

H11610

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

*Type of Survey* ..... HYDROGRAPHIC

*Field No.* ..... n/a

*Registry No.* ..... H11610

### LOCALITY

*State* ..... Alaska

*General Locality* ..... Approaches to Cordova, Alaska

*Sublocality* ..... St. Matthews Bay to Gravina Point

2006

### CHIEF OF PARTY

..... Commander Andrew L. Beaver, NOAA

### LIBRARY & ARCHIVES

DATE .....

**HYDROGRAPHIC TITLE SHEET**

H11610

INSTRUCTIONS - The hydrographic sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the office.

FIELD NO.  
n/a

State Alaska

General Locality Approaches to Cordova

Sublocality Saint Matthews Bay to Gravina Point

Scale 1:10,000

Date of Survey 10 Sep to 26 Oct, 2006

Instructions Dated 8/4/2006

Project No. OPR-P158-FA-06

Vessel FAIRWEATHER S220

Chief of Party CDR Andrew L. Beaver, NOAA

Surveyed by FAIRWEATHER Personnel

Soundings taken by echo sounder Reson 8111ER, Reson 8101

Graphic record scaled by N/A

Graphic record checked by N/A

Evaluation by Matt Andring

Automated plot by N/A

Verification by Fernando Ortiz

Soundings in Fathoms and Feet

at

MLLW

REMARKS: Time in UTC. UTM Projection Zone 6

Revisions and annotations appearing as endnotes were  
generated during office processing.

As a result, page numbering may be interrupted or non-sequential.

All separates are filed with the hydrographic data.

# Descriptive Report to Accompany Hydrographic Survey H11610

Project OPR-P158-FA-06  
Approaches to Cordova, Alaska  
Scale 1:10,000  
October 2006

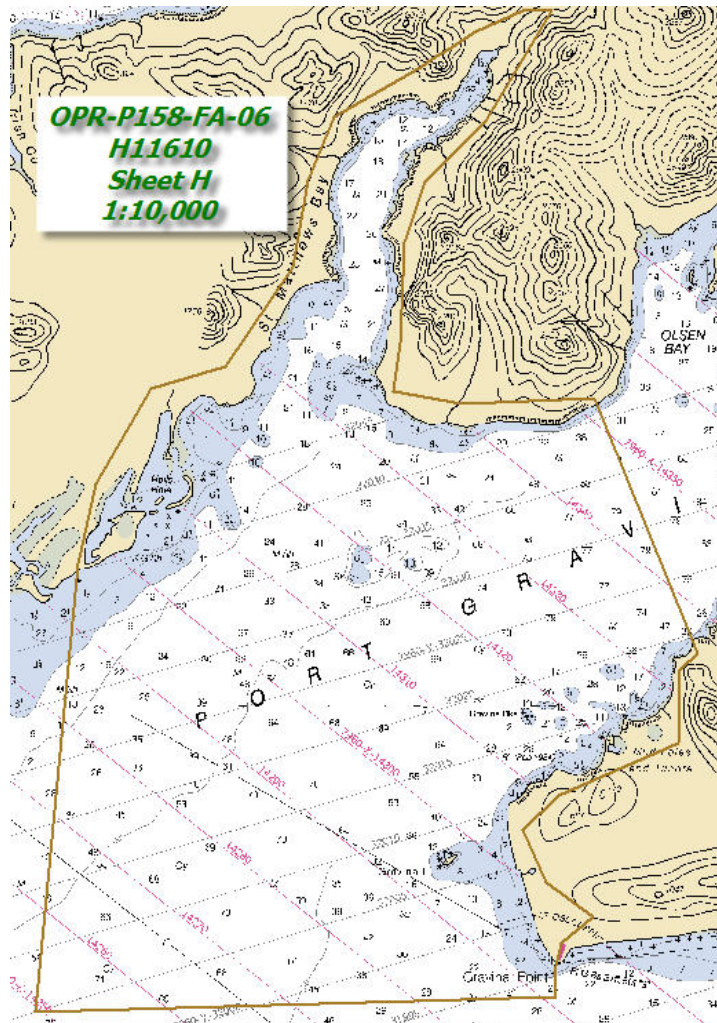
**NOAA Ship FAIRWEATHER**

Chief of Party: Commander Andrew L. Beaver, NOAA

## A. AREA SURVEYED

The survey area was located in Approaches to Cordova, within the sub-locality of St. Matthews Bay to Gravina Point. This survey corresponds to Sheet H in the sheet layout provided with the Letter Instructions, as shown in *Figure 1* below. The survey area is bounded on the Southwest corner at 60°36'50"N, 146°26'15"W and the Northeast corner at 60°48'00"N, 146°11'00"W.

Data acquisition was conducted from September 10 to October 26, 2006 (DN 253 to DN 299).



*Figure 1: H11610 Sheet Limits*

One hundred percent multibeam echo sounder (MBES) coverage was obtained in the survey area offshore of the 8-meter depth curve<sup>1</sup>. When conditions allowed, multibeam echo sounder (MBES) data was acquired parallel to contours and at a line spacing of no less than 25 meters at depths between four and eight meters. Additional coverage was obtained when determining least depths over features or shoals offshore of the Navigational Area Limit Line (NALL), which is defined as the furthest offshore of the either the 4-meter depth contour or 0.8mm distance of the scale of the largest chart of the area from the Mean High Water line<sup>2</sup>.

Shoreline data were acquired for H11610. These data were attributed as S-57 objects for submittal.

## B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition/processing systems and survey vessels along with quality control procedures and data processing methods are included and described in the *OPR-P158-FA-06 Data Acquisition and Processing Report (DAPR)*<sup>3</sup>, submitted under separate cover. Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections. This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-P158-FA, dated August 4, 2006 and Change No. 2, dated October 6, 2006.

### B1. Equipment and Vessels

Equipment and vessels used for data acquisition and survey operations during this survey are listed below in *Table 1*.

|   | FAIRWEATHER              | Jensen Launch 1010  | Jensen Launch 1018   | MonArk    | Ambar 700               |
|---|--------------------------|---------------------|----------------------|-----------|-------------------------|
| <b>Hull Registration Number</b>             | S220                     | 1010                | 1018                 | 1706      | 2302                    |
| <b>Builder</b>                              | Aerojet-General Shipyard | The Boat Yard, Inc. | The Boat Yard, Inc.  | MonArk    | Marine Silverships, Inc |
| <b>Length Overall</b>                       | 231 feet                 | 28' 10"             | 28' 10"              | 17'       | 23'                     |
| <b>Beam</b>                                 | 42 feet                  | 10' 8"              | 10' 8"               | 7'2"      | 9' 4"                   |
| <b>Draft, Maximum</b>                       | 15' 6"                   | 4' 0" DWL           | 4' 0" DWL            | 1' 3"     | 1' 4"                   |
| <b>Cruising Speed</b>                       | 13.0 knots               | 24 knots            | 24 knots             | 20 knots  | 22 knots                |
| <b>Max Survey Speed</b>                     | 10 knots                 | 10 knots            | 10 knots             |           |                         |
| <b>Primary Echosounder</b>                  | RESON 8111               | RESON 8101          | RESON 8101           |           |                         |
| <b>Sound Velocity Equipment</b>             | MVP 200                  | SBE 19plus          | SBE19plus            |           |                         |
| <b>Attitude &amp; Positioning Equipment</b> | POS/MV V3                | POS/MV V3           | POS/MV V3            |           |                         |
| <b>Type of operations</b>                   | MBES                     | MBES                | MBES, Bottom Samples | Shoreline | Shoreline               |

*Table 1: Vessel Inventory*

No vessel configurations used during data acquisition deviated from the *DAPR*.

## B2. Quality Control

Internal consistency and integrity of data collected for survey H11610 were manually examined by the Hydrographer in CARIS Subset Editor. The internal consistency and integrity of data collected for survey H11610 were found to be very good<sup>4</sup>.

### Crosslines

Shallow water multibeam crosslines for this survey totaled 33.55 linear nautical miles (lnm), comprising 6.73% of the 498.67 lnm of total SWMB hydrography. Both main scheme and cross line mileage are summarized in *Table 2*.

| MAIN SCHEME - Mileage                       |  |
|---|--|
| Single Beam MS                              | 0  |
| Multibeam MS mileage                        | 498.665776   |
| SideScan MS                                 | 0  |
| <b>Total MS</b>                             | <b>498.665776</b>  |
| CROSSLINE - Mileage                         |  |
| Single Beam XL                              | 0  |
| Multibeam XL                                | 33.5557723   |
| <b>Total XL</b>                             | <b>33.5557723</b>  |
| OTHER                                       |  |
| Developments/AWOIS - Mileage                | 0  |
| Shoreline/Nearshore Investigation - Mileage | 22.3   |
| <b>Total # of Investigated Items</b>        | <b>21</b>  |
| <b>Total Bottom Samples</b>                 | <b>25</b>  |
| <b>Total SNM</b>                            | <b>35</b>  |
| <b>Specific Dates of Acquisition</b>        | 9/10, 9/11, 9/24, 9/25, 9/27, 9/28, 10/4, 10/7, 10/17, 10/18, 10/22, 10/24-10/26 |
| <b>Specific Dn#s of Acquisition</b>         | Dn 253, 254, 267, 268, 270, 271, 277, 280, 290, 291, 295, 297-299                |

*Table 2: H11610 MBES Statistics*

The Hydrographer has determined through manual examination of the data that the cross line agreement with main scheme data meet the vertical accuracy requirements as stated in the *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM), June 2006*. On average, the agreement was less than .5m<sup>5</sup>

### Junctions

Survey H11610 junctions with H11611, H11609, and H11608 which are Sheets J, G, and E, respectively, of the same project. The area of overlap between the sheets was approximately 300, 125, and 500 meters wide, respectively. Data were reviewed in CARIS Subset Editor and depths were found to be consistent between H11610 and the other three surveys<sup>6</sup>, meeting the requirements as stated in section 5.1.1.1 of the *HSSDM*. The sheet limits for Sheets H, J, E, and G are shown in *Figure 2*.

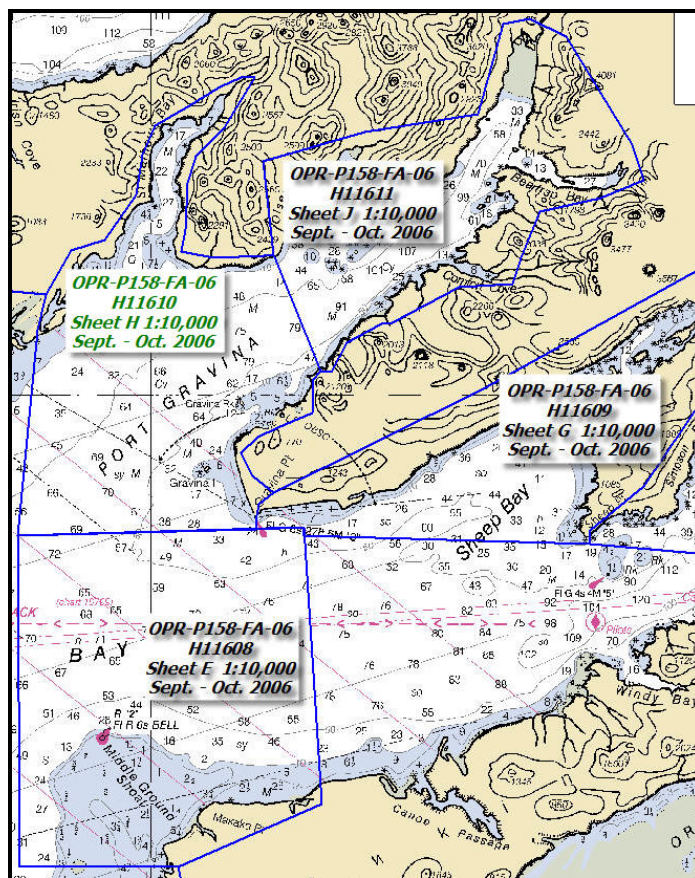


Figure 2: Junctions between H11610, H11611, H11609 and H11608

### Quality Control Checks

MBES quality control checks were conducted as discussed in the quality control section of the DAPR.

### Data Quality Factors

#### COVERAGE ASSESSMENT:

Coverage assessment was determined using the following base surface resolutions listed below in Table 3.

| Depth Ranges (m) |      | Resolution (m) |
|------------------|------|----------------|
| Low              | High |                |
| 0                | 40   | 2              |
| 30               | 70   | 5              |
| 50               | 120  | 10             |
| 100              | 200  | 20             |

Table 3: Depth Ranges and Resolutions

In the case that the holiday was larger than 3 nodes across (see Figure 3), the corresponding multibeam backscatter sidescan was examined and no navigationally significant items were found; additionally, the least depths were represented<sup>7</sup>.



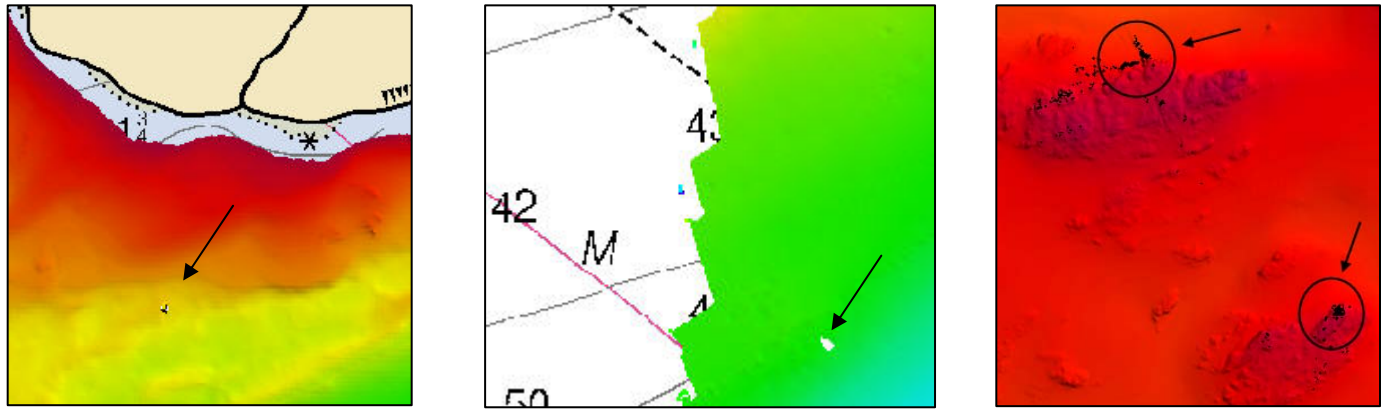


Figure 3: Holidays in the 10m (left), 5m (center) and 2m (right) surfaces

#### DESIGNATED SOUNDINGS:

Designation of soundings followed procedures as outlined in the *DAPR*.

#### TRUEHEAVE:

TrueHeave data was not be applied to MBES data on October 17, 2006 (DN 290) for the MBES survey lines collected by launch 1010 because it was not logged. TrueHeave data was not applied to a small portion of MBES on October 25, 2006 (DN 298) because of an error regarding UTC midnight. TrueHeave data was not applied to two MBES lines on September 27, 2006 (DN 270) because it failed to be logged during acquisition. All lines lacking TrueHeave have been noted in the Acquisition & Processing Log included in the Separates folder. MBES data quality from those days does not appear to have been affected by the lack of TrueHeave due to the negligible swell in the protected waters of Port Gravina<sup>8</sup>.

