H12518

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

# DESCRIPTIVE REPORT

| | |
|---|---|
| Type of Survey: | Navigable Area |
| Registry Number: | H12518 |

## LOCALITY

| | |
|---|---|
| State(s): | Alaska |
| General Locality: | Behm Canal |
| Sub-locality: | Vicinity of Burroughs Bay |

**2013**

CHIEF OF PARTY
Richard T. Brennan, CDR/NOAA

LIBRARY & ARCHIVES

Date:

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

REGISTRY NUMBER:

# HYDROGRAPHIC TITLE SHEET

**H12518**

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: | **Behm Canal** |
| Sub-Locality: | **Vicinity of Burroughs Bay** |
| Scale: | **40000** |
| Dates of Survey: | **05/09/2013 to 06/18/2013** |
| Instructions Dated: | **04/01/2013** |
| Project Number: | **OPR-O193-RA-13** |
| Field Unit: | **NOAA Ship *Rainier*** |
| Chief of Party: | **Richard T. Brennan, 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. Notes in red were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.***

# Table of Contents

# List of Tables



# List of Figures

**Descriptive Report to Accompany Survey H12518**

Project: OPR-O193-RA-13

Locality: Behm Canal

Sublocality: Vicinity of Burroughs Bay

Scale: 1:40000

May 2013 - June 2013

**NOAA Ship *Rainier***

Chief of Party: Richard T. Brennan, CDR/NOAA

# A. Area Surveyed

The area surveyed is referred to as Sheet 1: "Vicinity of Burroughs Bay" within the Project Instructions. The area is in the northern portion of the eastern branch of Behm Canal near Ketchikan, Alaska (Figure 1).

## A.1 Survey Limits

Data were acquired within the following survey limits:

| Northwest Limit | Southeast Limit |
|---|---|
| 56° 2" 60' N<br>131° 15" 30' W | 55° 46" 30' N<br>130° 58" 0' W |

*Table 1: Survey Limits*

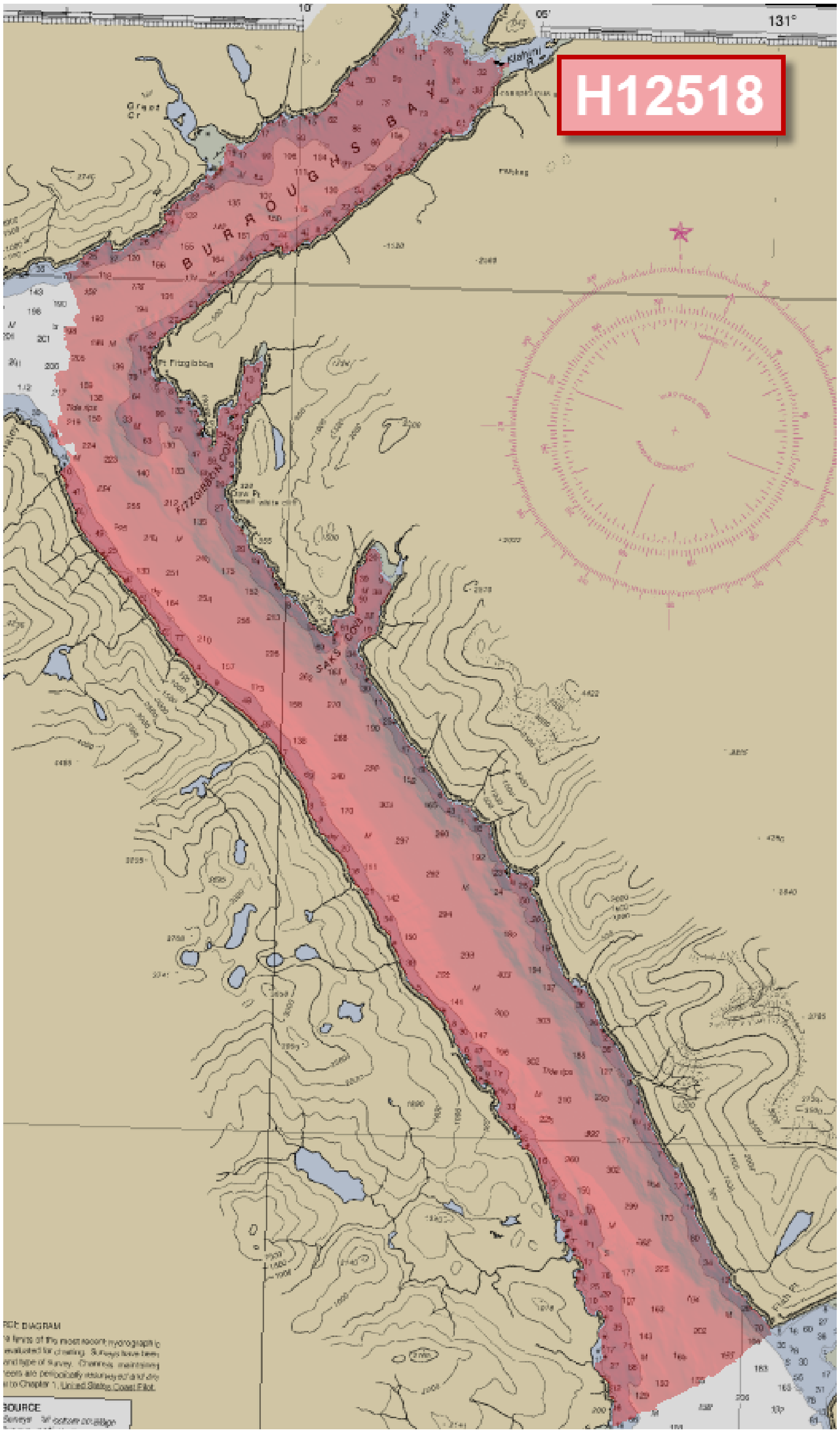


*Figure 1: H12518 survey limits.*

Survey limits were acquired in accordance with the requirements in the Project Instructions and the Hydrographic Survey Specifications and Deliverables Manual (HSSDM).

***Data is sufficient to supersede charted data in the common area. In addition no soundings for charting were selected from red areas shown in Figure 2.***

## A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products.

## A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired on survey H12518 met complete multibeam echosounder (MBES) coverage requirements, including the 5 soundings per node data density requirements outlined in Section 5.2.2.2 of the HSSDM (Figure 2). In order to extract some descriptive statistics of the data density achievements, the density layer of each finalized surface was queried within CARIS and then examined in Excel (Figure 3). Overall, the required data density was achieved in 98.7% of the nodes and 99.8% of the total area.

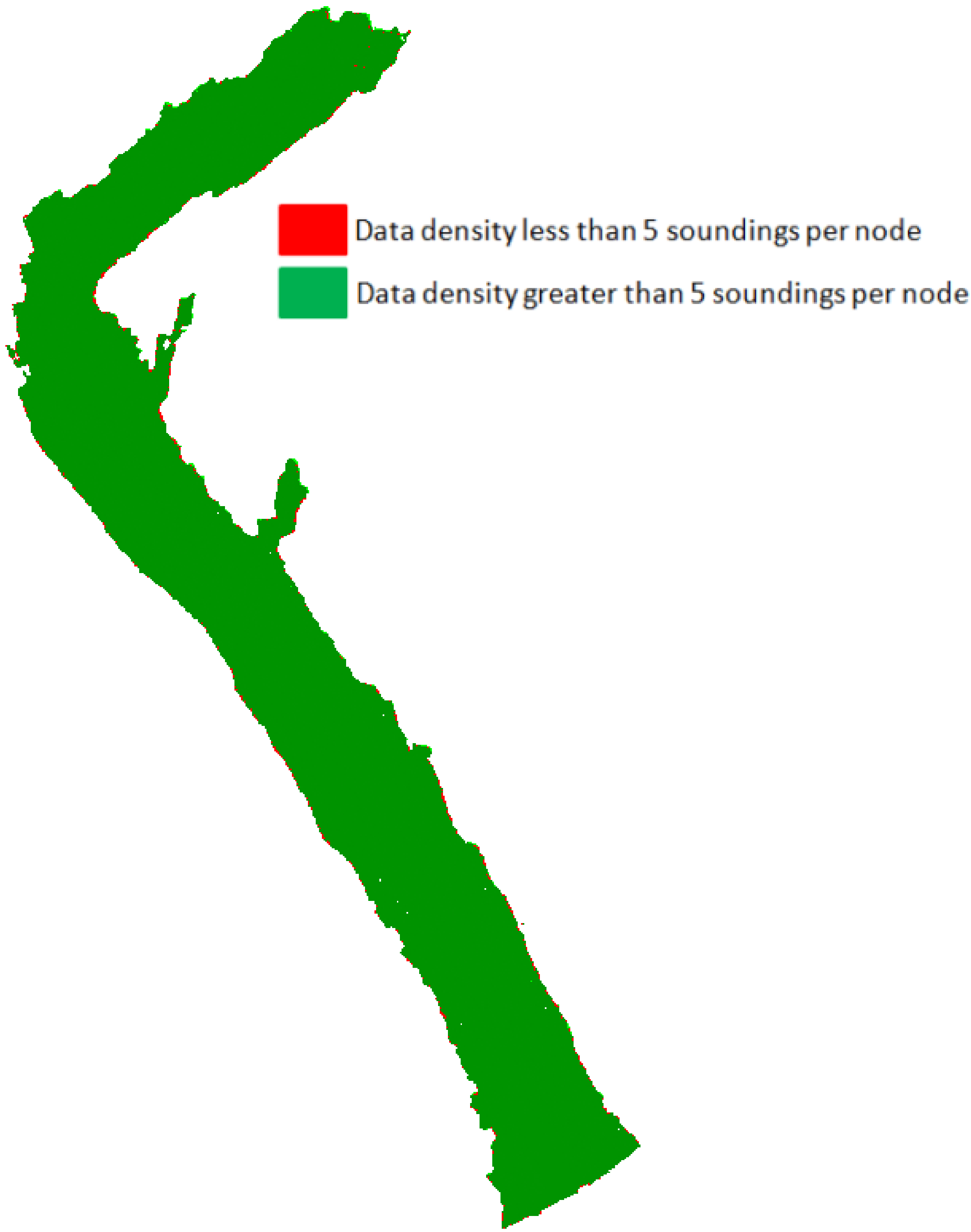


*Figure 2: H12518 data density.*

| Resolution | Depth range | Number of nodes | Fewer than five soundings per node | Percent of nodes with greater than five soundings per node |
|---|---|---|---|---|
| 1m | 0 - 20m | 1,553,865 | 32,563 | 97.9% |
| 2m | 18 - 40m | 901,268 | 10,902 | 98.8% |
| 4m | 36 - 80m | 459,499 | 813 | 99.8% |
| 8m | 72 - 160m | 241,545 | 129 | 99.9% |
| 16m | 144 - 320m | 125,188 | 79 | 99.9% |
| 32m | 288 - 1000m | 48,601 | 86 | 99.8% |
| | TOTAL: | 3,329,966 | 44,572 | **98.7%** |
| | TOTAL (by area): | 109,785,353 | 205,723 | **99.8%** |

*Figure 3: Summary table showing the percentage of nodes satisfying the 5 sounding density requirements, sub-divided by the appropriate depth ranges. Note: The final row has a unit of square meters, and sums the number of different resolution nodes into a common unit of area.*

## A.4 Survey Coverage

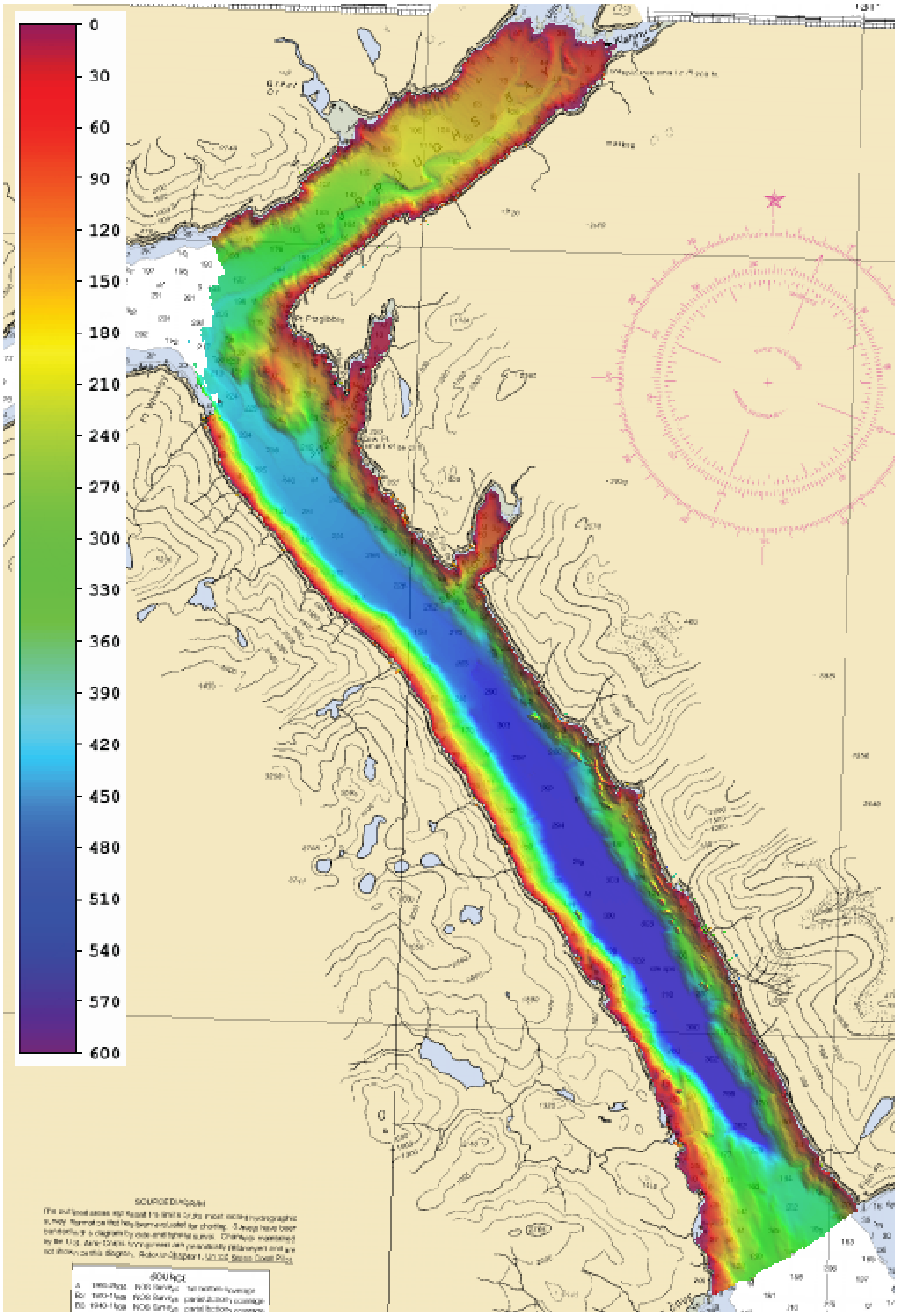


*Figure 4: Acquired survey coverage overlaid on Chart 17424.*

Complete multibeam (MBES) coverage was achieved within the limits of hydrography as defined in the Project Instructions (Figure 4). There are a few gaps in coverage where multibeam data did not meet the sheet limit nor the 4-meter curve. In all cases, these gaps were nearshore and dangerous to approach, and were therefore deemed to be inshore of the NALL. Further, HSD has acknowledged minor gaps along the sheet limits, which the field determines to be non-navigationally significant, need not be acquired (see Supplemental Correspondence - HSD_holidays_on_edge.pdf).

***Email correspondence is appended to this report.***

## A.5 Survey Statistics

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

| | Vessel | ***S221*** | ***2801 (RA-4)*** | ***2802 (RA-5)*** | ***2803 (RA-3)*** | ***2804 (RA-6)*** | ***Total*** |
|---|---|---|---|---|---|---|---|
| **LNM** | **SBES Mainscheme** | 0 | 0 | 0 | 0 | 0 | 0 |
| | **MBES Mainscheme** | 74.7 | 138.4 | 30.6 | 10.0 | 13.4 | 267.1 |
| | **Lidar Mainscheme** | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SSS Mainscheme** | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SBES/MBES Combo Mainscheme** | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SBES/SSS Combo Mainscheme** | 0 | 0 | 0 | 0 | 0 | 0 |
| | **MBES/SSS Combo Mainscheme** | 0 | 0 | 0 | 0 | 0 | 0 |
| | **SBES/MBES Combo Crosslines** | 0 | 0 | 0 | 0 | 18.1 | 18.1 |
| | **Lidar Crosslines** | 0 | 0 | 0 | 0 | 0 | 0 |
| **Number of Bottom Samples** | | | | | | | 7 |
| **Number AWOIS Items Investigated** | | | | | | | 0 |
| **Number Maritime Boundary Points Investigated** | | | | | | | 0 |
| **Number of DPs** | | | | | | | 53 |
| **Number of Items Items Investigated by Dive Ops** | | | | | | | 0 |
| **Total Number of SNM** | | | | | | | 29.0 |

*Table 2: Hydrographic Survey Statistics*

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

| Survey Dates | Julian Day Number |
|---|---|
| 05/08/2013 | 128 |
| 05/13/2013 | 133 |
| 05/14/2013 | 134 |
| 05/15/2013 | 135 |
| 06/16/2013 | 167 |
| 06/17/2013 | 168 |

*Table 3: 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* | *S221* |
|---|---|---|---|---|---|
| **LOA** | 28 feet | 28 feet | 28 feet | 28 feet | 231 feet |
| **Draft** | 3.5 feet | 3.5 feet | 3.5 feet | 3.5 feet | 16.5 feet |

*Table 4: Vessels Used*

Data was primarily acquired by RAINIER (S221) for the deep central portion of the survey, with limited nearshore mainscheme data acquired with survey launches (2801, 2802, 2803 and 2804) (Table 4). The vessels acquired multibeam echosounder (MBES) soundings, sound speed profiles, and bottom samples.

