

H12026

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.* ..... RA-20-01-09  
*Registry No.* ..... H12026

### LOCALITY

*State* ..... Alaska  
*General Locality* ..... West of Prince of Wales Island  
*Sublocality* ..... Western Portion of San Alberto Bay

**2009**

### 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>H12026</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:</p> <p style="text-align: center;"><b>RA-20-01-09</b></p>
<p>State <u>Alaska</u></p> <hr/> <p>General Locality <u>West of Prince of Wales Island</u></p> <hr/> <p>Sub-Locality <u>Western Portion of San Alberto Bay</u></p> <hr/> <p>Scale <u>1:20,000</u> Date of Survey <u>April 27, 2009 - June 2, 2009</u></p> <hr/> <p>Instructions dated <u>4/8/2009</u> Project No. <u>OPR-O190-RA-09</u></p> <hr/> <p>Vessel(s) <u>RA1 (1101), RA2 (1103), RA4 (2801), RA5 (2802), RA3 (2803)</u></p> <hr/> <p>Chief of party <u>Captain Donald W. Haines, NOAA</u></p> <hr/> <p>Surveyed by <u>RAINIER Personnel</u></p> <hr/> <p>Soundings by <u>Reson SeaBat 7125, Tilted Reson SeaBat 8125, Knudsen 320M</u></p> <hr/> <p>SAR by <u>Tyanne Faulkes</u> Compilation by <u>Katie Reser</u></p> <hr/> <p>Soundings compiled in <u>Fathoms</u></p>	
<p><b>REMARKS:</b> <u>All times are UTC. UTM Zone 8N.</u></p> <hr/> <p><u>The purpose of this survey is to provide contemporary surveys to update</u></p> <hr/> <p><u>National Ocean Service (NOS) nautical charts.</u></p> <hr/> <p><u>Revisions and end notes in red were generated during office processing.</u></p> <hr/> <p><u>Page numbering may be interrupted or non sequential.</u></p> <hr/> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the</u></p> <hr/> <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 H12026

Project OPR-O190-RA-09  
West of Prince Of Wales Island, Alaska  
Western Portion of San Alberto Bay  
Scale 1:20,000  
April – June 2009  
**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 Project Instructions OPR-O190-RA-09 dated April 8, 2009 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, Western portion of San Alberto Bay, Alaska. This survey corresponds to sheet “A” in the sheet layout provided with the Project Instructions. The purpose of OPR-O190-RA-09 is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.

Complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 8 meters and deeper. In depths less than 8 meters additional MBES coverage was acquired to identify least depths over significant features or shoals, as appropriate for this survey. Additional multibeam coverage was achieved in water depths between 8 m and 4 m that meet or exceed the project instruction requirements. Total mileage acquired by each vessel and system is referenced in Table 1.

Data Acquisition Type	Hull Number with Mileage (nm)						Total
	S221	101	1103	2801	2802	2803	
VBES (Main scheme)	-	-	-	-	-	-	0
MBES (Main scheme)	-	16.9	-	114.9	43.2	152.8	327.8
SSS (Main scheme)	-	-	-	-	-	-	0
Developments	-	-	-	-	-	-	0
Crosslines	-	-	-	0.9	5.4	15.1	21.4
Shoreline	-	-	12.1	-	-	-	12.1
Bottom Samples	11	-	-	-	-	-	11
Total Number of Items Investigated	-	5	-	-	-	-	5
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	16.2

*Table 1: Statistics for Survey H12026*

Limited Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12026, as per section 3.5.5 of the Field Procedures Manual

<sup>1</sup> NOS Hydrographic Surveys Specifications and Deliverables (April 2009), OCS Field Procedures Manual for Hydrographic Surveying (April 2009), and all Hydrographic Surveys Technical Directives issued through the dates of data acquisition.

April 2009 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook .HOB files.

Data acquisition was conducted from April 27 to June 2, 2009 (DN117 to DN153).

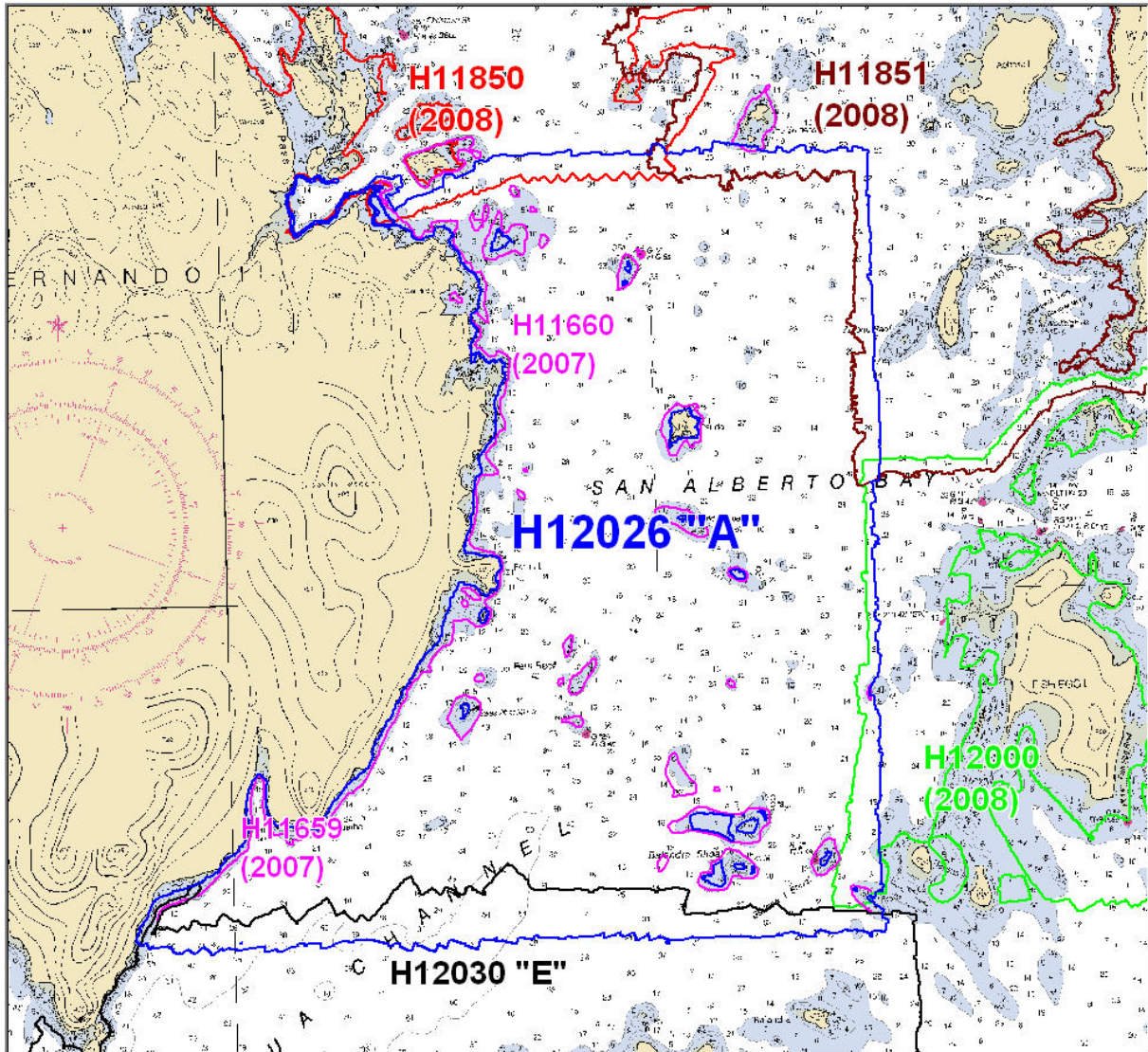


Figure 1: H12026 Survey Outline and Junctions overlaid on Chart 17405

## B. 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-09 Data Acquisition and Processing Report (DAPR)*, 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.

**B.1. Equipment and Vessels**

Data for this survey were acquired by the following vessels:

Hull Number	Name	Length (ft)	Draft (ft)	Acquisition Type
s221	<i>Rainier</i>	231	15.5	Bottom Samples
1101	RA-1	29	2	Reson 8125 Multibeam Echosounder
1103	RA-2	29	2	Knudsen 320M Vertical Beam Echosounder Detached Positions Bottom Samples
2803	RA-3	29	3.5	Reson 7125 Multibeam Echosounder
2801	RA-4	29	3.5	Reson 7125 Multibeam Echosounder
2802	RA-5	29	3.5	Reson 7125 Multibeam Echosounder

*Table 2: Data acquisition vessels and systems for H12026*

Sound speed profiles were measured in accordance with the Specifications and Deliverables using SEACAT SBE-19 and 19+ profilers and the Brooke Ocean Technology Moving Vessel Profiler. The profiles were concatenated for the H12026 survey area and applied using the “nearest in distance within 4 hours” option in CARIS HIPS.

Multibeam vessel navigation and attitude data were measured and recorded using Applanix POS/MV 320 systems, version 4. Vertical Beam echosounder navigation and attitude data were measured using a Trimble DSM212L GPS receiver and a TSS MAHRS system.

A complete description of survey vessels, hardware, and software systems is included in the *OPR-O190-RA-09 DAPR*.

No unusual vessel configurations were used for data acquisition.

**B.2. Quality Control**

**B.2.a. Crosslines**

Multibeam Echosounder (MBES) crosslines totaled 21.4 nautical miles, comprising 6.53% of main scheme MBES hydrography. The main scheme bathymetry was manually compared to the crossline nadir beams in CARIS subset mode and agreed very well with no discernable offset.<sup>1</sup>

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 2009 *Rainier* Hydrographic System Readiness Review package submitted with this survey.

**B.2.b. Final Uncertainty**

Uncertainty values of submitted, finalized grids are calculated in CARIS using the “Greater of the Two” of total propagated uncertainty and standard deviation (scaled to 95%). An IHO\_1 “child” attribute layer was created for the H12026\_Final\_Combined surface in CARIS HIPS for analysis. Throughout the majority of the survey, uncertainty values for H12026 fall below the IHO levels as described in the NOS Specifications and Deliverables.<sup>2</sup> The exception to these results occurred along very near-shore areas when using the tilted Reson 8125 sonar configuration, refer to OPR-O190-RA-09 Data Acquisition and Processing Report for specifics.<sup>3</sup>

**B.2.c. Junctions**

Survey H12026 junctions with surveys H12030, which is Sheet E of the same project, H11850, H11851, and H12000.<sup>4</sup> Survey H12026 also junctions with LIDAR surveys H11659 and H11660.<sup>5</sup> The sheet limits and area of overlap for multibeam surveys are shown in Figure 1.

<b>Junction Survey</b>	<b>Survey Scale</b>	<b>Date of Survey</b>	<b>Survey Location</b>
H11850	1:10,000	2008	North
H11851	1:10,000	2008	Northeast
H12000	1:10,000	2008	East
H12030	1:20,000	2009	South
H11659	1:10,000	2007	Southwest
H11660	1:10,000	2007	North

*Table 3: H12026 Junction surveys*

Survey H12026 was completed concurrently with survey H12030 during project OPR-O190-RA-09. Soundings from H12026 were compared with sounding data from survey H12030 in CARIS HIPS Subset Editor. The area of overlap between these sheets was examined and found to have excellent agreement with no discernable differences in depths.<sup>6</sup>

Survey data for surveys H11850, H11851, and H12000 were still archived aboard *Rainier* and were used for junction comparisons. Soundings from H12026 were compared with sounding data from surveys H11850, H11851, and H12000 in CARIS HIPS Subset Editor. The area of overlap between these sheets was examined and found to be in very good agreement within 0.1m.<sup>7</sup>

CARIS Lidar BAGs for H11659 and H11660 were provided by Pacific Hydrographic Branch for junction comparison. H12026 BASE surfaces were compared to this junction surface in CARIS Notebook. All surfaces were found to be in good general agreement within 0.2m, with the multibeam data trending to be shoaler than corresponding Lidar data.<sup>8</sup>

**B.2.d. Quality Control Checks**

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

**B.2.e. Data Quality Factors**

No data quality issues were evident in survey H12026.

**B.2.f. Object Detection and Coverage Assessment**

For holidays larger than 3 nodes across, the corresponding multibeam backscatter side scan was examined and no navigationally significant items were found; additionally, the least depths were represented.<sup>9</sup> These occurrences were caused by beams lost on moderate to steep down slopes, or “down slope noise”. These holidays not navigationally significant and were found in water depths greater than 40m. Holidays of this magnitude are shown in Figures 2 through 5.

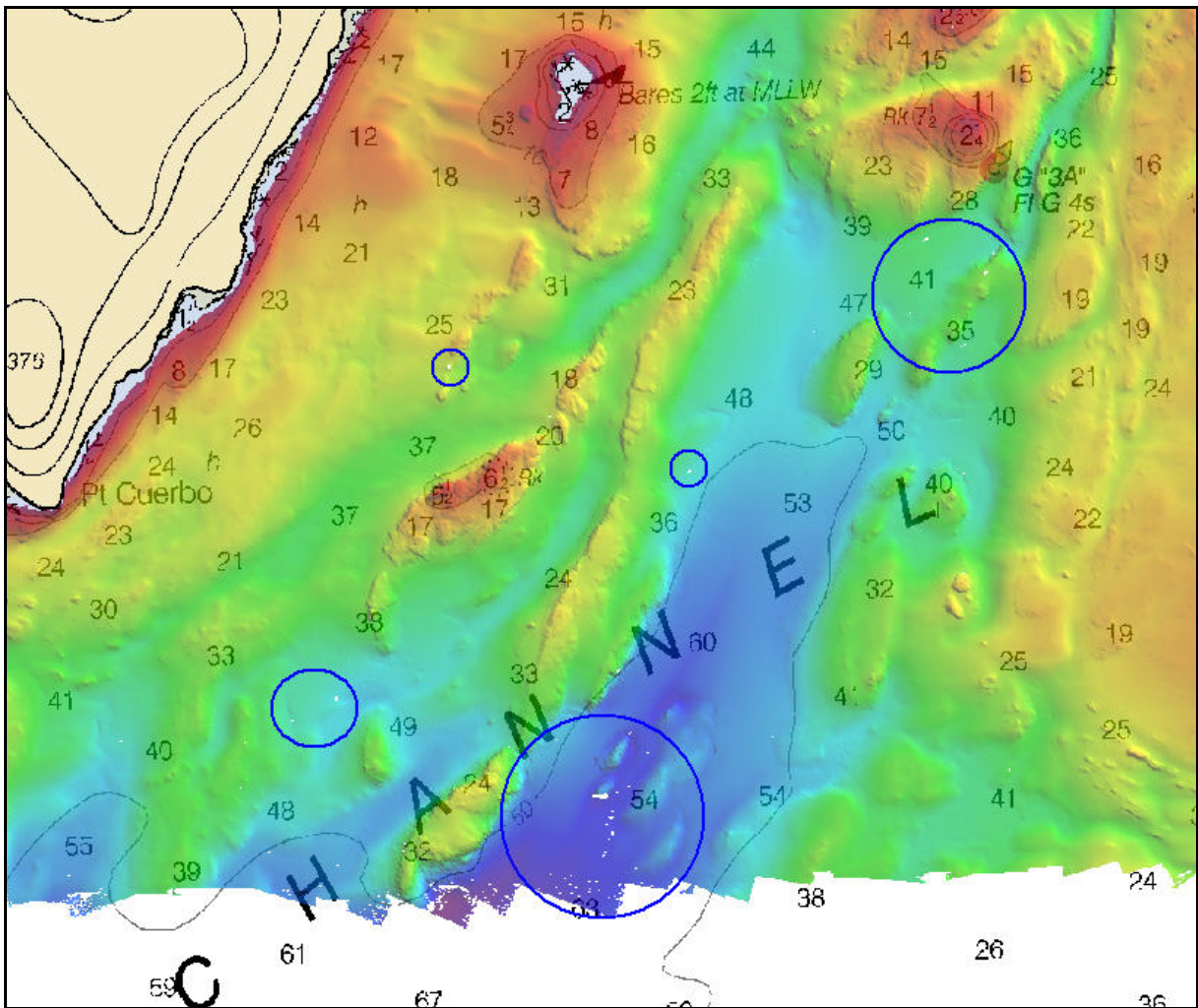


Figure 2: Non-significant holidays, south (Chart 17405)

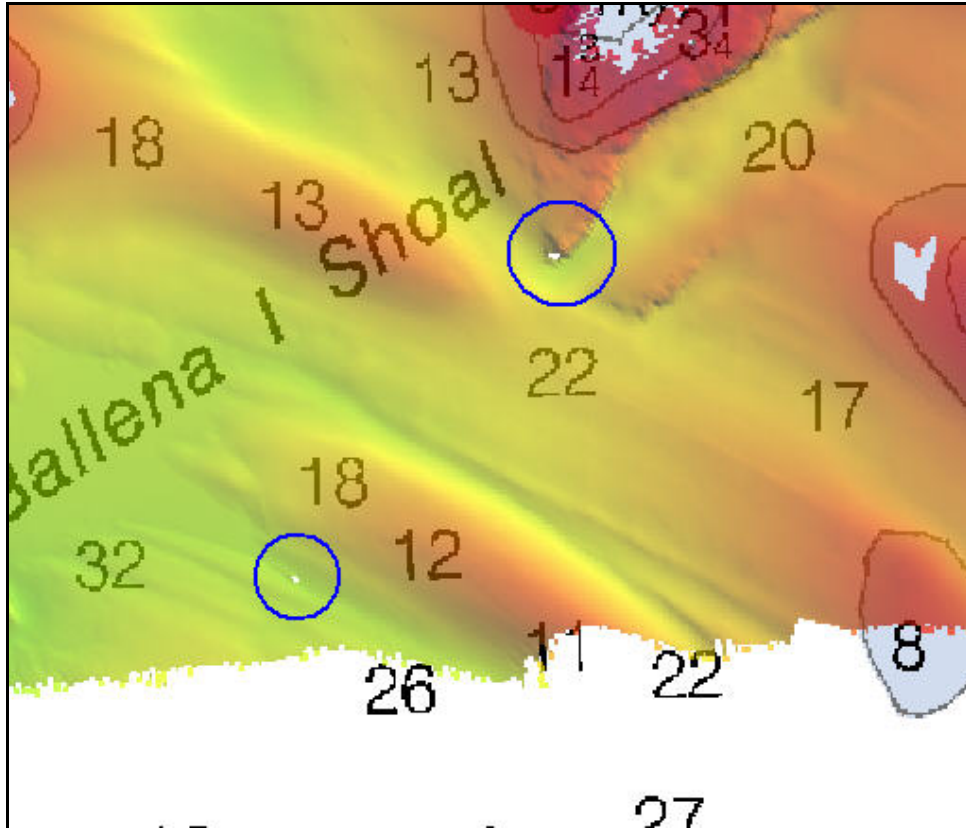


Figure 3: Non-significant holidays, southeast (Chart 17405)