#### ROLL

As mentioned in the *DAPR*, roll issues were found to be present in some of the MBES data collected from launches 1018 and 1010. Roll issues were found in survey H11610 during all days of data acquired by launch 1018 (DN 267, 268, 270, 277, 290), which were caused by the swing arm transducer mount. To help eliminate roll issues, Fairweather personnel evaluated and adjusted daily HVF files using adjacent lines for the aforementioned days when roll errors were present. After adjustments to the HVF were made, most data met accuracy specifications as stated within the *HSSDM*, with some roll artifacts still present south of Hells Hole (see *Figure 4*).<sup>9</sup>

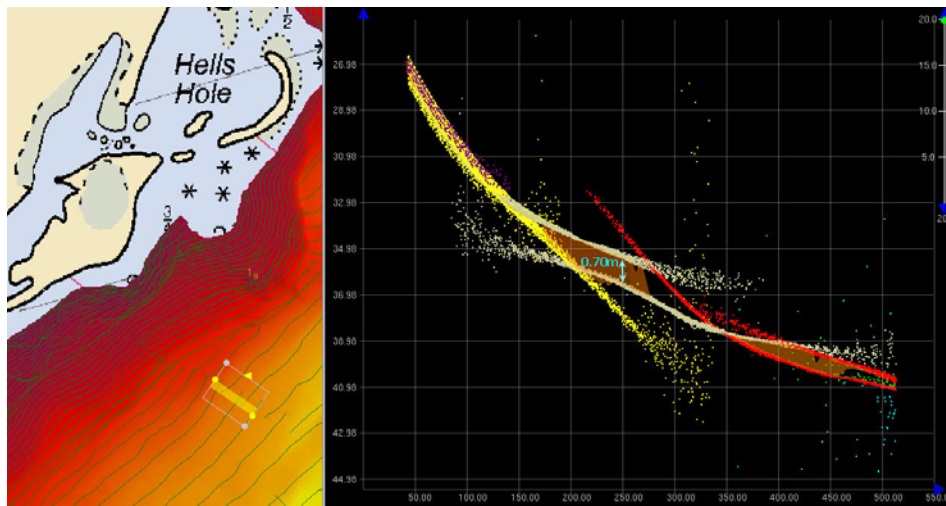
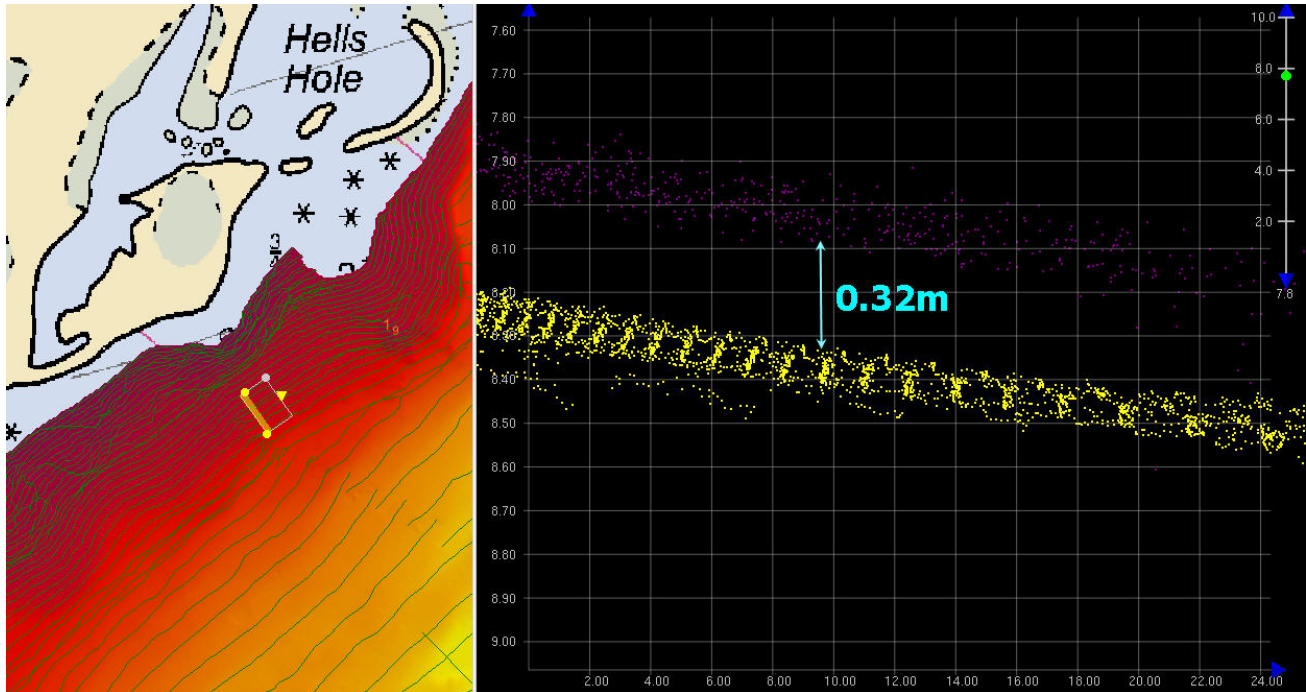


Figure 4: Roll artifacts south of Hells Hole

## UNUSUAL CONDITIONS

There is a vertical offset between survey launches 1010 and 1018 as depicted in *Figure 5*. The areas of overlap between the vessels were examined in CARIS subset mode and despite the offset, the data meet accuracy specifications as stated within the *HSSDM*.

The IMU on launch 1018 failed the tumble test administered by Applanix, a Trimble company. See email correspondence located in Appendix IV. This issue may have affected data quality and could perhaps also account for some of the differences stated above in the ‘ROLL’ section<sup>10</sup>.



*Figure 5: 1010/1018 vessel offset*

## Accuracy Standards

All data meet the data accuracy specifications as stated section 5.1.1.1 of the *HSSDM*<sup>11</sup>.

## B3. Corrections to Echo Soundings

Data reduction procedures for survey H11610 conform to those detailed in the *DAPR*.

## B4. Data Processing

There are six total fieldsheets fulfilling the various resolution requirements for survey H11610. Fieldsheet H11610 is the largest, encompassing the entire survey area to the five-, ten-, and twenty-meter resolutions. Five additional fieldsheets (H11610\_North, H11610\_West, H11610\_East, H11610\_Southeast, and H11610\_Central) cover the areas of the survey near coastline or shoals. These fieldsheets include surfaces of two meter resolution. The fieldsheet areas of coverage are displayed in *Figure 6*.



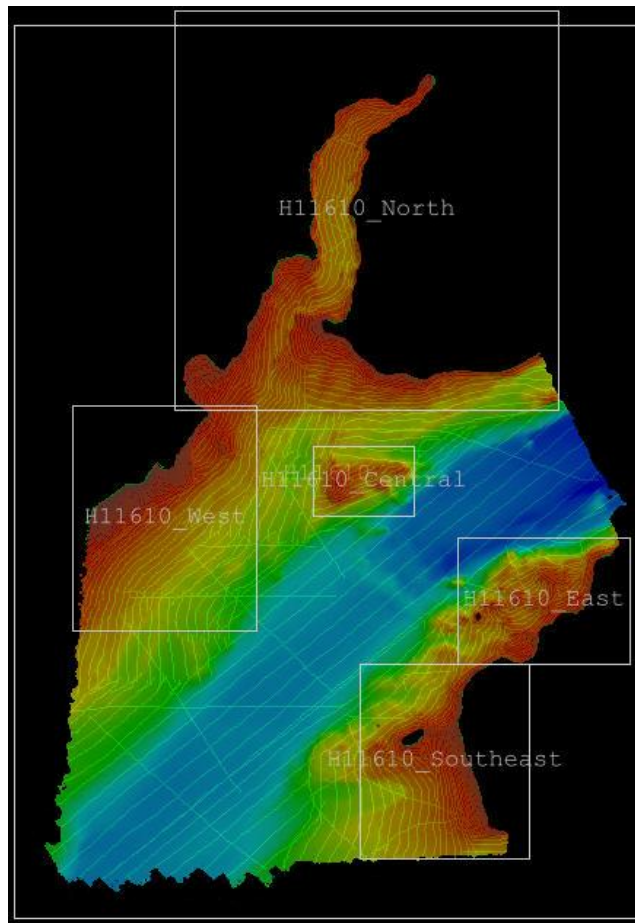


Figure 6: H11610 Field Sheets

### C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H11610 can be found in the *OPR-P158-FA-06 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

#### Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections came from the U.S. Coast Guard beacons at Cape Hinchinbrook (292 kHz), Potato Point (298 kHz) and Kenai (310 kHz).

Distances from the U.S. Coast Guard beacons combined with fjord-like topography created weak signal to noise ratios for the DGPS corrections within the project area. Occasionally the corrector signal from a beacon would be lost. When that occurred a launch would move away from the shoreline to re-acquire the signal (Launch 1010, Dn271 & 277) or switch to another corrector station (Launch 1010, Dn291). These lines have been noted in the Acquisition & Processing Log<sup>12</sup> included in the Separates folder. Switching stations is known to shift the relative horizontal position by a few meters, which causes vertical errors in regions with steep slope. Data affected by this issue has been reviewed and it meets the horizontal accuracy required by the *HSSDM*.

## Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Cordova, AK (945-4050) served as control for datum determination and as the primary source for water level reducers for survey H11610 during acquisition. Data were collected for the NWLON tertiary tide station listed below, although this data was not applied to final water levels for the project.

FAIRWEATHER personnel installed one Sutron 8210 “bubbler” tide gauge (Gauge #A4 S/N 002326) at the tertiary station listed below. The gauge was installed in order to provide information to Center for Operational Oceanographic Products and Services (CO-OPS N/OPS1).

| Station Name      | Station Number | Type of Gauge | Date of Installation | Date of Removal  |
|-------------------|----------------|---------------|----------------------|------------------|
| Gravina River, AK | 945-4153       | Tertiary      | October 17, 2006     | October 26, 2006 |

A request for delivery of final approved water level data (smooth tides) for survey H11610 was forwarded to N/OPS1 on October 30, 2006 in accordance with the *Field Procedures Manual v2p1*, dated May 2006 (FPM). A copy of the request is included in Appendix V<sup>13</sup>.

FAIRWEATHER received the Tide Note for Hydrographic Survey H11610 on November 9, 2006. The Tide Note for Hydrographic Survey H11610 states that preliminary zoning is accepted as the final zoning correctors. Final approved water level data were received by the FAIRWEATHER on November 9, 2006 for NWLON primary tide station Cordova (945-4050). The Tide Note for Hydrographic Survey H11610 is included in Appendix V.

As per the Letter Instructions, all data were reduced to MLLW using the final approved water levels (smooth tides) from station Cordova (945-4050) by applying tide file 9454050.tid and time and height correctors through the zone corrector file P158FA2006CORP.zdf. It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.

## D. RESULTS AND RECOMMENDATIONS

### D.1 Chart Comparison

Chart comparisons were carried out using Caris and MapInfo. CUBE surfaces, created for the appropriate resolutions dependent on survey depths, were finalized and brought into Field Sheet Editor in HIPS 6.1. A sounding layer was created for each surface and then exported to an S57 file. This file was then converted to a MapInfo Table, enabling chart comparisons to be carried out in MapInfo where the soundings from the ENC could be imported and overlaid on the soundings generated from the survey CUBE surfaces.

Survey H11610 was compared with chart US4AK24M.000 (9<sup>th</sup> Ed.; March 2007, 1:79,291). The ENC has been updated with the Notice to Mariners through January 2007. There was one new update to the survey

area which was applied to the ENC. The chart comparison was performed in MapInfo, where the soundings from the ENC were imported and overlaid on the soundings generated from the survey BASE surface. For easier viewing, the ENC soundings were colored cyan with a red border, and the survey soundings were colored yellow with a green border.

**Chart US4AK24M.000**

Chart comparisons with chart US4AK24M agreed within 1-2 meters with the following exceptions:

- 35m (on average) shoal sounding vs. charted 45.7m sounding at position 60°39'49.64" N 146°14'46.84" W (see Figure 7)
- 68m (on average) deep sounding vs. charted 51.2m sounding at position 60°39'34.21" N 146°16'36.70" W (see Figure 8)
- 12m (on average) shoal sounding vs. charted 14.6m sounding at position 60°38'19.15" N 146°17'15.73" W
- 140m (on average) deep sounding vs. charted 128m sounding at position 60°40'43.98" N 146°16'18.25" W
- 103m (on average) shoal sounding vs. charted 113.3m sounding at position 60°40'15.47" N 146°16'02.52" W

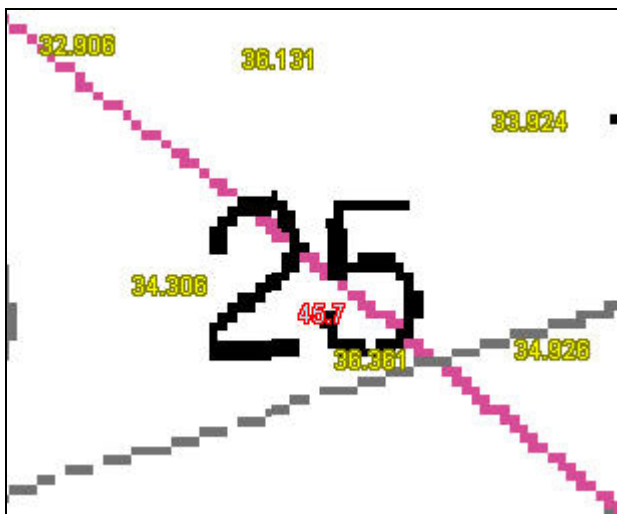


Figure 7: Charted 45.7m vs. ~35m surveyed

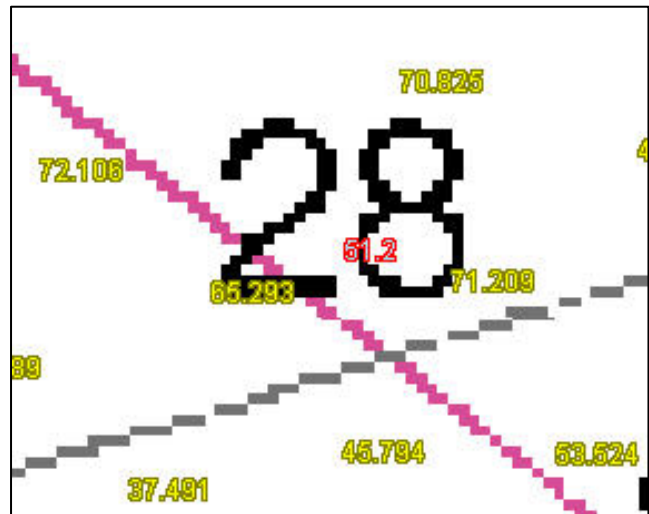


Figure 8: Charted 51.2m vs. ~68m surveyed

**Chart Comparison Recommendations**

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSDM*. The BASE surfaces with the application of designated soundings are adequate to supersede prior surveys in their common areas<sup>14</sup>. Based on the application of verified water level data (smooth tides) by FAIRWEATHER, final chart comparisons are not required by the Pacific Hydrographic Branch.

