

H12000

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

*Type of Survey* Hydrographic Survey

*Field No.* N/A

*Registry No.* H12000

### LOCALITY

*State* Alaska

*General Locality* West of Prince of Wales Island

*Sublocality* Klawock Inlet

2008

### CHIEF OF PARTY

Captain Donald W. Haines, NOAA

### LIBRARY & ARCHIVES

DATE

<p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;"><b>HYDROGRAPHIC TITLE SHEET</b></p>	<p>REGISTRY No</p> <p style="text-align: center;"><b>H12000</b></p>
<p><b>INSTRUCTIONS</b> – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p>	<p>FIELD No: N/A</p>
<p>State <u>Alaska</u></p> <p>General Locality <u>West of Prince of Wales Island</u></p> <p>Sub-Locality <u>Klawock Inlet</u></p> <p>Scale <u>1:10,000</u> Date of Survey <u>10/11/2008 - 11/9/2008</u></p> <p>Instructions dated <u>4/9/2008</u> Project No. <u>OPR-O190-RA-08</u></p> <p>Vessel <u>RA6 (1015 Reson8101), RA3 (1021), RA1 (1101), RA2 (1103), RA4 (2801), and RA5 (2802)</u></p> <p>Chief of party <u>Captain Donald W. Haines, NOAA</u></p> <p>Surveyed by <u>RAINIER Personnel</u></p> <p>Soundings by <u>Reson SeaBat 8101, Tilted Reson 8125, Knudsen 320M, Reson SeaBat 7125</u></p> <p>SAR by <u>Annemieke Raymond</u> Compilation by <u>Toshi Wozumi</u></p> <p>Soundings compiled in <u>Fathoms</u></p>	
<p>REMARKS: <u>All times are UTC. UTM Zone 08</u></p> <p><u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS)</u></p> <p><u>naautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were</u></p> <p><u>generated during office processing. Page numbering may be interrupted or non sequential.</u></p> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the</u></p> <p><u>National Geophysical Data Center (NGDC) and can be retrieved via <a href="http://www.ngdc.noaa.gov/">http://www.ngdc.noaa.gov/</a>.</u></p>	

# Descriptive Report to Accompany Hydrographic Survey H12000

Project OPR-O190-RA-08  
West Prince of Wales Island, Alaska

Klawock Inlet

Scale 1:10,000

October to November, 2008

**NOAA Ship *Rainier* (s221)**

Chief of Party: Captain Donald W. Haines, NOAA

## A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-O190-RA-08 dated April 9, 2008 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area is West of Prince of Wales Island, Alaska and Klawock Inlet. This survey corresponds to sheet "N" in the sheet layout provided with the Letter Instructions. Klawock Inlet is located above Craig, AK and is frequented by logging ships, fuel barges, and recreational and commercial fishing boats. The purpose of project OPR-O190-RA-08 is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts in the area.

With the exceptions noted in this report, complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 4 meters and deeper up to the assigned LIDAR survey junction, or navigable area limit line where LIDAR data was not available. Total mileage acquired by each vessel and system is reference in Table 1.

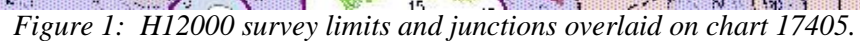
Limited Shoreline Verification was performed for the survey area.

Data Acquisition Type	Hull Number with Mileage (lnm)						Total
	1101	1103	1021	1015	2801	2802	
VBES (mainscheme)	-	1.95	-	-	-	-	1.95
MBES (mainscheme)	14.5	-	67.21	18.28	94.94	20.57	215.5
Crosslines	-	-	-	0.70	12.8	-	13.5
Developments		2.28	-	0.80	-	-	3.08
Total Number of Items Investigated	-	1	-	-	-	-	1
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	6.42

*Table 1: Acquisition statistics for survey H12000*

Data acquisition was conducted from October 11, 2008 to November 9, 2008 (DN285 to DN314).

<sup>1</sup> NOS Hydrographic Surveys Specifications and Deliverables (April 2008), OCS Field Procedures Manual for Hydrographic Surveying (May 2008), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.





## DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *OPR-O190-RA-08 Data Acquisition and Processing Report* (DAPR) entitled OPR-O190-RA-08\_DAPR\_Fall.pdf, submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

Final Approved Water Levels have been applied to this survey. See Section C. for additional information.

### B1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
1101	RA-1	Multibeam Echosounder
1103	RA-2	Vertical Beam Echosounder Detached Positions
1021	RA-3	Multibeam Echosounder
2801	RA-4	Multibeam Echosounder
2802	RA-5	Multibeam Echosounder
1015	RA-6	Multibeam Echosounder

*Table 2: Data Acquisition Vessels for H12000.*

Sound speed profiles were measured with SEACAT SBE-19+ profilers in accordance with the Specifications and Deliverables.

No unusual vessel configurations were used for data acquisition.

### B2. Quality Control

#### Crosslines

Multibeam Echosounder (MBES) crosslines totaled 13.5 nautical miles, comprising 6.26% of mainscheme MBES hydrography. Crosslines were processed using a 50/50 filter to reject noisy outer beams and preserve the more accurate data near nadir. The lines were manually compared in CARIS subset mode. The mainscheme and crossline nadir beams in agreed very well with differences averaging approximately 0.15 meter and not exceeding 0.3 meters. Although agreement at nadir was good, outer beams of crosslines sometimes had higher levels of disagreement due to refraction errors.<sup>1</sup>

A small number of mainscheme Vertical Beam Echosounder lines were run in areas deemed too shallow to enter with multibeam echosounder equipped launches. Due to the limited number of lines run and time constraints while in the project area, crosslines were not run on these lines.

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2008 *Rainier* Hydrographic System Readiness Review package submitted with this survey.

## Junctions

The following contemporary surveys junction with H12000 (See Figure 1):<sup>2</sup>

<b>Registry #</b>	<b>Scale</b>	<b>Date</b>	<b>Junction side</b>
H11661	1:10,000	2007	Inshore Lidar Junction
H11851	1:10,000	2008	Northeast
H11852	1:10,000	2008	Northwest

A CARIS BASE surface for lidar survey H11661 was provided by Pacific Hydrographic Branch for junction comparison purposes. H12000 BASE surfaces were compared to this junction surface in CARIS HIPS. Surfaces generally agreed well, with differences averaging 0.1 to 0.35 meters. Rarely, differences as high as 0.6 meters were observed. These high offsets however seemed to be specific to the extreme outer edges of lidar coverage as well as the occasional steep slope area.<sup>3</sup>

One area was not surveyed by either lidar or multibeam. There were three small holes within the main area of lidar coverage that were not completed during survey H12000 (see figure 2.) The area was found to be foul and strewn with kelp, as charted, and was determined to not be critical to navigation. The hydrographer recommends that the area be retained as charted.<sup>4</sup>

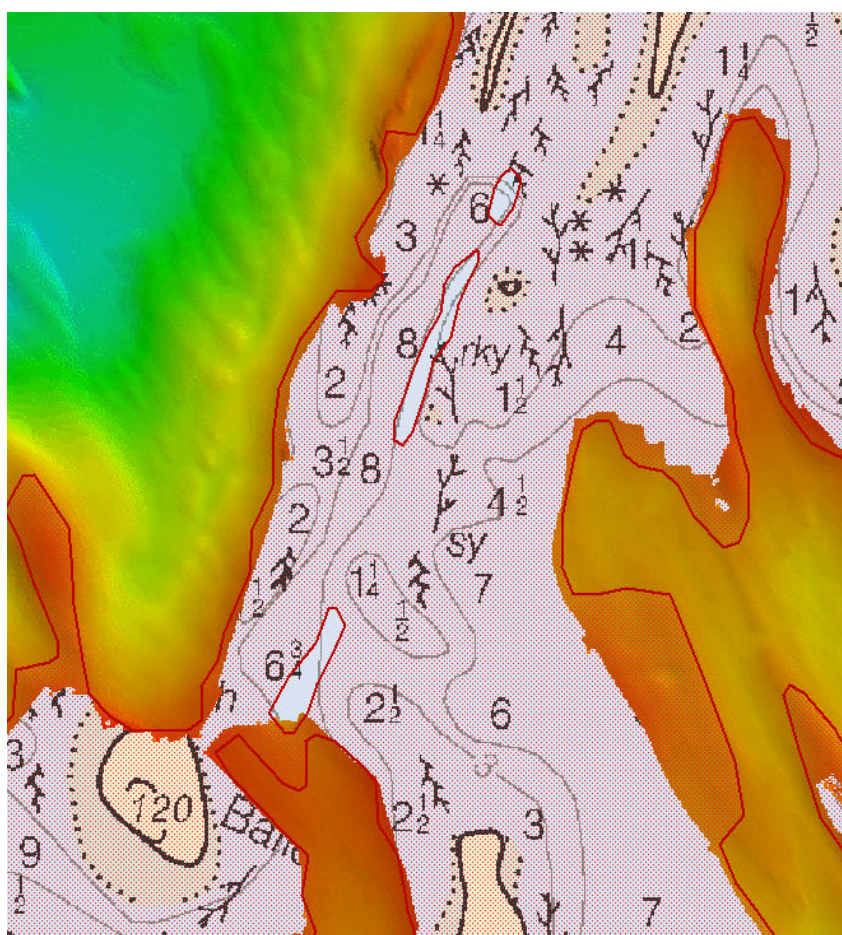


Figure 2: Holes in lidar coverage not surveyed by Rainier

Surveys H11851 and H11852 were manually compared to survey H12000 using Caris subset mode. All surveys agreed well with differences averaging less than 0.2 meters, and not exceeding 0.35 meters. Areas with higher offsets (0.2m – 0.35m) are attributable to minor tidal variations and sound speed errors.<sup>5</sup>

## Data Quality Factors

### Holidays

Several small holidays exist throughout survey H12000. The majority of these are insignificant; however, there are a few which exceed specification. The first is located in the Northwest edge of Klawock Inlet, and is a result of surface/midwater debris that prohibited the sonar from reaching the seafloor during acquisition. See figures 3 and 4 below. Data in the surrounding area was viewed in subset mode and there does not appear to be any features in the area that are of concern.<sup>6</sup>

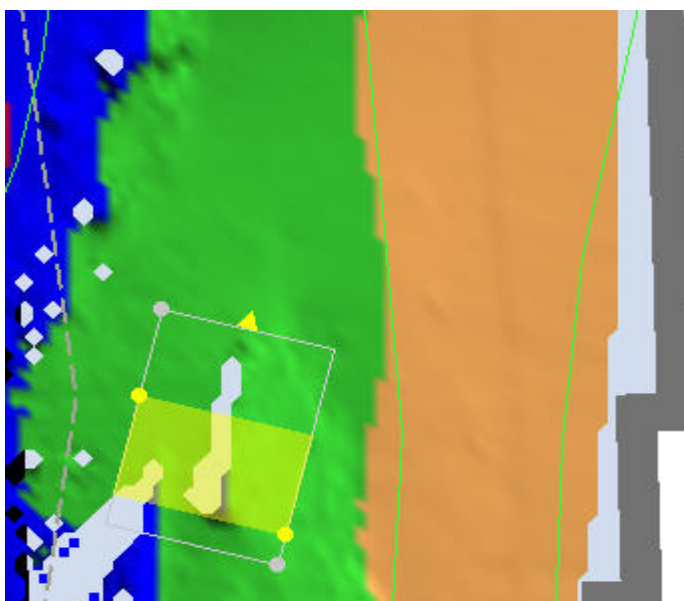


Figure 3: Holiday in surface resulting from surface/midwater debris.

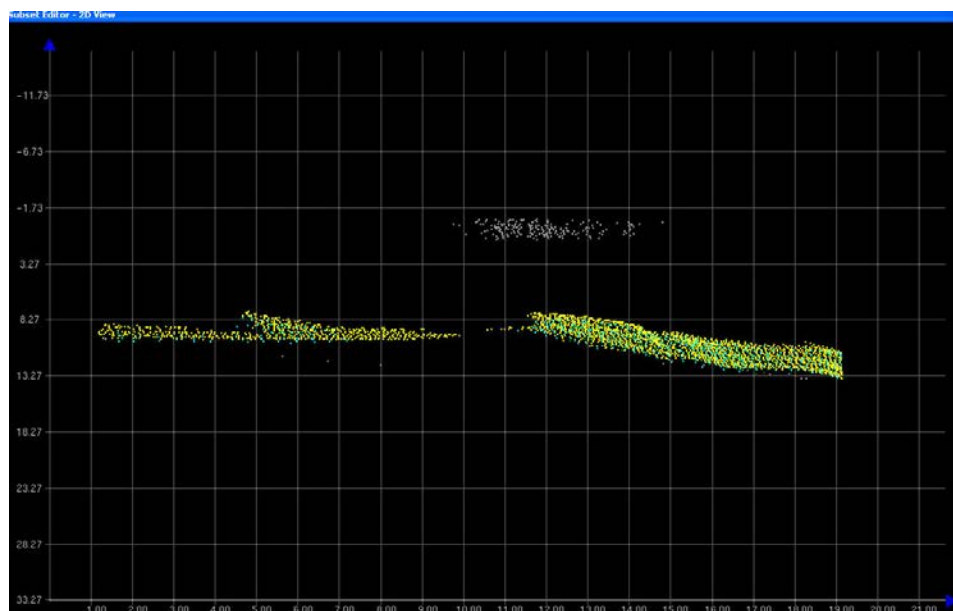
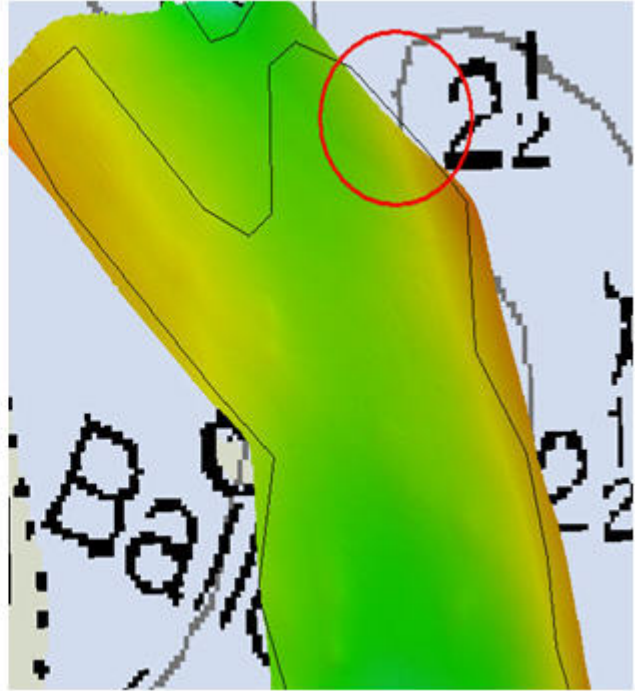


Figure 4: Rejected data causing holiday as viewed in Caris subset.

