

H11611

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.* ..... H11611

### LOCALITY

*State* ..... Alaska

*General Locality* ..... Approaches to Cordova

*Sublocality* ..... Olsen Bay to the Mouth of the Gravina River

**2006**

### CHIEF OF PARTY

..... CDR Andrew L. Beaver, NOAA

### LIBRARY & ARCHIVES

DATE .....

**HYDROGRAPHIC TITLE SHEET**

H11611

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 Olsen Bay to the Mouth of the Gravina River

Scale 1:10,000

Date of Survey 9/10/2006-10/27/2006

Instructions Dated 8/4/2006

Project No. OPR-P158-FA-06

Vessel FAIRWEATHER, Launch 1010, Launch 1018

Chief of Party CDR Andrew L. Beaver, NOAA

Surveyed by ST Mills, CST Froelich, LT Dowling

Soundings taken by echo sounder Reson 8101, Reson 8111

Graphic record scaled by N/A

Graphic record checked by N/A

Evaluation by Bonnie Johnston, Tyanne Faulkes Automated plot by N/A

Verification by \_\_\_\_\_

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 H11611

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 Olsen Bay to the mouth of the Gravina River. This survey corresponds to the Sheet J area designation in the survey layout provided with the Letter Instructions as shown in Figure 1 below. The survey area is bounded on the Southwest corner at 60°39'00"N, 146°17'00"W and the Northeast corner at 60°49'00"N, 145°56'00"W.

Data acquisition was conducted from September 10, 2006 to October 27, 2006 (DN 253 to DN 300).

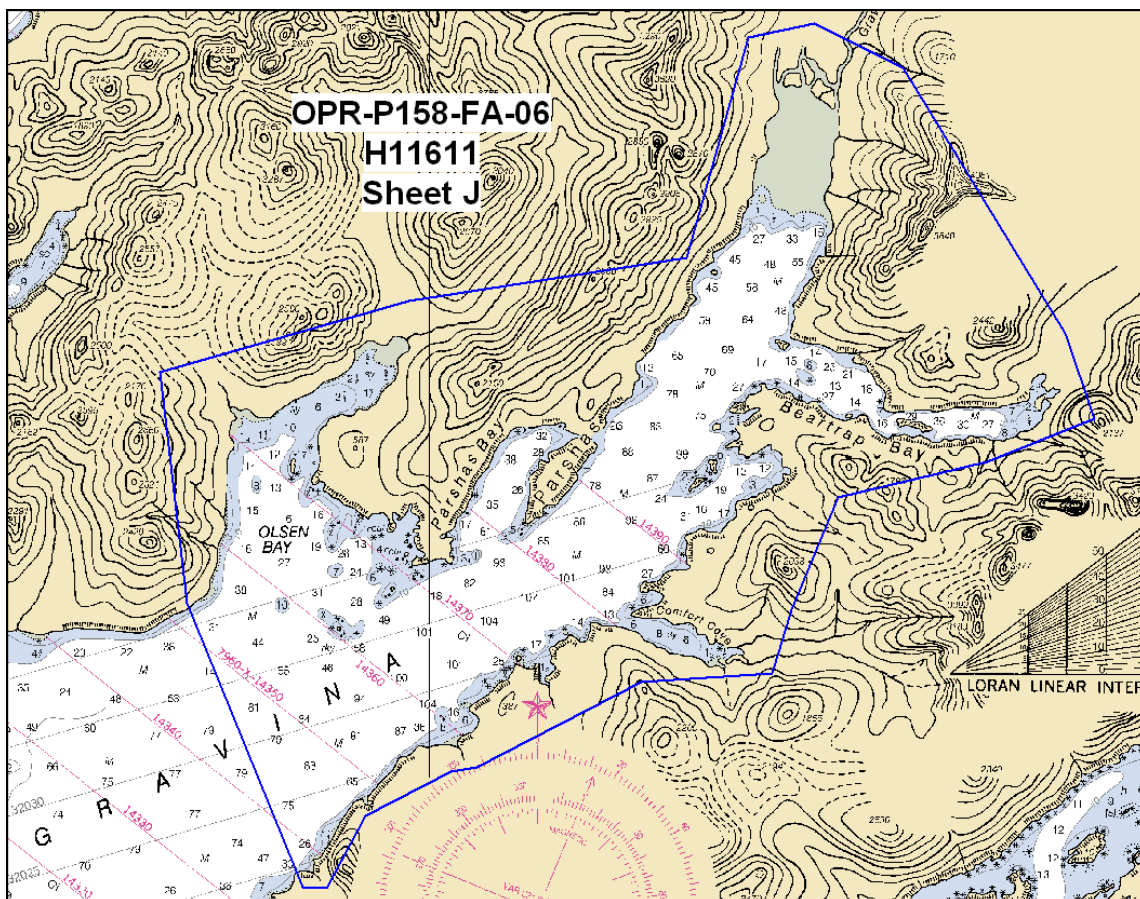


Figure 1: H11611 Sheet Limits

One hundred percent multibeam echosounder (MBES) coverage was obtained in the survey area up to the inshore limit of hydrography. As defined by the Letter Instructions, “the inshore limit of hydrography

was the farthest offshore of the following: (1) the 4-meter depth contour or (2) the line defined by the distance seaward from the MHW line which is equivalent to 0.8 millimeters at the scale of the largest scale nautical chart (64 meters for areas covered by chart 16708 & 16709).”<sup>1</sup>

Shoreline data were acquired for H11611. These data were attributed as S-57 objects for submittal.<sup>2</sup>

<b>MAIN SCHEME - Mileage</b>	
Single Beam MS	0
Multibeam MS mileage	208.162889
SideScan MS	0
<b>Total MS</b>	<b>208.162889</b>
<b>CROSSLINE - Mileage</b>	
Single Beam XL	0
Multibeam XL	17.6848483
<b>Total XL</b>	<b>17.6848483</b>
<b>OTHER</b>	
Developments/AWOIS - Mileage	0
Shoreline/Nearshore Investigation - Mileage	38.63552
<b>Total # of Investigated Items</b>	<b>37</b>
<b>Total Bottom Samples</b>	<b>24</b>
<b>Total SNM</b>	<b>12.55</b>
<b>Specific Dates of Acquisition</b>	September 10, 2006 through October 27, 2006
<b>Specific Dn#s of Acquisition</b>	Dn 253 through Dn 300

**Table 1: H11611 Data Statistics**

## **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, Change No. 1, dated October 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 2.



	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>	12.5 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 V4	POS/MV V3	POS/MV V3		
<b>Type of operations</b>	MBES	MBES	MBES, Shoreline	Shoreline	Shoreline, Bottom Samples

Table 2: Vessel Inventory

No vessel configurations used during data acquisition deviated from the DAPR.<sup>4</sup>

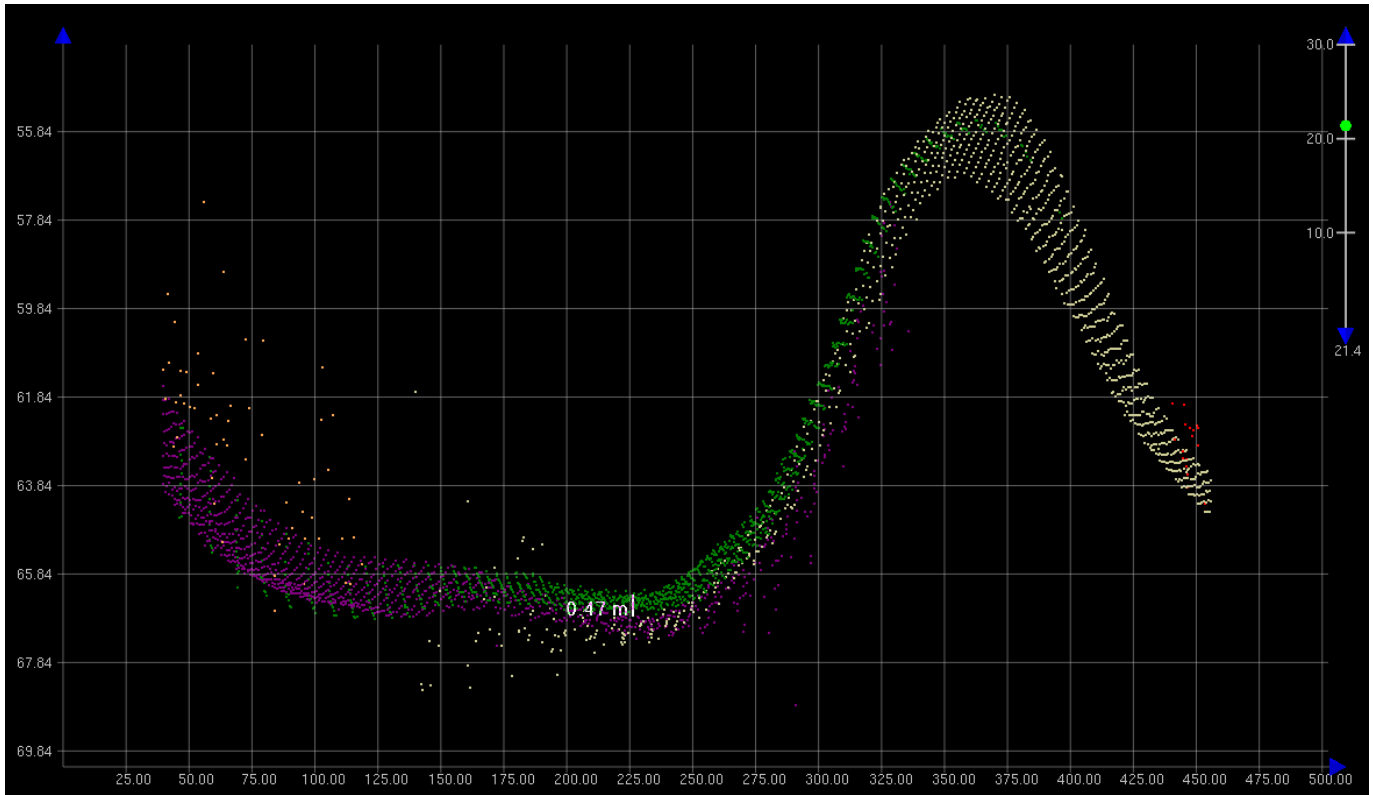
## B2. Quality Control

Internal consistency and integrity of data collected for survey H11611 were manually examined by the Hydrographer in CARIS subset mode. The internal consistency and integrity of data collected for survey H11611 were found to be acceptable as per the requirements laid forth in the Letter Instructions and in accordance with procedures set forth in the *Field Procedures Manual Version 2.1* (FPM) and the *NOS Hydrographic Surveys Specifications and Deliverables (HSSD)*, dated June 2006.<sup>5</sup>

### Crosslines

Shallow water multibeam crosslines for this survey totaled 17.68 linear nautical miles (lnm), comprising 7.8 percent of the total 225.85 lnm of SWMB hydrography<sup>6</sup>. Both main scheme and crossline mileage are summarized in Table 1.

The Hydrographer has determined, through manual examination of the data, that the crossline agreement with main scheme data meet the vertical accuracy requirements as stated in the *HSSD* (see Figure 2).<sup>7</sup>



**Figure 2: Screen grab showing characteristic agreement between cross lines and main scheme lines for H11611. Here, the cross line is the green line.**

## Junctions

Survey H11611 junctions with H11610 (Sheet H of the same project) in Port Gravina. The average area of overlap between the sheets is approximately 300 meters wide. Data were reviewed in CARIS Subset Editor and depths were found to be consistent between the two surveys, meeting the requirements as stated in section 5.1.1.1 of the *HSSD*.<sup>8</sup> The sheet limits and area of overlap for Sheets H and J are shown in Figure 3.

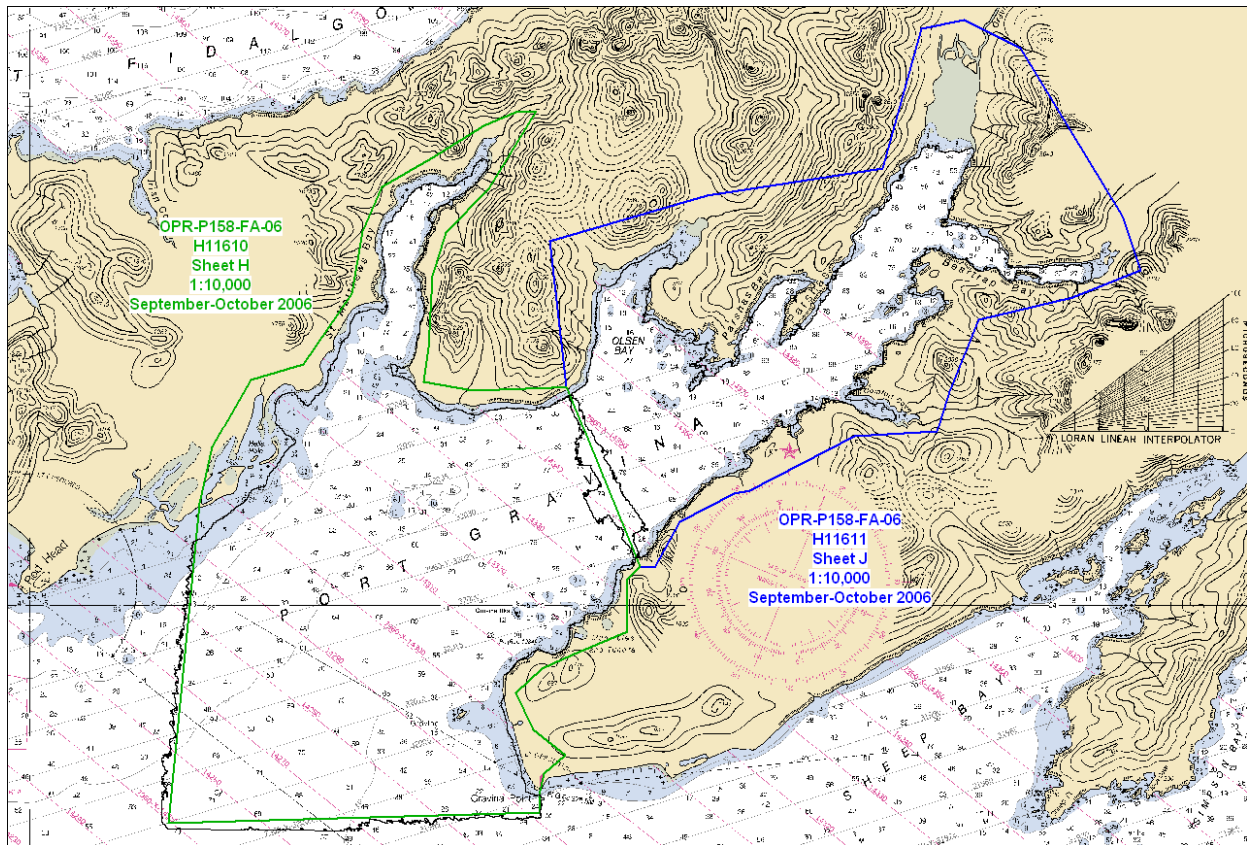


Figure 3: Junction between H11611 and H11610

### Quality Control Checks

MBES quality control checks were conducted as discussed in the quality control section of the *DAPR*. All initial processing of MBES data was performed using CARIS HIPS and SIPS 6.0. Any further processing and data review performed on or after February 25, 2007 was carried out in CARIS HIPS and SIPS 6.1.

### Data Quality Factors

#### COVERAGE ASSESSMENT:

Coverage assessment followed procedures as outlined in the *DAPR*. Coverage was determined using the surface resolutions and depth ranges listed below in Table 3 for all surfaces in the H11611 field sheet.

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 used for H11611

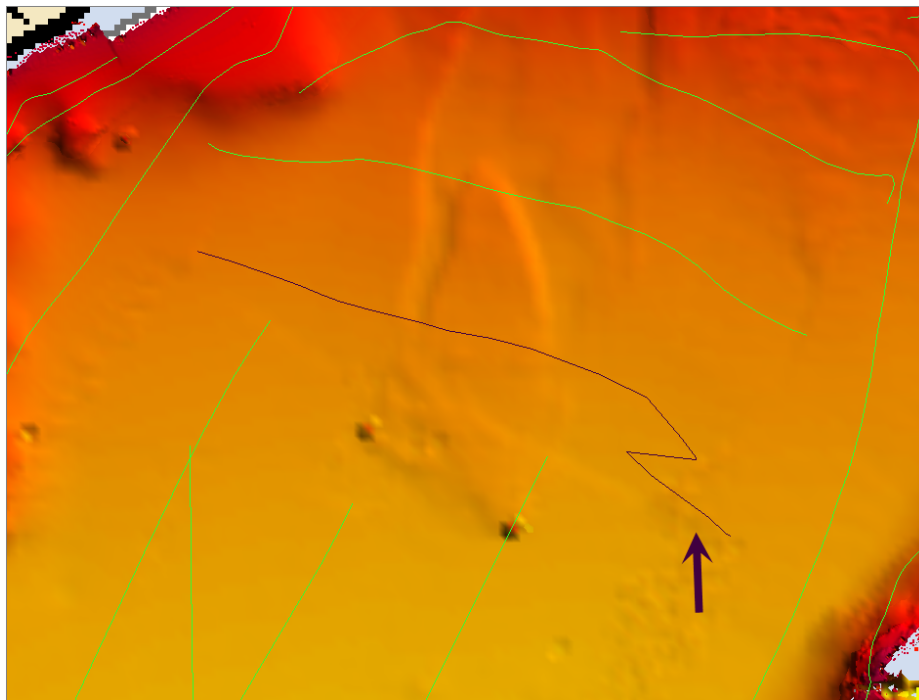
The data collected were examined for holidays in the field and extra lines were run before leaving the survey area, as per the DAPR. There are no holidays larger than 3 nodes across.<sup>9</sup>

#### DESIGNATED SOUNDINGS

Designation of soundings followed procedures as outlined in the DAPR.

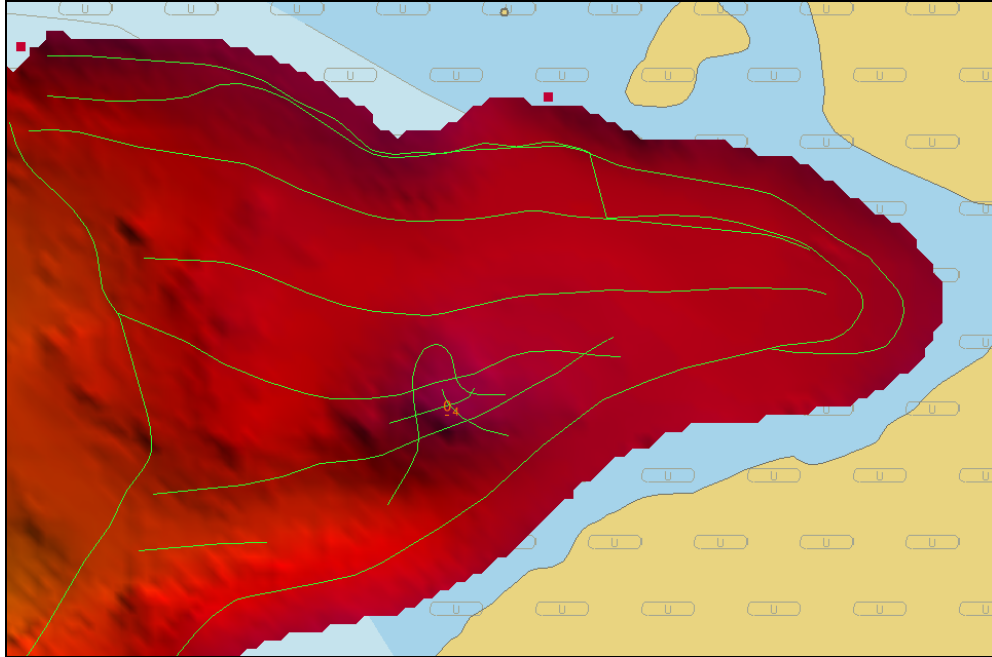
#### POSITIONING

There were several instances of horizontal shift in the data due to DGPS signal loss, as discussed in the Horizontal Control section. Line 292-2250 collected by launch 1018 demonstrates positioning error (see Figure 4), however the data collected does not display any offset and the associated surface is unaffected.<sup>10</sup>



**Figure 4: Horizontal shift due to DGPS dropout on line 292-2250 from launch 1018**

Line 293-2209 collected by launch 1010 also demonstrates horizontal shift that appears to be from a DGPS dropout (see Figure 5). There is an average 15 meter horizontal offset between the affected portion of the line and adjacent lines. The affected segment of the line is approximately 180 meters long. Data contributing to a surface offset was rejected by the hydrographer in Caris.<sup>11</sup>



**Figure 5: Horizontal shift due to DGPS dropout on line 293-2209 from launch 1010**

There is an area of significant horizontal offset in the vicinity of a charted rock located in the southeast corner of Olsen Bay ( $60^{\circ}43'44''\text{N}$ ,  $146^{\circ}11'20''\text{W}$ ). Survey lines 294-2009, -2014, -2016, and -2019 collected by launch 1010 on Dn294 all appear to have lost positioning for some or all of their line acquisition (see Figure 15). The subsequent horizontal offset is an average of 25 meters with a vertical offset over 4 meters between adjacent lines. The hydrographer rejected all data from line 294-2016, as well as any data from lines 294-2009, 294-2014, and 294-2019 contributing to a surface offset. Two features were rejected as a result. Both were inside of the inshore limit of hydrography, and could not be accurately represented.<sup>12</sup>

Other DGPS dropouts, though numerous, did not appear to result in a horizontal shift in the data.<sup>13</sup>

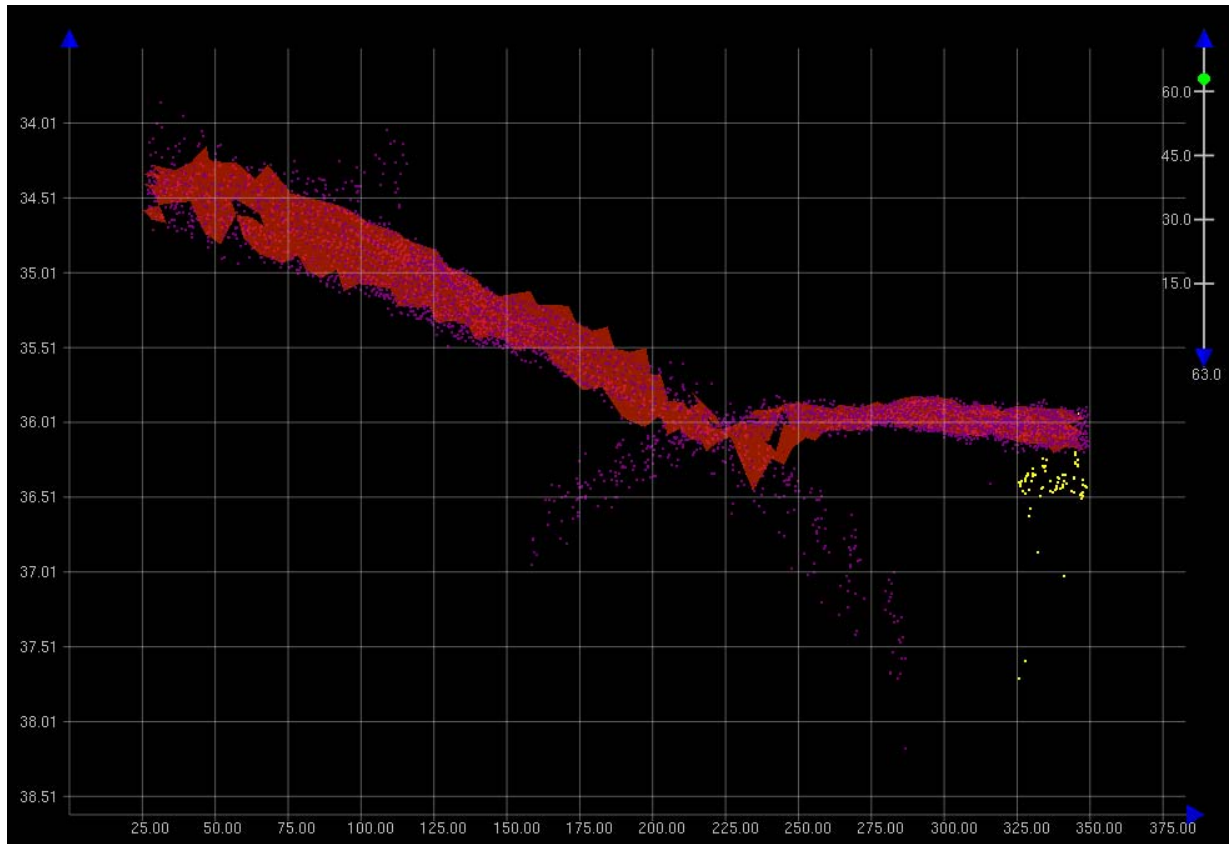
#### TRUEHEAVE

TrueHeave data could not be applied to 20 (twenty) lines of MBES data from launch 1018 collected on October 21, 2007 (DN 294). A new TrueHeave file was created at UTC midnight for these twenty lines starting with the line logged at UTC 0001 on DN 295, but the file still did not match Navigation time for the DN 295 lines. This issue is noted in the acquisition log for 1018. MBES data quality from that day does not appear to have been affected by the lack of TrueHeave, due to negligible swell in the survey area.<sup>14</sup>