**Automated Wreck and Obstruction Information System (AWOIS) Investigations**

There were 3 AWOIS items located within the limits of H11610. All AWOIS items are addressed in the H11610\_Features.pdf in Appendix II<sup>15</sup>.

## **Dangers to Navigation**

Five dangers to navigation were found and reported to the Marine Charting Division for final submission to the Seventeenth Coast Guard District on February 9, 2007. A copy of the preliminary Danger to Navigation Report is included with the Pydro Preliminary Smooth Sheet (PSS) as well as in Appendix I<sup>16</sup>.

## **D.2 Additional Results**

### **Shoreline Source**

Source shoreline for this sheet was taken from photogrammetric survey AK0402 (NAD 83) GC-10570 at the scale of 1:30,000. The CFF shoreline was imported into CARIS Notebook 2.2 as an editable layer named H11610\_edited\_CFF\_shoreline.hob, with all objects having S57 attribution.

### **Shoreline Verification**

FAIRWEATHER personnel conducted limited shoreline verification at times near predicted low water, in accordance with the Standing Project Instructions and Hydrographic Surveys Technical Directive 2006-2. Detached positions (DPs) and generic positions (GPs) acquired during shoreline verification were recorded in TerraSync and on paper DP forms. Scanned copies of the DP forms are included in the digital Separates folder and hard copies can be found with the *Separates to be Included with Survey Data*. In addition, annotations describing shoreline were recorded on hard copy plots of the digital shoreline<sup>17</sup>.

### **Shoreline Data Processing**

Positions acquired during shoreline verification operations were processed in GPS Pathfinder Office and inserted into Pydro using the Generic GPs/DPs Import tool and database import function. Features were entered as Detached Positions (DPs) when tide correctors were required, while Generic Positions (GPs) were used if no tide correction was needed. The DPs and GPs indicate new features, revisions to features, or features not found during shoreline verification. All features in Pydro were S57 attributed.

All accepted and primary detached and generic positions including any pertinent Lidar and AWOIS investigation items were imported from the Pydro .xml into two separate stand alone .hob files in CARIS Notebook 2.2. These were named H11610\_Updates.hob and H11610\_Charted\_Disprovals.hob.

### **Source Shoreline Changes, New Features and Charted Features**

Items for survey H11610 associated with a detached or generic position that needed further discussion were flagged Report in Pydro. Investigation or survey methods were listed under the Remarks tab and, when appropriate, recommendations to the cartographer were included in the Recommendations tab. A survey feature report for shoreline items was generated and included as H11610\_Features\_Report.pdf in Appendix II.

The H11610\_edited\_CFF\_shoreline.hob, compiled in CARIS Notebook, had new items digitized and existing features from the CFF and chart modified or deleted as necessary. New and modified items are denoted with the SORIND field filled in for the current survey. Features to be retained as depicted by the source shoreline file were left with their original SORIND value. One exception is when only small sections of the source item was edited, rather than update the entire items SORIND field, marker notes were used to indicate the section of the item that was modified by the current survey. Field notes made by the Hydrographer on the boat sheets and DP forms were transferred to the remarks field for each feature.

### Shoreline Recommendations

The Hydrographer recommends that the shoreline depicted in the CARIS Notebook files and final sounding files supersede and complement shoreline information compiled on the CFF and charts<sup>18</sup>.

### Aids to Navigation

Survey H11610 included one aid to navigation (ATON). Detached positions were taken for check purposes only. The ATON was found to serve its intended purpose<sup>19</sup>.

The following fixed ATON (*Table 4*) was positioned using static GPS survey methods:

| Light List Name       | Light List Number | ITRF00 (EPOCH:2006.7803)        |                                  | Ellipsoid Ht. (m) (Pk to Pk Err. (m)) | NAVD88 Ortho Ht. (m) (Pk to Pk Err. (m)) | Satellite Ephemeris File |
|-----------------------|-------------------|---------------------------------|----------------------------------|---------------------------------------|--|--------------------------|
|                       |                   | N. Latitude (Pk to Pk Err. (m)) | W. Longitude (Pk to Pk Err. (m)) |                                       |  |                          |
| GRAVINA POINT LIGHT 3 | 25545             | 60° 37' 22.16480" (0.034)       | 146° 15' 13.42904" (0.023)       | 23.969 (0.087)                        | 11.851 (0.090)                           | Precise                  |

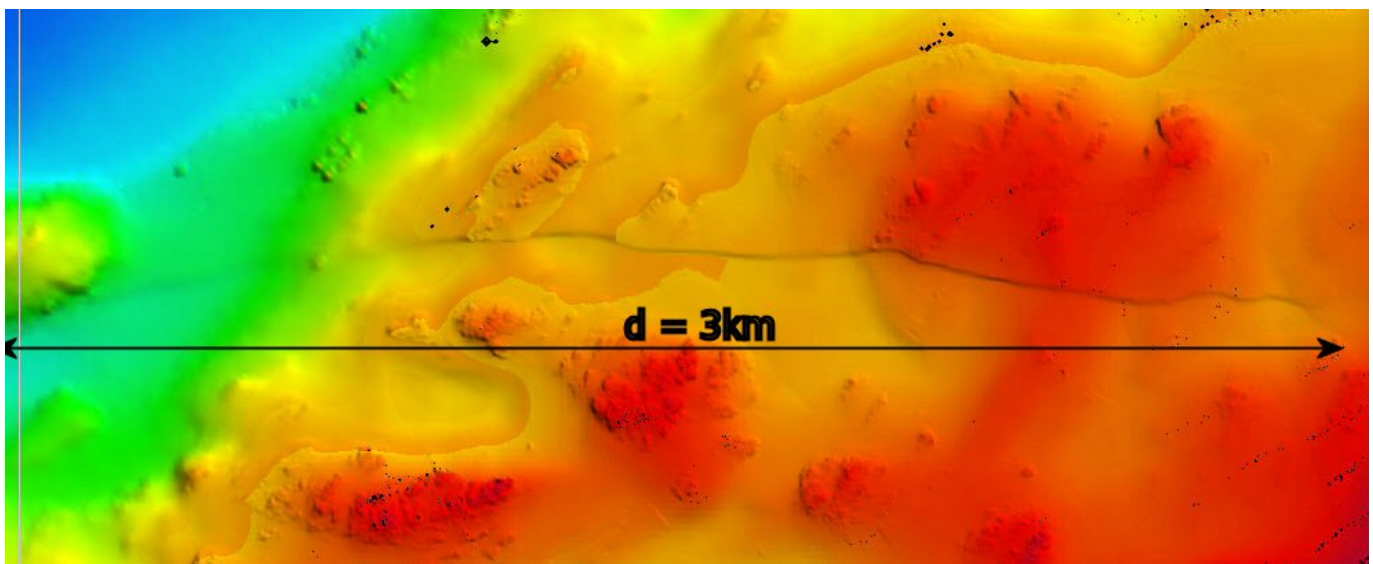
*Table 4: Fixed ATON positioned in sheet H11610*

### Bottom Samples

Bottom samples were collected on October 24, 2006 (DN 297) and are included as seabed classifications along with the other S57 features in the Pydro Preliminary Smooth Sheet. The bottom sample positions were also imported to the Notebook H11610\_Updates.hob file<sup>20</sup>.

### Miscellaneous

A submarine feature in the eastern portion of sheet H11610 was discovered with MBES. It is believed to be a fault line from the 1964 earthquake in the area; imagery was sent to the US Geological Survey office in Anchorage, AK. See email correspondence located in Appendix IV and *Figure 9*<sup>21</sup>.



*Figure 9: Suspected fault line in Port Gravina*



## **E. Supplemental Reports**

Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:

| <b><u>Title</u></b>                                   | <b><u>Date Sent</u></b> | <b><u>Office</u></b> |
|---|-------------------------|----------------------|
| Hydrographic Systems Readiness Review 2006            | May 18, 2006            | N/CS34               |
| OPR-P158-FA-06 Data Acquisition and Processing Report | April 10, 2007          | N/CS34               |
| OPR-P158-FA-06 Horizontal & Vertical Control Report   | Nov. 8, 2006            | N/CS34, N/OPS1       |

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**UNITED STATES DEPARTMENT OF COMMERCE**

National Oceanic and Atmospheric Administration  
NOAA Marine and Aviation Operations  
NOAA Ship FAIRWEATHER S-220  
1010 Stedman Street  
Ketchikan, AK 99901

June 6, 2007

MEMORANDUM FOR: CDR Donald W. Haines, NOAA  
Chief, Pacific Hydrographic Branch

FROM: CDR Andrew L. Beaver, NOAA  
Commanding Officer

Andrew L. Beaver  
I am approving this  
document  
2007.06.06 13:40:56  
-08'00'

TITLE: Approval of Hydrographic Survey H11610,  
OPR-P158-FA

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H11610 in accordance with the Hydrographic Manual, Fourth Edition; Hydrographic Survey Guidelines; Field Procedures Manual, May 2006 Version 2.1; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for June, 2006. Additional guidance was provided by applicable Hydrographic Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

I acknowledge that all of the information contained in this report is complete and accurate to the best of my knowledge.

In addition, the following individuals were responsible for oversight of acquisition and processing of this survey:

Matthew Glazewski  
I am the author of this document  
2007.06.06 12:30:59 -08'00'

---

ENS Matthew Glazewski  
Survey Manager

Jennifer Dowling  
I have reviewed this document  
2007.06.06 12:29:10 -08'00'

---

LT Jennifer Dowling  
Field Operations Officer

Grant Froelich  
I have reviewed this document  
2007.06.11 16:13:53 Z

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CST Grant Froelich  
Chief Survey Technician

Attachment



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## Revision compiled during office processing and certification

<sup>1</sup> Concur.

<sup>2</sup> Concur.

<sup>3</sup> Filed with the project records.

<sup>4</sup> Concur with clarification some data was rejected during the Survey Acceptance Review. All data used to compile Hcell meets or exceed IHO 1 data specifications.

<sup>5</sup> Concur.

<sup>6</sup> Concur.

<sup>7</sup> Concur.

<sup>8</sup> Concur.

<sup>9</sup> Concur with clarification, Data from launches 1010 and 1018 was edited due to the roll error. The HVF files did not match the values documented in DAPR.

<sup>10</sup> Concur.

<sup>11</sup> Concur with clarification. Numerous inconsistencies between DAPR and Hips Vessel Files. Coverage requirements were not met due to some holidays. Shoreline files were not included as described with the special directions laid out in the letter instructions.

<sup>12</sup> Filed with hydrographic records.

<sup>13</sup> Tide note is appended to this report.

<sup>14</sup> Concur.

<sup>15</sup> Concur. The features report appended to this report.

<sup>16</sup> Concur with clarification. All 5 DTONs have been applied to the charts.

<sup>17</sup> Concur.

<sup>18</sup> Concur.

<sup>19</sup> Use latest ATONIS information for charting.

<sup>20</sup> Concur.

<sup>21</sup> Filed with hydrographic records.

# H11610 Features Report

**Registry Number:** H11610  
**State:** Alaska  
**Locality:** Approaches to Cordova  
**Sub-locality:** St. Matthews Bay to Gravina Point  
**Project Number:** OPR-P158-FA-06  
**Survey Dates:** 9/10/06 - 10/26/06

Items for survey H11610 associated with a detached or generic position that needed further discussion were flagged Report in Pydro. Investiagation methods and recommendations were provided in the remarks and recommendations tabs.

## Charts Affected

| Number | Edition | Date       | Scale (RNC)         | RNC Correction(s)*  |
|--------|---------|------------|---------------------|---|
| 16708  | 27th    | 11/01/2008 | 1:79,291 (16708_1)  | USCG LNM: 05/05/2009 (08/18/2009)<br>CHS NTM: None (07/31/2009)<br>NGA NTM: 06/02/2001 (08/29/2009) |
| 16709  | 23rd    | 04/01/2005 | 1:80,000 (16709_1)  | [L]NTM: ?   |
| 16700  | 29th    | 07/01/2004 | 1:200,000 (16700_1) | [L]NTM: ?   |
| 16013  | 29th    | 11/01/2003 | 1:969,761 (16013_1) | [L]NTM: ?   |
| 531    | 23rd    | 01/01/2006 | 1:2,100,000 (531_1) | [L]NTM: ?   |
| 500    | 8th     | 06/01/2003 | 1:3,500,000 (500_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 | AWOIS Item |
|-----|--------------|--------------|-----------------|------------------|------------|
| 1.1 | Rock         | -1.06 m      | 60° 44' 10.3" N | 146° 19' 47.8" W | ---        |
| 1.2 | GP           | [None]       | 60° 41' 16.7" N | 146° 25' 07.9" W | ---        |
| 1.3 | GP           | [None]       | 60° 41' 16.2" N | 146° 25' 02.9" W | ---        |
| 1.4 | GP           | [None]       | 60° 41' 12.9" N | 146° 25' 08.3" W | ---        |
| 2.1 | AWOIS        | [no data]    | [no data]       | [no data]        | ---        |
| 2.2 | AWOIS        | [no data]    | [no data]       | [no data]        | ---        |
| 2.3 | GP           | [None]       | 60° 39' 30.7" N | 146° 15' 13.4" W | 53489      |

|     |       |         |                 |                  |     |
|-----|-------|---------|-----------------|------------------|-----|
| 3.1 | Shoal | 15.31 m | 60° 42' 26.2" N | 146° 14' 03.2" W | --- |
| 3.2 | Shoal | 2.25 m  | 60° 44' 01.2" N | 146° 19' 57.7" W | --- |
| 3.3 | Shoal | 1.86 m  | 60° 41' 32.6" N | 146° 23' 05.0" W | --- |
| 3.4 | Shoal | 9.77 m  | 60° 45' 07.1" N | 146° 18' 52.6" W | --- |
| 3.5 | Shoal | 3.84 m  | 60° 41' 19.4" N | 146° 19' 24.2" W | --- |



### **3 - Dangers to Navigation**

**3.1) 1643/38****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 60° 42' 26.2" N, 146° 14' 03.2" W  
**Least Depth:** 15.31 m (= 50.24 ft = 8.373 fm = 8 fm 2.24 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.989$  m ; **TVU (TPEv)**  $\pm 0.299$  m  
**Timestamp:** 2006-253.18:08:48.268 (09/10/2006)  
**Survey Line:** h11610 / fa\_1010\_reson8101 / 2006-253 / 253-1754  
**Profile/Beam:** 1643/38  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:****Feature Correlation**

| Address                                    | Feature | Range | Azimuth | Status  |
|--|---------|-------|---------|---------|
| h11610/fa_1010_reson8101/2006-253/253-1754 | 1643/38 | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

The Hydrographer recommends removing the 14 fathom sounding from chart 16708 and adding an 8-1/4 fathom obstruction (Chart 1 - K.41) in the measured location.