On the southeast side of Cole Island in Klawock inlet a holiday exists on the boundary of the Lidar limit junction line (see figure 5). This was a result of not meeting the previously acquired inshore buffer line that was run with the tilted Reson 8125. Although the holiday is significant in size and does not meet the inshore limit, there does not appear to be any features or obstructions in the area that would be of concern. A similar problem was found in the coverage area just east of Ballena Island, where the MBES coverage was short of meeting the lidar junction by approximately 5 meters in the northeast corner (see figure 6).<sup>7</sup>



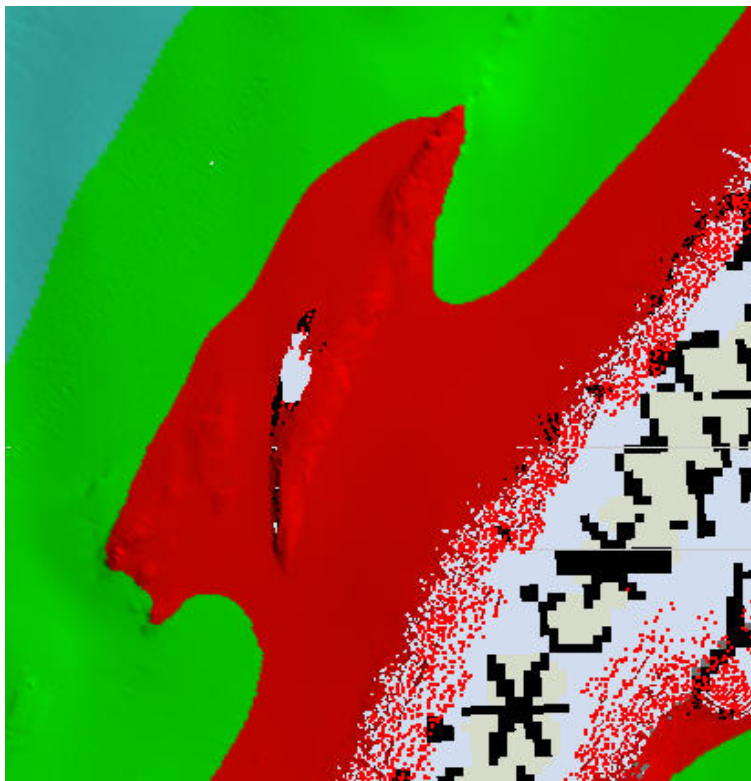
*Figure 5: Holiday in Klawock Inlet.*



*Figure 6: Lidar junction holiday near Ballena Is.*

Two rock features in the vicinity of Clam Island have significant holidays. The holidays are due to thick kelp and the survey launches were unable to approach any closer. The first holiday shown below in figure 7 is on the down slope of a feature located southwest of Clam Island near Klawock Reef. Although the holiday exists, it appears that the least depth was captured.<sup>8</sup>





*Figure 7: Holiday due to kelp near Klawock Reef.*

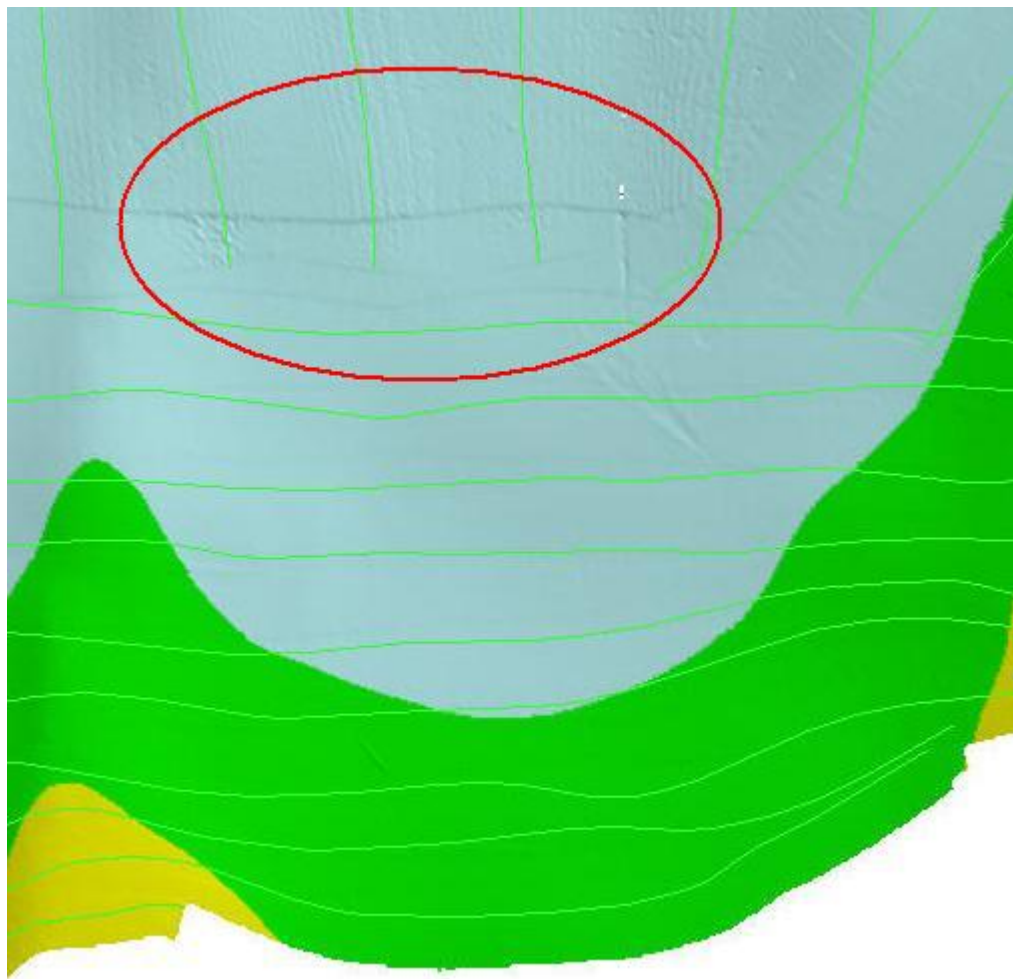
The second holiday is seen on a rock feature on the Northeast side of Clam Island (see figure 8). This is also due to thick kelp. It can not be determined in this case whether the least depth was acquired. The hydrographer recommends updating chart with the shoalest depth in the area as well as adding kelp symbols.<sup>9</sup>



*Figure 8: Holiday due to kelp on Northeast side of Clam Island*

### Tide offsets

Tidal correctors were a problem within survey H12000. Many areas show distinct offsets on the borders of data acquired on different days (see figure 9). *Rainier* did install a tide gauge during the project, but it was located quite far from survey H12000. The gauge did not seem to have a significant impact on improving the tidal data for lower Klawock Inlet. The offsets seen were helped somewhat by the application of final tides, however artifacts do still remain. The remaining vertical offsets were not observed to exceed 0.25 meters.<sup>10</sup>



*Figure 9: Effects of tidal offsets on BASE surface*

### Sound speed errors

The area in and around Klawock Inlet had a number of sound speed errors throughout the data. This can be attributed to thermal layers, fresh water layers from rainfall and/or runoff, and tidal mixing. After applying sound speed corrections in CARIS HIPS/SIPS, some lines still exhibited characteristic “smiles” and “frowns” indicative of inaccurate sound speed corrections. Sound speed casts were often taken more frequently than the standard 4 hour time interval. All cast data were compiled into a sheet-wide concatenated SVP file and applied using Nearest in Distance within Time. A minimum of 4 hours was used with this method. Despite the best efforts of the hydrographer to conduct sufficient sound speed casts distributed both spatially and temporally, and to correct for sound speed errors in post processing through methods previously mentioned, sound speed errors were still noticeable in several regions. To compensate, the

Hydrographer, where possible, rejected soundings obviously in error on the outer beams. Despite some remaining artifacts, the acquired data is within specification and is adequate to supersede charted depths.<sup>11</sup>

### Horizontal offsets

Horizontal offsets were rarely seen within survey H12000. One item in particular was noted to have a more noticeable offset of 0.70 meters (see figure 10). This was found on an assigned lidar investigation item located near Balena Island. The POS MV unit has a stated horizontal accuracy of 2 meters, and variations within this accuracy sometimes become apparent on slopes and over distinct features as seen below. The offset below appeared to be the largest seen at 0.70 meters. Although offsets exist, they are within the specification and data is adequate to supersede charted depths.<sup>12</sup>

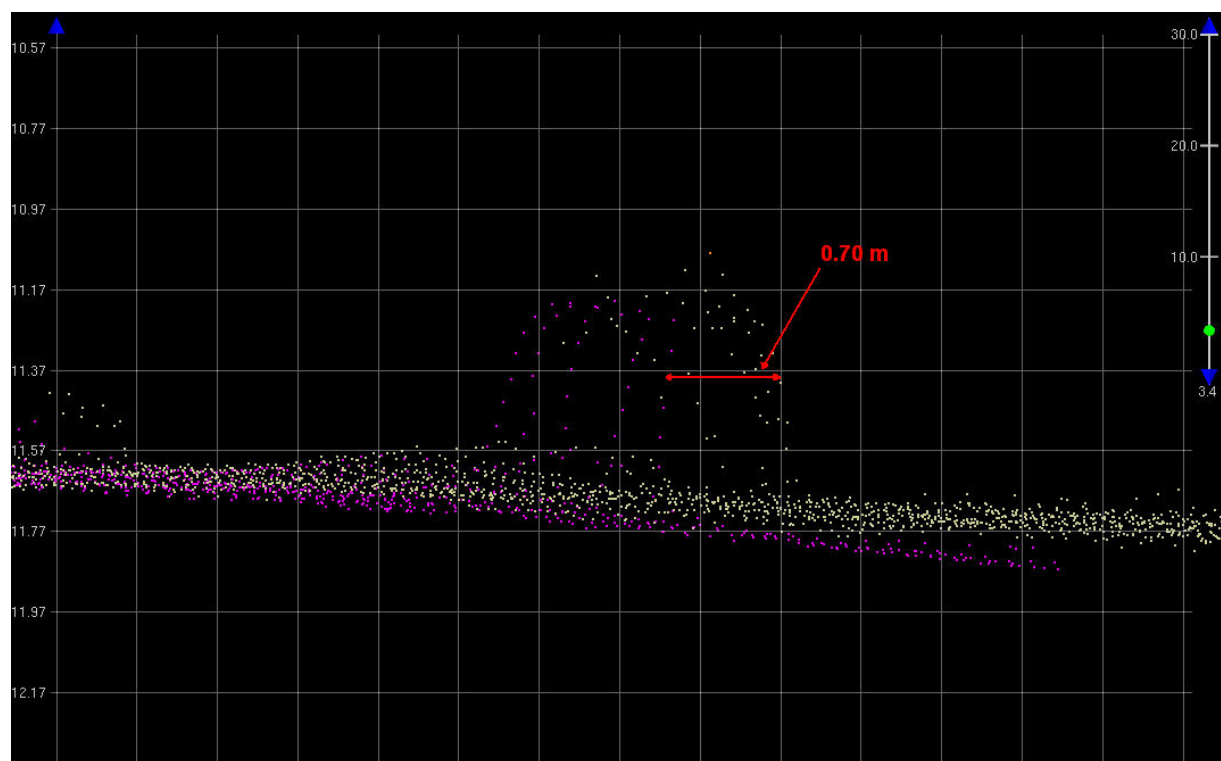


Figure 10: Horizontal offset seen between DN 900 and DN901 acquired with launch 2801.

### True heave

On DN303 launch 2801 ran for approximately 30 minutes without logging true heave. Times and line numbers are noted in the acquisition log; beginning with line 000\_1845.HSX and ending with the line 000\_1912.HSX. The weather and sea state were calm that day and no heave artifacts appear in the data.<sup>13</sup>

### Deleted HDCS data

Four lines were removed from the submitted HDCS data for launch 1021 on DN285. Line numbers 000A\_2009, 000\_2009, 222\_2010 and 000\_2012 were deleted during post processing after determining they did not contribute to the surface in a necessary way. The lines were very small and run outside the sheet limits for project H12000. They appeared to most likely be test lines for troubleshooting or lines recorded accidentally. The raw data had already been zipped and submitted to PHB and therefore the lines were not deleted from raw files.

### POS MV Heading Accuracy

During the course of data acquisition, survey personnel on launches 2802 (RA-4) and 2802 (RA-5) noted occasional instances when POS MV heading accuracy decreased from the normal level of  $\leq 0.05$  to a maximum of 0.078 degrees. This phenomenon was seen almost daily, but was always self correcting after a period of approximately 15 to 20 minutes. The most likely cause of these incidents was less than optimal satellite geometry and narrower GPS antenna spacing on these two new launches compared with older survey launches on *Rainier*.

### **B3. Data Reduction**

Data reduction procedures for survey H12000 conform to those detailed in the *OPR-O190-RA-08\_DAPR\_Fall*.

In deep water areas where outer beam noise was high, 60°/60° beam angle filters were often applied to reject said noise. Additionally, crosslines were processed using a 50°/50° beam angle filter so as to only use the more reliable data from the swath for crossline comparisons.

### **B4. Data Representation**

Many BASE surfaces were used in processing H12000. Final BASE surface resolutions and depth ranges were set according to table 3 below, with field sheets smaller than  $25 \times 10^6$  nodes. CUBE surfaces processed at one meter resolution were computed using “shallow” CUBE parameters whereas CUBE surfaces with resolutions of two and four meters were computed using “deep” CUBE parameters. Vertical Beam data is submitted in a 2 meter resolution uncertainty surface and, with the exception of the final combined surface, was not included in submitted CUBE surfaces. The submission Field Sheet and BASE Surface structure are shown in figures 11, 12, and 13.<sup>14</sup>

Depth Range (m)	Resolution (m)	Advanced Configuration
0-21.5	1	Shallow
18.5-52	2	Deep
46-115	4	Deep

*Table 3: Depth range and surface resolutions for H12000*

In areas where multibeam data was acquired on charted cultural features (pilings, piers, etc) that were above MLLW, all data were rejected on the feature itself to more accurately represent the seafloor below these features.

Soundings and contours were generated in CARIS HIPS from the final combined BASE surface for field unit review purposes. They are included for reference only and are not intended as a deliverable.