#### SOUND VELOCITY

There are three sound velocity casts taken by launch 1010 on DN 292 that are positioned badly. The first cast of the five taken that day (cast 06292163) is outside of the area run that day, and outside of the survey limits. The fourth and fifth casts (casts 062922229 and 062922358) are positioned on land. MBES data quality for data collected by launch 1010 that day does not appear to have been affected and shows no signs of degradation due to sound velocity error.<sup>15</sup> Some of the data in Olsen Bay collected by launch 1018 appear to have sound velocity error (Figure 6 and Figure 7). However, there is other error at

play in much of the data in Olsen Bay. As such, it is difficult to determine what role sound velocity plays in keeping this data from meeting IHO Order 1 accuracy specifications.<sup>16</sup>



**Figure 6: Sound velocity error associated with launch 1018 data on Olsen Bay.**

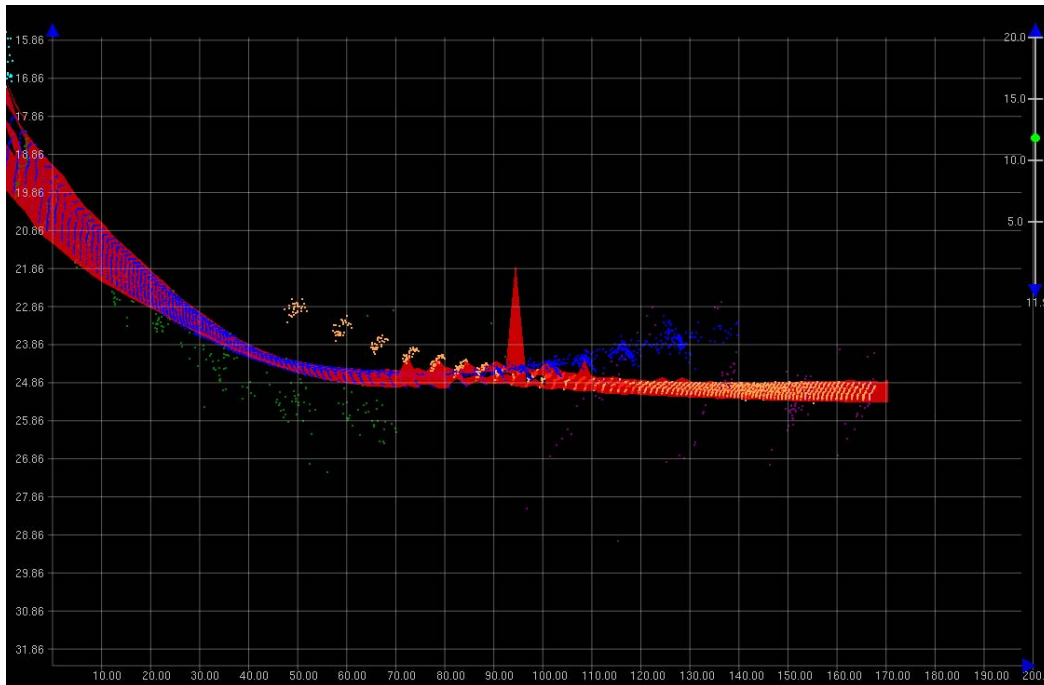


Figure 7: Sound velocity error in Olsen Bay.

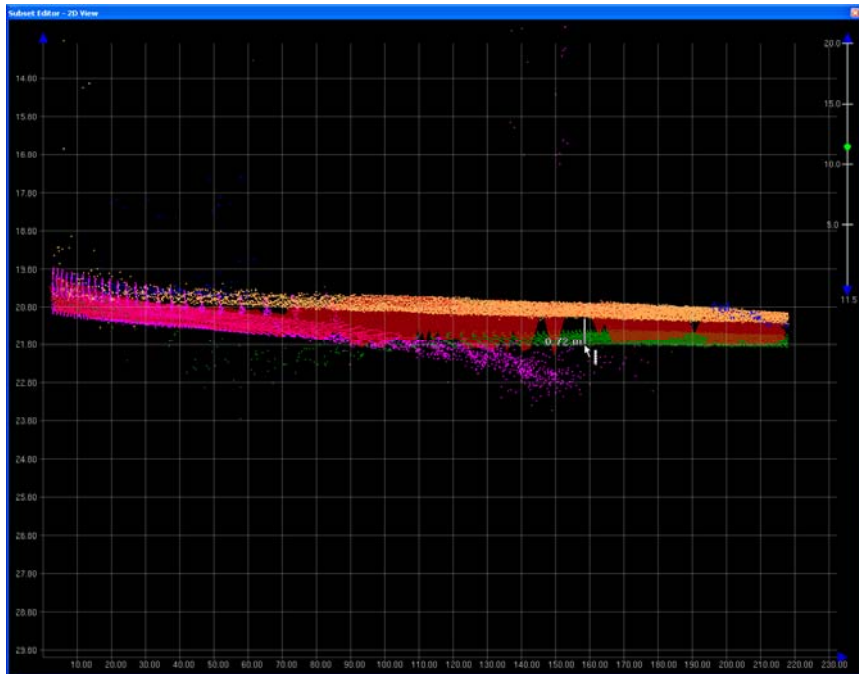
## ROLL

As mentioned in the DAPR, roll issues were found to be present in some of the MBES data collected from launch 1018 and 1010. The initial HVF files applied to this survey were adjusted for other surveys, not for H11611. The hydrographer subsequently adjusted these files by removing any sheet-specific values that should not have been incorporated. Accordingly, values for DN 255 were deleted from the HVF for launch 1010. Values for DN 252, DN 270, and DN 277 were deleted from the HVF for launch 1018. This improved the roll issues prevalent in Olsen Bay, but did not eliminate the error.<sup>17</sup> There is some data in Olsen Bay that still does not meet accuracy specifications for IHO Order 1.<sup>18</sup> This is discussed below as it is unclear if this is due exclusively to roll error.

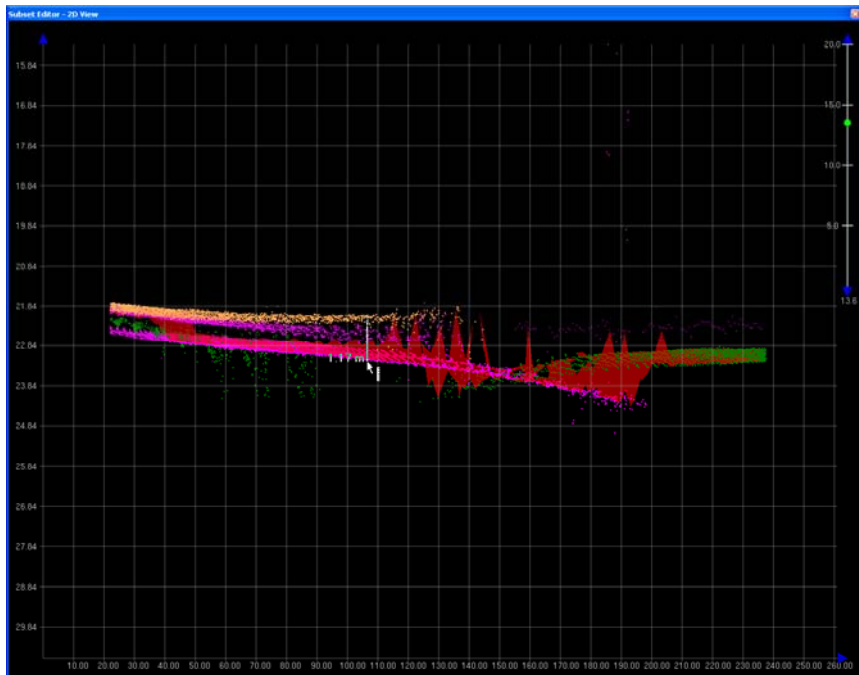
## UNDETERMINED ERROR

There is some data in Olsen Bay that do not meet accuracy specifications for IHO Order 1, even with the adjustments to the HVF.<sup>19</sup> Error is most prevalent for data from launch 1018 on DN 291 and DN 292, and for launch 1010 data from DN 293 and DN 294. Observed offset between the two launches varies in magnitude and consistency. It is impossible to say exactly which areas of Olsen Bay have error, as often data within one subset have some data that meet accuracy specifications and some that do not. Figures 7 through 11 show data that do not meet IHO Order 1. Figures 13 and 14 show data that have error but do meet IHO Order 1.<sup>20</sup> It is unclear what all of the sources of this error are, though they likely include the roll issues discussed above, sound velocity error, and/or other error from vessel offsets.





**Figure 8: Data do not meet IHO Order 1 - 0.72 meter error where acceptable error limit is 0.57 meters.**



**Figure 9: Data do not meet IHO Order 1 - 1.17 meter error where acceptable error limit is 0.582 meters.**



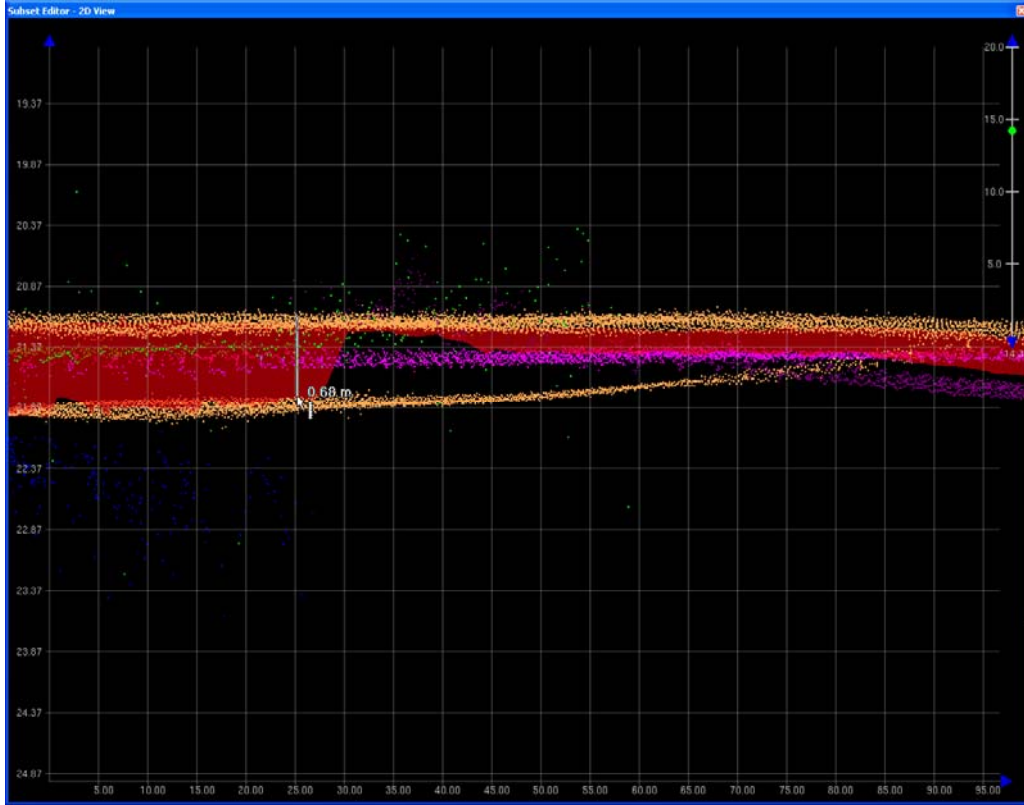


Figure 10: Data do not meet IHO Order 1 - 0.68 meter error where acceptable error limit is 0.573 meters.

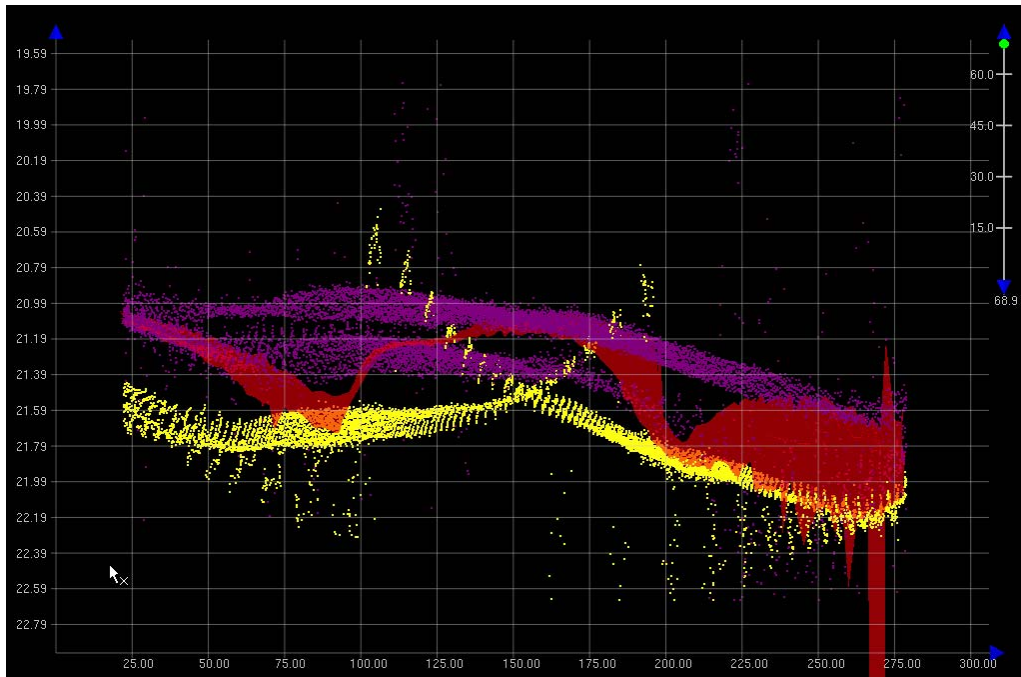


Figure 11: An example of apparent vessel offset error (between launches 1010 and 1018) in Olsen Bay (68.9 times exaggeration).

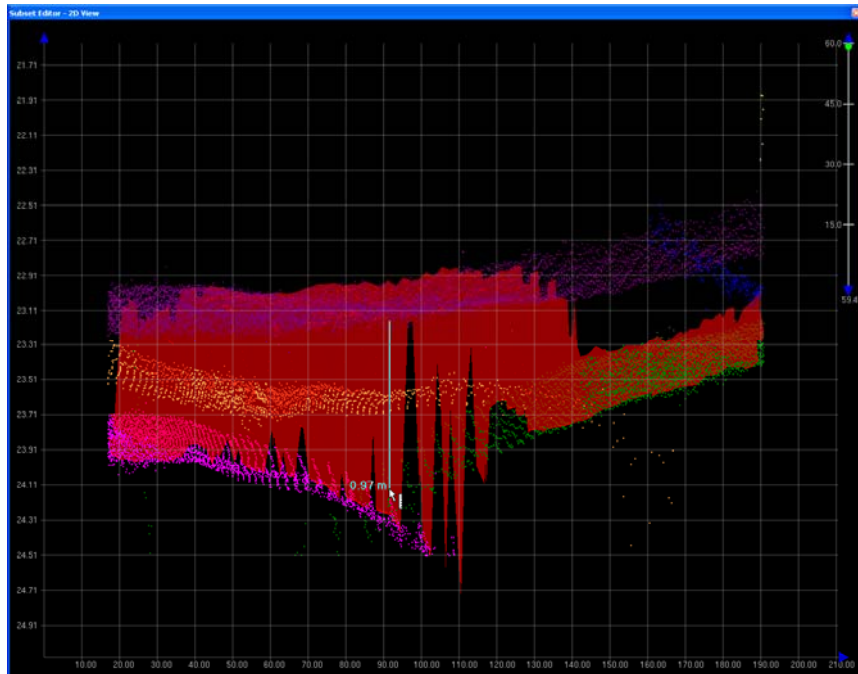


Figure 12: Data do not meet IHO Order 1 - 0.97 meter error where acceptable error limit is 0.586 meters.

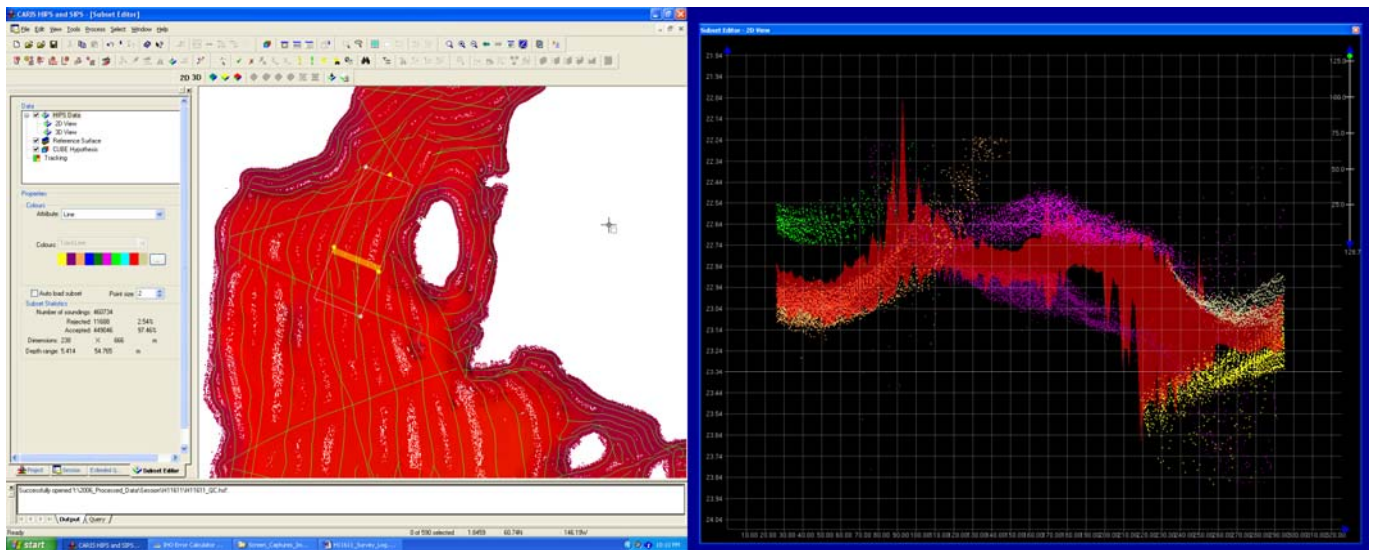
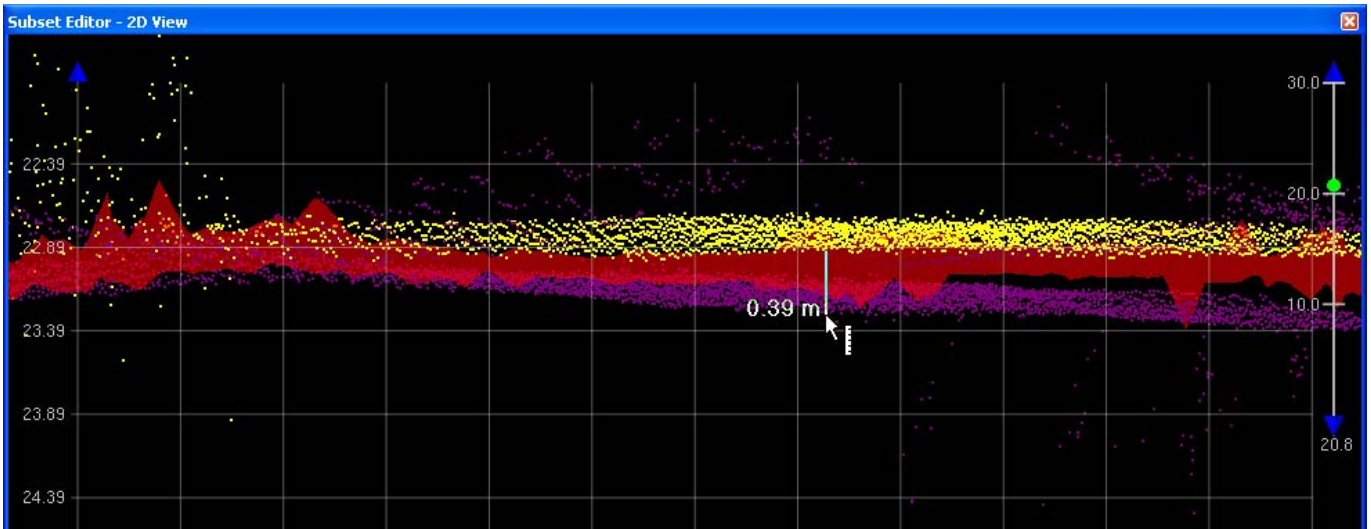


Figure 13: An area in Olsen Bay (128x exaggeration in subset) with offsets, but in which the data still meet IHO Order 1 accuracy specifications (0.48 meter error where acceptable error limit is 0.582 meters).



**Figure 14: An example of data that meet IHO Order 1 accuracy specifications, but still have error.**

There is also positioning error at the head of Parshas Bay (Figure 15).

