

H12088

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. ....

Registry No. H12088

### LOCALITY

State Alaska

General Locality Southern Portion of Cook Inlet

Sublocality Seldovia 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>H12088</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: <b>N/A</b></p>
<p>State <u>Alaska</u></p> <p>General Locality <u>Southern Portion of Cook Inlet</u></p> <p>Sub-Locality <u>Seldovia Bay</u></p> <p>Scale <u>1:10,000</u> Date of Survey <u>08/12/2009 to 09/05/2009</u></p> <p>Instructions dated <u>7/16/2009</u> Project No. <u>OPR-P357-RA-FA-09</u></p> <p>Vessel <u>RA1 (1101), RA2 (1103), RA3 (2803), RA4 (2801), RA5 (2802), RA6 (2804)</u></p> <hr/> <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 8125, 7125 and Knudsen 320M</u></p> <p>SAR by <u>Annie Raymond</u> Compilation by <u>Fernando Ortiz</u></p> <p>Soundings compiled in <u>Fathoms</u></p>	
<p>REMARKS: <u>All times are UTC. UTM Projection 5</u></p> <p><u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. Revisions and end notes in red were generated during office processing.</u></p> <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 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 H12088

Project OPR-P357-RA-FA-09  
Southern Portion of Cook Inlet, Alaska  
Seldovia Bay  
Scale 1:10,000  
August – September, 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-P357-RA-FA-09 dated July 16, 2009 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area is Seldovia Bay, Alaska and corresponds to sheet “E” in the sheet layout provided with the Project Instructions. The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts, in addition to supporting a total regional examination of Kachemak Bay.

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. Additionally, the project instructions delineated Seldovia Bay as a “target area”, where additional complete MBES coverage to the 2 meter curve was required. Outside of the target area additional multibeam coverage was achieved in water depths between 8 m and 4 m that meet or exceed the project instruction requirements.<sup>1</sup> Total mileage acquired by each vessel and system is reference in Table 1.

Data Acquisition Type	Hull Number with Mileage (nm)						Total
	1101 1	103 2	801	2802 2	803	2804	
VBES (main scheme)	-	20.81	-	-	-	-	20.81
MBES (main scheme)	38.26	-	84.42	-	106.90	187.58	417.16
SSS (main scheme)	-	-	-	-	-	-	-
Crosslines	-	1.41	9.06	-	-	-	10.47
MBES Developments and Holidays	-	-	-	-	-	14.12	14.12
Shoreline	-	15.03	-	-	-	-	15.03
Bottom Samples	-	-	-	-	-	-	-
Total Number of Items Investigated	-	15	-	-	-	-	15
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	10.92

Table 1: Statistics for survey H12088

Limited Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12088, 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 August 2009.

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

Data acquisition was conducted from August 12 to September 5, 2009 (DN 224 to 248).

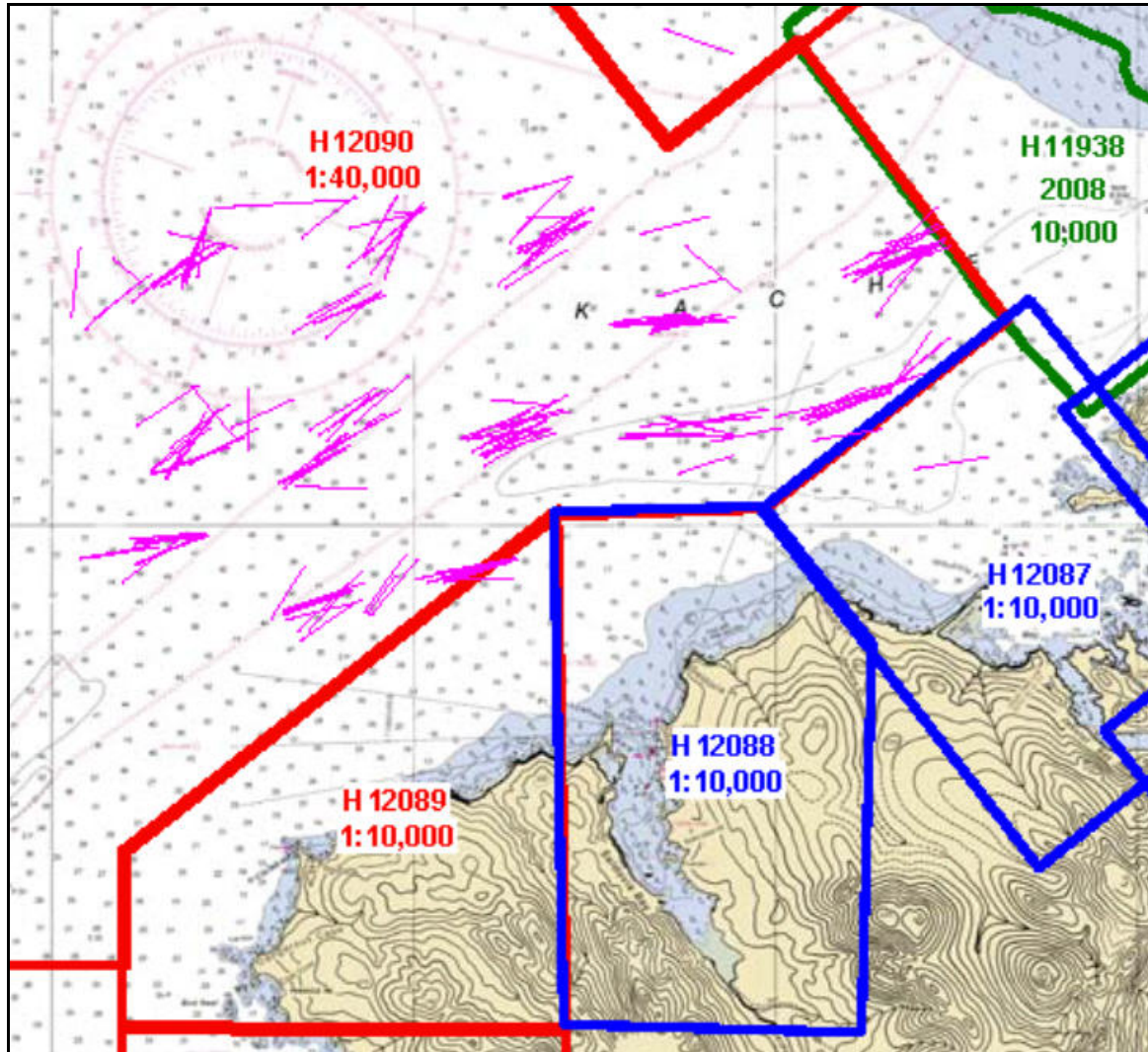


Figure 1: H12088 Survey Outline and Junctions

## 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-P357-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
1101	RA-1	29	2	Reson 8125 Multibeam Echosounder
1103	RA-2	29	2	Knudsen 320M Vertical Beam Echosounder Detached Positions
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
2804	RA-6	29	3.5	Reson 7125 Multibeam Echosounder

Table 2: Data acquisition vessels and systems for H12088

Sound speed profiles were measured in accordance with the Specifications and Deliverables using SEACAT SBE-19 and 19+ profilers, as well as the Brooke Ocean Technology Moving Vessel Profiler.

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-P357-RA-09 DAPR*.

No unusual vessel configurations were used for data acquisition.

## B.2. Quality Control

### B.2.a. Crosslines

Vertical Beam Echo Sounder (VBES) crosslines totaled 1.41 nautical miles, comprising 6.8% of main scheme hydrography. Crossline and main scheme bathymetry were manually compared in CARIS HIPS subset editor. Crosslines agreed within 0.1 meters of main scheme hydrography.<sup>2</sup>

Multibeam Echosounder (MBES) crosslines totaled 9.06 nautical miles, comprising 2.4% of main scheme MBES hydrography. *Rainier* was unable to achieve the required 4% multibeam crossline data due to time constraints on project operations. The main scheme bathymetry was manually compared to the crossline nadir beams in CARIS subset mode and agreed within 0.1 meters.<sup>3</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 H12088\_Final\_Combined surface in CARIS HIPS for analysis. Throughout the majority of the survey area, uncertainty values for H12088 fall below the IHO levels as described in the NOS Specifications and Deliverables.<sup>4</sup> The exception to these results occurred along the very near-shore areas when using the tilted Reson 8125 sonar<sup>5</sup> configuration; refer to OPR-P357-RA-09 Data Acquisition and Processing Report for specifics.



Figure 2: H12088 IHO Compliance

### B.2.c. Junctions

Survey H12088 junctions with surveys H12087, H12089, and H12090, which are sheets E, F, and G of the same project, respectively.<sup>6</sup> Surveys H12089 and H12090 were assigned the NOAA Ship *Fairweather* and a request was submitted for junction data from these two sheets. At the time of this report was compiled, no junction data was made available for junction comparison. The area of overlap between H12087 and H12088 was reviewed in CARIS subset editor for consistency and data were found to be in good agreement between 0.1 and 0.3 meters in water deeper than 30 meters.<sup>7</sup> The sheet limits and area of overlap for all sheet junctions are shown in Figure 1.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H12087	1:10,000	September 2010	East
H12089	1:10,000	August 2010	West
H12090	1:40,000	August 2010	North

Table 3: Junction Surveys

### 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

#### Atypical Sonar Settings

The Reson 7125 multibeam sonar installed on *Rainier* launch 2804 (RA-6) required significantly higher operator gain settings, than is normal, to achieve adequate bottom detection. Data acquired with the system appeared to be uncompromised.<sup>8</sup> Additional information is included in the *OPR-P357-RA-FA-09 DAPR*.