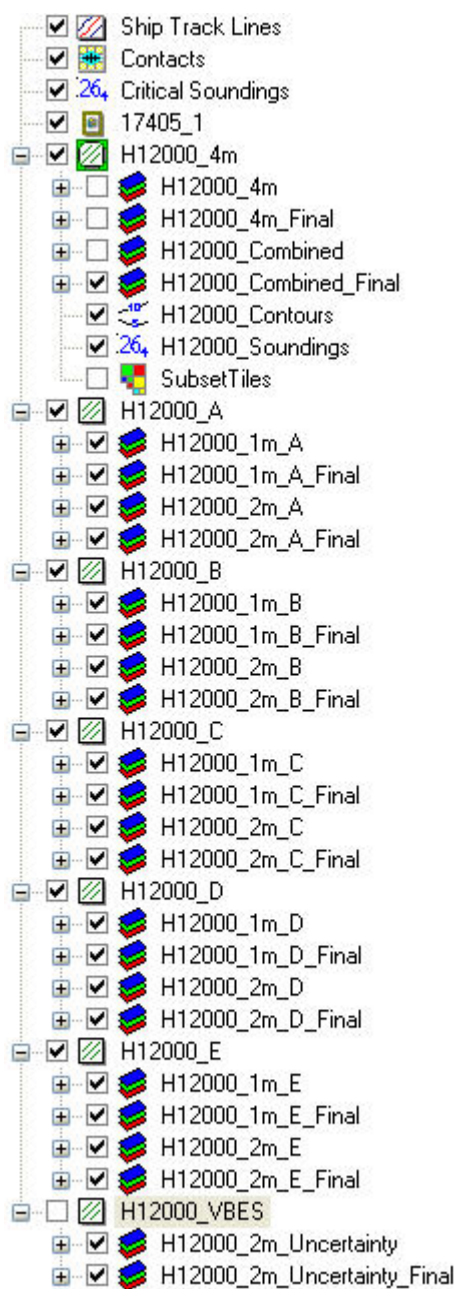


Figure 11: Field sheets and BASE surfaces submitted with H12000

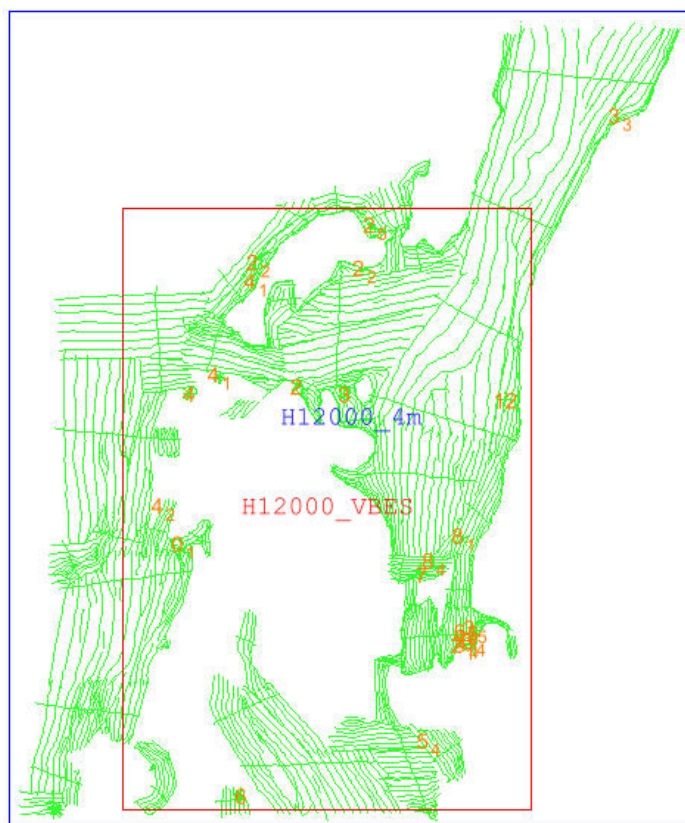


Figure 12: Layout of field sheet containing 4m and VBES surfaces for H12000.

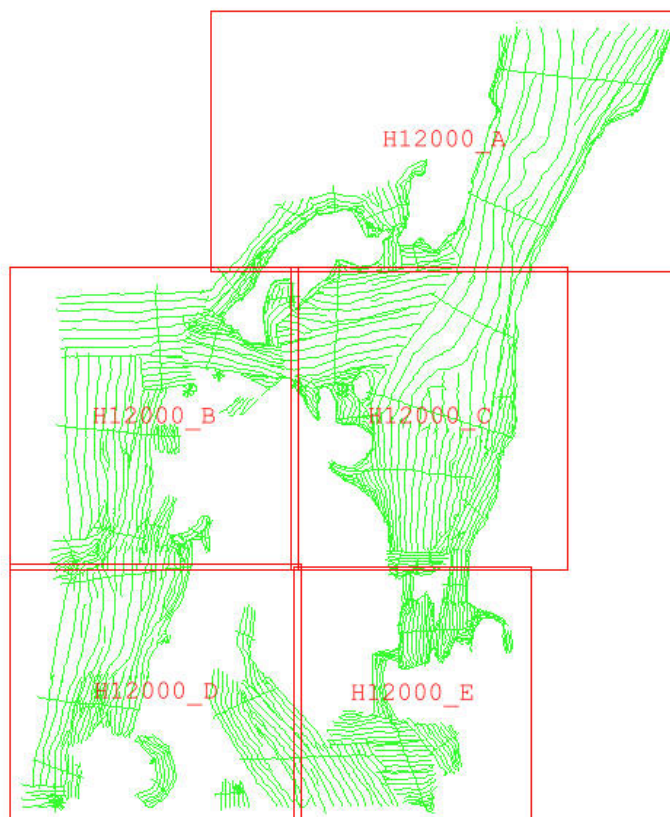


Figure 13: Layout of field sheets A thru E, containing 1m and 2m resolutions surfaces

## C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H12000 can be found in the *OPR-O190-RA-08 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

### Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacons utilized for this survey are given in Table 4.

Location	Frequency	Operator	Distance	Priority
Level Island	295 kHz	USCG	60nm	Primary
Annette Island	323 kHz	USCG	60nm	Secondary
Biorka Island	305 kHz	USCG	130nm	Secondary

Table 4: Differential Corrector Sources for H12000.

### 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 Sitka, AK (945-1600) served as control for datum determination and as the primary source for water level reducers for survey H12000.

*Rainier* personnel installed Sutron 8210 “bubbler” tide gauge at the following subordinate station. Originally, the Hydrographic Survey Project Instructions and Water Level Instructions required the installation and continuous operation of a water level measurement system (tide gauge) at a subordinate station located in Big Salt Lake. Although *Rainier* personnel did install this subordinate tide gauge during the spring operations, observations in the field lead *Rainier* to conclude that Big Salt Lake was poorly suited to contribute to project wide tidal correctors. The entrance to Big Salt Lake is extremely shallow and narrow, constricting the free flow of water during the tidal cycle. In fact this restriction causes tides in Big Salt Lake to strongly deviate from those throughout the rest of the project area. Subsequent correspondence with CO-OPS removed the requirement for this tide station and replaced it with an alternate site, Shinaku Inlet (945-0618). This station is described in detail in the *OPR-O190-RA-08 Horizontal and Vertical Control Report*. Additional information regarding the alternate gauge location can also be found in Appendix V under Supplemental Correspondence.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Shinaku Inlet	945-0618	30-day	October, 2008	November, 2008

Table 5: Tide Stations installed by *Rainier* personnel for H12000.

All data were reduced to MLLW using final approved water levels from station Sitka, AK (945-1600) using the tide file 9451600.tid and Shinaku Inlet, AK (945-0618) using the tide file 9450618.tid. Final time and height correctors using the zone corrector file H12000CORF.zdf.

The request for Final Approved Water Levels for H12000 was submitted to CO-OPS on November 11, 2008 and the Final Tide Note was received on January 21, 2009. This documentation is included in Appendix IV.<sup>15</sup>

## D. RESULTS AND RECOMMENDATIONS

### D.1. Chart Comparison

#### D.1.a. Survey Agreement with Chart

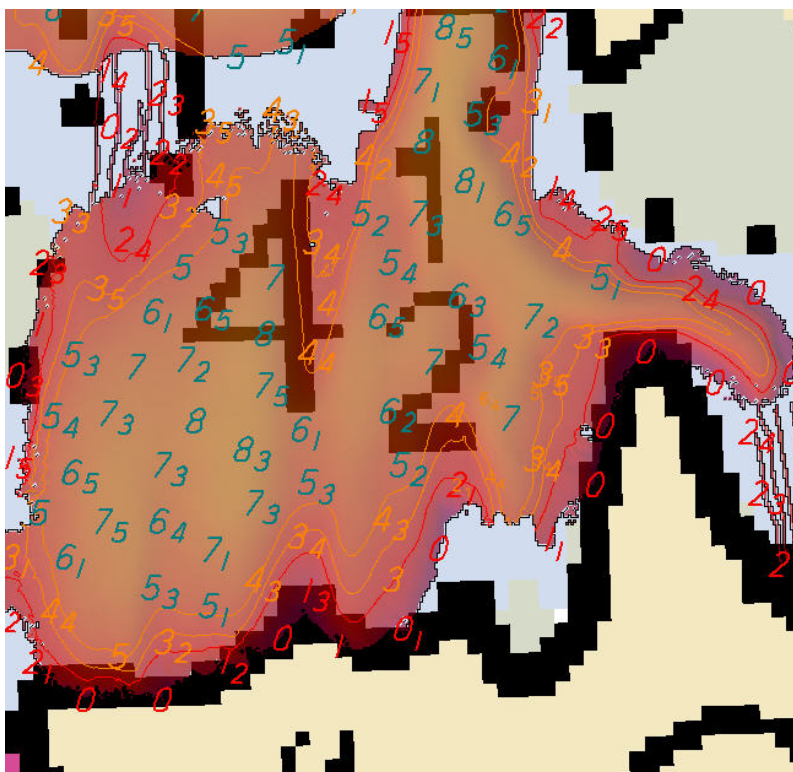
Survey H12000 was compared with the following charts:<sup>16</sup>

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17400	1:229,376	17 <sup>th</sup> Ed, March, 2007	09/20/2008
17405	1:40,000	15 <sup>th</sup> Ed, May, 2006	09/20/2008

*Table 6: Charts compared with H12000*

#### Chart 17400

Chart 17400 agrees very well with current surveyed depths. Differences were minor and were 1 fathom or less in all areas. One item worth mentioning is in the bay just north of Craig. Due to the small scale of the chart, one sounding is used to represent the least depth in the bay. The shoal it represents extends a bit further than currently charted (see figure 14) and has a current least depth of 3 fathoms 4 feet. This difference is also noted on charts 17405\_1 and its corresponding inset 17405\_2.<sup>17</sup>



*Figure 14: Current survey soundings overlaid on chart 17400 North of Craig Island*



Chart 17405<sup>18</sup>

Survey soundings generally agreed well with charted depths with differences averaging 1 to 2 fathoms, with the following exceptions.

In the northwest corner of the survey, just west of Klawock Reef, differences of 3-4 fathoms were seen. The area is charted as 22 to 24 fathoms, with survey soundings measuring depths at approximately 18 to 20 fathoms.

Just to the southwest, on the approach to the western entrance to Klawock Inlet, there is an area where survey soundings are 3 to 5 fathoms deeper than currently charted (see figure 15).

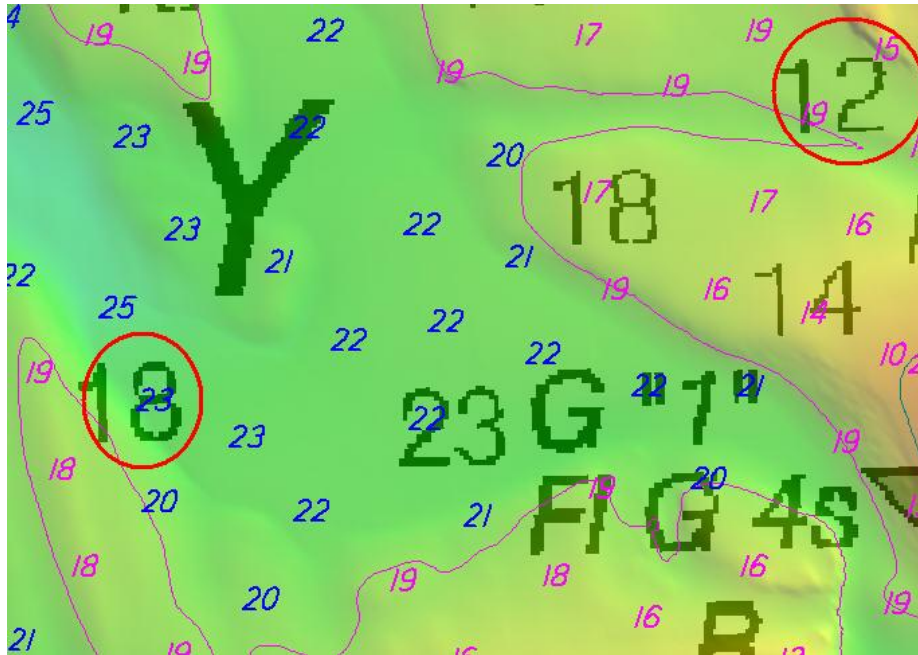


Figure 15: Mischarted shoal soundings

Near Clam Island at Entrance Point, a 3 fathom shoal is charted. The depths measured in this area were 6 to 8 fathoms. No underwater features or indications of shoaling were seen (see figure 16).

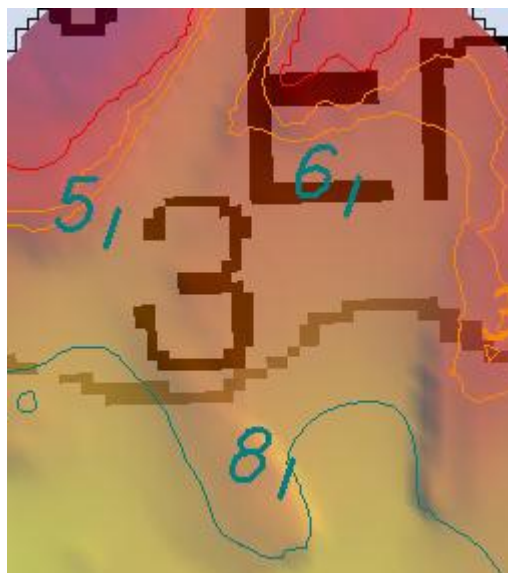


Figure 16: Mischarted shoal near Entrance Point

Lastly, the area surrounding Craig Island has a few notable changes. To the southwest of Craig survey soundings are approximately 2 fathoms shoaler than charted depths in many areas and the 10 fathom contour is mischarted by up to 100 meters in places (see figure 17.)

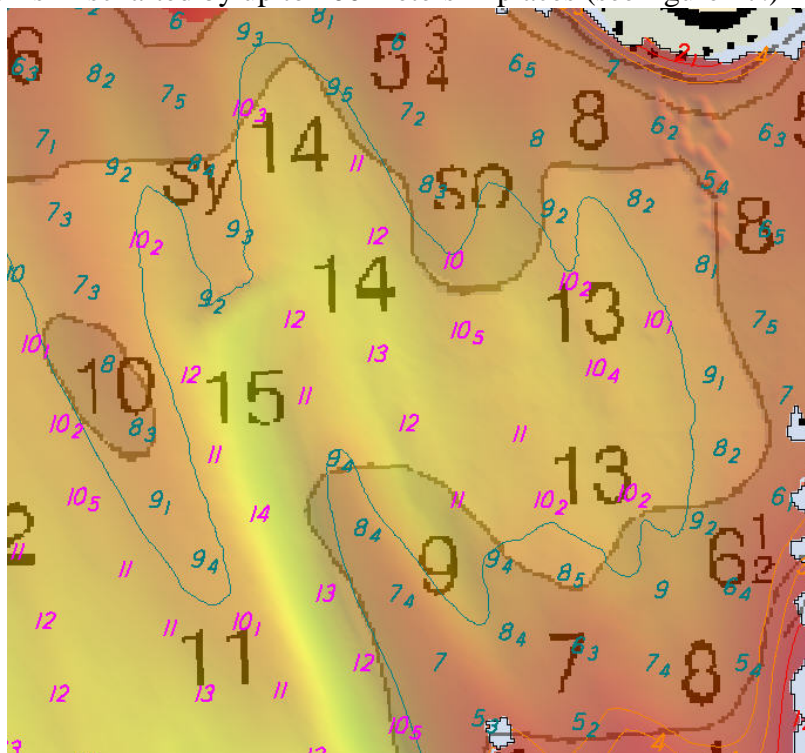


Figure 17: Southwest of Craig Island, 10 fathom contour shown in green

On the north side of Craig Island the 5 fathom contour needs to be adjusted. In this case survey soundings are approximately 2 fathoms deeper than current charted depths (see figure 18).