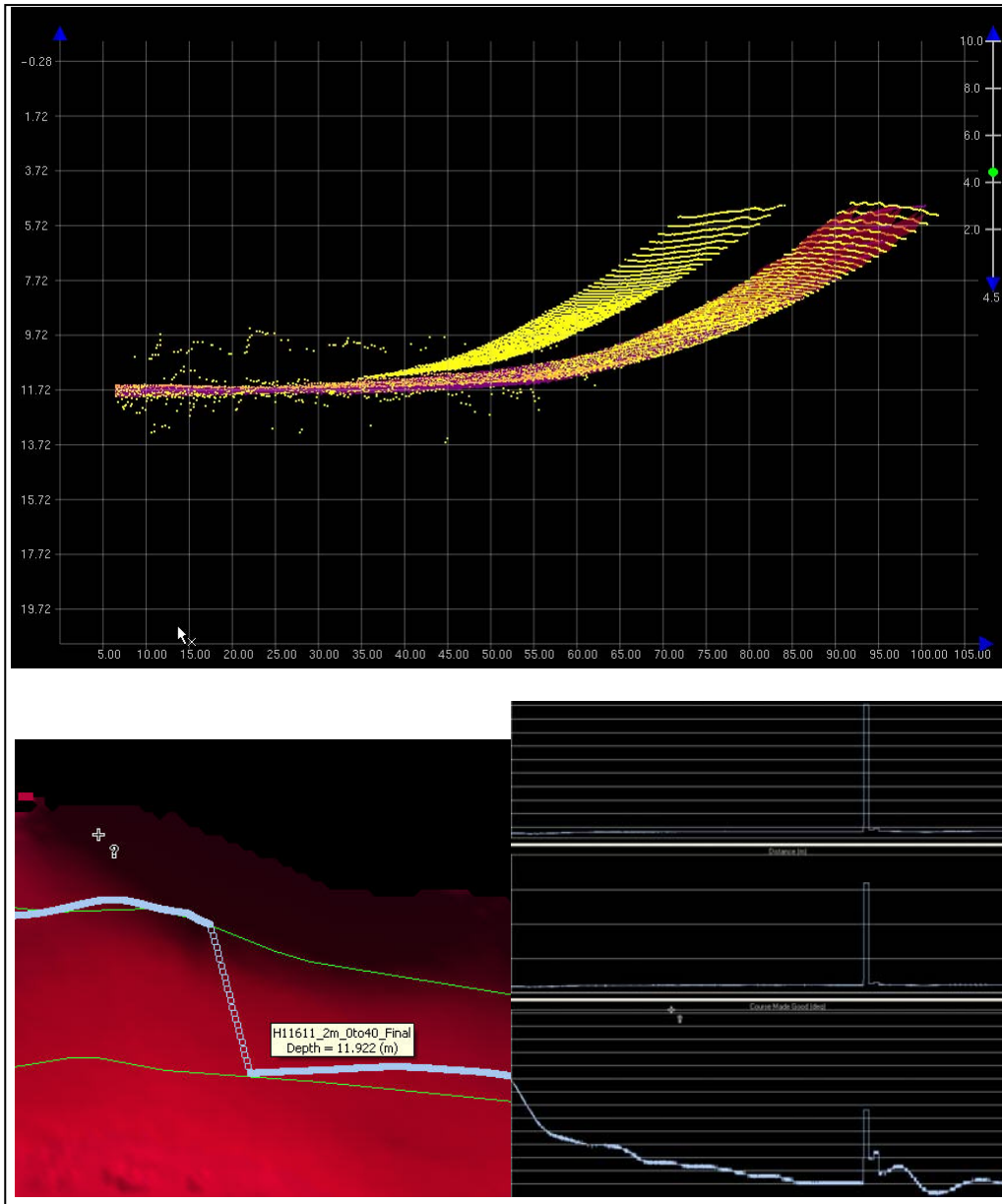


Figure 15: Positioning error at the head of Parshas Bay (data shown in subset mode by Line).

Again, some of the data that do not meet accuracy specifications for IHO Order 1 are adjacent to data that do meet IHO Order 1. All data meet IHO Order 2 accuracy specifications.<sup>21</sup>

### Accuracy Standards

Not all of the MBES data meet the data accuracy specifications as stated in the *HSSD*. As stated above, there are data in Olsen Bay which do not meet S-44 IHO Order 1. All MBES data meet IHO Order 2 standards. The data are still sufficient to supersede prior surveys.<sup>22</sup>

### **B3. Corrections to Echo Soundings**

Data reduction procedures for survey H11611 conform to those detailed in the *DAPR*.<sup>23</sup>

### **B4. Data Processing**

There is one field sheet named H11611 for the various resolution requirements for survey H11611. This field sheet encompasses the entire survey area and includes CUBE weighted BASE surfaces for the two meter, five meter, ten meter, and twenty meter resolutions. These resolutions satisfy the coverage requirements for the survey area.<sup>24</sup> The steep and deep nature of the area limits the accuracy of each resolution surface to its appropriate depth range, the two meter surface being the most accurate along the shore and the twenty meter surface the most accurate and useful for the middle of the channel approaching the mouth of the Gravina River.

## **C. HORIZONTAL AND VERTICAL CONTROL**

A complete description of horizontal and vertical control for survey H11611 can be found in the *OPR-P158-FA-06 Horizontal and Vertical Control Report*,<sup>25</sup> 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).

The steep topography of the survey area sometimes created weak signal to noise ratios for the DGPS corrections within the project area. Occasionally the corrector signal from a U.S. Coast Guard beacon would be lost. This problem was most persistent in Beartrap Bay which is almost completely surrounded by steep and tall mountains. The launch crew running here on DN 294 lost their DGPS position over two dozen times. If the DGPS loss resulted in the loss of GAMS, the launch crew would stop collecting data and try to reacquire the signal. In some instances data were acquired on C/A mode. All DGPS dropouts are noted in acquisition logs for each vessel. Data affected by this issue have been reviewed and meet the horizontal accuracy required by the *HSSD*.<sup>26</sup>

### **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 H11611 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 H11611 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.

FAIRWEATHER received the Tide Note for Hydrographic Survey H11611 on November 9, 2006. The Tide Note for Hydrographic Survey H11611 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 H11611 is included in Appendix V.<sup>27</sup>

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

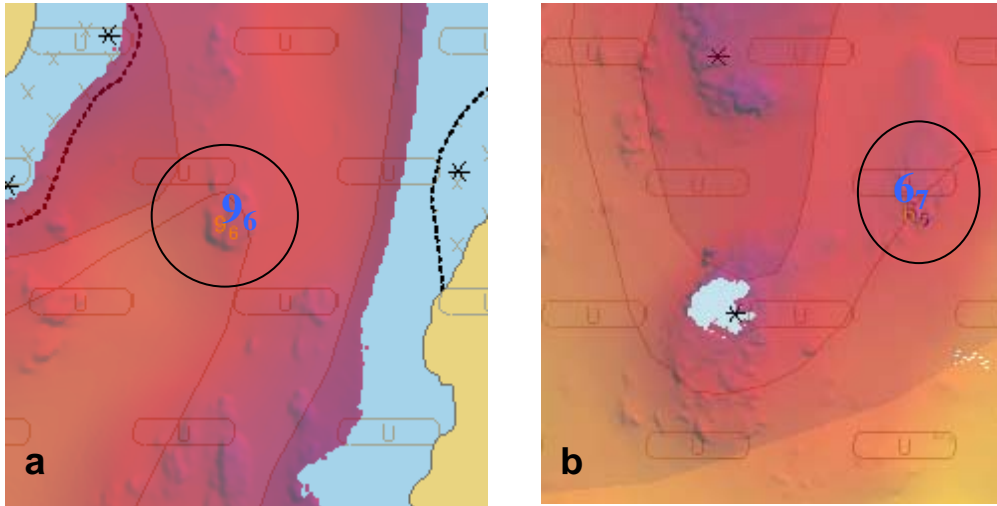
Survey H11611 was compared with ENC (Electronic Navigation Chart) US4AK24M (5<sup>th</sup> Ed.; March 2006, 1:79,291) as per the Letter Instructions. The 9<sup>th</sup> edition of this chart released in March 2007 was viewed and there were no new changes within the survey area. ENC US4AK25M and US5AK2CM do not have any overlapping soundings with survey H11611.

#### OLSEN BAY

An overall shoaling trend dominates the southern part of Olsen Bay, with discrepancies from 0 to 5 fathoms noted between surveyed and charted depths. Surveyed depths in the northern part of the bay appear to agree well with the charted depths.<sup>28</sup> Particularly significant discrepancies are discussed in the following paragraphs.

A significant shoaling trend was noted on the charted (16708) 10-fm (18.3 m) contour running along the Eastern side of Olsen Bay and continues on towards the entrance to Parshas Bay. New shoals with least depths ranging between 3.6 and 8 fms (6.7 to 14.6 M) were surveyed along the charted 10-fm contour in Olsen Bay (Figure 16 a, b). It is recommended that surveyed depths be used to modify the charted 3-fm and 10-fm contours in and on approach to Olsen Bay.<sup>29</sup>





**Figure 16** (a) A new shoal along the Northeast coast of Olsen Bay with a least depth of 5.2 fm (9.6 m) was found in the vicinity of the charted 10-fm (18.2 m) contour (60-44-14 N, 146-12-18 W). (b) A new shoal with a least depth of 3.6 fm (6.7 m) was found in the vicinity of the charted 10-fm (18.2 m) contour in the Southeast corner of Olsen Bay (60-43-39 N, 146-11-35 W). The above images were taken in Caris HIPS 6.1, with a 2-m CUBE surface colored by depth overlaid on ENC US4AK24M. Designated depths are displayed in meters.<sup>30</sup>

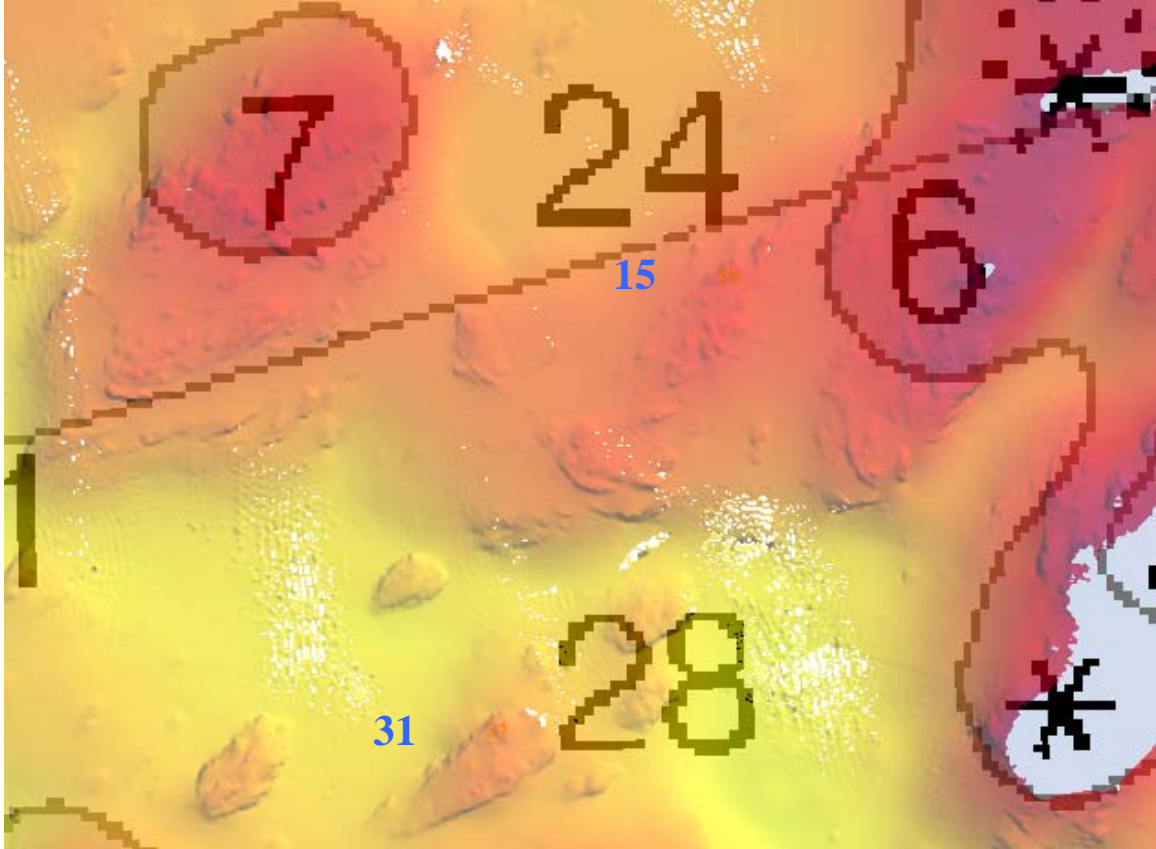
Two new shoals with least depths of 1 and 3.7 fm (1.8 and 6.8 m) were surveyed in the vicinity of a charted (16708) 7-fm (12.9 m) sounding (Figure 17). The depths are located in the vicinity of 60-44-27 N, 146-12-15 W between a small islet and the coastline in the Northeast corner of Olsen Bay.<sup>31</sup>



**Figure 17.** A 2-m CUBE surface colored by depth is overlaid over chart 16708 in Caris HIPS 6.1. Soundings were designated over 2 new shoals surveyed in the vicinity of a charted 7-fm (12.9 m) sounding, and are displayed in blue with depth in meters.

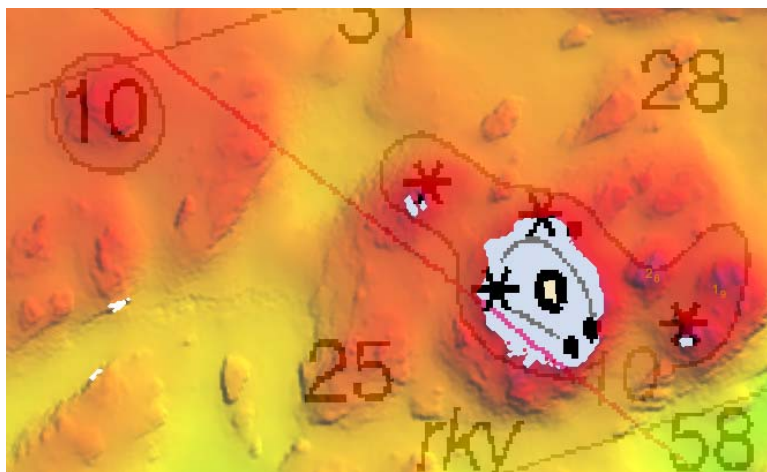
A new shoal was surveyed in the vicinity of a charted (16708) 24-fm sounding. The shoaling trend extends between charted (16708) 6 and 7 fathom depths in the Southeast corner of Olsen Bay (Figure 18). Depths over the shoal were surveyed between 8 and 16 fathoms. This is significantly shoaler than nearby charted depths that claim depths offshore of the 10-fm contour to be 24 and 28 fathoms.<sup>32</sup>





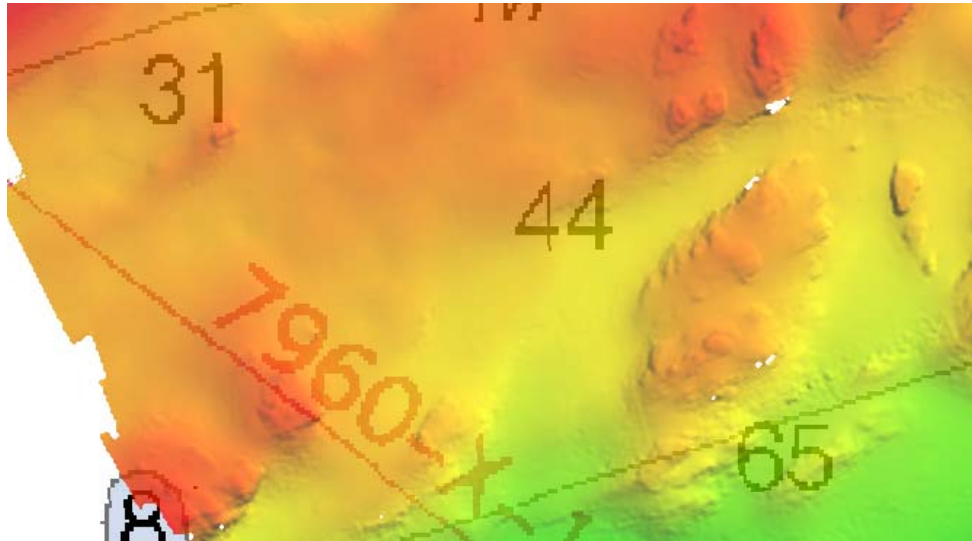
**Figure 18.** An image depicting a new shoal just south of a charted 24 fm depth in the Southeast corner of Olsen Bay. A 2m CUBE surface colored by depth is displayed over chart 16708 in Caris HIPS 6.1. Designated soundings are shown in blue in meters.

Other significant discrepancies between charted and surveyed depths were noted at the entrance to Olsen Bay. A charted 10-fm shoal located in the vicinity of 60-43-06 N, 146-12-43 W was surveyed with a least depth of 7.7 fm. Also, a shoal with the least depth of 14.6 fm was surveyed in the vicinity of a charted 25-fm located approximately 700 meters to the Southeast of the charted 10-fm sounding mentioned above (Figure 19).<sup>33</sup>



**Figure 19.** An image showing the shoals located at the entrance to Olsen Bay with a 2m CUBE surface colored by depth overlaid on chart 16708 displayed in Caris HIPS 6.1.

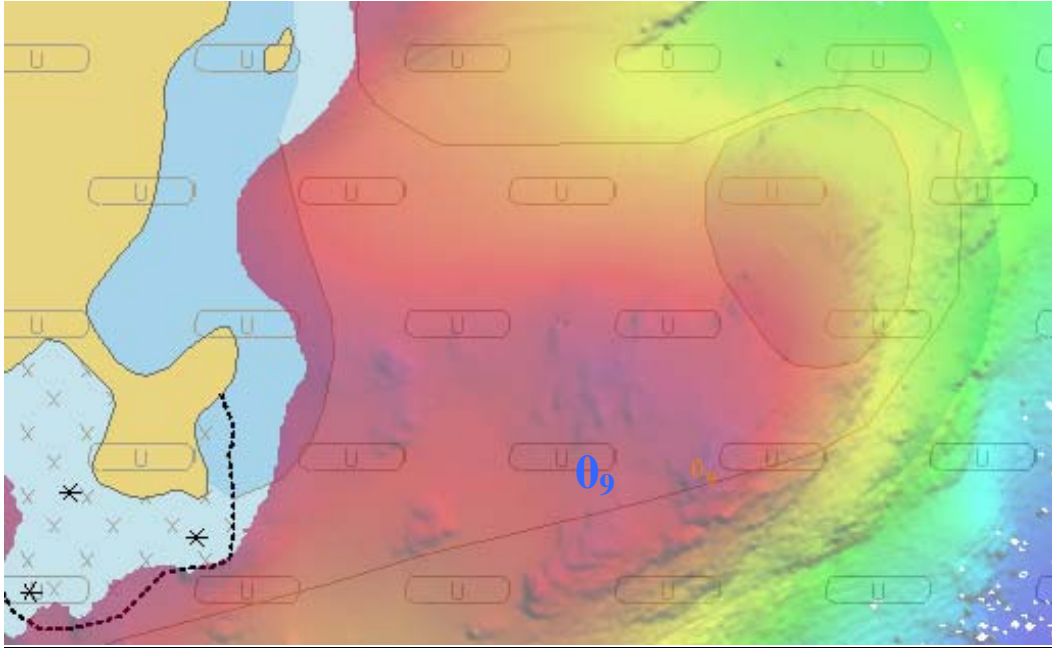
A new shoal was surveyed on the southern approach to Olsen Bay between charted (16708) 44 and 65 fm soundings. The surveyed least depth of the new shoal is 27.5 fm located in the vicinity of 60-42-38 N, 146-12-49.4 W. Approximately 700 meters northwest of the new shoal, a least depth of 21.5 fm was surveyed in the vicinity of a charted 31-fm sounding (Figure 20).<sup>34</sup>



**Figure 20.** An image showing the shoals on the southern approach to Olsen Bay with a 2m CUBE surface colored by depth overlaid on chart 16708 displayed in Caris HIPS 6.1.

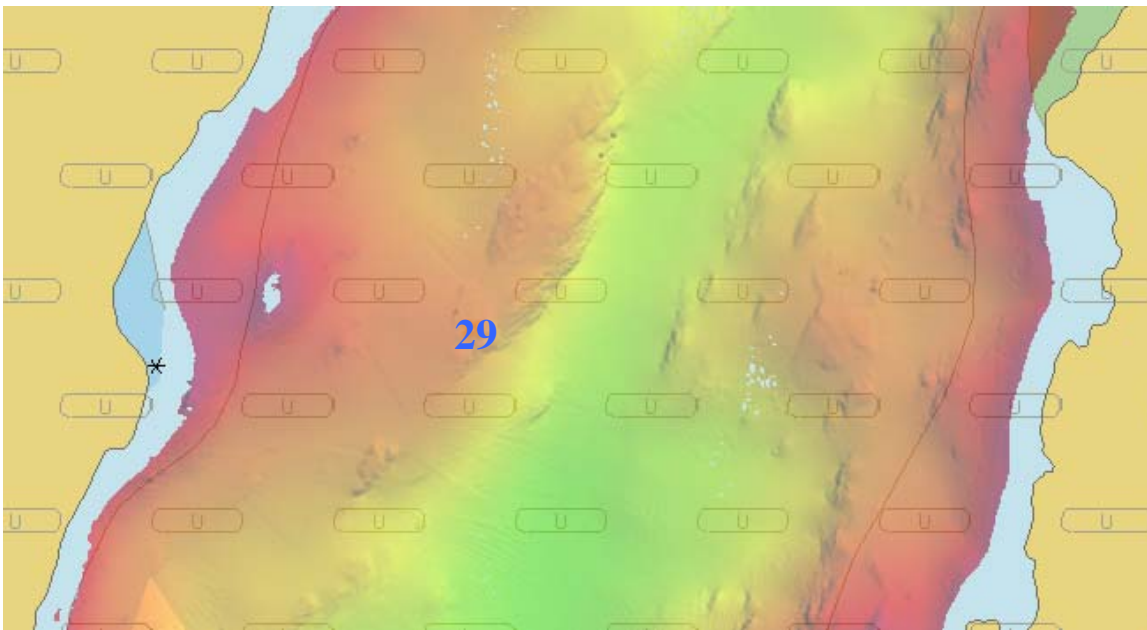
### PARSHAS BAY

The shoal with a charted depth of 1 fm (1.8 m) at the southwest entrance to Parshas Bay appears to be charted incorrectly. Depths surveyed over the shoal's charted position ranged between 5 and 35 fathoms. The true position of the shoal was surveyed with a least depth of 0.5 fm (0.9 m) at 60-43-28 N, 146-09-14.19 W, approximately 150 meters to the southwest (Figure 21).<sup>35</sup>



**Figure 21.** An image displaying the shoal at the southwest entrance to Parshas Bay. A 5-meter CUBE surface is overlaid on ENC US4AK24M, with the least depth of 0.9 meters shown in blue.

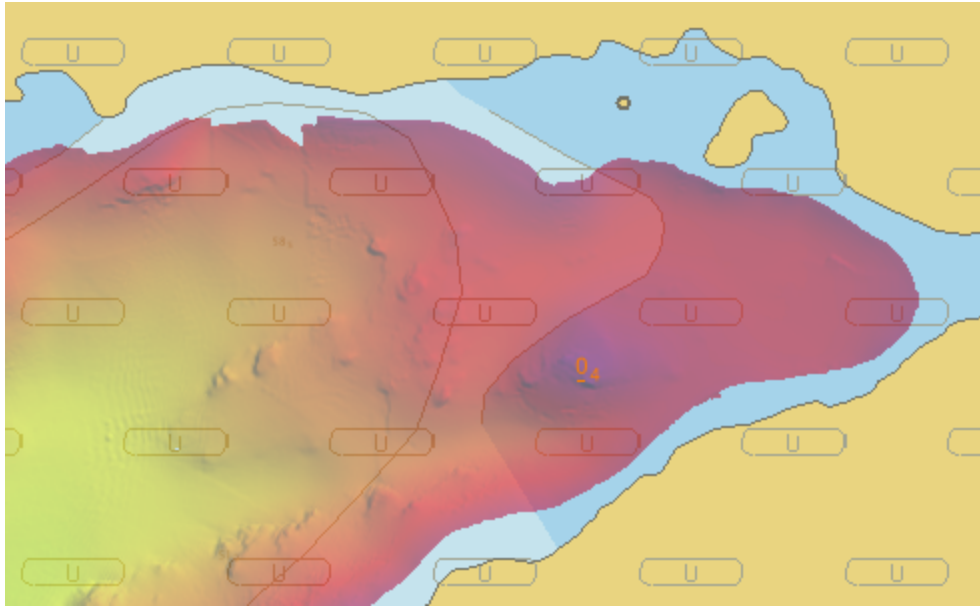
Significant shoaling is evident in the center of Parshas Bay in the vicinity of charted 47.5 and 64 m soundings (Figure 22). A 29 meter sounding was surveyed in the center of the bay approximately 200 meters north of the charted 64 meter depth. Surveyed depths in the vicinity of the 47.5 meter sounding were up to 15 meters shallower than charted.<sup>36</sup>



**Figure 22.** An image displaying the shoaling trend in the center of Parshas Bay, with a 5-meter CUBE surface overlaid on ENC US4AK24M.

