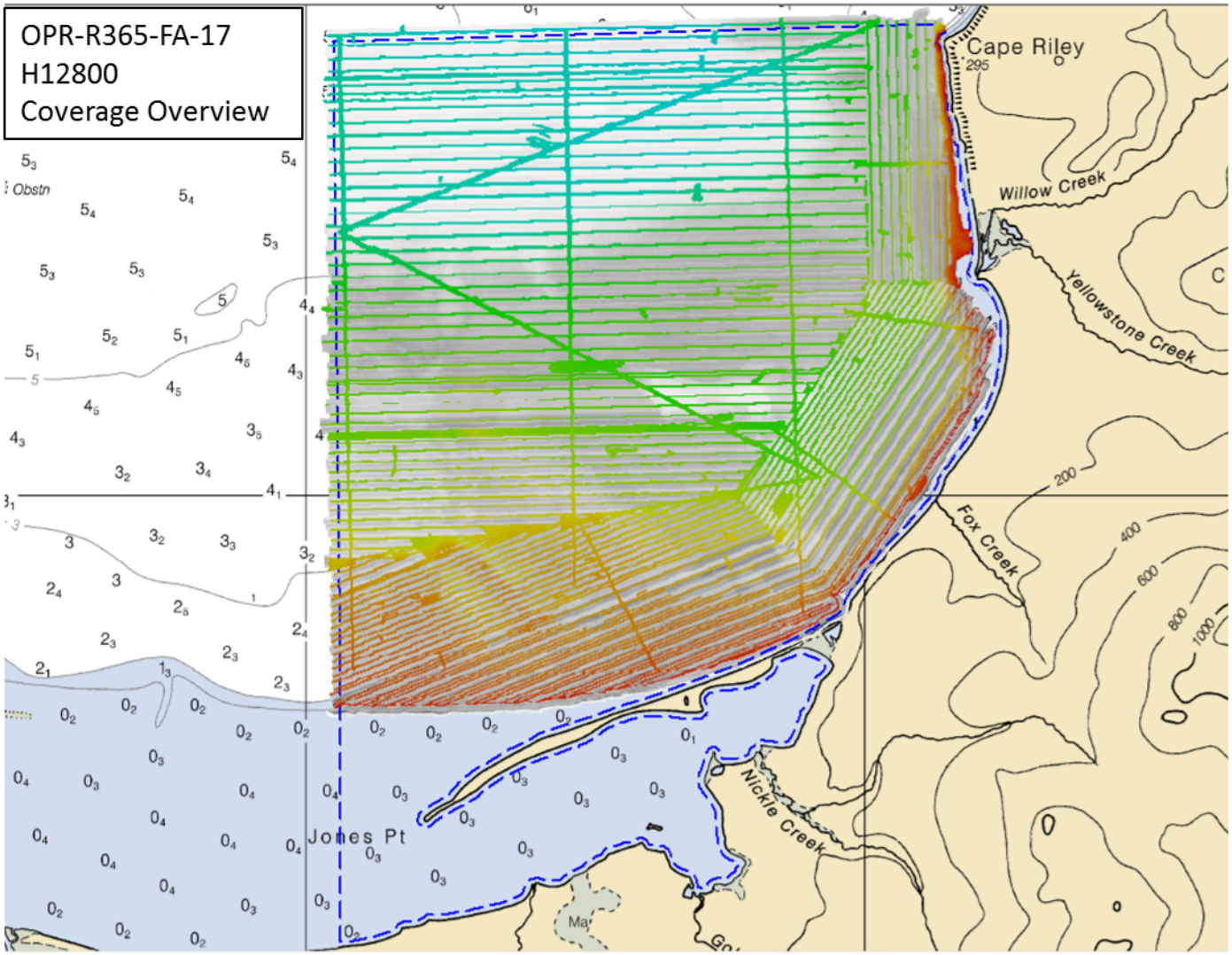



*Figure 2: H12800 Coverage Overview*

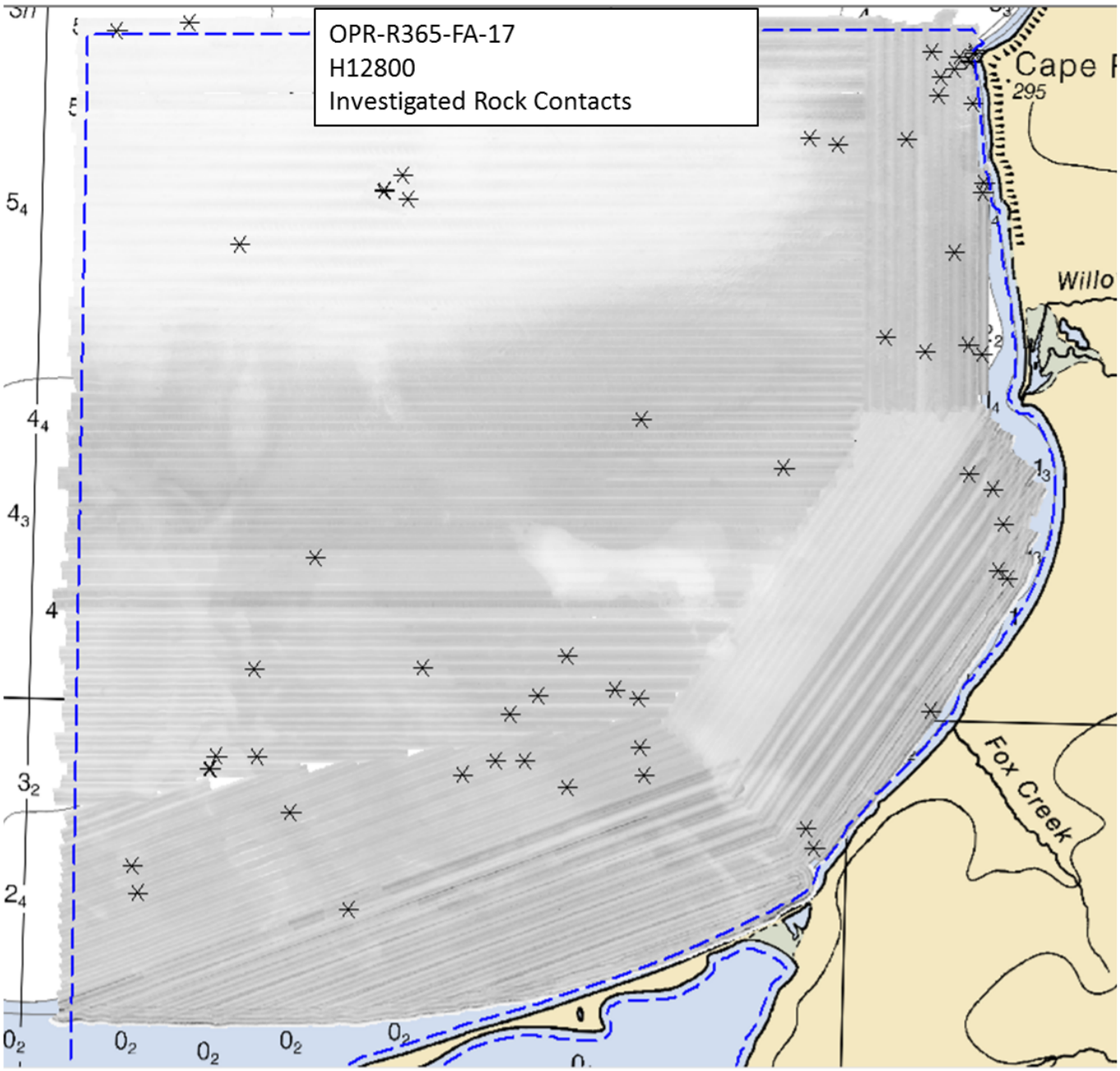



*Figure 3: Investigated contacts in SSS imagery*

## A.5 Survey Statistics

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

| | HULL ID | *2806* | *2807* | *2808* | *Total* |
|---|---|---|---|---|---|
| LNM | SBES Mainscheme | 0 | 0 | 0 | 0 |
| | MBES Mainscheme | 46.79 | 14.99 | 3.91 | 65.69 |
| | Lidar Mainscheme | 0 | 0 | 0 | 0 |
| | SSS Mainscheme | 0 | 0 | 0 | 0 |
| | SBES/SSS Mainscheme | 0 | 0 | 0 | 0 |
| | MBES/SSS Mainscheme | 0 | 160.83 | 181.51 | 342.34 |
| | SBES/MBES Crosslines | 28.20 | 4.28 | 0 | 32.48 |
| | Lidar Crosslines | 0 | 0 | 0 | 0 |
| Number of Bottom Samples | | | | | 4 |
| Number Maritime Boundary Points Investigated | | | | | 0 |
| Number of DPs | | | | | 0 |
| Number of Items Investigated by Dive Ops | | | | | 0 |
| Total SNM | | | | | 23 |

*Table 2: Hydrographic Survey Statistics*

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

| Survey Dates | Day of the Year |
|---|---|
| 07/21/2017 | 202 |
| 07/22/2017 | 203 |

| Survey Dates | Day of the Year |
|---|---|
| 07/25/2017 | 206 |
| 07/26/2017 | 207 |
| 07/29/2017 | 210 |
| 07/30/2017 | 211 |
| 08/02/2017 | 214 |
| 08/09/2017 | 221 |
| 08/10/2017 | 222 |
| 08/11/2017 | 223 |
| 08/14/2017 | 226 |
| 08/15/2017 | 227 |
| 08/16/2017 | 228 |
| 08/17/2017 | 229 |
| 08/18/2017 | 230 |
| 08/21/2017 | 233 |
| 08/22/2017 | 234 |
| 08/23/2017 | 235 |

*Table 3: Dates of Hydrography*

***The survey statistics in Table 2 above differ slightly from those computed during office review. The MBES Mainscheme for vessel 2806 were computed as 41.73 LNM giving a total MBES Mainscheme of 60.63 LNM. The crosslines for 2806 were computed as 25.65 LNM giving a crossline total of 29.93 LNM.***

# 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 | *2806* | *2807* | *2808* |
|---|---|---|---|
| **LOA** | 8.6 meters | 8.6 meters | 8.6 meters |
| **Draft** | 1.1 meters | 1.1 meters | 1.1 meters |

*Table 4: Vessels Used*

The DAPR is archived at NCEI and is not appended to this report

### B.1.2 Equipment

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

| Manufacturer | Model | Type |
|---|---|---|
| Kongsberg | EM 2040 | MBES |
| Sea-Bird Scientific | 19plus V2 | Conductivity, Temperature, and Depth Sensor |
| Applanix | POS MV V5 | Positioning System |
| Klein | 5000 | SSS |
| Teledyne Reson | SVP 71 | Sound Speed System |

*Table 5: Major Systems Used*

All launches utilized Kongsberg EM 2040 MBES, Teledyne RESON SVP71 surface sound speed sensors, and Sea-Bird Scientific 19plus CTD casts. Additionally, Launches 2808 and 2807 were equipped with Klein 5000 SSS for side scan acquisition.

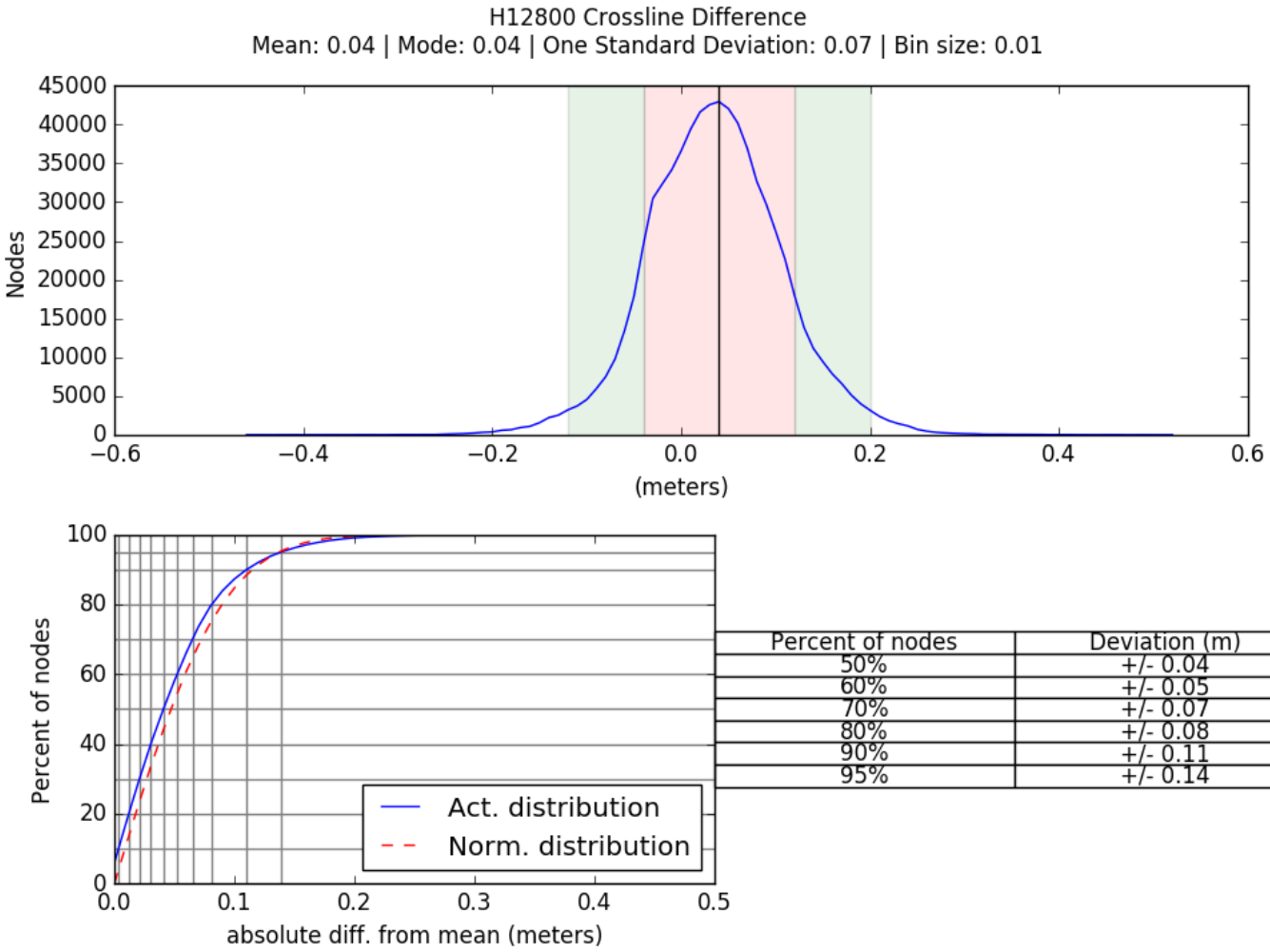
## B.2 Quality Control

### B.2.1 Crosslines

Crosslines acquired for this survey totaled 7.96% of mainscheme acquisition.