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

8 ¼fm (16708\_1, 16700\_1, 16013\_1)

8fm 2ft (531\_1)

15.3m (500\_1, 50\_1)

**S-57 Data**

[None]

**Office Notes**

Concur with clarification. Chart 8 fathom 2 foot sounding.

### Feature Images

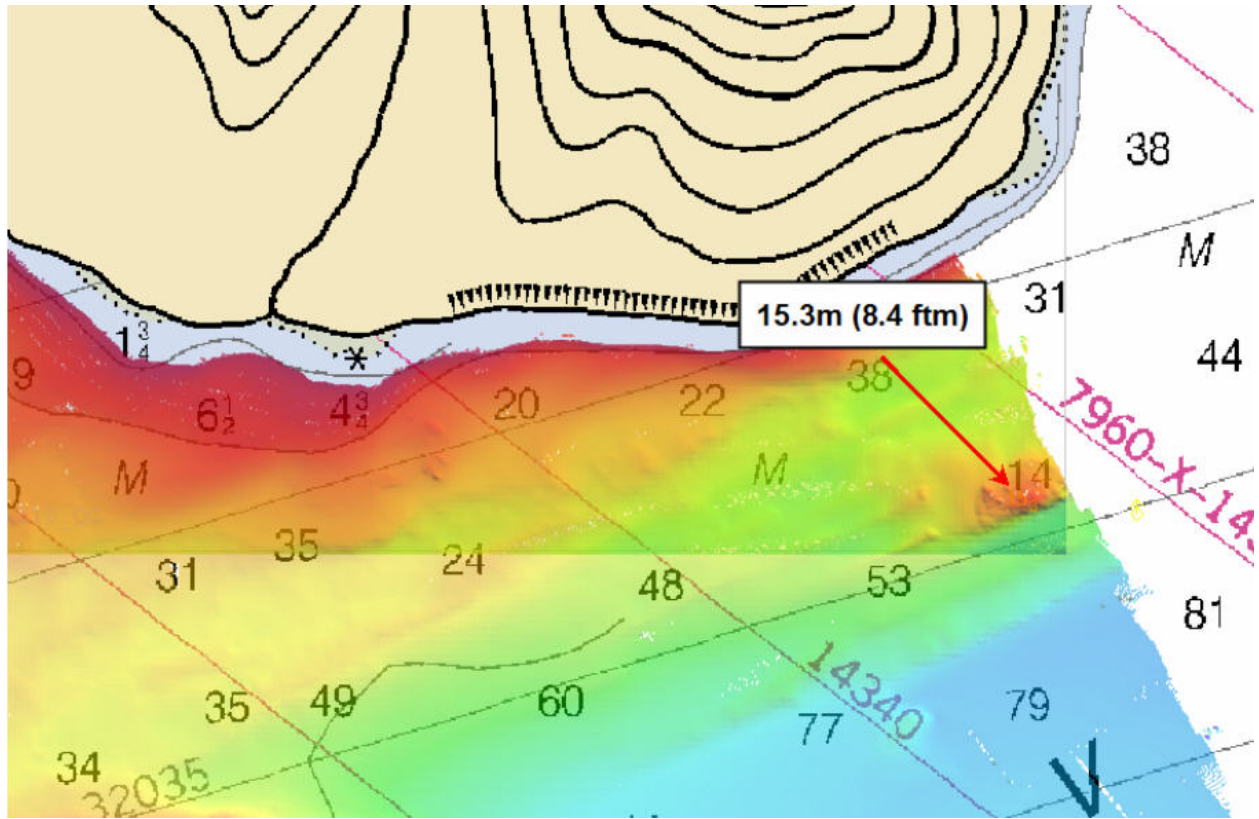


Figure 3.1.1

**3.2) 425/11****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 60° 44' 01.2" N, 146° 19' 57.7" W  
**Least Depth:** 2.25 m (= 7.39 ft = 1.231 fm = 1 fm 1.39 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.987$  m ; **TVU (TPEv)**  $\pm 0.301$  m  
**Timestamp:** 2006-272.01:12:30.331 (09/29/2006)  
**Survey Line:** h11610 / fa\_1010\_reson8101 / 2006-271 / 272-0109  
**Profile/Beam:** 425/11  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

| Address                                    | Feature | Range | Azimuth | Status  |
|--|---------|-------|---------|---------|
| h11610/fa_1010_reson8101/2006-271/272-0109 | 425/11  | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

The Hydrographer recommends removing the 4-3/4 fathom sounding from chart 16708 and adding an 1-1/4 fathom sounding in the measured location.

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

1 ¼fm (16708\_1, 16700\_1, 16013\_1)

1fm 1ft (531\_1)

2.3m (500\_1, 50\_1)

**S-57 Data**

[None]

## Office Notes

Concur with clarification. Chart 1 fathom 1 foot sounding.



### Feature Images

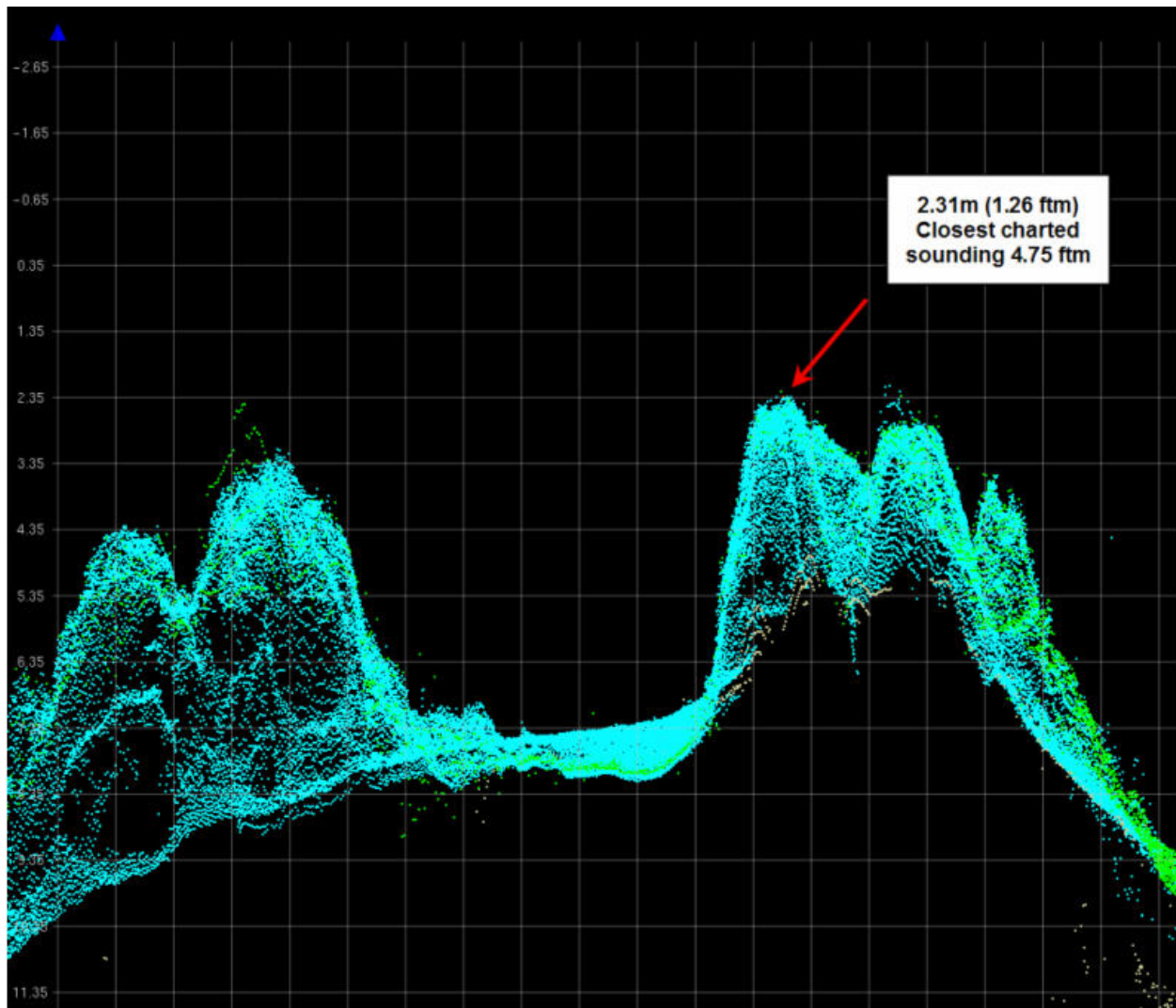


Figure 3.2.1

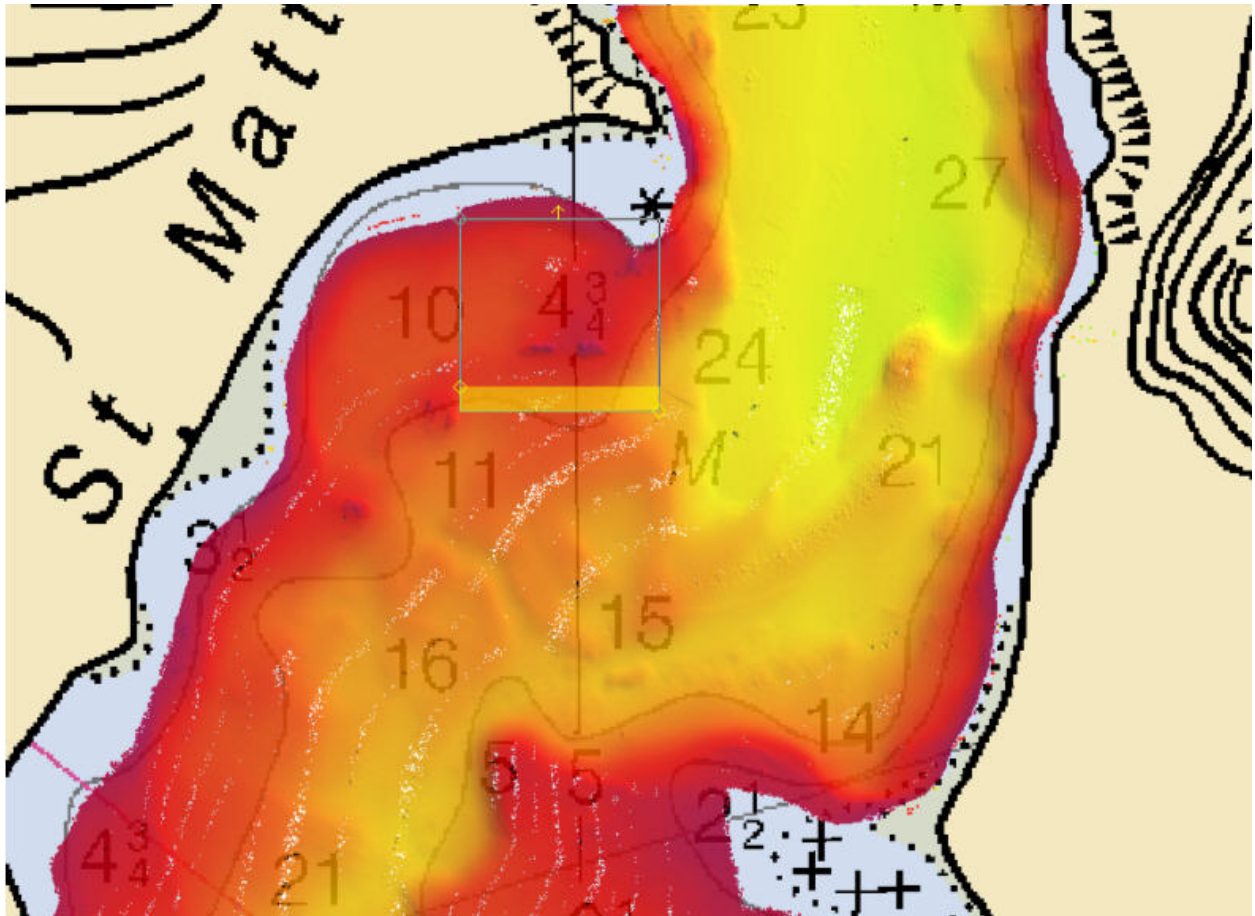


Figure 3.2.2

**3.3) 1677/77****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 60° 41' 32.6" N, 146° 23' 05.0" W  
**Least Depth:** 1.86 m (= 6.09 ft = 1.015 fm = 1 fm 0.09 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.982$  m ; **TVU (TPEv)**  $\pm 0.296$  m  
**Timestamp:** 2006-291.18:58:50.447 (10/18/2006)  
**Survey Line:** h11610 / fa\_1010\_reson8101 / 2006-291 / 291-1854  
**Profile/Beam:** 1677/77  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

| Address                                    | Feature | Range | Azimuth | Status  |
|--|---------|-------|---------|---------|
| h11610/fa_1010_reson8101/2006-291/291-1854 | 1677/77 | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

The Hydrographer recommends removing the 2-1/2 fathom sounding from charts 16708/16709 and adding 1 fathom sounding in the measured location.

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

1fm (16708\_1, 16709\_1, 16700\_1, 16013\_1)

1fm 0ft (531\_1)

1.9m (500\_1, 50\_1)

**S-57 Data**

[None]

## Office Notes

Concur with clarification. Chart 2 fathom 4 foot sounding.