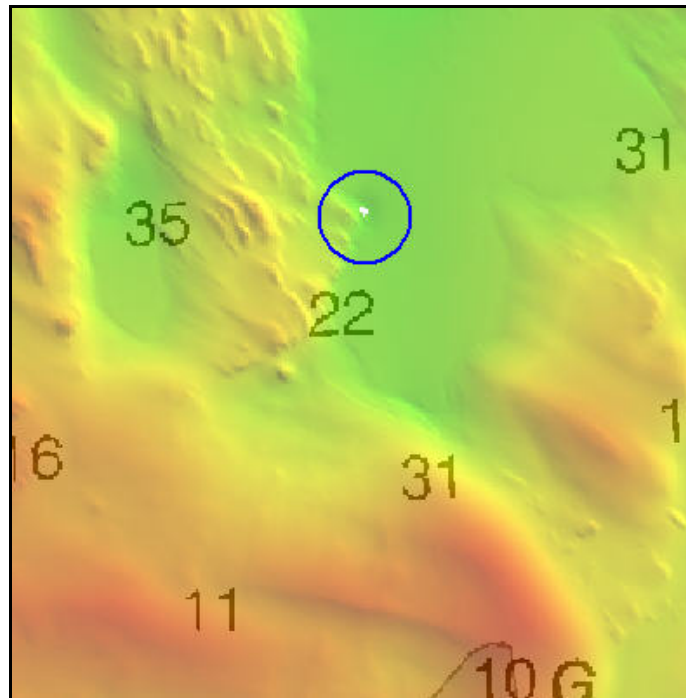


Figure 4: Non-significant holiday, north of Balandra Shoal (Chart 17405)



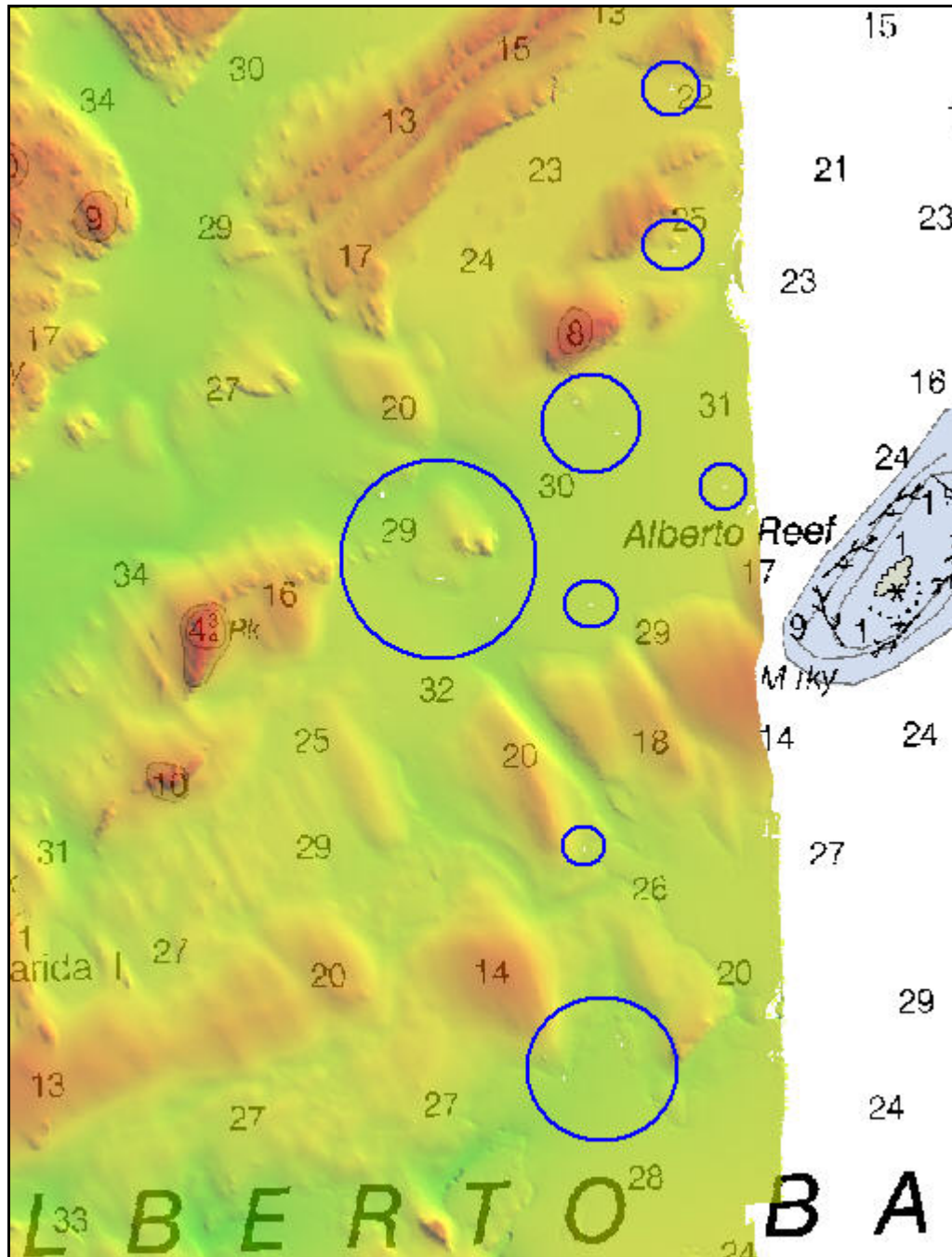


Figure 5: Non-significant holidays, east (Chart 17405)

Density of Soundings

Data density for survey H12081 met the 5 sounding per node density requirement with 98.1% of nodes having greater than 5 contributing soundings. These requirements were waived in depths greater than 100 meters after consultation with HSD Operations Branch and Pacific Hydrographic Branch (see email correspondence in Appendix V). A majority of nodes exhibiting densities lower than 5 soundings per node occurred in this depth range.<sup>10</sup>

**B.2.g. Unusual Conditions**

No unusual conditions were encountered during the survey that affected the expected accuracy and quality of survey data.

**B.3. Corrections to Echo soundings**

Data reduction procedures for survey H12026 conform to those detailed in the *OPR-O190-RA-09 DAPR*.

**B.4. Data Processing**

Data processing procedures for survey H12026 conform to those detailed in the DAPR. Data were processed initially using CARIS HIPS & SIPS v6.1, Service Pack 2, and Hotfix 8. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

**TPU VALUES:**

The survey specific parameters used to compute TPU in CARIS for H12026 are listed in Table 4.

<b>Tide values:</b>	Measured	0.01 m	Zoning	0.12 m
<b>Sound Speed Values:</b>	Measured	0.50 m/s	Surface	As per DAPR

*Table 4: Survey Specific CARIS TPU Parameters*

Many BASE surfaces were used in processing H12026. Final BASE surface resolutions and depth ranges were set according to Table 5 below, with field sheets smaller than 25 million nodes. CUBE surfaces were processed with a parameter set corresponding to each resolution as per HTD 2009-2. The CUBE parameter XML file is included with the data deliverables. The submission Field Sheet and BASE Surface structure are shown in Figures 6, 7, and 8.<sup>11</sup>

<b>Depth Range (m)</b>	<b>Resolution (m)</b>
0-23	1
20-52	2
46-115	4
103-350	8

*Table 5: Depth range and surface resolutions for H12026*

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.

Contours and soundings 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.

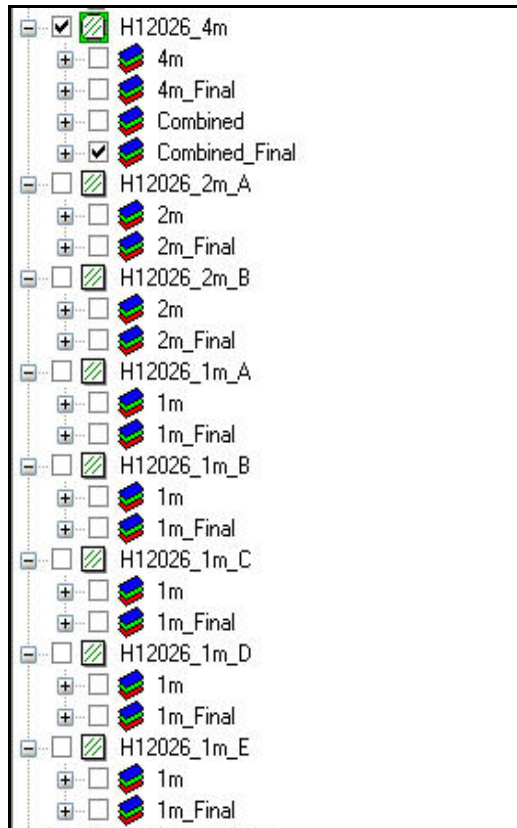


Figure 6: Field sheets and BASE surfaces submitted with H12026

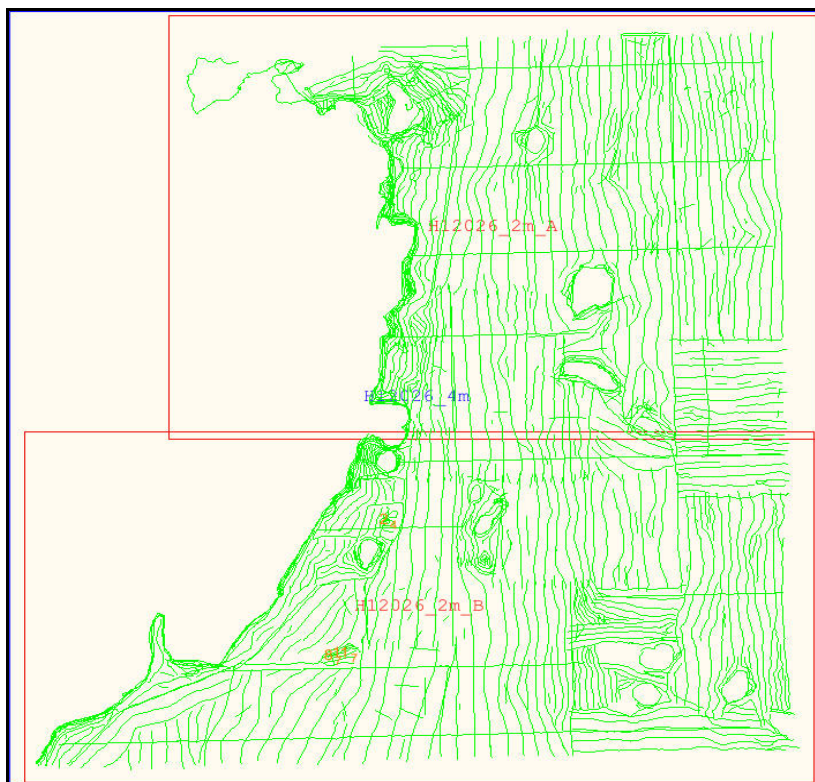


Figure 7: H12026 2-meter and 4-meter Field Sheet Layout

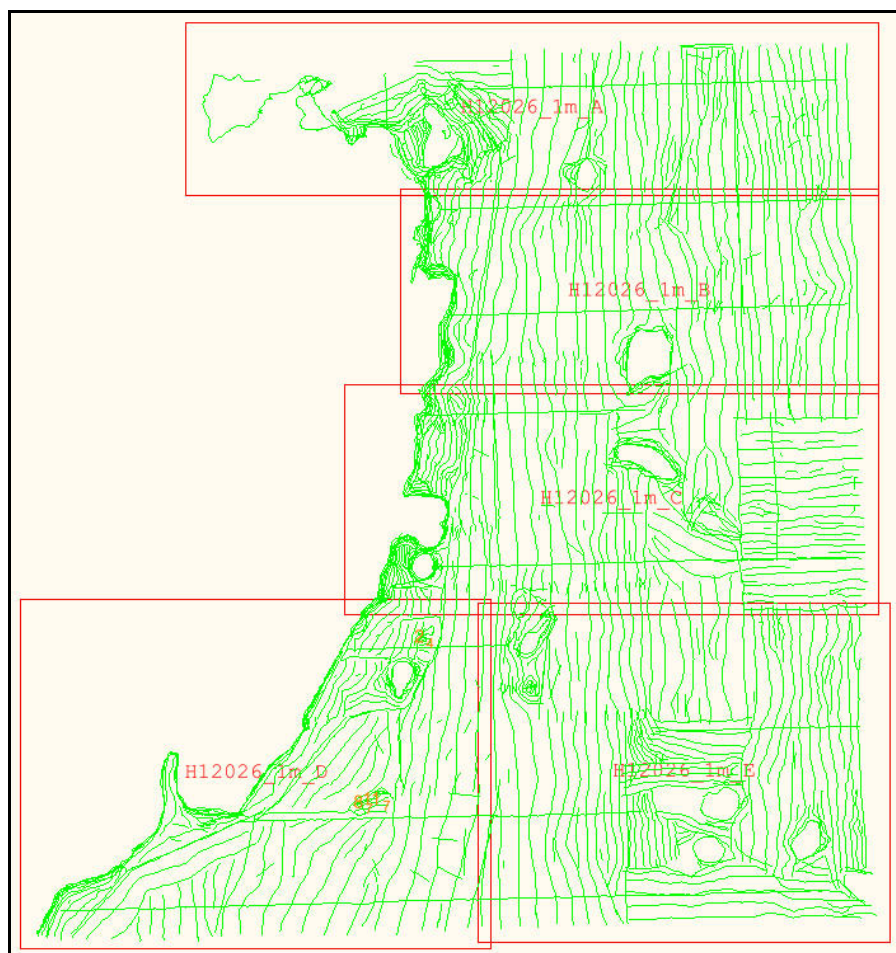


Figure 8: H12026 1-meter Field Sheet Layout

### C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H12026 can be found in the *OPR-O190-RA-09 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

#### C.1. 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 6.

Location	Frequency	Operator	Priority
Level Island	295 kHz	USCG	Primary
Annette Island	323 kHz	USCG	Secondary

Table 6: Differential Corrector Sources for H12026

**C.2. 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 for survey H12026.

*Rainier* personnel installed Sutron 8210 “bubbler” tide gauge at the following subordinate station in accordance with the Project Instructions (Table 7). The gauges were installed in order to provide information to the Center for Operational Oceanographic Products and Services (CO-OPS N/OPS1) for the determination of time and height correctors. This station is described in detail in the *OPR-O190-RA-09 Horizontal and Vertical Control Report*.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Trocadero Bay	945-0463	30-day	April 26, 2009	June 9, 2009

*Table 7: Tide Station installed by Rainier personnel for H12026*

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels from the Trocadero Bay station (954-0463) by applying tide file 9450463.tid and time and height correctors through the zone corrector file H12026CORF.zdf. **It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during final processing.**

The request for Final Approved Water Levels for H12026 was submitted to CO-OPS on June 11, 2009 in accordance with the Field Procedures Manual (FPM), dated April 2009. The Final Tide Note was received on August 28, 2009. This documentation is included in Appendix IV.<sup>12</sup>

**D. RESULTS AND RECOMMENDATIONS**

**D.1. Chart Comparison**

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

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.3-D.1 of the HSSDM, utilizing CARISCARIS HIPS and SIPS 6.1.