#### Horizontal Offset

All lines acquired by Launch 1101 (RA-1) on August 20, 2009 (DN 232) were found to have a horizontal offset of 2-3 meters. To correct this offset, post processing of the logged navigation data was completed with *Fairweather* provided base station data for DN 232 from their DGPS Base Station set-up in Port Graham, AK at 59°23'41.24"N 151°54'19.46"W. Using a single-base solution in Applanix POSPac MMS version 5.1 software package a smooth best estimate of trajectory (SBET) was created for Launch 1101 (RA-1) on DN 232. This SBET was applied to the multibeam data in CARIS HIPS using the Load Attitude/Navigation data utility. The application of the SBET corrected the positioning error and no horizontal offsets are evident in the data.<sup>9</sup>

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

#### Seldovia Marina

*Rainier* did not achieve complete MBES coverage within the limits of the Seldovia Smallboat Marina due to restricted maneuverability and marina infrastructure.<sup>10</sup> The survey found a controlling depth of 14 feet for the entrance channel to the marina, while a controlling depth of 12 feet was found for the entrance ways for the northern slips in the marina with shoaling further to the south.<sup>11</sup> The depths obtained are depicted in figure 3.

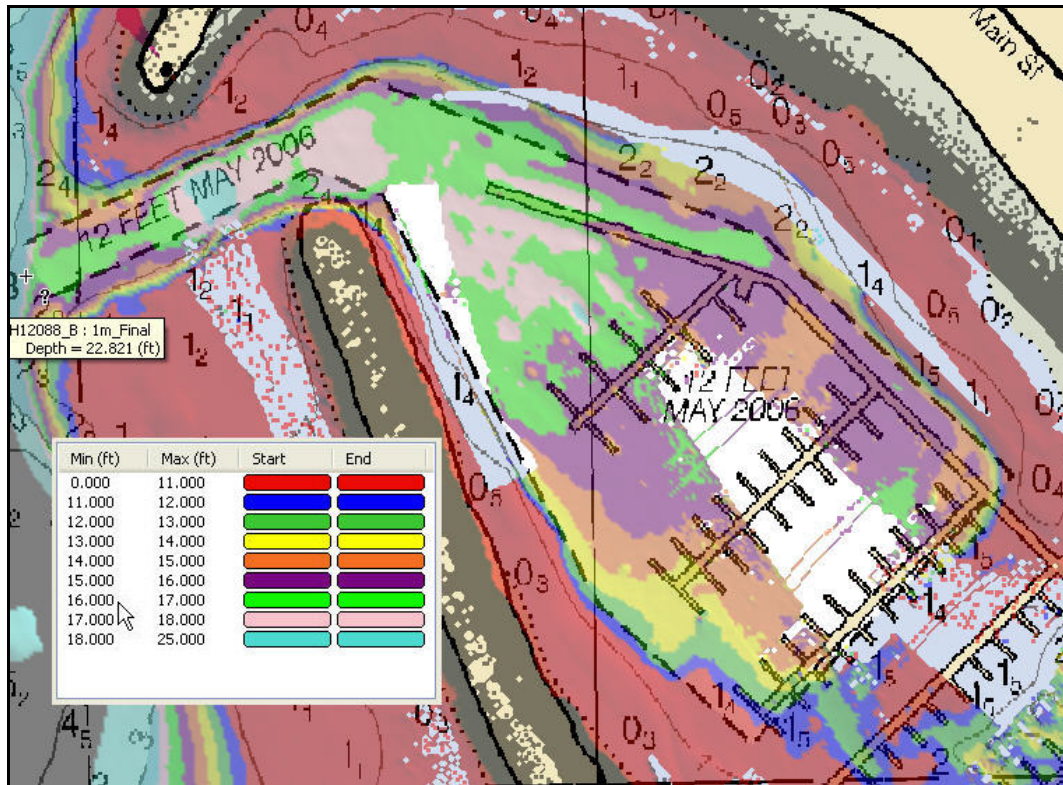


Figure 3: Seldovia Marina surveyed depths

Holidays

The holiday on the eastern side of Seldovia Bay (figure 4) is due to the inability to reach the 2 meter curve due to several rocks that were exposed at lower tides, which precluded launch operations in the area due to safety concerns. The rocks in this area are depicted in the H12088\_Final\_Features\_File.hob file. The holiday in figure 4 is 375 meters by 100 meters; the depth reached is between 3 and 4.5 meters.<sup>12</sup>

There is a holiday, 40 meters by 5 meters, located 0.82 nautical miles northwest of Seldovia Point (figure 5). The holiday was caused by a hypack freeze during acquisition. The corresponding multibeam backscatter side scan was examined and no navigationally significant items were found; additionally, the least depths were represented.<sup>13</sup>

The large holidays on the western side of Seldovia Bay are due to fishing nets that were set out during acquisition; these are not permanent features. The 2 meter curve was not met, but the majority of the depths obtained were between 2.5 and 4 meters, due to the inability to get inshore of the nets. The red line in figure 6 represents the location of fishing nets. The upper holiday in figure 5 is 700 meters by 375 meters, and the lower holiday is 1500 meters by 215 meters.<sup>14</sup>

There are several holidays located at the southern part of H12088 (figure 7) that were caused by weak returns on outer beams from the tilted Reson 8125 on Launch 1101 (RA-1). These holidays are located in the 2-3 meter depth range and the largest measures 12 meters by 12 meters.<sup>15</sup>

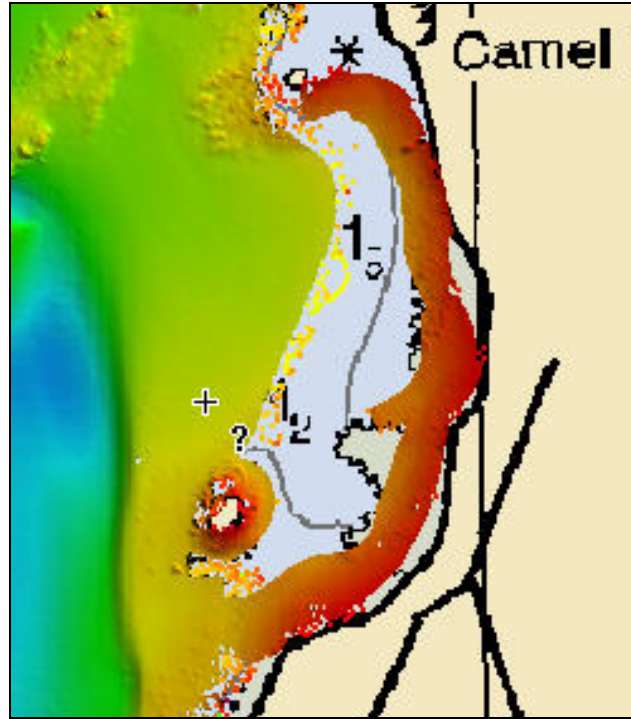


Figure 4: *Holiday*

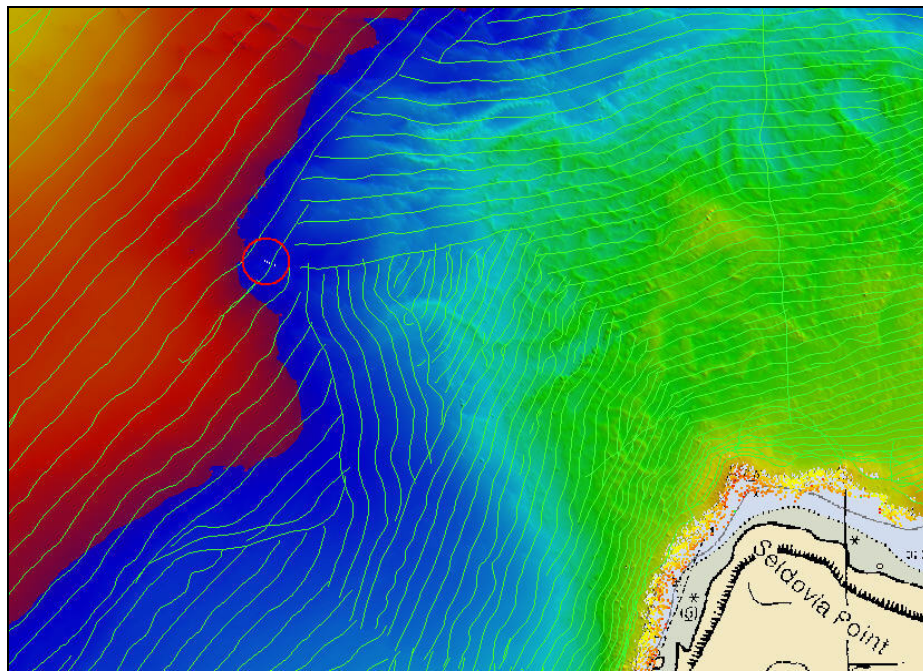


Figure 5: *Holiday*

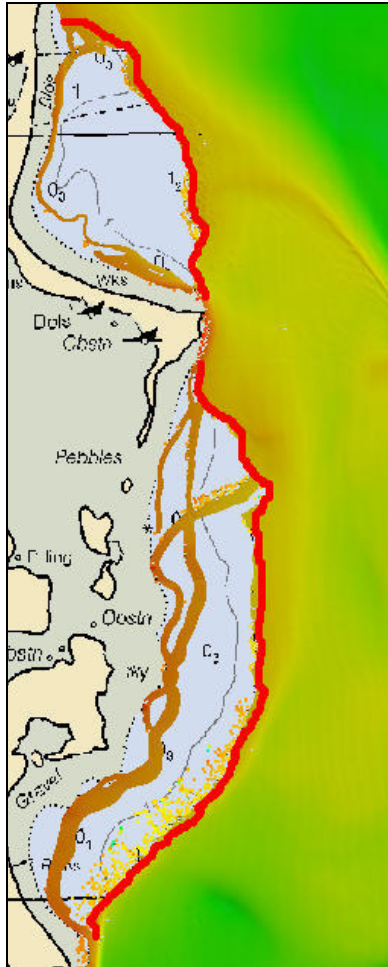


Figure 6: Holidays caused by fishing nets. The red line represents the location of these fishing nets