Crosslines were collected, processed and compared in accordance with Section 5.2.4.3 of the HSSD. To evaluate crosslines, a surface using strictly mainscheme lines, and a surface using strictly crosslines were

created. From these two surfaces, a difference surface (mainscheme - crosslines = difference surface) was generated and is submitted in the Separates II Digital Data folder. For a visual representation of the crossline comparison see Figure 5. Statistics show the mean difference between the depths derived from mainscheme and crosslines was 0.04 meters (with mainscheme being deeper) and 95% of nodes falling within 0.14 meters (Figure 4). The difference surface was compared to the allowable NOAA uncertainty standards via the Grid Comparison tool in Pydro XL. In total, 99.98% of the depth differences between H12800 mainscheme and crossline data were within allowable NOAA uncertainties .




| Percent of nodes | Deviation (m) |
|---|---|
| 50% | +/- 0.04 |
| 60% | +/- 0.05 |
| 70% | +/- 0.07 |
| 80% | +/- 0.08 |
| 90% | +/- 0.11 |
| 95% | +/- 0.14 |

*Figure 4: H12800 Crossline Difference Statistics*

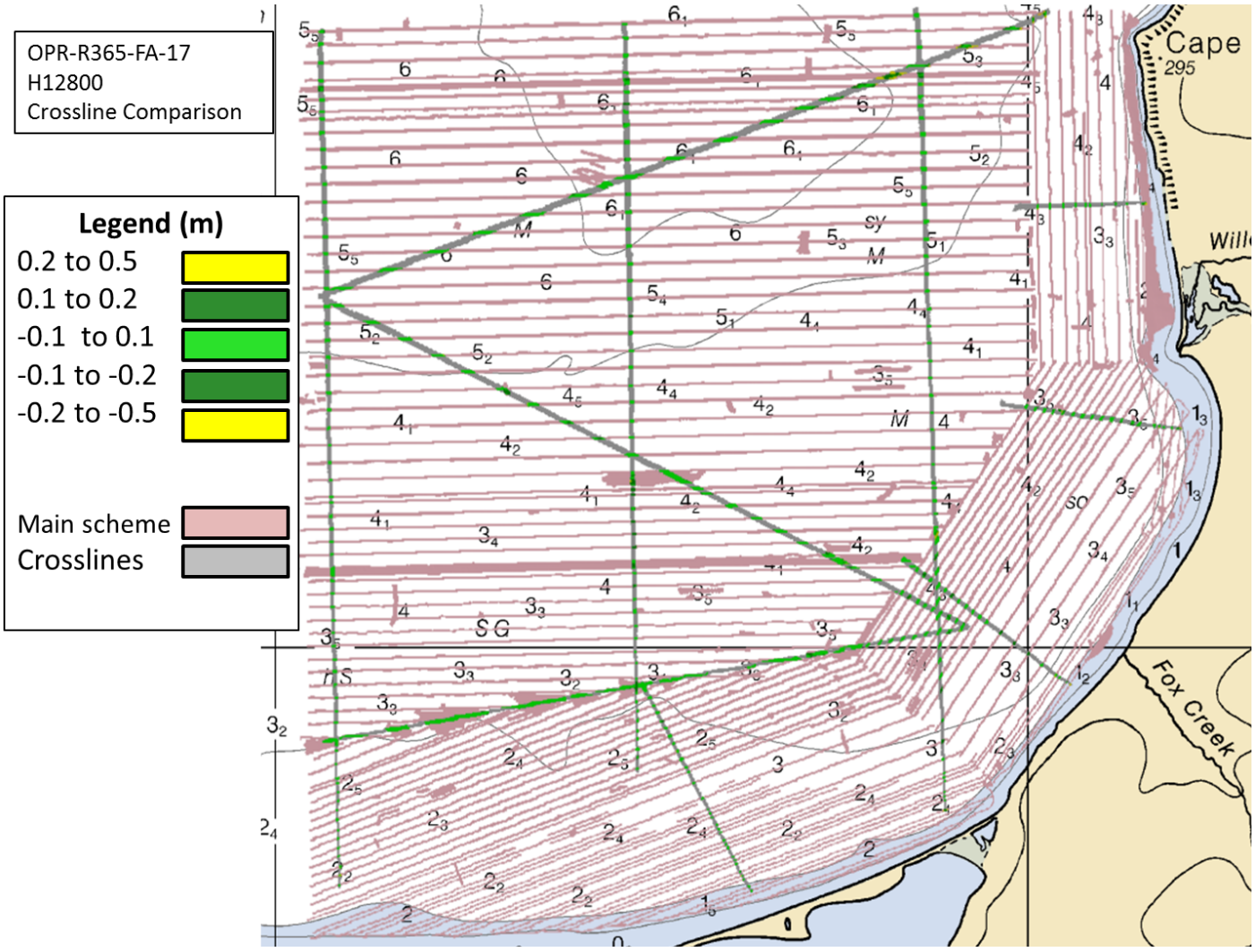



*Figure 5: H12800 Crossline Comparison*

***Crosslines calculated at Processing Branch, totaled 7.4% of mainscheme acquisition.***

### B.2.2 Uncertainty

| Hull ID | Measured - CTD | Measured - MVP | Surface |
|---|---|---|---|
| 280x (all launches) | 2 meters/second | N/A meters/second | 0.5 meters/second |

*Table 6: Survey Specific Sound Speed TPU Values.*

In addition to the usual a priori estimates of uncertainty provided via device models for vessel motion, ERZT, and Poor Man's VDatum (PMVD), real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H12800. Real-time uncertainties were provided via EM2040 MBES data, Applanix Delayed Heave RMS, and TCARI tides. 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

H12800 junctions with two adjacent surveys from this project, H12798 and H12799. Data overlap between H12800 and each adjacent survey was achieved. These areas of overlap between surveys were reviewed with CARIS HIPS and SIPS by surface differencing (at equal resolutions) to assess surface agreement. The multibeam data were also examined in CARIS Subset Editor for consistency and agreement. The junctions with H12798 and H12799 are generally within the NOAA allowable uncertainty in their areas of overlap. For all junctions with H12798 and H12799, a negative difference indicates H12800 was shoaler, and a positive difference indicates H12800 was deeper.

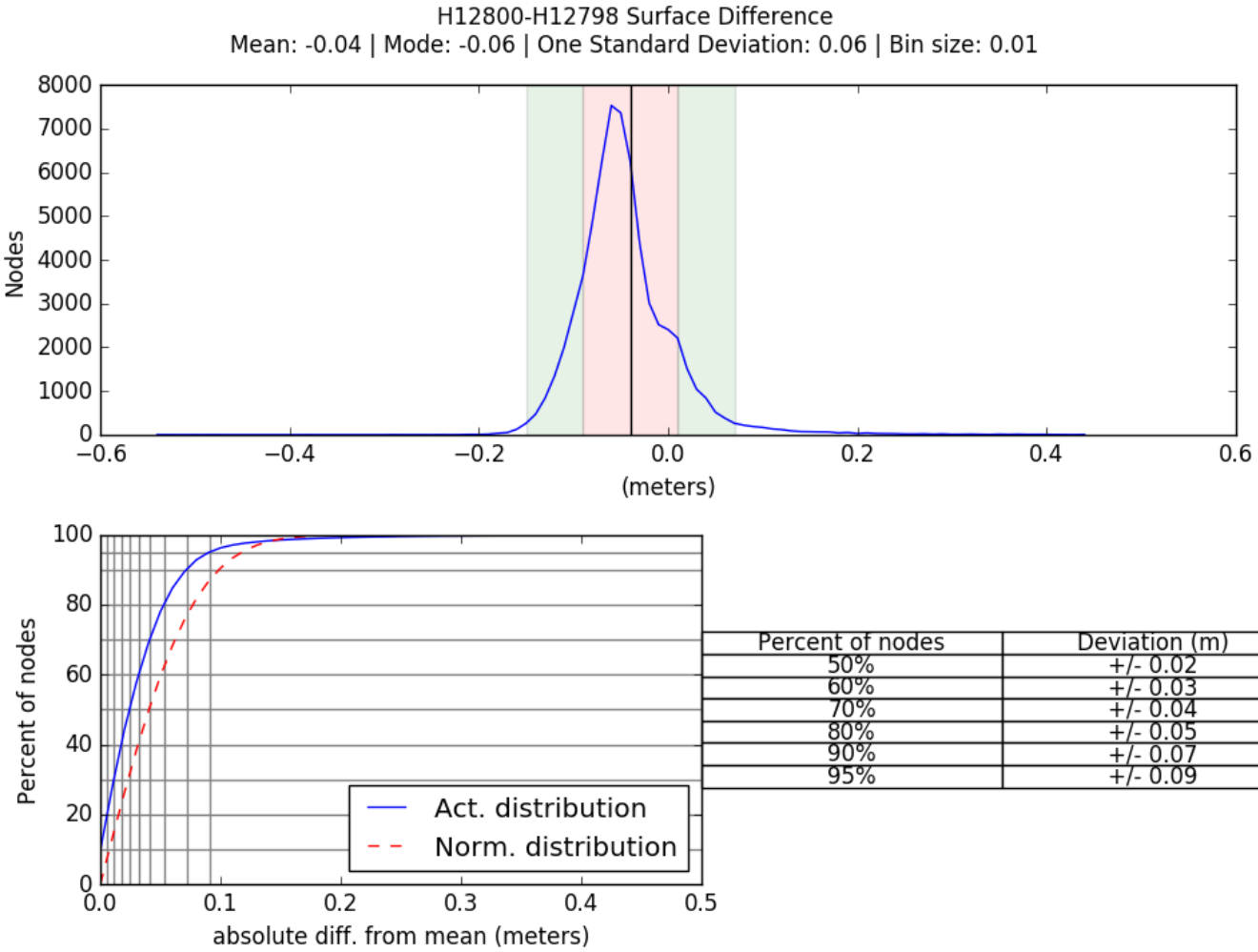
The following junctions were made with this survey:

| Registry Number | Scale | Year | Field Unit | Relative Location |
|---|---|---|---|---|
| H12798 | 1:40000 | 2017 | NOAA Ship FAIRWEATHER | N |
| H12799 | 1:40000 | 2017 | NOAA Ship FAIRWEATHER | W |

*Table 7: Junctioning Surveys*

H12798

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H12800 and the surface from H12798 (Figure 7). The statistical analysis of the difference surface shows a mean of -0.04 with 95% of all nodes having a maximum deviation of +/-0.09 meters, as seen in Figure 6. It was found that 99.97% of nodes are within NOAA allowable uncertainty.




| Percent of nodes | Deviation (m) |
|---|---|
| 50% | +/- 0.02 |
| 60% | +/- 0.03 |
| 70% | +/- 0.04 |
| 80% | +/- 0.05 |
| 90% | +/- 0.07 |
| 95% | +/- 0.09 |

*Figure 6: H12800 and H12798 Difference Statistics*

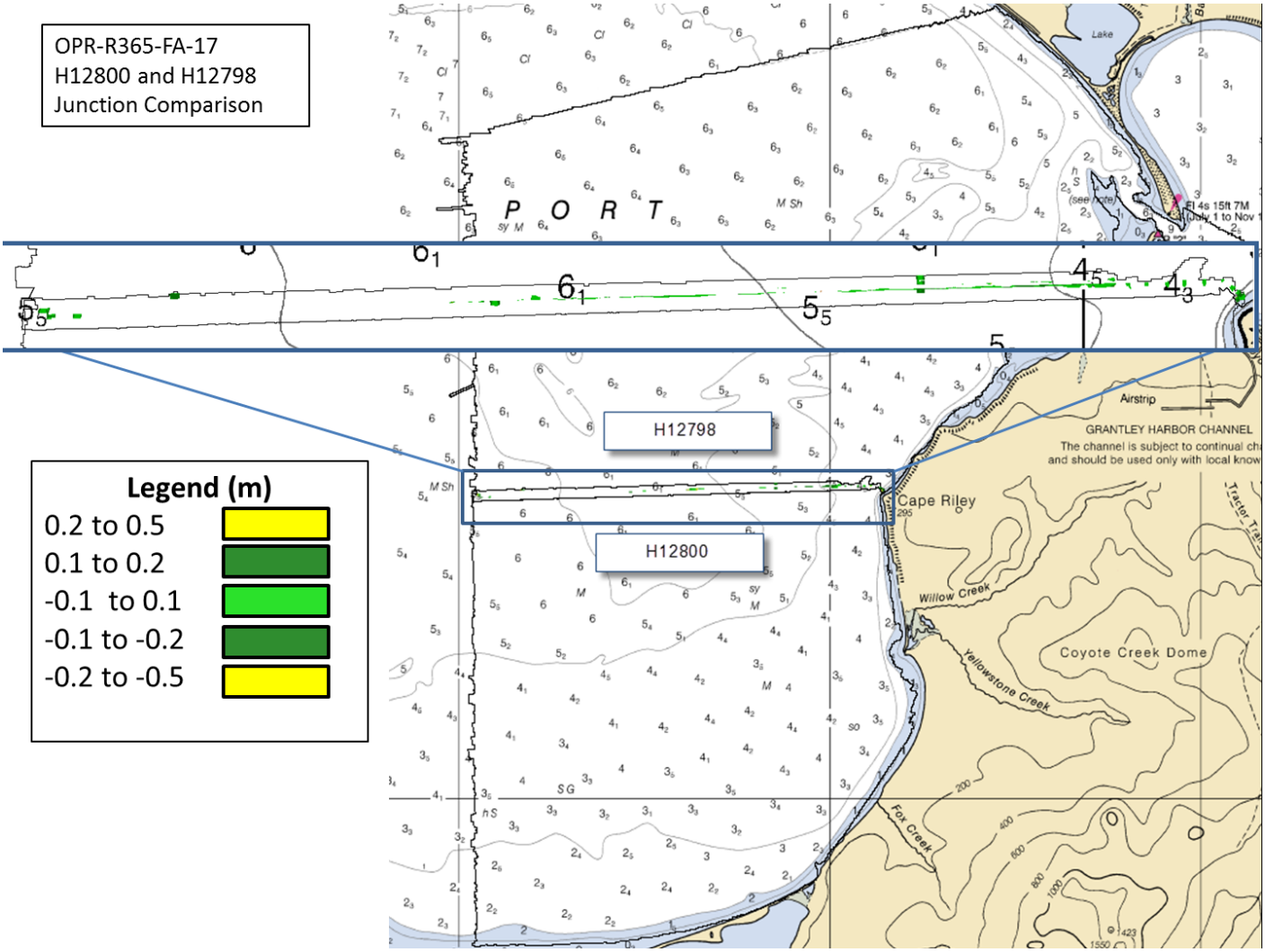
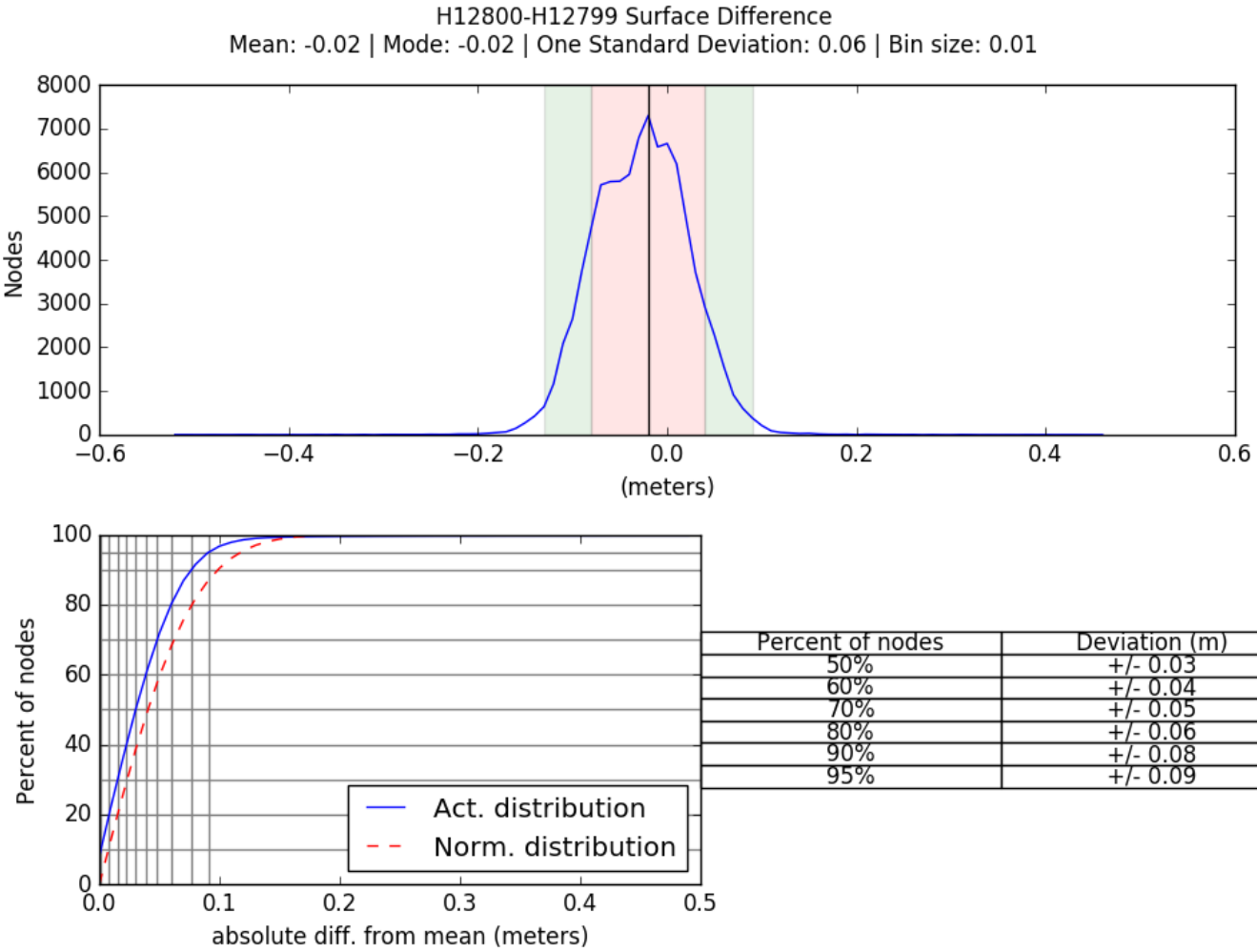



*Figure 7: H12800 and H12798 Junction*

H12799

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between the surface from H12800 and the surface from H12799 (Figure 9). The statistical analysis of the difference surface shows a mean of -0.02 with 95% of all nodes having a maximum deviation of +/-0.09 meters, as seen in Figure 8. It was found that 99.71% of nodes are within NOAA allowable uncertainty.




| Percent of nodes | Deviation (m) |
|---|---|
| 50% | +/- 0.03 |
| 60% | +/- 0.04 |
| 70% | +/- 0.05 |
| 80% | +/- 0.06 |
| 90% | +/- 0.08 |
| 95% | +/- 0.09 |