### Feature Images

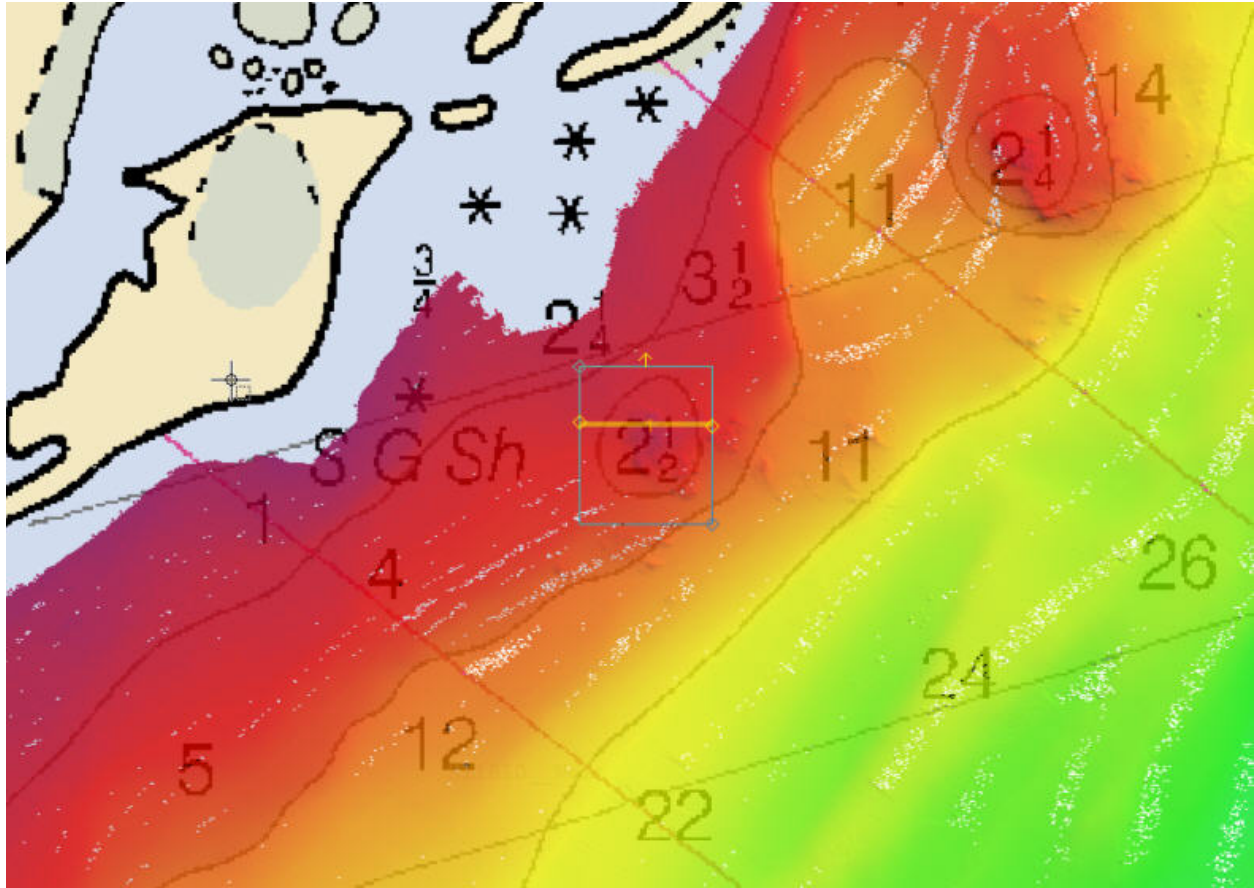


Figure 3.3.1



**3.4) 276/13****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 60° 45' 07.1" N, 146° 18' 52.6" W  
**Least Depth:** 9.77 m (= 32.06 ft = 5.343 fm = 5 fm 2.06 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.007$  m ; **TVU (TPEv)**  $\pm 0.322$  m  
**Timestamp:** 2006-299.00:44:56.069 (10/26/2006)  
**Survey Line:** h11610 / fa\_1010\_reson8101 / 2006-298 / 299-0039  
**Profile/Beam:** 276/13  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

| Address                                    | Feature | Range | Azimuth | Status  |
|--|---------|-------|---------|---------|
| h11610/fa_1010_reson8101/2006-298/299-0039 | 276/13  | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

The Hydrographer recommends removing the 21 fathom sounding from chart 16708 and adding a 5-1/4 obstruction (Chart 1 - K.41) in the measured location.

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

5 ¼fm (16708\_1, 16700\_1, 16013\_1)

5fm 2ft (531\_1)

9.8m (500\_1, 50\_1)

**S-57 Data**

[None]

## Office Notes

Concur with clarification. Chart 5 fathom 2 foot sounding.

### Feature Images

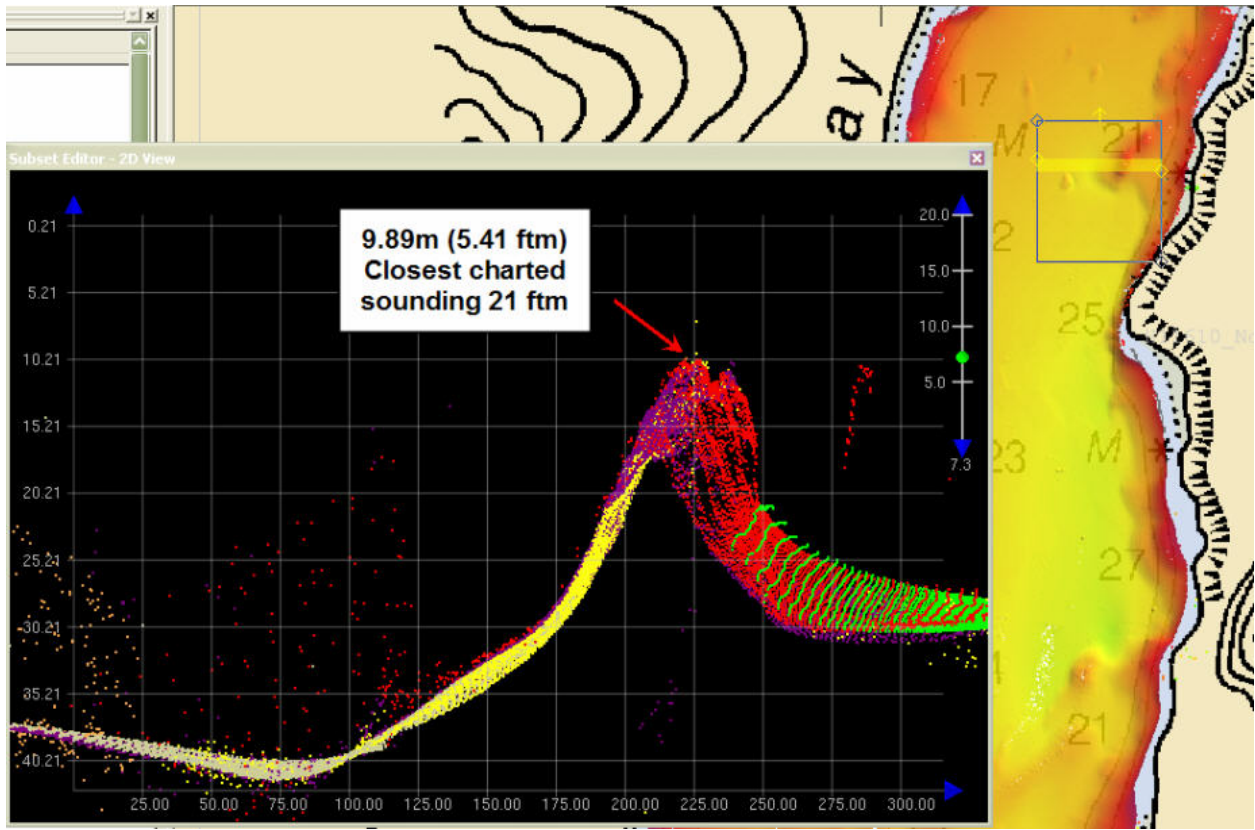


Figure 3.4.1

**3.5) 1110/97**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 60° 41' 19.4" N, 146° 19' 24.2" W  
**Least Depth:** 3.84 m (= 12.58 ft = 2.097 fm = 2 fm 0.58 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±0.990 m ; **TVU (TPEv)** ±0.318 m  
**Timestamp:** 2006-268.22:51:51.605 (09/25/2006)  
**Survey Line:** h11610 / fa\_1018\_reson8101 / 2006-268 / 268-2248  
**Profile/Beam:** 1110/97  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

| Address                                    | Feature | Range | Azimuth | Status  |
|--|---------|-------|---------|---------|
| h11610/fa_1018_reson8101/2006-268/268-2248 | 1110/97 | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

The Hydrographer recommends removing the 3-1/4 fathom sounding from charts 16708/16709 and adding a 2-1/4 fathom sounding in the measured location.

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

- 2fm (16708\_1, 16709\_1, 16700\_1, 16013\_1)
- 2fm 0ft (531\_1)
- 3.8m (500\_1, 50\_1)

**S-57 Data**

[None]

## Office Notes

Concur with clarification. Chart 2 fathom sounding.

### Feature Images

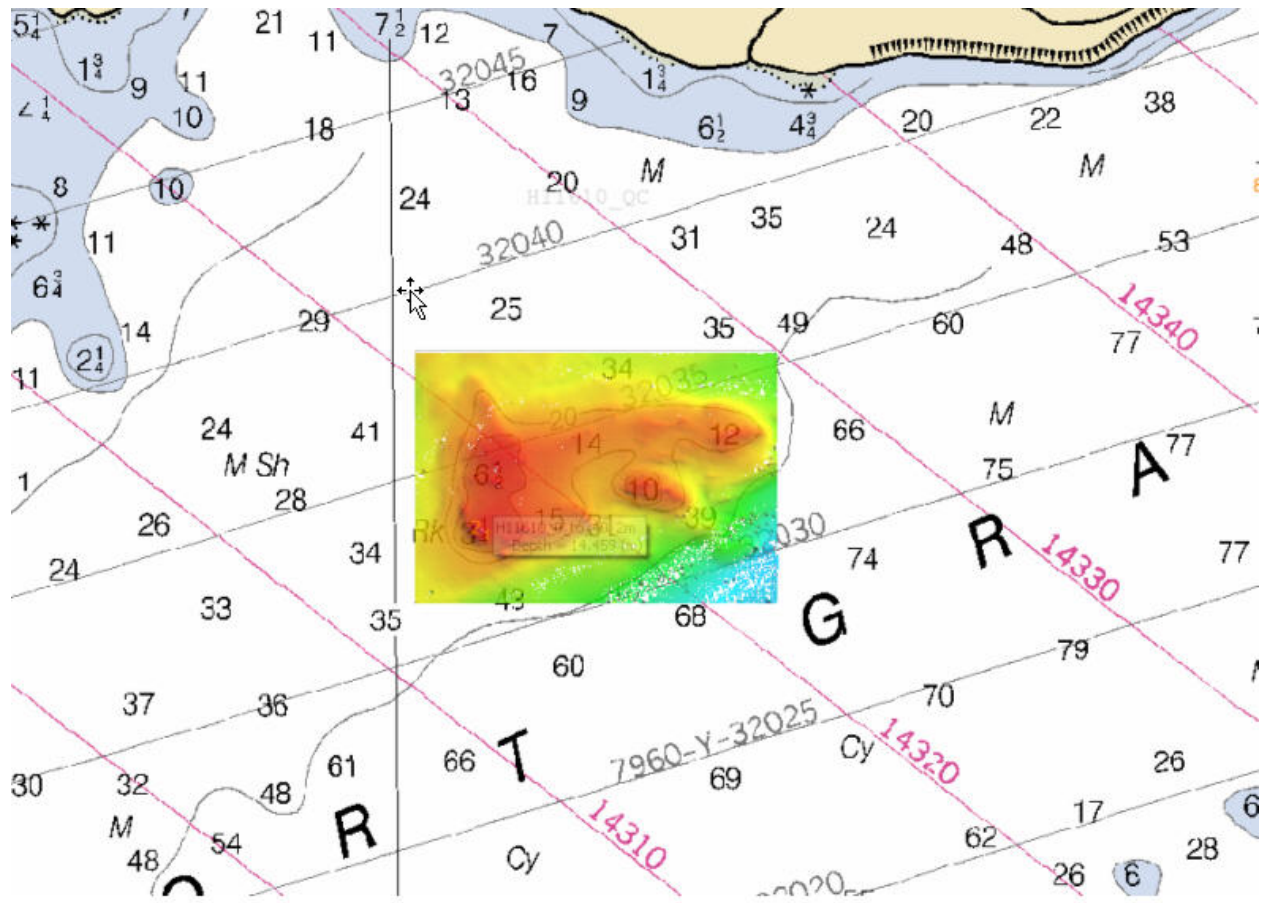


Figure 3.5.1

## **1 - New Features**



**1.1) 225310****Survey Summary**

**Survey Position:** 60° 44' 10.3" N, 146° 19' 47.8" W  
**Least Depth:** -1.06 m (= -3.48 ft = -0.580 fm = 0 fm 2.52 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.18:18:18.000 (09/10/2006)  
**DP Dataset:** h11610 / fa\_trimble\_dpne\_2 / 2006-253 / tt2\_253.mdb  
**Profile/Beam:** 10/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new posn chd (Chart #16708) rk is sig hp new reef

**Feature Correlation**

| Address                                       | Feature | Range | Azimuth | Status  |
|---|---------|-------|---------|---------|
| h11610/fa_trimble_dpne_2/2006-253/tt2_253.mdb | 10/1    | 0.00  | 000.0   | Primary |

**Hydrographer Recommendations**

The Hydrographer recommends extending a reef from shore to the DP (60.73618836° N, 146.32993449° W) extent. [See H11610\_Updates.hob.]

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

0 ½fm (16708\_1, 16700\_1, 16013\_1)

0fm 3ft (531\_1)

-1.1m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)

**Attributes:** QUASOU - 1:depth known

RECDAT - 20060910

TECSOU - 1:found by echo-sounder

VALSOU - -1.061 m

VERDAT - 12:Mean lower low water

WATLEV - 4:covers and uncovers

## Office Notes

Concur

## 1.2) GP No. - 1 from ChartGPs - Digitized

### Survey Summary

**Survey Position:** 60° 41' 16.7" N, 146° 25' 07.9" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-326.11:01:24 (11/22/2006)  
**GP Dataset:** ChartGPs - Digitized  
**GP No.:** 1  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

Charted rock (#16708) not seen at low water.

### Feature Correlation

| Address              | Feature | Range | Azimuth | Status  |
|----------------------|---------|-------|---------|---------|
| ChartGPs - Digitized | 1       | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

The Hydrographer recommends the removal of the rock symbol on chart #16708.

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

### Office Notes

Concur

### 1.3) GP No. - 2 from ChartGPs - Digitized

#### Survey Summary

**Survey Position:** 60° 41' 16.2" N, 146° 25' 02.9" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-326.11:02:11 (11/22/2006)  
**GP Dataset:** ChartGPs - Digitized  
**GP No.:** 2  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

Charted rock (#16709) not seen at low water. Charted rock (#16709) not seen at low water. Partial MBES coverage was obtained and backscatter imagery was examined, which revealed no contacts.

#### Feature Correlation

| Address              | Feature | Range | Azimuth | Status  |
|----------------------|---------|-------|---------|---------|
| ChartGPs - Digitized | 2       | 0.00  | 000.0   | Primary |

#### Hydrographer Recommendations

The Hydrographer recommends the removal of the rock symbol on chart #16709.