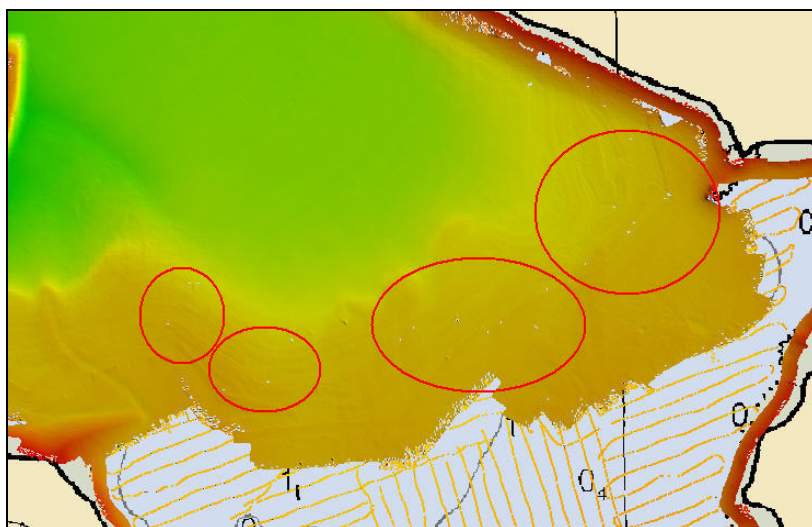


Figure 7: Holidays

Density of Soundings

Data density for survey H12088 met the 5 sounding per node density requirement with 97.9% of nodes having greater than 5 contributing soundings in accordance with the Specifications and Deliverables section 5.1.2.1. The analysis was performed using an ASCII file derived from the final combined surface for H12088. A Python script written by *Fairweather's* Weston Renoud was run on this ASCII file, which tallied the total nodes and nodes with at least five soundings contributing and calculated the overall percentage of passing nodes.

**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 H12088 conform to those detailed in the *OPR- P357-RA-09 DAPR*.

**B.4. Data Processing**

Data processing procedures for survey H12088 conform to those detailed in the DAPR. Data were processed 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 H12088 are listed in Table 4.

<b>Tide values:</b>	Measured	0.01 m	Zoning	0.10 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 H12088. 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 8 and 9.

<b>Depth Range (m)</b>	<b>Resolution (m)</b>
-5-23	1
20-52	2
46-115	4

*Table 5: Depth range and surface resolutions for H12088*

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.<sup>16</sup>

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.

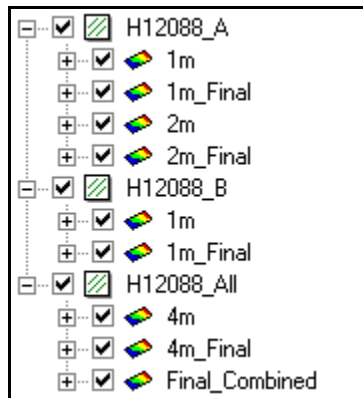


Figure 8: Field sheets and BASE surfaces submitted with H12088

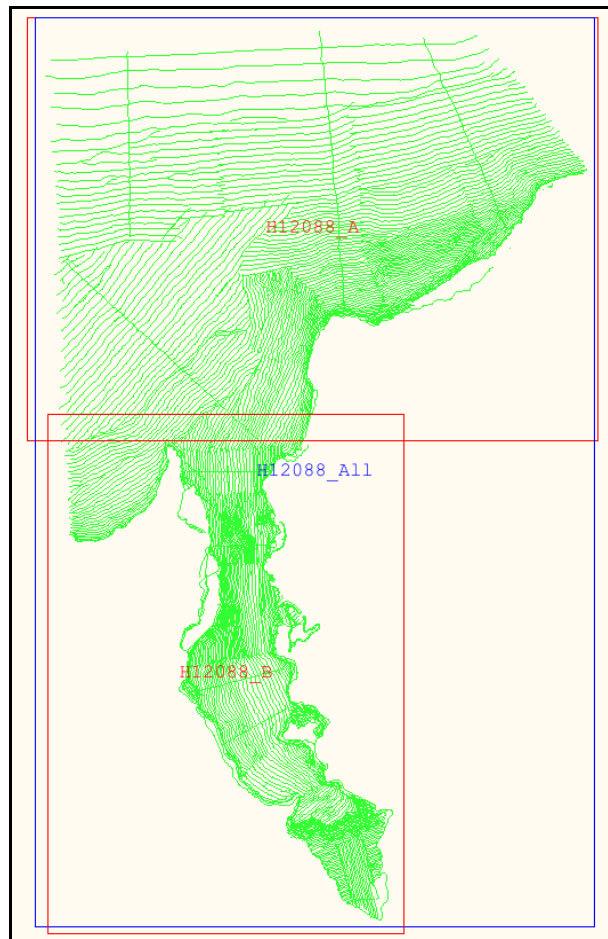


Figure 9: H12088 Field Sheet Layout

### C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H12088 can be found in the *OPR-P357-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
Kenai, AK	310 kHz	USCG	Primary
Kodiak, AK	313kHz	USCG	Secondary

Table 6: Differential Corrector Sources for H12088

As previously discussed in section B.2.e, SBET post-processing was performed to correct a horizontal offset problem with some SWMB data. This processing required the use of data from *Fairweather*'s base station in Port Graham, AK at 59°23'41.24"N 151°54'19.46"W. For more information on this station, please refer to *Fairweather*'s *OPR-P357-RA-FA-09 Horizontal and Vertical Control Report*.

#### 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 Seldovia, AK (945-5500) served as control for datum determination and as the primary source for water level reducers for survey H12088.

*Rainier* personnel installed Sutron 8210 "bubbler" tide gauge at the following subordinate station in accordance with the Project Instructions. The gauge was 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-P357-RA-09 Horizontal and Vertical Control Report*.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Bear Cove, AK	945-5595	30-day	August 11, 2009	September 18, 2009

Table 7: Tide Stations installed by *Rainier* personnel

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels from the Seldovia, AK station (945-5500) by applying tide file 9455500.tid and time and height correctors through the zone corrector file P357FARA2009CORP.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 H12088 was submitted to CO-OPS on September 9, 2009 in accordance with the Field Procedures Manual (FPM) dated April 2009. The Final Tide Note was received on October 9, 2009.<sup>17</sup> This documentation is included in Appendix IV.

## 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 CARIS HIPS software program.

Survey H12088 was compared with the following charts:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
16647	1:100,000	3 <sup>rd</sup> Ed; May 2001	01/31/2009
16645	1:82,662	18 <sup>th</sup> Ed; Jan 2002	09/01/2009
16646	1:20,000	13 <sup>th</sup> Ed; Nov 2007	02/16/2009

Table 8: Charts compared with H12088

During acquisition and subsequent processing it was noted that significant discrepancies existed between chart 16645 (1:82,662 scale) and chart 16647 (1:100,000 scale). In spite of the fact that chart 16645 is larger scale than chart 16647, the shoreline of chart 16647 appears to have been compiled at a higher resolution than that of chart 16645. Shoreline as depicted on chart 16647 appears to be consistent with shoreline features from the most recent prior surveys and observations made during shoreline acquisition for survey H12086, while chart 16645 shows major differences in common areas.<sup>18</sup>

While charted depths were far less dense on chart 16647, significant bathymetric features and least depths appeared to agree with survey soundings from this project and prior survey soundings far better than charted depths on chart 16645. Chart comparison was conducted with chart 16647 in addition to chart 16645.<sup>19</sup>

It appears that the most recent prior survey data may not have been applied to chart 16645, but was applied to chart 16647. These discrepancies were noted during acquisition and brought to the attention of Laurie Bennett, a visiting cartographer from the Marine Charting Division (MCD). Additionally, an e-mail was sent to MCD reiterating these issues by the Chief of the Pacific Hydrographic Branch and the Field Operations Officer, *Rainier*. This e-mail correspondence is included in Appendix V.<sup>20</sup>

Soundings from survey H12088 agreed with charted depths to within 0.8 fathoms throughout the survey area with the following exceptions:<sup>21</sup>