*Figure 8: H12800 and H12799 Difference Statistics*

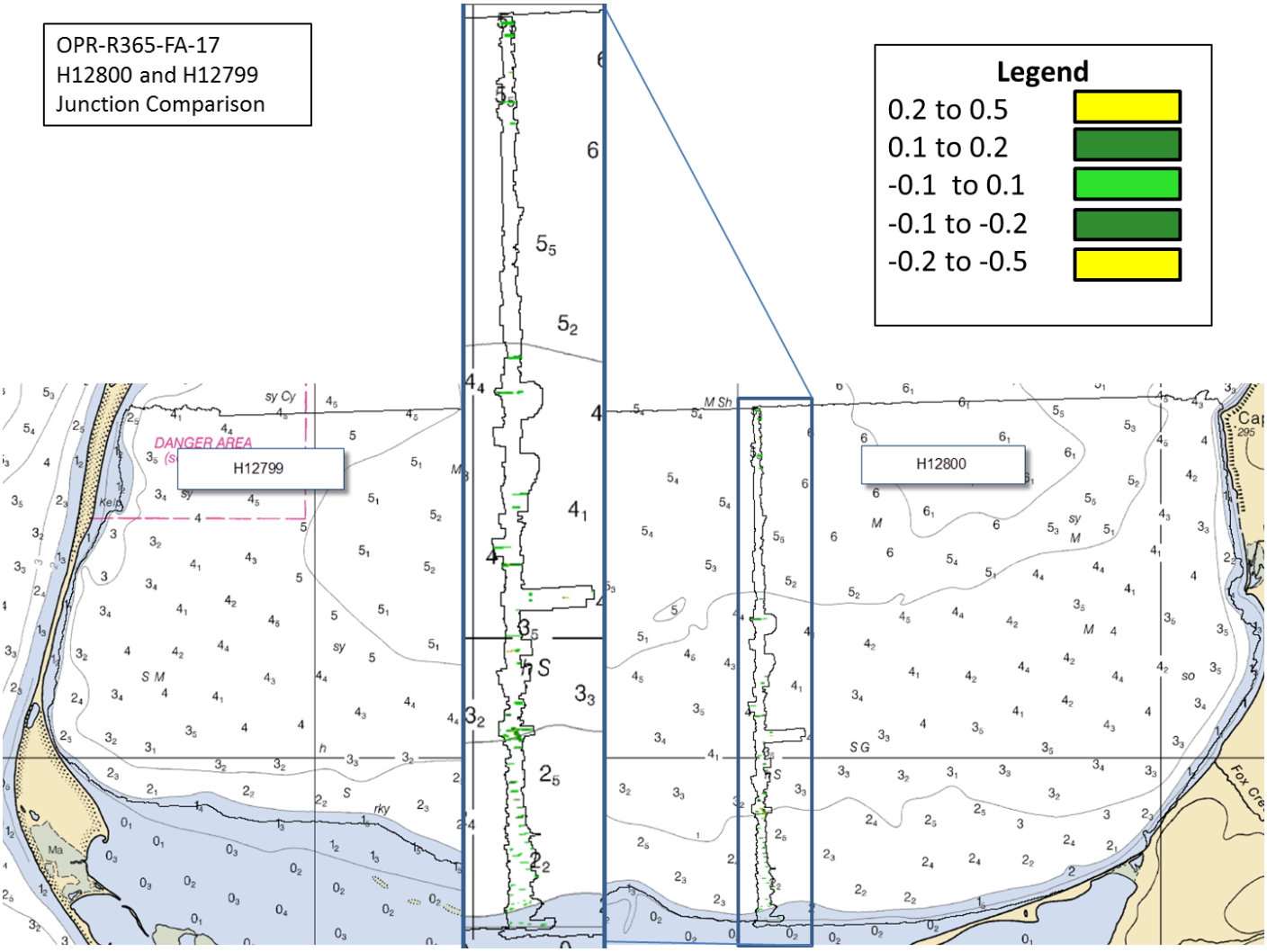



*Figure 9: H12800 and H12799 Junction*

### 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

Sea State

MBES Blowouts were common in the southeast portion of H12800 during launch operations due to sea state and high winds. All launch data were acquired with concurrent SSS in order to provide complete coverage of either MBES or SSS. All MBES data gaps were checked with the corresponding SSS data to ensure that any potential contacts in the MBES data gaps could be developed in subsequent boat days as seen in Figure 10.

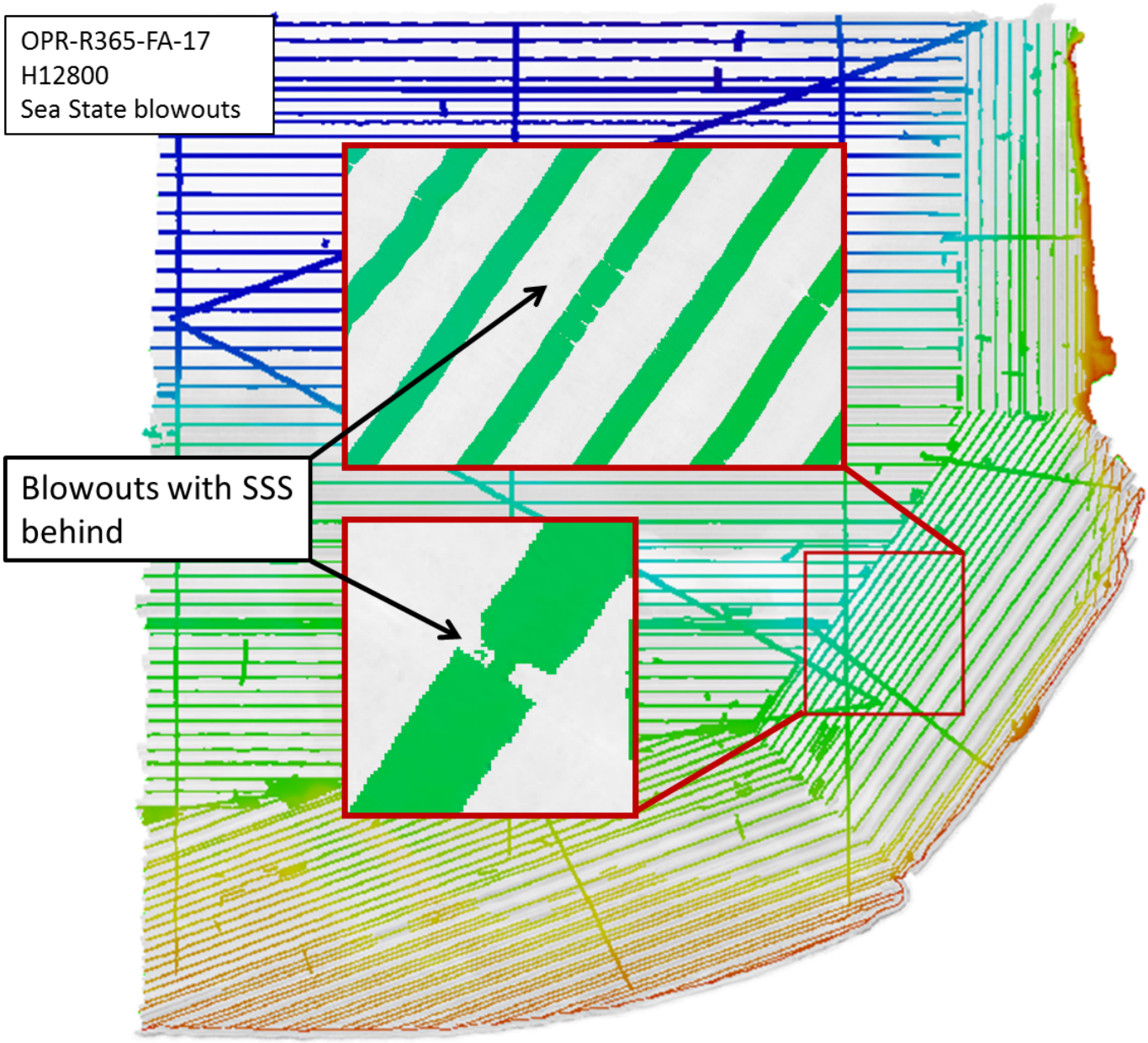



*Figure 10: H12800 Sea State Blowouts*

Refraction

Refraction was an issue in a few areas in sheet H12800. In two areas the refraction was extreme enough that possible contacts could not be identified. In these areas MBES was used to fill in these refraction holidays as seen in Figure 11.

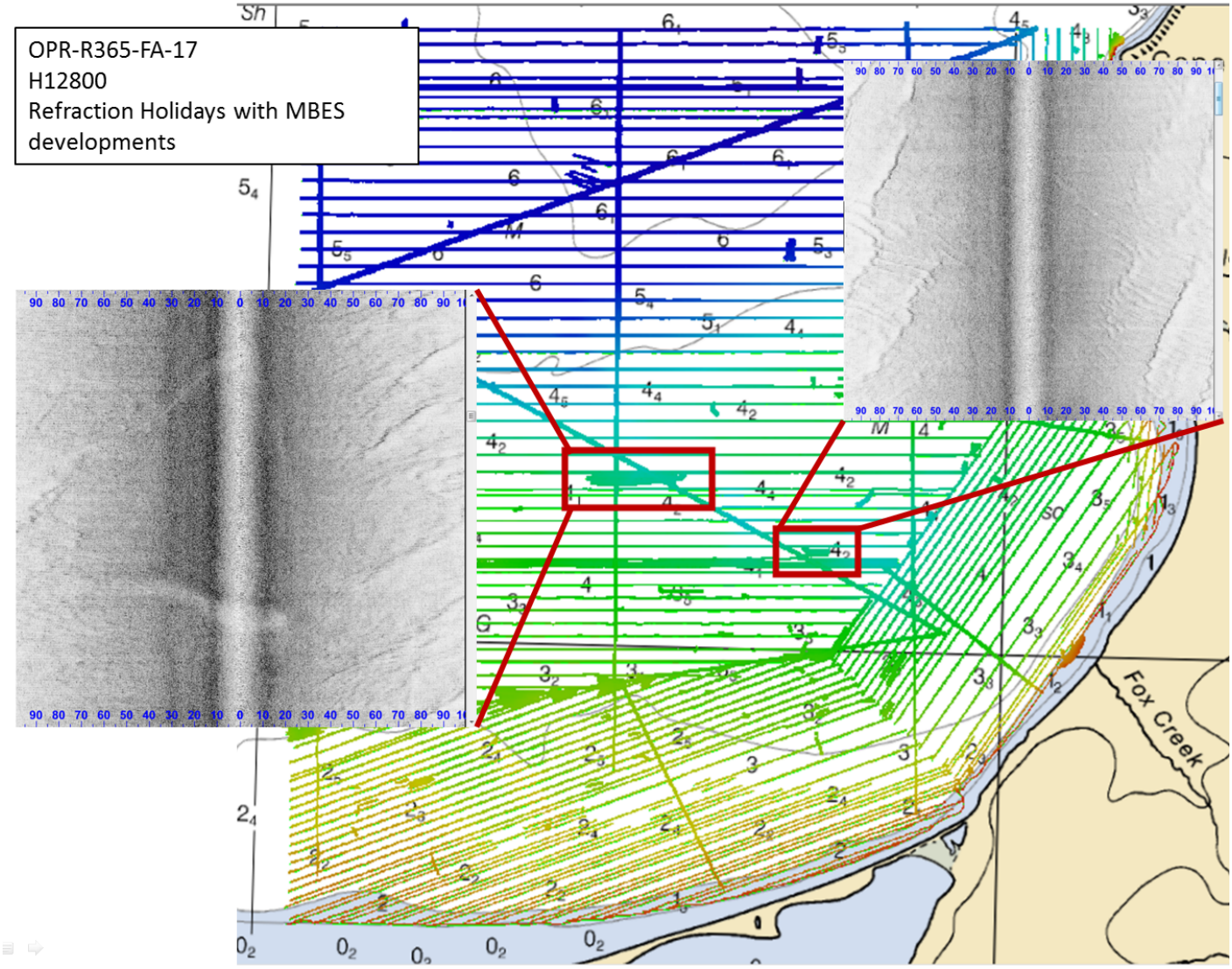



*Figure 11: H12800 Refraction areas*

### B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: 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.

### B.2.8 Coverage Equipment and Methods

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

### B.2.9 MBES Holidays

H12800 data were reviewed in CARIS HIPS and SIPS for holidays in accordance with Section 5.2.2.3 of the HSSD. 26 holidays which meet the three by three node definition were identified via Pydro QC Tools Holiday Finder tool. This tool automatically scans finalized surfaces for holidays as defined in the HSSD and was run in conjunction with a visual inspection of all surfaces by the hydrographer.
Although numerous apparent holidays were flagged by Holiday Finder, all were examined and determined to be from areas where adjoining surfaces covered the gap (e.g., a holiday in the one meter surface was covered by SSS coverage) as shown in Figure 12.

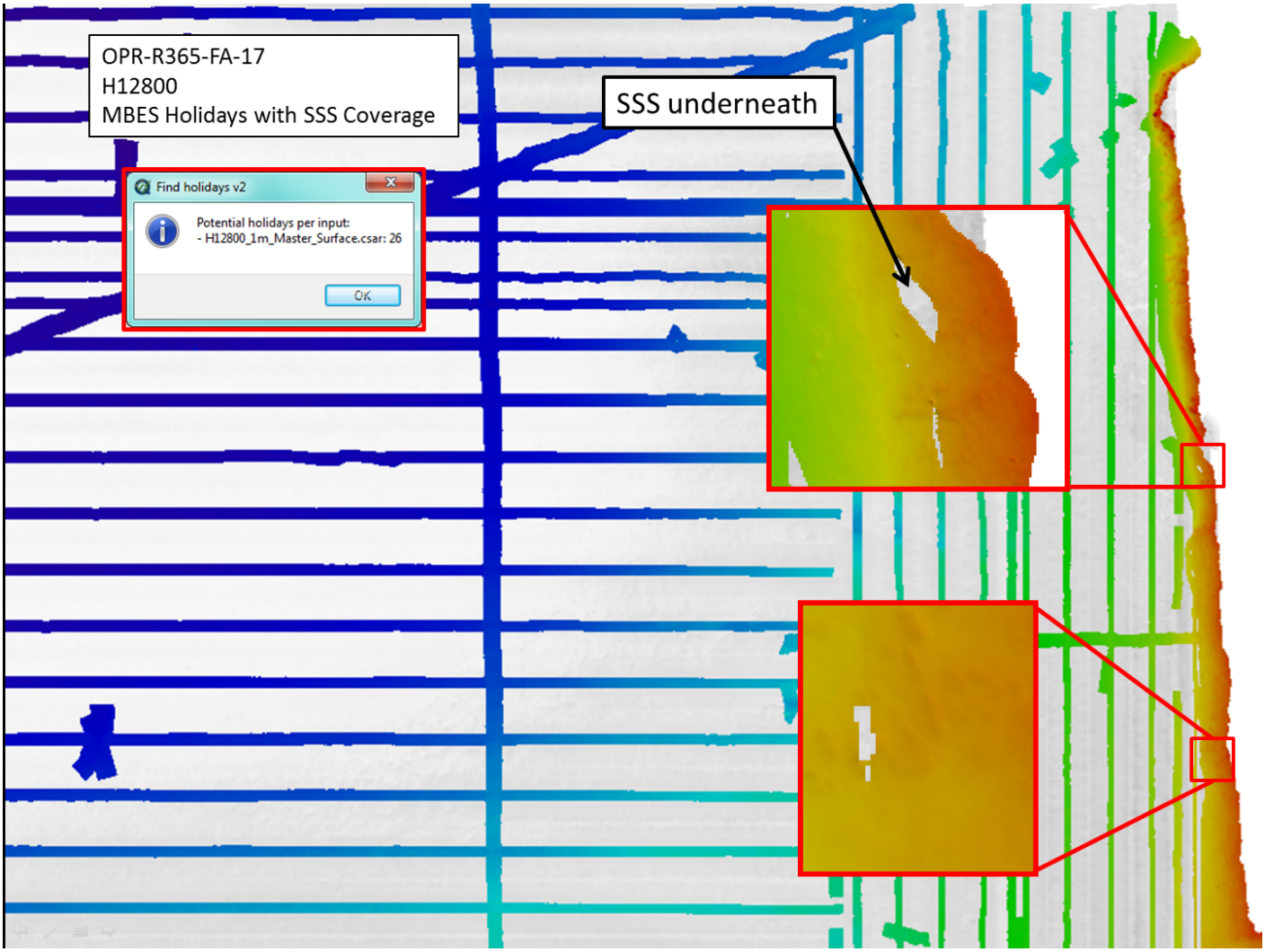



*Figure 12: H12800 MBES Holidays*

### B.2.10 SSS gaps

The H12800 SSS mosaic was reviewed manually in CARIS HIPS and SIPS for gaps. All gaps that were greater than two pixels by two pixels (four square meters) were identified and filled in with Multibeam data as seen in Figure 13.