### B.1.2 Equipment

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

| Manufacturer | Model | Type |
|---|---|---|
| Kongsberg | EM710 | MBES |
| Reson | 7125 | MBES |
| Applanix | POS-MV V4 | Attitude System |
| Seabird | SBE 19 Plus | Sound Speed System |
| ODIM Brooke Ocean (Rolls Royce Group) | MVP30 | Sound Speed System |
| ODIM Brooke Ocean (Rollys Royce Group) | MVP200 | Sound Speed System |
| Reson | SVP 71 | Sound Speed System |
| Reson | SVP 70 | Sound Speed System |

*Table 5: Major Systems Used*

## B.2 Quality Control

### B.2.1 Crosslines

Crosslines, acquired for this survey, totalled 6.8% of mainscheme acquisition.

Multibeam crosslines were acquired using the Reson 7125 on Launch 2804. Crosslines totaled 18.1 NM, which comprised 6.8% of mainscheme hydrography. An 8-meter CUBE surface was created using strictly the mainscheme lines, while a second 8-meter CUBE surface was created using only crosslines, from which a difference surface was generated at an 8-meter resolution (Figure 5). Statistics were then derived from the difference surface and are shown in Figure 6. The average difference between the depths derived from mainscheme and crosslines was 0.56 meters (mainscheme being deeper) with a standard deviation of 2.41 meters. There is a bimodal distribution in the depth differences (Figure 6), which has a distinct geographic trend (Figure 5). Generally speaking, the crosslines were deeper in deep central portions of the survey area, and shoaler in the shoal waters closer to shore. This deep-biasing in the deeper waters may be a function of the crosslines being acquired with the Reson 7125, which is seldom operationally deployed in waters deeper than 200 meters; in the areas of overlap, crossline depths exceeded 500 meters.

For the respective depths, the difference surface was compared to the allowable IHO accuracy standards (Figure 7). In total, 95.6% of the depth differences between H12518 mainscheme and crossline data are within allowable IHO accuracies (Figure 8). The majority of the inconsistencies are on the steep inclines and may simply be an artifact of the gridding algorithm.

In addition to performing a crossline comparison using surface differencing, the CARIS QC Report was used to compare the crossline soundings to the depth estimates of the 8-meter resolution surface. The depth differences are calculated between each crossline ping and mainscheme surface; and that depth difference is then compared to allowable IHO uncertainties. The output QC Report classifies the percentage of pings meeting IHO orders by beam angle. This table was copied and examined in Excel (Figure 9). Only 90% of the pings up to 40-degrees from nadir satisfy IHO Order 2. The relatively low percentage of pings meeting IHO standards is largely due to the depth of water (averaging 263 meters in the area of overlap), which exceeds the operational limits of the Reson 7125 (which will seldom return a full swath in depths greater than 200 meters).

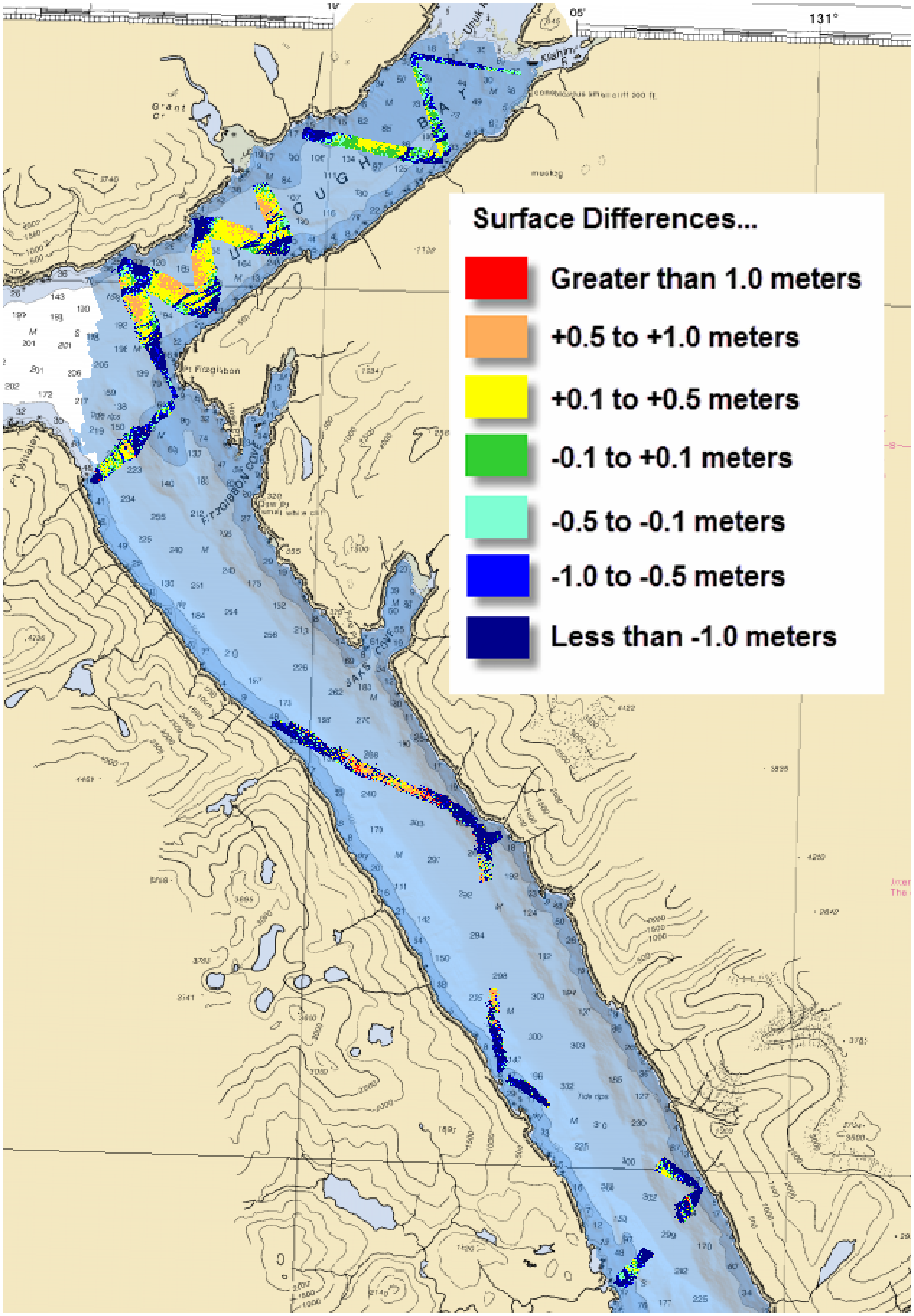


*Figure 5: H12518 crosslines.*

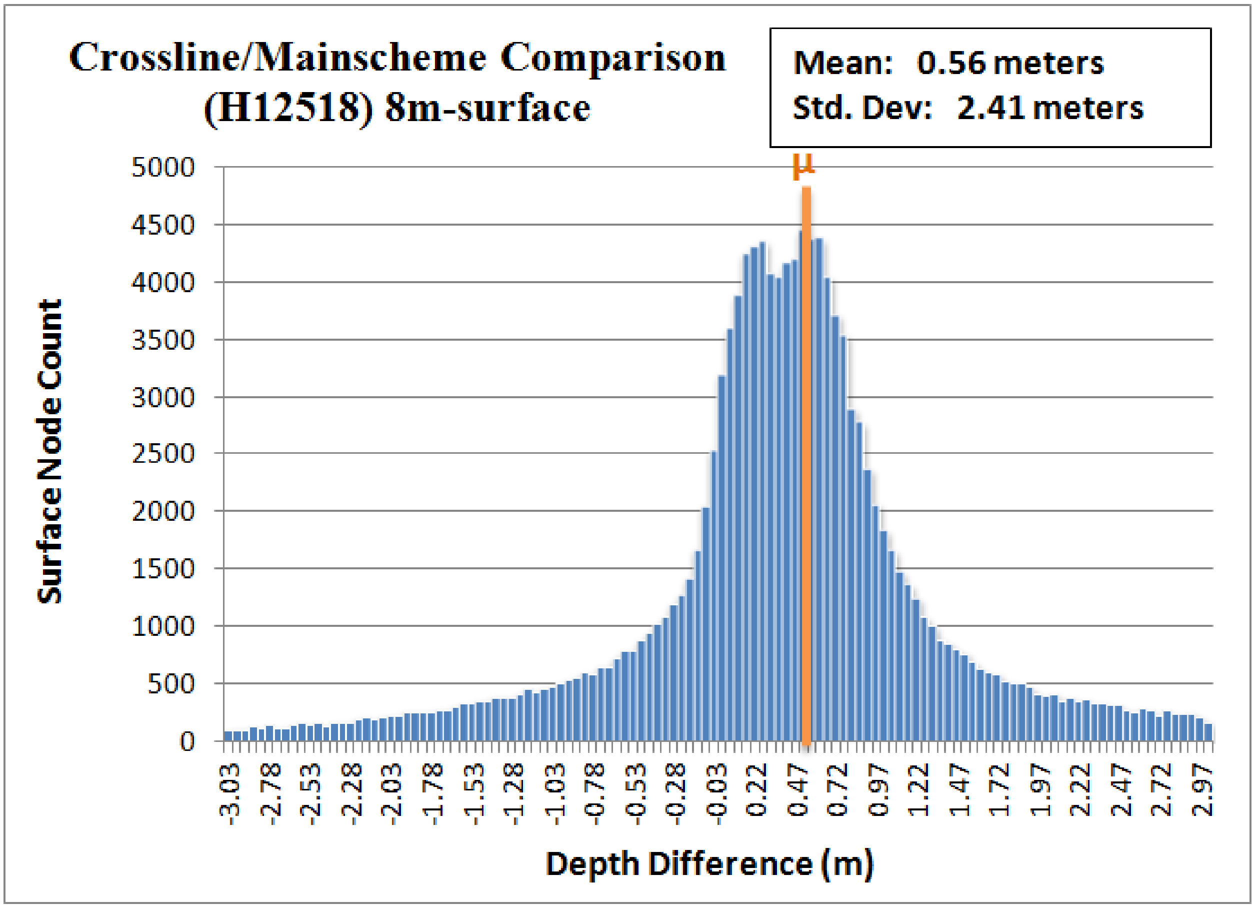


*Figure 6: Crossline comparison with mainscheme lines.*

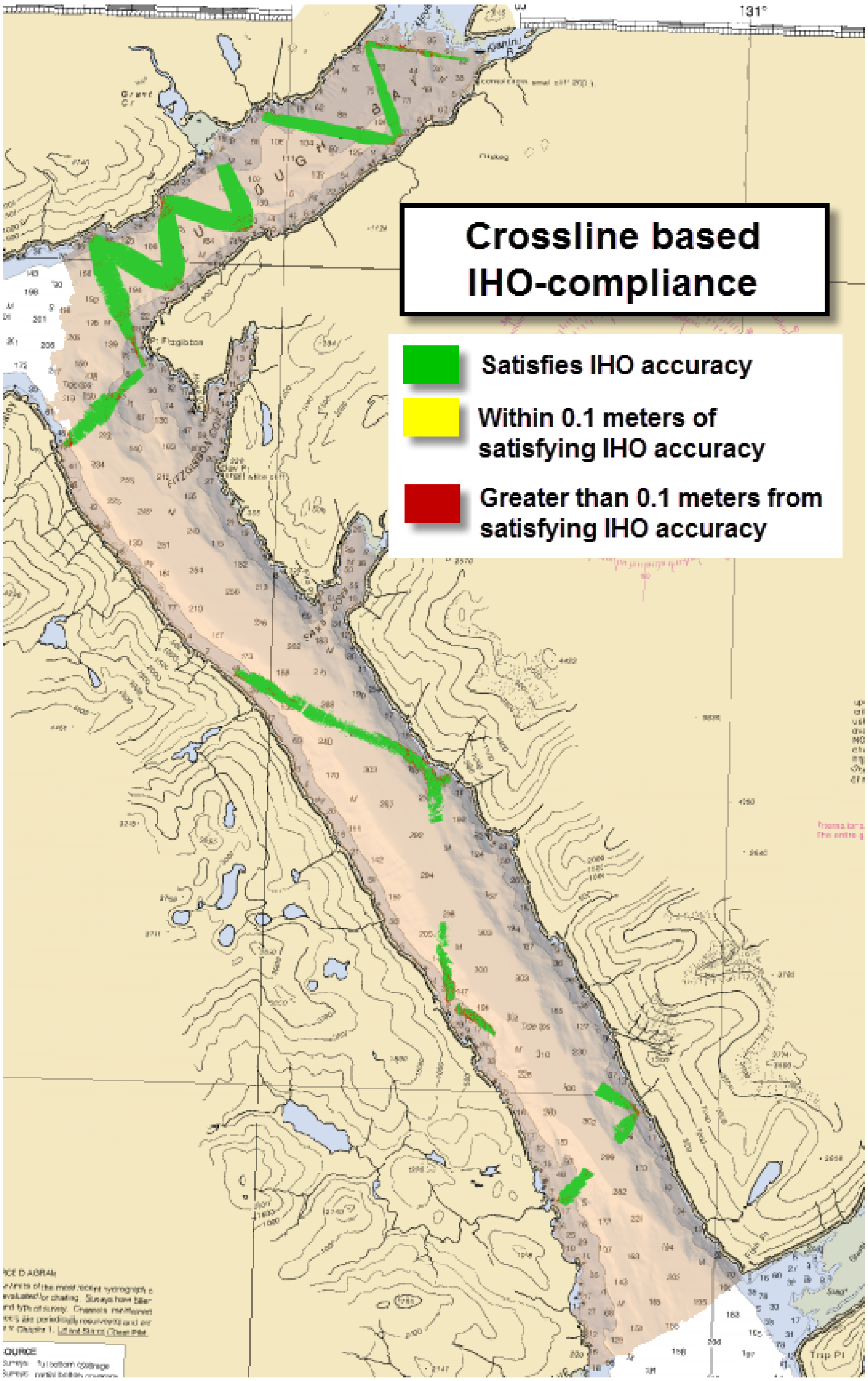


*Figure 7: Depth differences between H12518 mainscheme and crossline data as compared to allowable IHO accuracy standards for the associated depths.*

| Depth range | IHO Order | Number of nodes | Nodes satisfying IHO accuracy | Percent nodes satisfying IHO accuracy |
|---|---|---|---|---|
| Less than 100m | Order 1 | 8,654 | 6,055 | 70.0% |
| Greater than 100m | Order 2 | 133,954 | 130,313 | 97.3% |
| | TOTAL: | 142,608 | 136,368 | **95.6%** |

*Figure 8: Summary table showing percentage of difference surface nodes between H12518 mainscheme and crossline data that meet allowable IHO accuracy standards for the associated depths.*

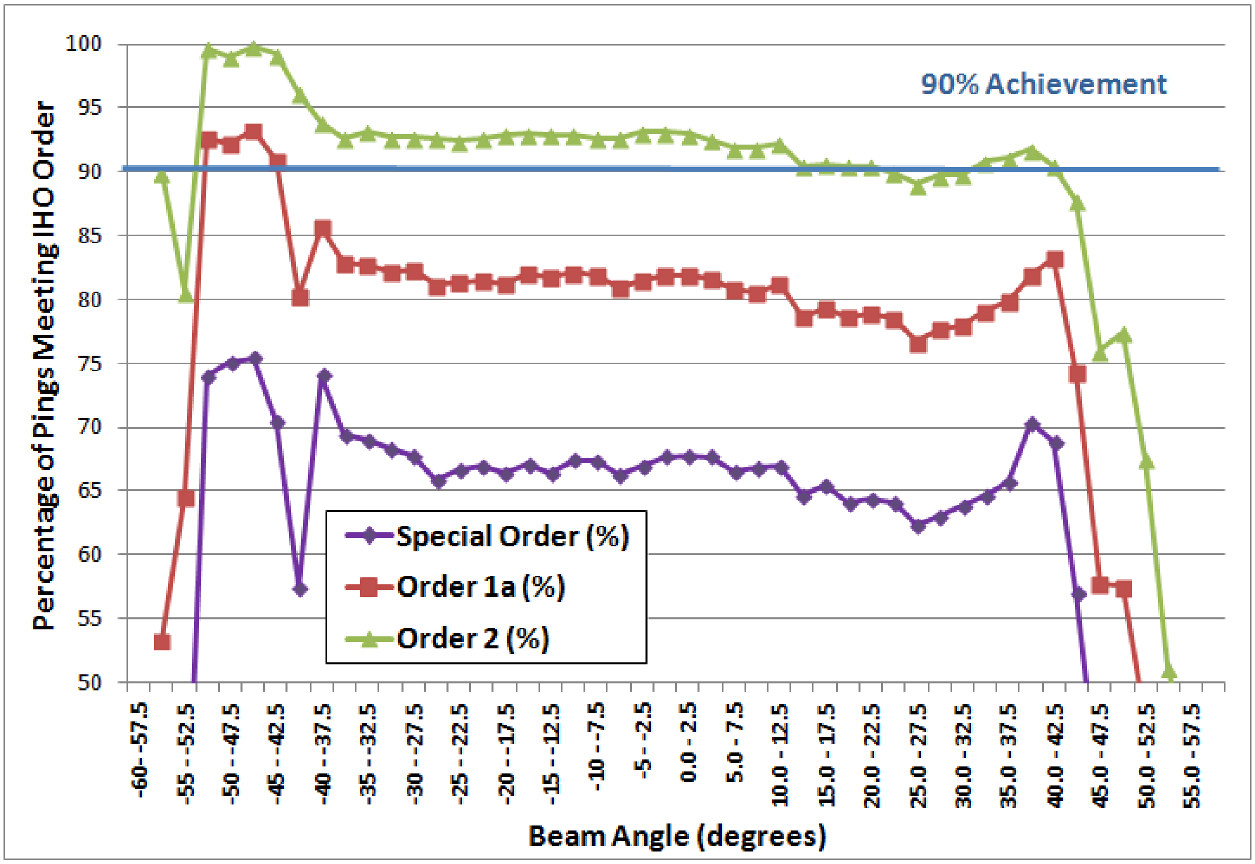


*Figure 9: CARIS QC Report comparing crossline soundings to depth estimates.*

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

| Measured | Zoning |
|---|---|
| 0 meters | 0.07 meters |

*Table 6: Survey Specific Tide TPU Values*

| Hull ID | Measured - CTD | Measured - MVP | Surface |
|---|---|---|---|
| 2801 | 3 meters/second | | .15 meters/second |
| 2802 | 3 meters/second | | .15 meters/second |
| 2803 | 3 meters/second | | .15 meters/second |
| 2804 | 3 meters/second | 1 meters/second | .15 meters/second |
| S221 | | 1 meters/second | .05 meters/second |

*Table 7: Survey Specific Sound Speed TPU Values*

In addition to the usual a priori estimates of uncertainty, some real-time and post-processed uncertainty sources were also incorporated into the depth estimates of survey H12518. Real-time uncertainties from both the EM710 and Reson 7125 were recorded and applied in post-processing. Applanix TrueHeave files are recorded on all survey vessels, which includes an estimate of the heave uncertainty, and are applied during post-processing. Finally, the post-processed uncertainties associated with vessel roll, pitch, gyro and navigation are applied in CARIS HIPS via an SBET RMS file generated in POSPac.