- Survey soundings showed a depth of 3 fathoms 3 feet in the vicinity of a charted (16646) wire drag sounding of 2 fathoms 5 feet at 59°26.3'N, 151°43.4'W. This area had

- complete multi-beam coverage and no indication of a shoaler depth or obstruction was evident. The Hydrographer recommends charting according to digital data.<sup>22</sup>
- Survey soundings showed a depth of 4 fathoms 1 foot in the vicinity of a charted (16646) wire drag sounding of 2 fathoms 4 feet at 59°26'N, 151°43.4'W. This area had complete multi-beam coverage and no indication of a shoaler depth or obstruction was evident. The Hydrographer recommends charting according to digital data.<sup>23</sup>
  - Survey soundings showed a depth of 3 fathoms 4 feet in the vicinity of a charted (16646) wire drag sounding of 2 fathoms 2 feet at 59°27.3'N, 151°43.9'W. This area had complete multi-beam coverage and no indication of a shoaler depth or obstruction was evident. The Hydrographer recommends charting according to digital data.<sup>24</sup>
  - A 6 fathom survey sounding was found in the vicinity of a 4ftm 4feet charted (16646) depth at 59°25.2'N, 151°43.5'W. This area had complete multi-beam coverage and no indications of shoaler depths were evident. The Hydrographer recommends charting according to digital data.<sup>25</sup>
  - A 2 fathom 5 *feet* survey sounding was found in the vicinity of a 1ftm 4feet charted (16646) depth at 59°26.010'N, 151°43.9'W. This area had complete multi-beam coverage and no indications of shoaler depths were evident. The Hydrographer recommends charting according to digital data.<sup>26</sup>
  - A 2 fathom 3 feet survey sounding was found in the vicinity of a 1ftm 4feet charted (16646) depth at 59°26.1'N, 151°43.5'W. This area had complete multi-beam coverage and no indications of shoaler depths were evident. The Hydrographer recommends charting according to digital data.<sup>27</sup>
  - A 3 fathom 2 feet survey sounding was found in the vicinity of a 2ftm 1 feet charted (16646) depth at 59°26'N, 151°44'W. This area had complete multi-beam coverage and no indications of shoaler depths were evident. The Hydrographer recommends charting according to digital data.<sup>28</sup>

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.

#### **D.1.b. Automated Wreck and Obstruction Information System (AWOIS) Items<sup>29</sup>**

Four (4) AWOIS items were located within the survey limits of H12088. All of these were assigned for full investigation. Descriptions of each AWOIS item investigation are included in the Survey Feature Report in Appendix II.

<b>AWOIS#</b>	<b>Latitude</b>	<b>Longitude</b>	<b>remark</b>	<b>recommendation</b>
50802 <sup>30</sup>	59° 28' 26.800"	151° 44' 06.600"	AWOIS Item disproved with 100% MBES	Remove
50624 <sup>31</sup>	59° 25' 54.481"	151° 43' 02.350"	Seen on shore during shoreline verification	Leave in charted location
50625 <sup>32</sup>	59° 25' 46.770"	151° 42' 54.070"	Seen on shore during shoreline verification	Leave in charted location
50626 <sup>33</sup>	59° 25' 31.640"	151° 42' 46.910"	AWOIS Item disproved with 100% MBES	Remove

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

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

At the mouth of Seldovia Bay, in the vicinity of 59°26'51.88" N 151°43'22.95" W, an apparent derelict AToN was positioned near an existing Coast Guard buoy (G "1"). This metal stanchion was built on top of an offshore rock is now badly damaged and sticking up at an angle.<sup>34</sup> See figures 10 and 11.

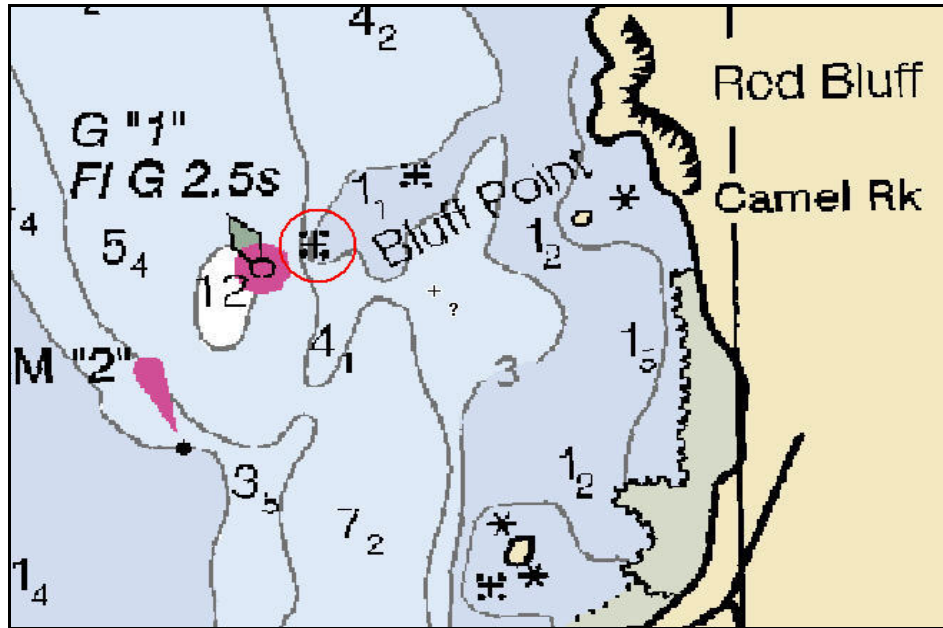


Figure 10: Chart location of Derelict AToN



Figure 11: Derelict AToN

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

Six (6) Dangers to Navigation (DTONs) were found on survey H12088, and reported to the Marine Chart Division via email on March 1, 2010. The original DTON submission package is included in Appendix I.<sup>35</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 the composite source file (CSF) provided with the project instructions. The CSF has been created using the latest ENC's, most recent aerial photogrammetry, and prior hydrographic surveys. Prior survey features within the CSF are for reference. This composite source was printed on paper "boat sheets" and displayed in CARIS Notebook and/or Hypack for field verification.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables section 8.2 and the Field Procedures Manual section 3.5 and 4.4. Detached positions (DPs) acquired during shoreline verification were recorded and S-57 attributed in CARIS Notebook. These indicate revisions to features and features not found in the provided CSF. In addition, annotations describing shoreline were recorded on the hard copy plots of the CSF as described above.

All shoreline data is submitted in CARIS Notebook HOB files. The session H12088\_NTBK contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H12088_Comp_Source.hob	Original Source Data as provided for project OPR-P357-RA-FA-09 and filtered to the limits of survey H2088.
H12088_Reference.hob	Survey sheet limits.
H12088_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.
H12088_Disprovals.hob	Composite source items that were deleted or modified in position or geographic type.

*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>36</sup>

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

Prior survey comparison was not performed.

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

There were seven (7) aids to navigation (ATONs) located within the survey limits of H12088. Each ATON's position was visually checked in the field against the digital raster chart. Each of the ATONs was found to serve its intended purpose.<sup>37</sup>

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

There are no overhead features within the limits of survey H12088.<sup>38</sup>

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

There is one charted cable area within the survey limits of H12088, as shown in Figure 12. No visible indication of cables was evident in the MBES data in the cable areas running through the southern portion of Seldovia Bay on charts 16645 and 16646. The Hydrographer recommends retaining the cable areas as charted.<sup>39</sup>

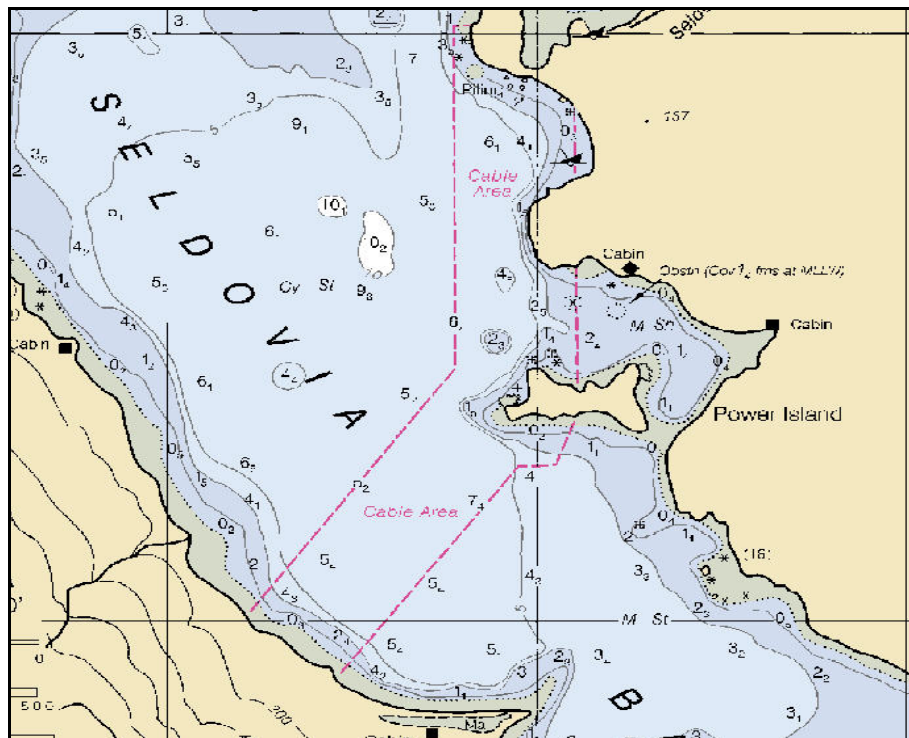


Figure 12: H12088 Cable area.