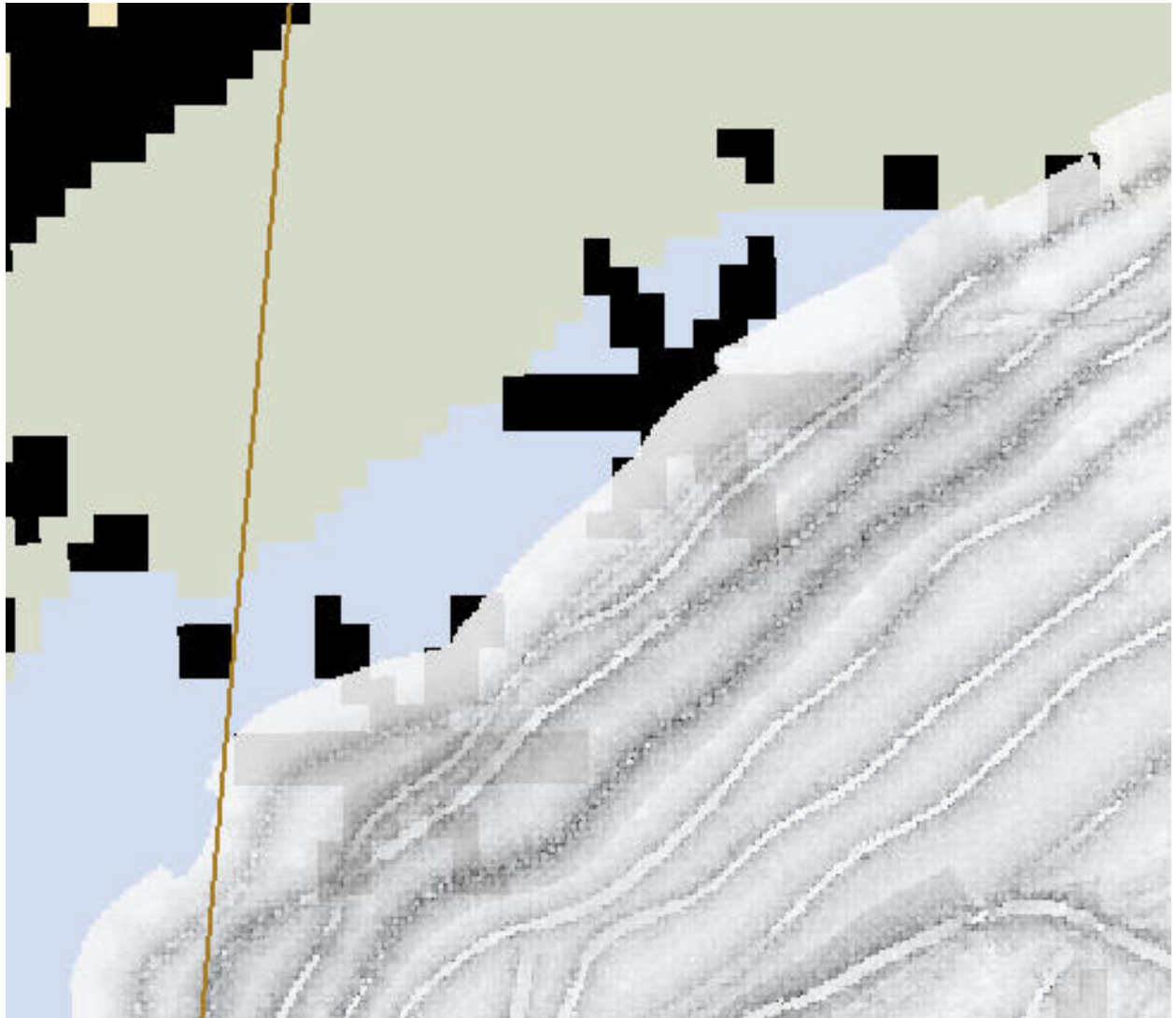
#### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

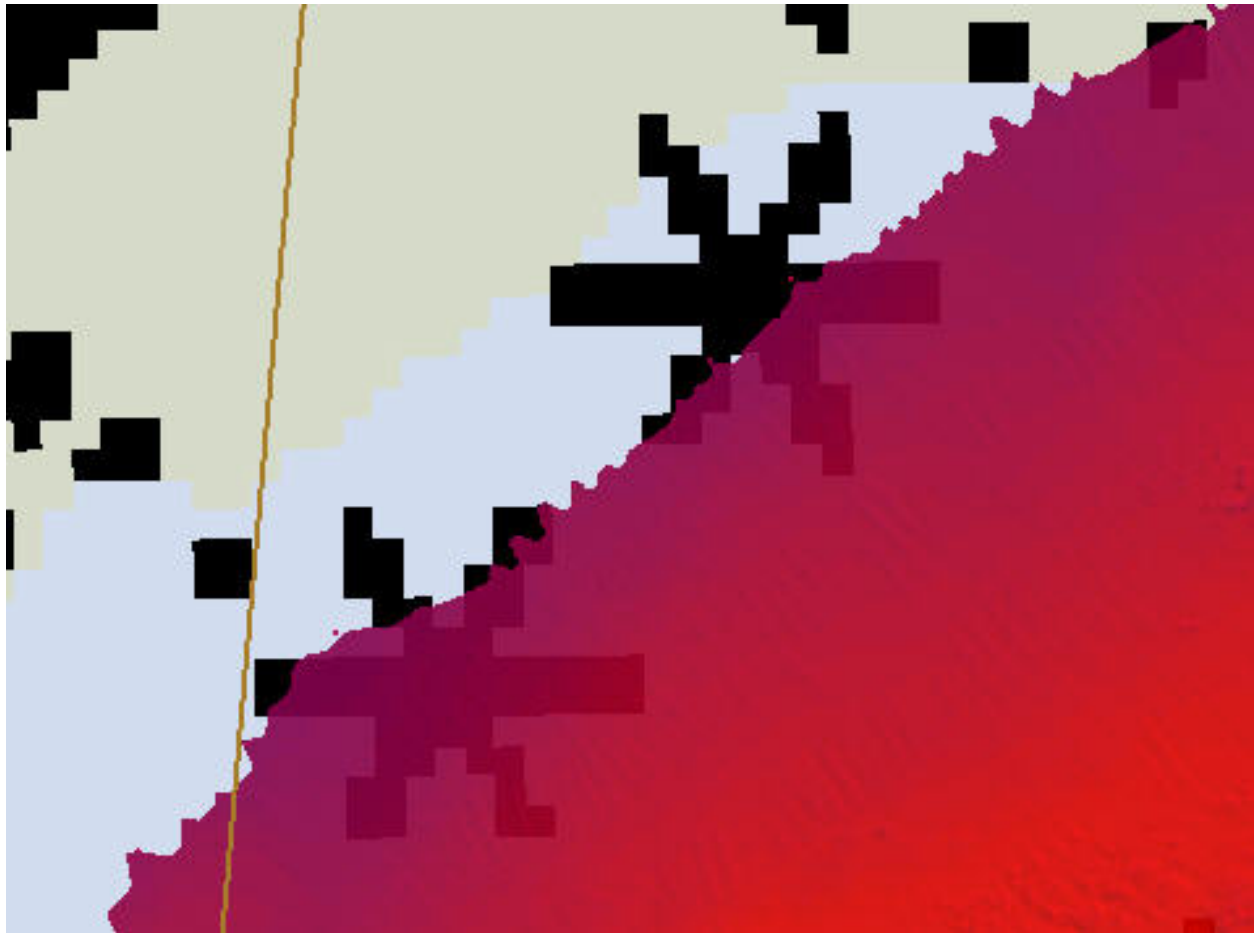
#### Office Notes

Concur

### Feature Images



*Figure 1.3.1*



*Figure 1.3.2*

## 1.4) GP No. - 3 from ChartGPs - Digitized

### Survey Summary

**Survey Position:** 60° 41' 12.9" N, 146° 25' 08.3" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-326.11:02:16 (11/22/2006)  
**GP Dataset:** ChartGPs - Digitized  
**GP No.:** 3  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

Charted rock (#16709) not seen at low water. Partial MBES coverage was obtained and backscatter imagery was examined, which revealed no contacts.

### Feature Correlation

| Address              | Feature | Range | Azimuth | Status  |
|----------------------|---------|-------|---------|---------|
| ChartGPs - Digitized | 3       | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

The Hydrographer recommends the removal of the rock symbol on chart #16709.

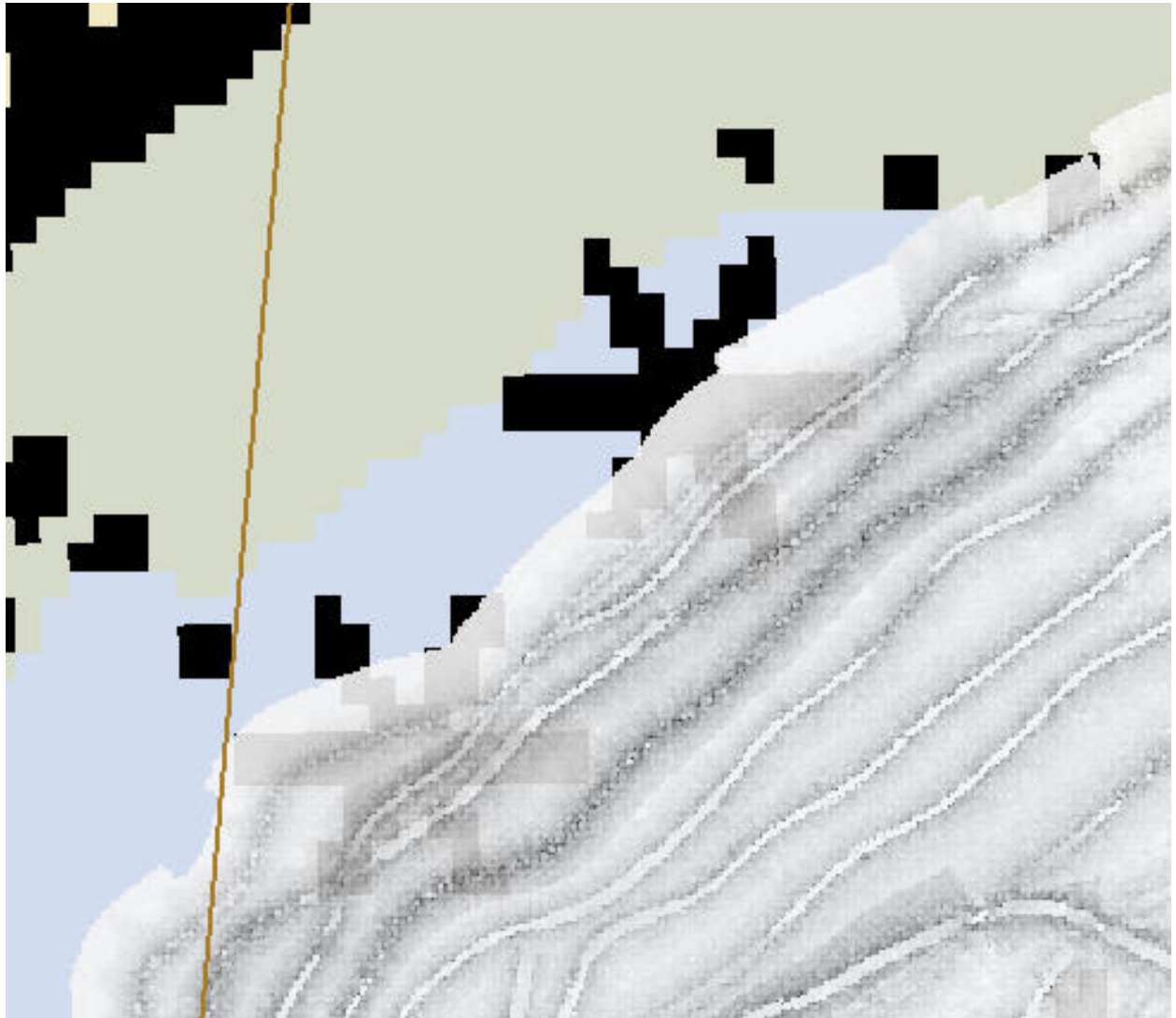
### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

### Office Notes

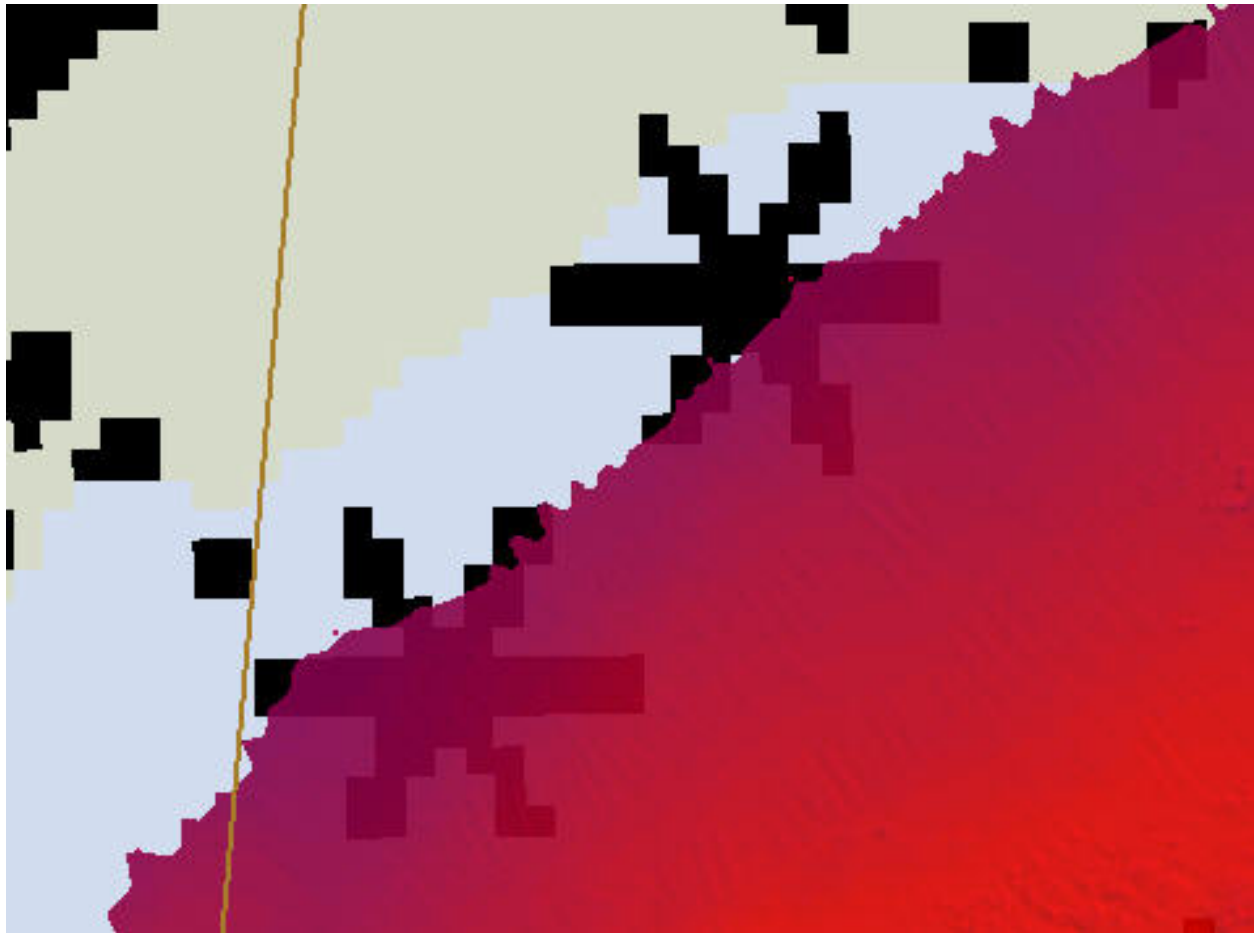
Concur

### Feature Images



*Figure 1.4.1*





*Figure 1.4.2*

## **2 - AWOIS Features**

## 2.1) AWOIS #53495 - OBSTRUCTION

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 60° 39' 56.7" N, 146° 15' 57.4" W  
**Historical Depth:** [None]  
**Search Radius:** 75  
**Search Technique:** VS, VB, MB, S2  
**Technique Notes:** CONDUCT SEARCH WITHIN THE LIMITS OF THE SURVEY.