Survey H12026 was compared with the following chart:<sup>13</sup>

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17405	1:40,000	16 <sup>th</sup> Ed. Oct 2008	12/03/2008

*Table 8: Chart compared with H12026*

Soundings from survey H12026 agreed very well with charted (17405) depths generally being within two (2) fathoms, except as indicated below.<sup>14</sup> These discrepancies between charted depths and H12026 soundings are shown in figures 9 and 10.<sup>15</sup>

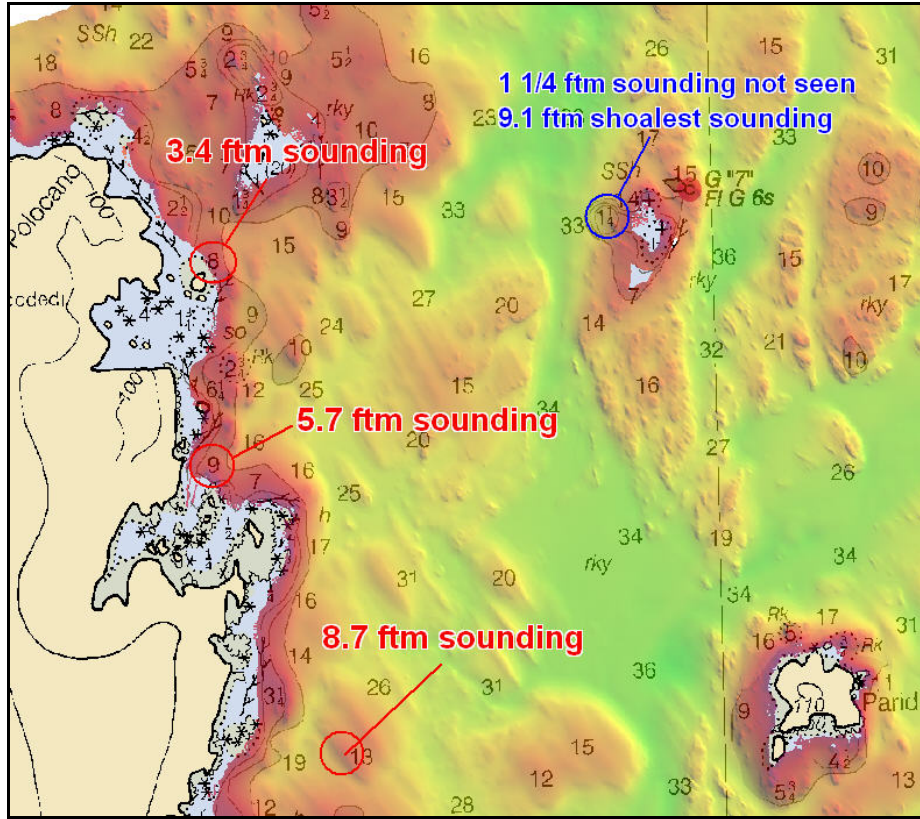


Figure 9: Charted discrepancies (17405) with H12026

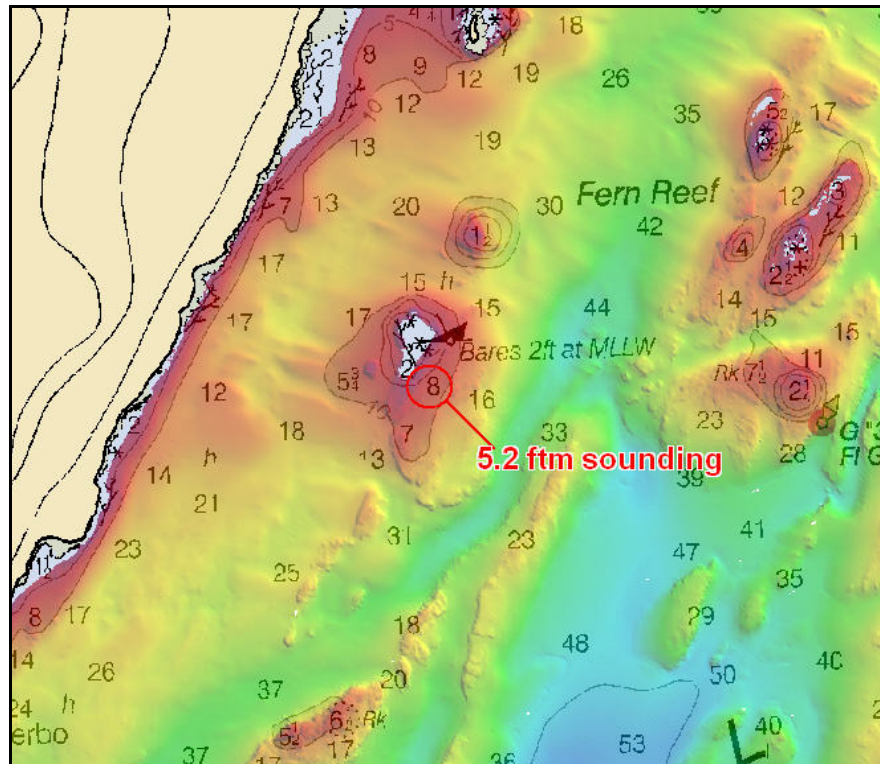


Figure 10: Charted discrepancies (17405) with H12026

No overall deepening or shoaling trends are apparent. In numerous instances, this survey found shoaler soundings between charted depths. This can be attributed to increased bottom coverage using MBES methods.

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.<sup>16</sup>

**D.1.b. Automated Wreck and Obstruction Information System (AWOIS) Items**

One (1) AWOIS item falls within the survey limits of H12026. This item was assigned for full investigation. Descriptions of the AWOIS item investigation are included in the Survey Feature Report in Appendix II.<sup>17</sup>

<b>AWOIS#</b>	<b>Latitude</b>	<b>Longitude</b>	<b>remark</b>	<b>recommendation</b>
53749	55° 29' 28" N	133° 17' 15" W	Investigated by Dive Ops	Chart as submerged wreck per digital data

*Table 9: Assigned AWOIS Items and the Hydrographer’s remarks and recommendations*

**D.1.c. Other Investigated Features**

Additional Items

Five (5) Lidar investigation items were included within H12026 survey limits. They were addressed using a combination of VBES, MBES, or visual methods. The results of these investigations can be found in the CARIS Notebook HOB files submitted with the session file H12026\_Notebook.wrk.<sup>18</sup>

**D.1.d. Dangers to Navigation**

Twenty-Two (22) Dangers to Navigation (DTONs) were found on survey H12026, and reported to the Marine Chart Division via email on November 17, 2009.<sup>19</sup> The original DTON submission package is included in Appendix I.<sup>20</sup> Descriptions of each DTON are included in the Survey Feature Report in Appendix II.

**D.2. Additional Results**

**D.2.a. Shoreline Verification**

Shoreline Source

Limited shoreline verification was accomplished using a combination of the composite source file (CSF) and project reference file (PRF) provided with the project instructions. CSF are created using various data including the latest ENC’s, most recent aerial photogrammetry, prior hydrographic surveys, and accepted Lidar survey features. Prior survey and Lidar features in the CSF are for reference. Lidar items assigned to the ship for further investigation were provided in the PRF as features with S-57 feature acronym BUAARE. The composite source along with Lidar items for further investigation are printed on paper “boat sheets” and displayed in CARIS Notebook and/or Hypack for use during field verification.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables and FPM sections 6.1 and 6.2. Features and Attributes acquired or modified or disproved during shoreline verification were recorded in HOB files using CARIS Notebook. These indicate revisions to features and features not found in the relevant CSF. In addition, annotations describing shoreline were recorded on the hard copy plots of the CSF as described above. The following field procedures were followed:

- H12026 Lidar items selected for further investigation and provided in the PRF 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.
- The composite source file was used for orientation and navigation while in transit between assigned H12026 items. Composite source features noted to be both egregiously misrepresented in source data and significant to navigation were investigated.
- All new, charted, and AWOIS items within the limits of H12026 (i.e., offshore of the limits prescribed in the Project Instructions and discussed in Section A.) were addressed.

All shoreline data is submitted in CARIS Notebook HOB files. The session H12026\_Notebook.wrk contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H12026_Comp_Source.hob	Original Source Data as provided for project OPR-O190-RA-09 and filtered to the limits of survey H12026
H12026_Lidar_Goodline.hob	Extents of Lidar junction surveys for H12026
H12026_Reference.hob	Survey outline and limit lines, and AWOIS item positions and radii.
H12026_Final_Feature_File.hob	Composite source data modified by the field to best represent the shoreline at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey. This file contains “Lidar Investigation Features” that were confirmed to exist or were unable to be investigated.
H12026_Disprovals.hob	Composite source items that were deleted or modified in position or geographic type. This file contains Lidar investigation items that were found in the field to not exist.

*Table 10: List and Description of Notebook HOB files*



Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook HOB files supersede and complement shoreline information compiled on the composite source file and charts as described above.<sup>21</sup>

**D.2.b. Prior Survey Comparison**

Prior survey comparison was not performed.

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

There were five (5) aids to navigation (ATONs) within the limits of survey H12026. Each ATON's position was visually checked in the field against the digital raster chart. All ATONs were found to be correctly charted and serve their intended purpose.<sup>22</sup>

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

There are no overhead features within the survey limits of H12026.<sup>23</sup>

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

There are no submarine cables or pipelines charted within the survey limits of H12026, and none were detected by the survey.<sup>24</sup>

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

There are no ferry routes charted within the survey limits of H12026, and none were observed to be operating in the area.<sup>25</sup>

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

There were eleven (11) bottom samples collected for survey H12026.<sup>26</sup> One historic bottom sample was collected, and did not agree with the charted characteristics.<sup>27</sup> The discrepancy is displayed below in Table 11. All bottom samples have been included in the H12026\_Final\_Feature\_File.hob in the CARIS Notebook session.

Historic S-57 Attribution	H12026 S-57 Attribution	Latitude	Longitude
Rky	Mud/Pebbles	55° 29.91' N	133° 14.94' W

*Table 11: Difference between historic and H12026 bottom sample*

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


There are no other findings to report for this survey.

**E. APPROVAL**

As Chief of Party, field operations for hydrographic survey H12026 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 2009 edition), Field Procedures Manual (April 2009 edition), Standing and Project Instructions, and all HSD Technical Directives issued through June 2009. 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 Off</u>	<u>ice</u>
Hydrographic Systems Readiness Review Package	<i>Under separate cover</i>	N/CS34
Data Acquisition and Processing Report for OPR-O190-RA-09	27-Oct-2009	N/CS34
Coast Pilot Report for OPR-O190-RA-09	<i>To be submitted</i>	N/CS26
Horizontal and Vertical Control Report for OPR-O190-RA-09	27-Oct-2009	N/CS34
Tides and Water Levels Package for OPR-O190-RA-09	20-Jun-2009	N/OPS1


Approved and Forwarded:  Donald W. Haines, CAPT/NOAA  
I am approving this document  
2009.12.15 07:52:07 -08'00'

Captain Donald W. Haines, NOAA  
Commanding Officer, NOAA Ship *Rainier*


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

Survey Sheet Manager:  Digitally signed by Shawn Gendron  
DN: cn=Shawn Gendron, o=NOAA, ou=NOAA Ship  
RAINIER, email=shawn.gendron@noaa.gov, c=US  
Date: 2009.12.15 15:43:56 Z

Shawn J. Gendron  
Senior Survey Technician, NOAA Ship *Rainier*

Chief Survey Technician:  James B Jacobson  
I have reviewed this document  
2009.12.15 14:51:05 Z

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

Field Operations Officer:  Brent Pounds  
I have reviewed this document  
2009.12.15 06:39:48 -09'00'

Lieutenant Brent J. Pounds, NOAA  
Field Operations Officer, NOAA Ship *Rainier*

## Revisions and Corrections Compiled During Office Processing and Certification

<sup>1</sup> Concur.

<sup>2</sup> Concur.

<sup>3</sup> The nearshore data collected by the tilted Reson 8125 show good internal consistency with surrounding data and, as stated in the DAPR, the high TPU values are likely a result of an error in the calculation used. Due to the age of the charted data and the internal consistency with the surrounding data that meets specification, it was determined that the inshore tilted 8125 data is adequate for charting.

<sup>4</sup> Concur. A common junction was made with H11850 and H11851, both of which have already been compiled. A partial junction was made with H12000 which is being concurrently compiled. A common junction with H12030 will be made when that survey is compiled.

<sup>5</sup> Concur with clarification. H12026 also junctions with a small portion of LIDAR survey H11662 at the southwestern end of the survey area and H11661 on the eastern side of the survey area. Portions of LIDAR surveys H11660 and H11662 were compiled concurrently with H12026 and are included in the HCell. The portion of LIDAR survey H11661 that junctions with H12026 falls within the limits of HCell H12000 and will be compiled with that survey. The portion of LIDAR survey H11659 that junctions with H12026 was compiled as a part of HCell H11850. See endnote 18 for details regarding compilation of LIDAR data.

<sup>6</sup> Concur.

<sup>7</sup> Concur.

<sup>8</sup> Concur.

<sup>9</sup> Concur. The data is adequate to supersede charted data in the common area despite the insignificant holidays.

<sup>10</sup> Concur. The data is adequate to supersede charted data in the common area.

<sup>11</sup> During the Survey Acceptance Review a combined surface, H12026\_Office\_4m\_Combined.hns, was created and was used as the basis for compilation.

<sup>12</sup> See attached Tide Note dated August 26, 2009.

<sup>13</sup> H12026 also falls on parts of charts 17404 (1:40,000) and 17406 (1:40,000) that entirely overlaps with chart 17405. The chart comparison for chart 17405 therefore applies to charts 17404 and 17406 as well.

<sup>14</sup> Concur.

<sup>15</sup> The discrepancies are addressed in the HCell. Chart depths as depicted in the HCell.

<sup>16</sup> Concur.

<sup>17</sup> Concur with clarification. AWOIS item 53749 was fully investigated with SWMB and the least depth was obtained on the feature. The AWOIS item is included in the HCell as a WRECKS feature with CATWRK 3(distributed remains of wreck) at 55-29-17.99N, 133-17-15.04W. The item was not included in the feature report and is not included in the Pydro PSS file. The feature included in the Field Verified Notebook hob file contained the following information:

**Remarks:** *Remains of wreck found in middle of reef. Shoalest point on a bit. The wreck is non-dangerous due to its proximity to the shoaler rocks around it on the reef.*

**Recommendations:** *Chart as submerged wreck per digital position.*

<sup>18</sup> No data from LIDAR included in HCell H12026 supersedes shoaler charted depths or has been used to disprove charted features.

<sup>19</sup> All of the DTONS have been applied to the charts. Seventeen of the 22 DTONS are included in the HCell as reported. Two reported DTONS were not included in the HCell as reported because there were shoaler rocks nearby that were included in the HCell instead. Three reported DTONS are not included in HCell H12026 because they fall within the limits of the HCell H11850 after the common junction was made, and 2 of those 3 DTONS are included in HCell H11850. The DTON not included in HCell H11850 (located at 55-32-51.3N, 133-16-56.6W with a depth of 7fm 2ft) was removed

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during QC because it was determined it was too close in proximity to a shoaler DTON rock (located at 55-32-52.9N, 133-16-51.6W with a depth of 5fm 4ft).

<sup>20</sup> See attached DTON Report.

<sup>21</sup> Concur with clarification. The submitted hob files were used in the compilation of HCell H12026. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.

<sup>22</sup> Chart per latest ATONIS information.

<sup>23</sup> Concur.

<sup>24</sup> Concur.

<sup>25</sup> Concur.

<sup>26</sup> Five of the 11 bottom samples collected during H12026 are included in the HCell. The remaining 6 bottom samples are not included because they fall within rocky seabed areas delineated during compilation. Two charted bottom samples were blue noted to be retained and the rest were blue noted to be removed because they fall within the limits of the rocky seabed areas delineated during compilation.

<sup>27</sup> During compilation, it was determined that the general characteristic of the area is rocky and rocky seabed areas were delineated in the HCell. Therefore, the new bottom sample indicating mud and pebbles at the historic position is not included in the HCell

**Registry Number:** H12026  
**State:** Alaska  
**Locality:** West of Prince Of Wales Island  
**Sub-locality:** Western Portion of San Alberto Bay  
**Project Number:** OPR-O190-RA-09  
**Survey Dates:** 04/27/2009 - 05/11/2009

### Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	16th	10/01/2008	1:40,000 (17405_1)	USCG LNM: 10/23/2007 (12/09/2008) CHS NTM: None (11/28/2008) NGA NTM: None (12/13/2008)
17404	14th	10/01/2008	1:40,000 (17404_1)	[L]NTM: ?
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	9.05 m	55° 32' 32.5" N	133° 17' 53.8" W	---
1.2	Shoal	2.63 m	55° 29' 10.8" N	133° 17' 18.1" W	---
1.3	Rock	1.84 m	55° 32' 33.5" N	133° 16' 51.0" W	---
1.4	Shoal	1.83 m	55° 32' 30.0" N	133° 16' 45.4" W	---
1.5	Rock	2.38 m	55° 29' 32.1" N	133° 15' 48.9" W	---
1.6	Shoal	2.86 m	55° 28' 19.1" N	133° 13' 05.5" W	---
1.7	Shoal	6.10 m	55° 30' 23.8" N	133° 14' 24.4" W	---
1.8	Rock	1.31 m	55° 30' 25.3" N	133° 14' 28.2" W	---
1.9	Shoal	14.81 m	55° 31' 01.2" N	133° 16' 28.5" W	---

1.10	Rock	10.38 m	55° 32' 52.9" N	133° 16' 51.6" W	---
1.11	Rock	13.43 m	55° 32' 51.3" N	133° 16' 56.6" W	---
1.12	Shoal	11.46 m	55° 28' 04.7" N	133° 14' 24.7" W	---
1.13	Shoal	15.84 m	55° 28' 42.0" N	133° 13' 47.8" W	---
1.14	Rock	15.91 m	55° 29' 52.8" N	133° 15' 13.5" W	---
1.15	Rock	9.21 m	55° 32' 28.1" N	133° 16' 58.3" W	---
1.16	Rock	2.92 m	55° 29' 13.7" N	133° 17' 24.8" W	---
1.17	Rock	17.34 m	55° 28' 13.6" N	133° 15' 00.3" W	---
1.18	Rock	15.96 m	55° 31' 22.7" N	133° 13' 58.1" W	---
1.19	Rock	14.76 m	55° 30' 51.9" N	133° 14' 33.9" W	---
1.20	Rock	13.42 m	55° 31' 54.9" N	133° 14' 27.7" W	---
1.21	Rock	10.83 m	55° 32' 35.3" N	133° 13' 53.7" W	---
1.22	Rock	7.87 m	55° 32' 27.4" N	133° 17' 32.7" W	---