Uncertainty values of submitted finalized grids were calculated in CARIS using the "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). To visualize the locations in which accuracy requirements were met for each finalized surface, a custom predicted IHO-compliance layer was created, based on the difference between calculated uncertainty of the nodes and the allowable IHO uncertainty (Figure 10). To quantify the extent to which accuracy requirements were met, the preceding predicted IHO-compliance layers were queried within CARIS and then examined in Excel (Figure 11). Overall 100.0% by node and 100.0% by area of survey H12518 met the accuracy requirements stated in the HSSDM.

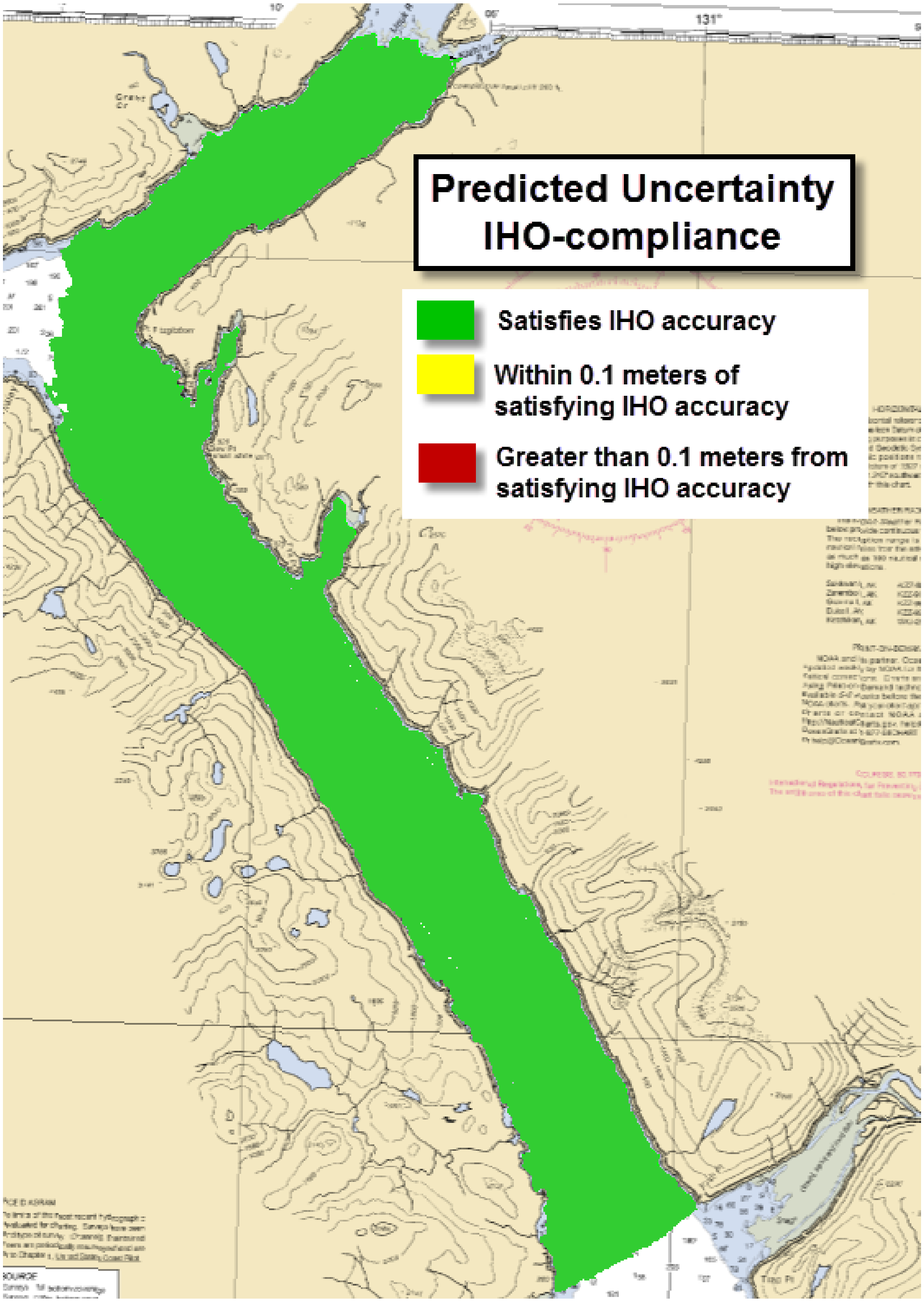


*Figure 10: H12518 met IHO accuracy standards for 99.8% of the survey area.*

| Resolution | Depth range | IHO Order | Number of nodes | Nodes satisfying IHO accuracy | Percent nodes satisfying IHO accuracy |
|---|---|---|---|---|---|
| 1m | 0 - 20m | Order 1 | 1,553,865 | 1,553,865 | 100.0% |
| 2m | 18 - 40m | Order 1 | 901,268 | 901,268 | 100.0% |
| 4m | 36 - 80m | Order 1 | 459,499 | 459,499 | 100.0% |
| 8m | 72 - 100m | Order 1 | 75,375 | 75,375 | 100.0% |
| 8m | 100 - 160m | Order 2 | 166,170 | 166,170 | 100.0% |
| 16m | 144 - 320m | Order 2 | 125,188 | 125,188 | 100.0% |
| 32m | 288 - 600m | Order 2 | 48,601 | 48,601 | 100.0% |
| | | TOTAL: | 3,329,966 | 3,329,966 | **100.0%** |
| | | TOTAL (by area): | 109,785,353 | 109,785,353 | **100.0%** |

*Figure 11: Summary table showing the percentage of nodes satisfying the indicated IHO accuracy level, sub-divided by the appropriate depth ranges. Note: The final row has a unit of square meters, and sums the number of different resolution nodes into a common unit of area.*

### B.2.3 Junctions

One junction comparison was completed for H12518 (Figure 12). The junctioning survey, H12519, was acquired concurrently with this survey. Depth comparisons were performed using the CARIS Difference Surface and CARIS Subset Editor.

The following junctions were made with this survey:

| Registry Number | Scale | Year | Field Unit | Relative Location |
|---|---|---|---|---|
| H12519 | 1:40000 | 2013 | NOAA Ship RAINIER | N |

*Table 8: Junctioning Surveys*

<u>H12519</u>

Overlap with survey H12519 was 400 meters wide along the 4,000 meter southern boundary of H12518 (Figure 13). Depths in the junction area range from 20 to 350 meters. A 16-meter CARIS Difference Surface analysis between CUBE depth surfaces for each survey showed H12518 to be an average of 0.04 meters shoaler than H12519, with a standard deviation of 2.06 meters (Figure 14).

For the respective depths, the difference surface was compared to the allowable IHO accuracy standards (Figure 15). In total, 91.2% of the depth differences between H12518 and junctioning survey H12519 are within allowable IHO accuracies (Figure 16). Inspection of the data in CARIS Subset Editor (Figure 17), shows great agreement between the two surveys, suggesting the majority of the inconsistencies seen in the difference surfaces are just artifacts of the gridding algorithm.

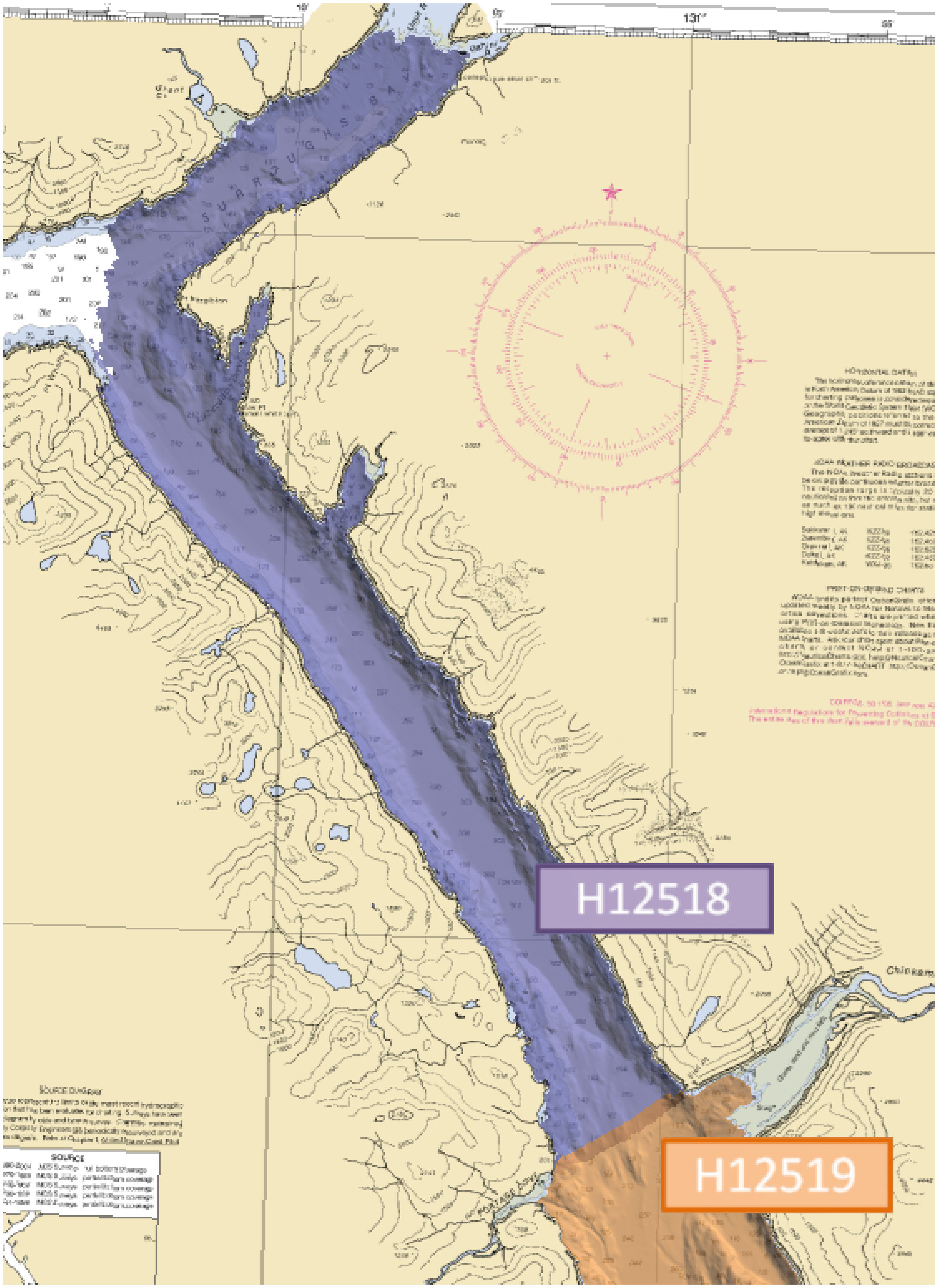


*Figure 12: Overview of junctions with survey H12518.*

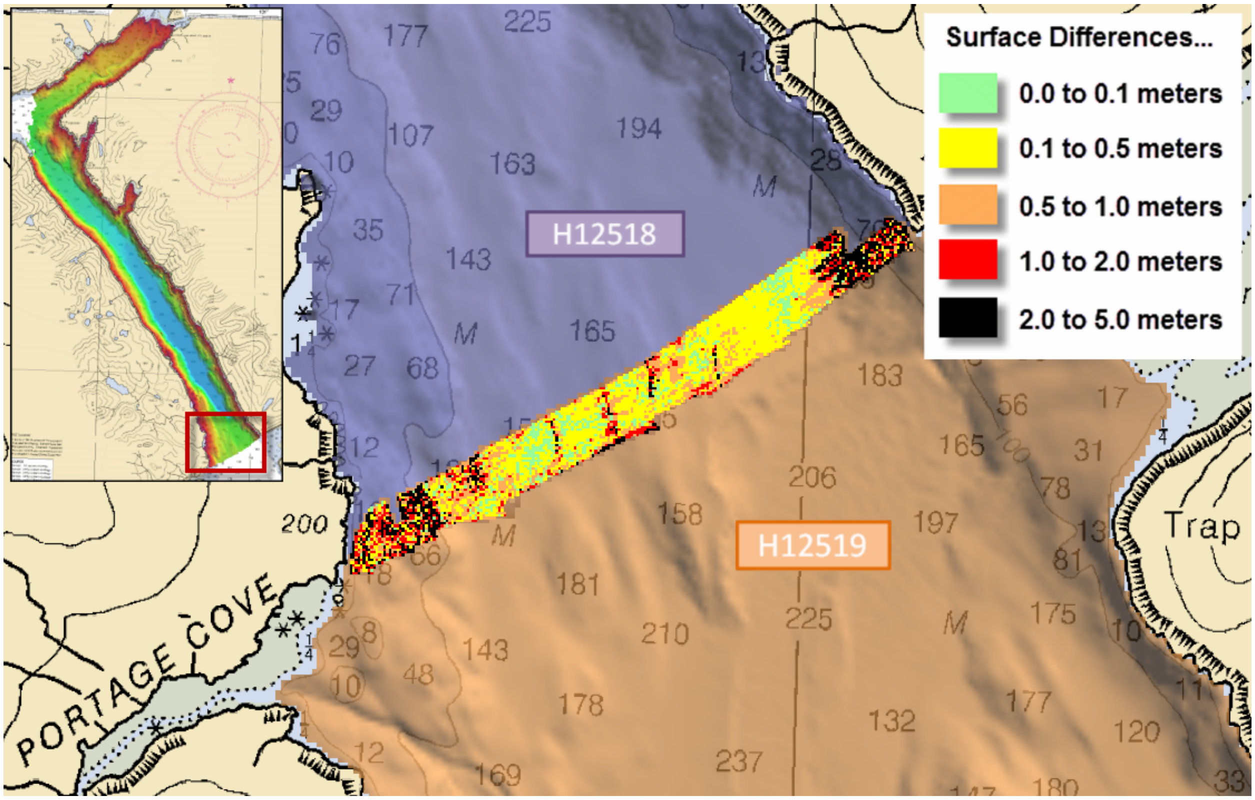


*Figure 13: Difference surface between H12518 (purple) and junctioning survey H12519 (orange).*