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

There is an Alaska State Ferry that runs from Homer, AK to Seldovia, AK three times weekly. The ferry ties up to the city pier located 0.15 nautical miles north of the entrance to Seldovia Harbor. This is a seasonal ferry with runs typically made on Sundays, Tuesdays, and Thursdays throughout the summer usually arriving at 1:15 pm and then departing again at 5:45 pm on the same day; however there are a few of the days that the arrival time is at 5:30 pm and departure time is 7:15 pm. The Hydrographer does not recommend that this ferry route be charted due to the intermittent and seasonal nature of the schedule.<sup>40</sup> There are also numerous water taxis that run daily between Seldovia and Homer, Alaska.

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

Bottom samples were not performed in survey H12088.<sup>41</sup>

**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 H12088 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 September 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</u>	<u>Office</u>
Hydrographic Systems Readiness Review Package	<i>Under separate cover</i>	N/CS34
Data Acquisition and Processing Report for OPR-P357-RA-FA-09	February 8, 2010	N/CS34
Coast Pilot Report for OPR-P357-RA-FA-09	<i>To be submitted</i>	N/CS26
Horizontal and Vertical Control Report for OPR-P357-RA-FA-09	December 14, 2009	N/CS34
Tides and Water Levels Package for OPR-P357-RA-FA-09	October 21, 2009	N/OPS1

Approved and Forwarded:



Donald W. Haines, CAPT/NOAA  
I am approving this document  
2010.03.11 08:17:53 -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:



Nickolas Mitchell  
I am the author of this document  
2010.03.10 14:04:38 -08'00'

Nickolas A. Mitchell  
Assistant Survey Technician, NOAA Ship *Rainier*

Chief Survey Technician:



James B Jacobson  
I have reviewed this document  
2010.03.10 21:02:18 Z

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

Field Operations Officer:



Brent Pounds  
I have reviewed this document  
2010.03.11 06:23:51 -09'00'

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

**Revisions and corrections compiled during office processing and certification**

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<sup>1</sup> Concur.

<sup>2</sup> Concur.

<sup>3</sup> Concur with clarification. Although the 4% requirement was not met, the crosslines were adequate for QC testing purposes.

<sup>4</sup> Concur.

<sup>5</sup> Concur. No soundings along the very near-shore areas were selected for charting.

<sup>6</sup> H12088 junctions with surveys H12087 to the E, H12089 to the W, and H12090 to the N. A common junction was made with and adjoining portion of these surveys.

<sup>7</sup> Concur.

<sup>8</sup> Concur. Data is adequate and within specifications for charting purposes.

<sup>9</sup> Concur. Data is adequate and within specifications for charting purposes.

<sup>10</sup> Concur.

<sup>11</sup> Concur with clarification. During office processing a 12 feet water depth was found in the entrance channel to the marina. Blue notes were added to the HCell to modify the depth and date in the entrance channel and the marina

<sup>12</sup> Concur. The holiday is preserved in the HCell.

<sup>13</sup> Concur. The area around the holiday was examined at PHB. There is no evidence of shoaling or significant features.

<sup>14</sup> Concur. Holidays were preserved in the HCell.

<sup>15</sup> Concur. The areas around the holidays were examined at PHB. There is no evidence of shoaling or significant features.

<sup>16</sup> Concur.

<sup>17</sup> Tide note is attached to this report.

<sup>18</sup> Concur with the hydrographers comments

<sup>19</sup> Concur with the hydrographers comments

<sup>20</sup> Email correspondence is attached to this report.

<sup>21</sup> All positions listed in the DR section D.1.a. Should be 59° not 55°.

<sup>22</sup> Concur.

<sup>23</sup> Concur.

<sup>24</sup> Do not concur. During compilation survey soundings showed a depth of 2 fathoms 5 feet Chart as per HCell.

<sup>25</sup> Do not concur. During compilation survey soundings showed a depth of 5 fathoms 4 feet Chart as per HCell.

<sup>26</sup> Concur.

<sup>27</sup> Concur.

<sup>28</sup> Concur.

<sup>29</sup> AWOIS report is attached to this report.

<sup>30</sup> Concur. A blue note was added to the HCell to remove charted AWOIS item # 50802 at 59-28-26.800N, 151-44-06.600W. AWOIS Item disproved with 100% MBES.

<sup>31</sup> Concur with clarification. AWOIS item # 50624 at 59-25-54.481, 151° 43' 02.350W, is composed for 4 charted piles that are the remains of a cannery pier. A blue note was added to the HCell to retain AWOIS item # 50624.

<sup>32</sup> Concur, A blue note was added to the HCell to retain AWOIS item # 50625 at 59-25-46.770N, 151-42-54.070W.

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<sup>33</sup> Concur. A blue note was added to the HCell to remove charted AWOIS item # 50626 at 59-25-31.640N, 151-42-46.910W. AWOIS Item disproved with 100% MBES.

<sup>34</sup> E-mail correspondence is included to this report.

<sup>35</sup> See attached DTON report. The one DTON that was not applied to the chart is included in the HCell. Chart features as depicted in the HCell.

<sup>36</sup> Concur with clarification. The submitted hob files were used in the compilation of HCell H12088. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.

<sup>37</sup> Chart ATONs per latest ATONIS information.

<sup>38</sup> Concur.

<sup>39</sup> Concur. The cable area was blue noted to be retained.

<sup>40</sup> Concur with clarification. There is no ferry route currently charted in Seldovia area.

<sup>41</sup> Twenty bottoms samples were imported from the ENC to be retained.

# AWOIS Report

**Registry Number:** H12088  
**State:** Alaska  
**Locality:** Southern Portion of Cook Inlet  
**Sub-locality:** Seldovia Bay  
**Project Number:** OPR-P357-RA-09  
**Survey Date:**

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16646	13th	11/01/2007	1:20,000 (16646_5)	USCG LNM: 06/26/2007 (01/20/2009) CHS NTM: None (12/26/2008) NGA NTM: 10/27/2001 (01/31/2009)
16645	18th	01/12/2002	1:82,662 (16645_1)	[L]NTM: ?
16647	3rd	05/12/2001	1:100,000 (16647_1)	[L]NTM: ?
16640	24th	09/15/2001	1:200,000 (16640_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_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: ?
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	AWOIS	[no data]	[no data]	[no data]	---
1.2	AWOIS	[no data]	[no data]	[no data]	---
1.3	AWOIS	[no data]	[no data]	[no data]	---
1.4	AWOIS	[no data]	[no data]	[no data]	---

**1 - AWOIS**

## 1.1) AWOIS #50802 - HARRIET

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 59° 28' 26.8" N, 151° 44' 06.6" W  
**Historical Depth:** [None]  
**Search Radius:** 300  
**Search Technique:** ##  
**Technique Notes:** [None]

**History Notes:**

50802 ■ HISTORY ■ CL1787/67--SUBM WK, PA; NON-DANGEROUS, NEWSPAPER ACCOUNT OF 32FT CRAB BOAT ■ BROKEN IN HALF. STERN SECTION LOCATED AT BARABARA PT. CHARTED POSITION BASED ■ ON CREWMAN RECOLLECTION. ■ H9945/81--OPR-P114-RA-81, ITEM 34; SUBM WK, NOT VERIFIED OR DISPROVED, SNDG ■ LINES SPLIT APPROX. 300M OF STATED POSITION. CHART AS PD. (ENTERED 6/84 RWD) ■ ■ SURVEY REQUIREMENTS ■ LIMITED ■ NOT ASSIGNED

### Survey Summary

**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

Wreck, AWOIS #52037

Investigation Summary: The Search Radius was covered with complete MBES coverage and nothing was seen within the data to show that the AWOIS item is present.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
H12088_awois	AWOIS # 50802	0.00	000.0	Primary
h12088/2801_reson7125_hf_512/2009-226/000_2147	2341/189	33.86	010.6	Secondary

### Hydrographer Recommendations

[None]