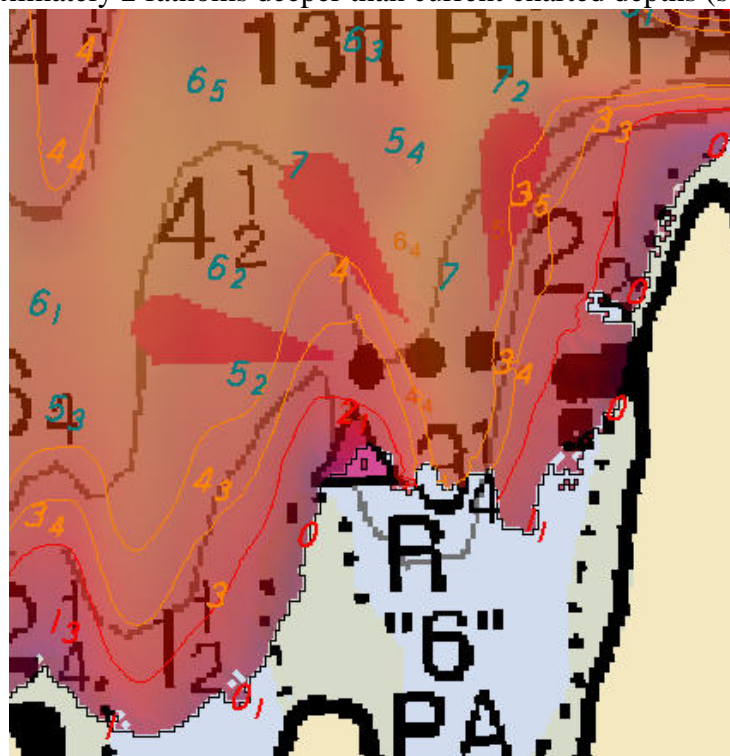


Figure 18: North of Craig Island, 5 fathom contour shown in orange

The 1:10,000 inset, 17405\_2, shows the same offsets in contours as mentioned previously. Survey soundings otherwise agree with charted depths within 1-2 fathoms.

Additional individual items that are considered significant, or were previously addressed by Lidar coverage and have updated depths, are discussed in Pydro and have been submitted in the Field\_verified.hob notebook file.<sup>19</sup>

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.<sup>20</sup>

#### **D.1.b. Dangers to Navigation**

Three (3) Dangers to Navigation (DTONs) were found on survey H12000. One was initially reported to the Marine Chart Division via email on November 11, 2008 as Danger to Navigation Report, H12000, OPR-O190-RA-08. The two additional items were reported on December 17, 2008 as Danger to Navigation #2, H12000, OPR-O190-RA-08. The original DTON submission packages are included in Appendix I. Descriptions of each DTON are included in the Survey Feature Report in Appendix II.<sup>21</sup>

### D.1.c. Other Features

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

No AWOIS items fall the within the survey limits of H12000.<sup>22</sup>

#### Additional Items

An unknown submerged feature is located south of Craig Island. The area appears to be a possible dumping ground. The area begins near the 5 fathom contour and extends south approximately 200m. It consists of a number of shoals. The least depth found on the area is located on the 10 fathom contour (see figure 19 below) and has been submitted as a DTON. The origin of this feature is unknown and the hydrographer has no further information on the source or purpose of the apparent dumping ground.<sup>23</sup>

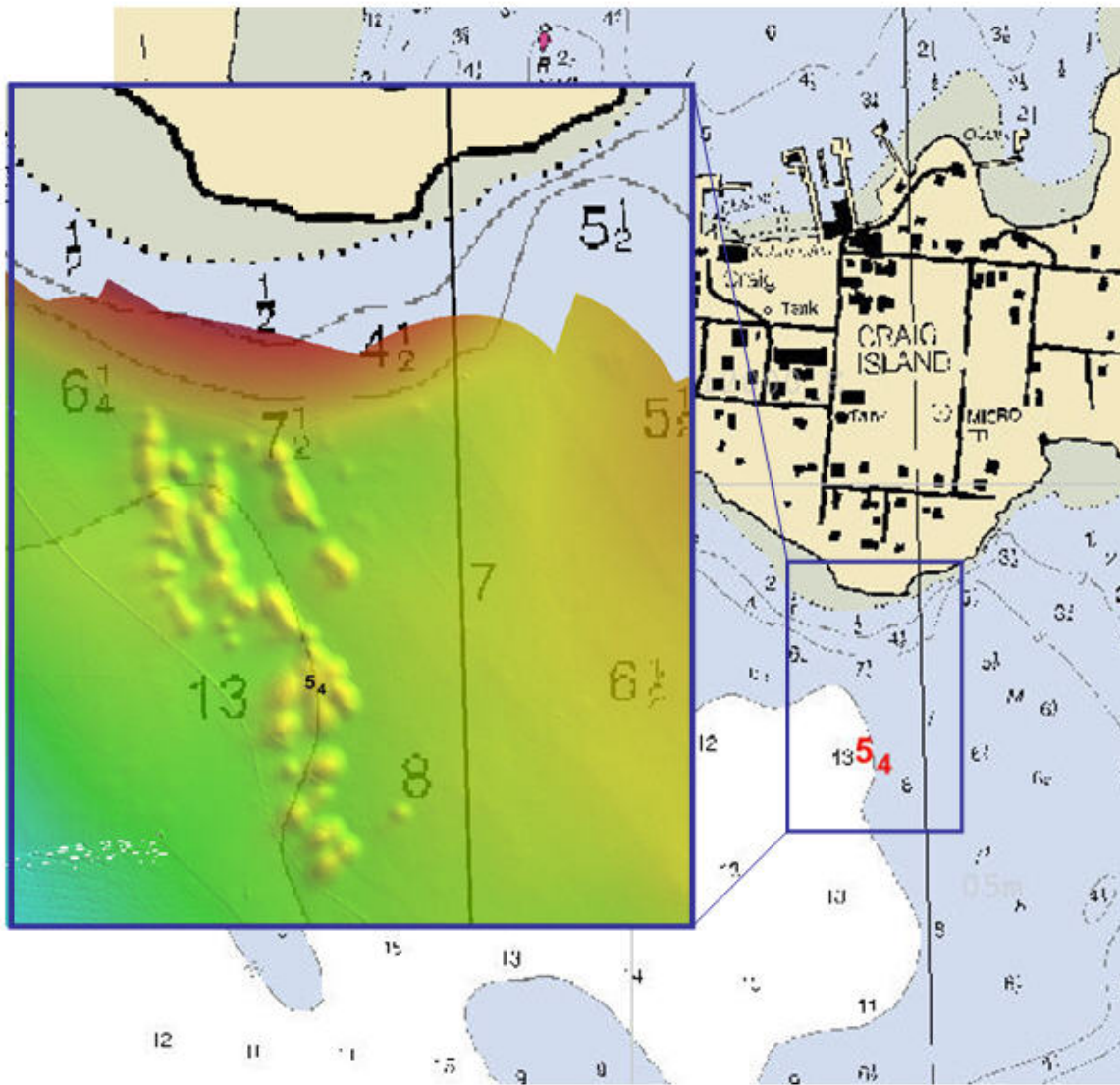
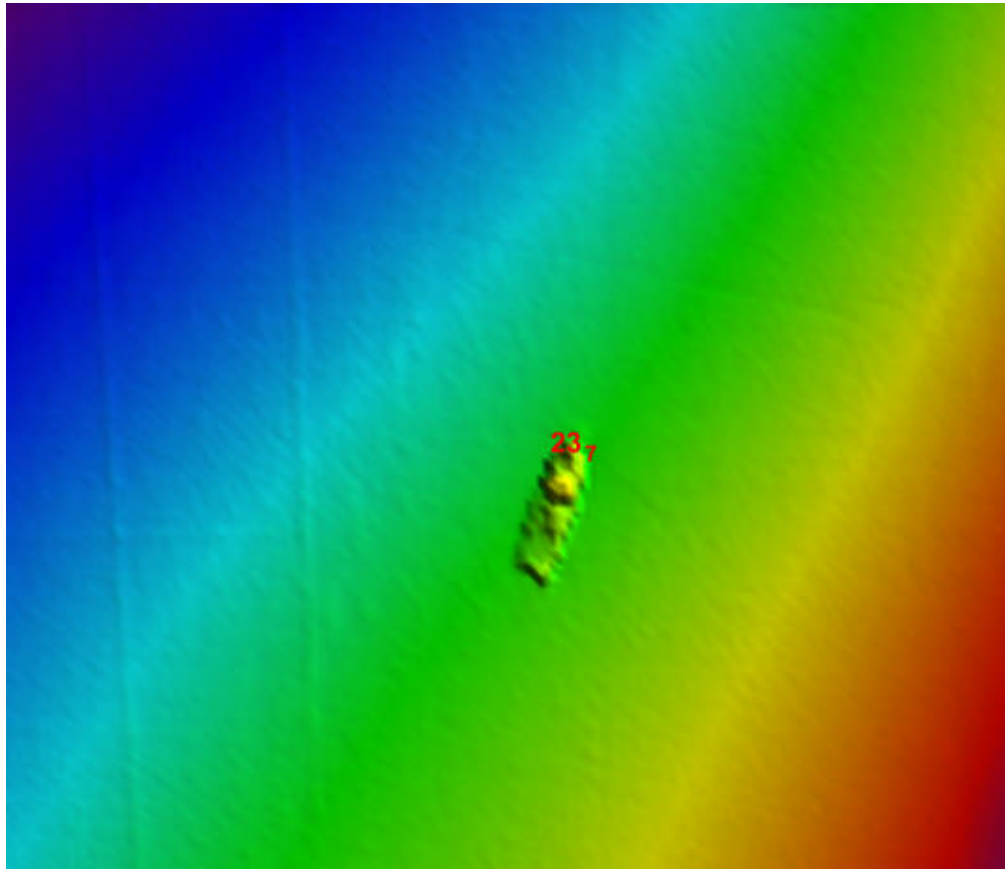


Figure 19: Possible dumping ground south of Craig Island, overlaid on chart 17405\_2.



An uncharted wreck was discovered in the southeastern portion of Klawock Inlet. It is approximately 12 meters in length with a least depth of 23.66 meters. The hydrographer recommends addition to the current chart as a non-dangerous wreck.<sup>24</sup>



*Figure 20: Uncharted wreck as seen in Caris BASE surface*

A floating platform is located north of Craig Island in Klawock inlet. The position has been updated in the H12000\_field\_verified.hob file as a result of the current Lidar survey H11661. Surrounding the platform are six (6) large anchors holding the platform in its current position (see figure 21). All anchors are set approximately 50 meters from the platform itself. Due to the shallow depths in this area and the large scale of the inset chart for the area (chart 17405\_2 at 1:10,000 scale) all six anchors have been marked as obstructions. The southwestern most anchor is located within the approach to the small harbor on the north side of the island. It is 2 fathoms, 1 foot, located on the 3 fathom contour (see figure 22).<sup>25</sup>

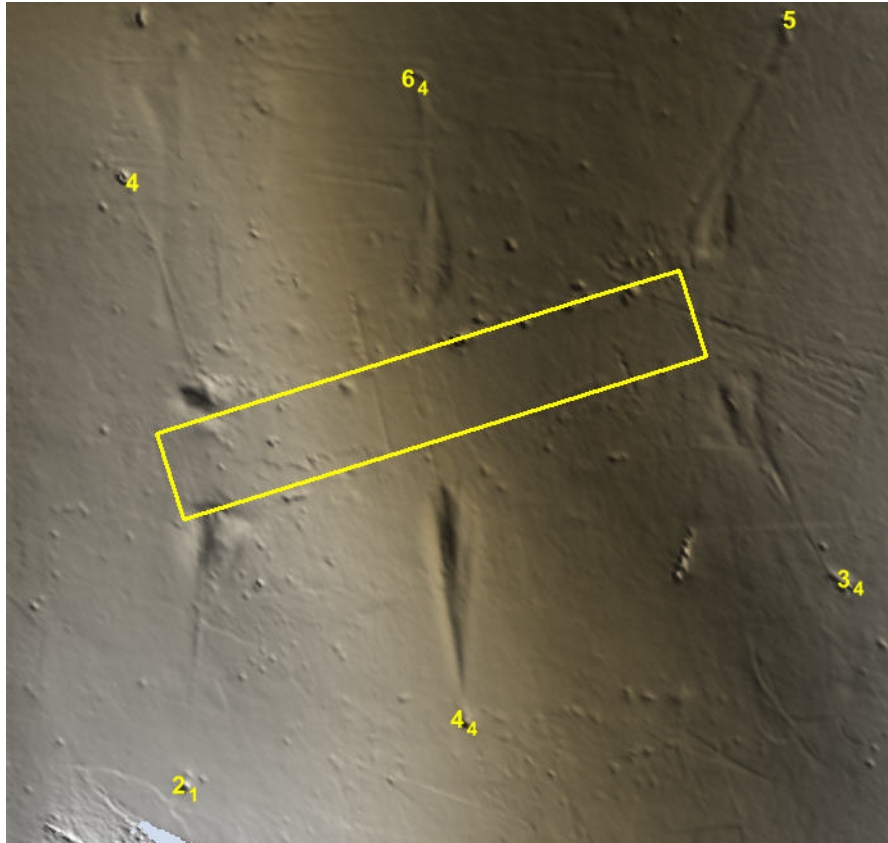


Figure 21: Outline of floating platform shown with soundings on anchors. Soundings are in fathoms.

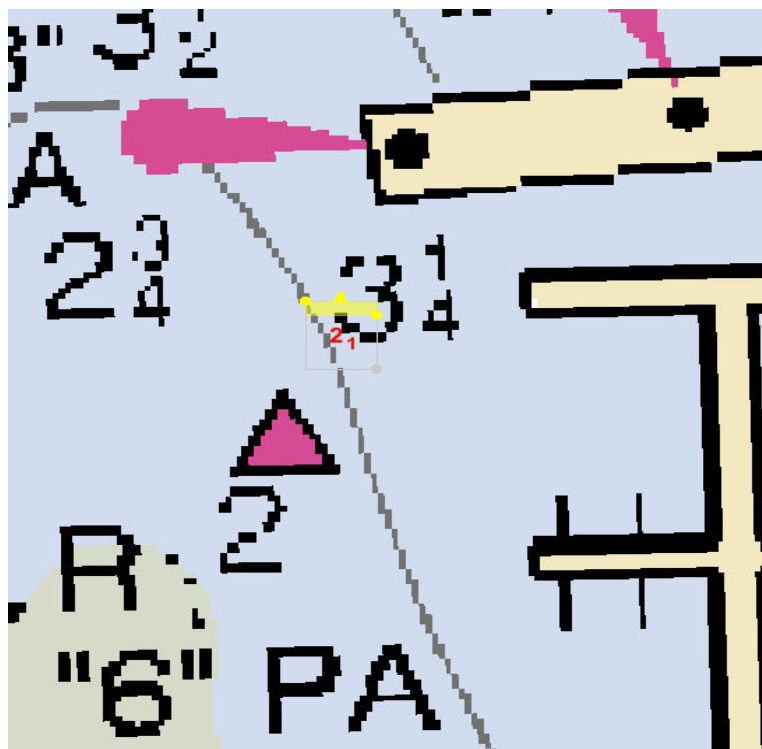


Figure 22: Location of southwestern anchor on chart 17405\_2.