## **1 - Danger To Navigation**

**1.1) Profile/Beam - 534/15 from h12026 / 1101\_reson8125 / 2009-117 / 302\_2158**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 32.5" N, 133° 17' 53.8" W  
**Least Depth:** 9.05 m (= 29.68 ft = 4.947 fm = 4 fm 5.68 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.264 m  
**Timestamp:** 2009-117.22:00:57.570 (04/27/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-117 / 302\_2158  
**Profile/Beam:** 534/15  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-117/302_2158	534/15	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

5fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 4fm 5ft (531\_1)  
 9.0m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026



TECSOU - 1:found by echo-sounder

VALSOU - 9.047 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

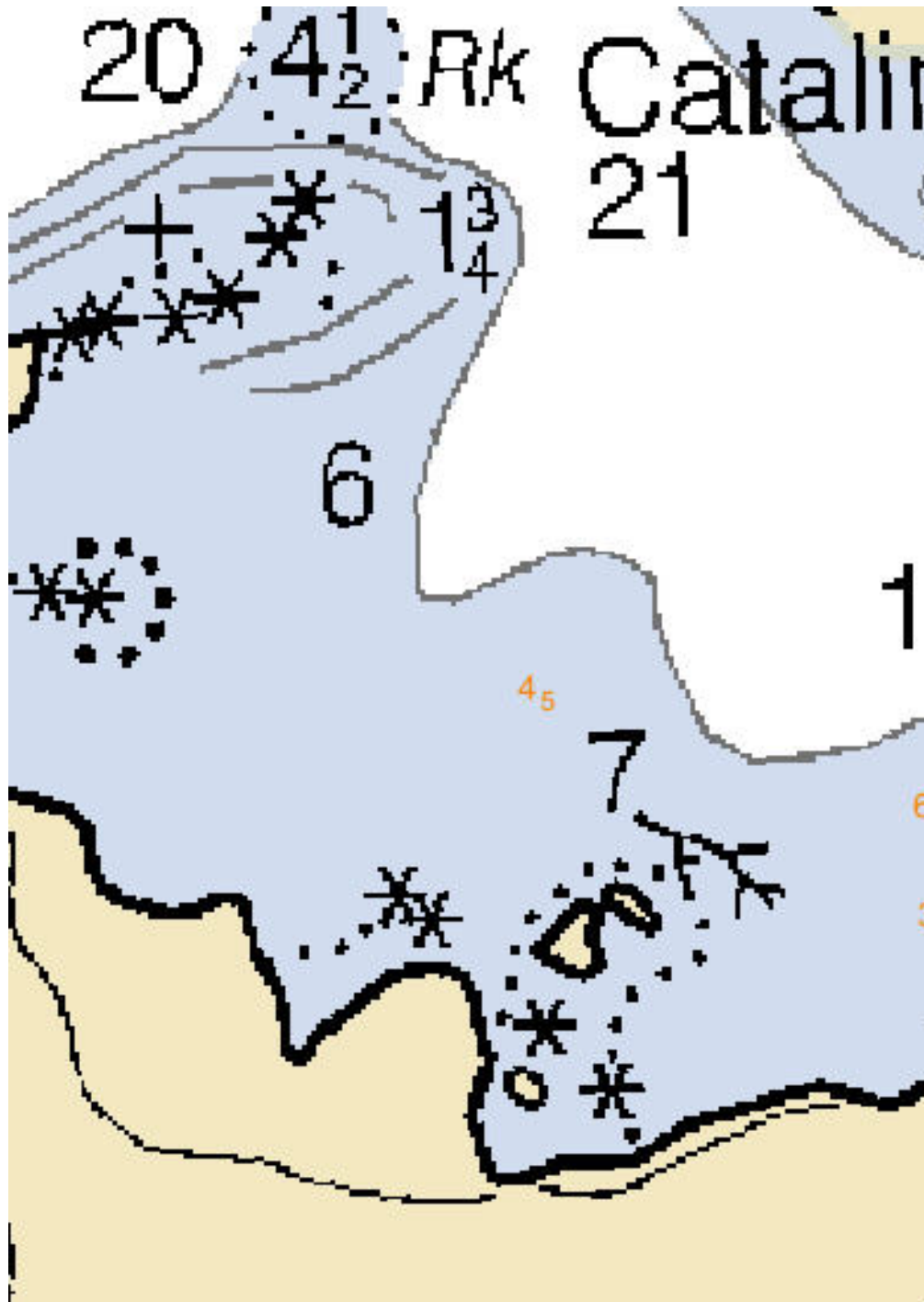


Figure 1.1.1

**1.2) Profile/Beam - 1298/230 from h12026 / 1101\_reson8125 / 2009-126 / 020\_1942**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 29' 10.8" N, 133° 17' 18.1" W  
**Least Depth:** 2.63 m (= 8.64 ft = 1.439 fm = 1 fm 2.64 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.980 m ; **TVU (TPEv)** ±0.660 m  
**Timestamp:** 2009-126.19:45:30.667 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 020\_1942  
**Profile/Beam:** 1298/230  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/020_1942	1298/230	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

1 ½fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 2ft (531\_1)  
 2.6m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam



Feature Images

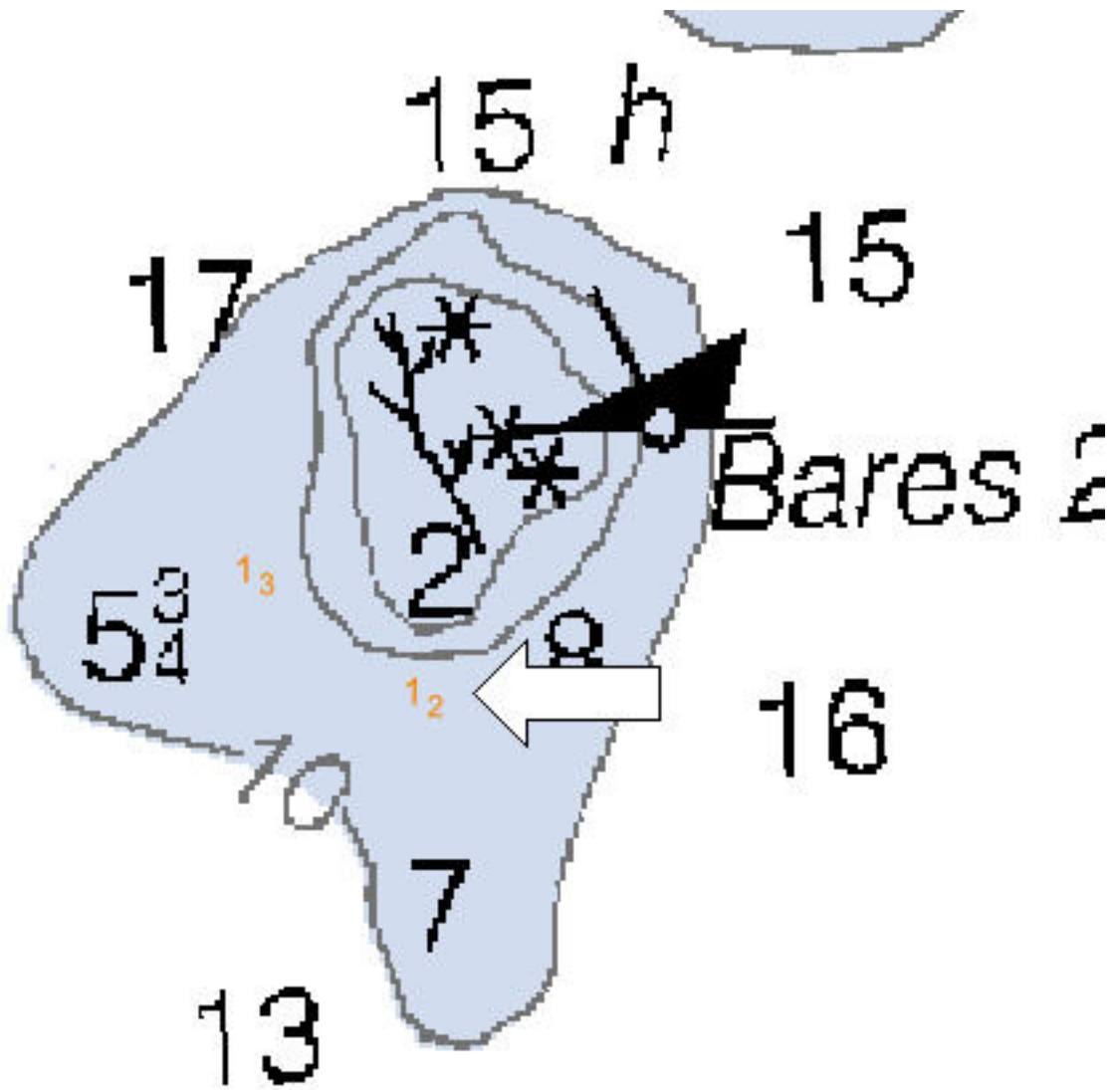


Figure 1.2.1

**1.3) Profile/Beam - 362/238 from h12026 / 1101\_reson8125 / 2009-126 / 300\_1710**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 33.5" N, 133° 16' 51.0" W  
**Least Depth:** 1.84 m (= 6.02 ft = 1.003 fm = 1 fm 0.02 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.999 m ; **TVU (TPEv)** ±3.528 m  
**Timestamp:** 2009-126.17:12:39.259 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 300\_1710  
**Profile/Beam:** 362/238  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/300_1710	362/238	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

1fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 0ft (531\_1)  
 1.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 1.835 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

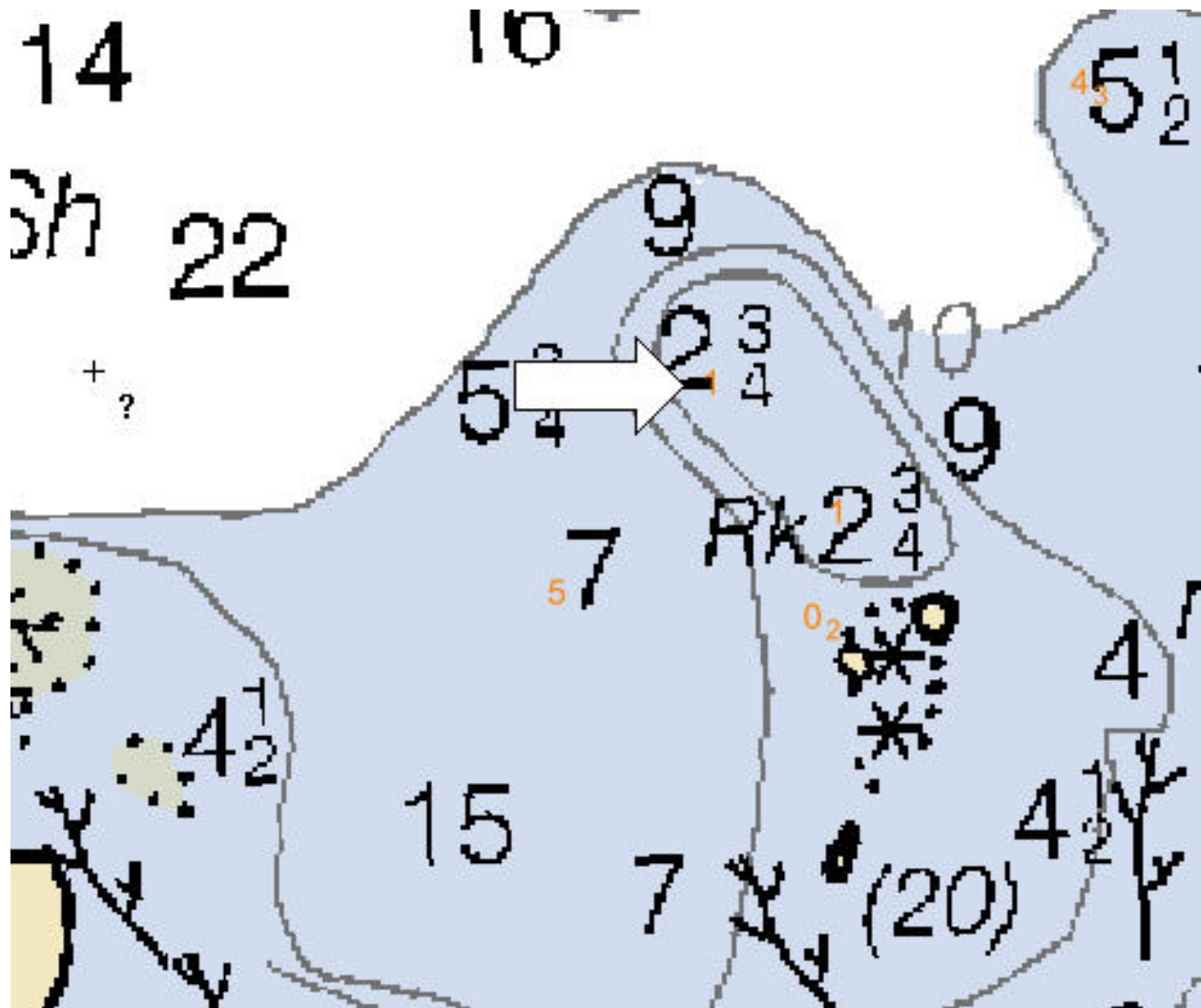


Figure 1.3.1



**1.4) Profile/Beam - 1140/237 from h12026 / 1101\_reson8125 / 2009-126 / 300\_1710**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 30.0" N, 133° 16' 45.4" W  
**Least Depth:** 1.83 m (= 6.02 ft = 1.003 fm = 1 fm 0.02 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±2.074 m ; **TVU (TPEv)** ±4.391 m  
**Timestamp:** 2009-126.17:16:29.539 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 300\_1710  
**Profile/Beam:** 1140/237  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/300_1710	1140/237	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

1fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 0ft (531\_1)  
 1.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam



### Feature Images

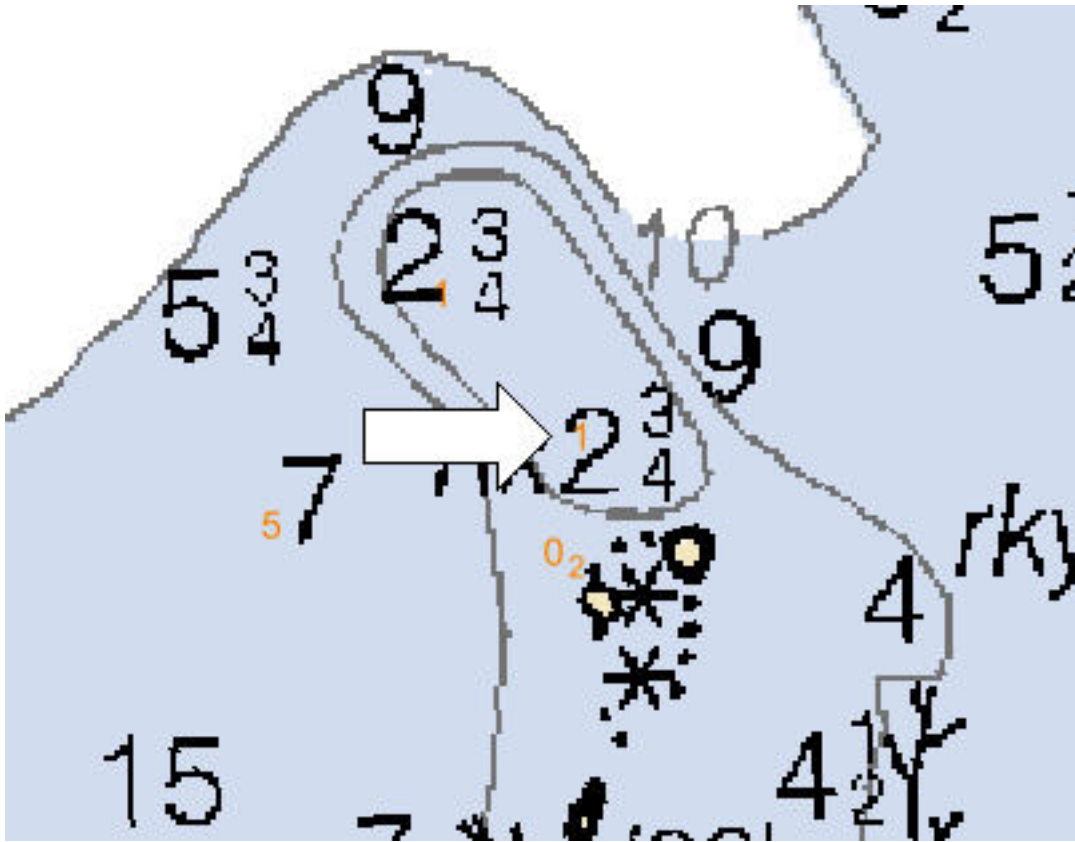


Figure 1.4.1

**1.5) Profile/Beam - 284/154 from h12026 / 1101\_reson8125 / 2009-126 / 304\_1849**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 29' 32.1" N, 133° 15' 48.9" W  
**Least Depth:** 2.38 m (= 7.81 ft = 1.301 fm = 1 fm 1.81 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.264 m  
**Timestamp:** 2009-126.18:50:50.153 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 304\_1849  
**Profile/Beam:** 284/154  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/304_1849	284/154	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

1 ¼fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 2ft (531\_1)  
 2.4m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 2.379 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