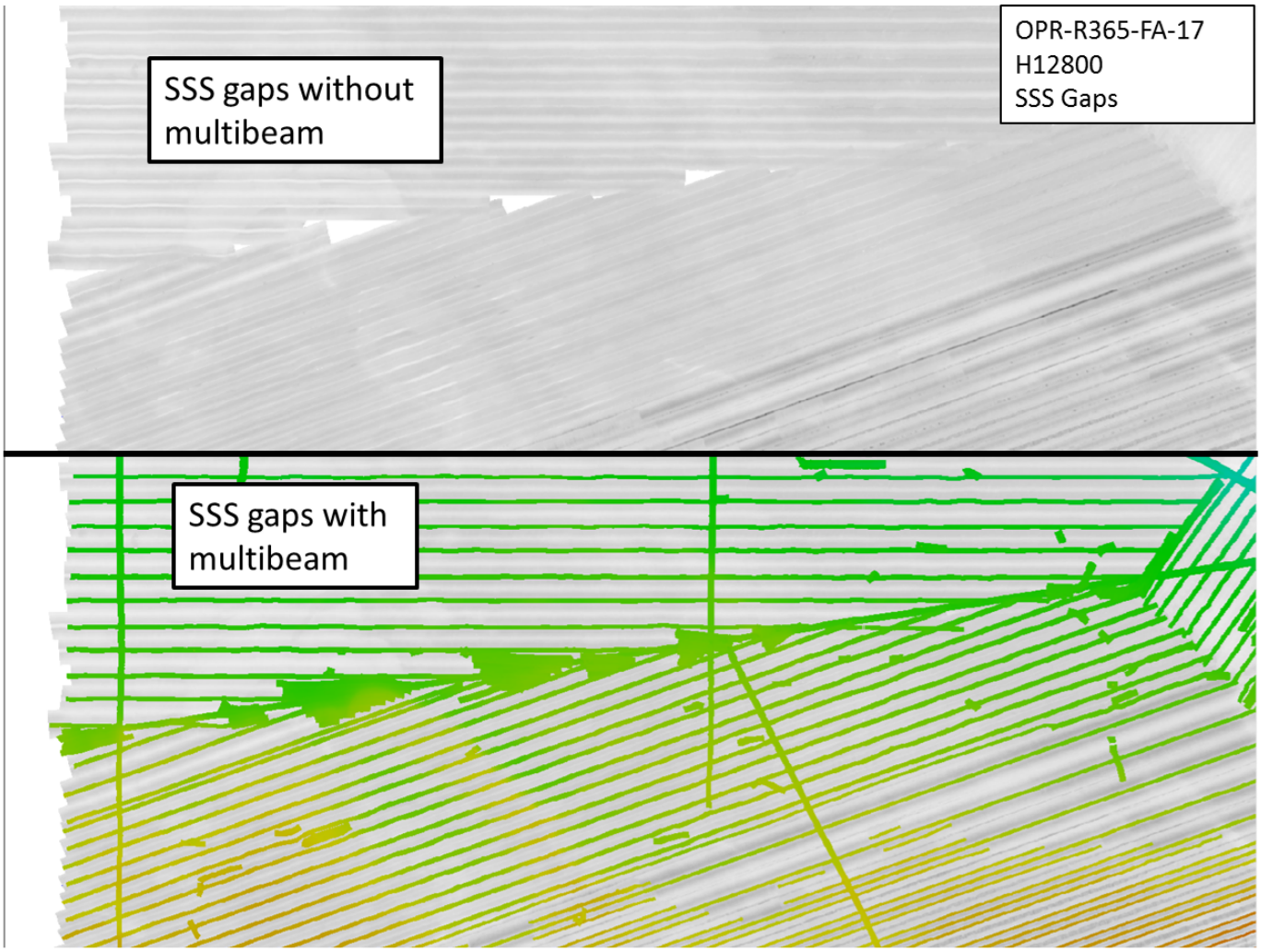



*Figure 13: H12800 SSS Coverage Gaps*

### B.2.11 NOAA Allowable Uncertainty

The surface was analyzed using the Pydro QC Tools Grid QA feature to determine what percentage of the surface meets specifications. Overall, more than 99.99% of nodes within the surface meet NOAA Allowable Uncertainty specifications for H12800. For a graphical overview see the Standards and Compliance Review located in Appendix II.

### B.2.12 Density

The surface was analyzed using the Pydro QC Tools Grid QA feature to determine that density requirements for H12800 were achieved. It was found that at least 99.14% of surface nodes containing five or more

soundings as required by HSSD Section 5.2.2.3. For a graphical overview see the Standards and Compliance Review located in Appendix II.

## 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 the Kongsberg system. All backscatter were processed by the field unit via Fledermaus FMGT 7.7.4. All processed mosaics and .gsf files have been submitted digitally to the Pacific Hydrographic Branch. See Figure 14 for complete mosaic.

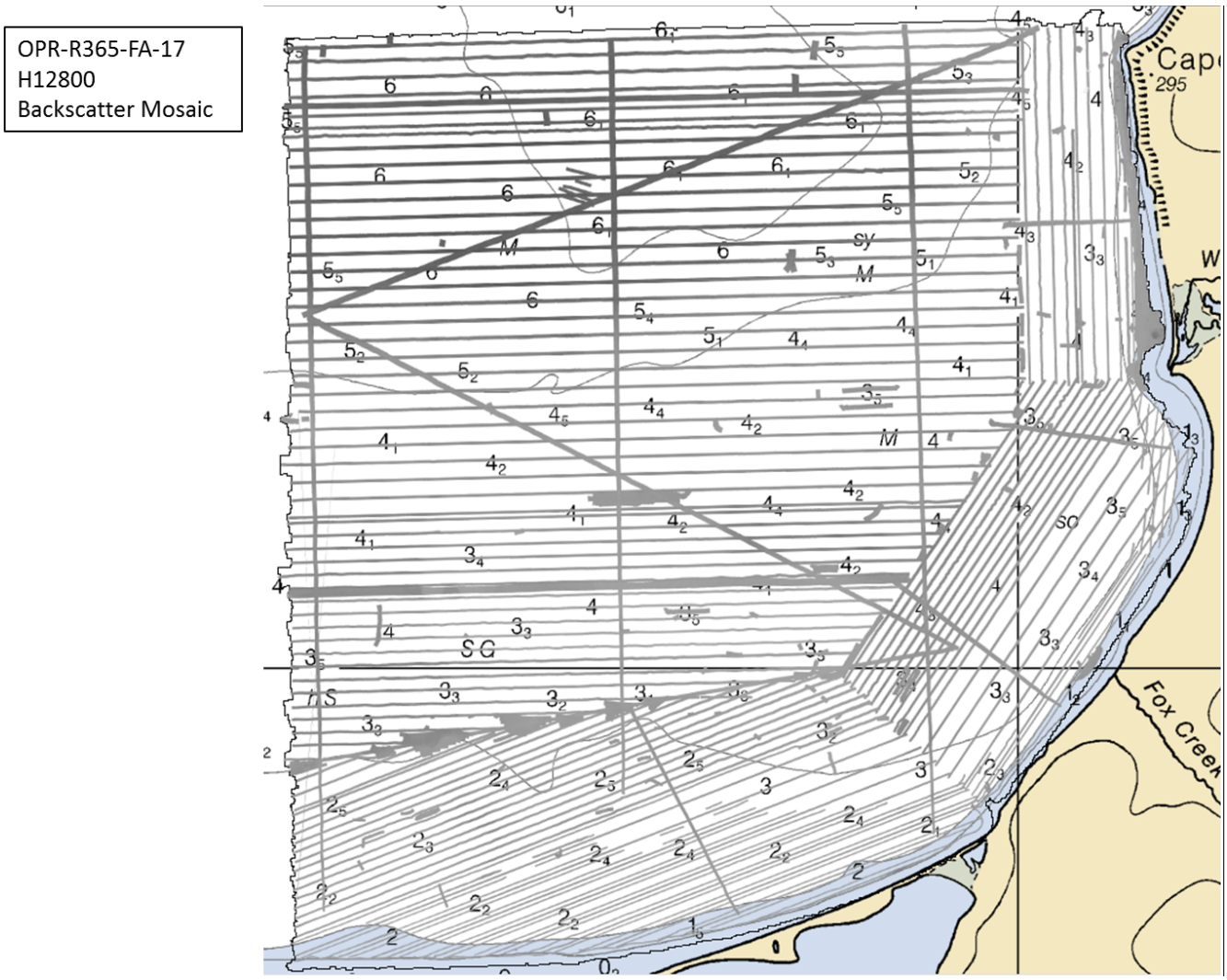



*Figure 14: H12800 Backscatter Mosaic*

***There was no backscatter requirement for Project OPR-R365-FA-17. Therefore no mosaics or.gsf files were submitted to the Processing Branch but were instead generated during office review.***

## 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 |
|---|---|---|
| Teledyne Caris | HIPS and SIPS | 10.3.3 |

*Table 8: Primary bathymetric data processing software*

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

| Manufacturer | Name | Version |
|---|---|---|
| Teledyne Caris | HIPS and SIPS | 10.3.3 |

*Table 9: Primary imagery data processing software*

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

| Manufacturer | Name | Version |
|---|---|---|
| QPS | Fledermaus FMGT | 7.7.4 |

*Table 10: Primary imagery data processing software*

The following Feature Object Catalog was used: NOAA Extended Attribute Files version 5.6

### 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 |
|---|---|---|---|---|---|
| H12800_MB_1m_MLLW_Final | CUBE | 1 meters | 2 meters - 12 meters | NOAA_1m | Concurrent MBES |
| H12800_MB_1m_MLLW | CUBE | 1 meters | 2 meters - 12 meters | NOAA_1m | Concurrent MBES |
| H12800_SSS_1m | SSS Mosaic | 1 meters | 2 meters - 12 meters | N/A | 100% SSS |

*Table 11: Submitted Surfaces*

### B.5.3 Data Logs

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as final tide and sound speed application are noted in the H12800 Data Log spreadsheet. All data logs are submitted digitally in the Separates I folder.

***The Separates are archived at NCEI and are not appended to this report.***

### B.5.4 Designated Soundings

H12800 contains two designated soundings in accordance with HSSD Section 5.2.1.2.3. One designated sounding represents a new rock feature, while two designated soundings were selected to accurately represent the seafloor. The designated soundings are on rocks in flat shallow areas where the CUBE surface did not accurately depict the true seafloor. Figure 15 shows an overview of the survey area with the location of designated soundings, highlighting the two selected to represent the seafloor.

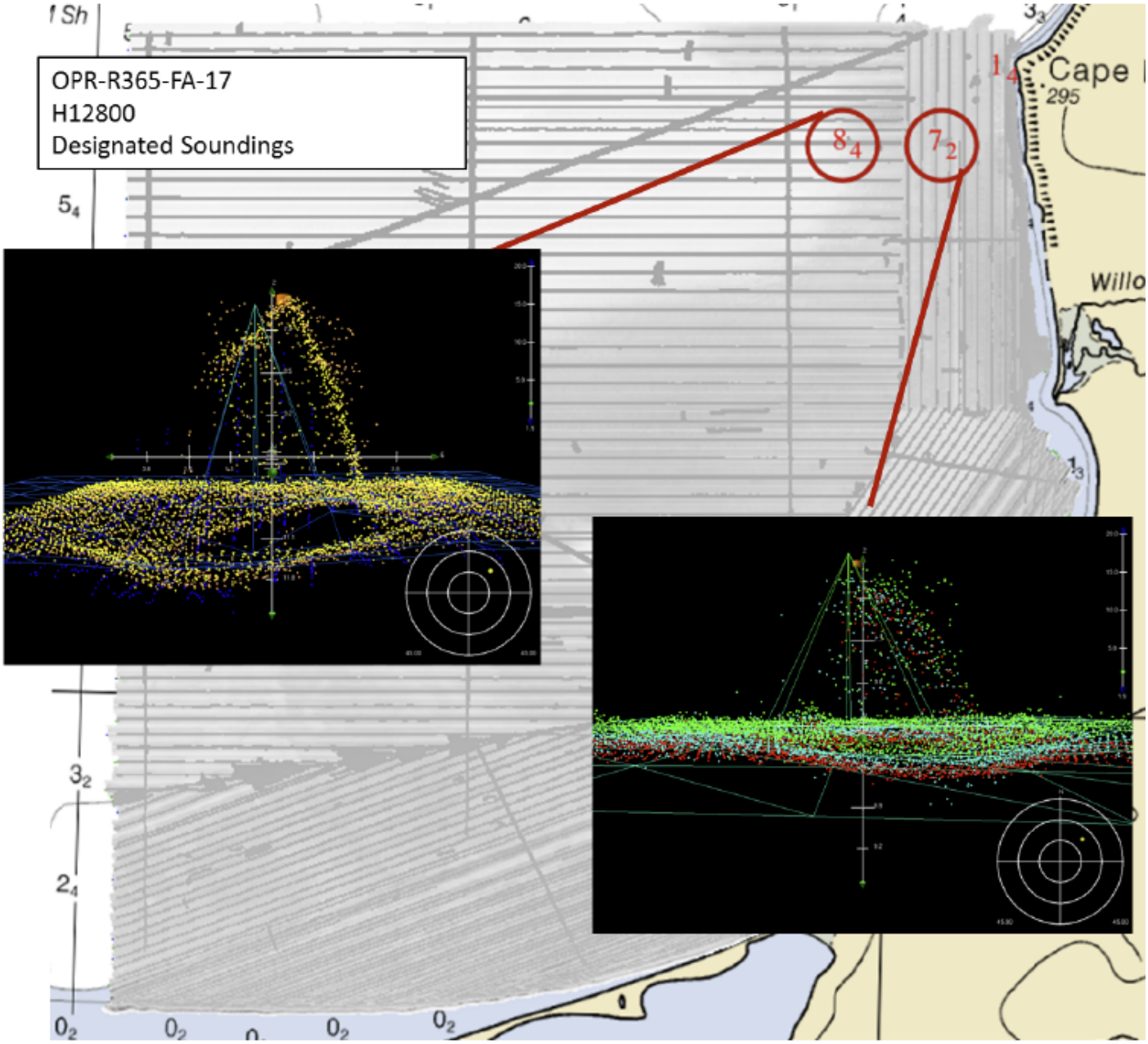



*Figure 15: H12800 Designated Soundings*

# 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.

Traditional Methods Used:

TCARI

| File Name | Status |
|---|---|
| 9468756.tid | Final Approved |

*Table 12: Water Level Files (.tid)*

| File Name | Status |
|---|---|
| R365FA2017.tc | Final |

*Table 13: Tide Correctors (.zdf or .tc)*

A request for final approved tides was sent to N/OPS1 on 09/01/2017. The final tide note was received on 09/14/2017.

Initial reduction of acquired data to MLLW was accomplished via traditional tidal means using Tidal Constituent And Residual Interpolation (TCARI) grid provided by HSD-OPS. Following the successful application of SBETs and computation of an Ellipsoidally Referenced Zone Tide (ERZT) separation model, ERS methods were used for reducing data to MLLW. After final tides were received, the final TCARI grids were applied to the data and used for reducing features to MLLW.

***The Tide Note is attached to this report.***

ERS Methods Used:

ERS via Poor Mans VDATUM

Ellipsoid to Chart Datum Separation File:

R365FA2017_PMVD_EPSG6332_NAD83_MLLW_Composite.csar

ERS methods were used as the final means of reducing H12800 to MLLW for submission. Data were initially reduced via traditional tidal means until an ERZT separation model could be calculated. This empirically derived model was then checked for consistency and compared to the Poor Man's VDatum (PMVD) separation model provided with the Project Instructions. The PMVD separation model was then vertically shifted such that the average difference between these two separation models is zero. This vertical shift de-biases the PMVD separation model, correcting for local offsets that cannot be effectively modeled by the PMVD. In areas where the PMVD model did not have sufficient coverage such as near shore areas, the ERZT separation model was appended to the PMVD model creating the composite ERZT/PMVD separation model listed above and used to reduce H12800 to MLLW.

***A separation model uncertainty of 0.045m was calculated using the equation below and applied during the Compute TPU step in CARIS HIPS & SIPS.***

$$\sigma^2_{PMVDsep} = \sigma^2_{(PMVDsep-ERZTsep)} - M = \frac{(TCARI\ 1\sigma\ \text{uncertainty}\ )^2}{\left(\frac{SEP\ grid\ size}{Project\ Area\ /\ \ Linear\ distance\ of\ Project}\right)}$$

*Sep model uncertainty calculation*

## C.2 Horizontal Control

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

The projection used for this project is UTM Zone 03 North.

The following PPK methods were used for horizontal control:

Single Base

Vessel kinematic data were post-processed using Applanix POSPac processing software and Single Base 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 with the exception of DN221 and DN222. The base station lost power during this time and ceased recording data, so RTX processing was used for these days. For further details regarding the processing and quality control checks performed, see the H12800 POSPAC Processing Logs spreadsheet located in the Separates folder. See also the OPR-R365-FA-17 Horizontal and Vertical Control Report (HVCR), submitted under separate cover.