### Feature Images

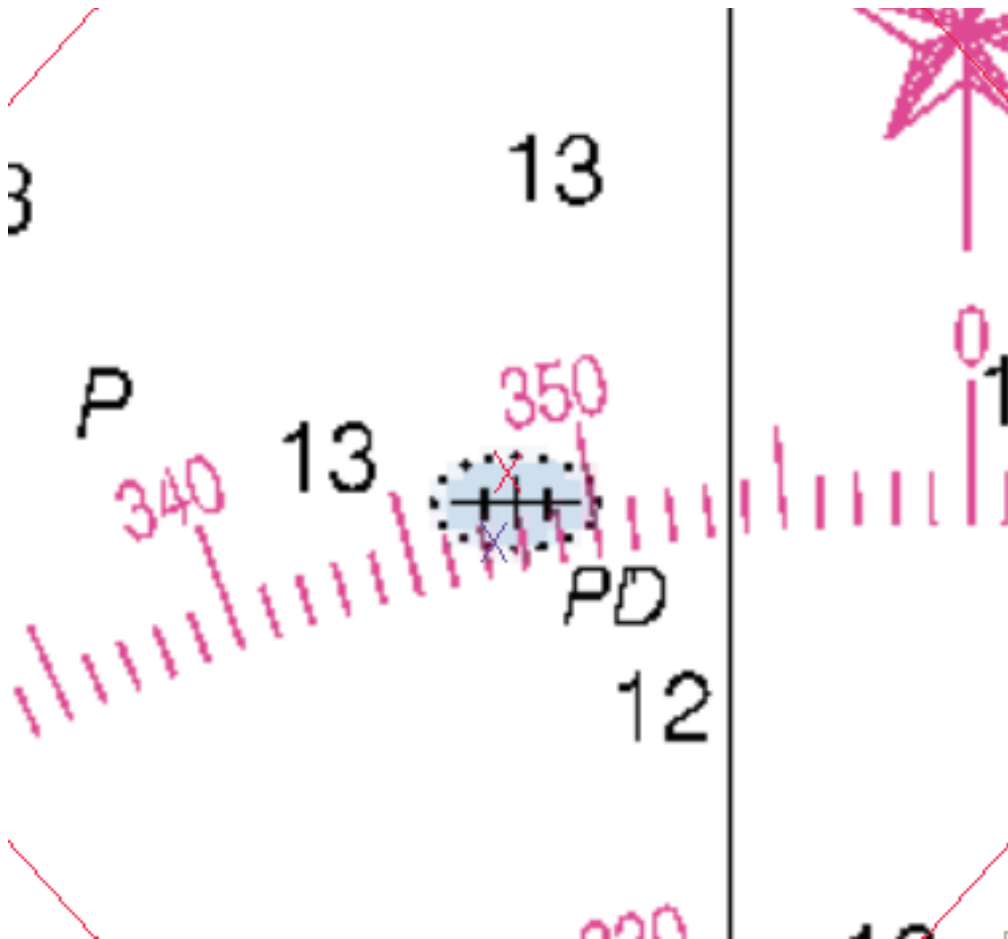


Figure 1.1.1

## 1.2) AWOIS #50624 - OBSTRUCTION

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 59° 25' 54.8" N, 151° 43' 02.6" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** ##  
**Technique Notes:** [None]

#### History Notes:

50624 ■ HISTORY ■ T9566/53-56--NOS; THE PILES CHARTED IN LAT.59-25.96N, LONG.151-42.90W ARE THE ■ REMAINS OF A CANNERY PIER. IT IS PRESENTLY CHARTED AS PILES WITH TWO SYMBOLS ■ (CHART 16646, 9TH ED.) (ENTERED, 12/14/83, MJF). ■ TP00814/75-81-NOS; THIS FEATURE WAS LOCATED AND POSITIONED PHOTOGRAMMETRICALLY ■ IN LAT.59-25-57N, LONG.151-42-55W. (ENTERED, 12/14/83, MJF). ■ H9940/81--OPR-P114-RA-81; ITEM 32; DESCRIP. REP. CITES TP-00814 AS THE SOURCE ■ FOR ITS POSITION. (ENTERED, 12/14/83, MJF). ■ ■ SURVEY REQUIREMENTS ■ NOT DETERMINED

### Survey Summary

**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Pilings, AWOIS# 50624

Investigation Summary: Pilings were visually observed during shoreline investigations. They were located up on the beach and are not navigationally significant.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
H12088_awois	AWOIS # 50624	0.00	000.0	Primary
h12088/1101_reson8125/2009-229/000a2019	2334/232	5.81	096.8	Secondary

### Hydrographer Recommendations

[None]

### Feature Images

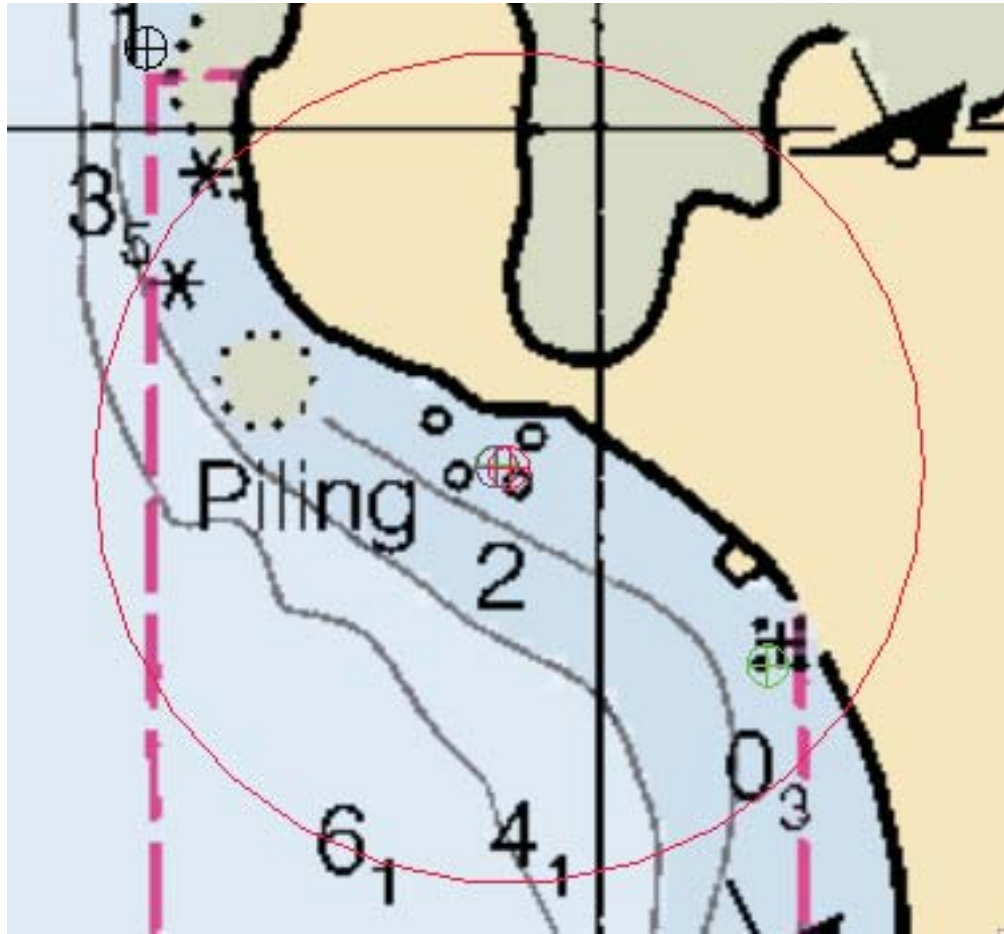


Figure 1.2.1

### 1.3) AWOIS #50625 - UNKNOWN

#### No Primary Survey Feature for this AWOIS Item

**Search Position:** 59° 25' 46.8" N, 151° 42' 54.1" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** ##  
**Technique Notes:** [None]

#### History Notes:

50625 ■ HISTORY ■ U.S.ARMY PHOTOGRAPHY/48--A VISIBLE WRECK WAS LOCATED IN LAT.59-25.81N, ■ LONG.151-42.76W. IT IS PRESENTLY CHARTED AS A VIS. WK.(CHART 16646, 9TH ED.) ■ (ENTERED, 12/14/83, MJF) ■ TP00814/75-81-NOS; THIS FEATURE WAS LOCATED AND POSITIONED PHOTOGRAMMETRICALLY ■ IN LAT.59-25-49.0N, LONG.151-42-46.5W. (ENTERED, 12/14/83, MJF). ■ H9940/81--OPR-P114-RA-81; ITEM 33; DESCRIP. REP. CITES TP-00814 AS THE SOURCE ■ FOR ITS POSITION. (ENTERED, 12/15/83, MJF) ■ ■ SURVEY REQUIREMENTS ■ NOT DETERMINED

#### Survey Summary

**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Wreck, AWOIS# 50625

Investigation Summary: A wreck was observed on the beach during shoreline verification and is not navigationally significant.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
H12088_awois	AWOIS # 50625	0.00	000.0	Primary
h12088/1101_reson8125/2009-229/000a2019	265/238	14.85	287.6	Secondary

#### Hydrographer Recommendations

[None]