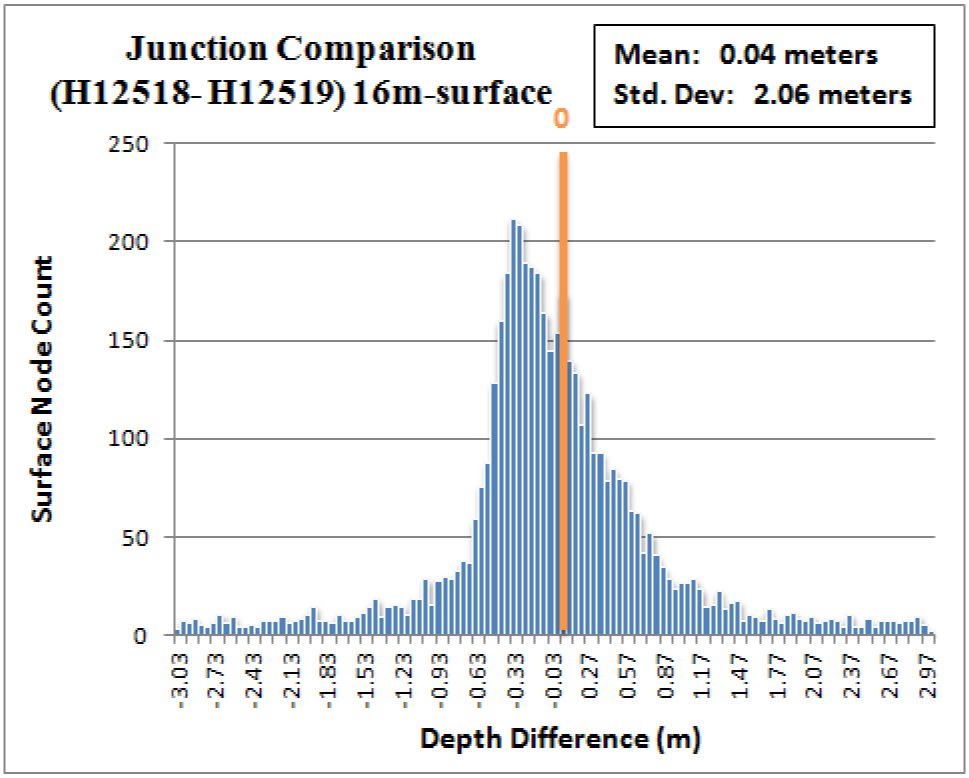


*Figure 14: Difference surface statistics between H12518 and H12519 CUBE depth layers (16-meter grid size). H12518 is an average of 0.04 meters shoaler.*

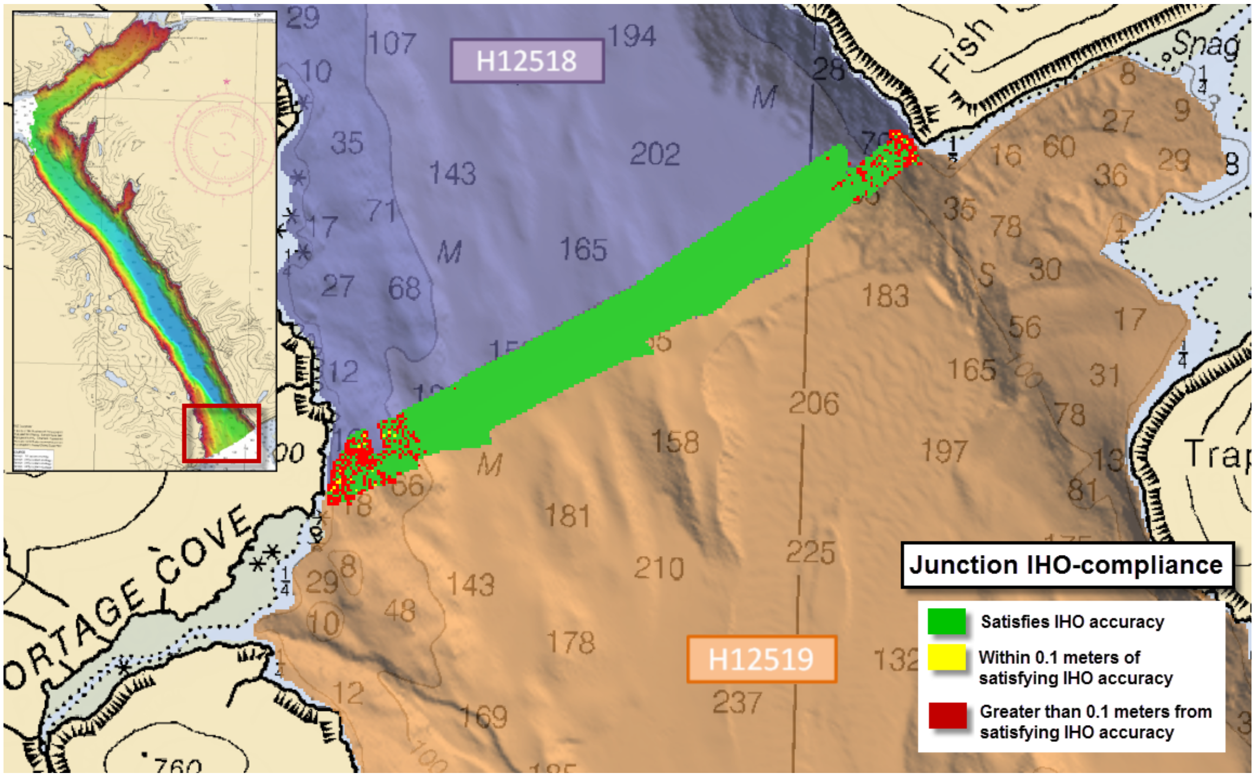


*Figure 15: Depth differences between H12518 and junctioning survey H12519 as compared to allowable IHO accuracy standards for the associated depths.*

| Depth range | IHO Order | Number of nodes | Nodes satisfying IHO accuracy | Percent nodes satisfying IHO accuracy |
|---|---|---|---|---|
| Less than 100m | Order 1 | 446 | 158 | 35.4% |
| Greater than 100m | Order 2 | 4,728 | 4,563 | 96.5% |
| | TOTAL: | 5,174 | 4,721 | **91.2%** |

*Figure 16: Summary table showing percentage of difference surface nodes between H12518 and junctioning survey H12519 that meet allowable IHO accuracy standards for the associated depths.*

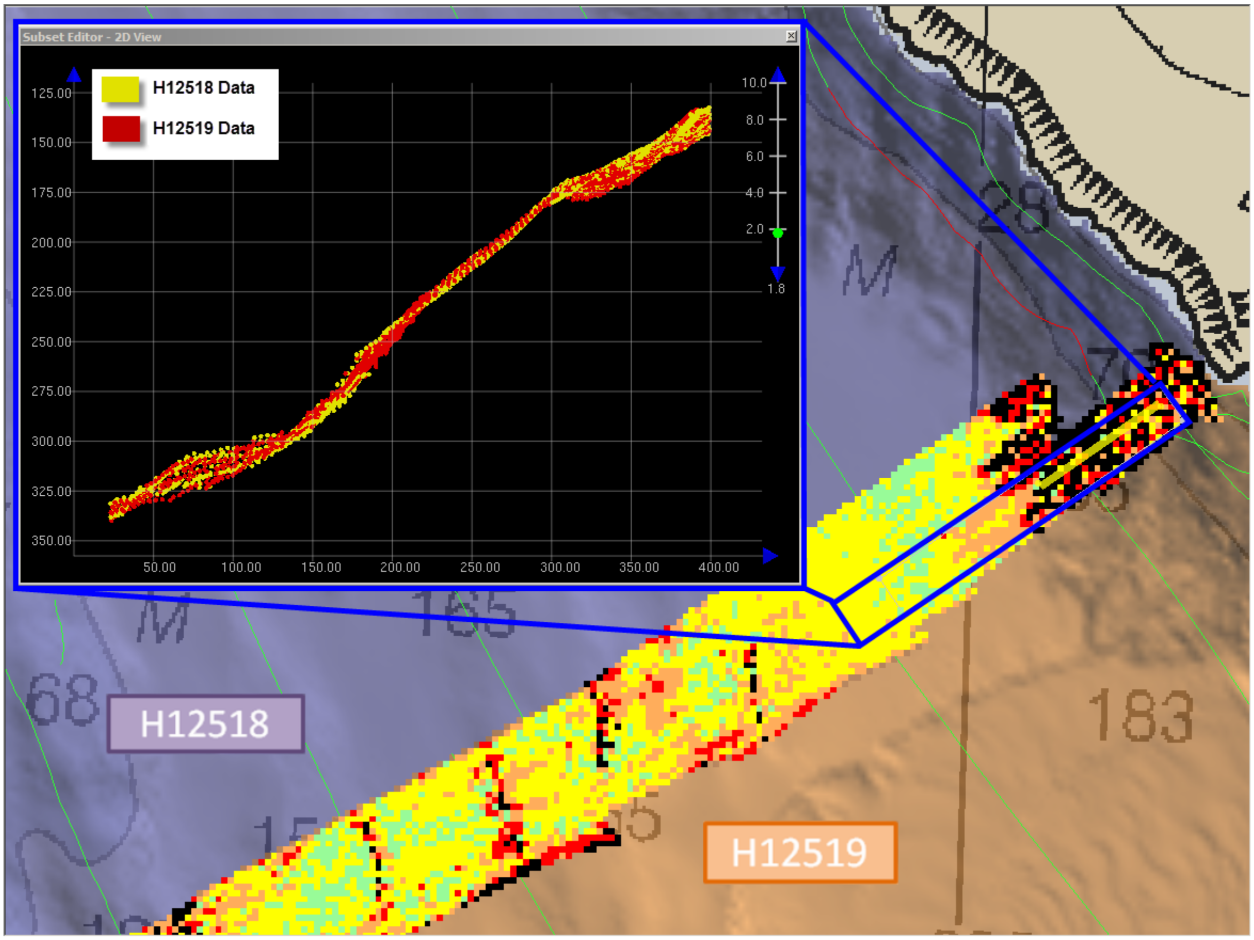


*Figure 17: Subset view of sonar data between H12518 (yellow) and junctioning survey H12519 (red).*

### 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

<u>Loss of GAMS solution.</u>

On DN167 (16 June), Launch 2802 experienced numerous drops in position throughout the day; this was likely due to a combination of high PDOP and satellite masking by the surrounding mountains. The post-processing of position via POSPac was able to remedy some, but not all, of the errors in the trajectory file (Figure 18). Every line from this day was closely scrutinized for potential errors in navigation or attitude records. All cases in which the affected lines diverged from neighboring data, the affected soundings were flagged as rejected. The lines requiring editing were DN167-1821, 1831, 1835, 1857 and 1928.

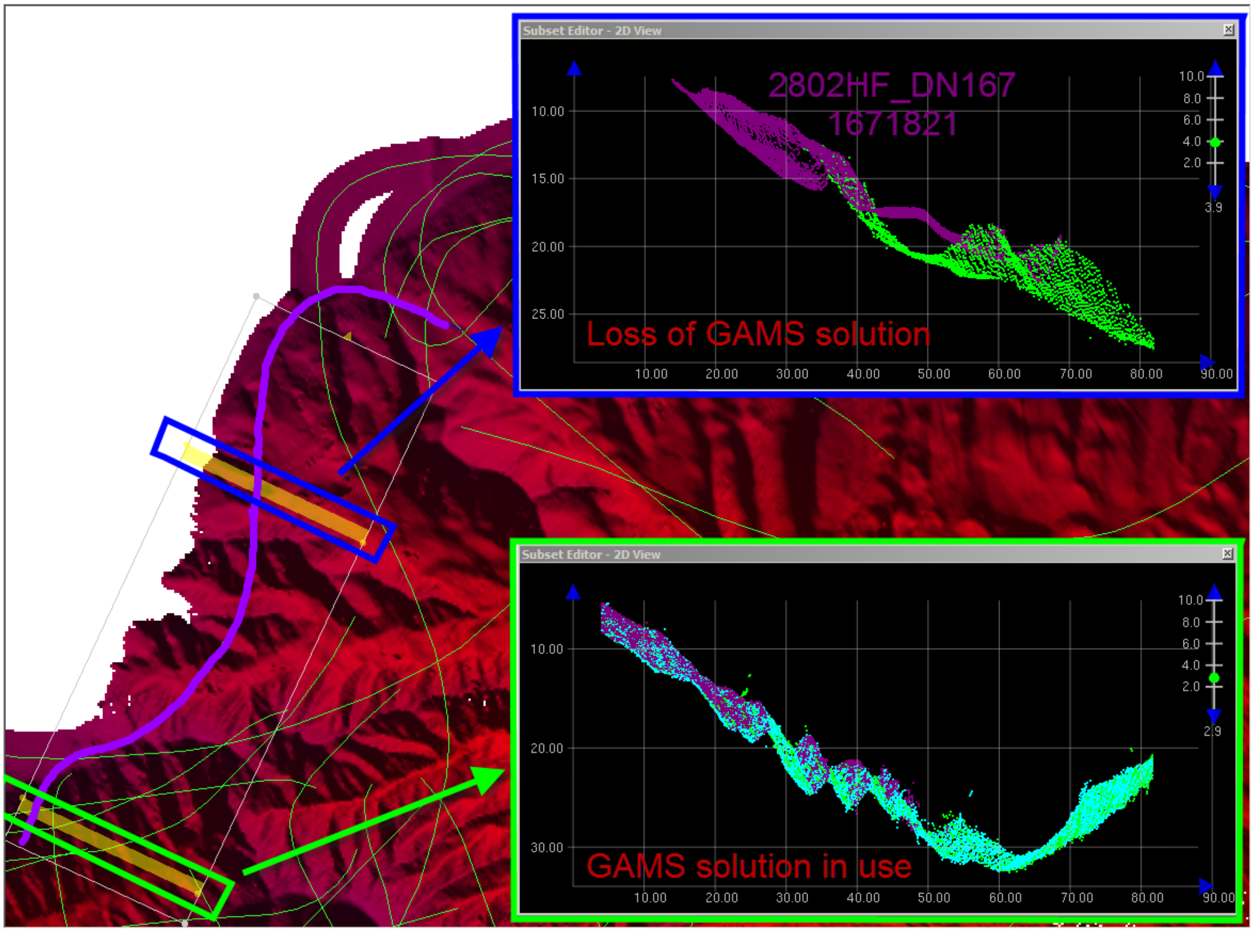


*Figure 18: Example of the effects of GPS drop outs and loss of GAMS solution on a single survey line: upper inset shows artifact during loss of GAMS solution, while lower inset shows agreement between datasets while GAMS is in use.*

**B.2.6 Factors Affecting Soundings**

Ellipsoid-to-Tidal surface comparison

Using the GPS height determined from the SBET file, data from H12518 was referenced to the ellipse and gridded. By differencing this ellipsoidally-referenced surface (ERS) from the traditional tidally-referenced surface, one should only see the ellipsoidal slope across the length of the survey. Any deviations from this slope would therefore be the result of an error intrinsic to either the ERS or tidal processing work flow. For example, misprojected SBETs, current-induced dynamic draft, incorrect waterline measurements, corrupt True Heave files, or poorly-modeled water levels are all examples of artifacts that can be identified through the difference of the ERS and tidally-referenced surfaces.

Figure 19 shows the gentle slope of the ellipse from north to south in the vicinity of survey H12518. Given there were no major "bright spots" in the difference surface, none of the artifacts mentioned in the previous paragraph are likely present, in any substantial amount, in survey H12518. Extending the ellipsoidal-to-tidal surface across the entire Behm Canal project (Figure 20), one can see the ellipsoid slope seen in survey H12518 continues through junctioning survey H12519.

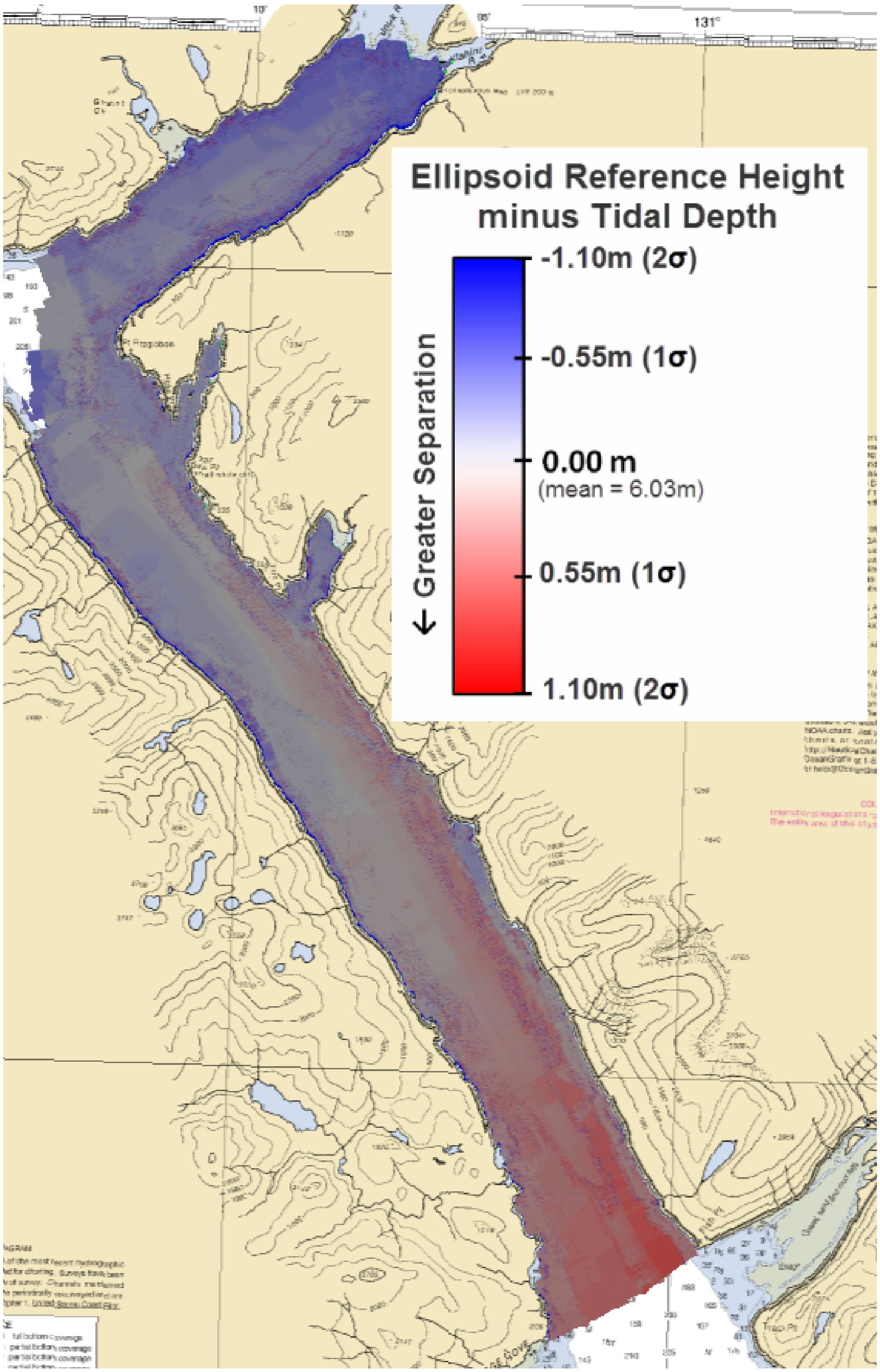


*Figure 19: Difference surface between the ellipsoidally-referenced and tidally-referenced surfaces.*