#### History Notes:

CHARTED POSITION LAT. 60/39/56.7N LONG. 146/15/57.4W (NAD83) OF ROCK AWASH IS OFFSET FROM SOURCE POSITION. CONDUCT SEARCH TO VERIFY OR DISPROVE CHARTED ROCK. (ENTERED 8/2006 BY JCA) ■■■AWOIS item #53495 not seen on fathometer. 5 minute star pattern search yielded 30m shoalest depth. Disproved by 100% MBES coverage across area.

### Survey Summary

**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

AWOIS item #53495 not seen on fathometer. 5 minute star pattern search yielded 30m shoalest depth. Disproved by 100% MBES coverage across area.

### Feature Correlation

| Address        | Feature       | Range | Azimuth | Status  |
|----------------|---------------|-------|---------|---------|
| OPR-P158-FA-06 | AWOIS # 53495 | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

The hydrographer recommends removal of the charted rock on charts #16708, 16709, and 16710.

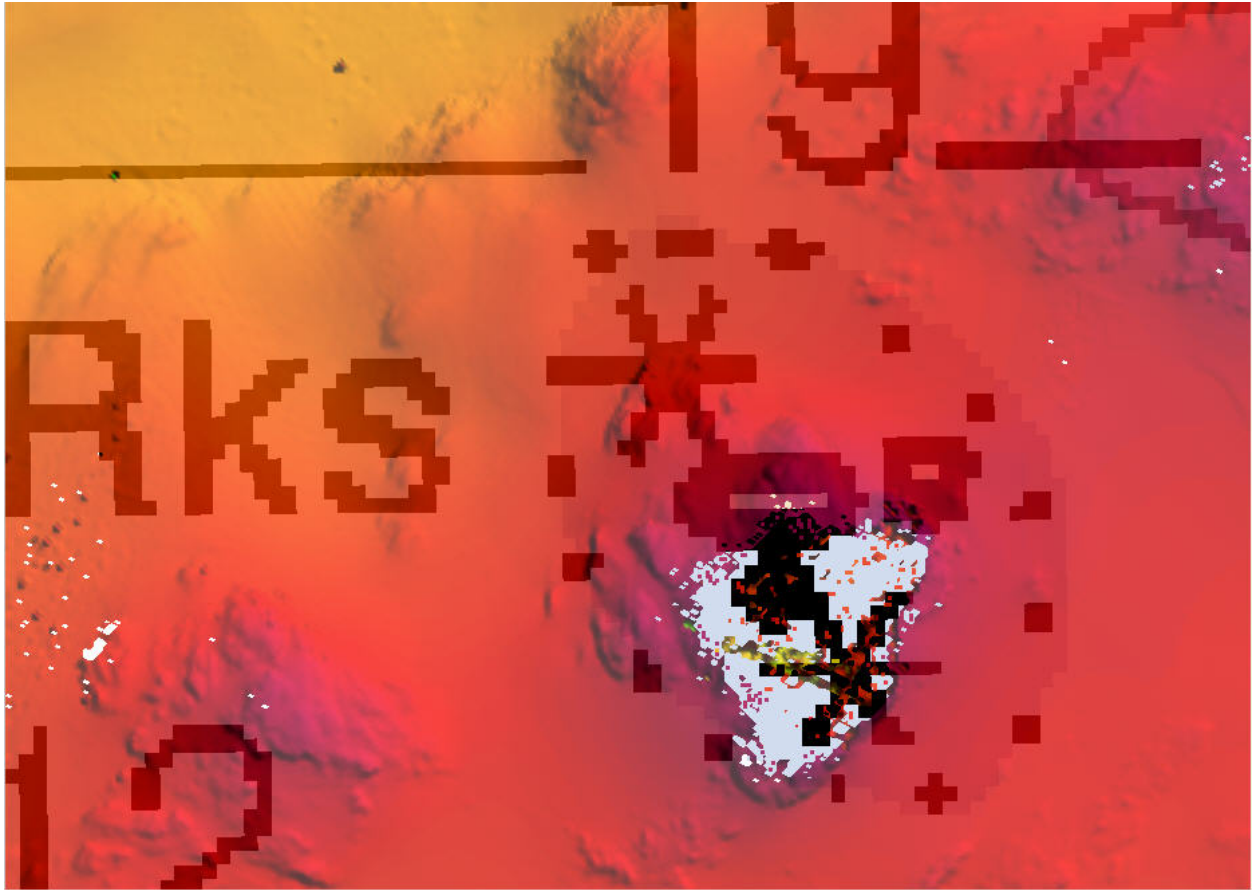
### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

## Office Notes

Concur

### Feature Images



*Figure 2.1.1*

## 2.2) AWOIS #53500 - OBSTRUCTION

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 60° 41' 35.1" N, 146° 23' 44.3" W  
**Historical Depth:** [None]  
**Search Radius:** 75  
**Search Technique:** VS, VB, MB, S2  
**Technique Notes:** CONDUCT SEARCH WITHIN THE LIMITS OF THE SURVEY.

#### History Notes:

CHARTED POSITION LAT. 60/41/35.1N LONG. 146/23/44.3W (NAD83) OF ROCK AWASH IS OFFSET FROM SOURCE POSITION. CONDUCT SEARCH TO VERIFY OR DISPROVE CHARTED ROCK. (ENTERED 8/2006 BY JCA) ■■■AWOIS #53500 (rock awash) not seen during field verification. 5 minute star pattern search conducted across area, yielding 2.5ft. Disproved by 100% MBES coverage across area.

### Survey Summary

**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

AWOIS #53500 (rock awash) not seen during field verification. 5 minute star pattern search conducted across area, yielding 2.5ft. Disproved by 100% MBES coverage across area.

### Feature Correlation

| Address        | Feature       | Range | Azimuth | Status  |
|----------------|---------------|-------|---------|---------|
| OPR-P158-FA-06 | AWOIS # 53500 | 0.00  | 000.0   | Primary |

### Hydrographer Recommendations

The hydrographer recommends removal of charted rock on charts #16708 16709.

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

## Office Notes

Concur



### Feature Images

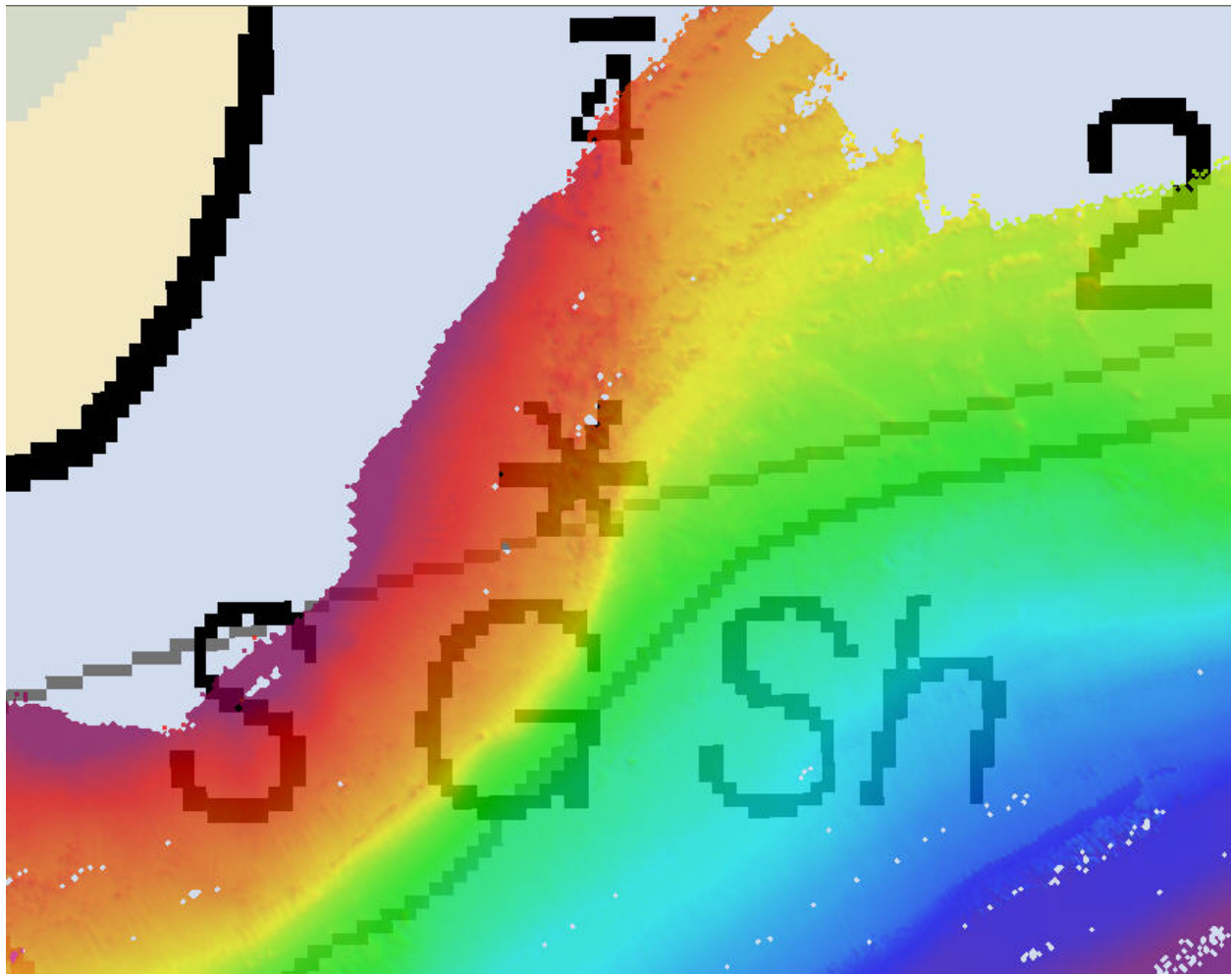


Figure 2.2.1

**2.3) 22405**

**Primary Feature for AWOIS Item #53489**

**Search Position:** 60° 39' 29.9" N, 146° 15' 12.3" W  
**Historical Depth:** [None]  
**Search Radius:** 150  
**Search Technique:** VS, DI, S2, MB, VB  
**Technique Notes:** [None]

**History Notes:**

L938/1984--USCGC SWEETBRIER REPORTED AN UNCHARTED OBSTRUCTION IN POSITION LAT. 60/39/31.9N LONG. 146/15/05.1W (NAD27) COVERED BY 12 FEET OF WATER AT MLLW. ENTERED 7/2006 BY JCA■■■AWOIS item #53489 verified with 100% MBES as charted 2 fathom shoal with (charts #16708, 16709, and 16700).

**Survey Summary**

**Survey Position:** 60° 39' 30.7" N, 146° 15' 13.4" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-254.17:54:48.000 (09/11/2006)  
**GP Dataset:** TT2\_254.mdb  
**GP No.:** 1  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

AWOIS item #53489 is a 4m shoal extending NW of Gravina Rocks. Verified with 100% MBES as charted 2 fathom shoal (charts #16708, 16709, and 16700).

**Feature Correlation**

| Address        | Feature       | Range | Azimuth | Status    |
|----------------|---------------|-------|---------|-----------|
| TT2_254.mdb    | 1             | 0.00  | 000.0   | Primary   |
| OPR-P158-FA-06 | AWOIS # 53489 | 29.86 | 327.1   | Secondary |

## Hydrographer Recommendations

The Hydrographer does not recommend any changes to charts #16708, 16709 or 16700 with the exception of the removal of the text "reported 1984."

### S-57 Data

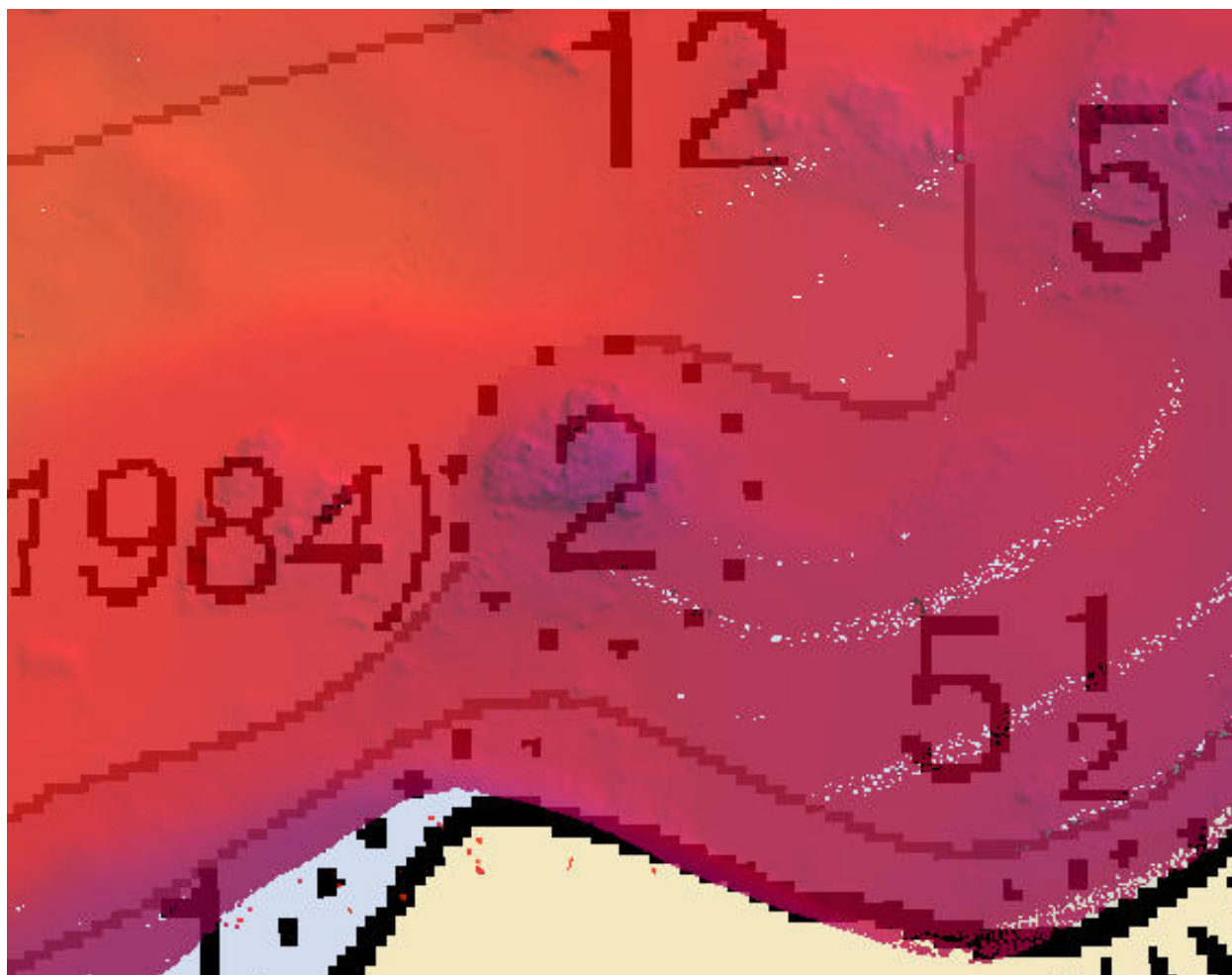
**Geo object 1:** Cartographic symbol (\$CSYMB)

**Attributes:** RECDAT - 20060911

### Office Notes

Concur

### Feature Images



*Figure 2.3.1*



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** November 9, 2006

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-P158-FA-2006  
**HYDROGRAPHIC SHEET:** H11610

**LOCALITY:** St. Matthews to Gravina Point, AK  
**TIME PERIOD:** September 10 - October 26, 2006

**TIDE STATION USED:** 945-4050 Cordova, AK  
Lat. 60° 33.5'N Long. 145° 45.3' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 3.559 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project OPR-P158-FA-2006, H11610, during the time period between September 10 and October 26, 2006.