Shoaling was also noted along the charted 10-fm contour in the northeast corner of Parshas Bay (Figure 23). Soundings as shallow as 1 fathom (2 meters) were surveyed along and seaward of the charted

contour. Also at the mouth of Parshas Bay, a new rock with a depth of -0.4 meters was surveyed at 60-44-32 N, 146-07-39 W.<sup>37</sup>



**Figure 23.** The mouth of Parshas Bay is shown with a 5-meter CUBE surface overlaid on ENC US4AK24M. The least depth of a new rock is displayed in orange in meters.

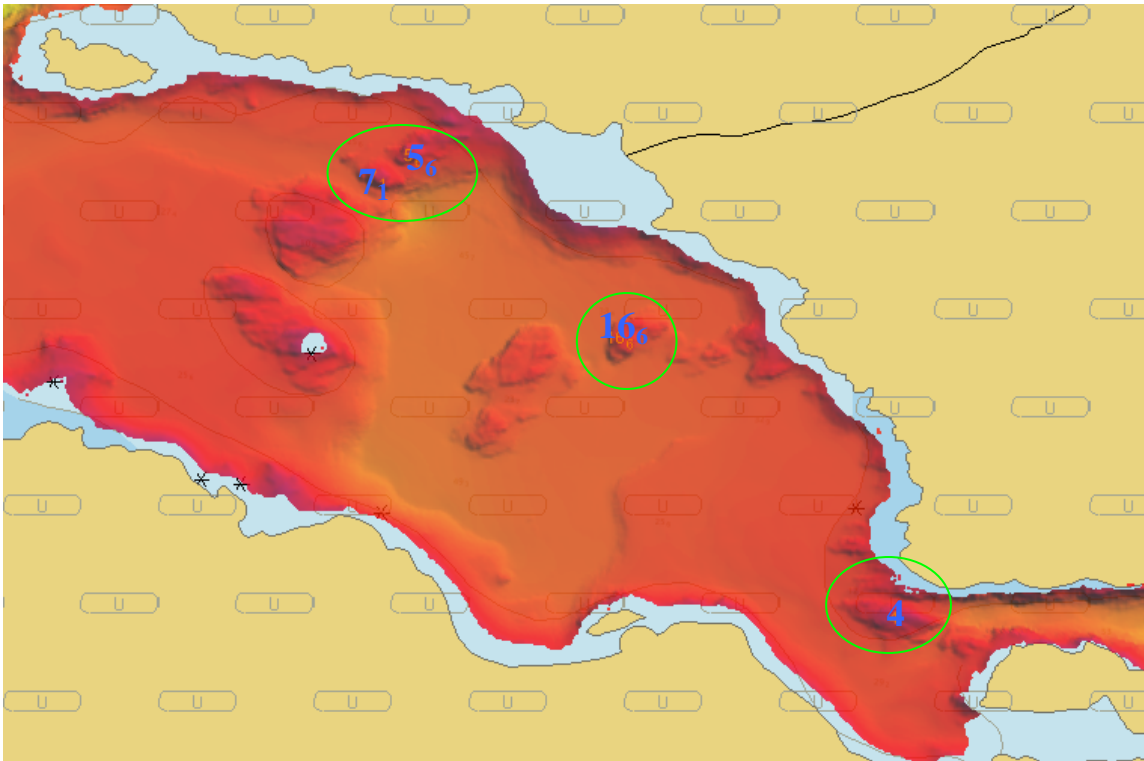
Overall, surveyed depths in Parshas Bay were shoaler than charted with minimum discrepancies on average of 8 fm (14.6 m).<sup>38</sup>

### BEARTRAP BAY

Several new shoals were surveyed in Beartrap Bay (Figure 24). New shoals with least depths of 7.1 and 5.6 meters were surveyed approximately 100 meters to the southeast of a charted 25 meter depth located at 60-45-21 N, 146-02-55 W. The 7.1 m shoal was submitted as a Danger to Navigation.<sup>39</sup>

In the center of Beartrap Bay, a shoal with a least depth of 16.8 meters was surveyed in the vicinity of a charted 38.4 sounding located at 60-45-08 N, 146-02-20 W.<sup>40</sup>

Finally, a new shoal with a least depth of 4 meters was surveyed in the vicinity of a charted 12.8 meter sounding located at 60-44-49 N, 146-01-45 W. The 4 meter sounding should be charted as the limiting depth for vessels heading into the eastern portion of Beartrap Bay.<sup>41</sup>



**Figure 24.** An overview of Beartrap Bay with a 2-m CUBE surface overlaid on ENC US4AK24M. The locations of significant new shoals are circled in green with designated soundings displayed in blue in meters.

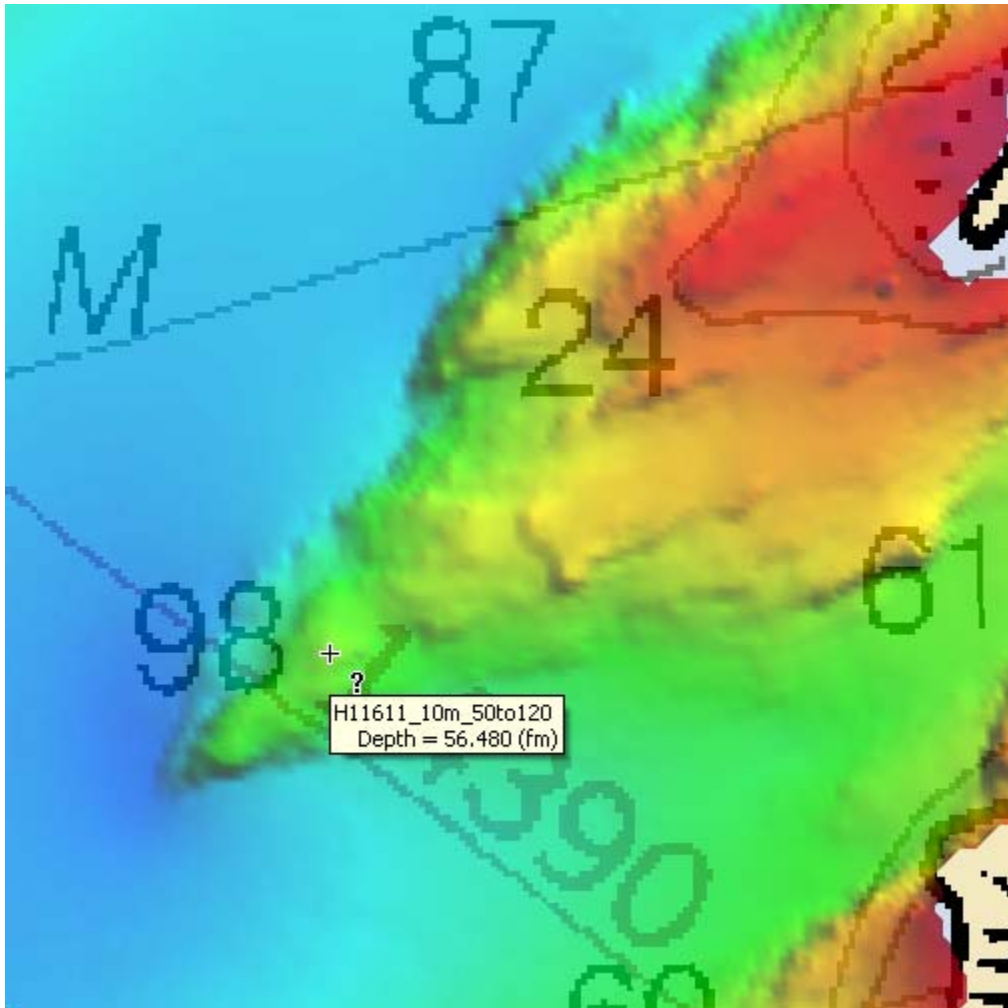
### MAIN CHANNEL

Consistent shoaling was noted along the charted 10-fm contour on the west side of the main channel extending north from Parshas Bay to the Mouth of the Gravina River.<sup>42</sup>

On average, surveyed depths were 5 to 10 fathoms (9 to 18 meters) shallower than charted depths. Larger discrepancies were noted on the east side of the main channel over several new shoals.<sup>43</sup>

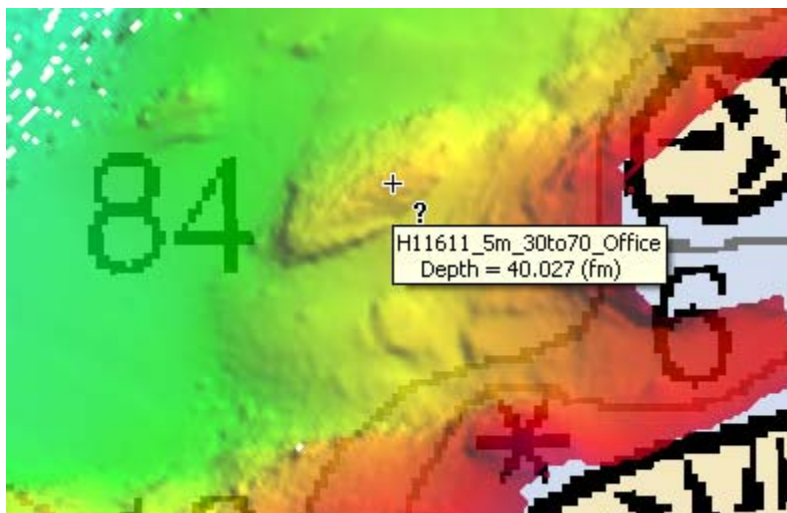
A 56.4-fathom depth was surveyed in the vicinity of a charted (16708) 98-fathom sounding (Figure 25) located at 60-43-50.8 N, 146-06-09 W.<sup>44</sup>





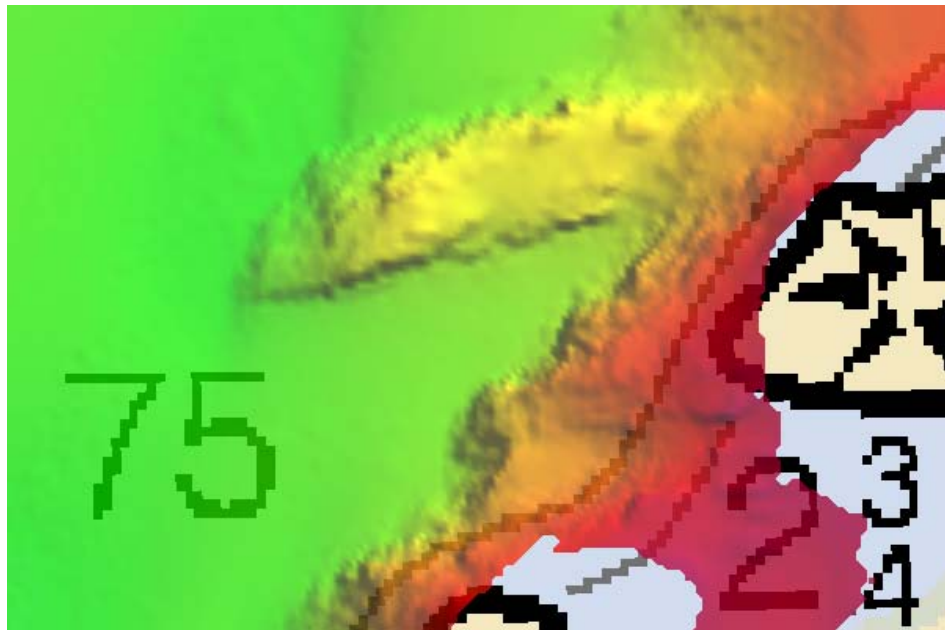
**Figure 25.** An image from Caris HIPS 6.1 showing a 10-meter CUBE surface overlaid on Chart 16708. An uncharted shoal is shown with depths over 40 fathoms shoaler than charted.

A new shoal located at the position of 60-43-14 N, 146-06-27 W with a least depth of approximately 40 fm was located in the vicinity of a charted (16708) 84-fm depth (Figure 26).<sup>45</sup>



**Figure 26.** A new shoal with a least depth located on the west side of the main surveyed channel is displayed in Caris HIPS 6.1 with a 5-meter CUBE surface overlaid on Chart 16708.

A new shoal with a least depth of 45 fathoms extends into the main channel in the vicinity of 60-44-55 N, 146-04-49 W (Figure 27).<sup>46</sup>



**Figure 27.** An uncharted shoal displayed in Caris HIPS 6.1 with a 10-meter CUBE surface overlaid on Chart 16708.

### **Chart Comparison Recommendations**

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSD* (exceptions discussed above). The CUBE weighted BASE surfaces with the application of designated soundings are adequate to supersede prior surveys in their common areas.<sup>47</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 four AWOIS items located within the limits of H11611. These four items were rocks and were verified.<sup>48</sup> All AWOIS items are addressed in the H11611\_Features\_Report.pdf in Appendix II.<sup>49</sup>

### **Dangers to Navigation**

One Danger to Navigation was found within the survey limits.<sup>50</sup> This DTON was reported to the Marine Charting Division for final submission to the Seventeenth Coast Guard District on June 3, 2007. A copy of the Danger to Navigation Report is included in Appendix I.

### **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 H11611\_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*.<sup>51</sup> In addition, annotations describing shoreline were recorded on hard copy boat sheets of the digital shoreline. Scanned copies of the boat sheets are also included in the digital Separates folder and hard copies can be found with the *Separates to be Included with Survey Data*.

## Shoreline Data Processing

Positions acquired during shoreline verification operations were processed in GPS Pathfinder Office and inserted into Pydro using the database import function. Features were entered as Detached Positions (DPs) when tide correctors were required and as Generic Positions (GPs) 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.<sup>52</sup>

All accepted and primary detached and generic positions including any pertinent AWOIS investigation items were imported from the Pydro .xml into one separate stand alone .hob file in CARIS Notebook 2.2 named H11611\_Updates.hob.<sup>53</sup> There were no disapprovals for H11611.<sup>54</sup>

## Source Shoreline Changes, New Features and Charted Features

AWOIS items and items for survey H11611 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.<sup>55</sup> A survey feature report for shoreline items was generated and included as H11611\_Survey\_Features.pdf in Appendix II.

The H11611\_edited\_CFF\_shoreline.hob, compiled in CARIS Notebook, had new items digitized and existing features from the CFF modified or deleted as necessary.<sup>56</sup> 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.



CFF features that were located outside of the inshore limits observable do *not* have any remarks added. This applies solely to features behind a Marker in the H11611\_CFF\_shorelineHOB (see Figure 28). There are six such areas: one at the head of Olsen Bay, one at the head of Beartrap Bay, one at the limits of H11611 near the Gravina River mouth, and three others in Olsen Bay. All other features in the CFF shoreline HOB have the appropriate comments in the remarks field.

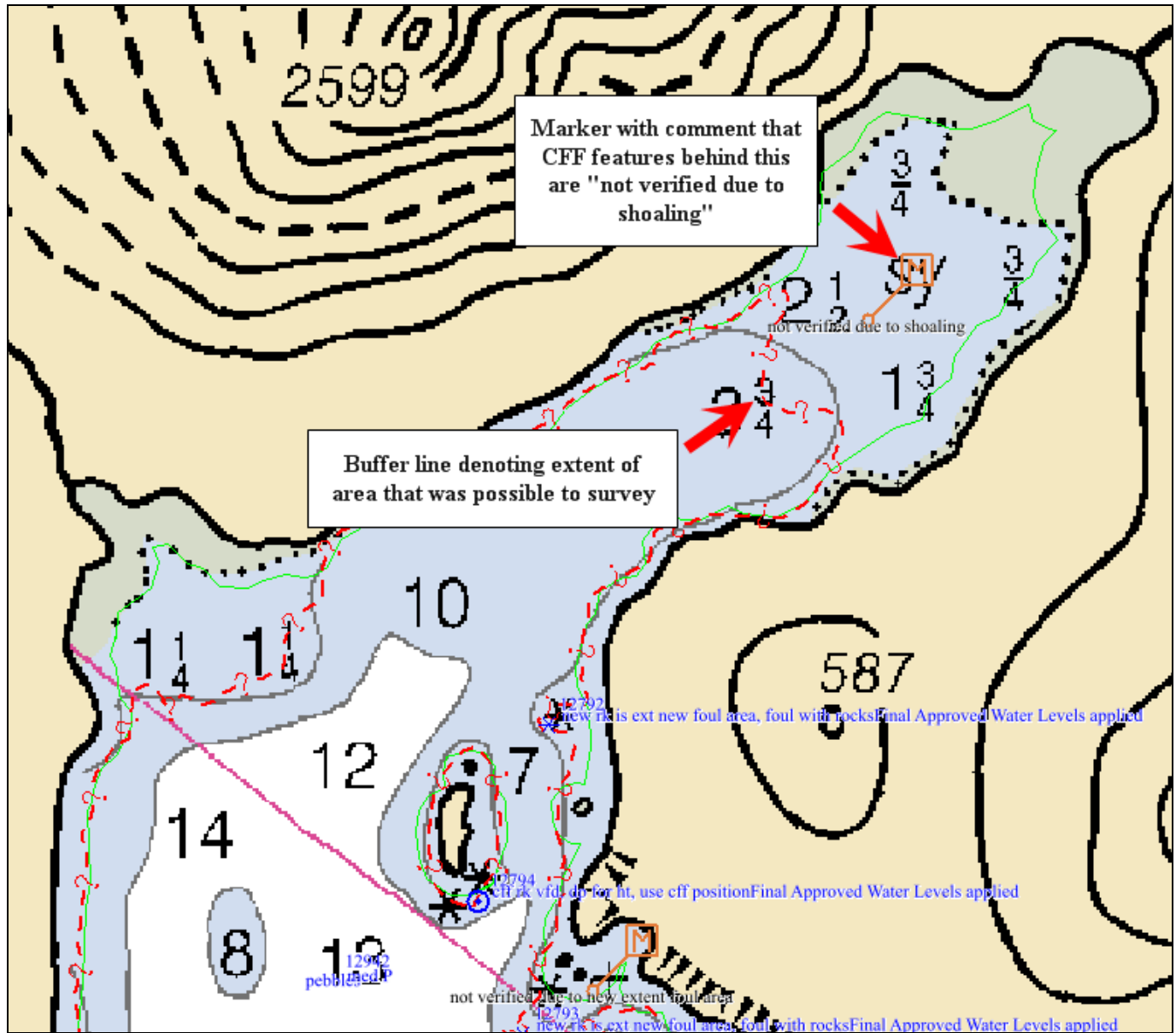


Figure 28: Notebook session showing one of the Marker notes showing the extent of the area surveyed; CFF features behind such Markers do not have additional remarks.

### 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>57</sup>

## **Aids to Navigation**

There were no Aids to Navigation within the survey limits.<sup>58</sup>

## **Bottom Samples**

Bottom samples were collected on October 21, 2006 (DN 294) and October 25, 2006 (DN 298) and are included as S-57 seabed classifications (SBDARE objects) along with the other S57 features in the Pydro Preliminary Smooth Sheet. The bottom sample positions were also imported to the Notebook H11611\_Updates.hob file.<sup>59</sup>

## **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

## Supplement to Survey H11611

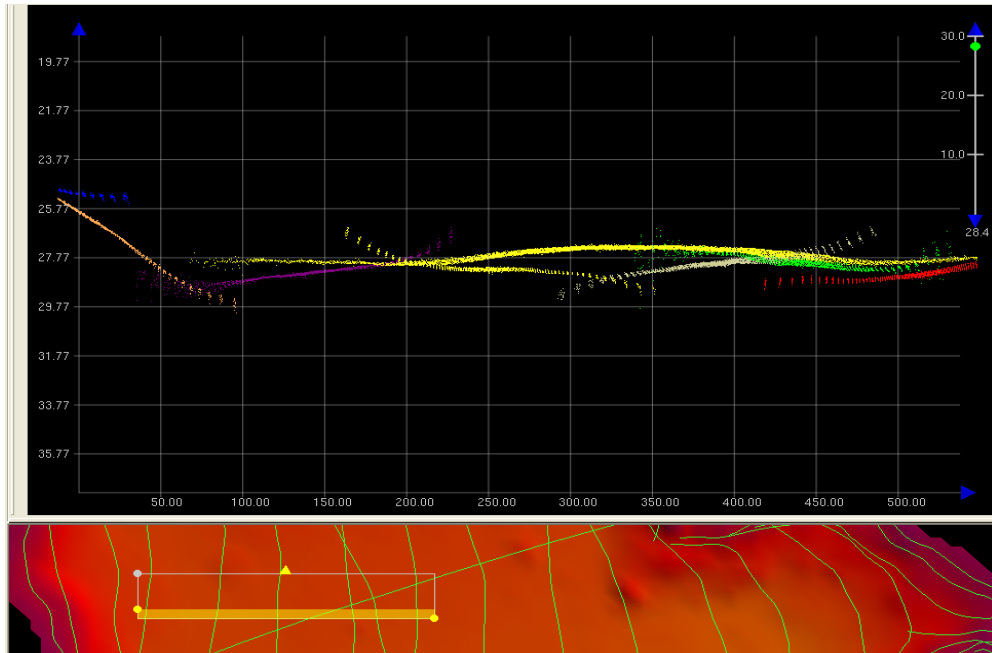
**Purpose:** The purpose of this document is to record the work performed at PHB to restore survey H11611 to a state that complies with NOS Specifications and Deliverables. The methods discussed below recount the additional processing conducted in the office to finalize survey deliverables for H11611. The office-generated deliverables should supersede those originally submitted to PHB. This document will be appended to the Descriptive Report for survey H11611.

### B. Data Acquisition and Processing (Addendum)

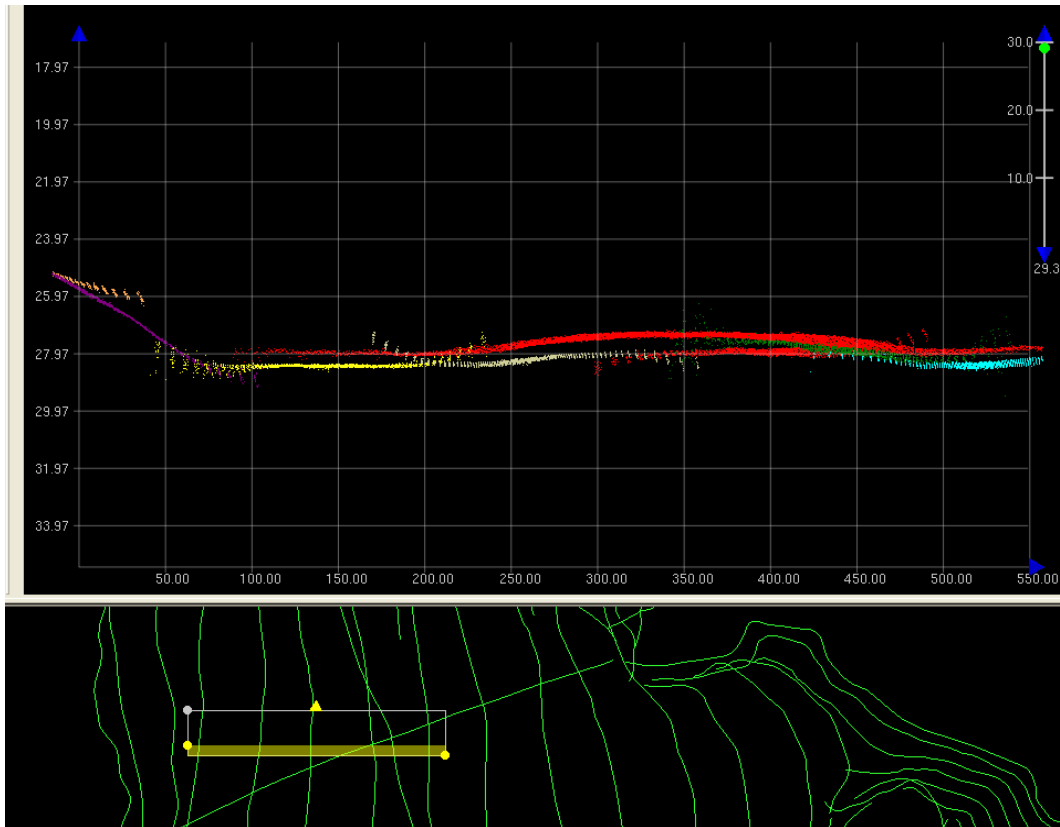
#### **B.2 Quality Control**

##### Roll Error

The original descriptive report called attention to large vertical offsets in Olsen Bay partly caused by an incorrect roll bias value in the original Hydrographic Vessel File (HVF). After survey H11611 was returned to the Survey Manager for additional processing, several issues related to the HVF were corrected and the survey lines were re-merged in Caris HIPS 6.1 using the updated HVF. There were various causes of the vertical offsets noted between sounding data in Olsen Bay (roll, SVP and unknown errors); however, the agreement between survey lines did improve following the changes ship personnel made to the HVF (Figure 1 a, b).