### Feature Images

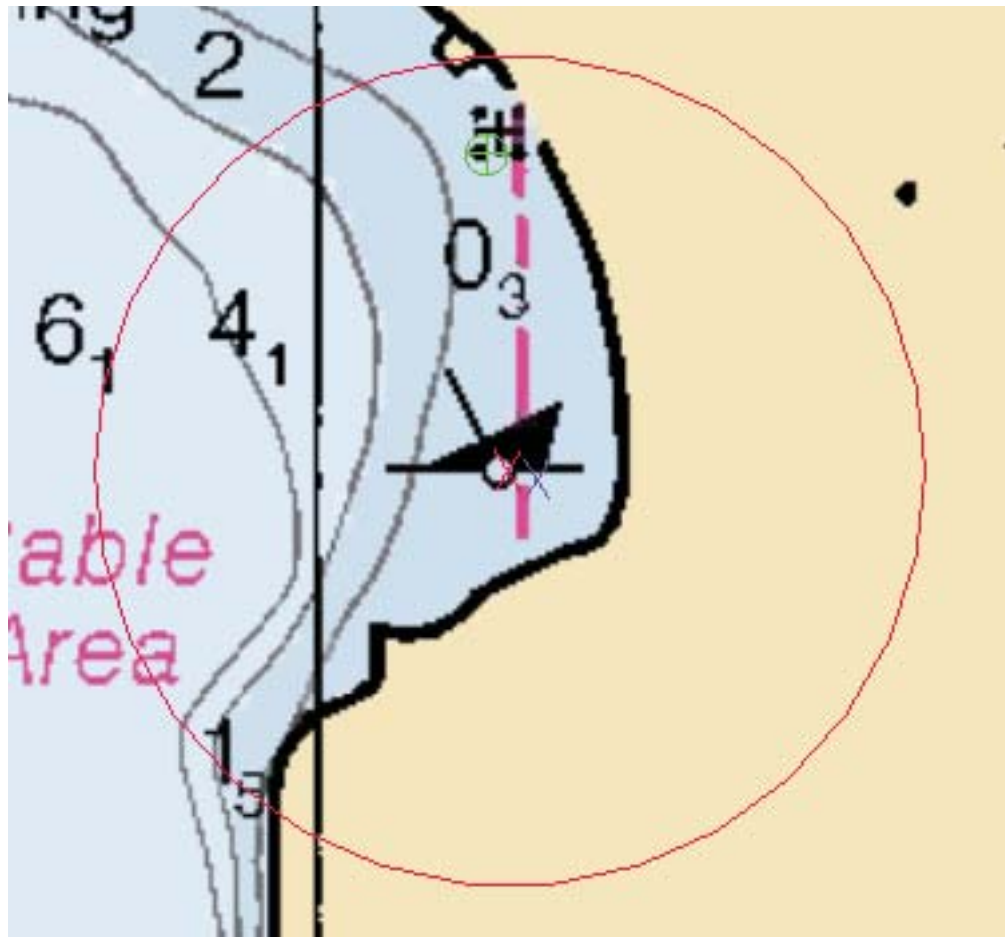


Figure 1.3.1



*Figure 1.3.2*

## 1.4) AWOIS #50626 - OBSTRUCTION

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 59° 25' 31.6" N, 151° 42' 46.9" W  
**Historical Depth:** [None]  
**Search Radius:** 85  
**Search Technique:** ##  
**Technique Notes:** [None]

**History Notes:**

50626 ■ HISTORY ■ NOS AERIAL PHOTOGRAPHY/64--A SUBM. OBSTR. WAS LOCATED IN LAT.59-25.55N, ■ LONG.151-42.58W. IT IS PRESENTLY CHARTED AS A SUBM. OBSTR. (CHART 16646, ■ 9TH ED). (ENTERED, 12/14/83, MJF). ■ H9940/81--OPR-P114-RA-81; ITEM 40; MINI-RANGER RANGE/AZIMUTH CONTROL; AN OBSTR ■ (SUBMERGED TREE) WAS LOCATED IN LAT.59-25-33.87N, LONG.151-42-39.34W. ■ (ENTERED, 12/14/83, MJF). ■ ■ SURVEY REQUIREMENTS ■ NOT DETERMINED

### Survey Summary

**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

Obstruction, AWOIS# 50626

Investigation Summary: A star pattern was performed over top of the charted obstruction and within the search radius for the AWOIS item. Nothing was seen in the complete MBES data.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
H12088_awois	AWOIS # 50626	0.00	000.0	Primary
h12088/1101_reson8125/2009-229/000_2010	168/146	9.88	097.7	Secondary

### Hydrographer Recommendations

[None]

### Feature Images

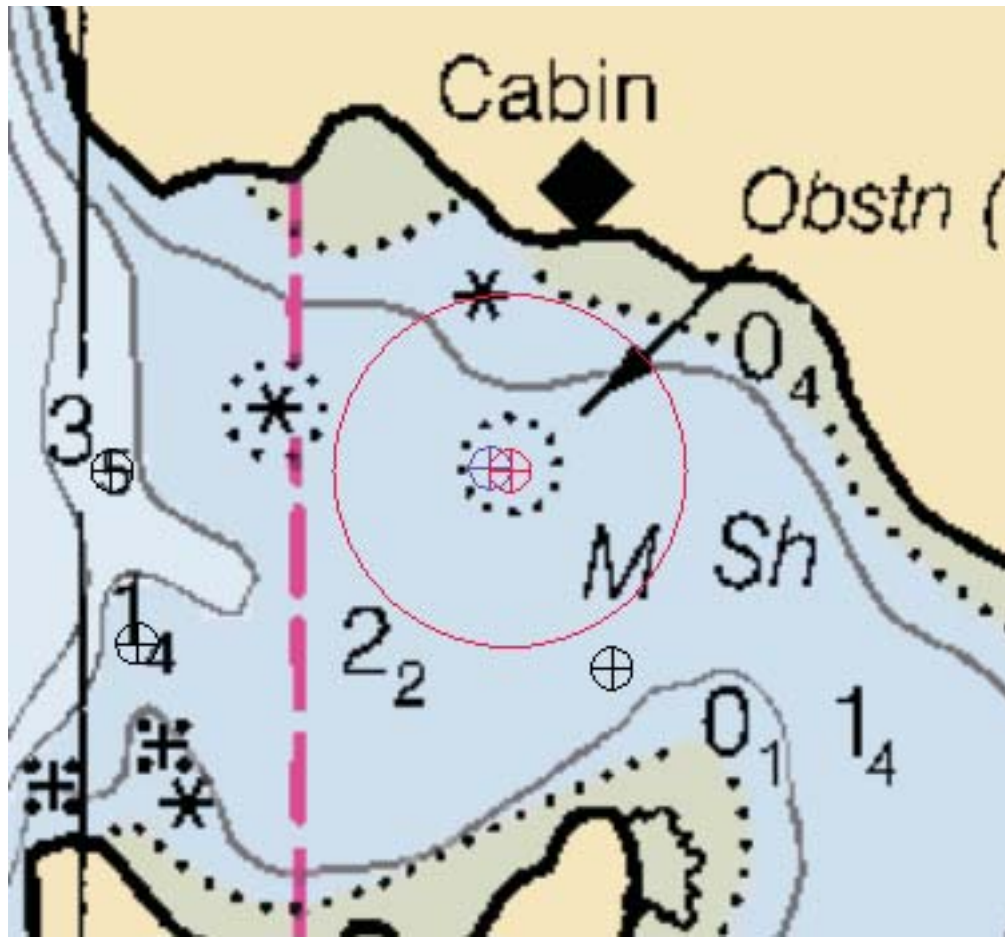


Figure 1.4.1

# H12088 Dangers To Navigaton

**Registry Number:** H12088  
**State:** Alaska  
**Locality:** Southern Portion of Cook Inlet  
**Sub-locality:** Seldovia Bay  
**Project Number:** OPR-P357-RA-09  
**Survey Dates:** 08/18/2009 - 08/24/2009

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16646	13th	11/01/2007	1:20,000 (16646_5)	USCG LNM: 06/26/2007 (01/20/2009) CHS NTM: None (12/26/2008) NGA NTM: 10/27/2001 (01/31/2009)
16645	18th	01/12/2002	1:82,662 (16645_1)	[L]NTM: ?
16647	3rd	05/12/2001	1:100,000 (16647_1)	[L]NTM: ?
16640	24th	09/15/2001	1:200,000 (16640_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_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: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
1.1	Shoal	3.84 m	59° 25' 29.2" N	151° 44' 05.4" W
1.2	Rock	2.44 m	59° 25' 31.6" N	151° 42' 59.0" W
1.3	Rock	8.02 m	59° 27' 30.6" N	151° 44' 36.9" W
1.4	Shoal	4.00 m	59° 27' 25.7" N	151° 44' 39.2" W
1.5	Rock	6.66 m	59° 27' 24.0" N	151° 43' 09.3" W
1.6	Shoal	4.48 m	59° 27' 47.8" N	151° 42' 40.1" W

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 452/149 from h12088 / 1101\_reson8125 / 2009-232 / 000\_2209

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 59° 25' 29.2" N, 151° 44' 05.4" W  
**Least Depth:** 3.84 m (= 12.60 ft = 2.099 fm = 2 fm 0.60 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.963$  m ; **TVU (TPEv)**  $\pm 0.266$  m  
**Timestamp:** 2009-232.22:11:03.123 (08/20/2009)  
**Survey Line:** h12088 / 1101\_reson8125 / 2009-232 / 000\_2209  
**Profile/Beam:** 452/149  
**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Area of uncharted shoaling. Charts shows a depth of 4 fathoms; surveyed depth of 2 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12088/1101_reson8125/2009-232/000_2209	452/149	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart according to depth, location and S-57 attribution.