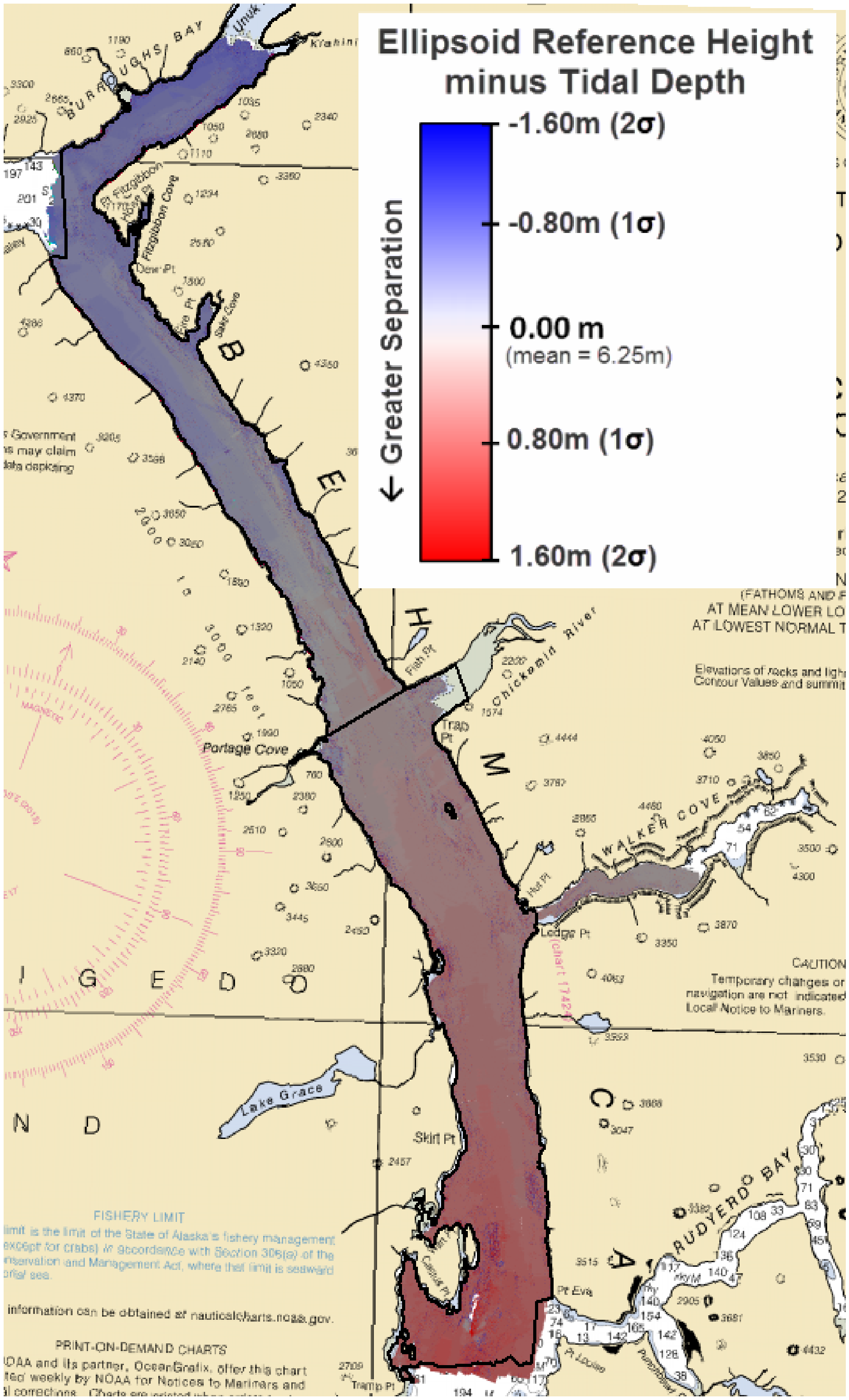


*Figure 20: Difference surface between the ellipsoidally-referenced and tidally-referenced surfaces across the entire Behm Canal project.*

Surface Sound Speed

Surface sound speed values were observed to vary temporally and spatially throughout the survey area, with the largest variations being near the Unuk and Klahini Rivers at the head of Burroughs Bay (Figure 21). A fresh water lens spread across the length of Burroughs Bay leading to sound speed changes of up to 30 meters/second. To mitigate the potential refraction errors, extra sound speed profiles were acquired in the upper arm of Burroughs Bay (for further details, see Section B.2.7 - Sound Speed Methods).

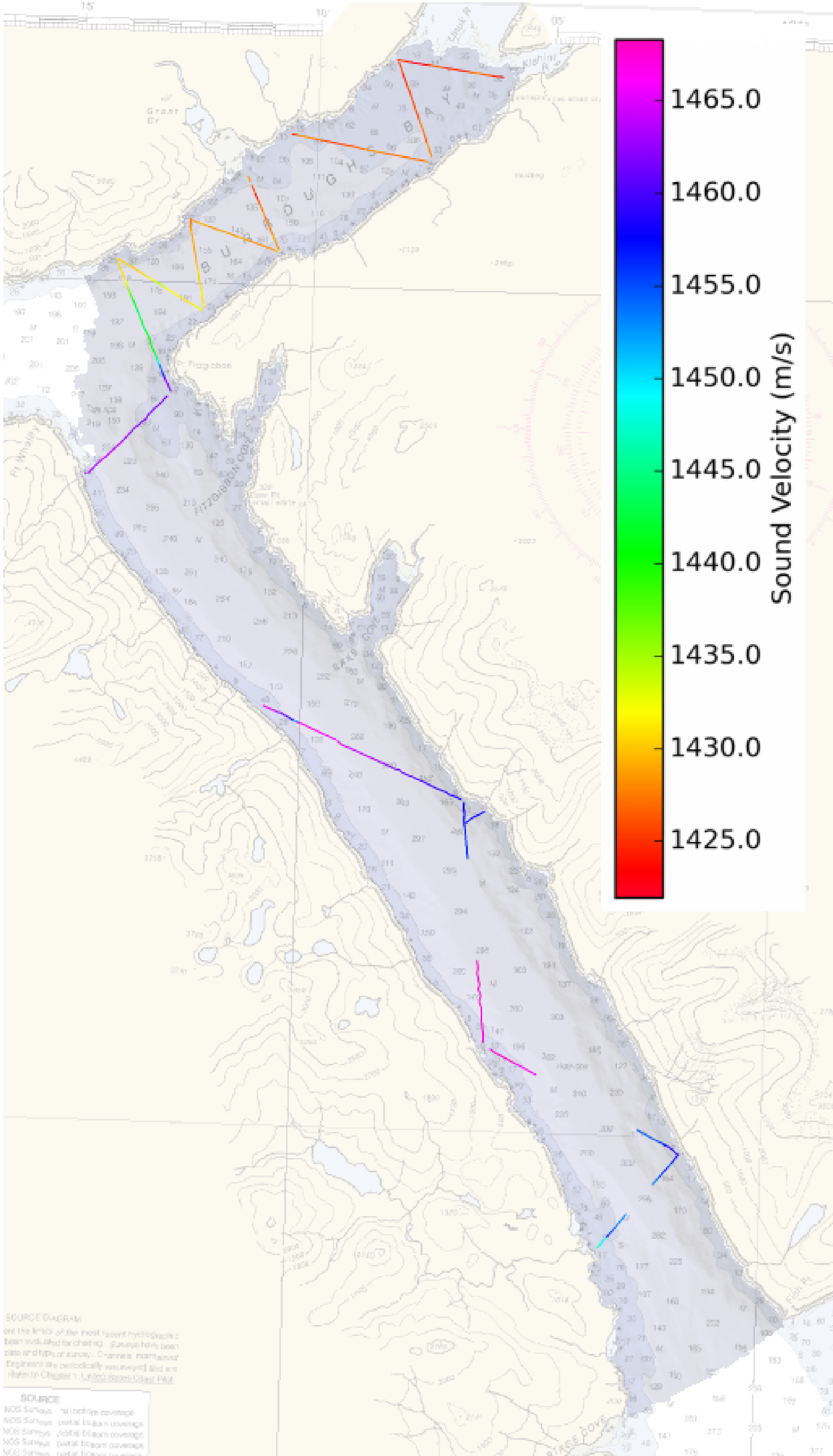


*Figure 21: Plot of surface sound speed as recorded on a single day while acquiring crossline data. Fresh water inflow from rivers at the head of Burroughs Bay, lead to a fresh water lens and corresponding drop in surface sound speed.*

### B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: For data collected by launches, sound speed profiles were acquired using the SBE 19plus CTDs at discrete locations within the survey area at least once every four hours, when large changes in surface sound speed were apparent, and when moving to a new area. For data collected on S221 (RAINIER), sound speed profiles were acquired using the Rolls Royce MVP200 approximately every 15 minutes or when recommended by "CastTime", a cast frequency program developed at the University of New Hampshire. All casts were concatenated into a master file for the entire survey and (with the exception of one line) applied to lines using the "Nearest in distance within time (4 hours)" profile selection method (Figure 22).

On DN135 (15 May) a line of opportunity was acquired by S221 without deploying the MVP (Line 0024). The most appropriate cast was acquired by a survey launch which was working in the same area at a different time. In order for this cast to be applied, the survey line was processed using the "Nearest in distance within time (6 hours)" profile selection method. The affected line was examined in Subset Editor, which showed good agreement between neighboring lines.

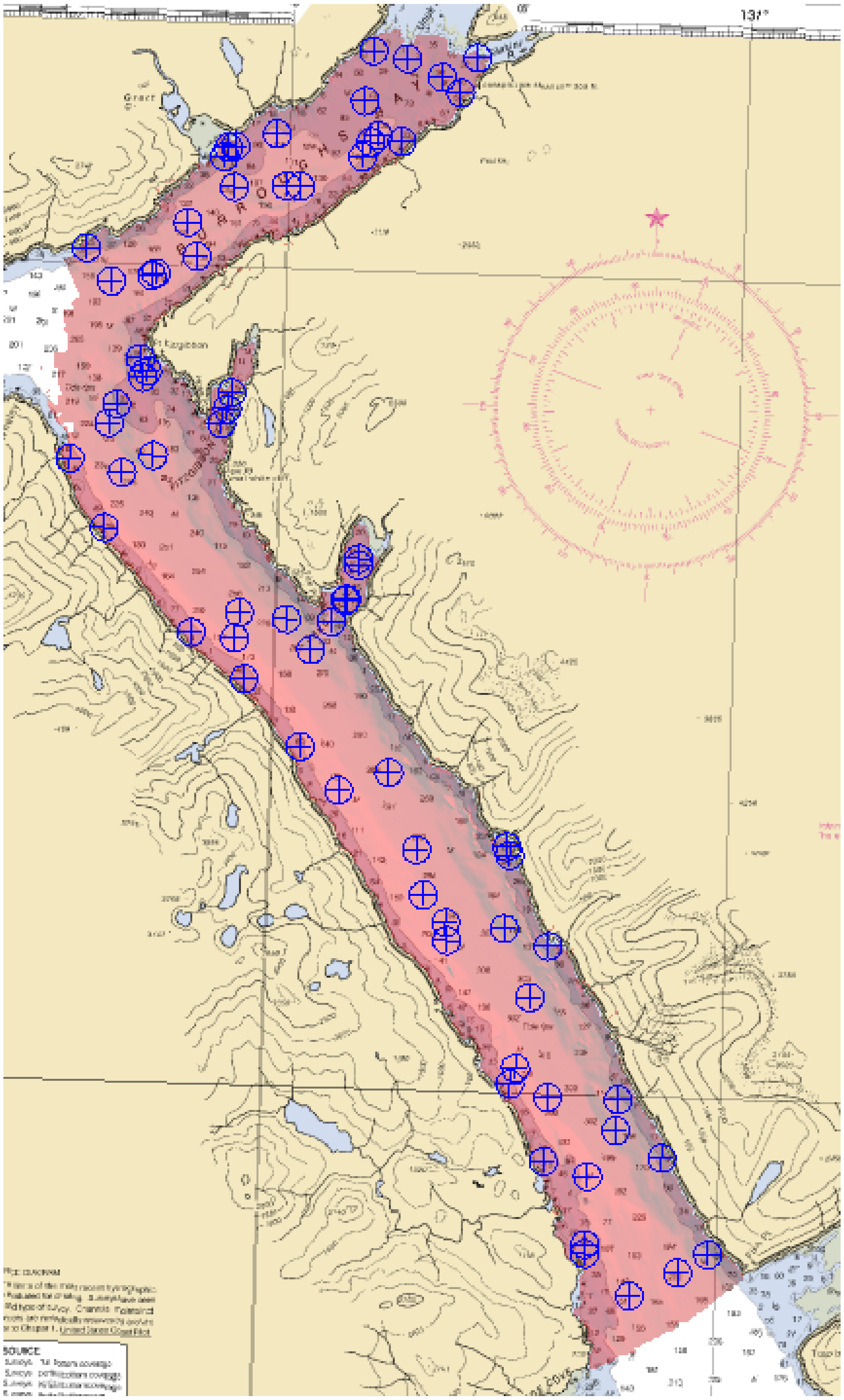

*Figure 22: Distribution of sound speed profiles acquired for survey H12518.*

### B.2.8 Coverage Equipment and Methods

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

## B.3 Echo Sounding Corrections

### B.3.1 Corrections to Echo Soundings

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

### B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

## B.4 Backscatter

Backscatter data was acquired, but not formally processed by RAINIER personnel. However, periodic spot checks were performed to ensure backscatter quality. A preliminary backscatter mosaic of data acquired by S221 is shown in Figure 23. Backscatter was logged as 7k or .ALL files and submitted to NGDC, but is not included with the data submitted to the Branch.

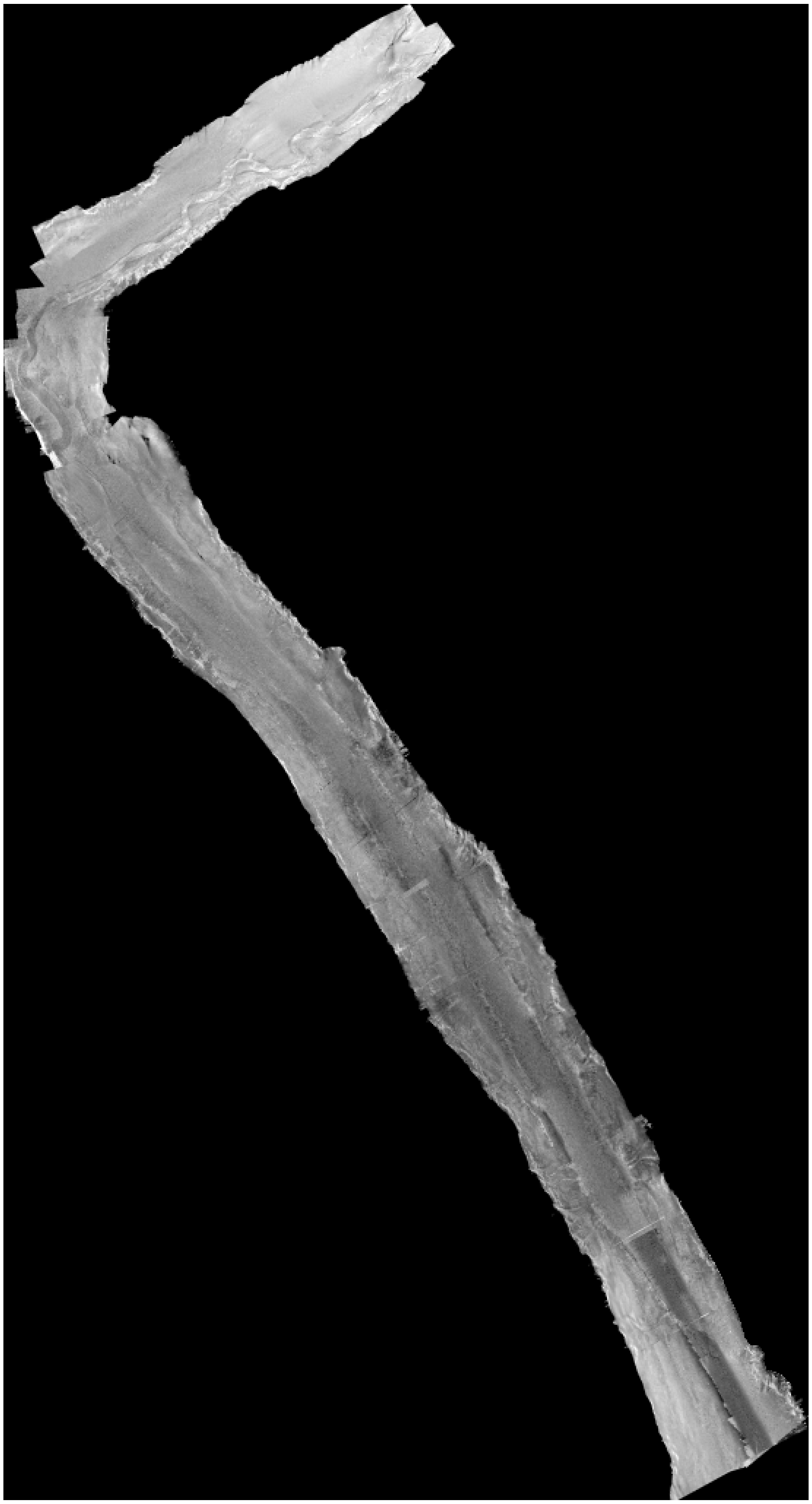

*Figure 23: H12518 backscatter mosaic of S221 lines.*

## B.5 Data Processing

### B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: NOAA Extended Attribute Files Version 5_3_2

All final data processing was performed using CARIS HIPS and SIPS 7.1.2.6. It should be noted that all Kongsberg EM710 data was intentionally processed without the Simrad Sound Velocity Correction (SVC) module. This was done in order to avoid a known error in the SVC module associated with reverse-mounted transducers. To accomplish this, a custom CARIS license file was used, which excluded the licensing for the Simrad SVC. For further details, refer to the DAPR.