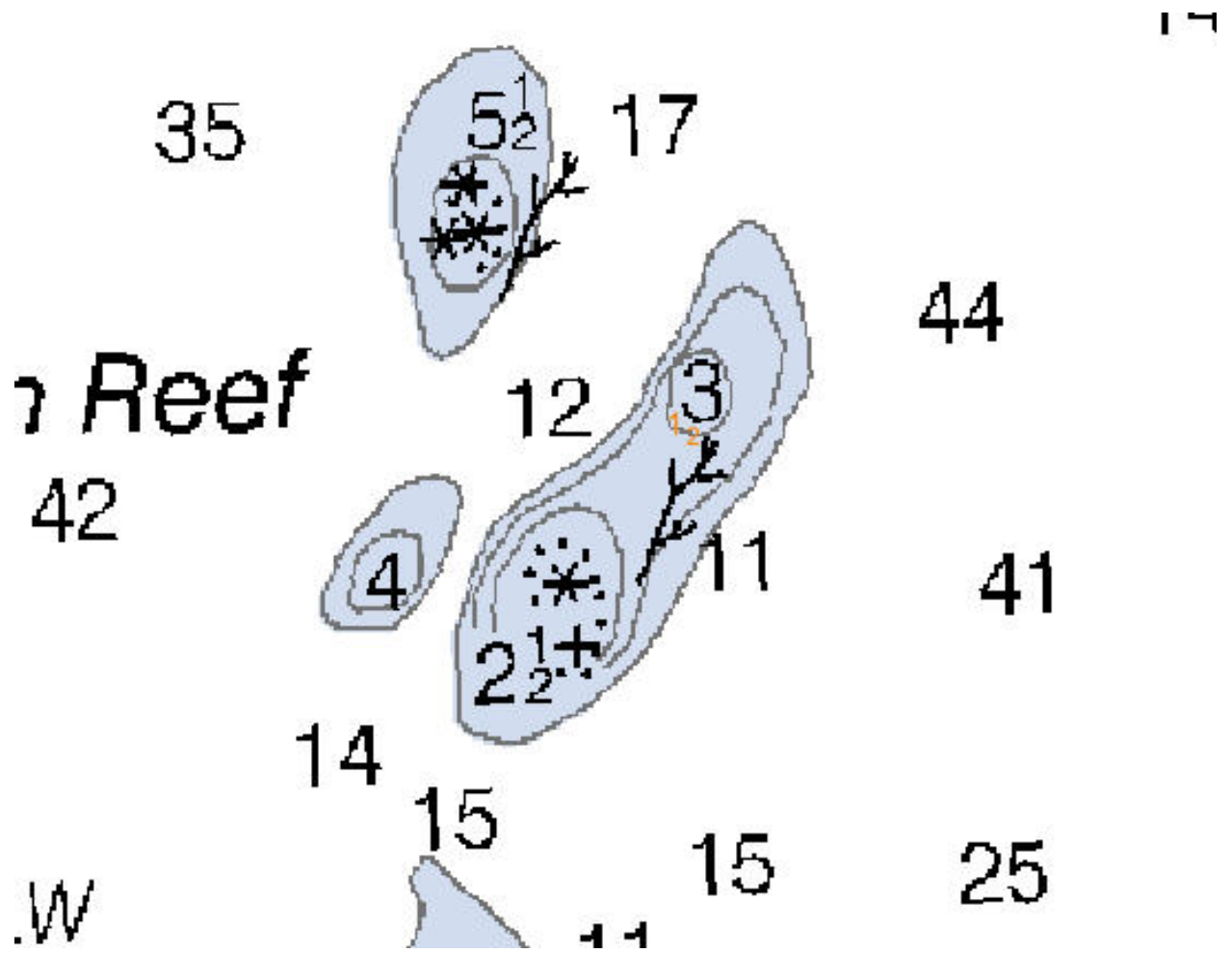


Figure 1.5.1

**1.6) Profile/Beam - 278/234 from h12026 / 1101\_reson8125 / 2009-126 / 308\_2022**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 28' 19.1" N, 133° 13' 05.5" W  
**Least Depth:** 2.86 m (= 9.37 ft = 1.561 fm = 1 fm 3.37 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±2.060 m ; **TVU (TPEv)** ±1.951 m  
**Timestamp:** 2009-126.20:23:17.362 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 308\_2022  
**Profile/Beam:** 278/234  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/308_2022	278/234	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

1 ½fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 3ft (531\_1)  
 2.9m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam





### Feature Images

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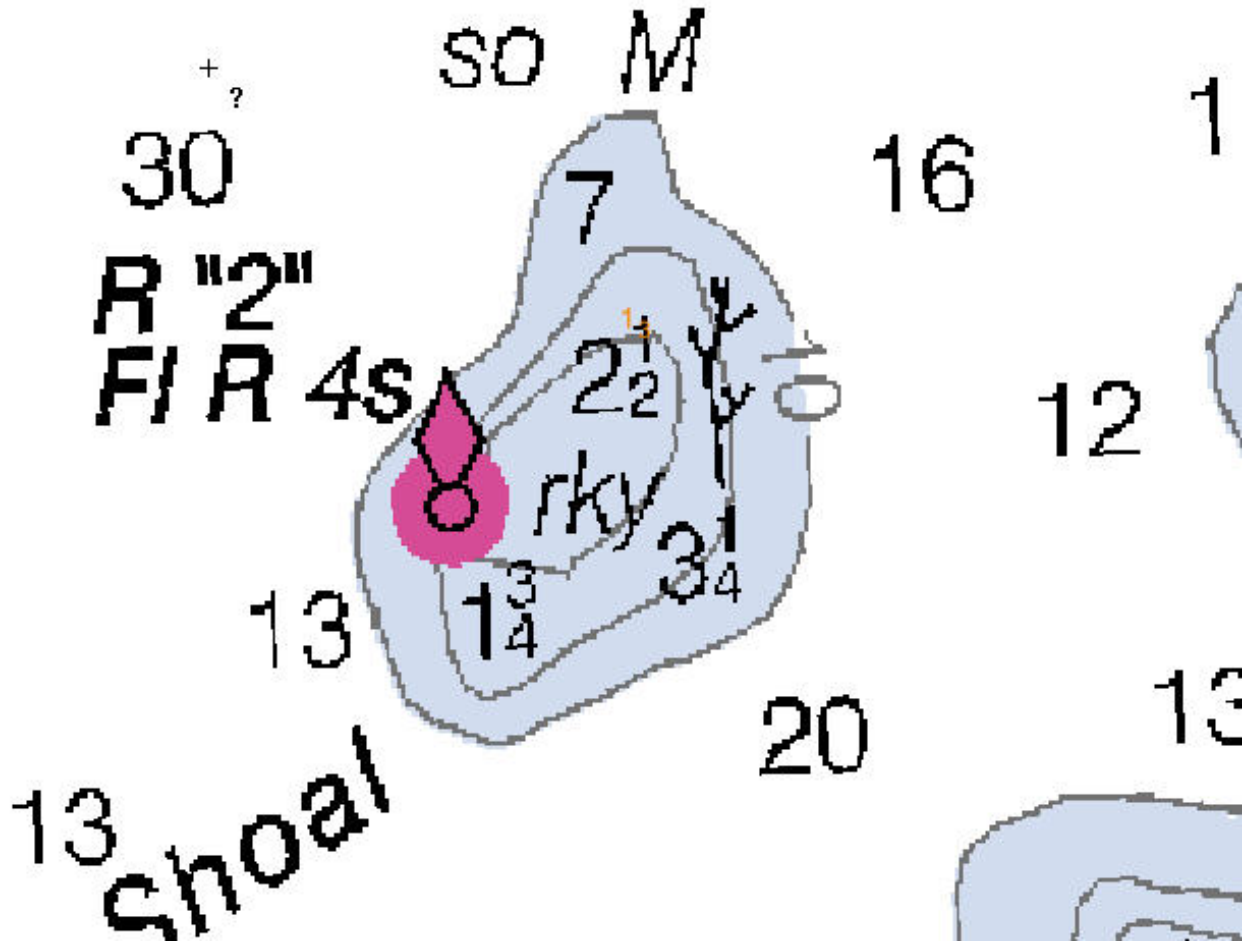


Figure 1.6.1

**1.7) Profile/Beam - 1506/203 from h12026 / 1101\_reson8125 / 2009-126 / 311\_1818**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 30' 23.8" N, 133° 14' 24.4" W  
**Least Depth:** 6.10 m (= 20.01 ft = 3.334 fm = 3 fm 2.01 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.967 m ; **TVU (TPEv)** ±0.286 m  
**Timestamp:** 2009-126.18:25:34.129 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 311\_1818  
**Profile/Beam:** 1506/203  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/311_1818	1506/203	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

3 ¼fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 3fm 2ft (531\_1)  
 6.1m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam



Feature Images

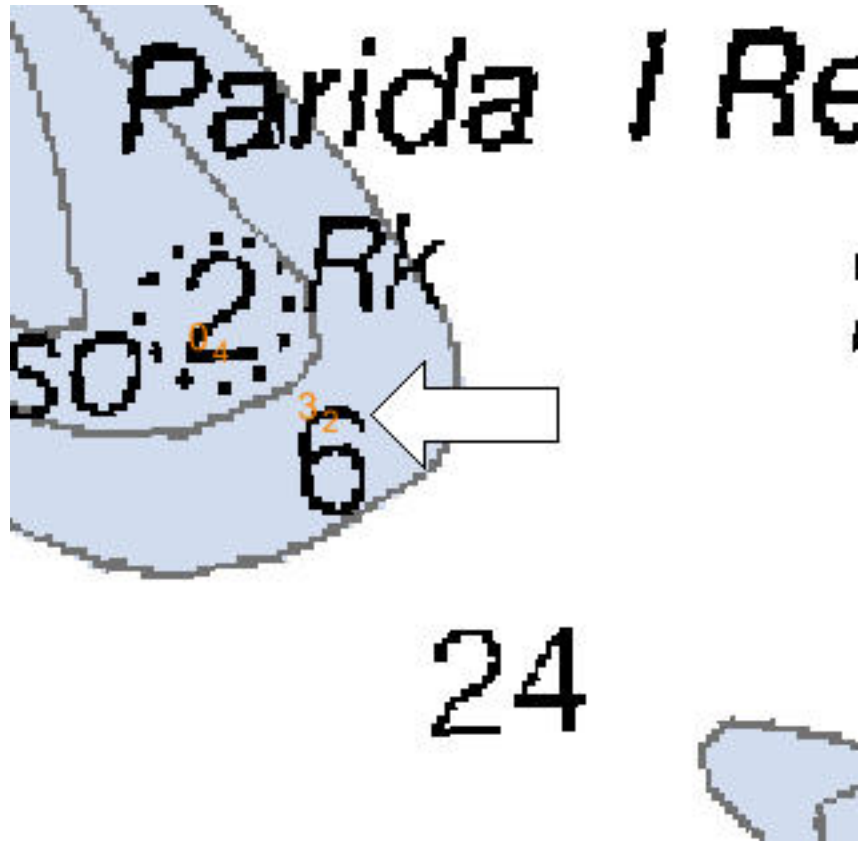


Figure 1.7.1

**1.8) Profile/Beam - 1469/233 from h12026 / 1101\_reson8125 / 2009-126 / 311\_1818**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 30' 25.3" N, 133° 14' 28.2" W  
**Least Depth:** 1.31 m (= 4.29 ft = 0.716 fm = 0 fm 4.29 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±2.077 m ; **TVU (TPEv)** ±2.109 m  
**Timestamp:** 2009-126.18:25:23.687 (05/06/2009)  
**Survey Line:** h12026 / 1101\_reson8125 / 2009-126 / 311\_1818  
**Profile/Beam:** 1469/233  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/1101_reson8125/2009-126/311_1818	1469/233	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

0 ¾fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 0fm 4ft (531\_1)  
 1.3m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 1.309 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images



Figure 1.8.1

**1.9) Profile/Beam - 1016/232 from h12026 / 2801\_reson7125\_hf\_512 / 2009-120 / 000\_1853**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 31' 01.2" N, 133° 16' 28.5" W  
**Least Depth:** 14.81 m (= 48.60 ft = 8.100 fm = 8 fm 0.60 ft)  
**TPU (±1.96σ):** THU (TPEh) ±1.962 m ; TVU (TPEv) ±0.265 m  
**Timestamp:** 2009-120.18:56:04.644 (04/30/2009)  
**Survey Line:** h12026 / 2801\_reson7125\_hf\_512 / 2009-120 / 000\_1853  
**Profile/Beam:** 1016/232  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2801_reson7125_hf_512/2009-120/000_1853	1016/232	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

8fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 0ft (531\_1)  
 14.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam





Feature Images

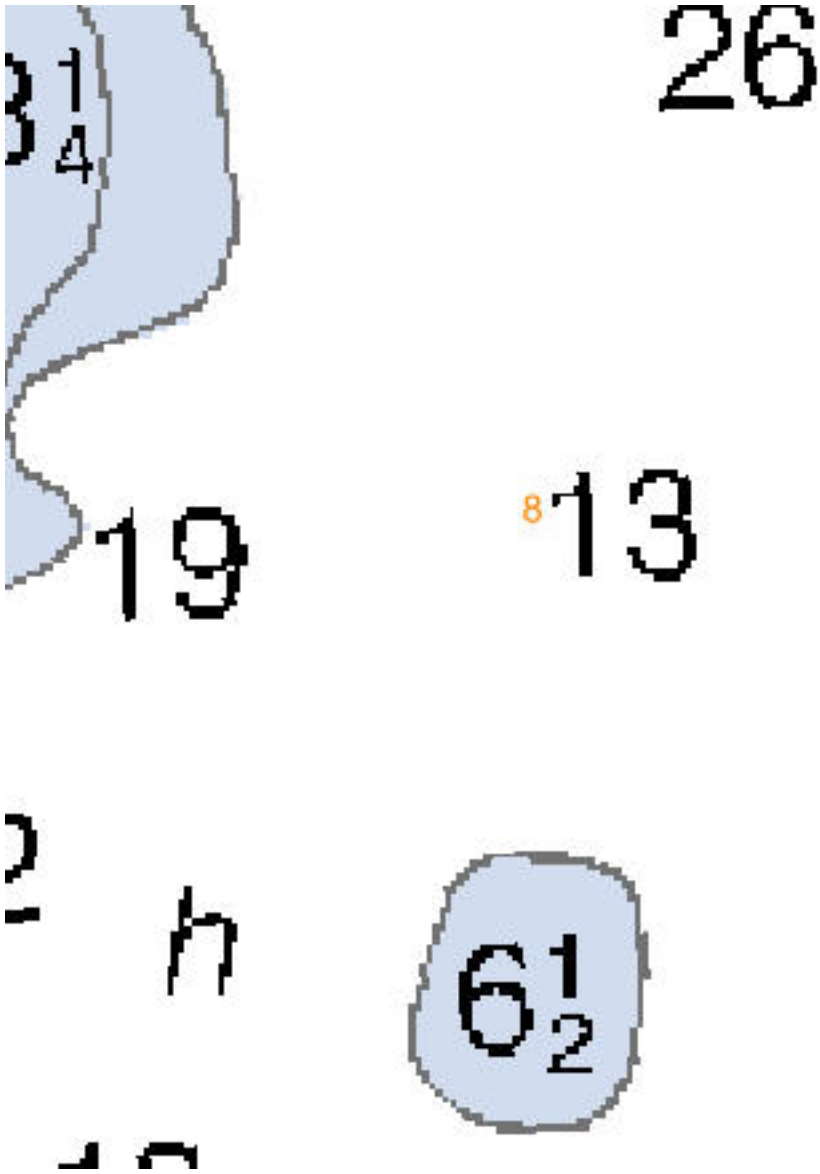


Figure 1.9.1

**1.10) Profile/Beam - 1207/512 from h12026 / 2801\_reson7125\_hf\_512 / 2009-120 / 000\_2110**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 52.9" N, 133° 16' 51.6" W  
**Least Depth:** 10.38 m (= 34.04 ft = 5.673 fm = 5 fm 4.04 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.968 m ; **TVU (TPEv)** ±0.278 m  
**Timestamp:** 2009-120.21:14:43.915 (04/30/2009)  
**Survey Line:** h12026 / 2801\_reson7125\_hf\_512 / 2009-120 / 000\_2110  
**Profile/Beam:** 1207/512  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2801_reson7125_hf_512/2009-120/000_2110	1207/512	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

5 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 5fm 4ft (531\_1)  
 10.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 10.375 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

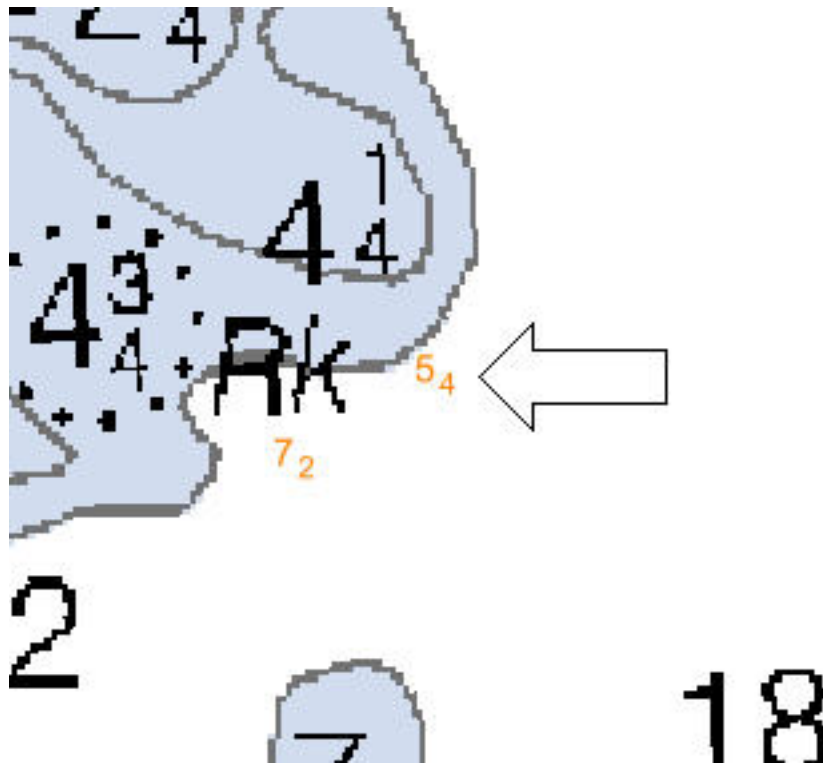


Figure 1.10.1

**1.11) Profile/Beam - 1419/26 from h12026 / 2801\_reson7125\_hf\_512 / 2009-120 / 000\_2110**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 51.3" N, 133° 16' 56.6" W  
**Least Depth:** 13.43 m (= 44.05 ft = 7.341 fm = 7 fm 2.05 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.969 m ; **TVU (TPEv)** ±0.280 m  
**Timestamp:** 2009-120.21:15:08.687 (04/30/2009)  
**Survey Line:** h12026 / 2801\_reson7125\_hf\_512 / 2009-120 / 000\_2110  
**Profile/Beam:** 1419/26  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2801_reson7125_hf_512/2009-120/000_2110	1419/26	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