**Figure 1. (a)** Sounding data from survey lines acquired in Olsen Bay for survey H11611 are shown in Caris HIPS 6.1 Subset Editor. The soundings are colored by line with a vertical exaggeration of 30 times has been applied to the data to enhance the visibility of the offset between the survey lines.



**Figure 1. (b)** The same subset of survey lines from Figure 1(a) is displayed above in Caris HIPS 6.1 following the re-merging of lines with the updated HVF applied. The soundings are colored by line with the same vertical exaggeration as in Figure 1(a). There is an evident improvement in agreement between survey lines.

Although there was a marked improvement in agreement of sounding data in Olsen Bay, the PHB reviewers found a prominent roll error was present in the re-submitted multi-beam data in Beartrap Bay and a small cove south of Beartrap Bay, located on the East side of survey H11611. After the gross fliers were cleaned from the data, the offsets were examined and quantified using Caris HIPS 6.1 Subset Editor. The roll bias error was visible in survey lines collected on DNs 293 and 294 with survey launch 1018. Vertical offsets in Beartrap Bay ranged between 1.5 and 2 meters in depths between 25 to 50 meters and offsets in the cove ranged between 0.5 and 1 meter in depths between 15 and 20 meters. These offsets exceed the IHO Order 1 acceptable error budget.

In an effort to improve data quality, the PHB Reviewers used the Calibration tool in Caris HIPS to calculate day specific roll bias values for vessel 1018, DNs 293 and 294. To calibrate the new roll bias values, the Reviewers selected adjacent survey lines, with opposite headings located in as flat a terrain as possible for each day. The new roll bias value that was calculated for vessel 1018, DN 293 using HDCS lines 293-1816-1 and 293-1829 was 3.30 degrees and the roll bias value calculated for vessel 1018, DN 294 using HDCS lines 294-1854 and 294-1900 was 3.40 degrees.

The PHB Reviewers performed an analysis of the sounding data before and after the new HVF values were applied to determine if the new bias values were minimizing the roll offsets present in the data. Six locations were chosen from Beartrap Bay and the small cove to the south for the comparison test. The subset areas selected contained survey lines from vessel 1018 on DN 293 and 294 and also displayed a pronounced roll offset. The independent variable in the comparison test was the roll bias value in vessel 1018's HVF, all other HVF variables stayed constant to accurately measure the affect of the roll bias on the vertical offset between survey lines.

Four different 1018 HVF scenarios were tested: 1) Original HVF as submitted, 2) Original HVF with new roll bias for DN 293 only, 3) Original HVF with new roll bias for DN 294 only and 4) Original HVF with new roll bias entries for DNs 293 and 294 (Figure 2). For each HVF scenario, the roll bias value was updated and the survey lines from vessel 1018, DN 293-294 were re-merged in order to apply the change. After the lines were re-merged, each pre-selected area mentioned in the paragraph above was examined in Caris 6.1 Subset Editor.

Date	Time	Time Corre	X (m)	Y (m)	Z (m)	Pitch (deg)	Roll (deg)	Yaw (deg)
2006-199	00:00	-0.010	0.291	-0.150	0.556	-1.040	2.640	0.000
2006-293	00:00	-0.010	0.291	-0.150	0.556	-1.040	3.300	0.000
2006-294	00:00	-0.010	0.291	-0.150	0.556	-1.040	3.400	0.000

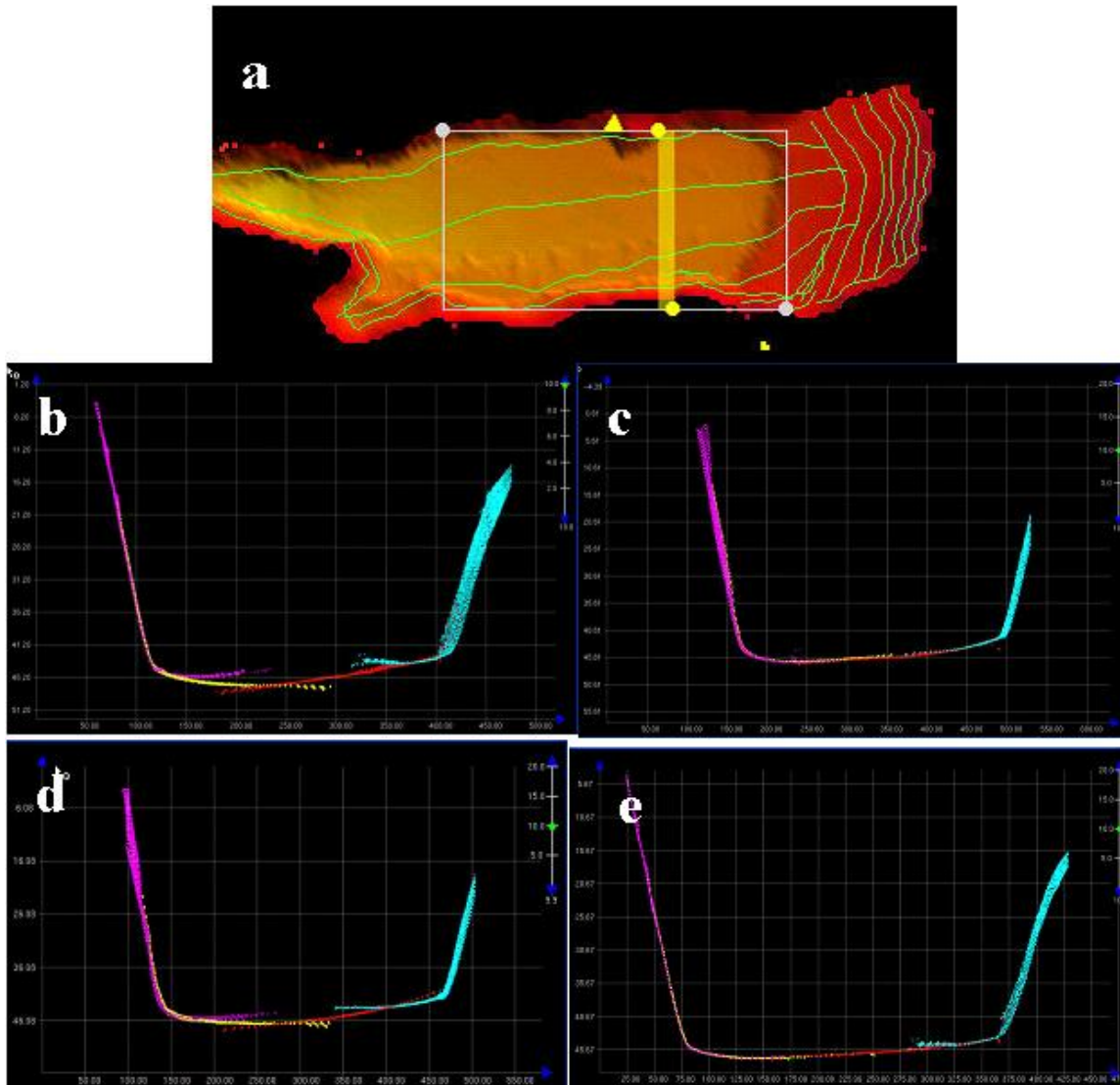
**Figure 2.** A portion of the HVF for vessel 1018 copied from the Caris HIPS Vessel Editor. The values from 2006-199 were originally applied to the data. The entries for 2006-293 and 2006-294 were calculated at PHB.

The vertical offsets between survey lines were measured using the distance measuring tool in Caris HIPS 6.1 Subset Editor. These offsets were averaged and compiled into Table 1.

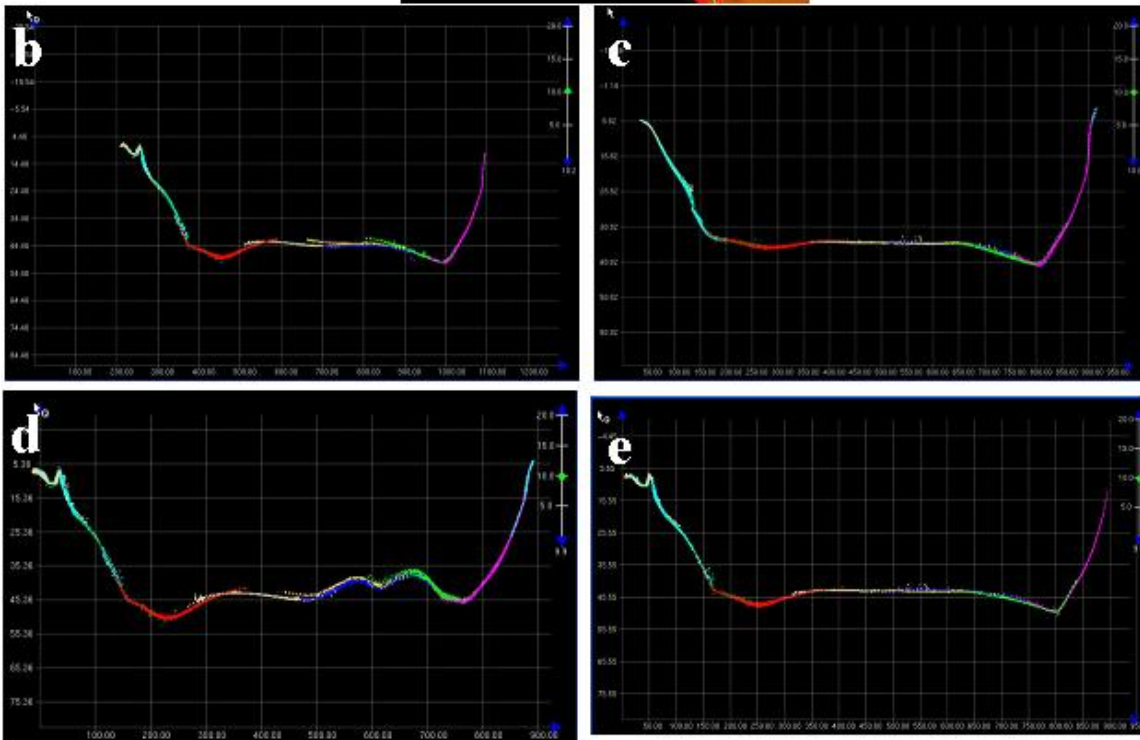
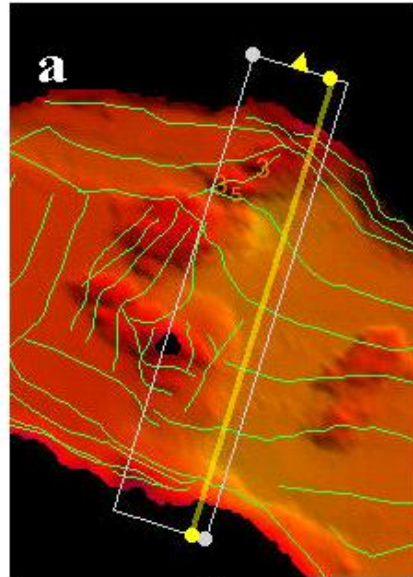
Subset Areas	Average Vertical Offset in Subset Editor (m)				Coordinates	
	No Roll Correction	Roll Correction for Dn 293	Roll Correction for Dn 294	Roll Correction for Dn 293 & 294	Latitude (deg, min, sec)	Longitude (deg, min, sec)
<b>Beartrap 1</b>	1.63	0.30	1.23	1.00	60-44-45 N	145-59-56 W
<b>Beartrap 2</b>	1.73	0.51	1.66	0.76	60-45-06 N	146-02-56 W
<b>Beartrap 3</b>	1.07	0.71	0.66	0.58	60-44-45 N	145-59-23 W
<b>Cove 1</b>	0.74	0.36	0.44	0.98	60-44-19 N	146-03-46 W
<b>Cove 2</b>	0.85	0.52	0.78	0.35	60-44-16 N	146-04-21 W
<b>Cove 3</b>	1.05	0.44	1.11	0.62	60-44-01 N	146-04-40 W
<b>Average</b>	1.18	0.47	0.98	0.715		

**Table 1.** Average vertical offsets measured between survey lines at six survey locations in Caris HIPS 6.1 Subset Editor. The lowest average vertical offset between survey lines for the sampled subset areas was found with an updated roll bias value for 1018 on DN 293.

The following figures were taken in Caris HIPS 6.1 to display the effect the roll bias adjustments in the HVF had on the artifacts prevalent in 1018 data collected on DNs 293 and 294. Figures 3 through 8 are divided up into five different segments (a-e) as follows: a. A 2-meter BASE Surface colored by depth is overlain with track lines from survey H11611 shown in green in Caris HIPS 6.1. The yellow rectangle represents the region/survey lines displayed in Caris HIPS Subset Editor in images b-e.; b. Survey Lines with Original HVF; c. HVF with Roll Bias Correction for Dn 293; d. HVF with Roll Bias Correction for Dn 294; and e. HVF with Roll Bias Correction for Dn 293 & 294. Each figure will include the lines used for the analysis.

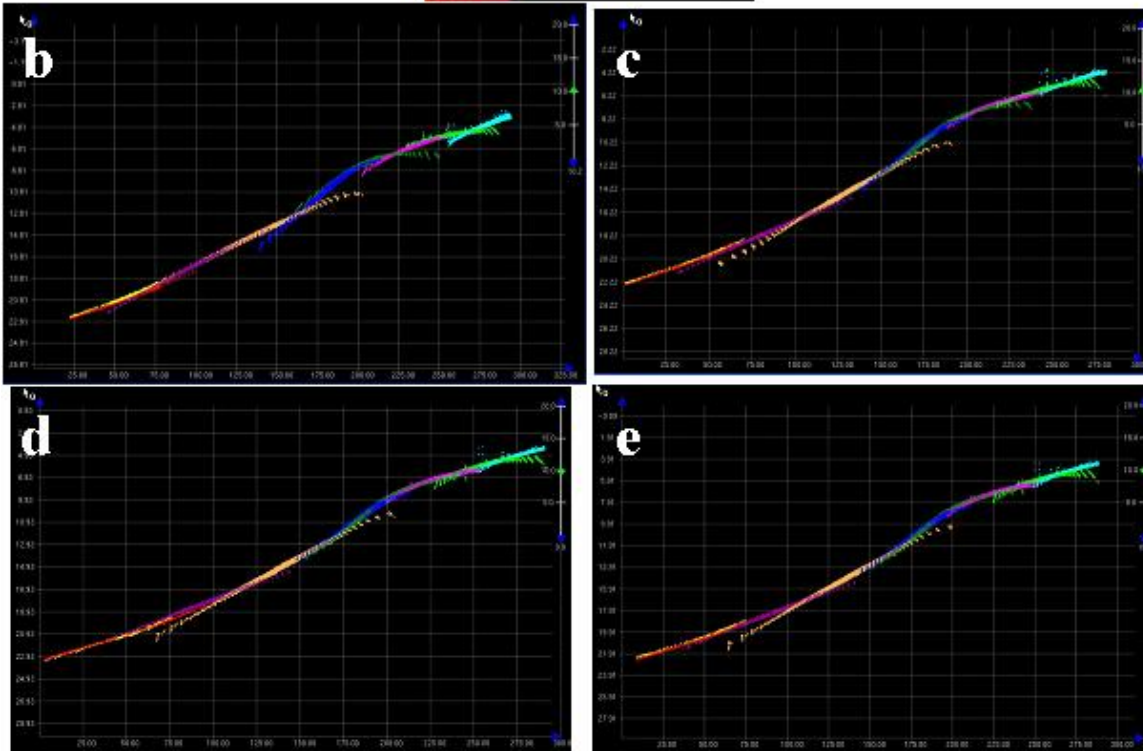
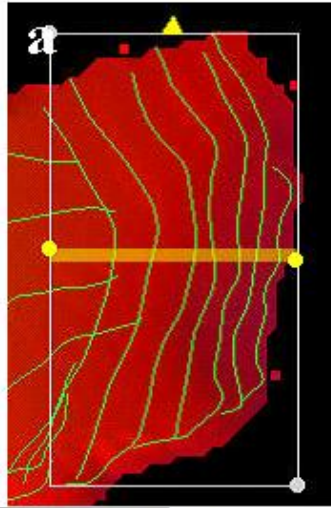


**Figure 3(a-e): Beartrap Bay I.** The smallest vertical offset is seen in Figure 3(c) where the HVF was changed only for DN 293. (Pink: 293-2040; Orange: 293-2035; Purple: 293-2032; Yellow: 293-2025; Red: 293-2014; Teal: 293-2005)



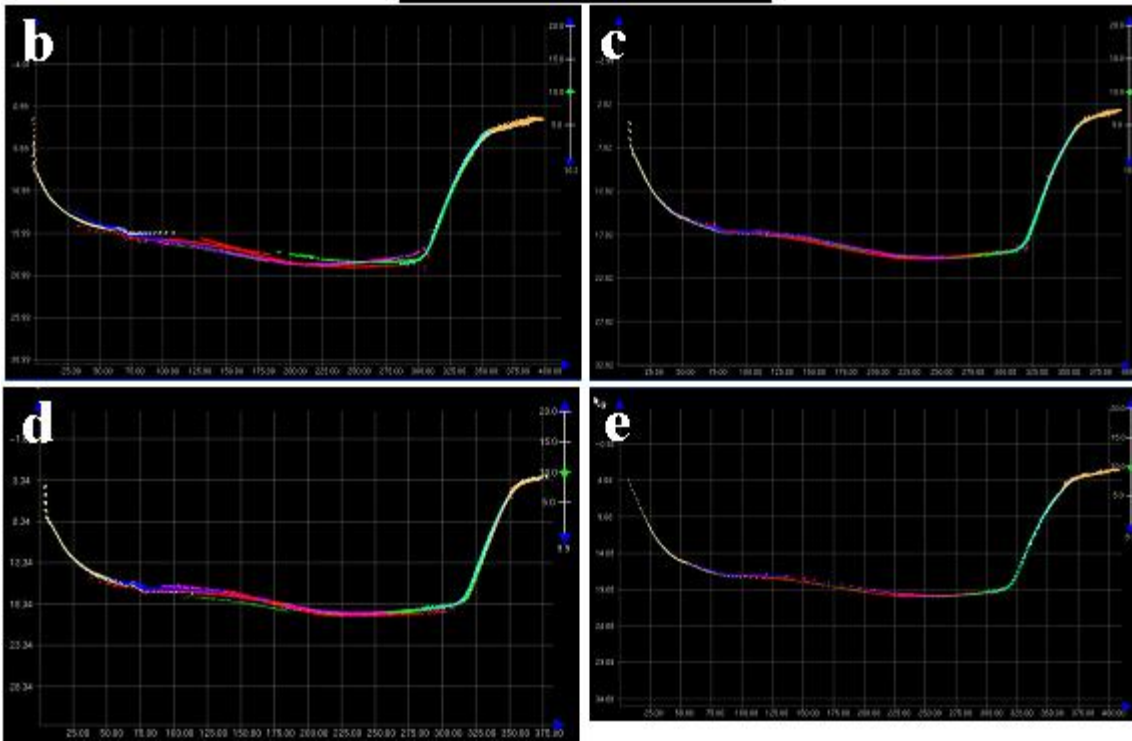
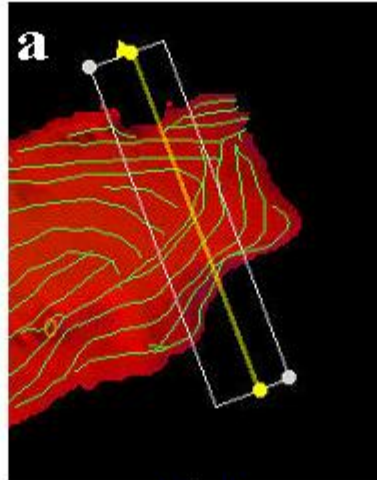
**Figure 4(a-e). Beartrap Bay 2.** The vertical offset between survey lines was smallest in Figure 4(c), where the HVF for DN 293 was changed. (Tan(1): 295-0024; Lt Green(1): 293-2144; Teel(1): 295-0020; Dk Green: 293-2132; Red: 293-2147; Pink(1): 293-2141; Tan(2): 293-2152; Purple: 293-2218; Orange: 293-2223; Dk Blue: 293-2223-1; Yellow: 293-2215; Lt Green(2): 293-2235; Pink(2): 293-2227; Teel(2): 294-2350)



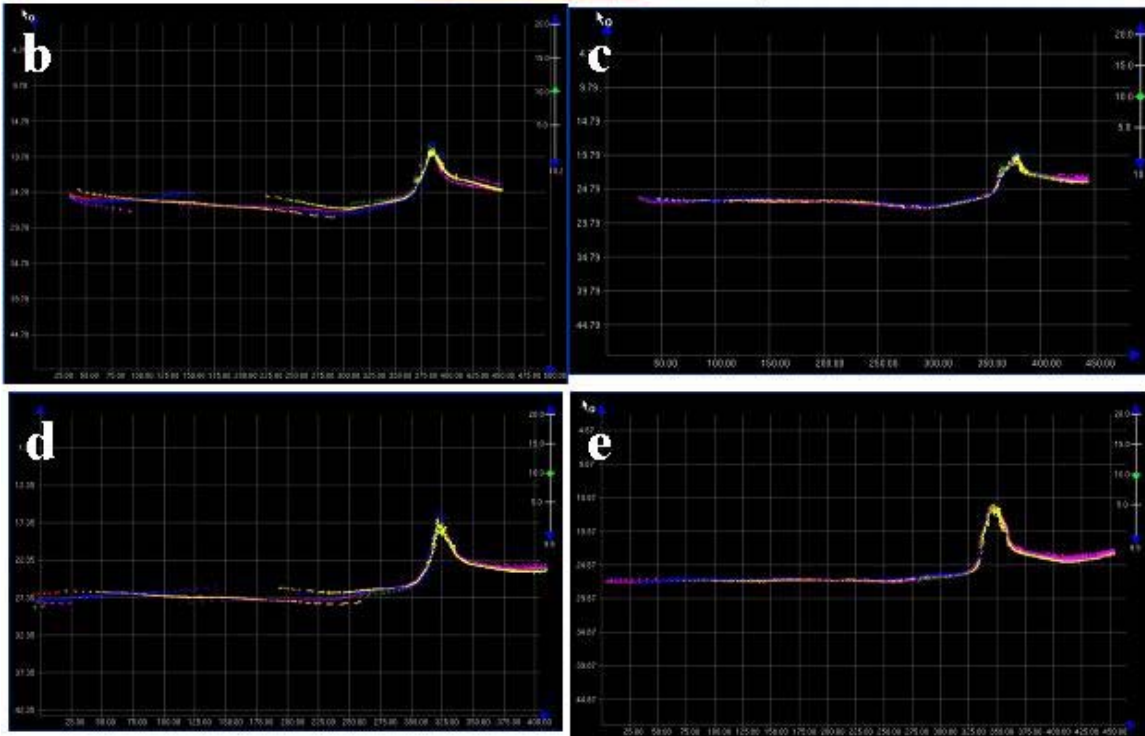
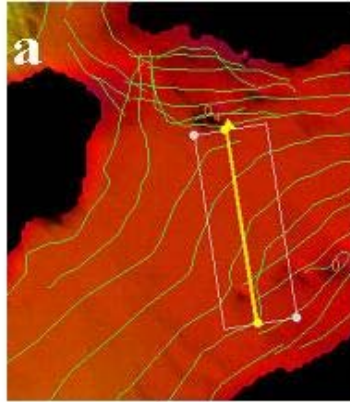