Additional features investigated within the limits of H12000 are described in the Survey Feature Report in Appendix II.<sup>26</sup>

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

### **D.2.a. Prior Survey Comparison**

Prior survey comparison was not performed.

### **D.2.b. Shoreline Verification**

#### Shoreline Source

The Pacific Hydrographic Branch provided *Rainier* with .HOB files containing features from LIDAR survey H11661 selected for further investigation. These were provided as H11661\_LI\_Investigations.hob.

In addition, a composite source file was provided using data from the latest ENC's as well as prior survey features. Photogrammetric survey projects GC-10545, GC-10583, GC-10632 and GC-10633 have been adequately applied to ENC's used in the composite source file. This source shoreline was used for orientation purposes in Hypack and Notebook and on printed boat sheets utilized for investigation of the LIDAR items discussed above.<sup>27</sup>

#### Shoreline Verification

Traditional "limited shoreline verification" was not required for this survey, since the near shore area was covered by junction LIDAR survey H11661 and thus outside the limits of H12000. The following field procedures were followed:

- H12000 LIDAR items selected for further investigation were addressed by visual, Detached Position (DP), VBES, or MBES techniques as appropriate and feasible, near predicted low water. Note that some of these features were located in areas unsafe to approach and/or were considered insignificant to navigation, and were not further investigated.
- All new, charted, and AWOIS items within the limits of H12000 (i.e., offshore of the limits prescribed in the Letter Instructions and discussed in Section A.) were addressed.

In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline, and transferred to the "remrks" attribute on the corresponding features in Notebook. DP forms are included in the Detached Position directory of the *Separates to be Included with Survey Data*.

Investigation methods and recommendations are described in the Pydro "Remarks" and "Recommendations" tabs. Additional information can also be found in the Pydro Feature Report included in Appendix II.

All shoreline data is submitted in Caris Notebook .hob files. The session H12000\_NTBK.wrk contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H12000_CompSource.hob	Original Source Data and Lidar investigation items as provided for project OPR-O190-RA-08 and filtered to the limits of survey H12000
H12000_lidar_extents.hob	Extents of Lidar junction survey H11661
H12000_Field_Verified.hob	Field verified source features and shoreline, and Lidar investigations items that were not accessible for investigation
H12000_Deleted_Source.hob	Composite Source and Lidar Investigation items that were deleted or modified

*Table 7: List and Description of Notebook HOB files.*

#### Source Shoreline Changes and New Features

Items for survey H12000 that require further discussion and are associated with a detached position, have been flagged “Report” in Pydro in H12000.pss. Investigation methods and recommendations are listed in the Remarks and Recommendation tabs. These features are included in the Survey Feature Report in Appendix II.

#### Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the CFF and charts as described above.<sup>28</sup>

#### **D.2.c. Aids to Navigation**

All aids to navigation (ATONs) were found to be correctly charted and serving their intended purpose.<sup>29</sup>

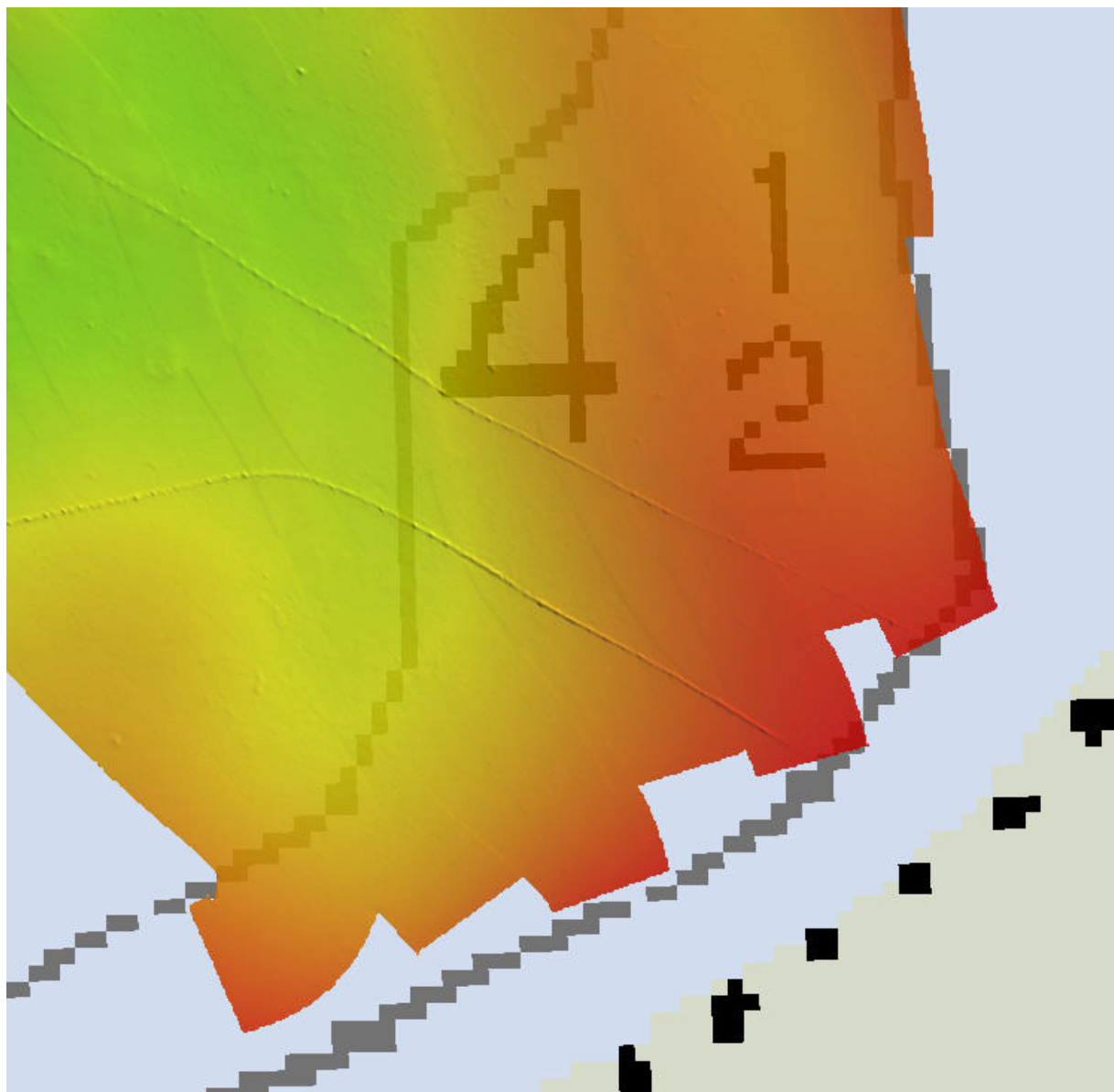
#### **D.2.d. Overhead Features**

There are no overhead features within the limits of survey H12000.<sup>30</sup>



### D.2.e. Submarine Cables and Pipelines

Although there are no charted submarine cables or pipelines within the limits of H12000, two pipelines were detected in the bathymetry south of Craig Island. They appear in the bay leading to Shelter Cover between Craig and Port Bagial. A high resolution Caris BASE surface was used to digitize the pipelines in Notebook. They are submitted within the file H12000\_Field\_Verified.hob.<sup>31</sup>



*Figure 23: H12000 pipelines*

**D.2.f. Ferry Routes**

There are no ferry routes charted within the limits of survey H12000, and none were observed to be operating in the area.<sup>32</sup>

**D.2.g. Bottom Samples**

Bottom samples were not performed in survey H12000.<sup>33</sup>

**D.2.h. Other Findings**

There are no other findings to report for survey H12000.

**E. APPROVAL**

As Chief of Party, Field operations for hydrographic survey H12000 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2008 edition), Field Procedures Manual (May 2008 edition), Project Instructions, and all HSD Technical Directives issued through November 2008. 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.

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-O190-RA-08 (Fall)	<i>To be submitted under separate cover</i>	N/CS34
Coast Pilot Report for OPR-O190-RA-08	<i>To be submitted under separate cover</i>	N/CS26
Horizontal and Vertical Control Report for OPR-O190-RA-08	<i>To be submitted under separate cover</i>	N/CS34

Approved and Forwarded:



CAPT Donald W. Haines, NOAA  
2009.03.19 10:39:06 -07'00'

Captain Donald W. Haines, NOAA  
Commanding Officer

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



Amy Riley  
2009.03.19  
08:30:58 -07'00'

Survey Sheet Manager:

Amy Riley  
Senior Survey Technician, NOAA Ship *Rainier*



James B Jacobson  
I have reviewed this document  
2009.03.19 09:15:08 -07'00'

Chief Survey Technician:

James B. Jacobson  
Chief Survey Technician, NOAA Ship *Rainier*



I have reviewed this document  
2009.03.19 09:15:57 -07'00'

Field Operations Officer:

Lieutenant Charles Yoos, NOAA  
Field Operations Officer

**Revisions and Corrections Compiled During Office Processing and Certification**

<sup>1</sup> Concur.

<sup>2</sup> Concur. Common junctions have been established between HCell H12000 and HCell H11851, H11852, H12026, H12027, and H12030. A portion of Lidar survey H11661 and H11660 were compiled concurrently with H12000 and are included in the HCell.

<sup>3</sup> Concur. Higher differences are expected in these cases. The data is adequate for charting.

<sup>4</sup> Concur. The kelp features in the area have been imported into the HCell to be retained.

<sup>5</sup> Concur with hydrograher comments reported above.

<sup>6</sup> Concur.

<sup>7</sup> Concur with clarification, these holidays were deemed insignificant and were not preserved in the HCell.

<sup>8</sup> Concur. A submerged rock is included in the HCell.

<sup>9</sup> Concur with clarification. In the area of the holiday, a kelp symbol is placed in the HCell.

<sup>10</sup> Concur. The data is adequate for charting.

<sup>11</sup> Concur.

<sup>12</sup> Concur.

<sup>13</sup> Concur.

<sup>14</sup> A 4-meter combined surface was created during the SAR and was used as the basis of compilation.

<sup>15</sup> See attached Tide Note dated January 14, 2009.

<sup>16</sup> Survey H12000 was compiled to chart 17405 16<sup>th</sup> edition, October 2008 ( Notice to Mariners: 10/23/2010)

<sup>17</sup> Concur with clarification, the depth difference is due to the small scale of the chart.

<sup>18</sup> Concur with all chart comparison results with chart 17405 reported by the hydrographer. Chart depths as depicted in the HCell.

<sup>19</sup> Concur with clarification. The submitted .hob file was used in the compilation of HCell H12000. During compilation some modifications were made to accommodate chart scale.

<sup>20</sup> Concur.

<sup>21</sup> Dton report is appended to this report. All Dtons have been applied to the chart and all are included in the HCell.

<sup>22</sup> Concur. New features recommended for AWOIS database were found. See endnote 24.

<sup>23</sup> Concur. The suspected dumping ground is included in the HCell as an obstruction area.

<sup>24</sup> Concur. The wreck is included in the HCell. The location of the wreck is 55°30'11.05" N, 133°08'12.91" W. Another uncharted wreck not mentioned in the DR is included in the HCell. The least depth of this wreck is 4.01 meters and is located in 55°28'54.82" N 133°08'34.25" W. It is recommended that the two wrecks be added to the AWOIS database.

<sup>25</sup> Concur with clarification, only one of the anchors is depicted as an obstruction and three are depicted as soundings on the HCell due to chart scale and space limitation on the raster chart.

<sup>26</sup> See attached feature report. Note: the survey feature report does not include all features from H12000. Additional features were added, some removed, and some modified in CARIS Notebook after the feature report was generated from Pydro. All features included in the compilation of H12000 have come directly from CARIS Notebook, which is the official features deliverable for this survey.

<sup>27</sup> No Lidar data included in HCell H12000 supersede shoaler charted data or have been used to disprove charted features.

<sup>28</sup> Concur with clarification. The submitted .hob files were used in the compilation of HCell H12000. During compilation some modifications were made to accommodate chart scale. It is recommended that features be charted as depicted in the HCell.

<sup>29</sup> Concur. Chart per latest ATONIS information.



<sup>30</sup> Concur.

<sup>31</sup> The features that appear to be submarine pipeline/cable have been reported via email to ocs.ndb@noaa.gov on 4/15/2011, and are included in the HCell as linear blue notes (\$LINES).

<sup>32</sup> Concur.

<sup>33</sup> Concur. Charted bottom samples were retained in the HCell.

# H12000 DTON Report

**Registry Number:** H12000  
**State:** Alaska  
**Locality:** West of Prince of Wales Island  
**Sub-locality:** Klawock Inlet  
**Project Number:** OPR-O190-RA-08  
**Survey Date:** 11/04/2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	15th	05/01/2006	1:40,000 (17405_1)	USCG LNM: 10/23/2007 (03/04/2008) CHS NTM: None (02/29/2008) NGA NTM: None (03/08/2008)
17400	17th	03/01/2007	1:229,376 (17400_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	0.22 m	55° 29' 25.2" N	133° 11' 23.5" W	---

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 752/234 from h12000 / 1101\_reson8125\_hvf / 2008-309 / 303\_1656

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 29' 25.2" N, 133° 11' 23.5" W  
**Least Depth:** 0.22 m (= 0.72 ft = 0.120 fm = 0 fm 0.72 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.971$  m ; TVU (TPEv)  $\pm 0.866$  m  
**Timestamp:** 2008-309.16:58:50.297 (11/04/2008)  
**Survey Line:** h12000 / 1101\_reson8125\_hvf / 2008-309 / 303\_1656  
**Profile/Beam:** 752/234  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

Uncharted rock found with MBES. Least depth found was 0.2m, heavy kelp covering top of feature. Extends from least acquired depth approximately 100m in the NW direction.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/1101_reson8125_hvf/2008-309/303_1656	752/234	0.00	000.0	Primary

#### Hydrographer Recommendations

Hydrographer recommends charting shoal point as rock awash.