### 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 |
|---|---|---|---|---|---|
| H12518_1m | CUBE | 1 meters | -2 meters - 600 meters | NOAA_1m | Complete MBES |
| H12518_2m | CUBE | 2 meters | -2 meters - 600 meters | NOAA_2m | Complete MBES |
| H12518_4m | CUBE | 4 meters | -2 meters - 600 meters | NOAA_4m | Complete MBES |
| H12518_8m | CUBE | 8 meters | -2 meters - 600 meters | NOAA_8m | Complete MBES |
| H12518_16m | CUBE | 16 meters | -2 meters - 600 meters | NOAA_16m | Complete MBES |
| H12518_32m | CUBE | 32 meters | -2 meters - 600 meters | NOAA_32m | Complete MBES |
| H12518_1m_-10to40_Final | CUBE | 1 meters | -2 meters - 40 meters | NOAA_1m | Complete MBES |
| H12518_2m_18to80_Final | CUBE | 2 meters | 18 meters - 80 meters | NOAA_2m | Complete MBES |
| H12518_4m_36to160_Final | CUBE | 4 meters | 36 meters - 160 meters | NOAA_4m | Complete MBES |
| H12518_8m_72to320_Final | CUBE | 8 meters | 72 meters - 320 meters | NOAA_8m | Complete MBES |
| H12518_16m_144to500_Final | CUBE | 16 meters | 144 meters - | NOAA_16m | Complete MBES |

| Surface Name | Surface Type | Resolution | Depth Range | Surface Parameter | Purpose |
|---|---|---|---|---|---|
| | | | 500 meters | | |
| H12518_32m_288to600_Final | CUBE | 32 meters | 288 meters - 600 meters | NOAA_32m | Complete MBES |
| H12518_Combined_32m | CUBE | 32 meters | -2 meters - 600 meters | NOAA_32m | Complete MBES |

*Table 9: Submitted Surfaces*

In order to prevent apparent coverage gaps resulting from the gridding algorithm in the "steep and deep" bathymetry found in H12518 (Figure 24), finalized surfaces were extended beyond the depth thresholds specified in the HSSDM. For example, rather than gridding the data at a 2-meter resolution between 18 and 40 meter depths; the depth range was extended to between 18 and 80 meter depths. All other finalization depth ranges are stated in Table 10.

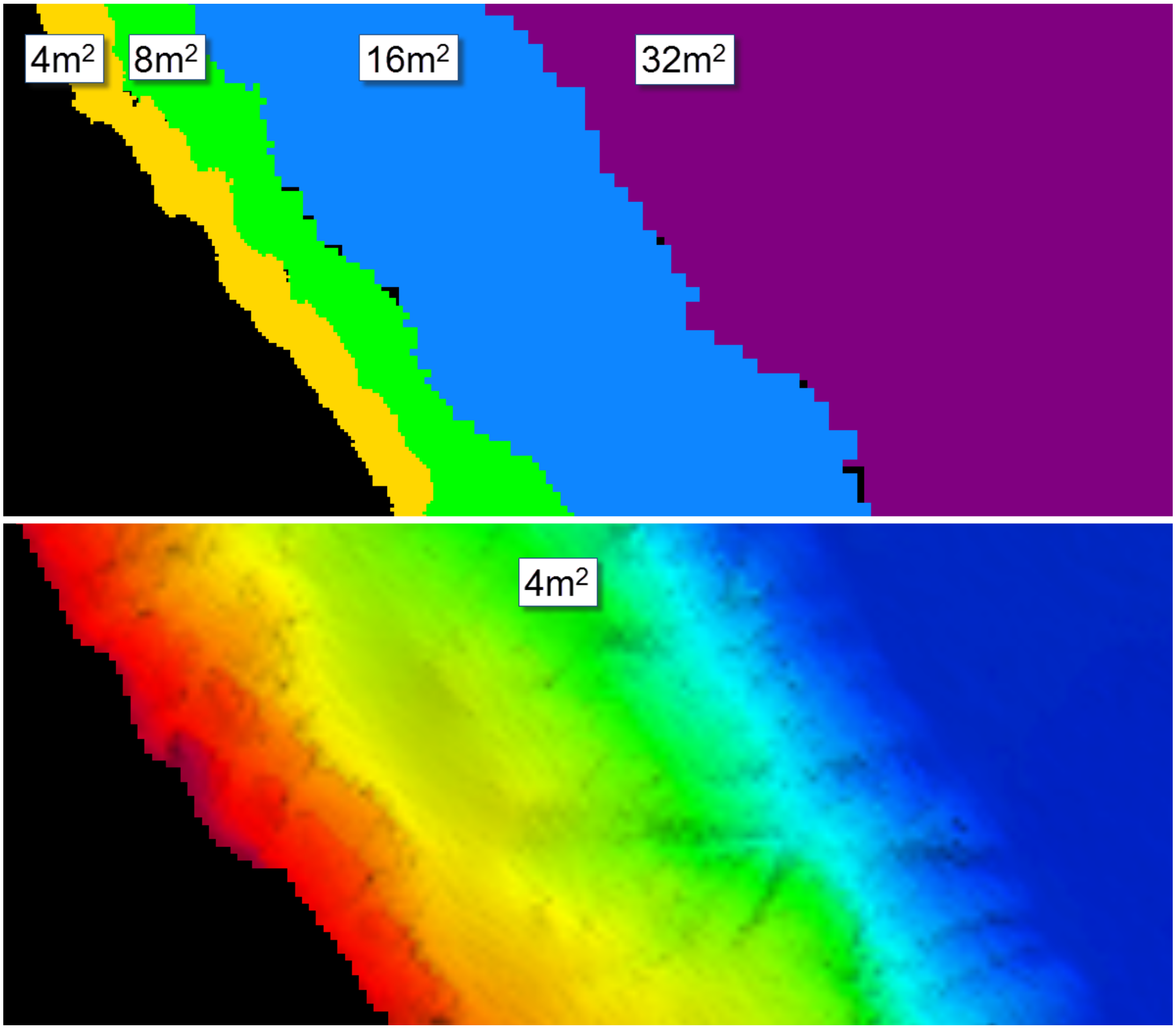


*Figure 24: (Top) Finalized surfaces created using depth thresholds specified in the HSSDM; notice the gaps between depth resolutions. (Bottom) The same region gridded at the finest resolution shows the data is free of coverage gaps.*

# 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.

<u>Standard Vertical Control Methods Used:</u>

Discrete Zoning

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

| Station Name | Station ID |
|---|---|
| Ketchikan, AK | 9450460 |

*Table 10: NWLON Tide Stations*

The following subordinate water level stations were established for this survey:

| Station Name | Station ID |
|---|---|
| Burroughs Bay, AK | 9450917 |

*Table 11: Subordinate Tide Stations*

| File Name | Status |
|---|---|
| 9450917.tid | Verified Observed |

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

| File Name | Status |
|---|---|
| H12518CORP.zdf | Final |

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

A request for final approved tides was sent to N/OPS1 on 06/21/2013. The final tide note was received on 08/02/2013.

The operating NWLON primary tide station in Ketchikan, AK (9450460), as well as a subordinate tide station installed by RAINIER personnel at Burroughs Bay, AK (9450917) served as the controls for datum determination and water level reducers for survey H12518. A complete description of the vertical and horizontal control for this survey can be found in the accompanying OPR-O193-RA-13 Horizontal and Vertical Control Report (HVCR), submitted under a separate cover.

***Tide note is appended to this report.***

## 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 - 09 North.

The following PPK methods were used for horizontal control:

Single Base

In conjunction with this project, a GNSS base station was established by RAINIER personnel on Channel Island near the center of the survey area. Vessel kinematic data was post-processed using Applanix POSPac processing software as described in the DAPR. Single Base processing was used from DN133 to DN134 while the site was installed.

The following user installed stations were used for horizontal control:

| HVCR Site ID | Base Station ID |
|---|---|
| Channel Island, AK | N/A |

*Table 14: User Installed Base Stations*

The PPK base station on Channel Island was removed on DN135 to relocate to the next project area. Therefore, a PPK solution was not possible for DN135, DN167, and DN168. To provide enhanced positioning data, a PPP solution was used for those days. Data processed by PPP correlated well with surrounding data processed with PPK.

Additionally, for testing purposes, DN129 was processed using PPP. The lines showed high correlation with surrounding data and was never reprocessed using PPK.

DGPS was used for primary positioning during acquisition. Following PPK or PPP processing, DGPS position data was replaced with improved SBET navigation data.

The following DGPS Stations were used for horizontal control:

| DGPS Stations |
|---|
| Biorka Island, AK (305 kHz) |
| Level Island, AK (295 kHz) |
| Annette Island, AK (323 kHz) |

*Table 15: USCG DGPS Stations*

# D. Results and Recommendations

## D.1 Chart Comparison

Two principle methods were used in comparing survey H12518 to the contemporary charts. From the survey data, contours and soundings were generated and compared to the raster chart. For the Electronic Navigation Chart (ENC), a TIN was generated from all soundings and contours within the ENC (Figure 25). From this TIN, an interpolated surface was generated, which was then differenced from the survey data for the purposes of visualization and computing statistics.

For specific details on the chart comparisons for survey H12518, refer to Section D.1.1 - Raster Charts, and Section D.1.2 - Electronic Navigation Charts.

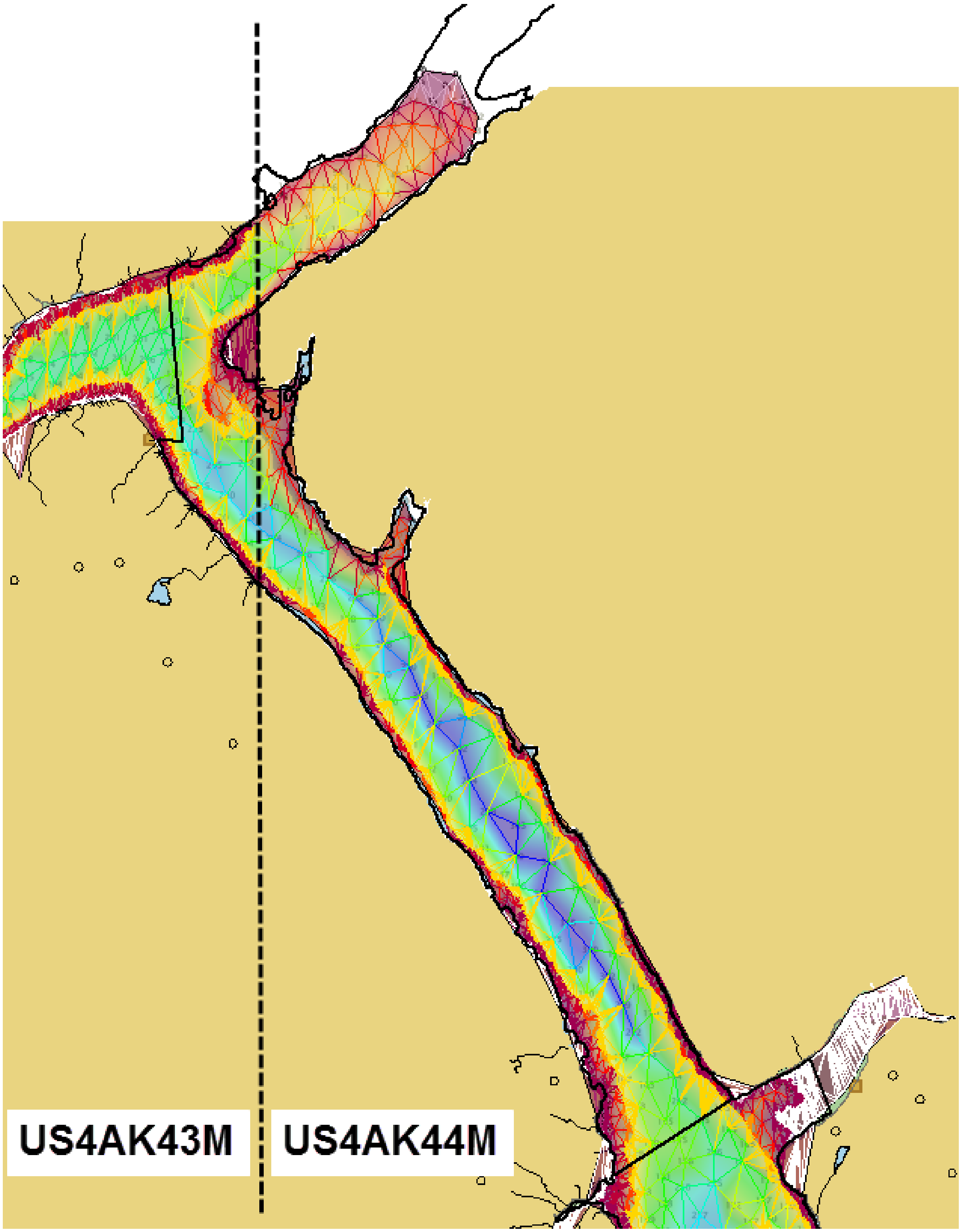


*Figure 25: TIN and interpolated surface generated from ENC US4AK43M and US4AK44M for the purposes of a chart comparison to survey H12518.*

### D.1.1 Raster Charts

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

| Chart | Scale | Edition | Edition Date | LNM Date | NM Date |
|---|---|---|---|---|---|
| 17424 | 1:80000 | 9 | 10/2009 | 08/14/2013 | 08/14/2013 |
| 17422 | 1:80000 | 9 | 02/2006 | 08/14/2013 | 08/14/2013 |

*Table 16: Largest Scale Raster Charts*

17424

A comparison was performed between survey H12518 and Chart 17424 (1:80000) using CARIS sounding and contour layers derived from the 32-meter combined surface. The contours and soundings have been overlaid on the chart, and a representative area is shown in Figure 26. Throughout the survey, the 100-fathom contour is closely followed by the survey data; however the charted 3-fathom contour has likely been pulled offshore for cartographic reasons and is seldom correctly modeled. Given the extreme steep and deep nature of the bathymetry, the 3-fathom contour is inappropriate for this area and the Hydrographer recommends removing it from the chart. For a further discussion of the surveyed depths to charted sounding comparison, refer to Section D.1.2 - Electronic Navigation Charts.

It is recommended that H12518 data supersede all charted depths on Chart 17424.