**Figure 5(a-e): Beartrap Bay 3.** A majority of the offset seen here is due to sound speed error but with the roll bias correction the vertical offset between survey lines has been minimized. Average vertical offset decreased the most for case 5(e), but similar results were achieved in cases 5(c) and 5(d). (Yellow: 293-2025; Red: 293-2014; Purple: 295-0054; Orange: 295-0057; Dk Blue: 295-0101; Dk Green: 295-0105; Pink: 295-0109; Light Green: 295-0113; Teal: 295-0117)

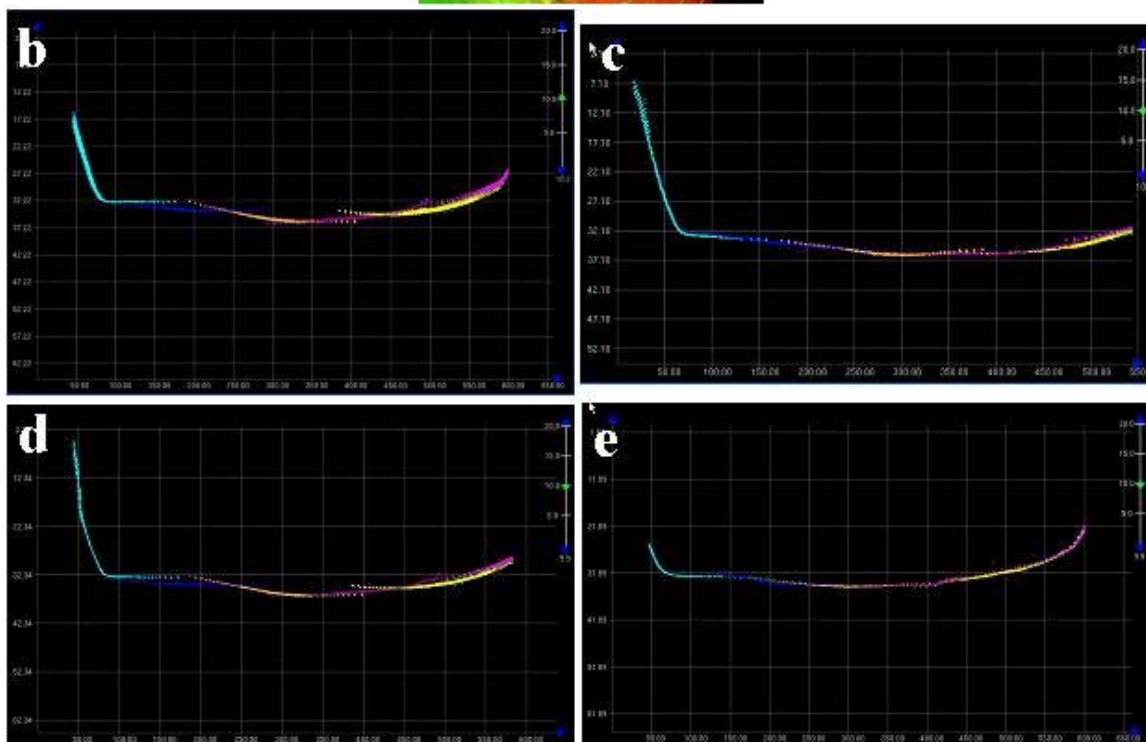
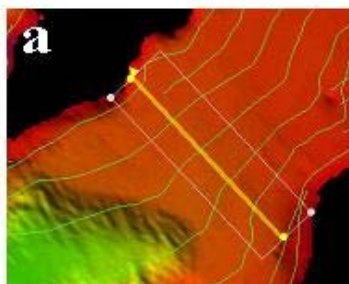




**Figure 6(a-e): Cove 1.** The unnamed cove south of Beartrap Bay displayed the best agreement between soundings when roll bias values were modified in the HVF for DN 293 (6(c)). (Tan(1): 294-2056; Dk Blue: 294-2038; Red: 293-1808; Pink: 294-2006; Dk Green: 293-1854; Lt Green: 294-2011; Teal: 294-2017; Tan(2): 294-2024; Orange: 294-2034)



**Figure 7 (a-e): Cove 2.** This is the second example from the cove south of Beartrap Bay. In image 7(d), updating the roll bias value for DN 294 alone results in nearly the same offset as with the original HVF values. Once again, in image 7(c), it is apparent that correcting for roll bias on DN 293 results in the best agreement between survey lines. (Dk Blue(1): 294-2038; Dk Blue(2): 293-1847; Red: 293-1808; Pink(1): 293-1857; Orange: 293-1837; Purple: 293-1829; Yellow: 293-1816-1; Dk Blue(3): 294-2002; Dk Green: 294-2004; Pink(2): 294-2006)



**Figure 8 (a-e): Cove 3.** The roll offsets improved the most after updating the roll bias value in the HVF for DN 293 (8(c)). (Teal: 293-1801; Dk Blue: 293-1847; Orange: 293-1837; Lt Green: 293-1901; Purple: 293-1829; Yellow: 293-1816-1; Pink: 298-1823; Lt Green: 298-1829)

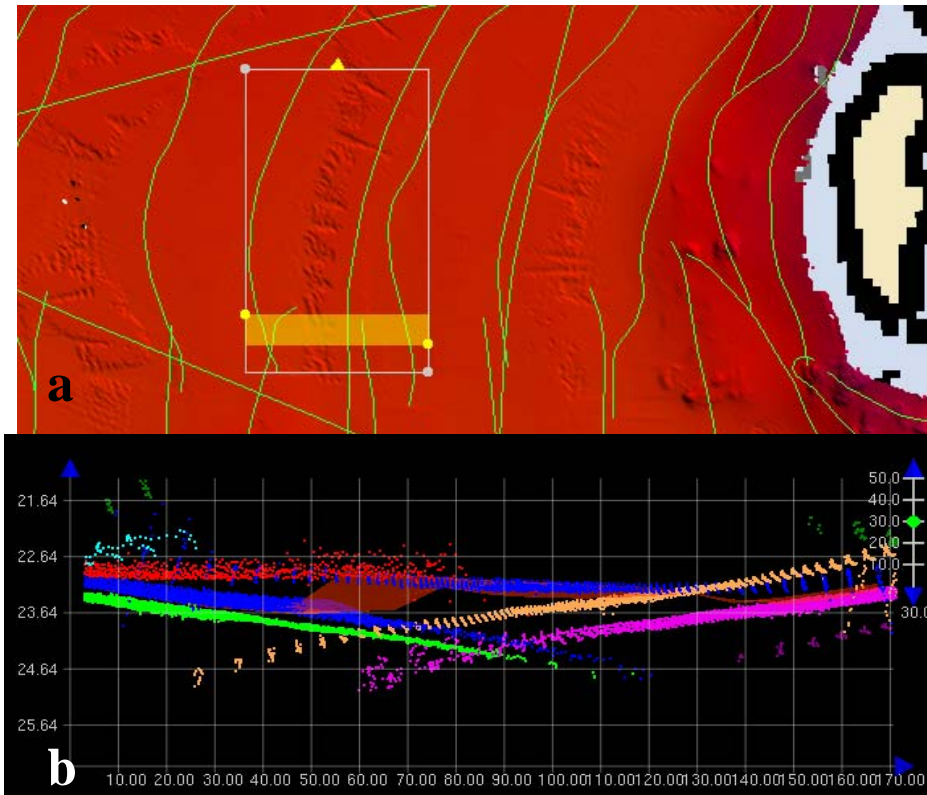
In the six regions selected, the greatest overall improvement in agreement between soundings can be seen when the roll bias value for vessel 1018’s HVF was changed to 3.30 on DN 293. Based on this analysis the PHB Reviewer created a new entry dated 2006-293 under the Swath 1 tab for the HVF titled FA\_1018\_Reson8101.hvf. All HVF parameters remained unchanged except for the Roll bias value being changed to 3.300 and an explanation of the change was entered under the “Comments” column.<sup>60</sup>

After the HVF roll bias value was updated, the survey lines from vessel 1018, DNs 293 and 294 were remerged and TPE was applied. New BASE surfaces were recomputed, finalized and combined to reflect the cleaning and HVF editing.<sup>61</sup>

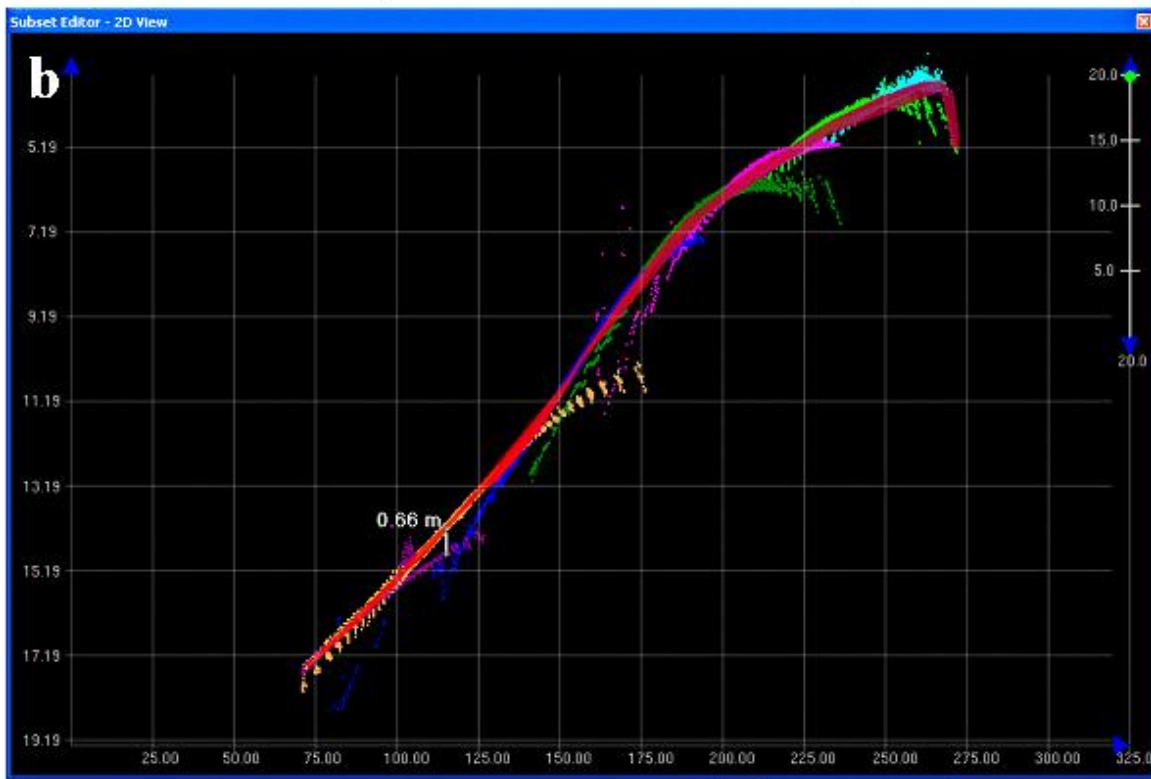
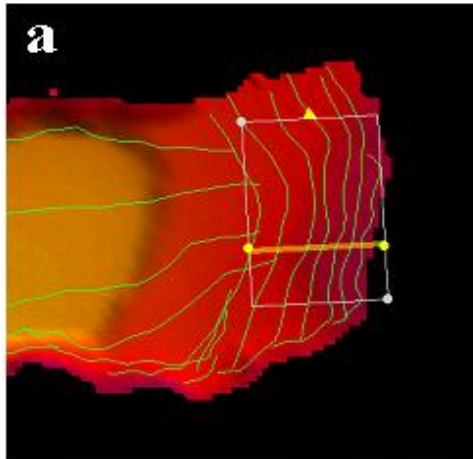
### Accuracy Standards

Despite efforts made by the survey manager and PHB reviewers to resolve systematic errors present in the data, some areas in the data still exceed the IHO acceptable error budget.<sup>62</sup> The offsets visible between survey lines can

be attributed to sound speed and roll errors that could not be remedied during post processing, and were particularly prevalent in Olsen and Beartrap Bay (Figures 10 and 11).



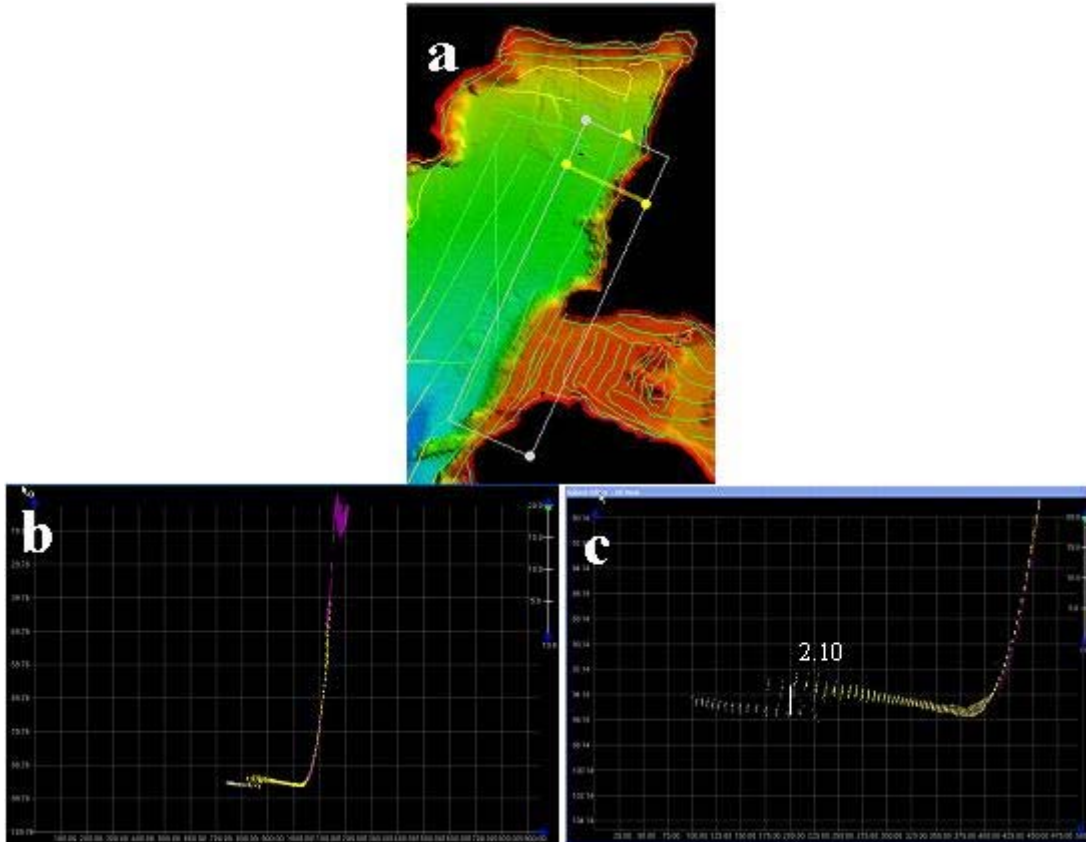
**Figure 10.** (a) A 2-meter BASE Surface of Olsen Bay is shown in Caris HIPS 6.1. The surface is colored by depth with survey track lines shown in green and the yellow rectangle highlights the area shown in Caris Subset Editor in 10(b). (b) Soundings colored by survey line are displayed in Subset Editor with a large vertical exaggeration. It is obvious that many systematic errors are at play in Olsen Bay.



**Figure 11.** (a) A 10-meter combined BASE Surface of Beartrap Bay is shown in Caris HIPS 6.1, colored by depth. The yellow rectangle highlights the survey area displayed in Subset Editor in 11(b). (b) Incorrect sound speed correctors appear to be the largest source of error in this section of Beartrap Bay displayed in Caris Subset Editor with soundings colored by survey line. An offset of 0.66 meters was measured between two survey lines where the maximum acceptable vertical error for Order 1 surveys at that depth is 0.53 meters. A vertical exaggeration of 20X has been applied in Subset Editor to emphasize the systematic error.

In addition to the sound velocity and roll errors mentioned above, there was a significant vertical offset noted where survey lines collected with vessel 1018's Reson 8101 multibeam system and the Reson 8111 multibeam system mounted on vessel S220 overlap (Figure 12). The offset between the two platforms occurs in waters over 80 meters deep and could be attributed to either sound velocity errors, roll errors or a combination of both.<sup>63</sup>





**Figure 12.** (a) A 10-meter combined surface of the northeast portion of survey H11611 is displayed in Caris HIPS 6.1. The subset rectangle highlights the overlap of survey lines from launch 1018 and the ship’s 8111 system. (b) An overview of the subset window. Soundings are colored by vessel with S220 data shown in tan (line 279-2140) and 1018 data shown in yellow and purple (lines 292-2306 and 292-2318). (c) A zoomed in view of the offset between the two vessels. The maximum acceptable error in a depth of 93 meters would be 1.31 meters, which has been exceeded in this case.

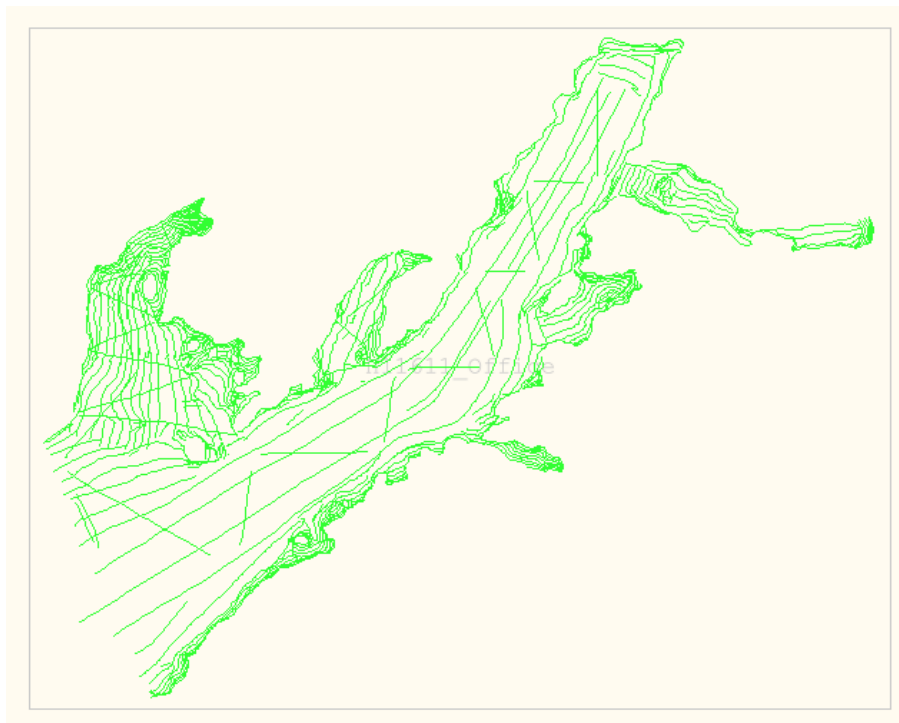
Despite many attempts made to resolve the systematic errors present in the data, a significant portion of the survey area does not meet IHO Order 1 accuracy standards. Vertical offsets are most prevalent in Olsen Bay and the small bays on the east side of the survey. The data do not meet IHO Order 1 standards in some instances, however, all data meet IHO Order 2 standards. Given that the data currently charted in the survey area is from partial bottom coverage collected between 1900 and 1939, it is the Reviewers opinion that the multibeam data from survey H11611 is sufficient to supersede charted soundings.<sup>64</sup>

#### B.4 Data Processing

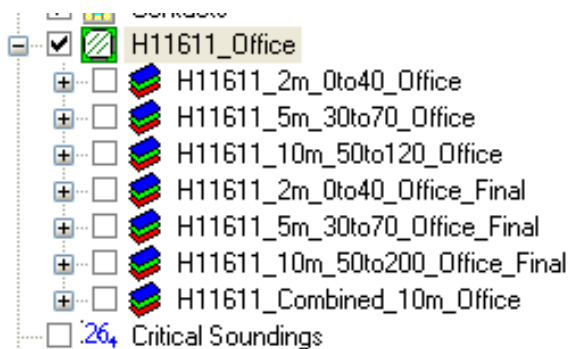
During the initial review of Survey H11611 it was discovered that uncleaned noise in the HDCS data was causing fliers, or “pimples,” in the submitted BASE Surfaces, especially in the 2-meter and combined surfaces. Following the return of the survey to the FAIRWEATHER for additional processing, approximately half of the noise was cleaned by the survey manager, but the work was not finished when the PHB Reviewers were tasked to complete the survey. The survey manager provided a subset tile layer in Caris HIPS which was used to indicate the survey areas that had been sufficiently cleaned and the areas that needed to be addressed. At PHB, the data was viewed in subset editor and any additional noise was cleaned to the surface by rejecting the soundings that were falsely influencing the grid nodes. After the surfaces were recomputed and recombined the surfaces no longer contained the “pimples” discovered during the initial SAR.<sup>65</sup>



Below, Figures 13 and 14, display the layout of the office-generated Caris HIPS Fieldsheets and the finalized BASE surfaces.



*Figure 13. Field sheet layout for H11611.*



*Figure 14. Fieldsheet and BASE surfaces finalized at PHB for H11611.*

## **D. Results and Recommendations (Addendum)**

### **D.2 Additional Results**

#### Shoreline

The PHB Reviewers decided the best approach to updating the Shoreline Deliverables for H11611 would be to begin from scratch with the original Composite Source File provided to the FAIRWEATHER survey manager and

process the data using the latest feature management procedures. Therefore, the Shoreline Deliverable files that were made match the current deliverables being submitted in 2008, not those of 2006. This was partly as a means of training a new employee in feature management and to assist those that will be compiling the initial chart products at PHB.

The feature management procedures that were followed to produce the office-generated shoreline deliverables differ significantly from the processes documented in the original DR for H11611 and the DAPR for project OPR-P158-FA-06.<sup>66</sup> The feature management procedures employed by the PHB Reviewers are in line with the current version of the Field Procedures Manual (May 2008) while integrating the shoreline changes listed in the initial PHB survey review of H11611. Below is provided an overview of the additional processing completed at PHB to produce the final shoreline deliverables.

The PHB Reviewers began with the Original Composite Source File (CSF) that was provided to the ship for shoreline verification. The CSF was composed only of CFF shoreline features (now referred to as GC) that were digitized by the Remote Sensing Division (RSD) from photogrammetric images. The initial CSF did not contain any charted features, which neglected the direction in the project instructions for H11611 that required all charted features within the survey area be addressed. The PHB Reviewers wanted the original CSF to include all the source features that were to be verified; therefore, charted features within the survey area were imported into the original CSF from ENC US4AK24M. The Source Indicator (SORIND) and Source Date (SORDAT) for the charted features were retained from the ENC. The new office-modified CSF HOB was titled H11611\_Original\_Composite\_Source. A copy of the Original CSF HOB was made and renamed H11611\_Field\_Verified\_Source. All modifications or deletions to source features were captured in the Field Verified source layer and all new shoreline features were also added.