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

0fm (17405\_1, 17400\_1, 16016\_1, 530\_1)

0fm 0ft (531\_1)

.2m (500\_1, 501\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20081109

SORIND - US, US, Survy, H12000

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

VALSOU - 0.220 m

VERDAT - 12:Mean lower low water

WATLEV - 5:awash



## Feature Images

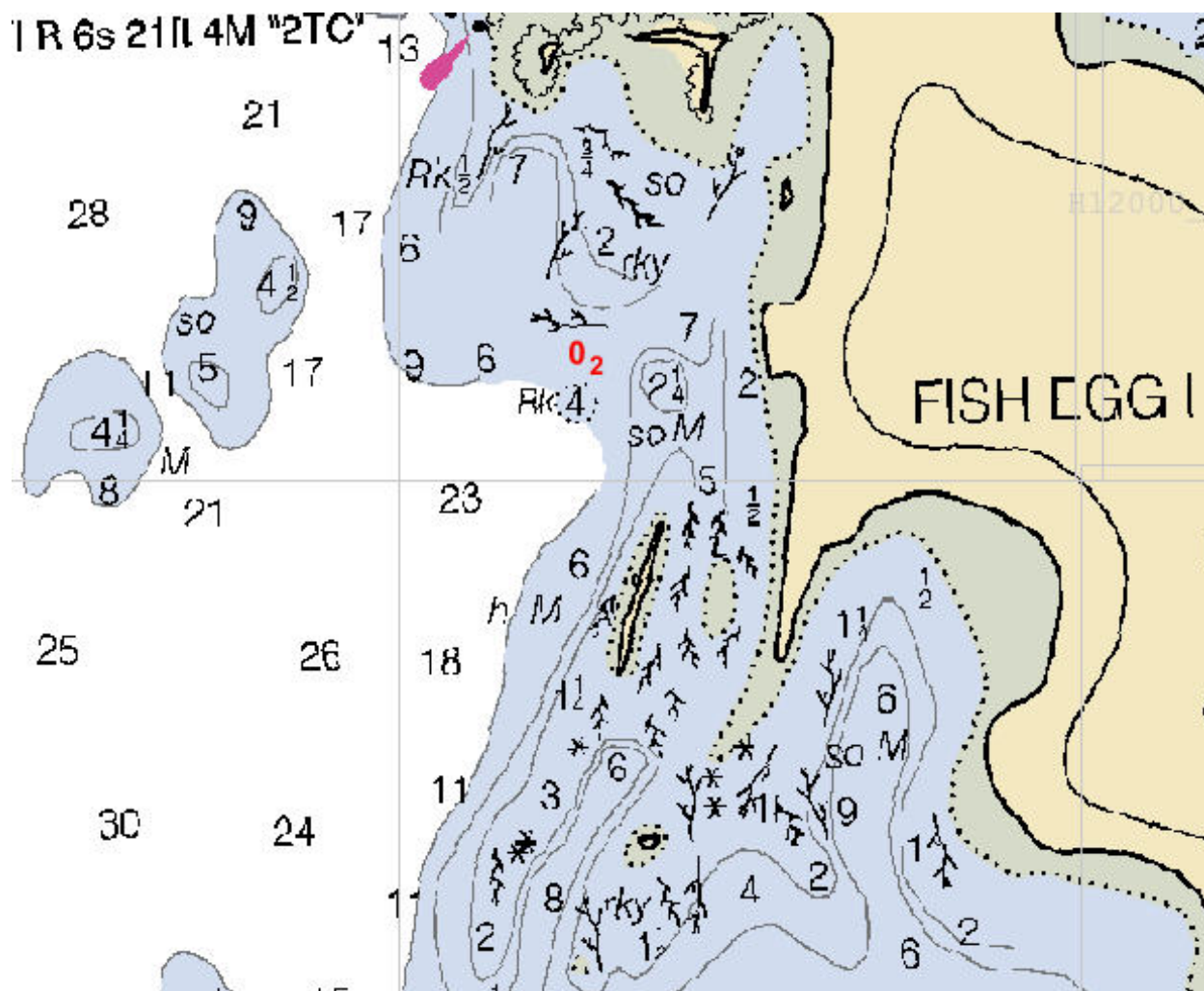
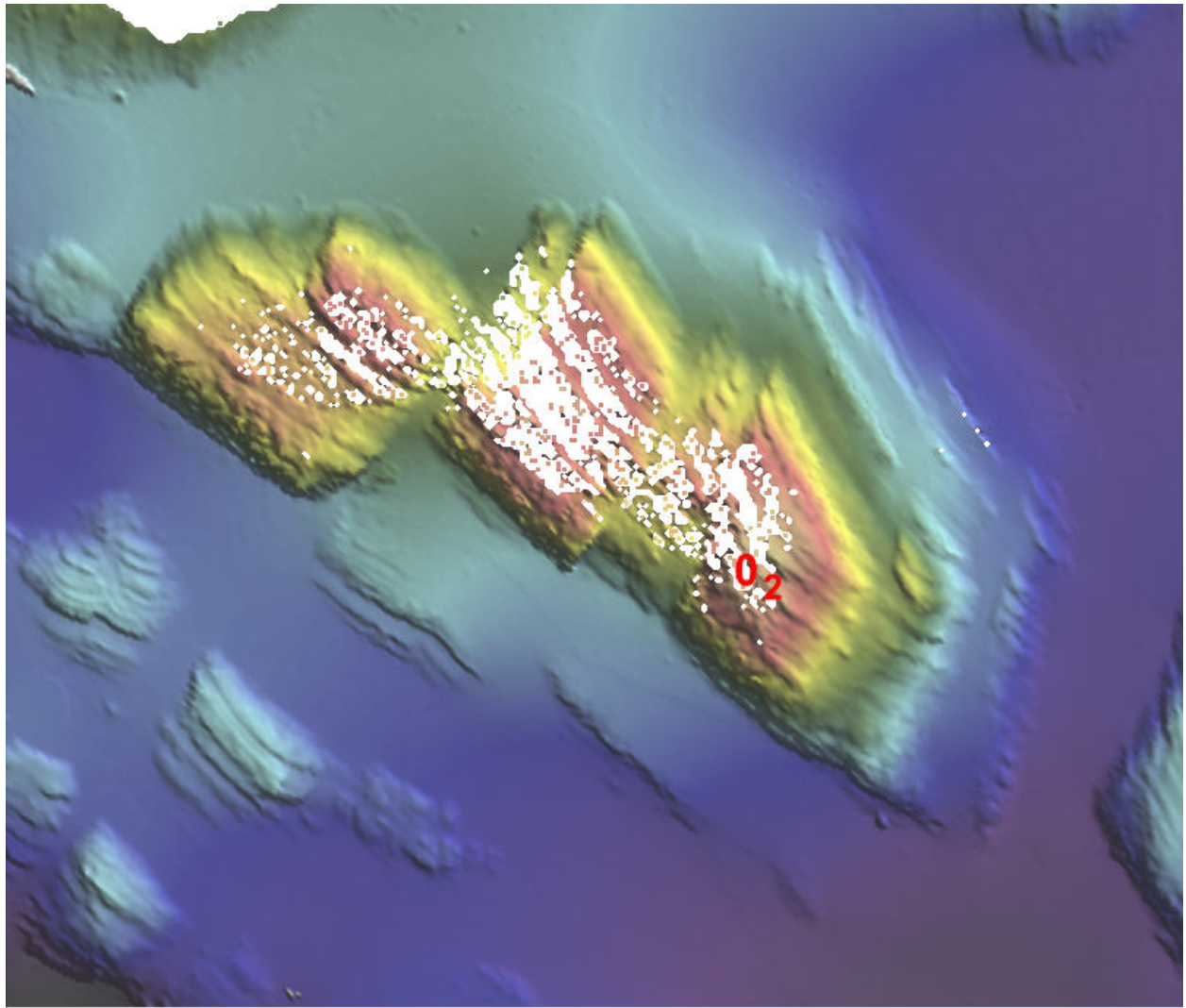


Figure 1.1.1



*Figure 1.1.2*

# H12000 DTON Report

**Registry Number:** H12000  
**State:** Alaska  
**Locality:** West of Prince of Wales Island  
**Sub-locality:** Klawock Inlet  
**Project Number:** OPR-O190-RA-08  
**Survey Dates:** October 21, 2008 - November 9, 2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	15th	05/01/2006	1:10,000 (17405_2)	[L]NTM: ?
17405	15th	05/01/2006	1:40,000 (17405_1)	USCG LNM: 10/23/2007 (03/04/2008) CHS NTM: None (02/29/2008) NGA NTM: None (03/08/2008)
17400	17th	03/01/2007	1:229,376 (17400_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Obstruction	10.49 m	55° 28' 17.8" N	133° 09' 03.2" W	---
1.2	Rock	4.28 m	55° 30' 54.9" N	133° 09' 33.2" W	---

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 823/179 from h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-304 / 906\_2233

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 28' 17.8" N, 133° 09' 03.2" W  
**Least Depth:** 10.49 m (= 34.41 ft = 5.735 fm = 5 fm 4.41 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.963$  m ; TVU (TPEv)  $\pm 0.232$  m  
**Timestamp:** 2008-304.22:34:54.197 (10/30/2008)  
**Survey Line:** h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-304 / 906\_2233  
**Profile/Beam:** 823/179  
**Charts Affected:** 17405\_2, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

Shoal point on unknown underwater feature. Appears to be a possible dump site. Does not appear to be a rocky area. Least depth is approximately 5.73 fathoms, located on the 10 fathom contour. Area starts near 5 fathom contour and extends approximately 200m in the SSW direction.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/2801_reson7125_hf_512_hysweep/2008-304/906_2233	823/179	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart shoal sounding as point obstruction. Use current bathymetry to update charted (17405) depths and contours.

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

5  $\frac{3}{4}$ fm (17405\_2, 17405\_1, 17400\_1, 16016\_1, 530\_1)

5fm 4ft (531\_1)

10.5m (500\_1, 501\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20081109



SORIND - US, US, Survy, H12000

TECSOU - 3:found by multi-beam

VALSOU - 10.488 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

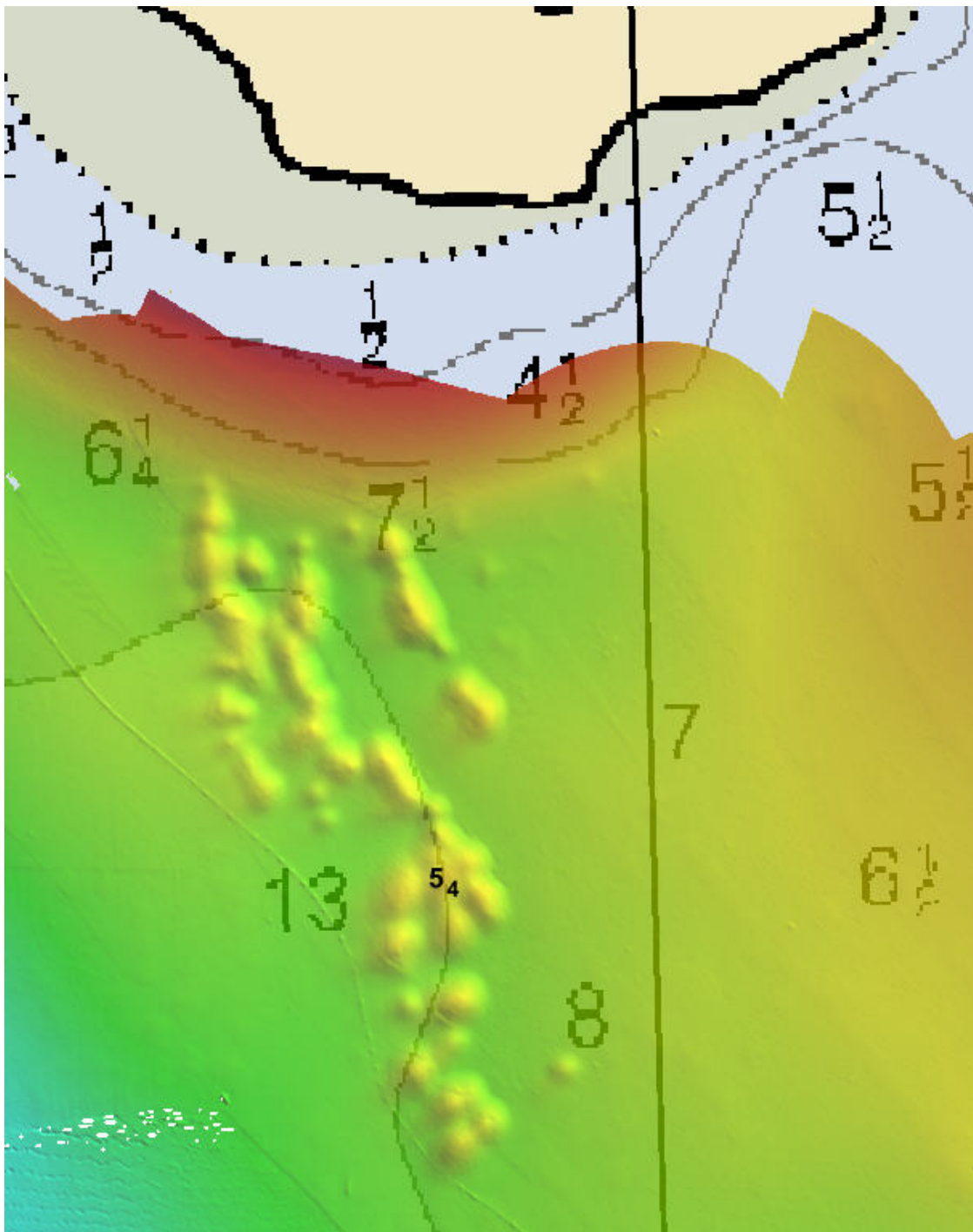


Figure 1.1.1

## 1.2) Profile/Beam - 173/13 from h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-309 / 000a2233

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 30' 54.9" N, 133° 09' 33.2" W  
**Least Depth:** 4.28 m (= 14.06 ft = 2.343 fm = 2 fm 2.06 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.963$  m ; TVU (TPEv)  $\pm 0.234$  m  
**Timestamp:** 2008-309.22:34:19.135 (11/04/2008)  
**Survey Line:** h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-309 / 000a2233  
**Profile/Beam:** 173/13  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Rock outcropping extends from shore. Sounding on endpoint, approximately 2 fathoms outside of 5 fathom contour.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/2801_reson7125_hf_512_hysweep/2008-309/000a2233	173/13	0.00	000.0	Primary

#### Hydrographer Recommendations

Modify contours and update soundings to reflect current bathymetry

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

2 ¼fm (17405\_1, 17400\_1, 16016\_1, 530\_1)

2fm 2ft (531\_1)

4.3m (500\_1, 50\_1)