The following user installed stations were used for horizontal control:

| HVCR Site ID | Base Station ID |
|---|---|
| 9273 A | 9677 |

*Table 14: User Installed Base Stations*

***The HVCR is archived at NCEI and is not appended to this report.***

## C.3 Additional Horizontal or Vertical Control Issues

### 3.3.1 WAAS

During real-time acquisition all launches received correctors from the Wide Area Augmentation System (WAAS) for increased accuracies similar to USCG DGPS stations. WAAS and SBETs were the sole correctors used for positioning for H12800 as no DGPS stations were available for real-time horizontal control.

### 3.3.2 RTX

Vessel kinematic data were post-processed utilizing Applanix POSPac RTX for DN221 and DN222 for Launch 2806 to account for the period of time where the user installed base station was inoperative. Smoothed Best Estimate of Trajectory (SBET) and associated error (RMS) data were applied to the MBES data for these dates in CARIS HIPS and SIPS. An offset of approximately 0.2m exists between data corrected using SBETs processed via RTX and data corrected using SBETs processed via Applanix POSPac Single-Base (Figure 16). The offset exhibited is within the NOS standards for Total Vertical Uncertainty (TVU) described in section 5.1.3 of the HSSD. The TVU was determined to be 0.5m based on the equation $\pm\#a^2+(b*d)^2$ where a=0.5m, b=0.013m, and d=4m.

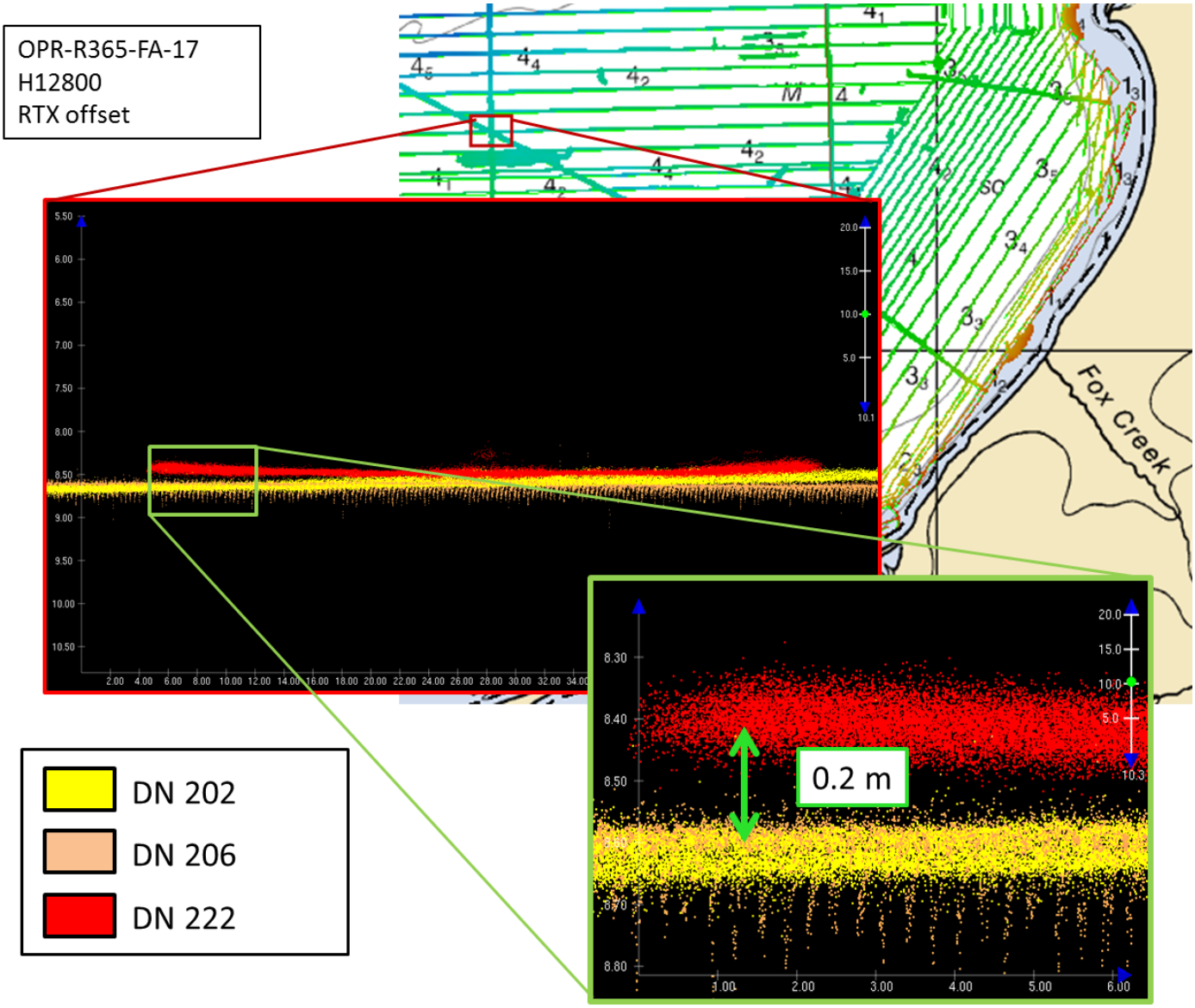



*Figure 16: H12800 RTX offset*

# D. Results and Recommendations

## D.1 Chart Comparison

A manual comparison was performed between survey H12800 and ENC US4AK81M, the highest scale chart, using CARIS HIPS and SIPS sounding layer derived from the one meter combined surface. The

soundings were overlaid on the chart to assess differences between the surveyed soundings and the charted depths and contours.

### 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? |
|---|---|---|---|---|---|
| US4AK81M | 1:100000 | 12 | 04/27/2016 | 07/13/2017 | NO |

*Table 15: Largest Scale ENCs*

US4AK81M

Soundings from H12800 are in a general agreement with charted depths and countours on ENC US4AK81M, with most of the depths agreeing within one meter, see Figure 17.

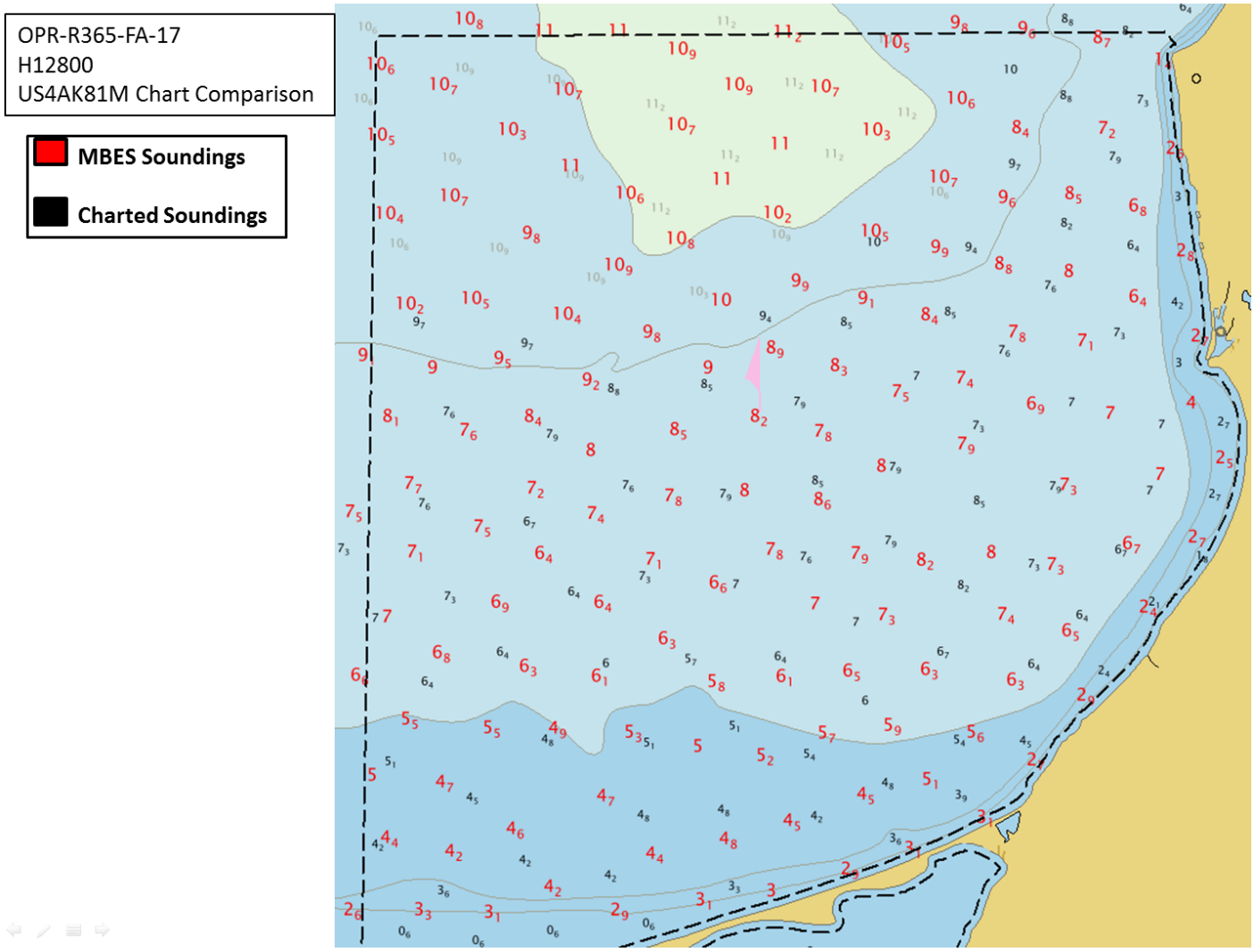



*Figure 17: H12800 Chart Comparison*

### 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

Survey H12800 has one new underwater rock feature that is addressed in the H12800 Final Feature File and shown in Figure 18.

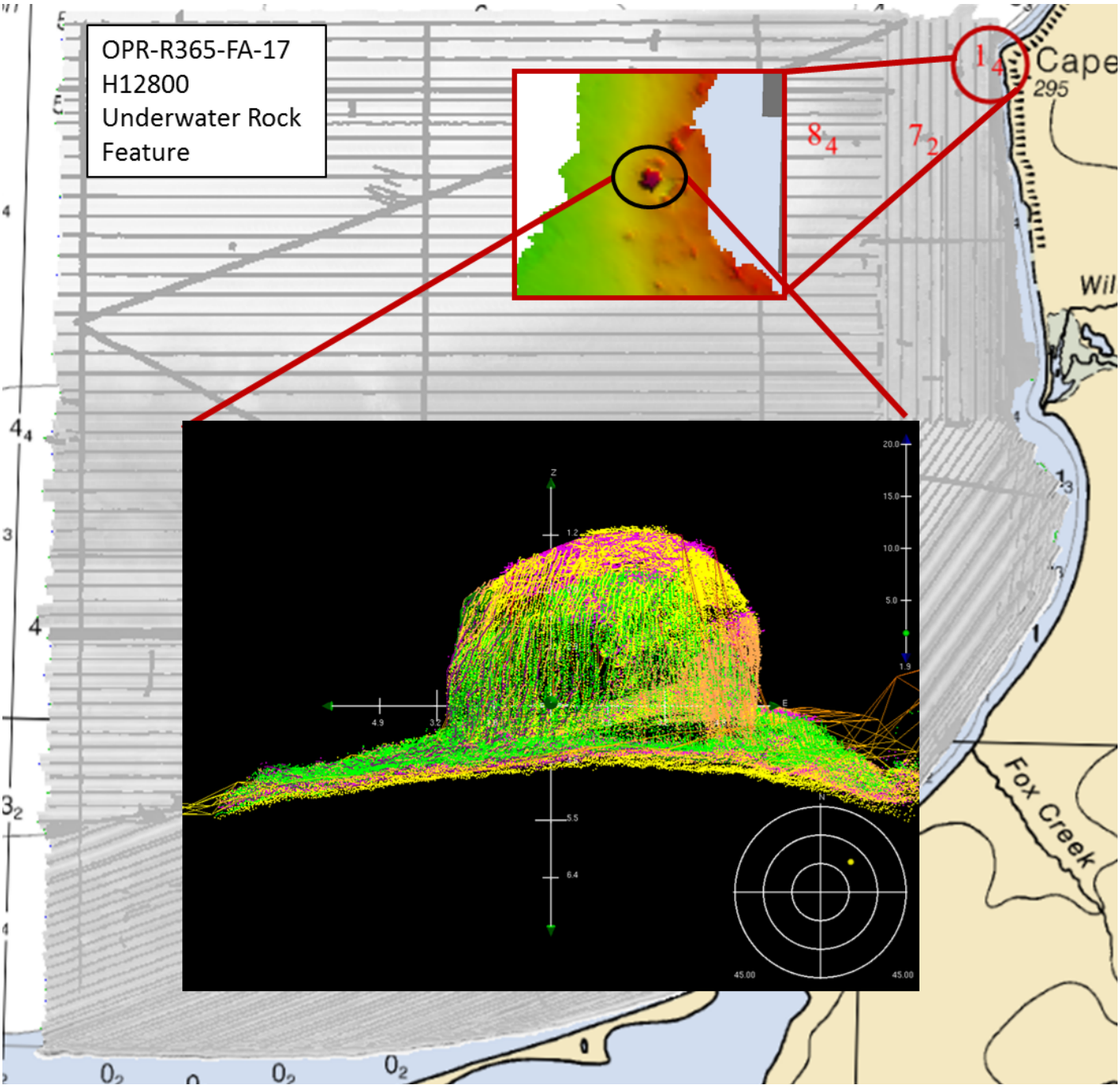



*Figure 18: H12800 New Feature*

### D.1.5 Dangers to Navigation

The following DTON reports were submitted:

| DTON Report Name | Date Submitted |
|---|---|
| H12800 Danger To Navigation Report | 2017-08-02 |

*Table 16: DTON Reports*

The DTON is a submerged anchor chain with three lengths of chain extending radially from the center point each measuring 155 meters, located three nautical miles west of Cape Riley (Figure 19). A Danger to Navigation Report is included in Appendix II of this report.

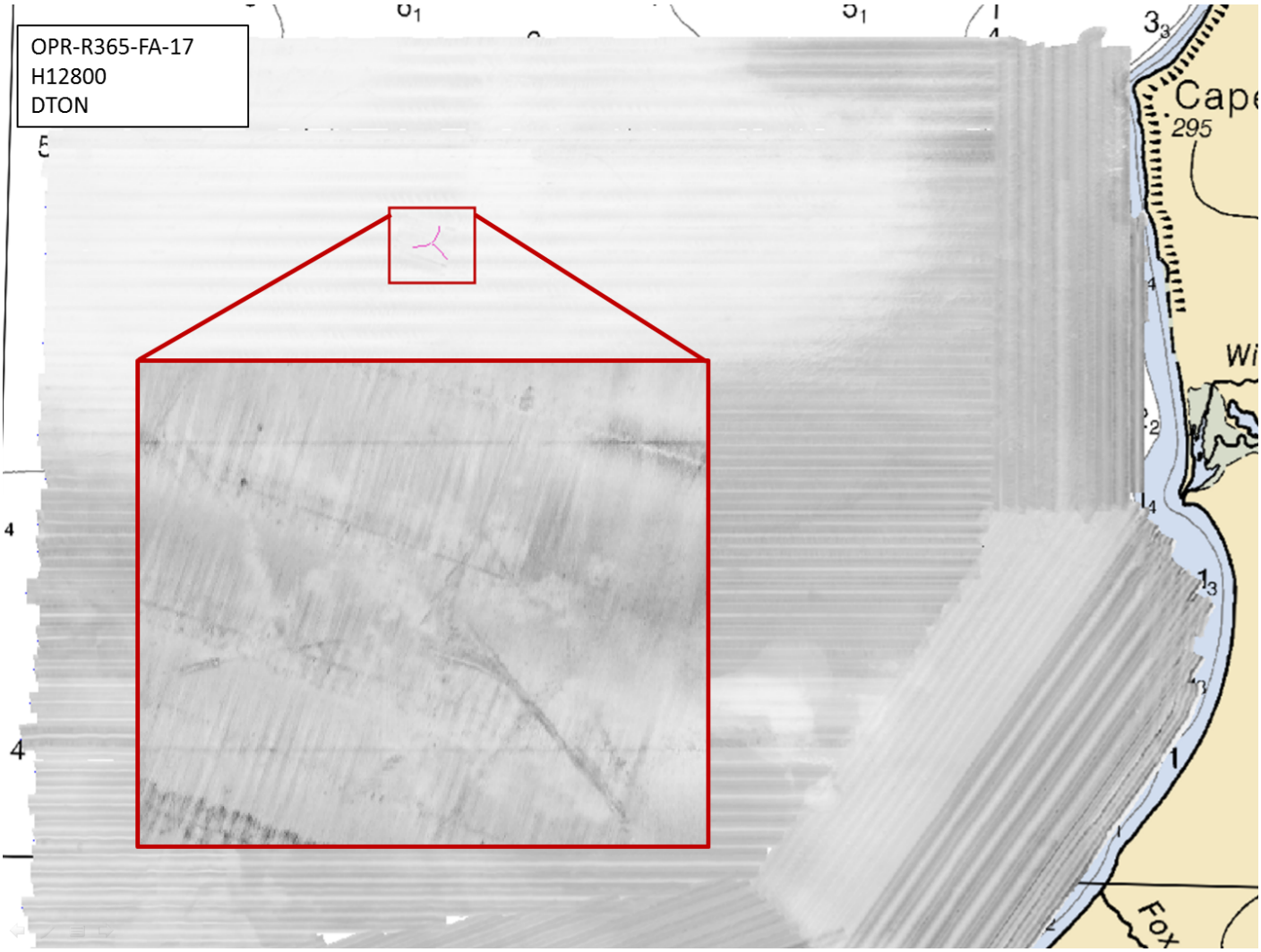



*Figure 19: H12800 DTON*

***The DTON Report is attached to this report.***

### D.1.6 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

### D.1.7 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.1.8 Bottom Samples

Four bottom samples were attempted and three were acquired in accordance with the Project Instructions for survey H12800. One bottom sample was attempted three times but came up empty each time. All bottom samples were entered in the H12800 Final Feature File. See Figure 20 for a graphical overview of sample locations.