Several corrections were made to the Pydro PSS (H11611\_Office\_Updated.pss) prior to importing Detached Positions (DPs) for H11611 into Notebook. Final tides were re-applied to several DPs that did not have the correct observed depth. Also, several new submerged rocks that were designated in Caris HIPS 6.1 were inserted as features into Pydro. The flagging, comments and S57 attribution of the features were updated as needed and all new or updated features to be imported into Notebook were exported from Pydro as an XML file.

The Pydro updates XML was imported into Notebook, the SORIND and SORDAT S57 attributes were updated to include survey H11611's information and then the updated and new features were added to the Field Verified Source layer.

The majority of the additional office processing completed at PHB centered on finalizing the Field Verified Source deliverable HOB. The value of sounding (VALSOU) fields were updated for any source rock that was DP'd for height and the cartographic symbol (\$CSYMB) item from the Pydro updates layer was deleted from the Field Verified layer after the final tide corrected depth was transferred from Pydro. Source deconfliction between RSD and charted source features was completed. Charted features were disproved with assistance of a BASE surface to identify areas of multibeam coverage and feature extents were updated as needed. The Reviewers used the original H11611 shoreline deliverables that were initially submitted to PHB and the interim office shoreline HOBs that were created during the first PHB Review.

Prior to source deconfliction, disproof and modification, a new HOB file was created titled H11611\_Disprovals. Source deconfliction occurred when charted features and RSD/CFF features were found to represent the same shoreline feature. In this instance, the most accurate source was retained in the Field Verified Source layer and the other item was copied to the Disprovals layer and deleted from the Field Verified layer. When the extents of a source feature such as the Mean Lower Low Water (MLLW) line or a Foul Area were disproved or modified, the original geometry of the source feature was copied to the disprovals layer before being deleted and replaced by the new extents. A 2-meter BASE surface was opened in Caris Notebook along with the Field Verified Layer and many charted features were disproved with 100 percent multibeam coverage. The disproved source features were

copied to the Disprovals layer. The remarks and recommendations attribute fields were updated for all disproved features. The SORIND and SORDAT fields were updated with survey H11611's information for all modified source features in the Field Verified layer.

The PHB Reviewers completed several S57 corrections. The water level effect (WATLEV) attribute field was finalized for all rocks with a final tide corrected VALSOU field using the latest edition of the Field and Branch Encoding Guide for guidance. The vertical datum (VERDAT) field for all rocks was also updated to MLLW. Finally, the pictorial representation (PICREP) fields for new and updated source features were updated and directed to the corresponding field photos that were submitted in the "Photos" folder along with the Pydro PSS.

The finalized shoreline deliverables for survey H11611 include:

H11611\_Original\_Composite\_Source.hob  
H11611\_Disprovals.hob

H11611\_Field\_Verified\_Source.hob  
H11611\_Office\_Update.pss



**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

May 21, 2007

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

FROM: CDR Andrew L. Beaver, NOAA  
Commanding Officer

Edward J. Van Den Ameele  
I have reviewed this  
document  
2007.06.11 12:45:04 -08'00'

TITLE: Approval of Hydrographic Survey H11611,  
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 H11611 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:

**Stephanie Mills**

Digitally signed by Stephanie Mills  
DN: cn=Stephanie Mills, c=US, o=NOAA OMAO,  
ou=FAIRWEATHER, email=stephanie.mills@noaa.gov  
Reason: I am the author of this document  
Date: 2007.05.21 19:19:05 Z

ST Stephanie Mills  
Survey Manager

Jennifer Dowling  
I have reviewed this document  
2007.06.06 10:54:36 -08'00'

LT Jennifer Dowling  
Field Operations Officer

Grant Froelich  
I have reviewed this document  
2007.06.11 16:14:57 Z

CST Grant Froelich  
Chief Survey Technician

Attachment



- 
- <sup>1</sup> 100% SWMB was not obtained. There were holidays larger than 3 nodes present and it reflected in the HCell.
  - <sup>2</sup> Shoreline deliverables were overhauled during office review. See appended document named “Supplement to Survey H11611” for more information.
  - <sup>3</sup> Filed with project reports.
  - <sup>4</sup> Concur
  - <sup>5</sup> Do not concur. Survey did not meet IHO Order I requirements. See Survey Acceptance Review filed with the hydrographic records.
  - <sup>6</sup> Concur
  - <sup>7</sup> Concur
  - <sup>8</sup> Concur
  - <sup>9</sup> Do not concur. Holiday larger than 3 nodes were retained in HCell compilation.
  - <sup>10</sup> Concur
  - <sup>11</sup> Concur
  - <sup>12</sup> Concur.
  - <sup>13</sup> Concur.
  - <sup>14</sup> Concur.
  - <sup>15</sup> Concur.
  - <sup>16</sup> Concur.
  - <sup>17</sup> Do not concur. See the appended document “Supplement to Survey H11611”. HVF has been adjusted to decrease the offsets in the data.
  - <sup>18</sup> Concur.
  - <sup>19</sup> Concur.
  - <sup>20</sup> Concur.
  - <sup>21</sup> Concur.
  - <sup>22</sup> Concur.
  - <sup>23</sup> Do not concur. See appended document “Supplement to Survey H11611” HVF has been adjusted to limit errors in the data by the SAR reviewer.
  - <sup>24</sup> Concur.
  - <sup>25</sup> Filed with project reports.
  - <sup>26</sup> Do not concur. See Section B2\Data Quality Factors\Positioning— DGPS dropouts did cause positioning errors.
  - <sup>27</sup> Tide note is appended to this report.
  - <sup>28</sup> Concur.
  - <sup>29</sup> Concur.
  - <sup>30</sup> Concur.
  - <sup>31</sup> Concur.
  - <sup>32</sup> Concur.
  - <sup>33</sup> Concur.
  - <sup>34</sup> Concur.
  - <sup>35</sup> Concur.
  - <sup>36</sup> Concur.
  - <sup>37</sup> Concur.
  - <sup>38</sup> Concur.
  - <sup>39</sup> Concur.
  - <sup>40</sup> Concur.
  - <sup>41</sup> Concur.
  - <sup>42</sup> Concur.
  - <sup>43</sup> Concur.
  - <sup>44</sup> Concur.
  - <sup>45</sup> Concur.
  - <sup>46</sup> Concur.
  - <sup>47</sup> Concur.
  - <sup>48</sup> Concur.
  - <sup>49</sup> Attached to this report.

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<sup>50</sup> Additional DtoNs were discovered during office review. See appended DtoN report. ALL DtoNs were present upon chart comparison.

<sup>51</sup> Filed with survey reports.

<sup>52</sup> See appended document :Supplement to Survey H11611” for more information on how Pydro data was edited.

<sup>53</sup> Do not concur. See appended document “Supplement to Survey H11611” for more information on how Pydro data was edited.

<sup>54</sup> Do not concur. A number of charted features were disproved with 100% SWMB and are reflected in the HCell.

<sup>55</sup> Concur.

<sup>56</sup> Do not concur. See appended document “Supplement to Survey H11611” for more information on how Pydro data was edited.

<sup>57</sup> Do not concur. During office review new .hob files were created for deliverables. See the appended document “Supplement to Survey H11611” for more details.

<sup>58</sup> Concur.

<sup>59</sup> Concur.

<sup>60</sup> Concur.

<sup>61</sup> Concur.

<sup>62</sup> Concur.

<sup>63</sup> Concur.

<sup>64</sup> Concur.

<sup>65</sup> Concur.

<sup>66</sup> Concur.



# H11611 Features Report

**Registry Number:** H11611  
**State:** AK  
**Locality:** Orca Bay  
**Sub-locality:** Olsen Bay to Mouth of the Gravina River  
**Project Number:** OPR-P158-FA-06  
**Survey Dates:** September 10, 2006 - October 27, 2006

Items for survey H11611 associated with a detached or generic position that needed further discussion were flagged Report in Pydro. Investigation methods and recommendations were provided in the Remarks and Recommendations tabs.

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16708	26th	10/01/2004	1:79,291 (16708_1)	[L]NTM: ?
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	30th	07/01/2006	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

Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
12531	Rock	-1.99 m	60° 41' 02.1" N	146° 11' 45.3" W
12532	Shoal	-0.14 m	60° 42' 05.6" N	146° 09' 46.9" W
12535	Shoal	0.03 m	60° 42' 22.2" N	146° 08' 55.9" W
12536	Rock	0.08 m	60° 42' 29.2" N	146° 08' 33.7" W
12537	Rock	-2.14 m	60° 44' 26.4" N	146° 03' 46.4" W
12538	Shoal	-7.17 m	60° 44' 25.8" N	146° 03' 53.0" W
12539	Obstruction	-0.35 m	60° 44' 20.1" N	146° 04' 58.0" W
125310	Rock	-0.76 m	60° 45' 04.2" N	146° 03' 38.2" W

22541	Rock	-0.58 m	60° 45' 02.9" N	146° 03' 38.0" W
22543	Rock	-0.86 m	60° 44' 55.7" N	146° 03' 06.3" W
12781	Shoal	-7.04 m	60° 43' 43.8" N	146° 08' 18.2" W
12782	Shoal	-3.44 m	60° 43' 42.3" N	146° 08' 35.1" W
12783	Obstruction	-0.32 m	60° 44' 16.1" N	146° 08' 07.1" W
12784	Rock	-1.72 m	60° 44' 37.3" N	146° 07' 40.1" W
12785	Rock	-0.19 m	60° 44' 06.6" N	146° 09' 01.0" W
12788	Rock	-0.29 m	60° 43' 20.1" N	146° 10' 58.7" W
12791	Shoal	-0.41 m	60° 43' 51.9" N	146° 13' 38.8" W
12792	Rock	0.30 m	60° 44' 29.7" N	146° 12' 12.9" W
12793	Rock	-0.54 m	60° 44' 02.2" N	146° 12' 18.1" W
12794	Shoal	-3.93 m	60° 44' 14.1" N	146° 12' 25.8" W
22791	Shoal	-4.38 m	60° 43' 45.6" N	146° 08' 17.1" W
22792	Obstruction	-0.60 m	60° 43' 28.5" N	146° 10' 50.8" W
22793	Rock	-1.49 m	60° 43' 29.5" N	146° 10' 52.8" W
22794	Rock	-1.42 m	60° 43' 31.6" N	146° 10' 56.0" W
22795	Obstruction	-0.05 m	60° 43' 44.8" N	146° 11' 23.5" W
22796	Shoal	-2.99 m	60° 43' 43.9" N	146° 11' 20.0" W
22797	Obstruction	0.09 m	60° 43' 43.1" N	146° 11' 00.3" W
22798	Rock	-0.33 m	60° 43' 40.4" N	146° 10' 54.8" W
22799	Rock	0.18 m	60° 43' 37.0" N	146° 10' 57.2" W
227910	Rock	-0.23 m	60° 43' 43.1" N	146° 10' 58.1" W
227911	Obstruction	0.53 m	60° 43' 38.3" N	146° 11' 47.6" W
227912	Rock	-0.42 m	60° 43' 36.6" N	146° 11' 49.6" W
307/50	Rock	-0.40 m	60° 44' 31.7" N	146° 07' 38.2" W
2702/24	Shoal	1.76 m	60° 44' 26.1" N	146° 12' 13.3" W
1152/7	Rock	0.62 m	60° 43' 45.0" N	146° 11' 48.3" W
12534	Rock	-4.06 m	60° 42' 03.8" N	146° 09' 46.2" W
22542	Rock	-0.69 m	60° 45' 06.6" N	146° 03' 01.6" W
12786	Rock	-0.46 m	60° 42' 49.6" N	146° 11' 19.1" W
12787	Rock	-0.96 m	60° 42' 58.7" N	146° 11' 58.1" W
431/1	Rock	0.00 m	60° 44' 10.4" N	146° 04' 06.3" W
639/100	Shoal	10.85 m	60° 44' 05.2" N	146° 12' 33.9" W
198/20	Shoal	7.04 m	60° 45' 18.0" N	146° 02' 52.3" W
372/88	Rock	1.44 m	60° 44' 21.1" N	146° 04' 23.5" W

## **1 - New Features**

## 1.1) 12531

### Survey Summary

**Survey Position:** 60° 41' 02.1" N, 146° 11' 45.3" W  
**Least Depth:** -1.99 m (= -6.53 ft = -1.089 fm = -1 fm 0.53 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.16:29:35.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 1/1  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

swm ext and hp of new ldg.

### Hydrographer Recommendations

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

-1fm (16708\_1, 16709\_1, 16700\_1, 16013\_1)  
-1fm 0ft (531\_1)  
-2.0m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** VALSOU - -1.991 m

### Office Notes

Ledge cannot be charted at chart scale. Adjust charted intertidal area and chart new rock. Need to adjust ENC intertidal area based on survey soundings.

**1.2) 12532****Survey Summary**

**Survey Position:** 60° 42' 05.6" N, 146° 09' 46.9" W  
**Least Depth:** -0.14 m (= -0.44 ft = -0.074 fm = 0 fm 5.56 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.16:59:24.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 2/1  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new reef - refer to AWOIS item 53494. During shoreline verification, the charted (16708) rock located at LAT. 60/42/05.640N LONG. 146/09/46.879W was found to be the significant high point of a new reef, DP 12532 and DP 12534.

**Hydrographer Recommendations**

The Hydrographer recommends retaining the charted (16708) rock symbol and adding a reef surrounding the rock.

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

0fm (16708\_1, 16709\_1, 16700\_1, 16013\_1)  
 0fm 0ft (531\_1)  
 -.1m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 10:hard  
 NATSUR - 9:rock

**Office Notes**

Concur with clarification. High point of reef found to be at 60-42-03.794N, 146-09-46.163W with least depth of -2.220 fthms and is included in the HCell.

Remove charted rock. Chart new rock and reef according to this survey.

## 1.3) 12535

### Survey Summary

**Survey Position:** 60° 42' 22.2" N, 146° 08' 55.9" W  
**Least Depth:** 0.03 m (= 0.09 ft = 0.015 fm = 0 fm 0.09 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.17:17:44.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 5/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new reef to replace chd (16708) rks

### Hydrographer Recommendations

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)

0fm 0ft (531\_1)

.0m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Seabed area (SBDARE)

**Attributes:** NATQUA - 10:hard

NATSUR - 9:rock

### Office Notes

Do not concur. Retaining charted rocks. Foul area would not be depicted properly at this scale.



## 1.4) 12536

### Survey Summary

**Survey Position:** 60° 42' 29.2" N, 146° 08' 33.7" W  
**Least Depth:** 0.08 m (= 0.25 ft = 0.042 fm = 0 fm 0.25 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.17:27:25.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 6/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

swm ext new ldg (to replace chd rks?)

### Hydrographer Recommendations

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)

0fm 0ft (531\_1)

.1m (500\_1, 50\_1)

### S-57 Data

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

**Attributes:** VALSOU - 0.076 m

### Office Notes

Do not concur at this scale. Chart as a new rock. Remove charted rocks.

**1.5) 12537****Survey Summary**

**Survey Position:** 60° 44' 26.4" N, 146° 03' 46.4" W  
**Least Depth:** -2.14 m (= -7.01 ft = -1.169 fm = -1 fm 1.01 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.18:27:36.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 7/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk

**Hydrographer Recommendations**

[None]

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

-1fm (16708\_1, 16700\_1, 16013\_1)  
 -1fm 1ft (531\_1)  
 -2.1m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20060910  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -2.138 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new rock.

## 1.6) 12538

### Survey Summary

**Survey Position:** 60° 44' 25.8" N, 146° 03' 53.0" W  
**Least Depth:** -7.17 m (= -23.52 ft = -3.920 fm = -3 fm 5.52 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.18:30:59.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 8/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

cff rk vfd, dp for ht, use cff position

### Hydrographer Recommendations

[None]

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

-3  $\frac{3}{4}$ fm (16708\_1, 16700\_1, 16013\_1)  
-3fm 5ft (531\_1)  
-7.2m (500\_1, 50\_1)

### S-57 Data

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

### Office Notes

Chart as new islet.

**1.7) 12539****Survey Summary**

**Survey Position:** 60° 44' 20.1" N, 146° 04' 58.0" W  
**Least Depth:** -0.35 m (= -1.15 ft = -0.192 fm = 0 fm 4.85 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.18:47:30.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 9/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new obstn is foul with rocks, shoal area

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 -.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 6:foul area  
 RECDAT - 20060910  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.351 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 5:awash

## Office Notes

Adjust charted foul to encompass field verified foul limits.

## 1.8) 125310

### Survey Summary

**Survey Position:** 60° 45' 04.2" N, 146° 03' 38.2" W  
**Least Depth:** -0.76 m (= -2.50 ft = -0.416 fm = 0 fm 3.50 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.19:10:31.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 10/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

new rk

### Hydrographer Recommendations

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)

0fm 2ft (531\_1)

-.8m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20060910  
SORDAT - 20061027  
SORIND - US,US,graph,H11611  
VALSOU - -0.761 m  
VERDAT - 12:Mean lower low water  
WATLEV - 5:awash

### Office Notes

Update depth of charted rock.



**1.9) 22541****Survey Summary**

**Survey Position:** 60° 45' 02.9" N, 146° 03' 38.0" W  
**Least Depth:** -0.58 m (= -1.92 ft = -0.320 fm = 0 fm 4.08 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-254.16:58:52.000 (09/11/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-254 / tr2\_254.mdb  
**Profile/Beam:** 1/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 2ft (531\_1)  
 -.6m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20060911  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.585 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 3:always under water/submerged

**Office Notes**

Do not chart. Chart offshore rock located at 60-45-04.2N, 146-03-38.2W.

**1.10) 22543****Survey Summary**

**Survey Position:** 60° 44' 55.7" N, 146° 03' 06.3" W  
**Least Depth:** -0.86 m (= -2.81 ft = -0.468 fm = 0 fm 3.19 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-254.17:19:45.000 (09/11/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-254 / tr2\_254.mdb  
**Profile/Beam:** 3/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk

**Hydrographer Recommendations**

[None]

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

0 ½fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 3ft (531\_1)  
 -.9m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20060911  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.856 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new rock.

## 1.11) 12781

### Survey Summary

**Survey Position:** 60° 43' 43.8" N, 146° 08' 18.2" W  
**Least Depth:** -7.04 m (= -23.09 ft = -3.848 fm = -3 fm 5.09 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.01:38:51.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 1/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

cff LNDARE vfd, dp for ht, use cff position

### Hydrographer Recommendations

[None]

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

-3 ¾fm (16708\_1, 16700\_1, 16013\_1)  
-3fm 5ft (531\_1)  
-7.0m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** PICREP - 12781\_and\_22791.jpg;12781\_and\_22791\_overview.jpg

### Office Notes

Update height on charted islet

## 1.12) 12782

### Survey Summary

**Survey Position:** 60° 43' 42.3" N, 146° 08' 35.1" W  
**Least Depth:** -3.44 m (= -11.28 ft = -1.879 fm = -1 fm 5.28 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.01:47:02.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 2/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

cff rk vfd, dp for ht, use cff position

### Hydrographer Recommendations

[None]

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

-1  $\frac{3}{4}$ fm (16708\_1, 16700\_1, 16013\_1)  
-1fm 5ft (531\_1)  
-3.4m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** PICREP - 12782.jpg

### Office Notes

Update position and height of charted rock.

**1.13) 12783****Survey Summary**

**Survey Position:** 60° 44' 16.1" N, 146° 08' 07.1" W  
**Least Depth:** -0.32 m (= -1.06 ft = -0.176 fm = 0 fm 4.94 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.01:56:55.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 3/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new obstn is foul with rocks

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)

0fm 1ft (531\_1)

-.3m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 6:foul area  
 RECDAT - 20061006  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.322 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new ledge.

## 1.14) 12784

### Survey Summary

**Survey Position:** 60° 44' 37.3" N, 146° 07' 40.1" W  
**Least Depth:** -1.72 m (= -5.64 ft = -0.939 fm = 0 fm 0.36 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.02:06:55.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 4/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

new rk

### Hydrographer Recommendations

[None]

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

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

0fm 5ft (531\_1)

-1.7m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061006  
SORDAT - 20061027  
SORIND - US,US,graph,H11611  
VALSOU - -1.718 m  
VERDAT - 12:Mean lower low water  
WATLEV - 4:covers and uncovers

### Office Notes

Chart new rock.

**1.15) 12785****Survey Summary**

**Survey Position:** 60° 44' 06.6" N, 146° 09' 01.0" W  
**Least Depth:** -0.19 m (= -0.63 ft = -0.105 fm = 0 fm 5.37 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.02:20:34.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 5/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk

**Hydrographer Recommendations**

[None]

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

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

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061006  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.192 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 5:awash

**Office Notes**

Chart new rock.



## 1.16) 12788

### Survey Summary

**Survey Position:** 60° 43' 20.1" N, 146° 10' 58.7" W  
**Least Depth:** -0.29 m (= -0.97 ft = -0.161 fm = 0 fm 5.03 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.03:12:59.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 8/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

new rk

### Hydrographer Recommendations

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)

0fm 1ft (531\_1)

-.3m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061006  
SORDAT - 20061027  
SORIND - US,US,graph,H11611  
VALSOU - -0.295 m  
VERDAT - 12:Mean lower low water  
WATLEV - 5:awash

### Office Notes

Chart new rock.

## 1.17) 12791

### Survey Summary

**Survey Position:** 60° 43' 51.9" N, 146° 13' 38.8" W  
**Least Depth:** -0.41 m (= -1.36 ft = -0.226 fm = 0 fm 4.64 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.01:58:28.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-280 / tr1\_279.mdb  
**Profile/Beam:** 1/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new ext mllw

### Hydrographer Recommendations

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)

0fm 1ft (531\_1)

-.4m (500\_1, 50\_1)

### S-57 Data

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

**Attributes:** PICREP - 12791.jpg  
RECDAT - 20061007  
SORDAT - 20061027  
SORIND - US,US,graph,H11611

### Office Notes

Adjust extents of MLLW.

**1.18) 12792****Survey Summary**

**Survey Position:** 60° 44' 29.7" N, 146° 12' 12.9" W  
**Least Depth:** 0.30 m (= 0.98 ft = 0.163 fm = 0 fm 0.98 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:42:44.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-280 / tr1\_279.mdb  
**Profile/Beam:** 2/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is ext new foul area, foul with rocks

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 .3m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - 0.298 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new foul area.

**1.19) 12793****Survey Summary**

**Survey Position:** 60° 44' 02.2" N, 146° 12' 18.1" W  
**Least Depth:** -0.54 m (= -1.76 ft = -0.293 fm = 0 fm 4.24 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:55:58.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-280 / tr1\_279.mdb  
**Profile/Beam:** 3/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is ext new foul area, foul with rocks

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 2ft (531\_1)  
 -.5m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.536 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new foul area

## 1.20) 12794

### Survey Summary

**Survey Position:** 60° 44' 14.1" N, 146° 12' 25.8" W  
**Least Depth:** -3.93 m (= -12.88 ft = -2.147 fm = -2 fm 0.88 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.03:07:16.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-280 / tr1\_279.mdb  
**Profile/Beam:** 4/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

cff rk vfd, dp for ht, use cff position

### Hydrographer Recommendations

[None]

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

-2fm (16708\_1, 16700\_1, 16013\_1)  
-2fm 1ft (531\_1)  
-3.9m (500\_1, 50\_1)

### S-57 Data

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

### Office Notes

Chart rock and foul area.