7 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 7fm 2ft (531\_1)  
 13.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 13.426 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

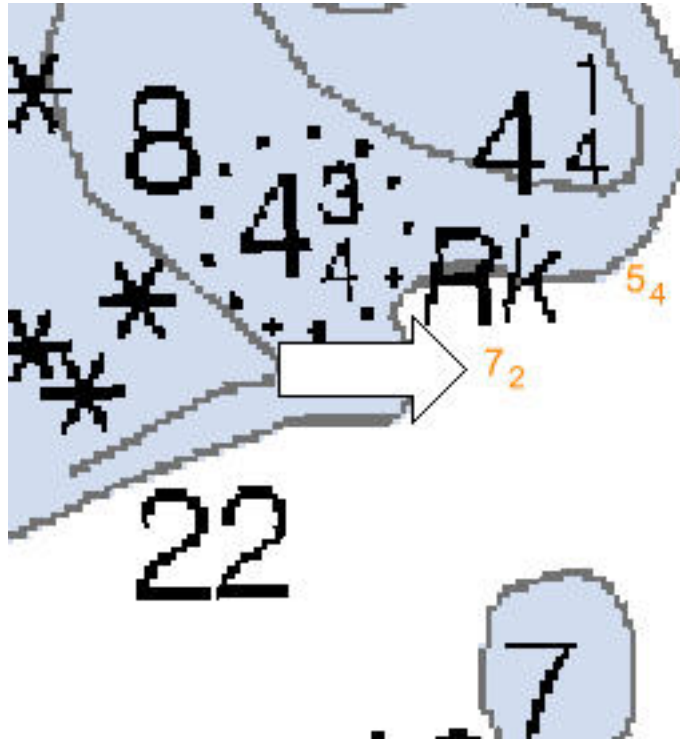


Figure 1.11.1



**1.12) Profile/Beam - 1217/508 from h12026 / 2801\_reson7125\_hf\_512 / 2009-126 / 000\_1753**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 28' 04.7" N, 133° 14' 24.7" W  
**Least Depth:** 11.46 m (= 37.59 ft = 6.264 fm = 6 fm 1.59 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.973 m ; **TVU (TPEv)** ±0.287 m  
**Timestamp:** 2009-126.17:58:18.749 (05/06/2009)  
**Survey Line:** h12026 / 2801\_reson7125\_hf\_512 / 2009-126 / 000\_1753  
**Profile/Beam:** 1217/508  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2801_reson7125_hf_512/2009-126/000_1753	1217/508	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

6 ¼fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 6fm 1ft (531\_1)  
 11.5m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam



Feature Images

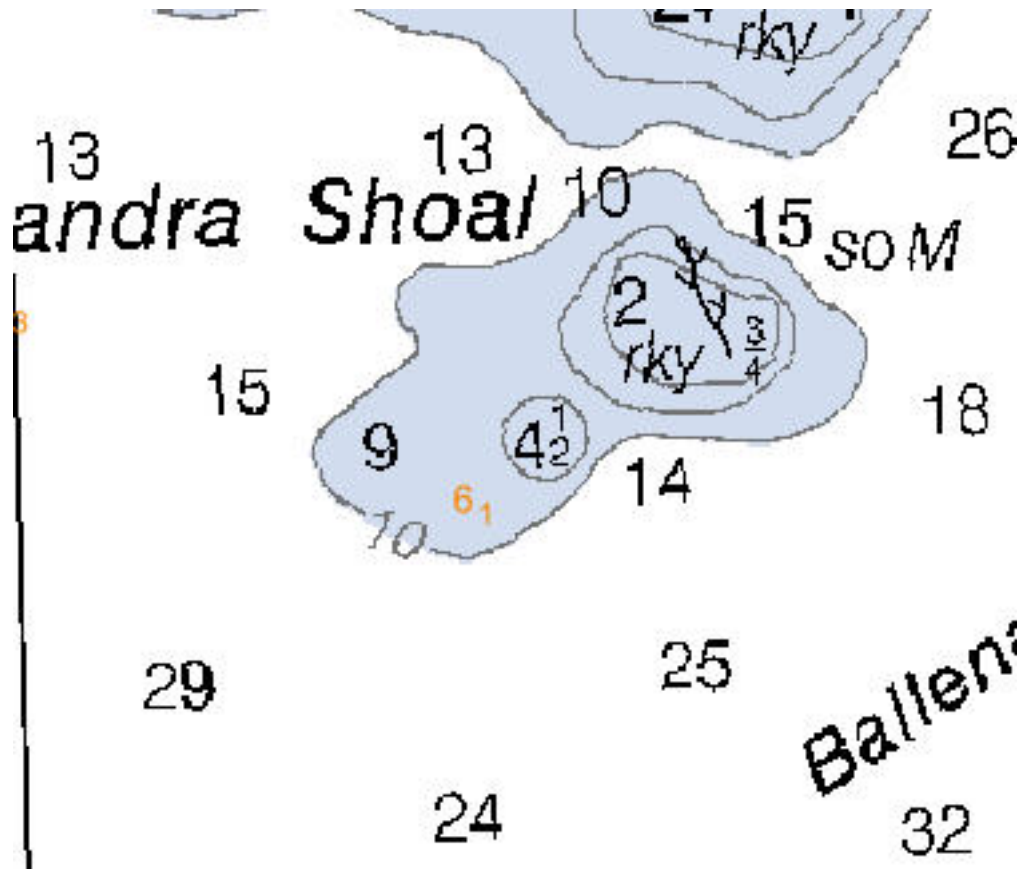


Figure 1.12.1

**1.13) Profile/Beam - 3403/221 from h12026 / 2801\_reson7125\_hf\_512 / 2009-126 / 000\_1801**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 28' 42.0" N, 133° 13' 47.8" W  
**Least Depth:** 15.84 m (= 51.98 ft = 8.663 fm = 8 fm 3.98 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.265 m  
**Timestamp:** 2009-126.18:13:43.432 (05/06/2009)  
**Survey Line:** h12026 / 2801\_reson7125\_hf\_512 / 2009-126 / 000\_1801  
**Profile/Beam:** 3403/221  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2801_reson7125_hf_512/2009-126/000_1801	3403/221	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

8 ½fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 4ft (531\_1)  
 15.8m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090601  
 SORIND - US,US,Survy,H12026  
 TECSOU - 3:found by multi-beam



Feature Images

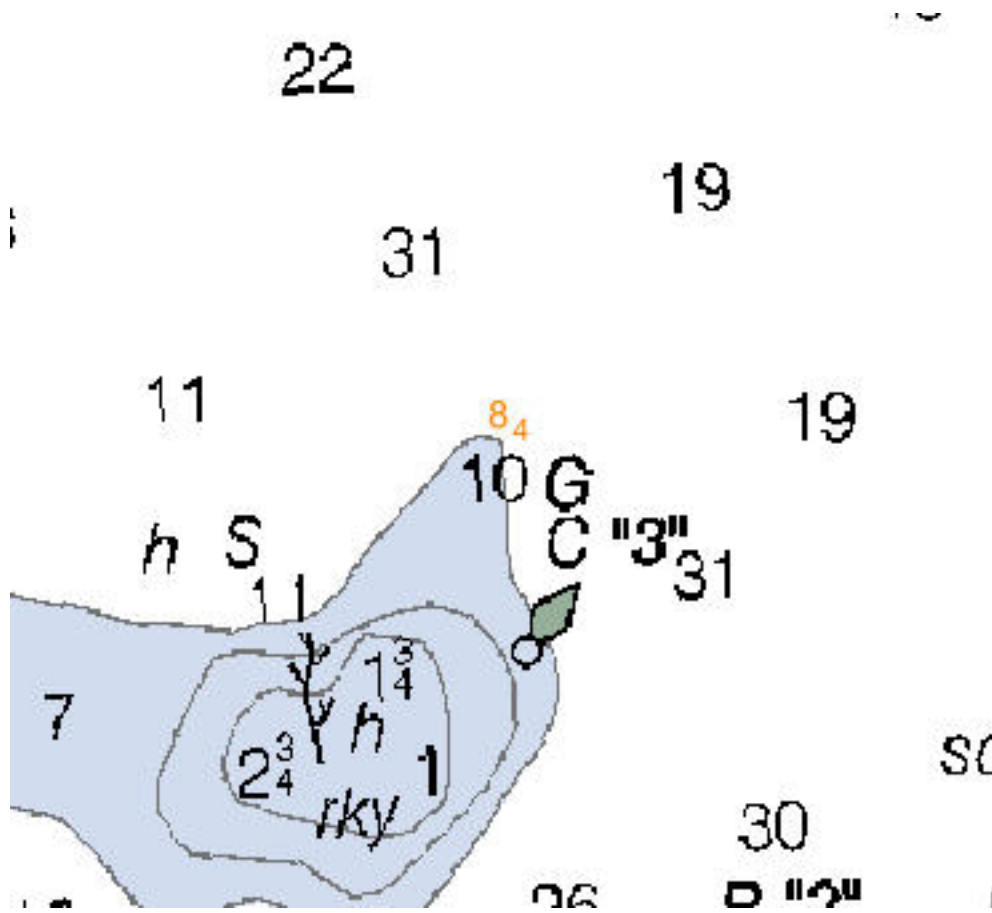


Figure 1.13.1

**1.14) Profile/Beam - 150/162 from h12026 / 2801\_reson7125\_lf\_256 / 2009-117 / 000\_2218**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 29' 52.8" N, 133° 15' 13.5" W  
**Least Depth:** 15.91 m (= 52.21 ft = 8.702 fm = 8 fm 4.21 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.267 m  
**Timestamp:** 2009-117.22:18:49.390 (04/27/2009)  
**Survey Line:** h12026 / 2801\_reson7125\_lf\_256 / 2009-117 / 000\_2218  
**Profile/Beam:** 150/162  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2801_reson7125_lf_256/2009-117/000_2218	150/162	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

8 ¾fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 4ft (531\_1)  
 15.9m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 15.914 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged



### Feature Images

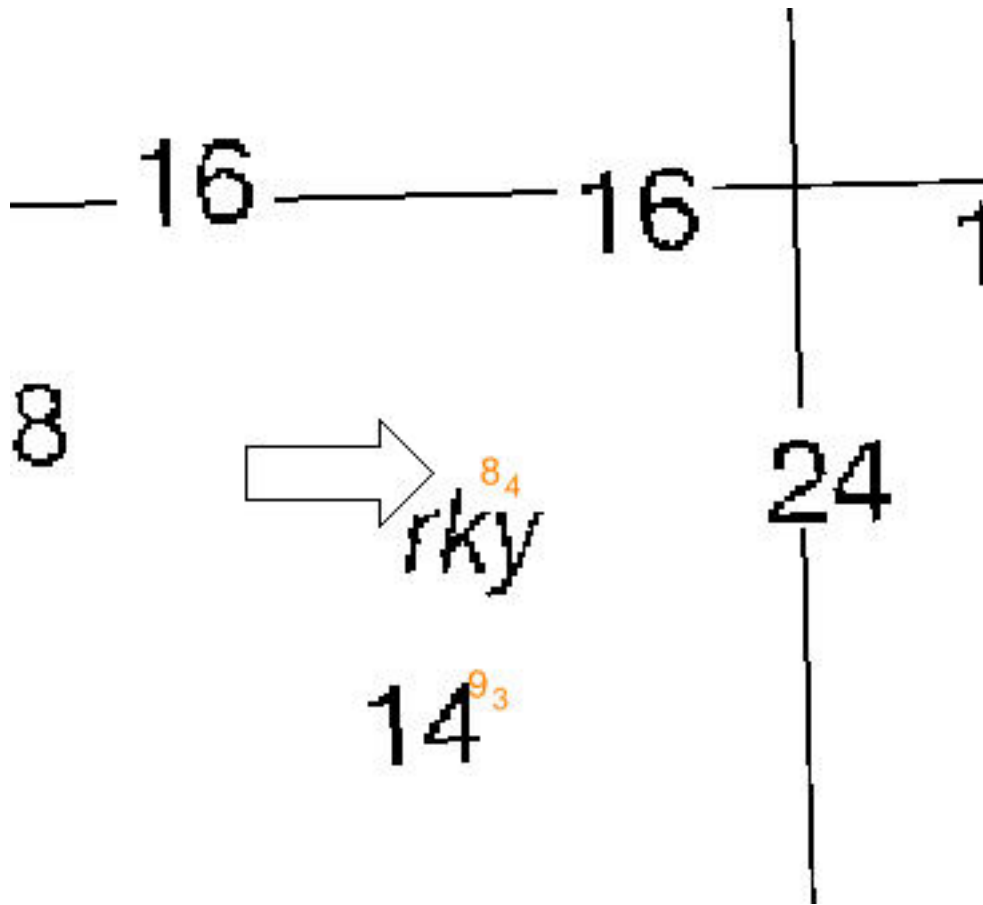


Figure 1.14.1

**1.15) Profile/Beam - 292/15 from h12026 / 2802\_reson7125\_hf\_512 / 2009-131 / 000\_1814**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 28.1" N, 133° 16' 58.3" W  
**Least Depth:** 9.21 m (= 30.21 ft = 5.034 fm = 5 fm 0.21 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.966 m ; **TVU (TPEv)** ±0.273 m  
**Timestamp:** 2009-131.18:15:24.756 (05/11/2009)  
**Survey Line:** h12026 / 2802\_reson7125\_hf\_512 / 2009-131 / 000\_1814  
**Profile/Beam:** 292/15  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2802_reson7125_hf_512/2009-131/000_1814	292/15	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

5fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 5fm 0ft (531\_1)  
 9.2m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 9.207 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

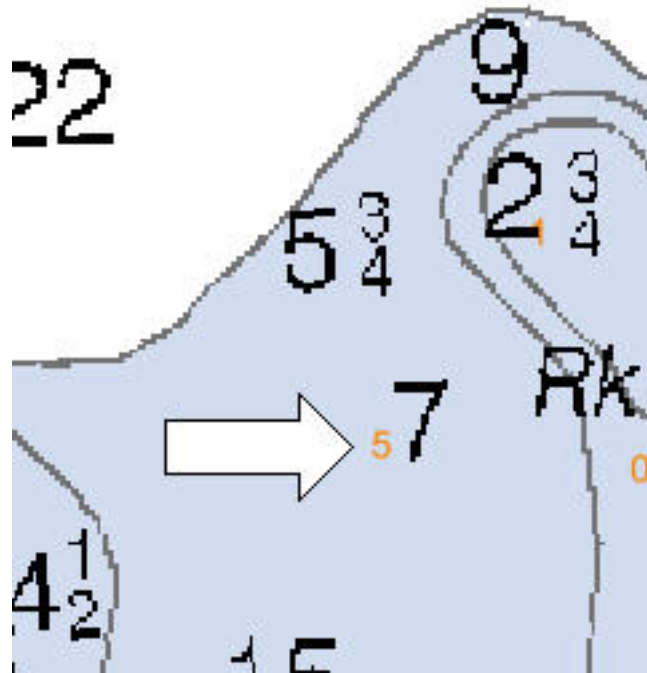


Figure 1.15.1

**1.16) Profile/Beam - 467/1 from h12026 / 2802\_reson7125\_hf\_512 / 2009-131 / 000\_1959**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 29' 13.7" N, 133° 17' 24.8" W  
**Least Depth:** 2.92 m (= 9.57 ft = 1.594 fm = 1 fm 3.57 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.265 m  
**Timestamp:** 2009-131.20:00:02.026 (05/11/2009)  
**Survey Line:** h12026 / 2802\_reson7125\_hf\_512 / 2009-131 / 000\_1959  
**Profile/Beam:** 467/1  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2802_reson7125_hf_512/2009-131/000_1959	467/1	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

1 ½fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 3ft (531\_1)  
 2.9m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 2.916 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