Please use the zoning file "P158FA2006CORP" submitted with the project instructions for Approaches to Cordova, AK. Zones PWS59A, PWS60 & PWS61 are the applicable zones for H11610.

**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).

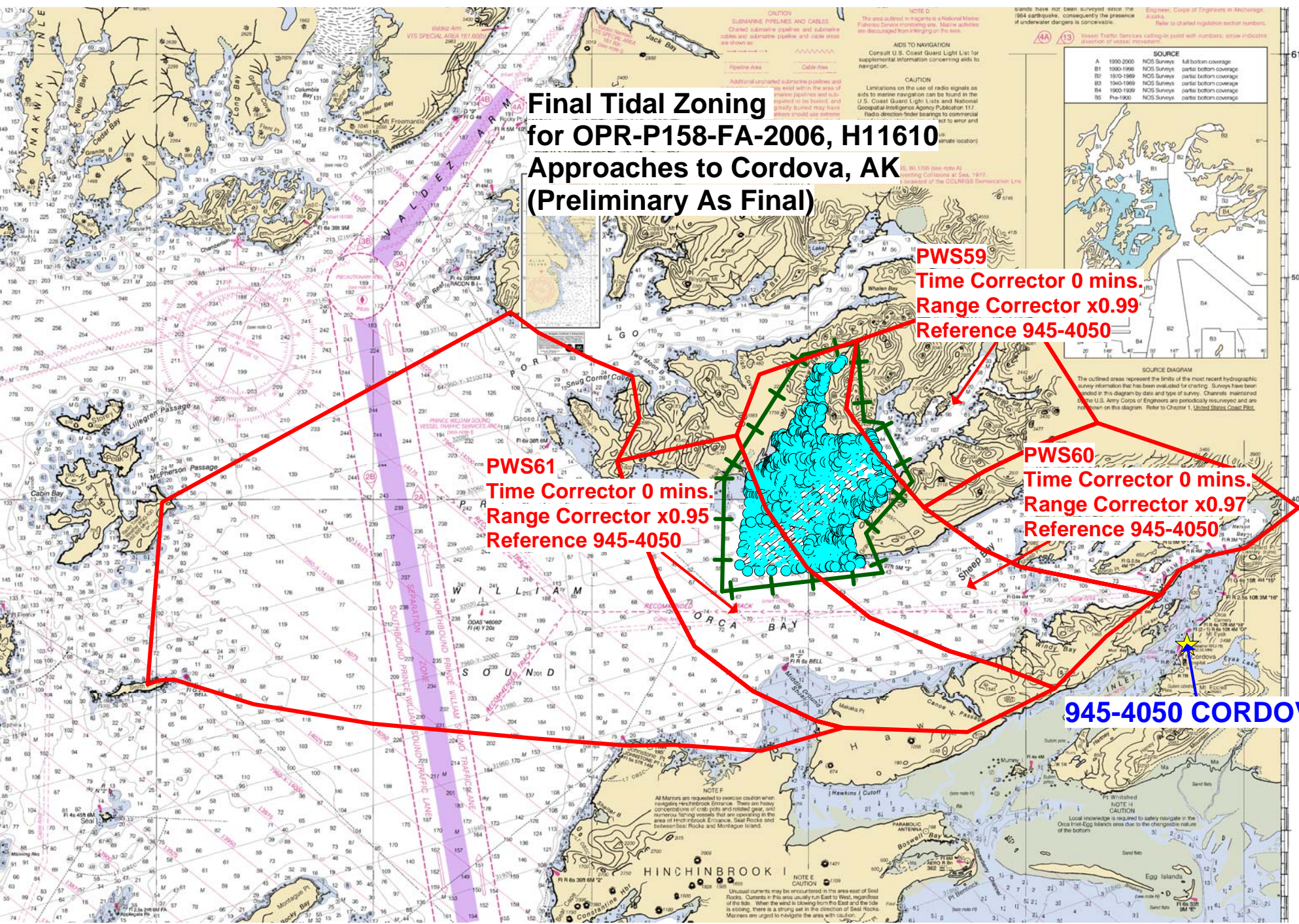
*Fa* *OKall*

CHIEF, PRODUCT AND SERVICES DIVISION





# Final Tidal Zoning for OPR-P158-FA-2006, H11610 Approaches to Cordova, AK (Preliminary As Final)



**PWS59**  
Time Corrector 0 mins.  
Range Corrector x0.99  
Reference 945-4050

**PWS61**  
Time Corrector 0 mins.  
Range Corrector x0.95  
Reference 945-4050

**PWS60**  
Time Corrector 0 mins.  
Range Corrector x0.97  
Reference 945-4050

**945-4050 CORDOVA**



**SOURCE DIAGRAM**  
The outlined areas represent the limits of the most recent hydrographic survey information that has been evaluated for charting. Surveys have been noted in this diagram by date and type of survey. Channels maintained by the U.S. Army Corps of Engineers are periodically resurveyed and are not shown on this diagram. Refer to Chapter 1, United States Coast Pilot.

**CAUTION**  
SUBMARINE PIPELINES AND CABLES  
Charted submarine pipelines and submarine cables and submarine pipeline and cable routes are shown as follows:  
Pipe Line Area Cable Area  
Additional uncharted submarine pipelines and cables exist within the area of intensive pipelines and are not shown on this chart. Mariners should use extreme caution in this area.

**NOTE D**  
The area outlined in magenta is a National Marine Fisheries Service monitoring site. Marine activities are discouraged from entering on the site.  
**AIDS TO NAVIGATION**  
Consult U.S. Coast Guard Light List for supplemental information concerning aids to navigation.  
**CAUTION**  
Limitations on the use of radio signals as aids to marine navigation can be found in the U.S. Coast Guard Light Lists and National Geospatial Intelligence Agency Publication 111. Radio direction-finder bearings to commercial vessels may be used for navigation. Do not transmit radio signals in this area.

charts have not been surveyed since the 1984 earthquake, consequently the presence of underwater dangers is conceivable.  
Engineer: Corps of Engineers in Anchorage, Alaska.  
Refer to charted registration sector numbers.  
Vessel Traffic Services call-signs by numbers, arrow indicates direction of vessel movement.

**NOTE E**  
All Mariners are requested to exercise caution when navigating near the Seal Rocks. There are heavy concentrations of crab pots and related gear, and numerous fishing vessels that are operating in the area of Seal Rocks Entrance. Seal Rocks and between Seal Rocks and Montague Island.  
**NOTE F**  
Unusual currents may be encountered in the area east of Seal Rocks. Currents in this area usually run East to West, regardless of the tide. When the wind is blowing from the East and the tide is ebbing, there is a strong set in the direction of Seal Rocks. Mariners are urged to navigate the area with caution.

**NOTE H**  
CAUTION  
Local knowledge is required to safely navigate in the Orca Inlet-Islands area due to the changeable nature of the bottom.



**H11610 HCell Report**  
Fernando Ortiz, Hydrographic Intern  
Pacific Hydrographic Branch

**Introduction**

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC's and RNC's in the region: NOAA ENC's US4AK24M.000, and NOAA RNC's 16700, 16708 and 16709.

HCell compilation of survey H11610 used Office of Coast Survey HCell Specifications Version 3.1 with approved modifications to better align with PHB's HCell process and to meet MCD needs.

**1. Compilation Scale**

Depths for HCell H11610 were compiled to the largest scale charts in the region, 16708 (1:80,000). The density and distribution of soundings from H11610 were selected to emulate the distribution on these charts. Non-bathymetric features have been generalized to chart scale.

**2. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 8.0-meter finalized surface, **H11610\_Office\_Final\_Combined\_8m.hns**, in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 scale for the 16708 chart. These shoal-based selections were made using a Radius Table file with values shown in the table, below. The resultant sounding layer contains 81,610 depths ranging from 0 to 162 meters.

NOAA RNC 16709

| Upper limit (m) | Lower limit (m) | Radius (mm) |
|-----------------|-----------------|-------------|
| 0               | 20              | 3           |
| 20              | 200             | 3.5         |
| 200             | 500             | 4           |

In CARIS BASE Editor soundings were manually selected from the high density sounding layers and imported into a new layer created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.



### 3. Depth Areas and Depth Contours

#### 3.1 Depth Areas

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize the hydrographic extents, which were then used to create the single, all encompassing depth area (DEPARE). One depth range, from 0 to 162 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth ranges are 0 to 531 feet.

#### 3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11610\_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The generalized metric and fathom equivalent contour values are shown in the table below.

| Chart Contours in Feet | Metric Equivalent of Chart Contours | Metric Equivalent of Chart Contours NOAA Rounded | Actual Value of Chart Contours |
|------------------------|-------------------------------------|--|--------------------------------|
| 3                      | 5.4864                              | 5.715  | 3.125                          |
| 5                      | 9.144                               | 9.3726   | 5.125                          |
| 10                     | 18.288                              | 18.5166  | 10.125                         |
| 20                     | 36.576                              | 37.9476  | 20.75                          |
| 50                     | 91.44                               | 92.8116  | 50.75                          |

Contours delivered in the H11610\_SS file have not been deconflicted against soundings and hydrography as all other features in the H11610\_CS file and soundings in the H11610\_SS have been. This results in conflicts between the H11610\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_COVR, M\_QUAL, and DEPARE objects with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over

### 4. Meta Areas

The following Meta object areas are included in HCell 11610:

M\_QUAL  
M\_COVR

Meta area objects were constructed on the basis of the limits of the hydrography. (See 3.1 *Depth Areas.*)

## 5. Features

Shoreline features for H11610 were delivered from the field in 3 hob files defining new features, modification to GC or charted features.

All features delivered in survey H11610 are included in H11610\_CS.000.

Bottom samples were collected during H11610. All charted bottom samples are included in the H11610 HCell.

There were 3 AWOIS items assigned to the survey. Refer to the AWOIS report.

The source of all features included in the H11610 HCell can be determined by the SORIND field.

## 6. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

|         |                                       |
|---------|---------------------------------------|
| \$CSYMB | Blue notes                            |
| COALNE  | Coast Line                            |
| DEPARE  | All-encompassing depth area           |
| DEPCNT  | Contours                              |
| LNDARE  | Land Area                             |
| LNDELV  | Land Elevation                        |
| M_COVR  | Data coverage Meta object             |
| M_QUAL  | Data quality Meta object              |
| OBSTRN  | Obstruction                           |
| SBDARE  | Bottom samples and rocky seabed areas |
| SOUNDG  | Chart scale soundings                 |
| UWTROC  | Submerged Rocks                       |
| WEDKLP  | Kelp                                  |

The \*\_SS HCell contains the following Objects:

|        |  |
|--------|--|
| SOUNDG | Soundings at the survey scale density          |
| DEPCNT | NOAA rounded contours at chart scale intervals |

All S-57 Feature Objects in the \*\_CS HCell have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with current guidance and the OCS HCell Specifications.

## 7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features with the Blue Note information located in the INFORM field. The NINFOM field is populated with the charting disposition.

## 8. Spatial Framework

### 8.1 Coordinate System

All spatial map and base cell file deliverables are in an LLDG geographic coordinate system, with WGS84 horizontal, MHW vertical, and MLLW (1983-2001 NTDE) sounding datums.

### 8.2 Horizontal and Vertical Units

DUNI, HUNI and PUNI are used to define units for depth, height and horizontal position in the chart units HCell, as shown below.

Chart Unit Base Cell Units:

|                          |                  |
|--------------------------|------------------|
| Depth Units (DUNI):      | Fathoms and Feet |
| Height Units (HUNI):     | Feet             |
| Positional Units (PUNI): | Meters           |

During creation of the HCell in CARIS BASE Editor and CARIS S-57 Composer, all soundings and features are maintained in metric units with as high precision as possible. Depth units for soundings measured with sonar maintain millimeter precision. Depths on rocks above MLLW and heights on islets above MHW are typically measured with range finder, and therefore have lower precision. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

|                    |  |
|--------------------|--|
| Sounding Units:    | Meters rounded to the nearest millimeter |
| Spot Height Units: | Meters rounded to the nearest decimeter  |

- All depths deeper or equal to 11 fathoms display as whole fathoms.
- All depth units between 0 fathoms (MLLW) and 11 fathoms display as fathoms and whole feet.
- All depth units above MLLW (0 fathoms) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet above that.
- All height units (HUNI) which have been converted to charting units, and that are 2.0 feet above MHW and greater, are shown in feet.

In an ENC viewer fathoms and feet depth units (DUNI) display in the format X.YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. In an ENC viewer, heights (HUNI) display as whole feet.

## **9. Data Processing Notes**

### **9.1 Junctions**

Refer to section B.2 of the Descriptive Report for information on junction surveys.

## **10. QA/QC and ENC Validation Checks**

H11610 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they have been approved by MCD as inherent to and acceptable for HCells.

## **11. Products**

### **11.1 HSD, MCD and CGTP Deliverables**

- H11610\_CS, Chart Units, Soundings compiled to 1:80,000
- H11610\_SS, Chart Units, Soundings compiled to 1:10,000
- H11610 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11610 Survey Outline to populate SURDEX

### **11.2 File Naming Conventions**

- Chart units base cell file, chart scale soundings H11610\_CS.000
- Chart units base cell file, survey scale soundings H11610\_SS.000
- Descriptive Report package H11610\_DR.pdf
- Survey outline H11610\_Outline.gml & \*.xsd

### 11.3 Software

|  |  |
|--|--|
| CARIS HIPS Ver. 6.1                                | Inspection of Combined BASE Surfaces   |
| CARIS BASE Editor Ver. 2.2                         | Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly. |
| CARIS S-57 Composer Ver. 2.0                       | Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.   |
| CARIS GIS 4.4a                                     | Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.   |
| CARIS HOM Ver. 3.3                                 | Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.  |
| HydroService AS, dKart Inspector Ver. 5.1          | Validation of the base cell file.  |
| Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3 | Independent inspection of final HCells using a COTS viewer.  |

### 12. Contacts

Inquiries regarding this HCell content or construction should be directed to:

Fernando Ortiz, Hydrographic Intern, PHB, Seattle, WA; 206-526-6883;  
[Fernando.ortiz@noaa.gov](mailto:Fernando.ortiz@noaa.gov).

APPROVAL SHEET  
H11610

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the H-Cell compiled per the latest OCS H-Cell Specifications.

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproval of charted data within the survey limits. The survey records and digital data comply with OCS requirements except where noted in the Descriptive Report and are adequate to supersede prior surveys and nautical charts in the common area.

I have reviewed the H-Cell, accompanying data, and reports. This survey and accompanying digital data meet or exceed OCS requirements and standards for products in support of nautical charting except where noted in the Descriptive Report.