## 1.21) 22791

### Survey Summary

**Survey Position:** 60° 43' 45.6" N, 146° 08' 17.1" W  
**Least Depth:** -4.38 m (= -14.38 ft = -2.396 fm = -2 fm 2.38 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.01:08:02.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 1/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

cff rk vfd, dp for ht, use cff position

### Hydrographer Recommendations

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

-2 ¼fm (16708\_1, 16700\_1, 16013\_1)  
-2fm 2ft (531\_1)  
-4.4m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** PICREP - 22791.jpg;12781\_and\_22791\_overview.jpg

### Office Notes

Chart as an islet

**1.22) 22792****Survey Summary**

**Survey Position:** 60° 43' 28.5" N, 146° 10' 50.8" W  
**Least Depth:** -0.60 m (= -1.96 ft = -0.326 fm = 0 fm 4.04 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.01:48:26.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 2/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new obstn is foul with rocks

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 2ft (531\_1)  
 -.6m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 6:foul area  
 RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.596 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart area as foul.

**1.23) 22793****Survey Summary**

**Survey Position:** 60° 43' 29.5" N, 146° 10' 52.8" W  
**Least Depth:** -1.49 m (= -4.88 ft = -0.813 fm = 0 fm 1.12 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)** [None] ; **TVU (TPEv)** [None]  
**Timestamp:** 2006-280.01:54:26.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 3/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is swm ext new foul area - see DP 22792

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

0 ¾fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 5ft (531\_1)  
 -1.5m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -1.487 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart rock.



**1.24) 22794****Survey Summary**

**Survey Position:** 60° 43' 31.6" N, 146° 10' 56.0" W  
**Least Depth:** -1.42 m (= -4.67 ft = -0.779 fm = 0 fm 1.33 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.01:58:00.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 4/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is western swm ext new foul area - see DP 22792

**Hydrographer Recommendations**

[None]

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

0 ¾fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 4ft (531\_1)  
 -1.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -1.424 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart rock.

**1.25) 22795****Survey Summary**

**Survey Position:** 60° 43' 44.8" N, 146° 11' 23.5" W  
**Least Depth:** -0.05 m (= -0.16 ft = -0.027 fm = 0 fm 5.84 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:19:57.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 5/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new obstn is foul with rocks

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 0ft (531\_1)  
 .0m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 6:foul area  
 RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.050 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

### Office Notes

Chart area as foul.

## 1.26) 22796

### Survey Summary

**Survey Position:** 60° 43' 43.9" N, 146° 11' 20.0" W  
**Least Depth:** -2.99 m (= -9.82 ft = -1.637 fm = -1 fm 3.82 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:23:43.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 6/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

cff rk vfd, dp for ht, use cff position; cff rk is hp of new foul area, see DP 22795

### Hydrographer Recommendations

[None]

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

-1 ½fm (16708\_1, 16700\_1, 16013\_1)  
-1fm 4ft (531\_1)  
-3.0m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)  
**Attributes:** PICREP - 22795\_and\_22796.jpg

### Office Notes

Chart rock.

**1.27) 22797****Survey Summary**

**Survey Position:** 60° 43' 43.1" N, 146° 11' 00.3" W  
**Least Depth:** 0.09 m (= 0.30 ft = 0.050 fm = 0 fm 0.30 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:29:07.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 7/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new obstn is foul with rocks

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 0ft (531\_1)  
 .1m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 6:foul area  
 RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - 0.092 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

## Office Notes

Concur with clarification. Chart new rocks. Incorporate foul area into larger obstruction area.

**1.28) 22798****Survey Summary**

**Survey Position:** 60° 43' 40.4" N, 146° 10' 54.8" W  
**Least Depth:** -0.33 m (= -1.10 ft = -0.183 fm = 0 fm 4.90 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:33:51.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 8/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is swm ext new foul area - see DP 22797

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 -.3m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.334 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new rock

**1.29) 22799****Survey Summary**

**Survey Position:** 60° 43' 37.0" N, 146° 10' 57.2" W  
**Least Depth:** 0.18 m (= 0.60 ft = 0.100 fm = 0 fm 0.60 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:34:54.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 9/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)

0fm 0ft (531\_1)

.2m (500\_1, 50\_1)

**S-57 Data**

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

**Attributes:** RECDAT - 20061007

SORDAT - 20061027

SORIND - US,US,graph,H11611

VALSOU - 0.182 m

VERDAT - 12:Mean lower low water

WATLEV - 5:awash

**Office Notes**

Chart new rock.



**1.30) 227910****Survey Summary**

**Survey Position:** 60° 43' 43.1" N, 146° 10' 58.1" W  
**Least Depth:** -0.23 m (= -0.76 ft = -0.127 fm = 0 fm 5.24 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.02:40:39.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 10/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is western swm ext new foul area - see DP 227911

**Hydrographer Recommendations**

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 -.2m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.233 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Chart new rock.

**1.31) 227911****Survey Summary**

**Survey Position:** 60° 43' 38.3" N, 146° 11' 47.6" W  
**Least Depth:** 0.53 m (= 1.73 ft = 0.288 fm = 0 fm 1.73 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.03:02:30.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 11/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new obstn is foul with rocks

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 .5m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 6:foul area  
 RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - 0.526 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

## Office Notes

Do not concur. Chart new rock. Do not chart foul area due to scale of the chart.

**1.32) 227912****Survey Summary**

**Survey Position:** 60° 43' 36.6" N, 146° 11' 49.6" W  
**Least Depth:** -0.42 m (= -1.39 ft = -0.232 fm = 0 fm 4.61 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-280.03:07:49.000 (10/07/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-280 / tr2\_279.mdb  
**Profile/Beam:** 12/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new rk is swm ext new foul area - see DP 227911

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 -.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** RECDAT - 20061007  
 SORDAT - 20061027  
 SORIND - US,US,graph,H11611  
 VALSOU - -0.424 m  
 VERDAT - 12:Mean lower low water  
 WATLEV - 4:covers and uncovers

**Office Notes**

Update position and height on charted rock.

**1.33) 307/50****Survey Summary**

**Survey Position:** 60° 44' 31.7" N, 146° 07' 38.2" W  
**Least Depth:** -0.40 m (= -1.30 ft = -0.217 fm = 0 fm 4.70 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.980$  m ; **TVU (TPEv)**  $\pm 0.297$  m  
**Timestamp:** 2006-293.22:32:56.783 (10/20/2006)  
**Survey Line:** h11611 / fa\_1010\_reson8101 / 2006-293 / 293-2229  
**Profile/Beam:** 307/50  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

New Rock designated at PHB during Survey Review.

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 -.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 TECSOU - 3:found by multi-beam  
 VALSOU - -0.397 m

**Office Notes**

Chart new rock.

## 1.34) 2702/24

### Survey Summary

**Survey Position:** 60° 44' 26.1" N, 146° 12' 13.3" W  
**Least Depth:** 1.76 m (= 5.77 ft = 0.961 fm = 0 fm 5.77 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.982$  m ; **TVU (TPEv)**  $\pm 0.296$  m  
**Timestamp:** 2006-294.18:31:04.524 (10/21/2006)  
**Survey Line:** h11611 / fa\_1010\_reson8101 / 2006-294 / 294-1824  
**Profile/Beam:** 2702/24  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

Designated Sounding is least depth of new shoal.

### Hydrographer Recommendations

[None]

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

1fm (16708\_1, 16700\_1, 16013\_1)  
-1fm 0ft (531\_1)  
1.8m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)

### Office Notes

Chart as submerged rock.

**1.35) 1152/7****Survey Summary**

**Survey Position:** 60° 43' 45.0" N, 146° 11' 48.3" W  
**Least Depth:** 0.62 m (= 2.02 ft = 0.337 fm = 0 fm 2.02 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.985$  m ; **TVU (TPEv)**  $\pm 0.299$  m  
**Timestamp:** 2006-294.19:37:31.848 (10/21/2006)  
**Survey Line:** h11611 / fa\_1010\_reson8101 / 2006-294 / 294-1932-1  
**Profile/Beam:** 1152/7  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new ld on chd (16708) rk in rky seabed area

**Hydrographer Recommendations**

[None]

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
SORIND - US,US,survy,H11611  
STATUS - 1:permanent  
TECSOU - 3:found by multi-beam  
VALSOU - 0.617 m  
VERDAT - 12:Mean lower low water  
WATLEV - 3:always under water/submerged

**Office Notes**

Update position and height of charted rock.

## **2 - AWOIS Features**



## 2.1) 12534

### Primary Feature for AWOIS Item #53494

**Search Position:** 60° 42' 04.3" N, 146° 09' 43.5" 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. 60/42/04.3N LONG. 146/09/43.5W (NAD83) OF ROCK AWASH IS OFFSET FROM SOURCE POSITION. CONDUCT SEARCH TO VERIFY OR DISPROVE CHARTED ROCK. (ENTERED 8/2006 BY JCA) ■■■ Charted (16708) rock awash was found at LAT. 60/42/03.794N LONG. 146/09/46.163W (NAD83). Obstruction line (DP 12532) denotes the extents of the new reef with charted (16708) rock as the high point of the reef. Charted (16708) rock was found during shoreline verification. Retain charted (16708) rock as positioned on chart 16708.

### Survey Summary

**Survey Position:** 60° 42' 03.8" N, 146° 09' 46.2" W  
**Least Depth:** -4.06 m (= -13.33 ft = -2.222 fm = -2 fm 1.33 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-253.17:06:48.000 (09/10/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-253 / tr1\_253\_j.mdb  
**Profile/Beam:** 4/1  
**Charts Affected:** 16708\_1, 16709\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

chd (16708) rk is reef, sig hp foul area, chd (16708)rk position vfd - refer to AWOIS item 53494. During shoreline verification, the charted (16708) rock located at LAT. 60/42/05.640N LONG. 146/09/46.879W was found to be the significant high point of an area foul with a reef, DP 12532 and DP 12534.

### Hydrographer Recommendations

The Hydrographer recommends retaining the charted (16708) rock symbol and adding a reef surrounding the rock.

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

-2 ¼fm (16708\_1, 16709\_1, 16700\_1, 16013\_1)  
-2fm 1ft (531\_1)

-4.1m (500\_1, 50\_1)

### **S-57 Data**

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

**Attributes:** RECDAT - 20060910

SORDAT - 20061027

SORIND - US,US,survey,H11611

VALSOU - -4.063 m

VERDAT - 12:Mean lower low water

WATLEV - 2:always dry

### **Office Notes**

Chart rock as high point of reef.

### Feature Images



*Figure 2.1.1 AWOIS item 53494 and associated DP*



Figure 2.1.2



**2.2) 22542****Primary Feature for AWOIS Item #53493**

**Search Position:** 60° 45' 06.4" N, 146° 03' 02.3" 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. 60/45/06.4N LONG. 146/03/02.3W (NAD83) OF ROCK AWASH IS OFFSET FROM SOURCE POSITION. CONDUCT SEARCH TO VERIFY OR DISPROVE CHARTED ROCK. (ENTERED 8/2006 BY JCA) ■■■ Charted (16708) rock awash was found at LAT. 60/45/06.571N LONG. 146/03/01.636W (NAD83). Charted (16708) rock was found during shoreline verification. Retain charted (16708) rock as positioned on chart 16708.

**Survey Summary**

**Survey Position:** 60° 45' 06.6" N, 146° 03' 01.6" W  
**Least Depth:** -0.69 m (= -2.25 ft = -0.376 fm = 0 fm 3.75 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-254.17:11:46.000 (09/11/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_2 / 2006-254 / tr2\_254.mdb  
**Profile/Beam:** 2/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

chd (16708) rk vfd - refer to AWOIS item 53493. The charted (16708) rock associated with AWOIS item 53493 was found during shoreline verification and is located at LAT. 60/45/06.571N LONG. 146/03/01.636W.

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)

0fm 2ft (531\_1)

-.7m (500\_1, 50\_1)

## S-57 Data

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

**Attributes:** RECDAT - 20060911

SORDAT - 20061027

SORIND - US,US,survey,H11611

VALSOU - -0.687 m

VERDAT - 12:Mean lower low water

WATLEV - 4:covers and uncovers

## Office Notes

Chart rock.

## Feature Images



*Figure 2.2.1 new obstrn is foul with rocks, shoal area*





*Figure 2.2.2 AWOIS item 53493.*



**2.3) 12786****Primary Feature for AWOIS Item #53492**

**Search Position:** 60° 42' 50.7" N, 146° 11' 20.1" 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. 60/42/50.7N LONG. 146/11/20.1W (NAD83) OF ROCK AWASH IS OFFSET FROM SOURCE POSITION. CONDUCT SEARCH TO VERIFY OR DISPROVE CHARTED ROCK. (ENTERED 8/2006 BY JCA) ■■■ Charted (16708) rock awash was found at LAT. 60/42/49.587N LONG. 146/11/19.148W (NAD83). Charted (16708) rock was found during shoreline verification. Retain charted (16708) rock as positioned on chart 16708.

**Survey Summary**

**Survey Position:** 60° 42' 49.6" N, 146° 11' 19.1" W  
**Least Depth:** -0.46 m (= -1.51 ft = -0.252 fm = 0 fm 4.49 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.02:48:32.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 6/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

chd (16708) rk vfd - refer to AWOIS item 53492. The charted (16708) rock associated with AWOIS item 53492 was found during shoreline verification and is located at LAT. 60/42/49.587N LONG. 146/11/19.148W.

**Hydrographer Recommendations**

[None]

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

0 ¼fm (16708\_1, 16700\_1, 16013\_1)  
 0fm 1ft (531\_1)  
 -.5m (500\_1, 50\_1)

## S-57 Data

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

**Attributes:** RECDAT - 20061006  
SORDAT - 20061027  
SORIND - US,US,graph,H11611  
VALSOU - -0.460 m  
VERDAT - 12:Mean lower low water  
WATLEV - 5:awash

## Office Notes

Update position and depth on charted rock.

## Feature Images



*Figure 2.3.1 new obstrn is foul with rocks, shoal area*



Figure 2.3.2 Overview of AWOIS item 53492.

**2.4) 12787****Primary Feature for AWOIS Item #53491**

**Search Position:** 60° 43' 00.7" N, 146° 11' 56.3" W  
**Historical Depth:** [None]  
**Search Radius:** 75  
**Search Technique:** VS, VB, MB, S2  
**Technique Notes:** CONDUCT SEARCH WITHIN LIMITS OF THE SURVEY.

**History Notes:**

CHARTED POSITION LAT. 60/43/00.7N LONG. 146/11/56.3W (NAD83) OF ROCK AWASH IS OFFSET FROM SOURCE POSITION. CONDUCT SEARCH TO VERIFY OR DISPROVE CHARTED ROCK. (ENTERED 8/2006 BY JCA) ■■■ Charted (16708) rock awash was found at LAT. 60/42/58.748N LONG. 146/11/58.120W (NAD83). Charted (16708) rock was found during shoreline verification. Retain charted (16708) rock as positioned on chart 16708.

**Survey Summary**

**Survey Position:** 60° 42' 58.7" N, 146° 11' 58.1" W  
**Least Depth:** -0.96 m (= -3.14 ft = -0.523 fm = 0 fm 2.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2006-279.02:57:31.000 (10/06/2006)  
**DP Dataset:** h11611 / fa\_trimble\_dpne\_1 / 2006-279 / tr1\_278.mdb  
**Profile/Beam:** 7/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

**Remarks:**

new position of chd (16708) rk - refer to AWOIS item 53491. The charted (16708) rock associated with AWOIS item 53491 was found during shoreline verification and is located at LAT. 60/42/58.748N LONG. 146/11/58.120W.

**Hydrographer Recommendations**

[None]

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

0 ½fm (16708\_1, 16700\_1, 16013\_1)  
0fm 3ft (531\_1)  
-1.0m (500\_1, 50\_1)

## S-57 Data

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

**Attributes:** RECDAT - 20061006

SORDAT - 20061027

SORIND - US,US,graph,H11611

VALSOU - -0.956 m

VERDAT - 12:Mean lower low water

WATLEV - 4:covers and uncovers

## Office Notes

Update position and depth on charted rock.



## Feature Images



*Figure 2.4.1 new obstrn is foul with rocks, shoal area*



*Figure 2.4.2 overview of AWOIS item 53491*





*Figure 2.4.3 overview of AWOIS item 53491*

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

### 3.1) 431/1

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 60° 44' 10.4" N, 146° 04' 06.3" W  
**Least Depth:** 0.00 m (= 0.01 ft = 0.002 fm = 0 fm 0.01 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.990$  m ; **TVU (TPEv)**  $\pm 0.320$  m  
**Timestamp:** 2006-294.20:08:02.891 (10/21/2006)  
**Survey Line:** h11611 / fa\_1018\_reson8101 / 2006-294 / 294-2006  
**Profile/Beam:** 431/1  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

The Hydrographer recommends charting a shoal sounding of one foot (1 ft) over a charted (16708) 3 fathom sounding.

### Hydrographer Recommendations

[None]

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

0fm (16708\_1, 16700\_1, 16013\_1)  
0fm 0ft (531\_1)  
.0m (500\_1, 50\_1)

### S-57 Data

[None]

### Office Notes

Do not concur. Chart as rock rather than sounding.

## **Feature Images**

[Image file n:/opr158fa06/surveys/h11611/smooth\_sheet/preliminary/pss/photos/dton.jpg does not exist.]

## 3.2) 639/100

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 60° 44' 05.2" N, 146° 12' 33.9" W  
**Least Depth:** 10.85 m (= 35.60 ft = 5.933 fm = 5 fm 5.60 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.066$  m ; **TVU (TPEv)**  $\pm 0.408$  m  
**Timestamp:** 2006-291.21:08:19.399 (10/18/2006)  
**Survey Line:** h11611 / fa\_1018\_reson8101 / 2006-291 / 291-2106  
**Profile/Beam:** 639/100  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

Designated Sounding is least depth of new shoal. Designated at PHB during Survey Review and submitted as a Danger to Navigation.

#### Hydrographer Recommendations

[None]

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

5  $\frac{3}{4}$ fm (16708\_1, 16700\_1, 16013\_1)

5fm 5ft (531\_1)

10.9m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)

#### Office Notes

Chart as submerged rock.

### 3.3) 198/20

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 60° 45' 18.0" N, 146° 02' 52.3" W  
**Least Depth:** 7.04 m (= 23.09 ft = 3.848 fm = 3 fm 5.09 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.989$  m ; **TVU (TPEv)**  $\pm 0.316$  m  
**Timestamp:** 2006-293.21:45:47.759 (10/20/2006)  
**Survey Line:** h11611 / fa\_1018\_reson8101 / 2006-293 / 293-2145  
**Profile/Beam:** 198/20  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

Designated Sounding is least depth of new shoal. Designated at PHB and submitted as a Danger to Navigation.

### Hydrographer Recommendations

[None]

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

3  $\frac{3}{4}$ fm (16708\_1, 16700\_1, 16013\_1)

3fm 5ft (531\_1)

7.0m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)

### Office Notes

Chart submerged rock.

### 3.4) 372/88

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 60° 44' 21.1" N, 146° 04' 23.5" W  
**Least Depth:** 1.44 m (= 4.73 ft = 0.788 fm = 0 fm 4.73 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.983$  m ; **TVU (TPEv)**  $\pm 0.310$  m  
**Timestamp:** 2006-294.20:52:14.469 (10/21/2006)  
**Survey Line:** h11611 / fa\_1018\_reson8101 / 2006-294 / 294-2051  
**Profile/Beam:** 372/88  
**Charts Affected:** 16708\_1, 16700\_1, 16013\_1, 531\_1, 500\_1, 50\_1

#### Remarks:

New position of charted (16708) rock located 100 meters to the north. Designated in the office and submitted as a danger to navigation.

### Hydrographer Recommendations

[None]

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

0  $\frac{3}{4}$ fm (16708\_1, 16700\_1, 16013\_1)  
0fm 4ft (531\_1)  
1.4m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** VALSOU - 1.442 m

### Office Notes

Chart new rock.



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: H11611

LOCALITY: Olsen Bay to Mouth of the Gravina River, AK  
TIME PERIOD: September 10 - October 27, 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, H11611, during the time period between September 10 and October 27, 2006.

Please use the zoning file "P158FA2006CORP" submitted with the project instructions for Approaches to Cordova, AK. Zones PWS59 & PWS60 are the applicable zones for H11611.

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).

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CHIEF, PRODUCT AND SERVICES DIVISION







**H11611 HCell Report**  
Tyanne Faulkes, ERT Associate  
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 ENC and RNC in the region: NOAA ENC: US4AK25M; and NOAA RNCs: 16708.

HCell compilation of survey H11611 utilized 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**

The density of soundings in the HCell are compiled as appropriate to emulate those soundings of Charts 16708 1:79,291.

**2. Soundings**

A survey-scale sounding (SOUNDG) feature object source layer was built from the **H11611\_Combined\_10m\_Office** surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale for the area of the survey covered by chart 16708 (1:79,291). These shoal-based selections were made using a Radius Table file with values shown in the table, below. The resultant sounding layer contains 17,173 depths ranging from 0-105 fathoms.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	150	5

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 104.98 meters, was used for depth area objects. Upon conversion to NOAA charting units, the depth range is 0 to 105 fathoms.

### 3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11611\_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 Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
0	0	0.2286	0.125
3	5.4864	5.715	3.125
10	18.288	18.5166	10.125
20	36.576	37.9476	20.750
50	91.44	92.8116	50.750

Contours delivered in the H11611\_SS file have not been deconflicted against soundings and hydrography as all other features in the H11611\_CS file and soundings in the H11611\_SS have been. This results in conflicts between the H11611\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_COVR, M\_QUAL, and DEPARE objects should be expected. HCell features should be honored over H11611\_SS.000 file contours in all cases where conflicts are found.

### 4. Meta Areas

The following Meta object areas are included in HCell H11611:

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

Features files **H11611\_Field\_Verified\_Source.hob**, **H11611\_Disprovals.hob**, **H11611\_Original\_Composite\_Source.hob** were delivered. The features files have been combined into one feature file for delivery to MCD for historical purposes called H11611\_Features.000. There one DTON reported by the field unit and four reported during office review. These Dangers to Navigation were discovered to be depicted on Chart 16708 during chart comparison and are reflected in H11611\_CS.000.

25 bottom sample features were imported into the HCell, 20 from the survey and 5 from chart 16708. The source of all features included in the H11611 HCell can be determined by the SORIND field.

## **6. S-57 Objects and Attributes**

The H11516\_CS HCell contains the following Objects:

SOUNDG	Chart scale soundings
DEPARE	All-encompassing depth area and intertidal areas
SBDARE	Bottom samples and rocky seabed areas
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
\$CSYMB	Blue notes
OBSTRN	Foul areas
UWTROC	Rocks
WEDKLP	Kelp
DEPCNT	Zero contour
LNDARE	Islets
LNDELV	Elevation of islets

The H11516\_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 H11611\_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.

## **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
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

Conversion to charting units and application of NOAA rounding is completed in the same step, at the end of the HCell compilation process.

Conversion to charting units with NOAA rounding ensures that:

- 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 skyward of 0 fathoms (MLLW) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet skyward of that.
- All height units (HUNI) which have been converted to charting units, and that are 2.00 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**

H11611 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

- H11611\_CS, Chart Units, Soundings compiled to 1:79,291
- H11611\_SS, Chart Units, Soundings compiled to 1:10,000
- H11611\_Features, survey scale features compiled to 1:10,000
- H11611\_DR including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11611 Survey Outline to populate to SURDEX

### 11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11611\_CS.000
- Chart units base cell file, survey scale soundings H11611\_SS.000
- Chart units base file, survey scale features H11611\_Features.000
- Descriptive Report H11611\_DR.pdf
- Survey outline H11611\_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:

Tyanne Faulkes, ERT Associate, PHB, Seattle, WA; 206-526-6883;  
[Tyanne.Faulkes@noaa.gov](mailto:Tyanne.Faulkes@noaa.gov)

APPROVAL SHEET  
H11611

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.