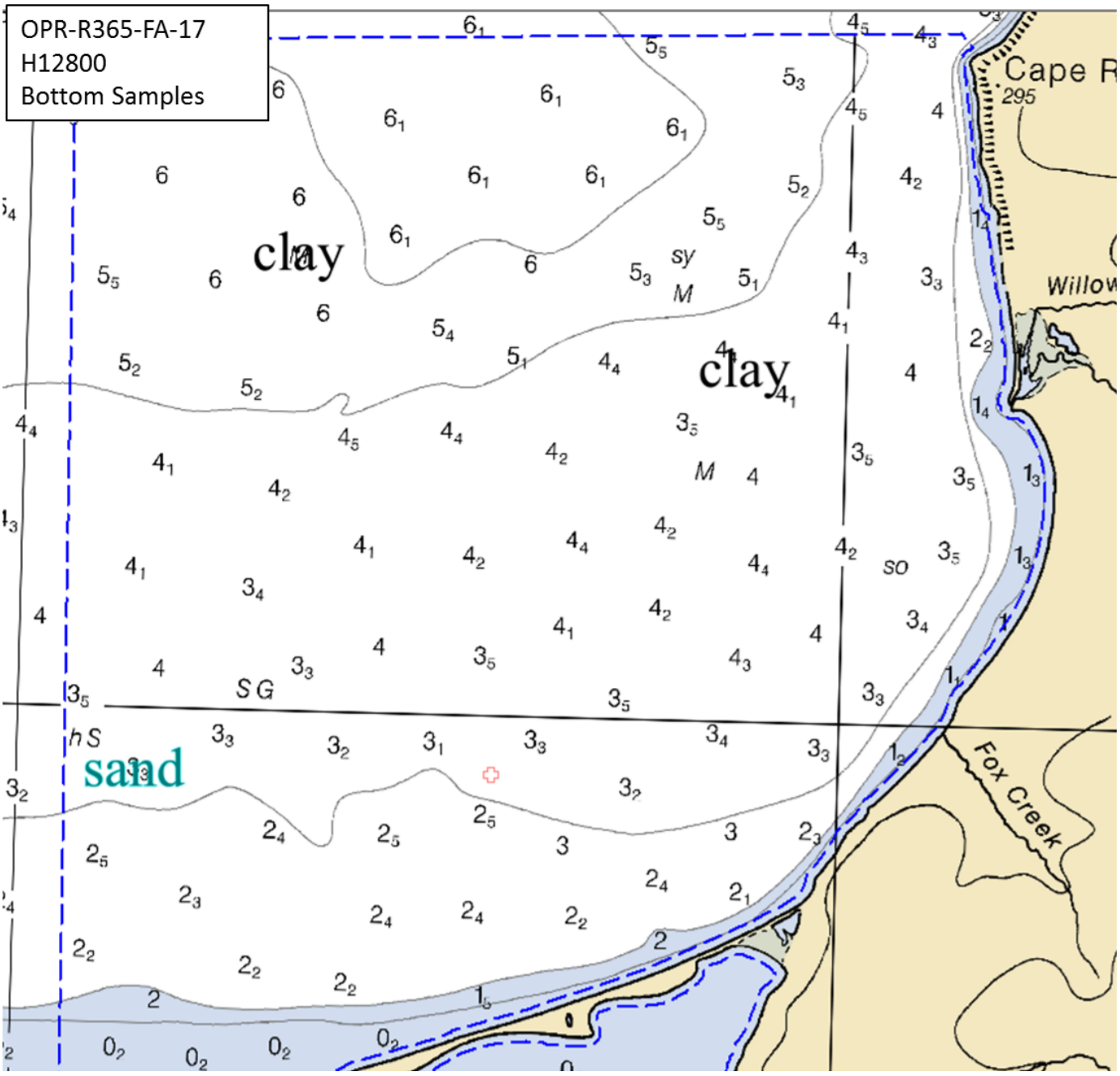



*Figure 20: H12800 Bottom Samples*

## D.2 Additional Results

### D.2.1 Shoreline

No shoreline features for verification existed within the sheet limits and no gaps in coverage were left due to features.

### D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

### D.2.3 Aids to Navigation

No Aids to navigation (ATONs) exist 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 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

### D.2.7 Platforms

No platforms exist for this survey.

### D.2.8 Significant Features

No Significant Features 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 and Specifications Deliverables Manual, 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 herein.

| Approver Name | Approver Title | Approval Date | Signature |
|---|---|---|---|
| CDR Mark Van Waes | Commanding Officer | 12/20/2017 | VAN WAES.MARK.1240076329 2017.12.20 16:22:15 -05'00' |
| FOR LT Damian Manda | Field Operations Officer | 12/20/2017 | VAN WAES.MARK.1240076329 2017.12.20 16:21:55 -05'00' |
| Samuel Candio | Chief Survey Technician | 12/20/2017 | Digitally signed by CANDIO.SAMUEL.LOUIS.1515897743 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=CANDIO.SAMUEL.LOUIS.1515897743 Date: 2017.12.20 12:34:27 -08'00' |
| FOR Alissa Johnson | Sheet Manager | 12/20/2017 | Digitally signed by CANDIO.SAMUEL.LOUIS.1515897743 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=CANDIO.SAMUEL.LOUIS.1515897743 Date: 2017.12.20 12:34:02 -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** | Continually Operating Reference Staiton |
| **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** | Local Notice to Mariners |
| **LNM** | Linear Nautical Miles |
| **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 |
| **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 Stated Coast Guard |
| **UTM** | Universal Transverse Mercator |
| **XO** | Executive Officer |
| **ZDA** | Global Positiong System timing message |
| **ZDF** | Zone Definition File |

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

# PROVISIONAL TIDE NOTE FOR HYDROGRAPHIC SURVEY

**DATE :** September 14, 2017

**HYDROGRAPHIC BRANCH:** Pacific
**HYDROGRAPHIC PROJECT:** OPR-R365-FA-17
**HYDROGRAPHIC SHEET:** H12800
**LOCALITY:** Southeastern Vicinity of Port Clarence, AK
**TIME PERIOD:** July 21 - August 23, 2017

**TIDE STATION USED:** 9468756 Nome,AK
Lat. 64° 29.7'N Long. 165° 26.4' W
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 0.406 meters

**REMARKS: RECOMMENDED GRID** Please use the TCARI grid "R945FA2017.tc" as the final grid for project OPR-R365-FA-17, H12800, during the period between July 21 and August 23, 2017.

**Refer to attachments for zoning 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 in FY17 for 9468756 Nome,AK was not verified at time of this note. A review of the verified leveling records from June 2008 to June 2016 shows the tide station benchmark network to be stable within an allowable 0.009 m tolerance. This Tide Note may be used as final stability verification for survey OPR-R365-FA-17, H12800. 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.

**Note 3:** Due to inaccurate shoreline, survey track lines fall outside of the TCARI grid boundaries in some areas. TCARI will extrapolate the tide corrector to cover these soundings.

_____
CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final TCARI Grid for
OPR-R365-FA-17, H12800
Southeastern Vicinity of Port Clarence
Bering Srait and Vicinity, AK
Port Clarence
Teller
9468756 NOME, NORTON SOUND
Nome
0
10
nautical miles
bing
Earthstar Geographics SIO © 2017 Microsoft Corporation © 2017 HERE

Alissa Johnson - NOAA Federal <alissa.johnson@noaa.gov>

# Fwd: H12800 and H12799 DTON

4 messages

**OPS Fairweather** <ops.fairweather@noaa.gov> Sun, Aug 13, 2017 at 5:04 AM
To: Alissa Johnson <Alissa.Johnson@noaa.gov>, Andrew Leonard <Andrew.Leonard@noaa.gov>

FYI, usually the sheet managers would be copied for DtoN submissions, but I think the CO just got the distribution list from the past project, hence why Bekah is included.

Very Respectfully,

**LT Damian Manda**

Operations Officer
NOAA Ship *Fairweather*
1010 Stedman Street
Ketchikan, Alaska 99901

Ship Cell: 907.254.2842
Iridium: 808.659.0054
OPS.Fairweather@noaa.gov

---------- Forwarded message ----------
From: **CO Fairweather - NOAA Service Account** <co.fairweather@noaa.gov>
Date: Sat, Aug 12, 2017 at 8:42 PM
Subject: H12800 and H12799 DTON
To: OCS NDB <OCS.NDB@noaa.gov>
Cc: Jacklyn James - NOAA Federal <jacklyn.c.james@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>, FA OPS <ops.fairweather@noaa.gov>, Rebekah Gossett <Rebekah.Gossett@noaa.gov>, "ChiefST.Fairweather" <chiefst.fairweather@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Bart Buesseler - NOAA Federal <bart.o.buesseler@noaa.gov>

Good evening,

Attached find one (1) Danger to Navigation for survey H12799 and three (3) Dangers to Navigation for survey H12800.

These mooring cables/chains on the bottom pose a significant risk for vessels anchoring in Port Clarence.

Please let me know if there are any questions.

-Marc

**2 attachments**

**H12800_DTON_Report_01.zip**
2667K

**H12799_DTON_Report_01.zip**
3493K

**Rebekah Gossett - NOAA Federal** <rebekah.gossett@noaa.gov> Sun, Aug 13, 2017 at 8:01 AM
To: Alissa Johnson - NOAA Federal <alissa.johnson@noaa.gov>, Andrew Leonard - NOAA Federal <andrew.leonard@noaa.gov>

---------- Forwarded message ----------
From: **CO Fairweather - NOAA Service Account** <co.fairweather@noaa.gov>
Date: Sat, Aug 12, 2017 at 8:42 PM
Subject: H12800 and H12799 DTON
To: OCS NDB <OCS.NDB@noaa.gov>
Cc: Jacklyn James - NOAA Federal <jacklyn.c.james@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>, FA OPS <ops.fairweather@noaa.gov>, Rebekah Gossett <Rebekah.Gossett@noaa.gov>, "ChiefST.Fairweather" <chiefst.fairweather@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Bart Buesseler - NOAA Federal <bart.o.buesseler@noaa.gov>

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-Marc

--
*Rebekah Gossett*
*Hydrographic Survey Technician*
*NOAA Ship Fairweather*
*1010 Stedman St*
*Ketchikan, AK 99901*
*Ship Cell: (907) 254-2842*
*rebekah.gossett@noaa.gov*

**2 attachments**

**H12800_DTON_Report_01.zip**
2667K

**H12799_DTON_Report_01.zip**
3493K

---

**Rebekah Gossett - NOAA Federal** <rebekah.gossett@noaa.gov> Mon, Aug 14, 2017 at 10:39 AM
To: Alissa Johnson - NOAA Federal <alissa.johnson@noaa.gov>, Andrew Leonard - NOAA Federal <andrew.leonard@noaa.gov>

---------- Forwarded message ----------
From: **OCS NDB - NOAA Service Account** <ocs.ndb@noaa.gov>
Date: Mon, Aug 14, 2017 at 10:31 AM
Subject: Fwd: H12800 and H12799 DTON
To: _NMAO MOP CO Fairweather <CO.Fairweather@noaa.gov>
Cc: Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>, Russell Quintero <Russell.Quintero@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Rebekah Gossett - NOAA Federal <rebekah.gossett@noaa.gov>, _NMAO MOP ChiefST Fairweather <ChiefST.Fairweather@noaa.gov>, Corey Allen <Corey.Allen@noaa.gov>, Bart Buesseler - NOAA Federal <bart.o.buesseler@noaa.gov>, _NOS OCS PBA Branch <ocs.pba@noaa.gov>, _NOS OCS PBB Branch <ocs.pbb@noaa.gov>, _NOS OCS PBC Branch <ocs.pbc@noaa.gov>, _NOS OCS PBD Branch <ocs.pbd@noaa.gov>, _NOS OCS PBE Branch <ocs.pbe@noaa.gov>, _NOS OCS PBG Branch <ocs.pbg@noaa.gov>, Castle E Parker <Castle.E.Parker@noaa.gov>, James M Crocker <James.M.Crocker@noaa.gov>, Matt Kroll <Matt.Kroll@noaa.gov>, NSD Coast Pilot <coast.pilot@noaa.gov>, Pearce Hunt <Pearce.Hunt@noaa.gov>, PHB Chief <PHB.Chief@noaa.gov>, Tara Wallace <Tara.Wallace@noaa.gov>

DD-28684 has been registered by the Nautical Data Branch and directed to Products Branch A for processing.

The DtoNs reported are three submerged mooring cables in Port Clarence, AK.

The following charts are affected:

16204 kapp 2451

16200 kapp 2449

16005 kapp 2410

16003 kapp 2408

The following ENCs are affected:
US4AK81M

US3AK80M

US2AK92M

US1AK90M

References:

H12800
OPR-R365-FA-17

This information was discovered and submitted by the crew of the NOAA Ship *Fairweather.*

Nautical Data Branch/Marine Chart Division/
Office of Coast Survey/National Ocean Service/
Contact: ocs.ndb@noaa.gov
NOAA NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

---------- Forwarded message ----------
From: **CO Fairweather - NOAA Service Account** <co.fairweather@noaa.gov>
Date: Sun, Aug 13, 2017 at 12:42 AM
Subject: H12800 and H12799 DTON
To: OCS NDB <OCS.NDB@noaa.gov>
Cc: Jacklyn James - NOAA Federal <jacklyn.c.james@noaa.gov>, Russell Quintero - NOAA Federal <Russell.Quintero@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>, FA OPS <ops.fairweather@noaa.gov>, Rebekah Gossett <Rebekah.Gossett@noaa.gov>, "ChiefST.Fairweather" <chiefst.fairweather@noaa.gov>, Corey Allen - NOAA Federal <corey.allen@noaa.gov>, Bart Buesseler - NOAA Federal <bart.o.buesseler@noaa.gov>

Good evening,

Attached find one (1) Danger to Navigation for survey H12799 and three (3) Dangers to Navigation for survey H12800.

These mooring cables/chains on the bottom pose a significant risk for vessels anchoring in Port Clarence.

Please let me know if there are any questions.

-Marc

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*Rebekah Gossett*
*Hydrographic Survey Technician*
*NOAA Ship Fairweather*
*1010 Stedman St*
*Ketchikan, AK 99901*
*Ship Cell: (907) 254-2842*
*rebekah.gossett@noaa.gov*

---

**2 attachments**

**H12800_DTON_Report_01.zip**
2667K

**H12799_DTON_Report_01.zip**
3493K

---

**Rebekah Gossett - NOAA Federal** <rebekah.gossett@noaa.gov> Mon, Aug 14, 2017 at 6:52 PM
To: Andrew Leonard - NOAA Federal <andrew.leonard@noaa.gov>, Alissa Johnson - NOAA Federal <alissa.johnson@noaa.gov>

---------- Forwarded message ----------
From: **OCS NDB - NOAA Service Account** <ocs.ndb@noaa.gov>
Date: Mon, Aug 14, 2017 at 12:32 PM
Subject: Fwd: H12800 and H12799 DTON
To: _NMAO MOP CO Fairweather <CO.Fairweather@noaa.gov>
Cc: Jacklyn James - NOAA Federal <Jacklyn.C.James@noaa.gov>, Russell Quintero <Russell.Quintero@noaa.gov>, Benjamin K Evans <Benjamin.K.Evans@noaa.gov>, _OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov>, Rebekah Gossett - NOAA Federal <rebekah.gossett@noaa.gov>, _NMAO MOP ChiefST Fairweather <ChiefST.Fairweather@noaa.gov>, Corey Allen <Corey.Allen@noaa.gov>, Bart Buesseler - NOAA Federal <bart.o.buesseler@noaa.gov>, _NOS OCS PBA Branch <ocs.pba@noaa.gov>, _NOS OCS PBB Branch <ocs.pbb@noaa.gov>, _NOS OCS PBC Branch <ocs.pbc@noaa.gov>, _NOS OCS PBD Branch <ocs.pbd@noaa.gov>, _NOS OCS PBE Branch <ocs.pbe@noaa.gov>, _NOS OCS PBG Branch <ocs.pbg@noaa.gov>, Castle E Parker <Castle.E.Parker@noaa.gov>, James M Crocker <James.M.Crocker@noaa.gov>, Matt Kroll <Matt.Kroll@noaa.gov>, NSD Coast Pilot <coast.pilot@noaa.gov>, Pearce Hunt <Pearce.Hunt@noaa.gov>, PHB Chief <PHB.Chief@noaa.gov>, Tara Wallace <Tara.Wallace@noaa.gov>

DD-28683 has been registered by the Nautical Data Branch and directed to Products Branch A for processing.