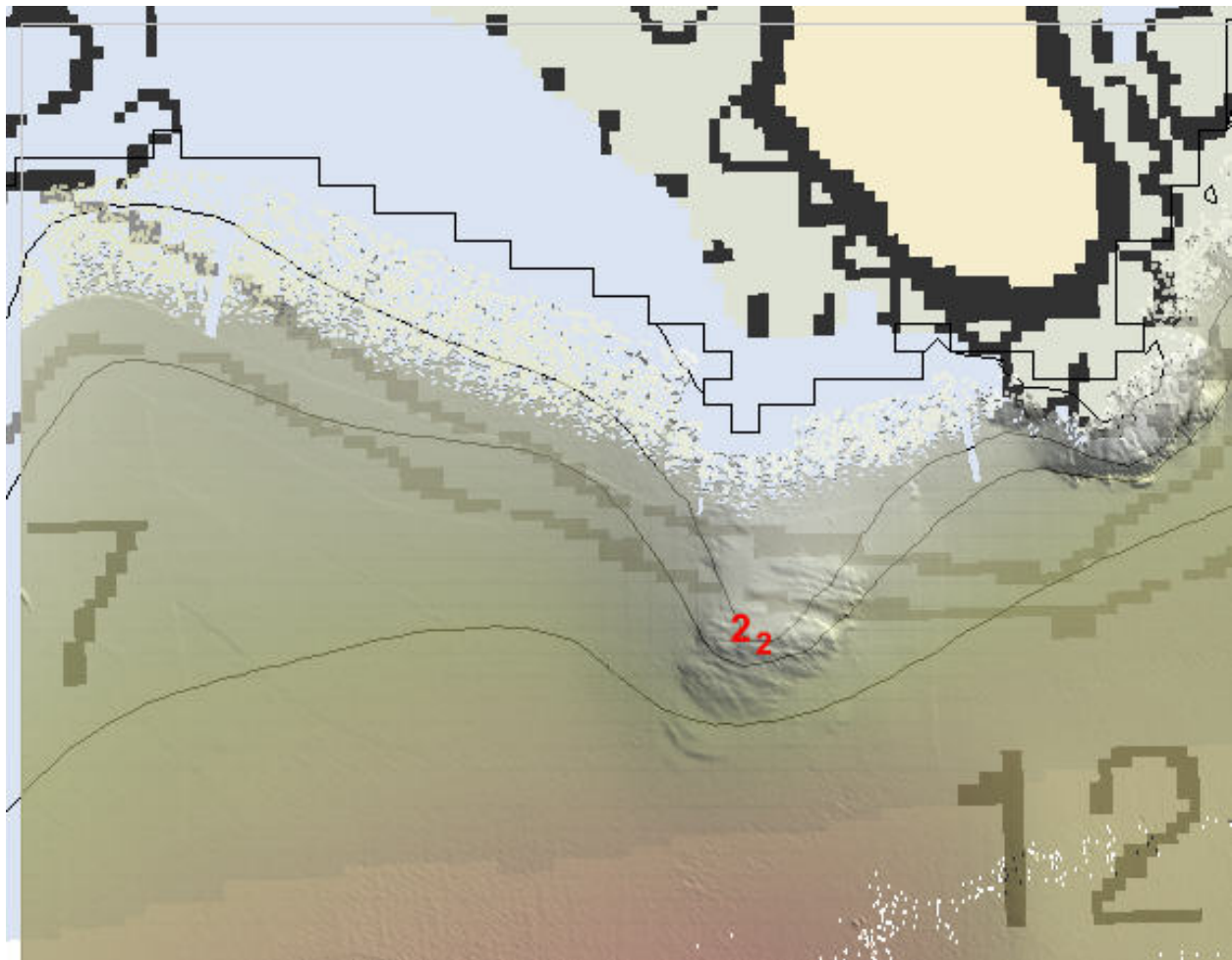
#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20081109

SORIND - US, US, Survy, H12000

STATUS - 1:permanent

TECSOU - 3:found by multi-beam

**Feature Images***Figure 1.2.1*



# H12000\_Feature\_Report

**Registry Number:** H12000  
**State:** Alaska  
**Locality:** West of Prince of Wales Island  
**Sub-locality:** Klawock Inlet  
**Project Number:** OPR-O190-RA-08  
**Survey Dates:** October 21, 2008 - November 9, 2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	15th	05/01/2006	1:10,000 (17405_2)	[L]NTM: ?
17405	15th	05/01/2006	1:40,000 (17405_1)	USCG LNM: 10/23/2007 (03/04/2008) CHS NTM: None (02/29/2008) NGA NTM: None (03/08/2008)
17400	17th	03/01/2007	1:229,376 (17400_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Wreck	23.71 m	55° 30' 11.1" N	133° 08' 12.9" W	---
1.2	Rock	7.96 m	55° 29' 38.0" N	133° 11' 34.1" W	---
1.3	Obstruction	4.03 m	55° 28' 49.4" N	133° 08' 42.6" W	---
1.4	Shoal	6.45 m	55° 31' 43.1" N	133° 07' 02.0" W	---

## **1 - New Features**

## 1.1) Profile/Beam - 1055/1 from h12000 / 1021\_reson8101\_hvf / 2008-285 / 000\_2334

### Survey Summary

**Survey Position:** 55° 30' 11.1" N, 133° 08' 12.9" W  
**Least Depth:** 23.71 m (= 77.80 ft = 12.966 fm = 12 fm 5.80 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.380$  m ; TVU (TPEv)  $\pm 0.286$  m  
**Timestamp:** 2008-285.23:39:24.722 (10/11/2008)  
**Survey Line:** h12000 / 1021\_reson8101\_hvf / 2008-285 / 000\_2334  
**Profile/Beam:** 1055/1  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

least depth on submerged non-dangerous wreck. Wreck is uncharted, approximately 12 meters in length.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/1021_reson8101_hvf/2008-285/000_2334	1055/1	0.00	000.0	Primary

### Hydrographer Recommendations

Chart as non-dangerous wreck, least depth known

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

13fm (17405\_1, 17400\_1, 16016\_1, 530\_1)

13fm (531\_1)

24m (500\_1, 50\_1)

### S-57 Data

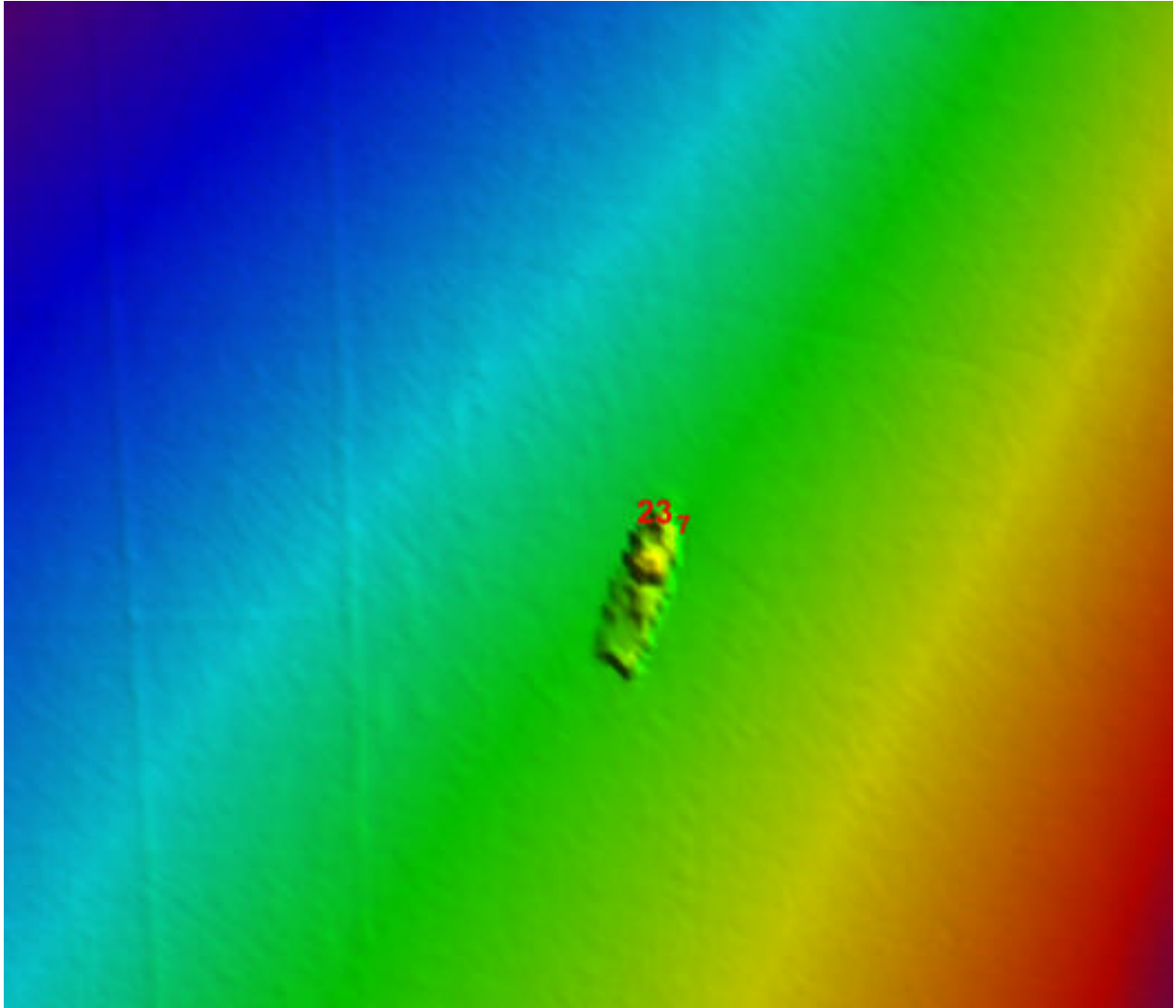
**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 1:non-dangerous wreck  
 QUASOU - 1:depth known  
 SORDAT - 20081109  
 SORIND - US, US, Survy, H12000  
 TECSOU - 3:found by multi-beam

VALSOU - 23.713 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Feature Images



*Figure 1.1.1*



## 1.2) Profile/Beam - 1642/260 from h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-303 / 000\_2203

### Survey Summary

**Survey Position:** 55° 29' 38.0" N, 133° 11' 34.1" W  
**Least Depth:** 7.96 m (= 26.12 ft = 4.353 fm = 4 fm 2.12 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.962$  m ; TVU (TPEv)  $\pm 0.230$  m  
**Timestamp:** 2008-303.22:05:59.731 (10/29/2008)  
**Survey Line:** h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-303 / 000\_2203  
**Profile/Beam:** 1642/260  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

Shoal point on rock outcropping

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/2801_reson7125_hf_512_hysweep/2008-303/000_2203	1642/260	0.00	000.0	Primary

### Hydrographer Recommendations

update chart with shoal sounding using current bathymetry

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

4 ¼fm (17405\_1, 17400\_1, 16016\_1, 530\_1)

4fm 2ft (531\_1)

8.0m (500\_1, 501\_1, 50\_1)

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20081109  
 SORIND - US, US, Survy, H12000

### 1.3) Profile/Beam - 986/169 from h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-311 / 911\_1809

#### Survey Summary

**Survey Position:** 55° 28' 49.4" N, 133° 08' 42.6" W  
**Least Depth:** 4.03 m (= 13.23 ft = 2.205 fm = 2 fm 1.23 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.961$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2008-311.18:10:35.062 (11/06/2008)  
**Survey Line:** h12000 / 2801\_reson7125\_hf\_512\_hysweep / 2008-311 / 911\_1809  
**Profile/Beam:** 986/169  
**Charts Affected:** 17405\_2, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

unknown obstruction located in approach to small harbor on the northern side of Craig Island. No identifying image in available backscatter imagery.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/2801_reson7125_hf_512_hysweep/2008-311/911_1809	986/169	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart as obstruction

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

2 ¼fm (17405\_2, 17405\_1, 17400\_1, 16016\_1, 530\_1)

2fm 1ft (531\_1)

4.0m (500\_1, 501\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20091109  
 SORIND - US, US, Survy, H12000  
 TECSOU - 3:found by multi-beam

VALSOU - 4.033 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

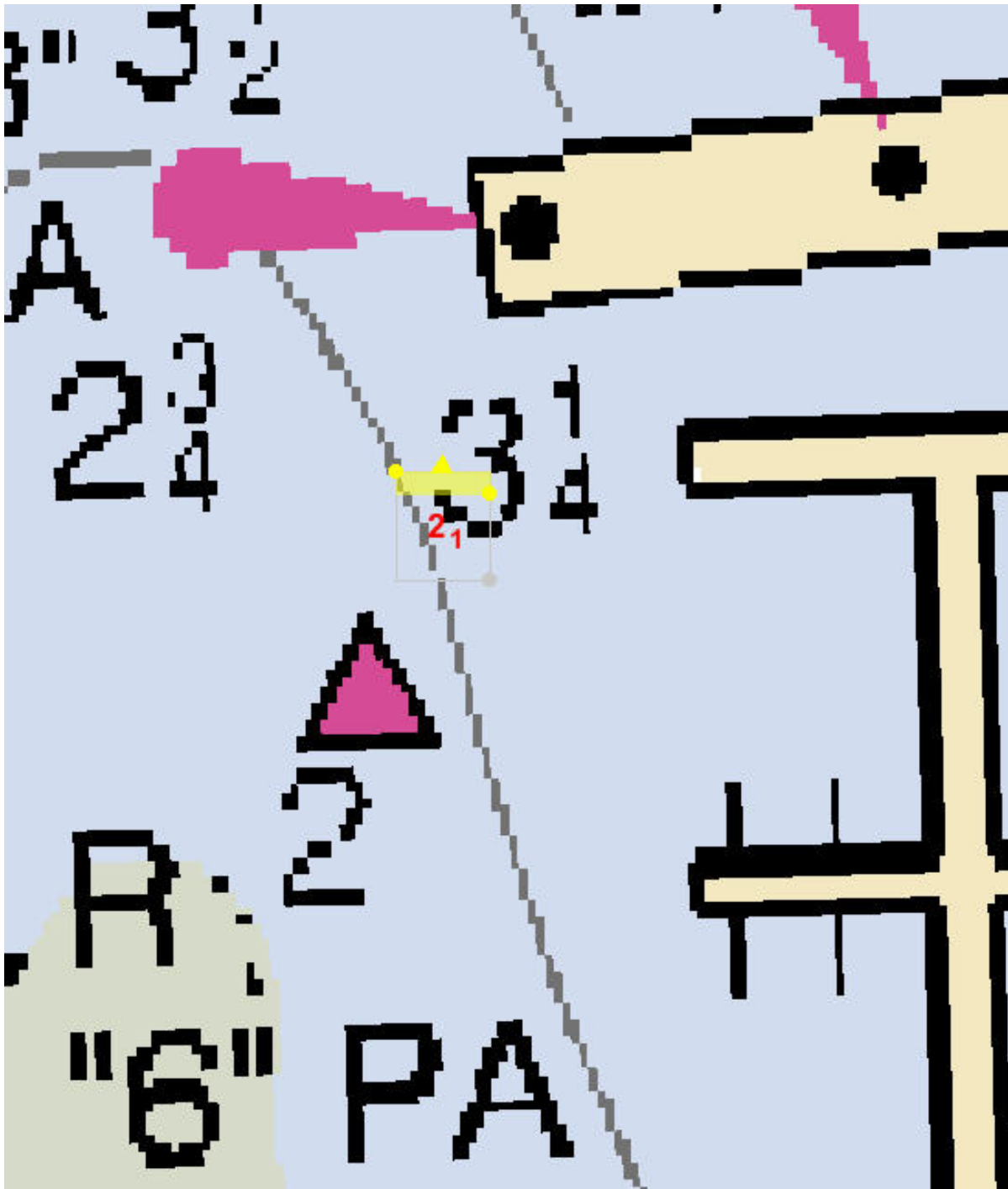
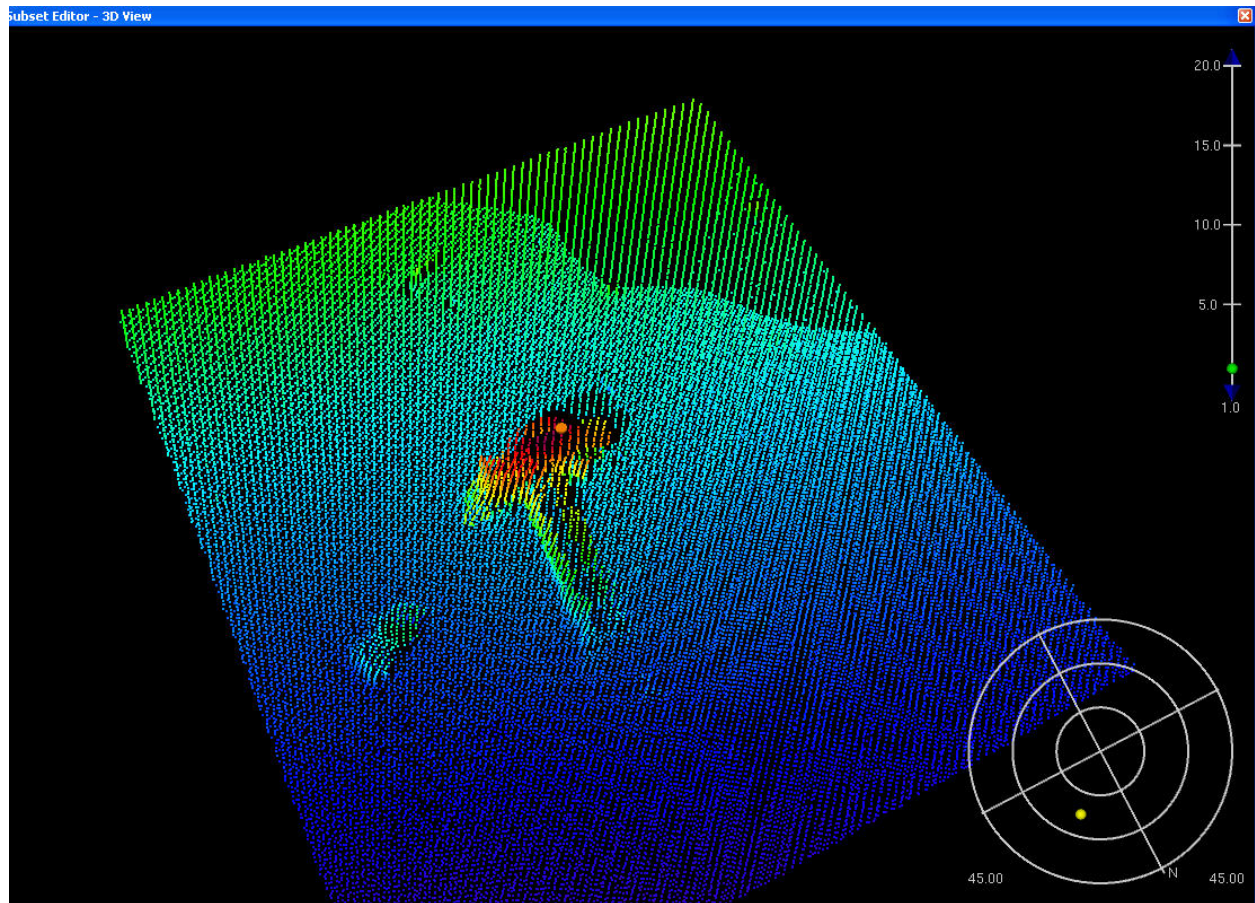