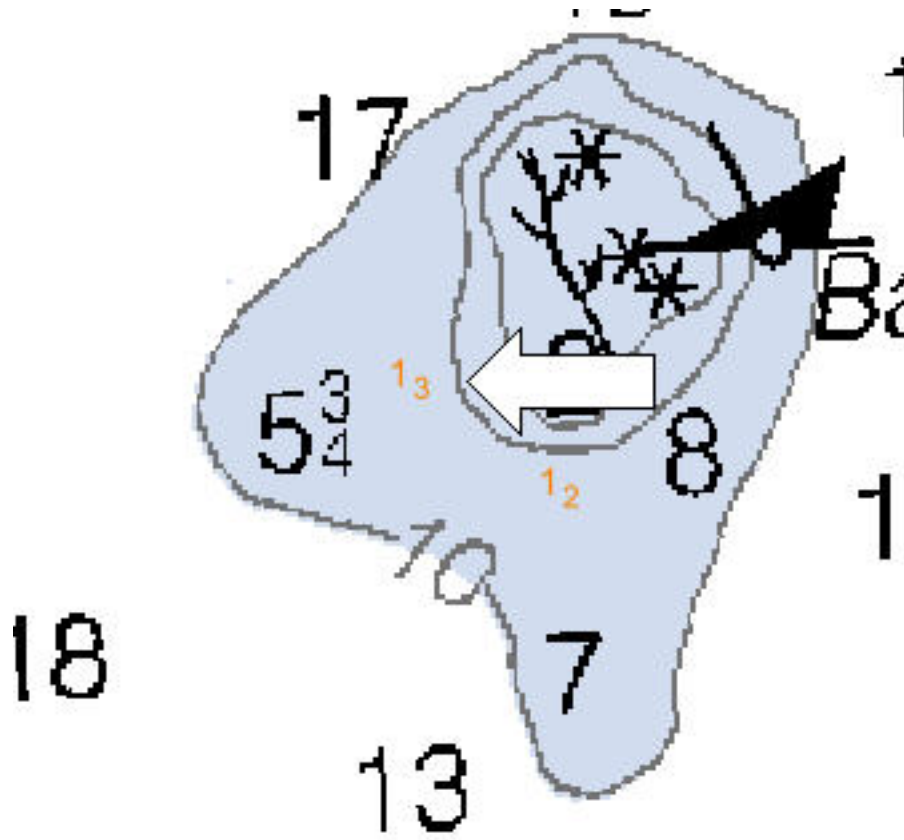


Figure 1.16.1

**1.17) Profile/Beam - 1562/18 from h12026 / 2802\_reson7125\_lf\_256 / 2009-130 / 000\_2317**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 28' 13.6" N, 133° 15' 00.3" W  
**Least Depth:** 17.34 m (= 56.89 ft = 9.482 fm = 9 fm 2.89 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.981 m ; **TVU (TPEv)** ±0.314 m  
**Timestamp:** 2009-130.23:21:48.216 (05/10/2009)  
**Survey Line:** h12026 / 2802\_reson7125\_lf\_256 / 2009-130 / 000\_2317  
**Profile/Beam:** 1562/18  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 501\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2802_reson7125_lf_256/2009-130/000_2317	1562/18	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

9 ½fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 9fm 3ft (531\_1)  
 17.3m (500\_1, 501\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026



TECSOU - 3:found by multi-beam

VALSOU - 17.341 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

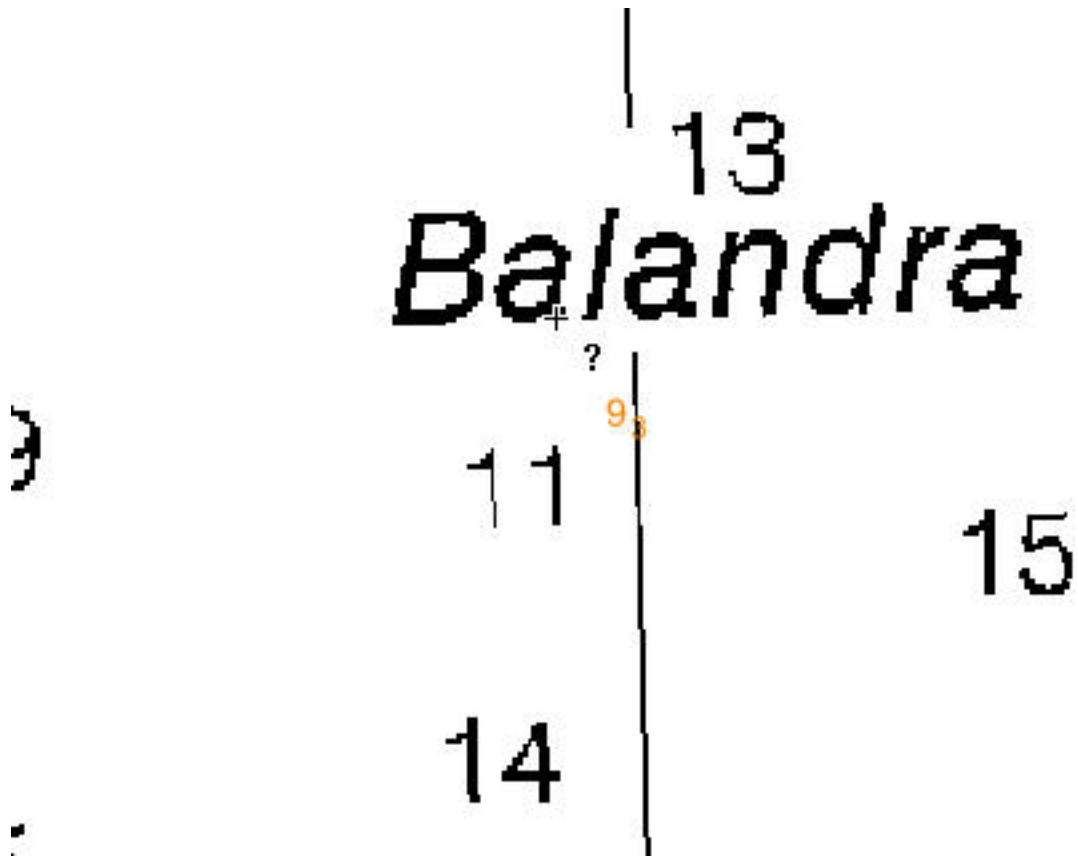


Figure 1.17.1

**1.18) Profile/Beam - 117/385 from h12026 / 2803\_reson7125\_hf\_512 / 2009-120 / 000\_1928**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 31' 22.7" N, 133° 13' 58.1" W  
**Least Depth:** 15.96 m (= 52.38 ft = 8.729 fm = 8 fm 4.38 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.966 m ; **TVU (TPEv)** ±0.271 m  
**Timestamp:** 2009-120.19:29:03.555 (04/30/2009)  
**Survey Line:** h12026 / 2803\_reson7125\_hf\_512 / 2009-120 / 000\_1928  
**Profile/Beam:** 117/385  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2803_reson7125_hf_512/2009-120/000_1928	117/385	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

8 ¾fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 4ft (531\_1)  
 16.0m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 15.964 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

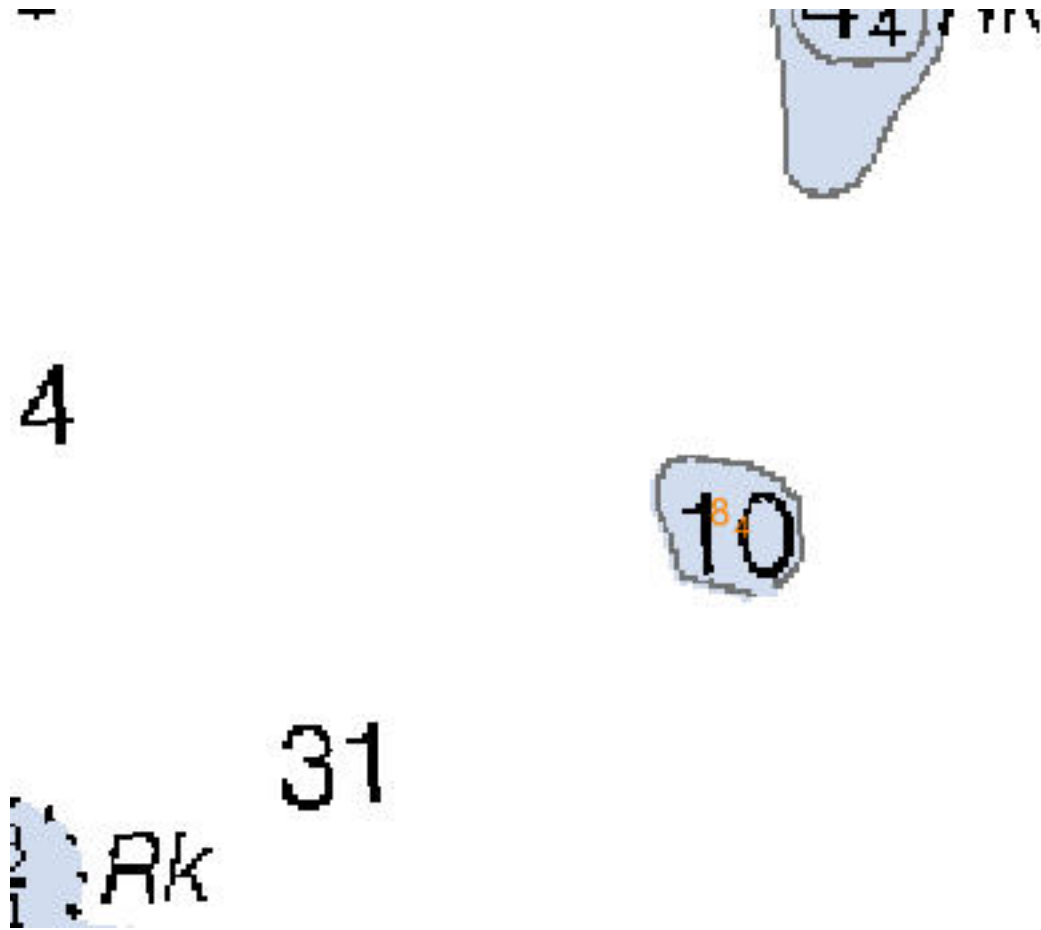


Figure 1.18.1

**1.19) Profile/Beam - 707/33 from h12026 / 2803\_reson7125\_hf\_512 / 2009-120 / 000\_2121**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 30' 51.9" N, 133° 14' 33.9" W  
**Least Depth:** 14.76 m (= 48.44 ft = 8.073 fm = 8 fm 0.44 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.972 m ; **TVU (TPEv)** ±0.285 m  
**Timestamp:** 2009-120.21:24:21.702 (04/30/2009)  
**Survey Line:** h12026 / 2803\_reson7125\_hf\_512 / 2009-120 / 000\_2121  
**Profile/Beam:** 707/33  
**Charts Affected:** 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2803_reson7125_hf_512/2009-120/000_2121	707/33	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

8fm (17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 0ft (531\_1)  
 14.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 14.763 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

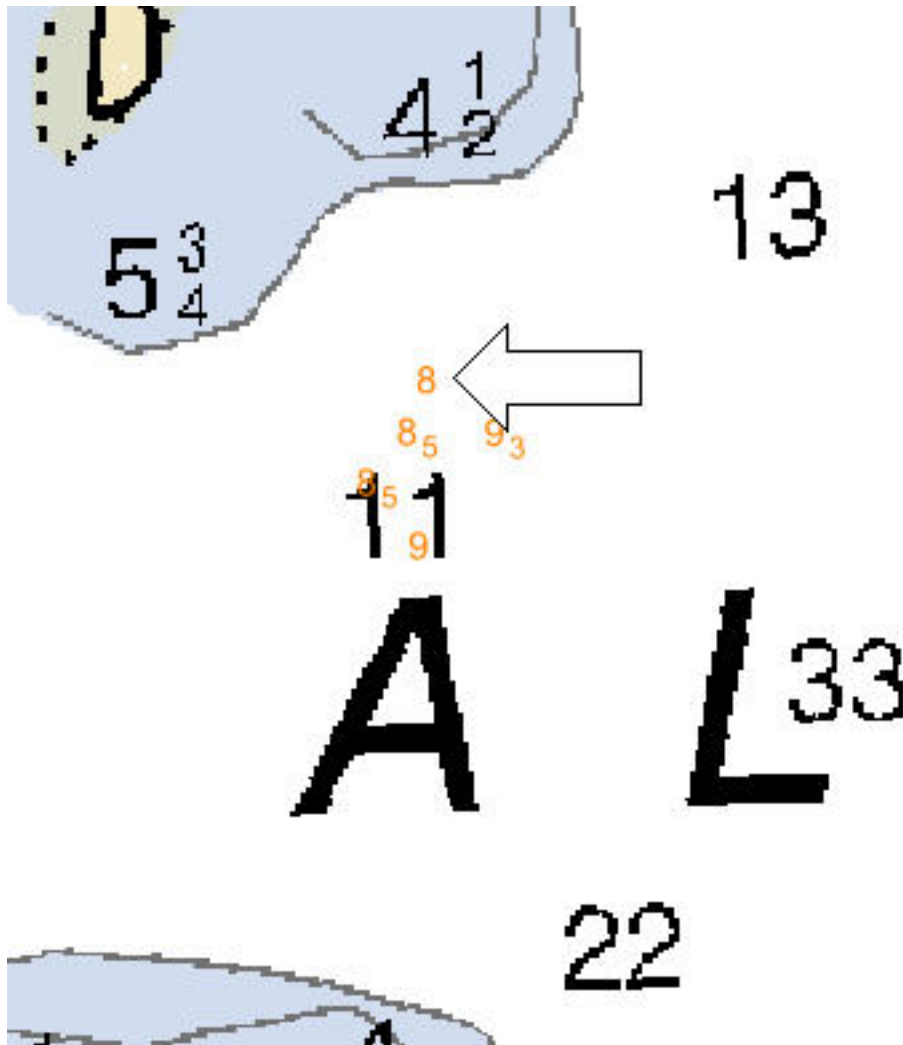


Figure 1.19.1



**1.20) Profile/Beam - 510/456 from h12026 / 2803\_reson7125\_hf\_512 / 2009-120 / 000\_2357**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 31' 54.9" N, 133° 14' 27.7" W  
**Least Depth:** 13.42 m (= 44.03 ft = 7.338 fm = 7 fm 2.03 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.970 m ; **TVU (TPEv)** ±0.280 m  
**Timestamp:** 2009-120.23:58:58.507 (04/30/2009)  
**Survey Line:** h12026 / 2803\_reson7125\_hf\_512 / 2009-120 / 000\_2357  
**Profile/Beam:** 510/456  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2803_reson7125_hf_512/2009-120/000_2357	510/456	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

7 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 7fm 2ft (531\_1)  
 13.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 13.419 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

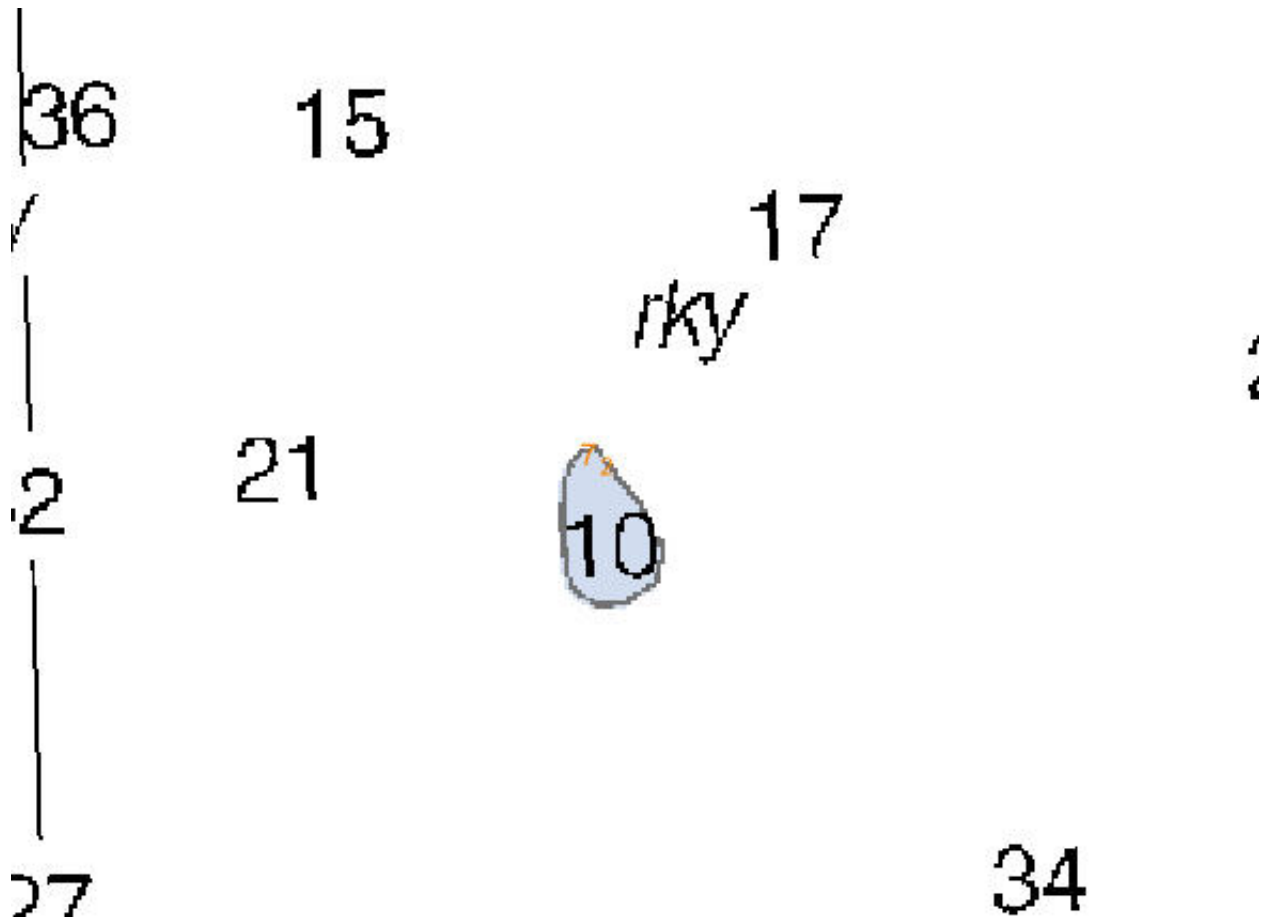


Figure 1.20.1

**1.21) Profile/Beam - 121/89 from h12026 / 2803\_reson7125\_hf\_512 / 2009-126 / 000\_1821**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 35.3" N, 133° 13' 53.7" W  
**Least Depth:** 10.83 m (= 35.54 ft = 5.924 fm = 5 fm 5.54 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.967 m ; **TVU (TPEv)** ±0.273 m  
**Timestamp:** 2009-126.18:22:19.854 (05/06/2009)  
**Survey Line:** h12026 / 2803\_reson7125\_hf\_512 / 2009-126 / 000\_1821  
**Profile/Beam:** 121/89  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2803_reson7125_hf_512/2009-126/000_1821	121/89	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