The DtoN reported is a submerged mooring cable in Port Clarence, AK.

The following charts are affected:

16204 kapp 2451

16200 kapp 2449

16005 kapp 2410

16003 kapp 2408

The following ENCs are affected:

US4AK81M

US3AK80M

US2AK92M

US1AK90M

References:

H12799
OPR-R365-FA-17
[Quoted text hidden]
[Quoted text hidden]

---

**2 attachments**

**H12800_DTON_Report_01.zip**
2667K

**H12799_DTON_Report_01.zip**
3493K

# H12800 Danger to Navigation Report

**Registry Number:** H12800
**State:** Alaska
**Locality:** Bering Strait and Vicinity
**Sub-locality:** Southeastern Vicinity of Port Clarence
**Project Number:** OPR-R365-FA-17
**Survey Date:** 08/02/2017

Anchor chains for large vessel mooring buoy placed by Bering Straits Native Corporation. No surface buoy observed during investigation.

## Charts Affected

| Number | Edition | Date | Scale (RNC) | RNC Correction(s)* |
|---|---|---|---|---|
| 16204 | 7th | 10/01/2014 | 1:100,000 (16204_1) | USCG LNM: 2/2/2016 (5/16/2017)<br>CHS NTM: None (4/28/2017)<br>NGA NTM: None (5/27/2017) |
| 16200 | 15th | 10/01/2014 | 1:400,000 (16200_1) | USCG LNM: 2/2/2016 (6/6/2017)<br>CHS NTM: None (5/26/2017)<br>NGA NTM: 5/25/2013 (6/17/2017) |
| 16005 | 11th | 05/01/2015 | 1:700,000 (16005_1) | USCG LNM: 2/2/2016 (6/6/2017)<br>CHS NTM: None (5/26/2017)<br>NGA NTM: 5/25/2013 (6/17/2017) |
| 16006 | 37th | 12/01/2015 | 1:1,534,076 (16006_1) | USCG LNM: 3/7/2017 (6/6/2017)<br>CHS NTM: None (5/26/2017)<br>NGA NTM: 8/27/2016 (6/17/2017) |
| 16003 | 18th | 05/01/2015 | 1:1,587,870 (16003_1) | USCG LNM: 2/2/2016 (6/6/2017)<br>CHS NTM: 10/26/2012 (5/26/2017)<br>NGA NTM: 5/25/2013 (6/17/2017) |
| 514 | 8th | 06/01/2015 | 1:3,500,000 (514_1) | USCG LNM: 10/1/2013 (6/6/2017)<br>CHS NTM: None (5/26/2017)<br>NGA NTM: 5/25/2013 (6/17/2017) |
| 50 | 9th | 12/01/2015 | 1:10,000,000 (50_1) | USCG LNM: 6/20/2017 (6/13/2017)<br>CHS NTM: 10/26/2012 (5/26/2017)<br>NGA NTM: 10/26/2013 (6/24/2017) |

* Correction(s) - *source: last correction applied (last correction reviewed--"cleared date")*

# Features

| No. | Feature Type | Survey Depth | Survey Latitude | Survey Longitude |
|---|---|---|---|---|
| 1.1 | GP | [None] | 65° 12' 39.1" N | 166° 35' 52.0" W |
| 1.2 | GP | [None] | 65° 12' 44.6" N | 166° 35' 36.2" W |
| 1.3 | GP | [None] | 65° 12' 36.4" N | 166° 35' 31.6" W |

# 1 - Dangers To Navigation

## 1.1) H12800 Submerged Mooring 1

### DANGER TO NAVIGATION

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 65° 12' 39.1" N, 166° 35' 52.0" W |
| **Least Depth:** | [None] |
| **TPU (±1.96σ):** | **THU (TPEh)** [None] ; **TVU (TPEv)** [None] |
| **Timestamp:** | 2017-214.00:00:00.000 (08/02/2017) |
| **Dataset:** | H12800_DTON.000 |
| **FOID:** | US 0000000819 00001(0226000003330001) |
| **Charts Affected:** | 16204_1, 16200_1, 16005_1, 16006_1, 16003_1, 514_1, 50_1 |

**Remarks:**

Mooring cable line, submerged. Buoy not observed.

### Hydrographer Recommendations

Chart mooring cable

### S-57 Data

| | |
|---|---|
| **Geo object 1:** | Cable, submarine (CBLSUB) |
| **Attributes:** | CATCBL - 6:mooring cable/chain |
| | SORDAT - 20170802 |
| | SORIND - US,US,Graph,H12800 |

# Feature Images

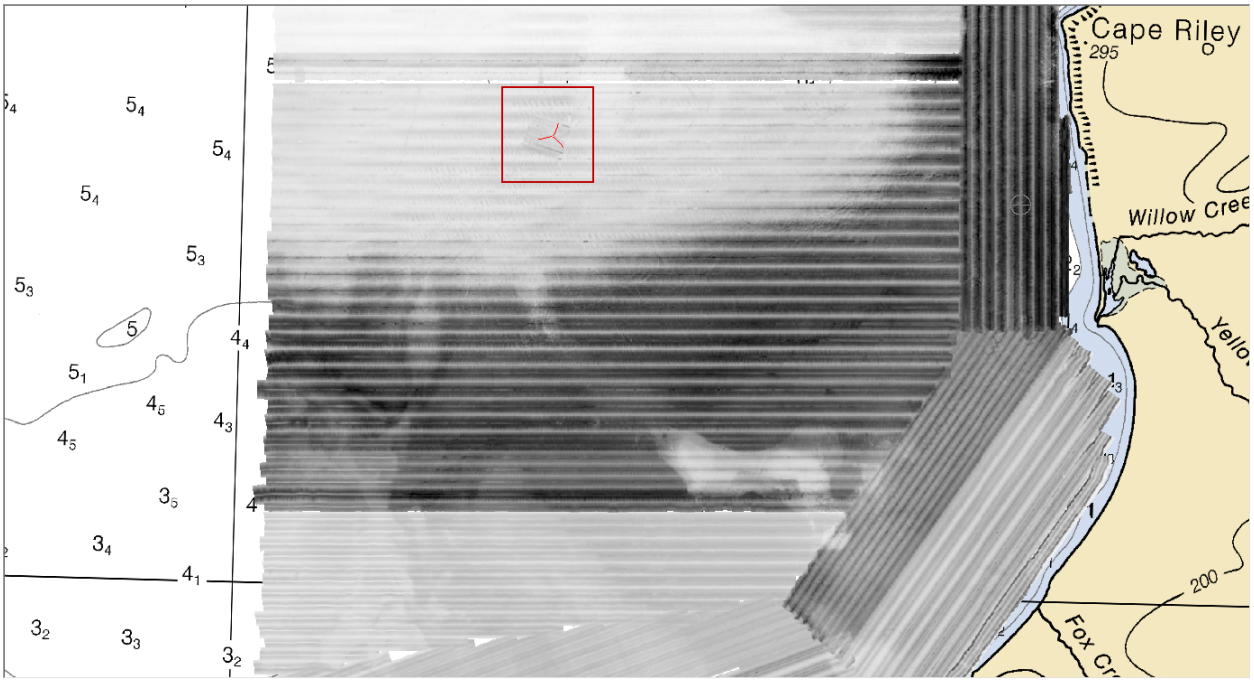



*Figure 1.1.1*

*Figure 1.1.2*

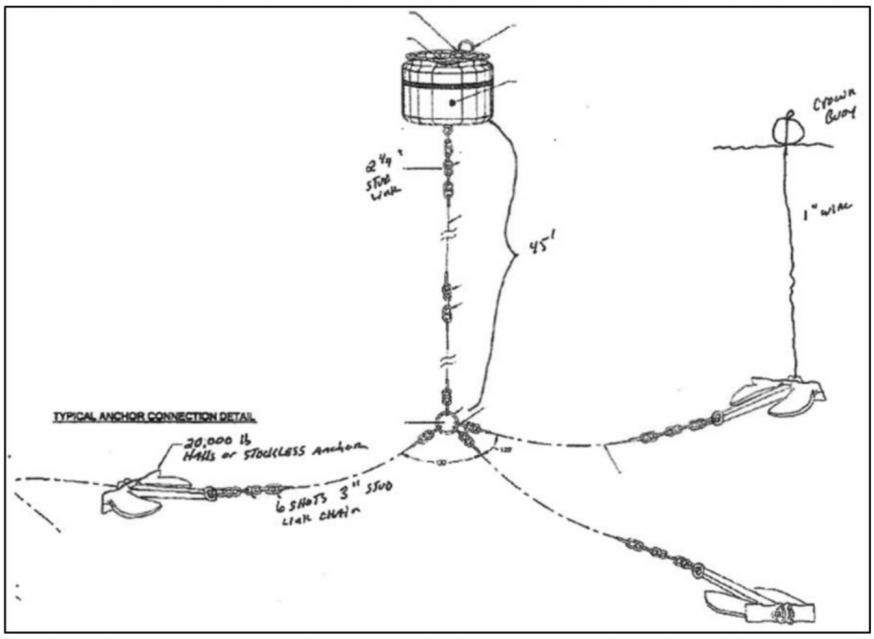

TYPICAL ANCHOR CONNECTION DETAIL
20,000 lb
Halls or Stockless Anchor
6 Shots 3" Stud
Link Chain
45'
1" wire

*Figure 1.1.3*

## 1.2) H12800 Submerged Mooring 2

### DANGER TO NAVIGATION

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 65° 12' 44.6" N, 166° 35' 36.2" W |
| **Least Depth:** | [None] |
| **TPU (±1.96σ):** | **THU (TPEh)** [None] ; **TVU (TPEv)** [None] |
| **Timestamp:** | 2017-214.00:00:00.000 (08/02/2017) |
| **Dataset:** | H12800_DTON.000 |
| **FOID:** | US 0000000818 00001(0226000003320001) |
| **Charts Affected:** | 16204_1, 16200_1, 16005_1, 16006_1, 16003_1, 514_1, 50_1 |

**Remarks:**

Mooring cable line, submerged. Buoy not observed.

### Hydrographer Recommendations

Chart mooring cable

### S-57 Data

| | |
|---|---|
| **Geo object 1:** | Cable, submarine (CBLSUB) |
| **Attributes:** | CATCBL - 6:mooring cable/chain |
| | SORDAT - 20170802 |
| | SORIND - US,US,Graph,H12800 |

## 1.3) H12800 Submerged Mooring 3

### DANGER TO NAVIGATION

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 65° 12' 36.4" N, 166° 35' 31.6" W |
| **Least Depth:** | [None] |
| **TPU (±1.96σ):** | **THU (TPEh)** [None] ; **TVU (TPEv)** [None] |
| **Timestamp:** | 2017-214.00:00:00.000 (08/02/2017) |
| **Dataset:** | H12800_DTON.000 |
| **FOID:** | US 0000000820 00001(0226000003340001) |
| **Charts Affected:** | 16204_1, 16200_1, 16005_1, 16006_1, 16003_1, 514_1, 50_1 |

**Remarks:**

Mooring cable line, submerged. Buoy not observed.

### Hydrographer Recommendations

Chart mooring cable

### S-57 Data

| | |
|---|---|
| **Geo object 1:** | Cable, submarine (CBLSUB) |
| **Attributes:** | CATCBL - 6:mooring cable/chain |
| | SORDAT - 20170802 |
| | SORIND - US,US,Graph,H12800 |

**UNITED STATES DEPARTMENT OF COMMERCE**
**National Oceanic and Atmospheric Administration**
Office of Marine and Aviation Operations
NOAA Ship *Fairweather* (S220)
1010 Stedman Street, Ketchikan, Alaska 99901

July 19, 2017

MEMORANDUM FOR: Jacklyn James
Project Manager, OPR-R365-FA-17
Hydrographic Surveys Division Operations Branch

FROM: Commander Hector Casanova, NOAA
Acting Commanding Officer, NOAA Ship *Fairweather*

SUBJECT: Waiver Request – Use of Longer Sidescan Sonar Range Scale

*Fairweather* requests a waiver for sheets H12798, H12799 and H12800 in project OPR-R365-FA-17 with respect to the sidescan sonar (SSS) towfish height requirements in the 2017 Hydrographic Survey Specifications and Deliverables (HSSD). *Fairweather* requests to use up to a 100 m horizontal range scale throughout the sheets, dependent on data quality and water column refraction. Range scale will be adjusted in the shallowest waters such that the towfish height will be no less than 4% of the range scale in use.

*Justification*

Section 6.1.2.3 of the HSSD requires a towfish height of 8% - 20% of the range scale in use. This translates to a minimum height above the seafloor of 8 m at a 100 m range scale. The expected depths in the project area range from 4 m – 12 m, resulting in this requirement not being met in the shallower portions for a 75 or 100 m range scale with the hull mounted SSS in use on *Fairweather* launches. However, for past surveys in this area, the 100 m range scale has been used effectively, with a resulting increase in efficiency. To meet the HSSD range scale requirements would require the collection of twice as many lines in the shallow portion of the survey, significantly increasing acquisition time.

Prior to use of extended range scales, tests will be conducted to ensure that the accuracy requirements of Section 6.1.2.1 are still met. If data quality in the outer portion of the range degrades due to environmental effects, shorter range scales will be used where appropriate.