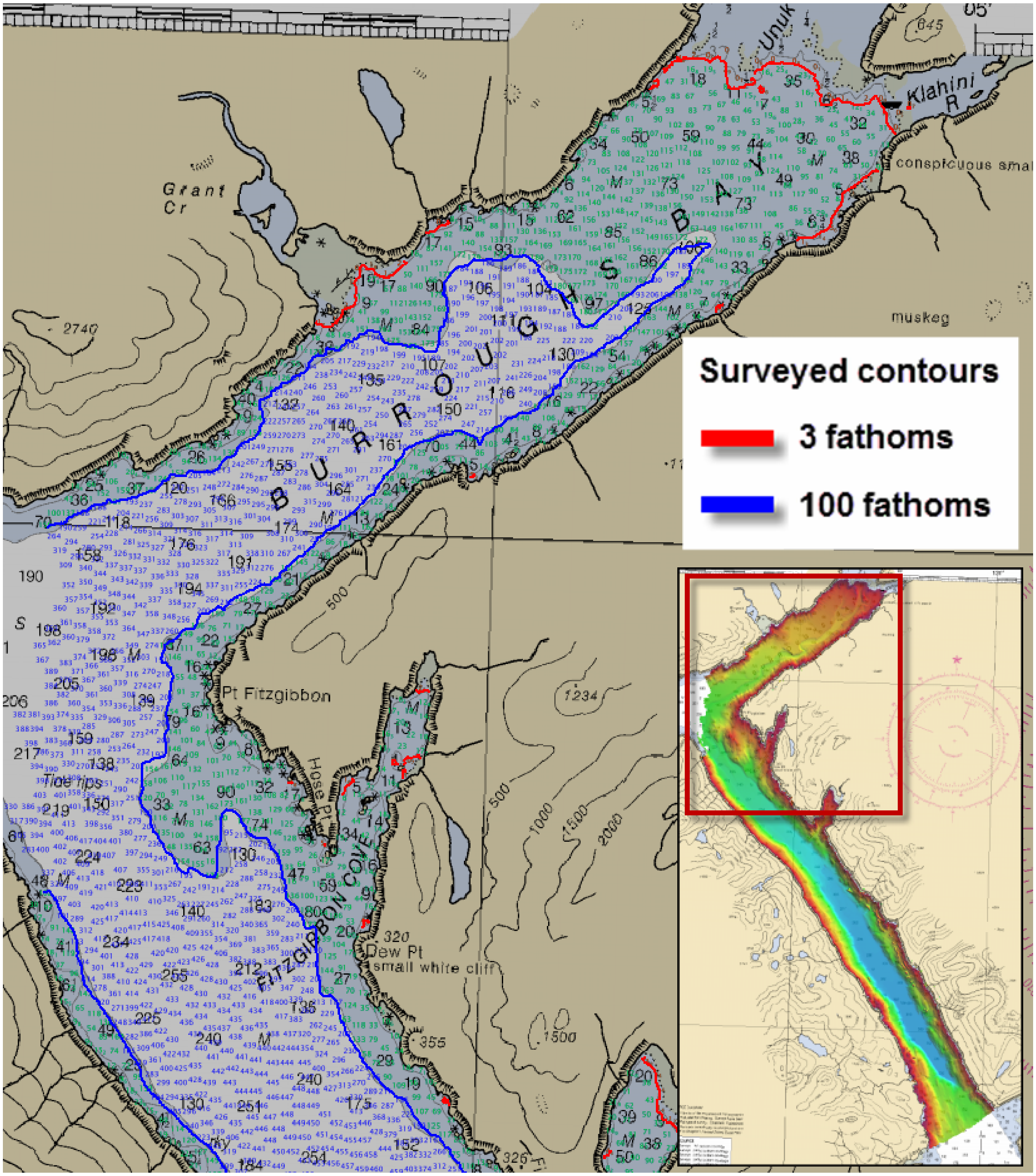


*Figure 26: Close-up of Burroughs Bay, showing comparison of contours derived from survey H12518 and those depicted on Chart 17424.*

***Contours for the chart update product are derived from the Combined BASE Surface. Final placement of depth curves for the chart is determined by MCD, and based on a number of factors, including soundings selected for compilation and the scale of the chart.***

<u>17422</u>

In the vicinity of survey H12518, Chart 17422 is equivalent to Chart 17424. Please refer back to the previous section for a comparison of survey H12518 and Chart 17424.

***The original scale of Chart 17422 is 79,334 .***

### D.1.2 Electronic Navigational Charts

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

| ENC | Scale | Edition | Update Application Date | Issue Date | Preliminary? |
|---|---|---|---|---|---|
| US4AK44M | 1:80000 | 2 | 12/12/2011 | 12/12/2011 | NO |
| US4AK43M | 1:80000 | 2 | 09/20/2012 | 09/20/2012 | NO |

*Table 17: Largest Scale ENCs*

US4AK44M

ENC US4AK44M coincides with raster Chart 17424 (with a small contribution from US4AK43M). To compare soundings, a TIN surface was created from the ENC depth features (soundings and contours). A 16-meter surface from H12518 was then differenced from the ENC TIN (Figure 27). Positive (red) values show where survey H12518 is shoaler than the TIN and negative (blue) values show where survey H12518 is deeper than the TIN. Overall, the surveyed depths and charted soundings agree well in the center of the channel; otherwise, there is a tendency for the chart to express a shoal biasing in the soundings (sometimes by over 10 fathoms). Figure 28 shows a close-up of the depth comparisons in the vicinity of Fitzgibbon Cove and Saks Cove. One can see how all the soundings near shore (shoaler than 100 fathoms) are typically much shoaler than H12518 depths (likely because the soundings were pulled offshore for cartographic reasons). Figure 28 also shows that, generally, the survey and chart agree in the two coves.

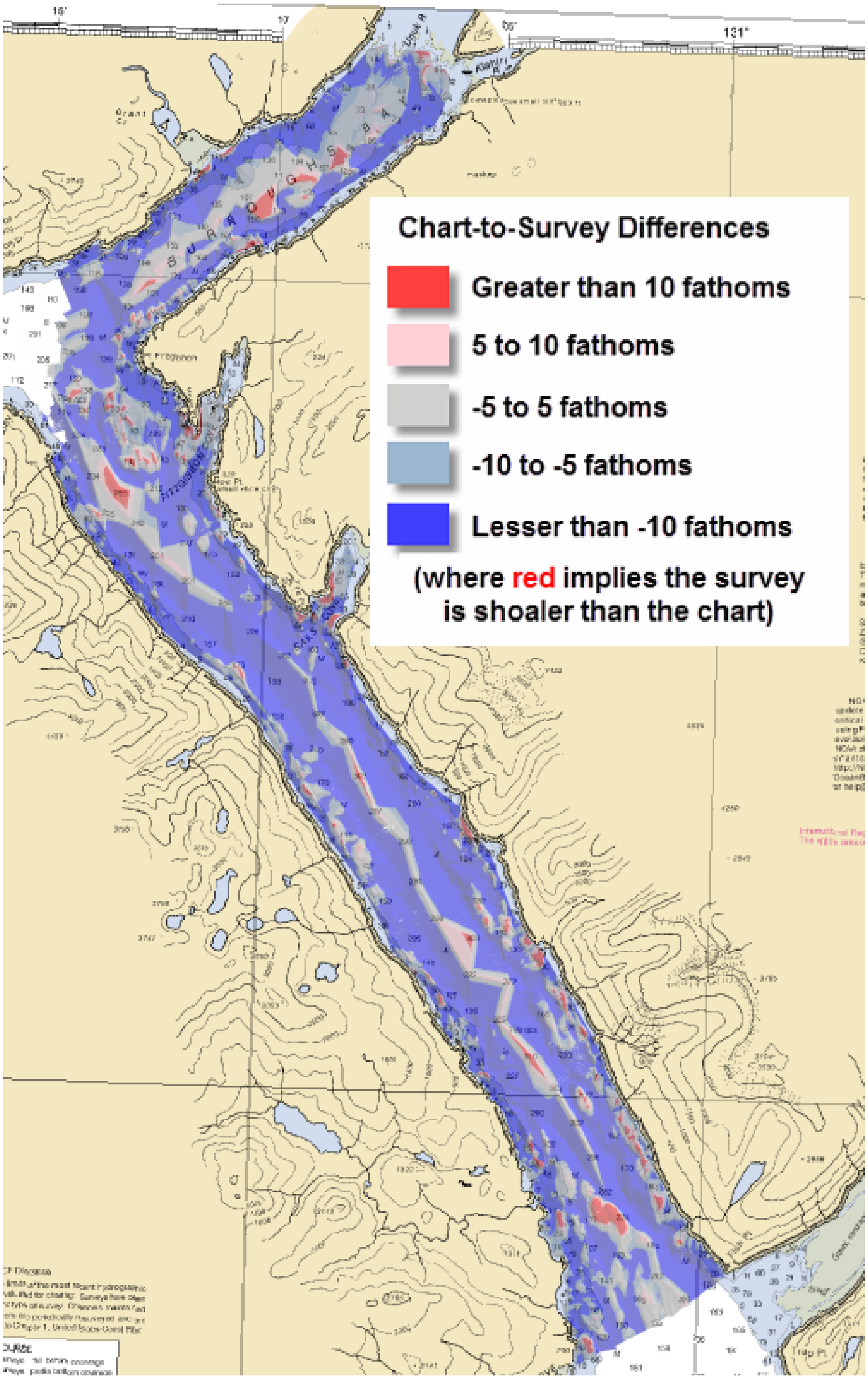


*Figure 27: Difference surface between depth estimates from survey H12518 and an interpolated surface created from the soundings and contours of ENC US4AK44M (with a small contribution from US4AK43M).*

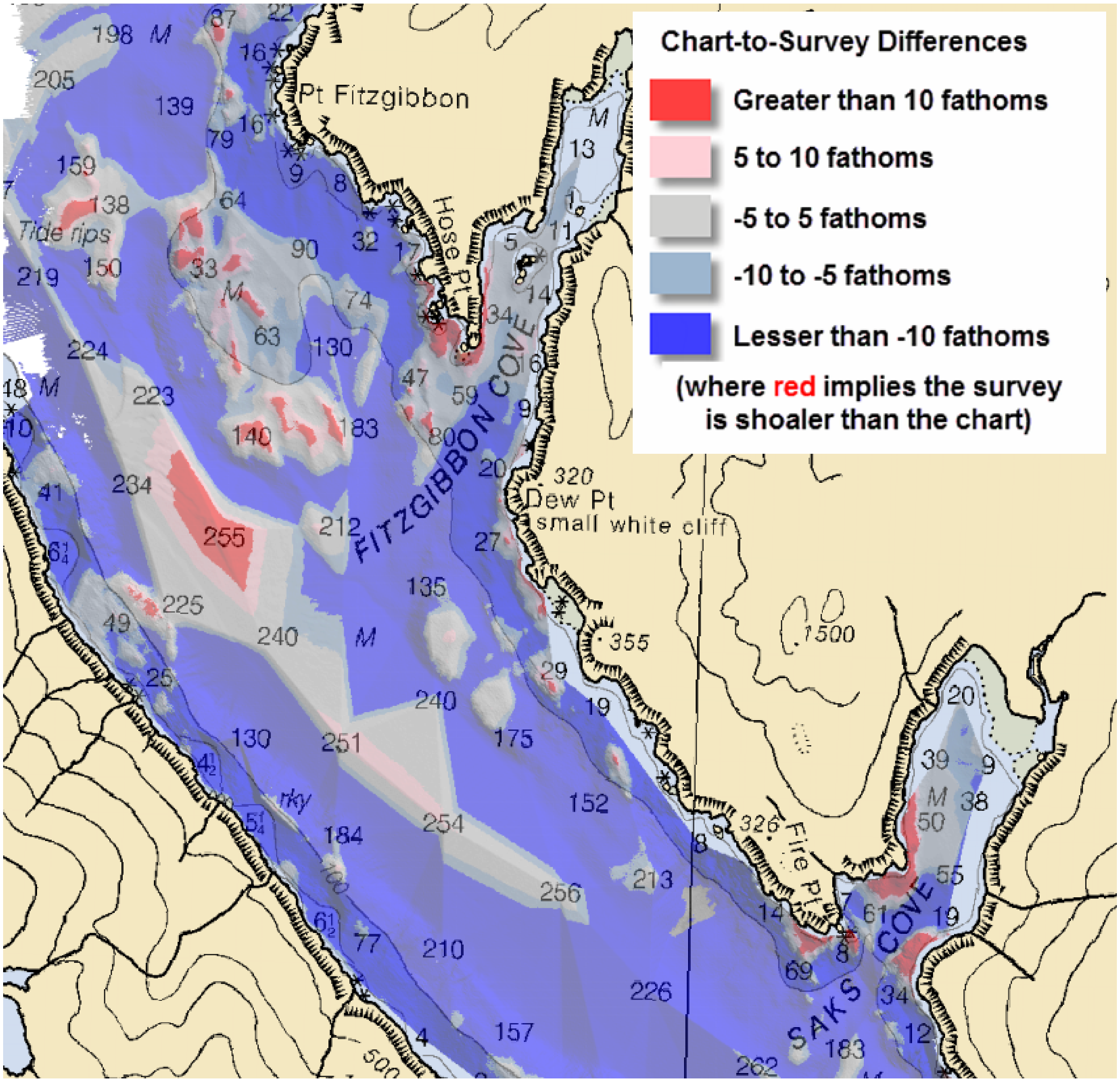


*Figure 28: Close-up view of Fitzgibbon and Saks Coves and difference surface between depth estimates from survey H12518 and the TIN surface. Charted nearshore soundings (except within the coves) appear to have been pulled offshore for cartographic reasons.*

US4AK43M

ENC US4AK43M only intersects with a small portion of survey H12518 (Figure 23). For the purposes of the chart comparison, both US4AK43M and US4AK44M were compiled into the TIN discussed previously that was used to create the difference surface. Please refer back to the previous section for a comparison of survey H12518 and ENC US4AK44M.

***The original scale of the ENC US4AK43M is 79,334 .***

### D.1.3 AWOIS Items

No AWOIS items were assigned for this survey.

### D.1.4 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

### D.1.5 Charted Features

Within the extents of survey H12518, Chart 17424 reports "tide rips" in two locations (Figure 29). Though the RAINIER worked in the area through two spring tides, with daily tidal ranges exceeding five meters, no tidal rips were observed in the project area.

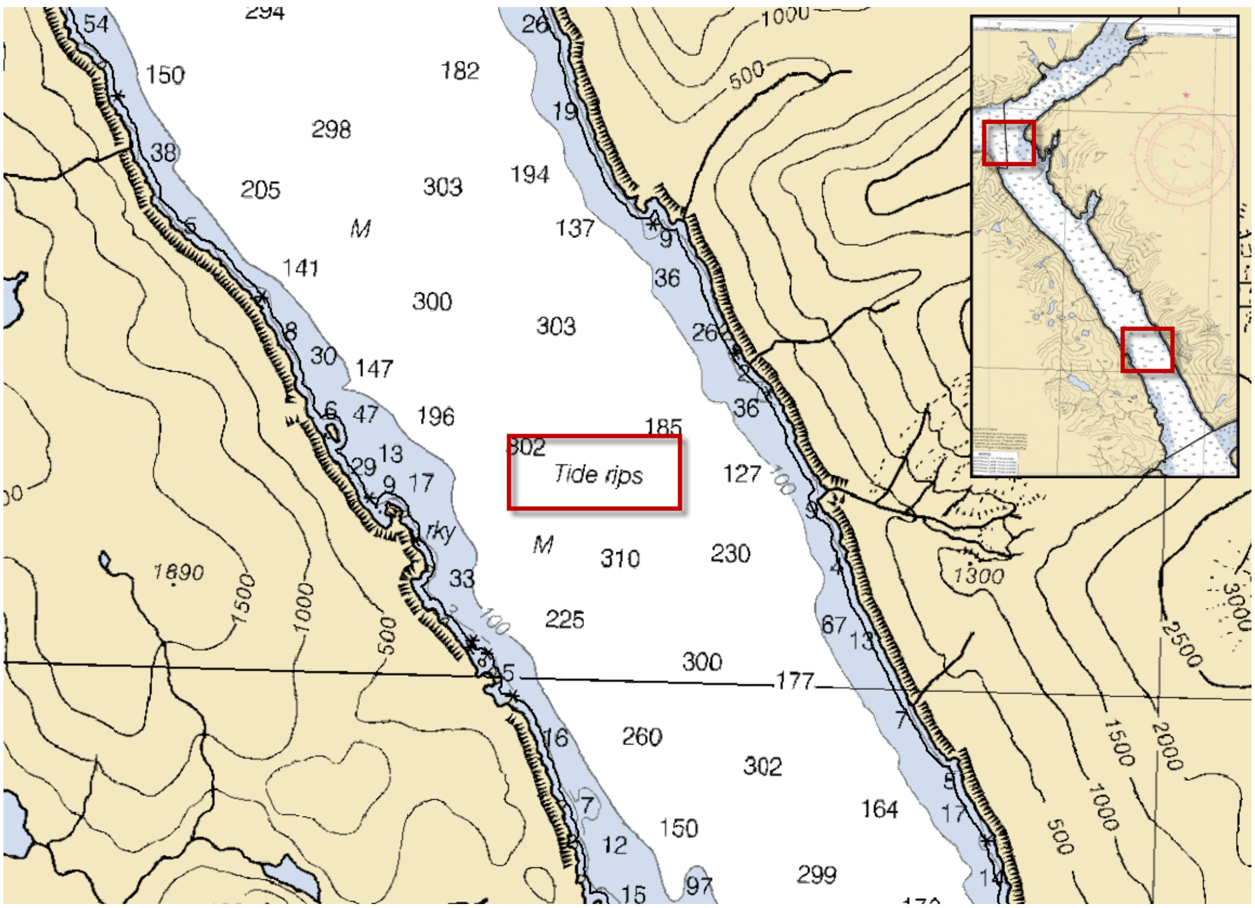


*Figure 29: Tide rips reported on Chart 17424.*

***Two blue notes are included in the chart update product recommending to remove the charted tide rip symbols.***

### D.1.6 Uncharted Features

No uncharted features exist for this survey.

### D.1.7 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

***During office processing a DTON was found at the north end of the survey area. DTON report is appended to this report.***

### D.1.8 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

### D.1.9 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.1.10 Bottom Samples

Eighteen bottom sample locations were identified in the Project Reference File. Eleven assigned bottom samples, where depths exceeded 100 meters, were not acquired due to equipment limitations. Seven bottom sample locations were selected based on feasibility and distribution throughout the survey area (Figure 30). Acquired bottom samples are addressed, as required, with S-57 attribution and recorded in the Final Features File accompanying this submission.