Figure 1.3.1

*Figure 1.3.2*

## 1.4) Profile/Beam - 485/202 from h12000 / 2802\_reson7125\_hf\_512beams\_hysweep / 2008-285 / 000\_2344

### Survey Summary

**Survey Position:** 55° 31' 43.1" N, 133° 07' 02.0" W  
**Least Depth:** 6.45 m (= 21.16 ft = 3.526 fm = 3 fm 3.16 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.961$  m ; TVU (TPEv)  $\pm 0.231$  m  
**Timestamp:** 2008-285.23:44:45.768 (10/11/2008)  
**Survey Line:** h12000 / 2802\_reson7125\_hf\_512beams\_hysweep / 2008-285 / 000\_2344  
**Profile/Beam:** 485/202  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

designated sounding on shoal that extends from shore

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12000/2802_reson7125_hf_512beams_hysweep/2008-285/000_2344	485/202	0.00	000.0	Primary

### Hydrographer Recommendations

use current bathymetry to update CHD(17405) soundings and contours

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

3 ½fm (17405\_1, 17400\_1, 16016\_1, 530\_1)

3fm 3ft (531\_1)

6.4m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20081109  
 SORIND - US, US, Survy, H12000

## Feature Images

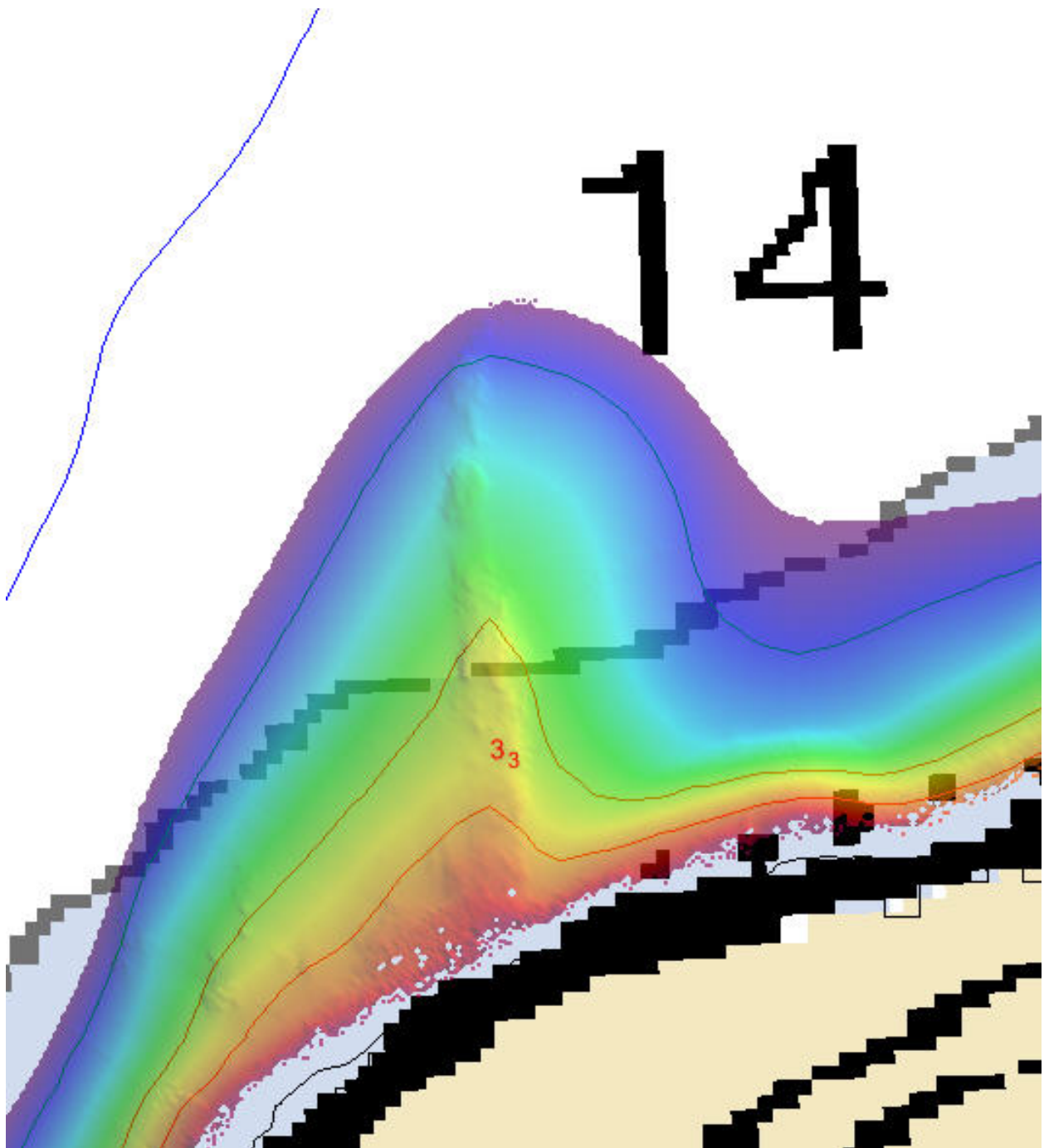


Figure 1.4.1





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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** January 14, 2009

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-O190-RA-2008  
**HYDROGRAPHIC SHEET:** H120000

**LOCALITY:** Klawock Inlet, West of Prince of Wales Island, AK  
**TIME PERIOD:** October 11 - November 9, 2008

**TIDE STATION USED:** 945-0618 Shinaku Inlet, AK  
Lat. 55° 35.6'N Long. 133° 09.1' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.813 meters

**REMARKS: RECOMMENDED ZONING**  
Use zone(s) identified as: SA229 & SA250

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).

**Peter J. Stone**  
Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS,  
email=peter.stone@noaa.gov, c=US  
Date: 2009.01.16 09:04:13 -05'00'

CHIEF, OCEANOGRAPHIC DIVISION



**Final Tidal Zoning for  
OPR-O190-RA-2008, H12000  
West of Prince of Wales Island**

UNITED STATES  
ALASKA - SOUTHEAST COAST  
WEST COAST OF PRINCE OF WALES ISLAND  
ULLOA CHANNEL TO SAN CRISTOVAL CHANNEL

9450618 SHINAKU INLET

SA229  
Time Corrector 0 mins  
Range Corrector x1.00  
Reference 9450618

SA250  
Time Corrector 0 mins  
Range Corrector x1.01  
Reference 9450618

SOUNDINGS IN FATHOMS

**Final Tidal Zoning for  
OPR-O190-RA-2008, H12000  
West of Prince of Wales Island**

UNITED STATES  
ALASKA - SOUTHEAST COAST  
WEST COAST OF PRINCE OF WALES ISLAND  
**ULLOA CHANNEL TO SAN CRISTOVAL CHANNEL**

(chart 17404)

SOUNDINGS IN FATHOMS

**9450618 SHINAKU INLET**

**SA229**  
Time Corrector 0 mins  
Range Corrector x1.00  
Reference 9450618

**SA250**  
Time Corrector 0 mins  
Range Corrector x1.01  
Reference 9450618

**Final Tidal Zoning for  
OPR-O190-RA-2008, H12000  
West of Prince of Wales Island**

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**ULLOA CHANNEL TO SAN CRISTOVAL CHANNEL**

(chart 17404)

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**SA229**  
Time Corrector 0 mins  
Range Corrector x1.00  
Reference 9450618

**SA250**  
Time Corrector 0 mins  
Range Corrector x1.01  
Reference 9450618

**Final Tidal Zoning for  
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West of Prince of Wales Island**

UNITED STATES  
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SA250  
Time Corrector 0 mins  
Range Corrector x1.01  
Reference 9450618

SOUNDINGS IN FATHOMS

TONOWEK BAY  
Salt Lake  
Cullebra Is.  
St Philip  
Blanqui  
SAN FERNANDO I.  
SAN ALBERTO  
SAN JUAN BAUTISTA  
PORT ST NICHOLAS

PRINCE OF WALES I.  
WADLEIGH I.  
RELI BAY

(chart 17404)

**Final Tidal Zoning for  
OPR-O190-RA-2008, H12000  
West of Prince of Wales Island**

UNITED STATES  
ALASKA - SOUTHEAST COAST  
WEST COAST OF PRINCE OF WALES ISLAND  
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SOUNDINGS IN FATHOMS

TONOWEK BAY  
Salt Lake  
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SAN ALBERTO  
SAN JUAN BAUTISTA  
PORT ST NICHOLAS

PRINCE OF WALES I.  
WADLEIGH I.  
RELI BAY

(chart 17404)

**H12000 HCell Report**  
Toshi Wozumi, Physical Scientist  
Pacific Hydrographic Branch

**1. Specifications, Standards and Guidance Used in HCell Compilation**

HCell compilation of survey H12000 used:

Office of Coast Survey HCell Specifications: Version: 4.0, 2 June, 2010.

HCell Reference Guide: Version 2.0, 2 June, 2010.

**2. Compilation Scale**

Depths and features for HCell H12000 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17405	1:40,000	16th	10/01/2008	10/23/2010
17405 (inset)	1:10,000	16th	10/01/2008	10/23/2010

The following ENC's were also used during compilation:

Chart	Scale
US5AK4BM	1:40,000

**3. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 4-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale (1:5000 for inset) using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0	10	3
10	20	3.5
20	50	4
50	500	5

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

#### 4. Depth Contours

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

Chart Contour Intervals in Fathoms from Chart 17405	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H12000_SS.000
0	0	0.2286	0.125	0
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.517	10.125	10

With the exception of the zero contours included in the \*\_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the \*\_CS file and soundings in the \*\_SS have been. This may result in conflicts between the \*\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_QUAL, SBDARE objects, and with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over \*\_SS.000 file contours in all cases where conflicts are found.

#### 5. Meta Areas

The following Meta object areas are included in HCell H12000:

M\_QUAL  
M\_CSCL

The Meta area objects were constructed on the basis of the limits of the hydrography.

#### 6. Features

Features addressed by the field units are delivered to PHB where they are deconflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base Surface, are included in the HCell. The geometry of these features may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

#### 7. Spatial Framework

##### 7.1 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.

## 7.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

## 7.3 S-57 Object Classes

The CS HCell contains the following Object Classes:

\$CSYMB	Blue Notes (points) —Notes to the MCD chart Compiler
\$LINES	Blue Notes (lines) —Notes to the MCD chart Compiler
BRIDGE	Footbridges
DEPCNT	Modified surveyed MLLW
FSHFAC	Fishing facility
LNDARE	Islets retained from the chart
LNDMRK	Landmark
M_CSCL	Compilation scale Meta area to define an inset
M_QUAL	Data quality Meta object
OBSTRN	Obstruction area objects
OFSPLF	Offshore platform
PILPNT	Piles
PONTON	Pontoons and floating docks
SBDARE	Bottom samples, reefs and ledges
SLCONS	Shoreline Construction features
SOUNDG	Soundings at chart scale density
UWTROC	Rock features
WEDKLP	Kelp
WRECKS	Wrecks

The SS HCell contains the following Object Classes:

DEPCNT	Generalized contours at chart scale intervals (See table under section 4.)
SOUNDG	Soundings at the survey scale density (See table under section 3.)

## 8. Data Processing Notes

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

## 9. QA/QC and ENC Validation Checks

H12000 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to 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 are MCD approved as inherent to and acceptable for HCells.

## 10. Products

### 10.1 HSD, MCD and CGTP Deliverables

H12000_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000 (1:10,000 for inset)
H12000_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000 (1:5000 for inset)
H12000_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12000_outline.gml	Survey outline
H12000_outline.xsd	Survey outline

### 10.2 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.1	Creation of soundings and bathy-derived features, creation of the meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.2	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.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

## **11. Contacts**

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

Toshi Wozumi  
Physical Scientist  
Pacific Hydrographic Branch  
Seattle, WA  
206-526-4763  
Toshi.Wozumi@noaa.gov



APPROVAL SHEET  
H12000

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the HCell compiled per the latest OCS HCell 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 disproof 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 HCell, 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.