*Decision*

Waiver is: Granted _____ Denied _____

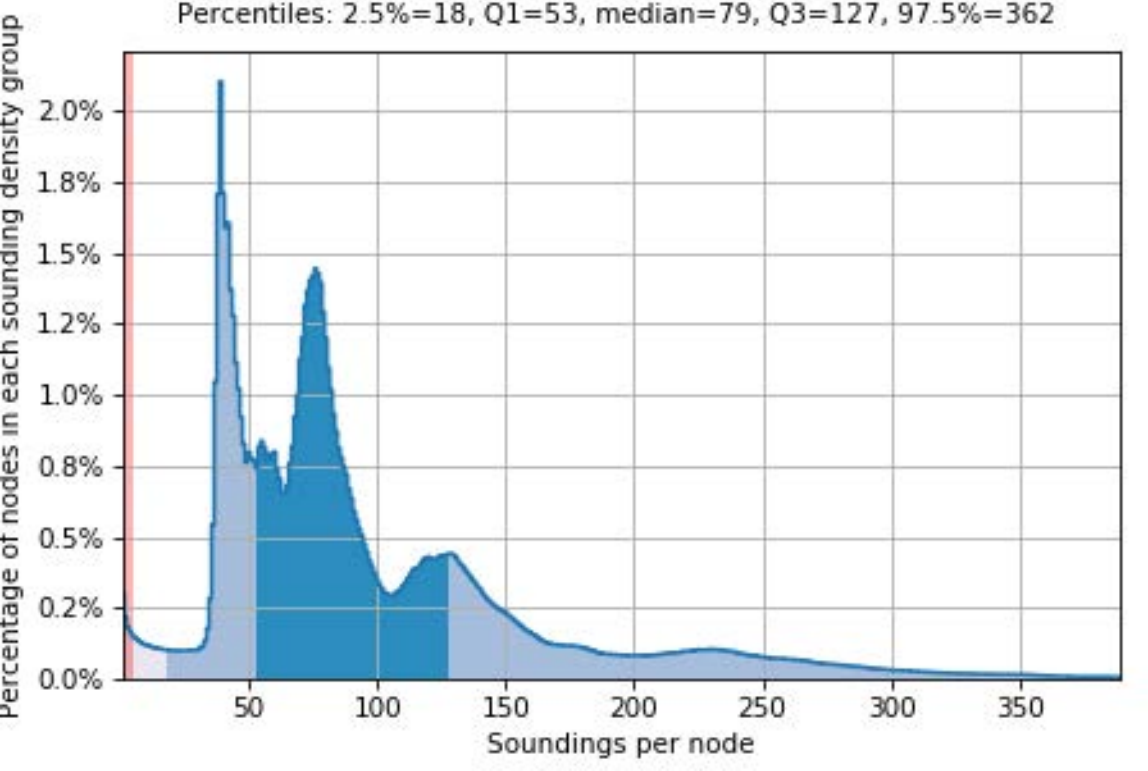
cc: Chief, HSD OPS
OPS, FA
HCST, FA

# Data Density

Grid source: H12800_1m_Finalized_Surface

99% pass (20,728,753 of all nodes), min=1.0, mode=39, max=15962.0

Percentiles: 2.5%=18, Q1=53, median=79, Q3=127, 97.5%=362

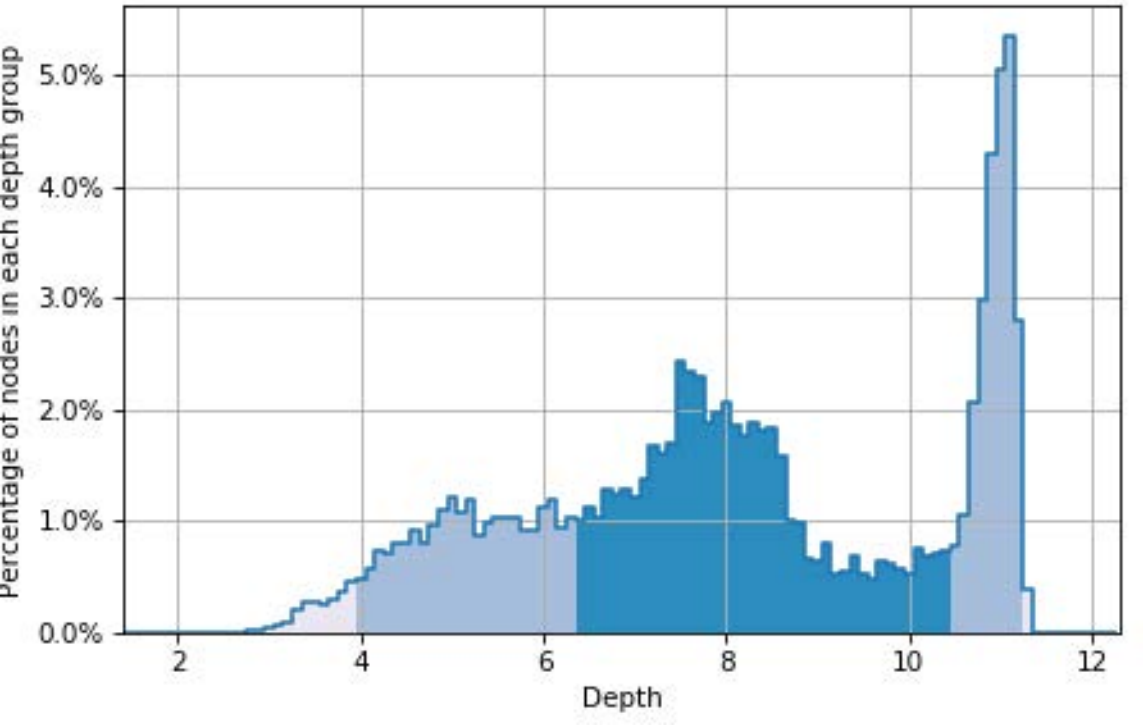


# Depth Distribution

Grid source: H12800_1m_Finalized_Surface

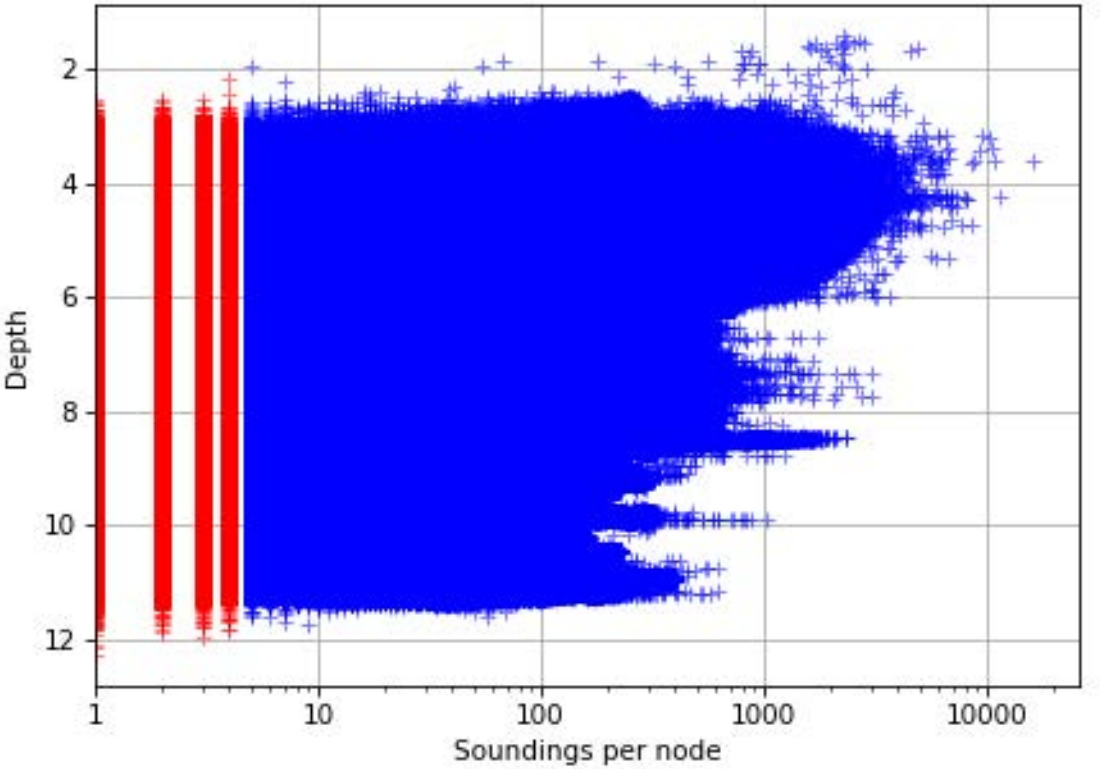
Total nodes: 20,909,140, min=1.40, mode=11.1, max=12.27

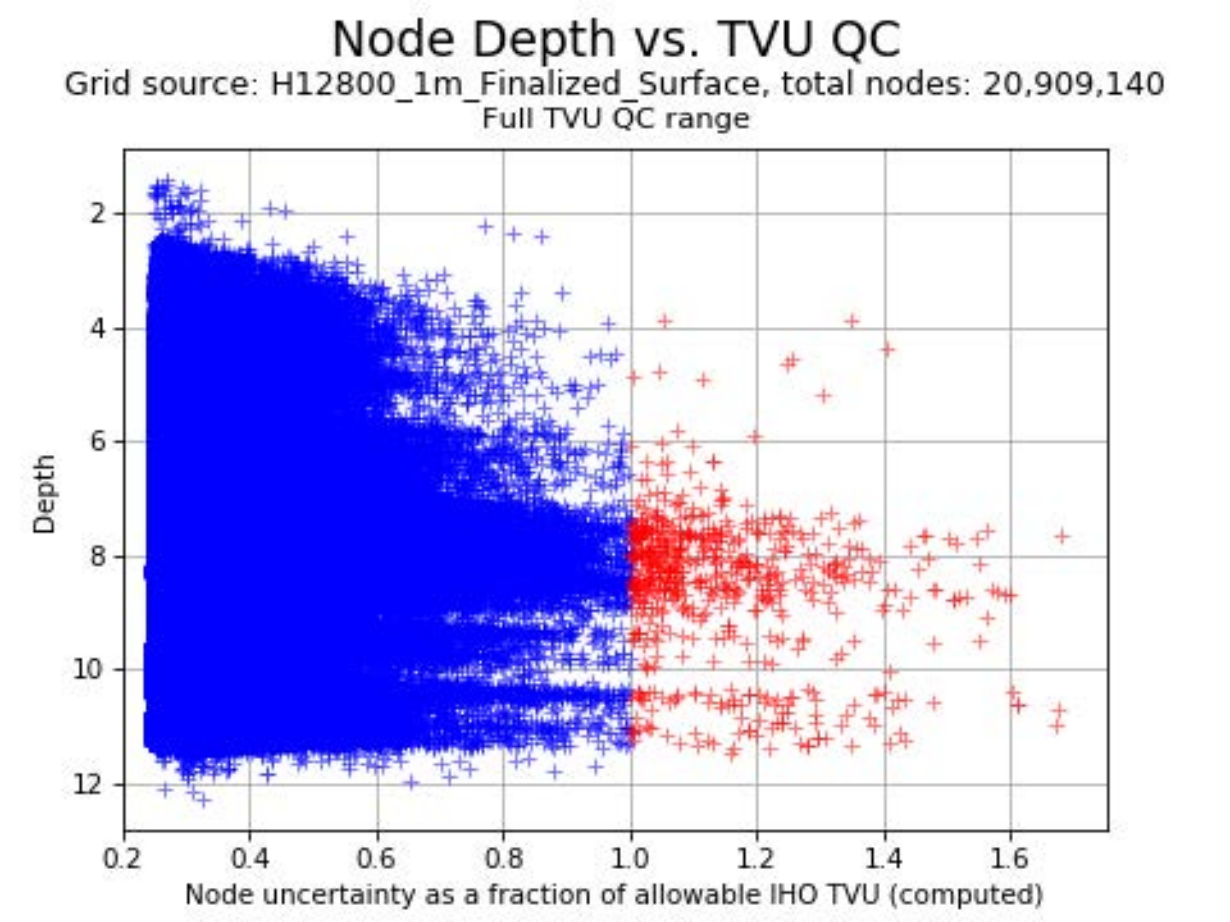
Percentiles: 2.5%=4.0, Q1=6.4, median=7.9, Q3=10.4, 97.5%=11.2

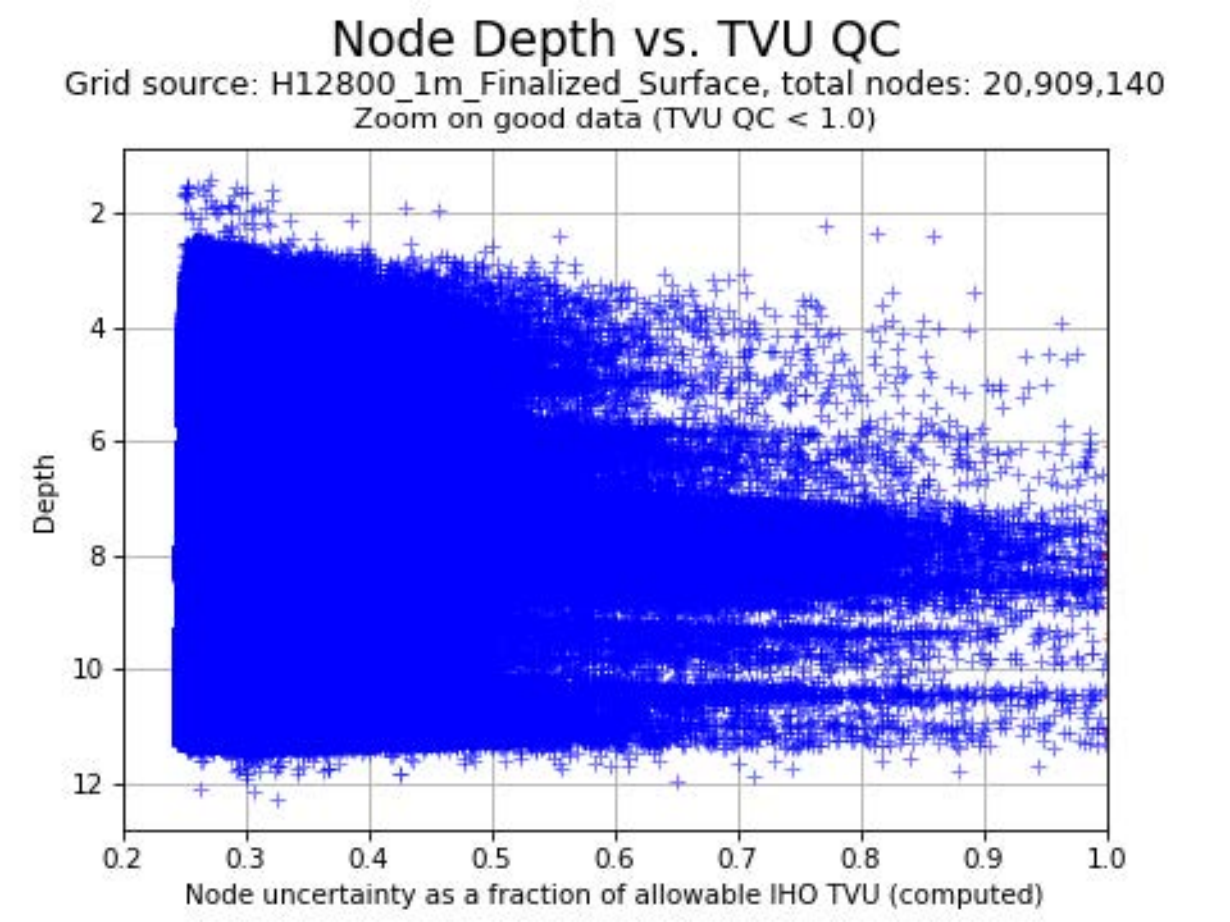


# Node Depth vs. Sounding Density

Grid source: H12800_1m_Finalized_Surface, total nodes: 20,909,140




Node Depth vs. TVU QC
Grid source: H12800_1m_Finalized_Surface, total nodes: 20,909,140
Full TVU QC range
Depth
2
4
6
8
10
12
0.2
0.4
0.6
0.8
1.0
1.2
1.4
1.6
Node uncertainty as a fraction of allowable IHO TVU (computed)

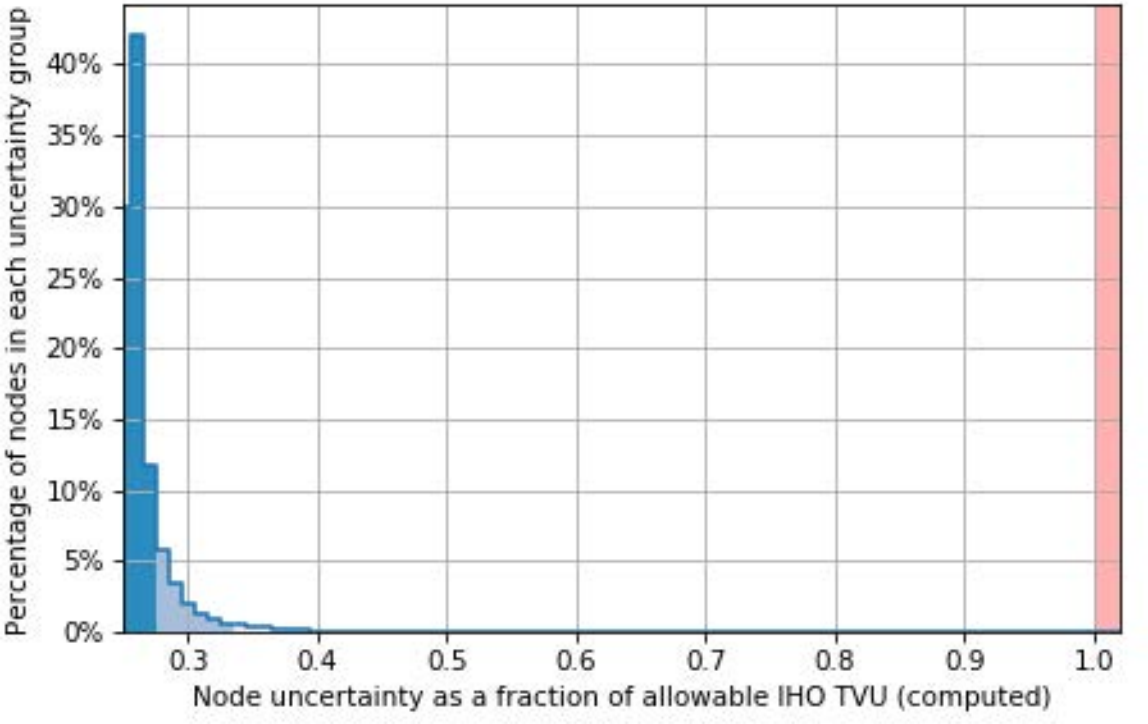

Node Depth vs. TVU QC
Grid source: H12800_1m_Finalized_Surface, total nodes: 20,909,140
Zoom on good data (TVU QC < 1.0)
Depth
2
4
6
8
10
12
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
Node uncertainty as a fraction of allowable IHO TVU (computed)

# Uncertainty Standards

Grid source: H12800_1m_Finalized_Surface

99.5+% pass (20,908,531 of all nodes), min=0.25, mode=0.26, max=1.68

Percentiles: 2.5%=0.25, Q1=0.25, median=0.26, Q3=0.27, 97.5%=0.33



APPROVAL PAGE

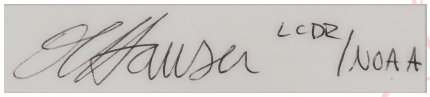
H12800

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.

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Date: 2018.08.31 09:27:54 -07'00'

Approved: _____

**Lieutenant Commander Olivia Hauser, NOAA**
Chief, Pacific Hydrographic Branch