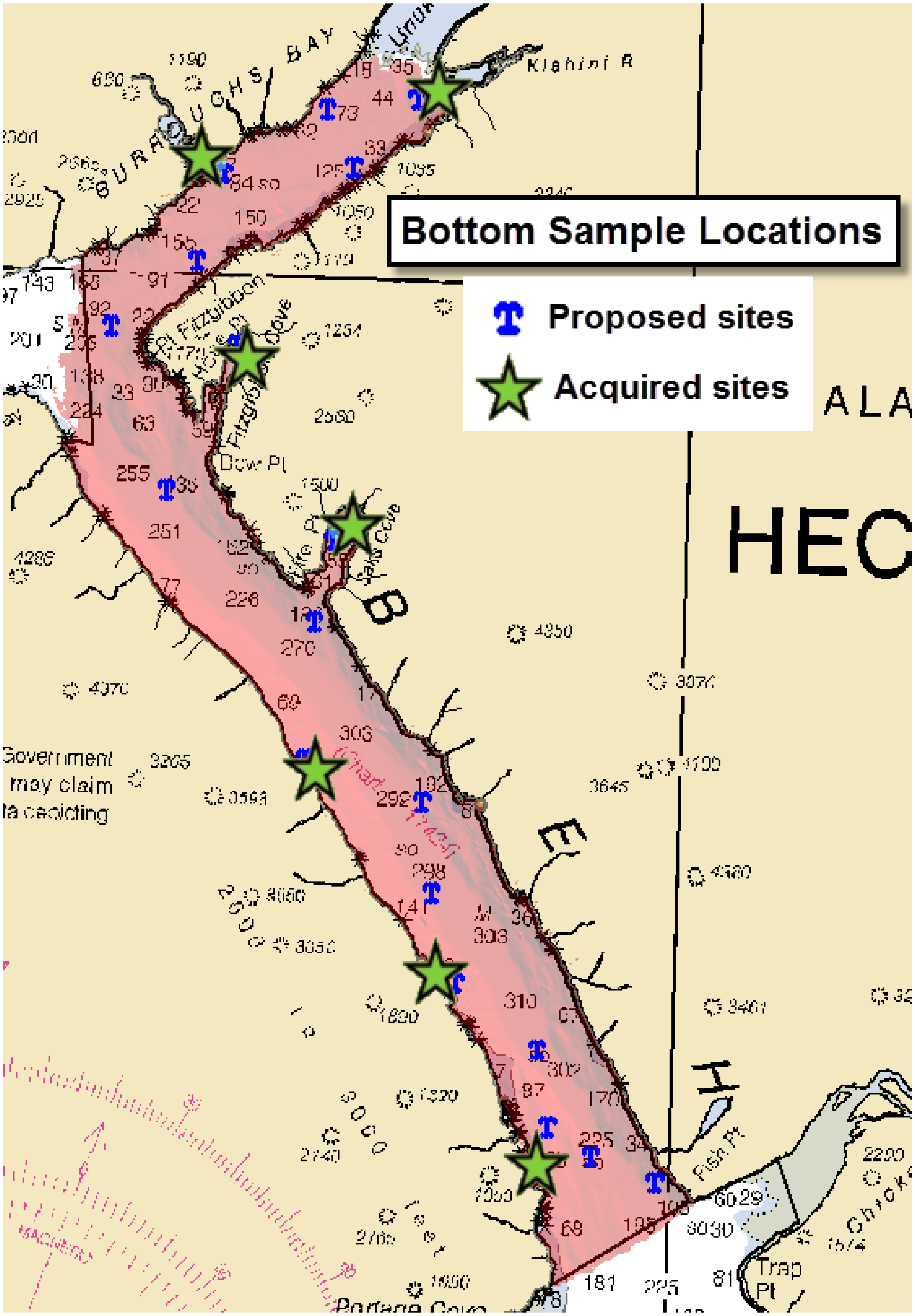


*Figure 30: Bottom samples in H12518.*

***Eight bottom samples were collected and have been recommended for charting, and sixteen bottom samples were imported from the ENC to be retained.***

## D.2 Additional Results

### D.2.1 Shoreline

Shoreline verification was conducted near predicted low water in accordance with the applicable sections of the NOAA HSSDM and FPM. There were 56 assigned features for this survey. All features were addressed as required with S-57 attribution and recorded in the H12518 Final Features File to best represent the features at chart scale.

### 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

Originating at the head of Burroughs Bay, and wrapping around Pt Fitzgibbon is, what appears to be, an ancient submerged riverbed (Figure 31). This meandering riverbed is pronounced in depths of up to 400 meters, and, in places, has scoured a trench in the seafloor of up to 50 meters.

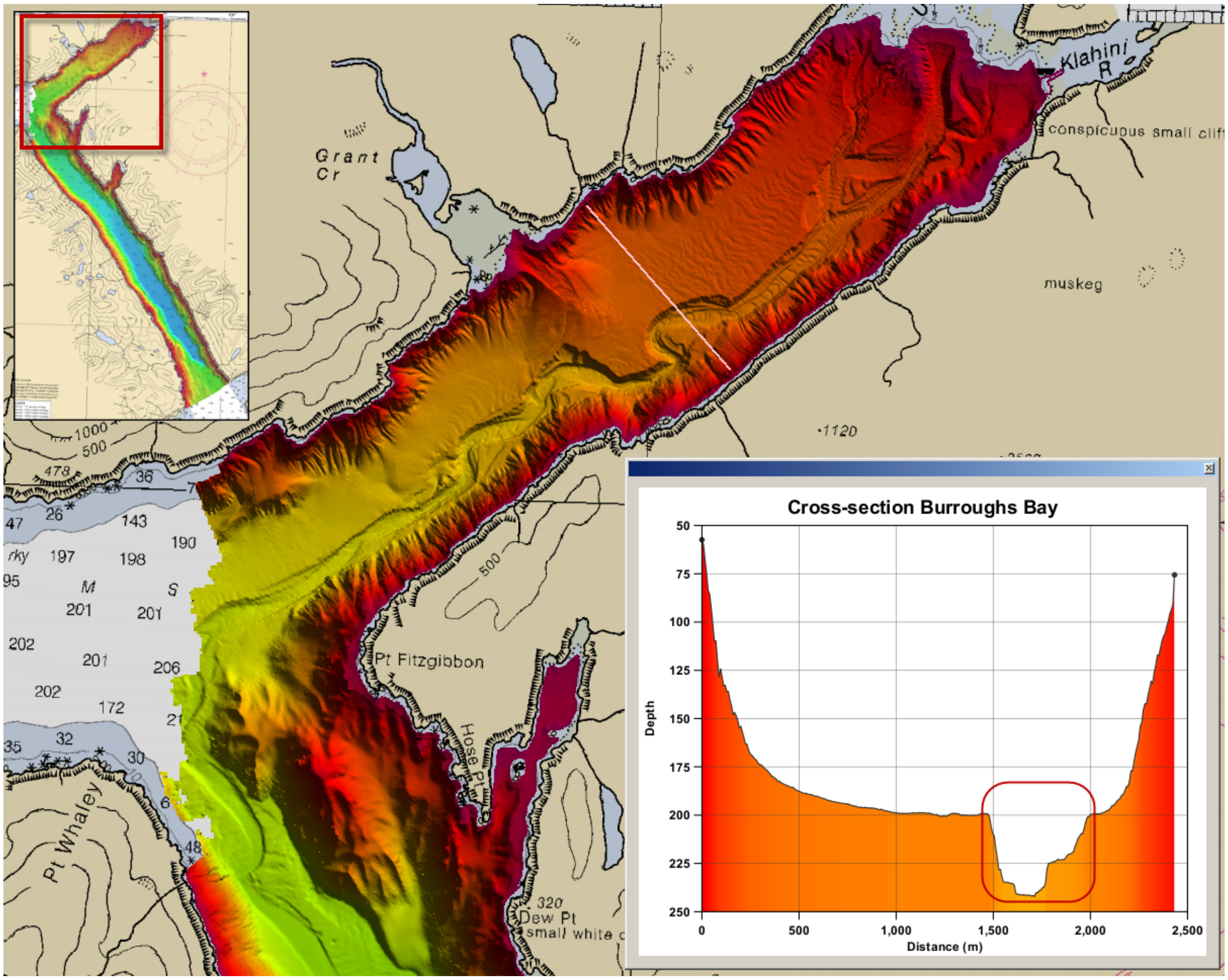


*Figure 31: Ancient submerged riverbed located at the head of Burroughs Bay.*

### D.2.9 Construction and Dredging

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

### D.2.10 New Survey Recommendations

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

### D.2.11 New Inset Recommendations

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, Standing and 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 |
|---|---|---|---|
| Richard T. Brennan, CDR/NOAA | Commanding Officer, NOAA Ship RAINIER | 08/15/2013 | |
| Michael O. Gonsalves, LT/NOAA | Field Operations Officer, NOAA Ship RAINIER | 08/15/2013 | |
| James B. Jacobson | Chief Survey Technician, NOAA Ship RAINIER | 08/15/2013 | |
| Damian Manda, LTJG/NOAA | Junior Officer, NOAA Ship RAINIER | 08/15/2013 | |

# 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 |
| **TPU** | Total Porpagated 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 |

# 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, Standing and 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 |
|---|---|---|---|
| Richard T. Brennan, CDR/NOAA | Commanding Officer, NOAA Ship RAINIER | 08/15/2013 | |
| Michael O. Gonsalves, LT/NOAA | Field Operations Officer, NOAA Ship RAINIER | 08/15/2013 | Michael O. Gonsalves 2013.08.17 00:59:13 -08'00' |
| James B. Jacobson | Chief Survey Technician, NOAA Ship RAINIER | 08/15/2013 | James Jacobson I have reviewed this document 2013.08.17 21:57:55 -08'00' |
| Damian Manda, LTJG/NOAA | Junior Officer, NOAA Ship RAINIER | 08/15/2013 | Damian Manda 2013.08.17 12:08:15 -06'00' |

# H12518 DTON REPORT

**Registry Number:** H12518

**State:** Alaska

**Locality:** Behm Canal

**Sub-locality:** Vicinity of Burroughs Bay

**Project Number:** OPR-O193-RA-13

**Survey Dates:** 05/09/2013 - 06/18/2013

## Charts Affected

| Number | Edition | Date | Scale (RNC) | RNC Correction(s)* |
|---|---|---|---|---|
| 17424 | 8th | 05/01/2007 | 1:80,000 (17424_1) | [L]NTM: ? |
| 17420 | 28th | 03/01/2007 | 1:229,376 (17420_1) | [L]NTM: ? |
| 16016 | 21st | 10/01/2007 | 1:969,756 (16016_1) | [L]NTM: ? |
| 531 | 24th | 07/01/2007 | 1:2,100,000 (531_1) | [L]NTM: ? |
| 530 | 32nd | 06/01/2007 | 1:4,860,700 (530_1) | [L]NTM: ? |
| 50 | 6th | 06/01/2003 | 1:10,000,000 (50_1) | [L]NTM: ? |

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

## Features

| No. | Feature Type | Survey Depth | Survey Latitude | Survey Longitude |
|---|---|---|---|---|
| 1.1 | Shoal | 2.55 m | 56° 02' 44.2" N | 131° 07' 16.4" W |

*Generated by Pydro v13.8(r4555) on Fri Apr 18 17:11:09 2014 [UTC]*

# 1 - Dangers To Navigation

## 1.1) US 0000269691 00001 / H12518_DTON.000

### DANGER TO NAVIGATION

### Survey Summary

| | |
|---|---|
| **Survey Position:** | 56° 02' 44.2" N, 131° 07' 16.4" W |
| **Least Depth:** | 2.55 m (= 8.36 ft = 1.393 fm = 1 fm 2.36 ft) |
| **TPU (±1.96σ):** | **THU (TPEh)** [None] ; **TVU (TPEv)** [None] |
| **Timestamp:** | 2013-169.00:00:00.000 (06/18/2013) |
| **Dataset:** | H12518_DTON.000 |
| **FOID:** | US 0000269691 00001(022600041D7B0001/1) |
| **Charts Affected:** | 17424_1, 17420_1, 16016_1, 531_1, 530_1, 50_1 |

**Remarks:**

This shoal sounding was identified as a DTON during HCell compilation. It is a 1 fm 2 ft sounding located between a charted 11 fm and a charted 35 fm sounding.

### Hydrographer Recommendations

Chart 1fm 2 ft shoal sounding.

**Cartographically-Rounded Depth (Affected Charts):**

1 ¼fm (17424_1, 17420_1, 16016_1, 530_1)

1fm 2ft (531_1)

2.5m (50_1)

### S-57 Data

| | |
|---|---|
| **Geo object 1:** | Sounding (SOUNDG) |
| **Attributes:** | QUASOU - 6:least depth known |
| | SORDAT - 20130618 |
| | SORIND - US,US,graph,H12518 |
| | TECSOU - 3:found by multi-beam |

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

# TIDE NOTE FOR HYDROGRAPHIC SURVEY

**DATE :** July 24, 2013

**HYDROGRAPHIC BRANCH:** Pacific
**HYDROGRAPHIC PROJECT:** OPR-O193-RA-2013
**HYDROGRAPHIC SHEET:** H12518

**LOCALITY:** Vicinity of Burroughs Bay, Behm Canal, AK
**TIME PERIOD:** May 9 - June 18, 2013

**TIDE STATION USED:** 945-0914 Burroughs Bay, AK
Lat. 56° 02.3'N Long. 131° 06.0' W
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 4.572 meters

**TIDE STATION USED:** 945-0460 Ketchikan, AK
Lat. 55° 20.0' N Long. 131° 37.5' W
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 4.433 meters

**REMARKS: RECOMMENDED ZONING**
**Use zone(s) identified as:** SA79, SA83 and SA84

**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:** Use tide data from the appropriate station with applicable zoning correctors for each zone according to the order in which they are listed in the Tidezone corrector file (*.ZDF). For example, tide station one (TS1) would be the first choice for an applicable zone followed by TS2, etc. when data are not available.

HOVIS.GERALD.THOMAS.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.1365860250
Date: 2013.08.02 08:52:40 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH

Final Tidal zoning for
OPR-O193-RA2013, H12518
Vicinity of Burroughs Bay, Behm Canal
SA84
Time Corrector 0 mins
Range Corrector x1.00
Reference 9450914
9450914 BURROUGHS BAY
SA83
Time Corrector 0 mins
Range Corrector x1.00
Reference 9450914
SA79
Time Corrector 0 mins
Range Corrector x0.99
Reference 9450914
9450460 KETCHIKAN
bing
© Harris Corp, Earthstar Geographics LLC © 2013 Microsoft Corporation

-------- Original Message --------
**Subject:**Re: Kurt Brown's trip Report
**Date:**Thu, 11 Jul 2013 08:59:27 -0400
**From:**Jeffrey Ferguson - NOAA Federal <Jeffrey.Ferguson@noaa.gov>
**To:**Peter Holmberg - NOAA Federal <Peter.Holmberg@noaa.gov>
**CC:**Mike Brown - NOAA Federal <Mike.Brown@noaa.gov>, _OMAO MOP CO Rainier <CO.Rainier@noaa.gov>, David Zezula <David.J.Zezula@noaa.gov>, Marc Moser - NOAA Federal <Marc.S.Moser@noaa.gov>

Nice report. I would just like to comment on the little corner gaps in the nearshore coverage.

Yes, Ops can try to smooth those out, but we also need a little common sense all along the pipeline. If a little triangle isn't Nav Sig and you need to zoom in to even see it in detail, then a launch shouldn't be backing and filling taking a bunch of time to fill it in. And PHB shouldn't "ding" the field for not doing so. They got nice clean near shore coverage that is more than sufficient to meet the intent.

Thanks,

Jeff

*******************
Jeffrey Ferguson
NOAA, Office of Coast Survey
Chief, Hydrographic Surveys Division
office: 301-713-2700 x124
cell: 240-753-4729

On Wed, Jul 10, 2013 at 12:06 PM, Peter Holmberg - NOAA Federal <peter.holmberg@noaa.gov> wrote:

> All,
>
> Kurt Brown recently sailed on Rainier for a 3 week leg. His trip report is available at http://ocsnavigator.nos.noaa/divisions/hsd/PHB/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2Fdivisions%2Fhsd%2FPHB%2FShared%20Documents%2FPHB%20Trip%20Reports%2F2013%20PHB%20Trip%20Reports&FolderCTID=0x012000630F266706EA064B83E0D1DC41969B68&View={987D5304-B3B9-4157-A544-9E9D3450E068}
>
> It is also attached to this email.
>
> Pete
>
> --
> Peter Holmberg
> Cartographic Team Lead
> Pacific Hydrographic Branch
> 7600 Sand Point Way N.E.
> Seattle, WA 98115
> 206-526-6843

APPROVAL PAGE

**H12518**

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 NGDC for archive

- H12518_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12518_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications.

Digitally signed by HOLMBERG.PETER.SCOTT.1365886101
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOLMBERG.PETER.SCOTT.1365886101
Date: 2014.07.24 07:57:12 -07'00'

Approved:________________________________________________

**Peter Holmberg**
**Cartographic Team Lead, Pacific Hydrographic Branch**

The survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

EVANS.BENJAMIN.K.1237217094
2014.07.25 11:07:00 -07'00'

Approved:________________________________________________

**LCDR Benjamin K. Evans, NOAA**
**Chief, Pacific Hydrographic Branch**