5 ¾fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 5fm 5ft (531\_1)  
 10.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 10.833 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

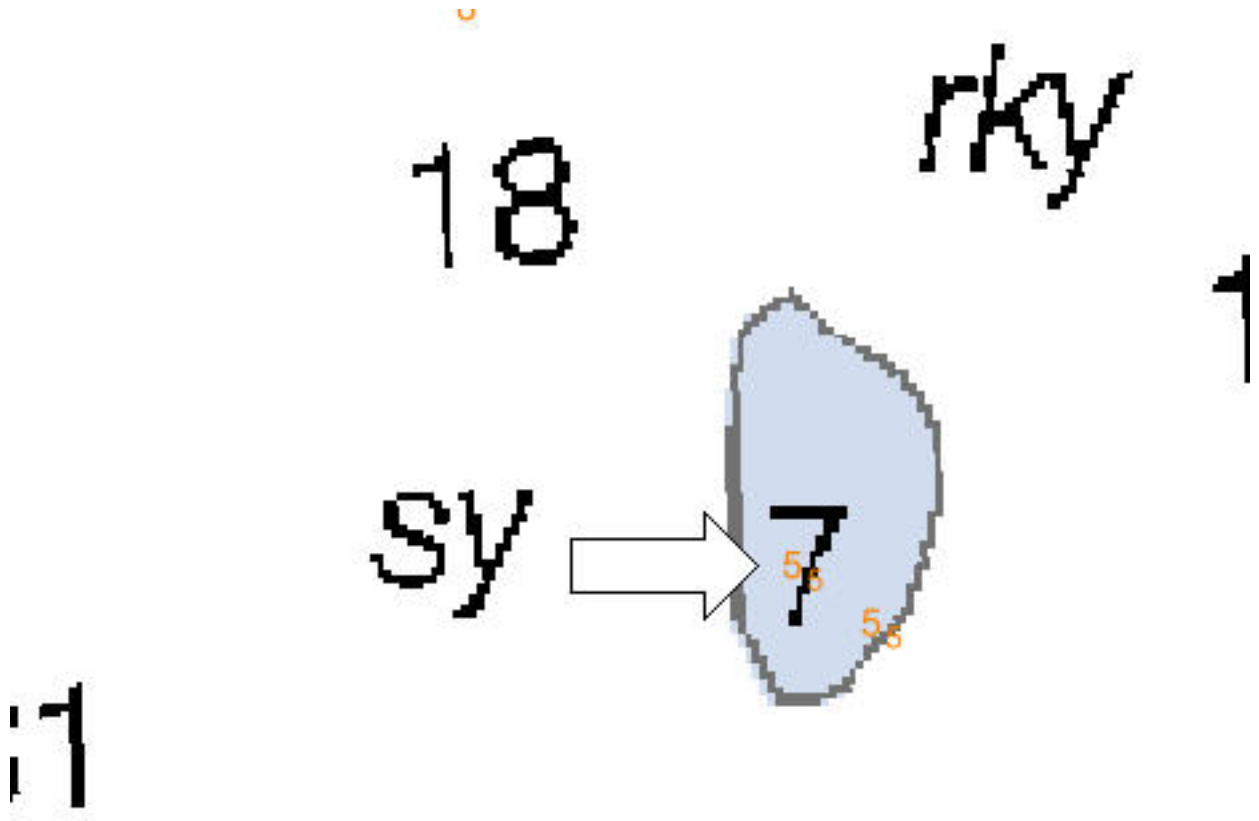


Figure 1.21.1

**1.22) Profile/Beam - 229/457 from h12026 / 2803\_reson7125\_hf\_512 / 2009-126 / 000\_2028**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 32' 27.4" N, 133° 17' 32.7" W  
**Least Depth:** 7.87 m (= 25.82 ft = 4.303 fm = 4 fm 1.82 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.965 m ; **TVU (TPEv)** ±0.271 m  
**Timestamp:** 2009-126.20:29:32.443 (05/06/2009)  
**Survey Line:** h12026 / 2803\_reson7125\_hf\_512 / 2009-126 / 000\_2028  
**Profile/Beam:** 229/457  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h12026/2803_reson7125_hf_512/2009-126/000_2028	229/457	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

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

4 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 4fm 2ft (531\_1)  
 7.9m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20090601  
 SORIND - US,US,Survy,H12026

TECSOU - 3:found by multi-beam

VALSOU - 7.869 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged



### Feature Images

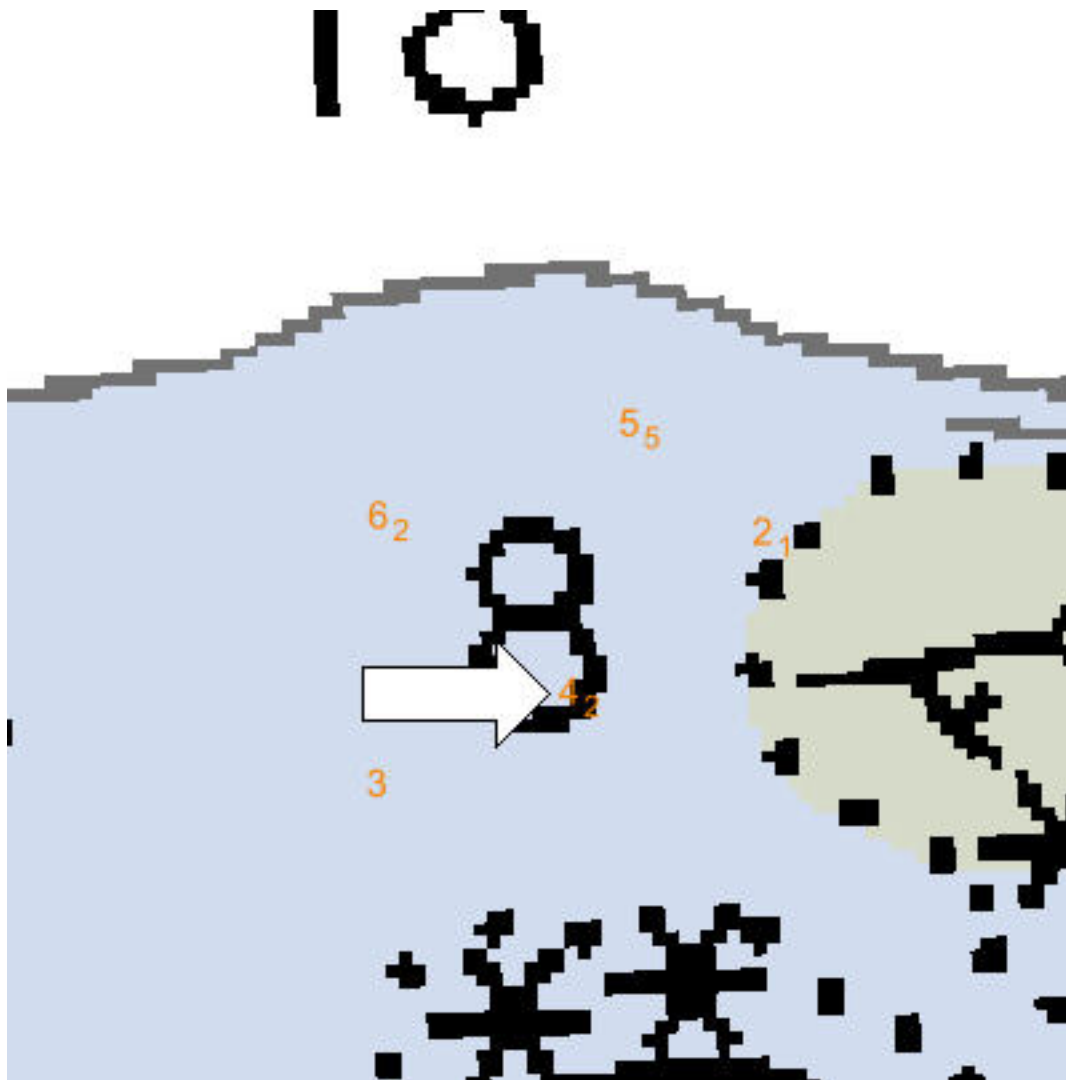


Figure 1.22.1



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** August 26, 2009

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-O190-RA-2009  
**HYDROGRAPHIC SHEET:** H12026

**LOCALITY:** West of Prince of Wales Island Western San Albero Bay  
**TIME PERIOD:** April 27 - June 7, 2009

**TIDE STATION USED:** 945-0463 Trocadero Bay  
Lat. 55° 21.1'N Long. 132° 56.3' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.825 meters

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

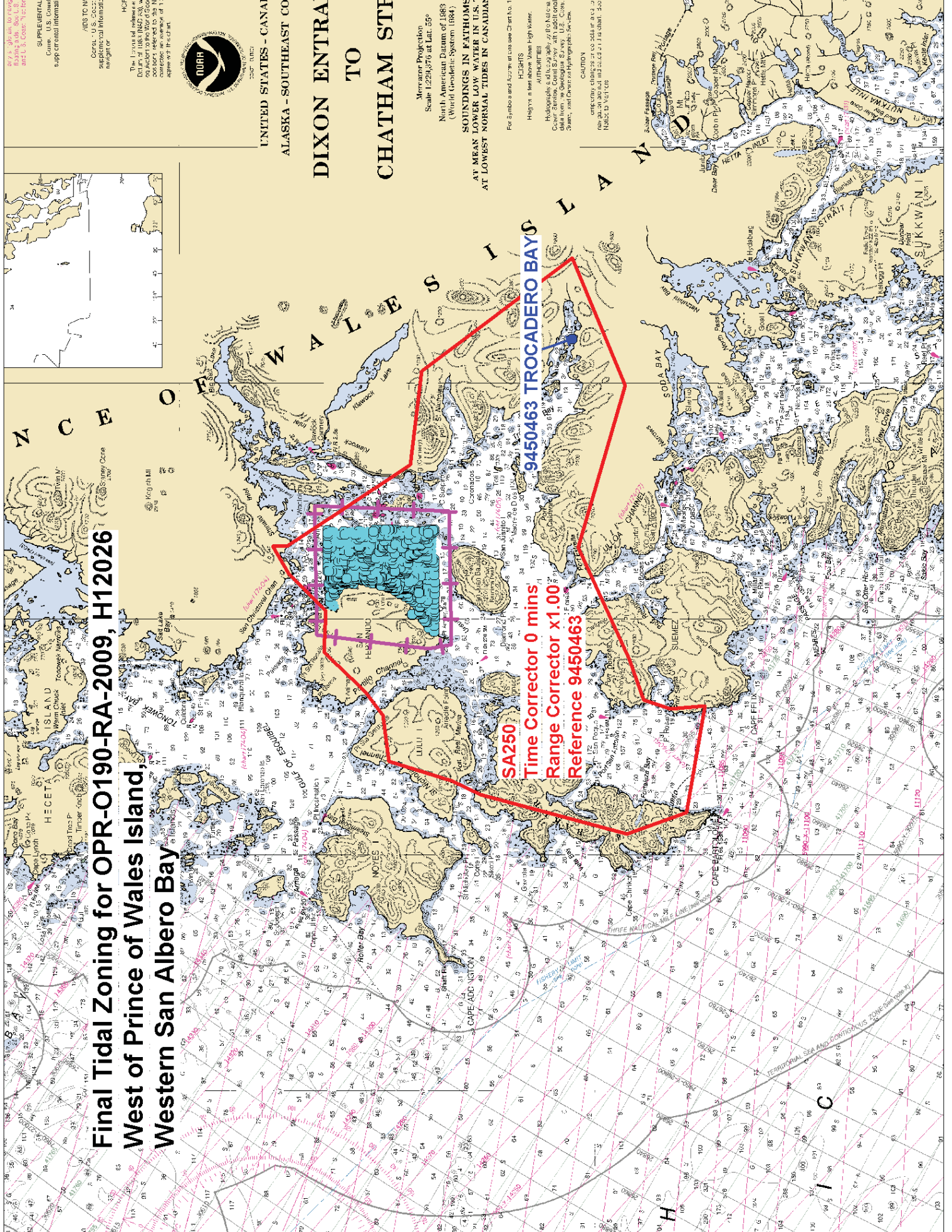
Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/  
NOS, email=peter.stone@noaa.gov, c=US  
Date: 2009.08.27 16:01:51 -04'00'

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CHIEF, OCEANOGRAPHIC DIVISION



**Final Tidal Zoning for OPR-0190-RA-2009, H12026  
West of Prince of Wales Island,  
Western San Albero Bay**



It is the user's responsibility to verify the accuracy of the information on this chart before use.

**SUPPLEMENTAL**  
Chart: U.S. Coast and Geodetic Survey  
supplemental information

**NOTES TO USER**  
General: U.S. Coast and Geodetic Survey  
supplemental information  
navigate on

The U.S. Coast and Geodetic Survey is not responsible for the accuracy of the information on this chart. The user is advised to verify the accuracy of the information on this chart before use.



**UNITED STATES - CANAL  
ALASKA - SOUTHEAST COAST**

**DIXON ENTRANCE  
TO  
CHATHAM STRAIT**

**Metric Projection**  
Scale 1:224,376 at Lat. 59°  
North American Datum of 1983  
(World Geodetic System 1984)

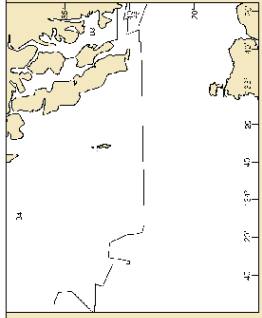
**SOUNDINGS IN METERS  
AT MEAN LOWER LOW WATER IN U.S.  
AT LOWEST NORMAL TIDES IN CANADIAN**

**HEIGHTS**  
Height in feet above high water.  
Height in meters above high water.  
Chart Soundings: Additional data from the Geodetic Survey, U.S. Coast and Geodetic Survey, and other hydrographic surveys.

**CAUTION**  
Sounding changes of 0.60 meters or 2.0 feet are shown in red on this chart. See Chart No. 1.

**SA250**  
**Time Corrector 0 mins**  
**Range Corrector x1.00**  
**Reference 9450463**

**9450463 TROCADERO BAYS**



**HECETA ISLAND**  
**PRINCE OF WALES ISLAND**  
**WESTERN SAN ALBERO BAY**  
**SODA BAY**  
**CHATHAM STRAIT**  
**SUKKAWANI**

**H12026 HCell Report**  
Katie Reser, Physical Scientist  
Pacific Hydrographic Branch

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

HCell compilation of survey H12026 used:

Office of Coast Survey HCell Specifications: Draft, Version: 4.0, 17 March, 2010.  
HCell Reference Guide: Version 2.0, 22 February, 2010.

**2. Compilation Scale**

Depths and features for HCell H12026 was compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17404	1:40,000	14 <sup>th</sup>	10/01/2008	01/29/2011
17405	1:40,000	16 <sup>th</sup>	10/01/2008	11/27/2010
17406	1:40,000	7 <sup>th</sup>	02/01/2004	01/29/2011

The following ENCs were also used during compilation:

Chart	Scale
US5AK4AM	1:40,000
US5AK4BM	1:40,000
US5AK4CM	1:40,000

**3. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from a 4-meter multibeam combined surface and two 3-meter finalized LIDAR surfaces in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-5	10	3
10	20	4
20	50	4.5
50	500	5

In CARIS BASE Editor soundings were manually selected from the high density sounding layer (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. In areas where there was an overlap between

multibeam and LIDAR data, multibeam data was honored over LIDAR data except in cases where the LIDAR data was shoaler.

#### 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	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 H12026_SS.000
0	0.0000	0.2286	0.125	0
3	5.4864	5.715	3.125	3
5	9.144	9.373	5.125	5
10	18.288	18.517	10.125	10
50	92.8116	92.8116	50.750	50

With the exception of zero contours included in the \*\_CS file, contours have not been de-conflicted 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, COALNE, DEPCNT and SBDARE objects 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 H12026:

M\_QUAL

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 de-conflicted 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. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue notes
COALNE	GC and charted coastline
DEPCNT	Zero contours
LNDARE	Islands and islets
LNDELV	Heights
M_QUAL	Data quality meta object
OBSTRN	Foul areas
SBDARE	Rocky seabed areas, ledges and bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WEDKLP	Kelp
WRECKS	Wreck

The \*\_SS HCell contains the following Objects:

DEPCNT	Generalized contours at chart scale intervals
SOUNDG	Soundings at the survey scale density

## 8. Spatial Framework

### 8.1 Coordinate System

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

### 8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

## 9. Data Processing Notes

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

## 10. QA/QC and ENC Validation Checks

H12026 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.

## 11. Products

### 11.1 HSD, MCD and CGTP Deliverables

H12026_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H12026_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H12026_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12026_Outline.gml	Survey outline
H12026_Outline.xsd	Survey outline

## 11.2 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, 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.
Northport Systems, Inc., Fugawi Marine ENC Ver.3.1.0.435	Independent inspection of final HCells using a COTS viewer.

## 12. Contacts

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

Katie Reser  
Physical Scientist  
Pacific Hydrographic Branch  
Seattle, WA  
206-526-6864  
[katie.reser@noaa.gov](mailto:katie.reser@noaa.gov)



APPROVAL SHEET  
H12026

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 disapproval 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.