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

2fm (16645\_1, 16640\_1, 16013\_1, 530\_1)

2fm 0ft (16646\_5, 16647\_1, 531\_1)

3.8m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090905  
 SORIND - US,US,nsurf,H12088

Feature Images

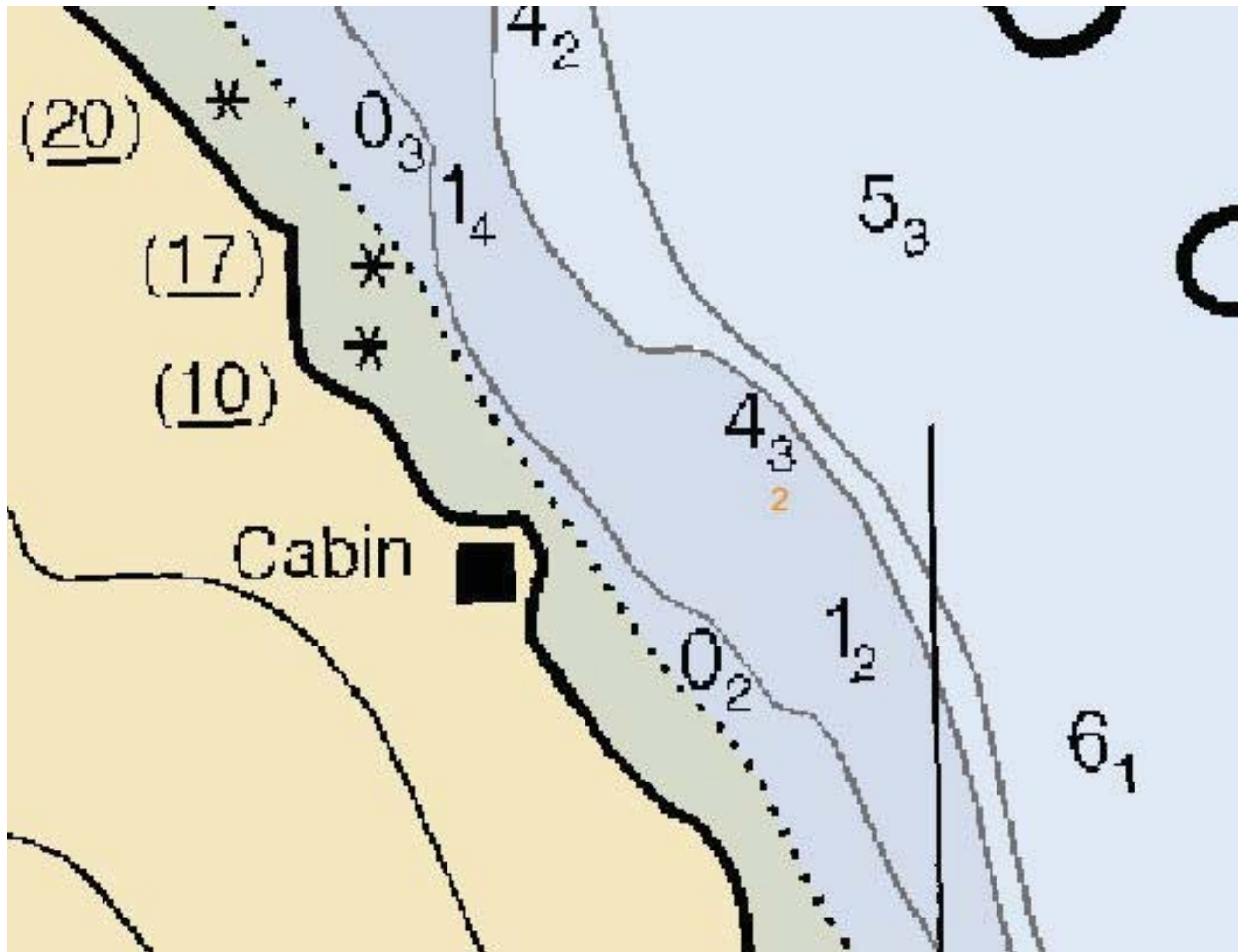


Figure 1.1.1

## 1.2) Profile/Beam - 132/388 from h12088 / 2801\_reson7125\_hf\_512 / 2009-235 / 000\_2358

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 59° 25' 31.6" N, 151° 42' 59.0" W  
**Least Depth:** 2.44 m (= 7.99 ft = 1.332 fm = 1 fm 1.99 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.962$  m ; TVU (TPEv)  $\pm 0.184$  m  
**Timestamp:** 2009-235.23:58:46.689 (08/23/2009)  
**Survey Line:** h12088 / 2801\_reson7125\_hf\_512 / 2009-235 / 000\_2358  
**Profile/Beam:** 132/388  
**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Rock found with complete MBES in vicinity of 3 fathoms 5 feet chart sounding; MBES depth is 1 fathom

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12088/2801_reson7125_hf_512/2009-235/000_2358	132/388	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart as per depth, location, and S-57 attribution

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

1 ¼fm (16645\_1, 16640\_1, 16013\_1, 530\_1)

1fm 2ft (16646\_5, 16647\_1, 531\_1)

2.4m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20090905  
 SORIND - US,US,nsurf,H12088  
 VALSOU - 2.436 m

WATLEV - 3:always under water/submerged

### Feature Images



Figure 1.2.1

### 1.3) Profile/Beam - 4673/264 from h12088 / 2803\_reson7125\_hf\_512 / 2009-230 / 000\_2039

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 59° 27' 30.6" N, 151° 44' 36.9" W  
**Least Depth:** 8.02 m (= 26.33 ft = 4.388 fm = 4 fm 2.33 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.962$  m ; **TVU (TPEv)**  $\pm 0.183$  m  
**Timestamp:** 2009-230.20:48:13.291 (08/18/2009)  
**Survey Line:** h12088 / 2803\_reson7125\_hf\_512 / 2009-230 / 000\_2039  
**Profile/Beam:** 4673/264  
**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

An underwater rock found with complete MBES with a depth of 4 fathoms right next to a 5 fathoms 5 feet charted sounding

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12088/2803_reson7125_hf_512/2009-230/000_2039	4673/264	0.00	000.0	Primary

### Hydrographer Recommendations

Chart as per depth, location, and S-57 attribution

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

4 ¼fm (16645\_1, 16640\_1, 16013\_1, 530\_1)

4fm 2ft (16646\_5, 16647\_1, 531\_1)

8.0m (500\_1, 50\_1)

### S-57 Data

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

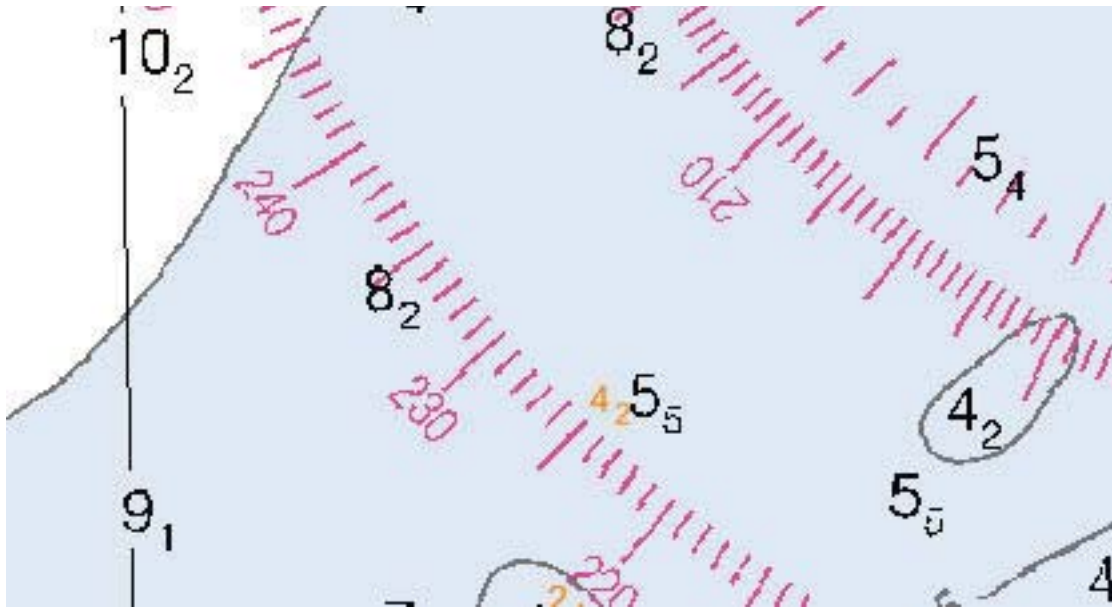
**Attributes:** SORDAT - 20090905

SORIND - US,US,nsurf,H12088

VALSOU - 8.024 m

WATLEV - 3:always under water/submerged

**Feature Images**



*Figure 1.3.1*

## 1.4) Profile/Beam - 3909/503 from h12088 / 2803\_reson7125\_hf\_512 / 2009-230 / 000\_2129

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 59° 27' 25.7" N, 151° 44' 39.2" W  
**Least Depth:** 4.00 m (= 13.12 ft = 2.187 fm = 2 fm 1.12 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.965$  m ; TVU (TPEv)  $\pm 0.192$  m  
**Timestamp:** 2009-230.21:37:33.122 (08/18/2009)  
**Survey Line:** h12088 / 2803\_reson7125\_hf\_512 / 2009-230 / 000\_2129  
**Profile/Beam:** 3909/503  
**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted shoaling with a depth of 2 fathoms next to a charted sounding of 4 fathoms 5 feet

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12088/2803_reson7125_hf_512/2009-230/000_2129	3909/503	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart as per depth, location, and S-57 attribution

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

2fm (16645\_1, 16640\_1, 16013\_1, 530\_1)

2fm 1ft (16646\_5, 16647\_1, 531\_1)

4.0m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090905  
 SORIND - us,us,nsurf,H12088

### Feature Images

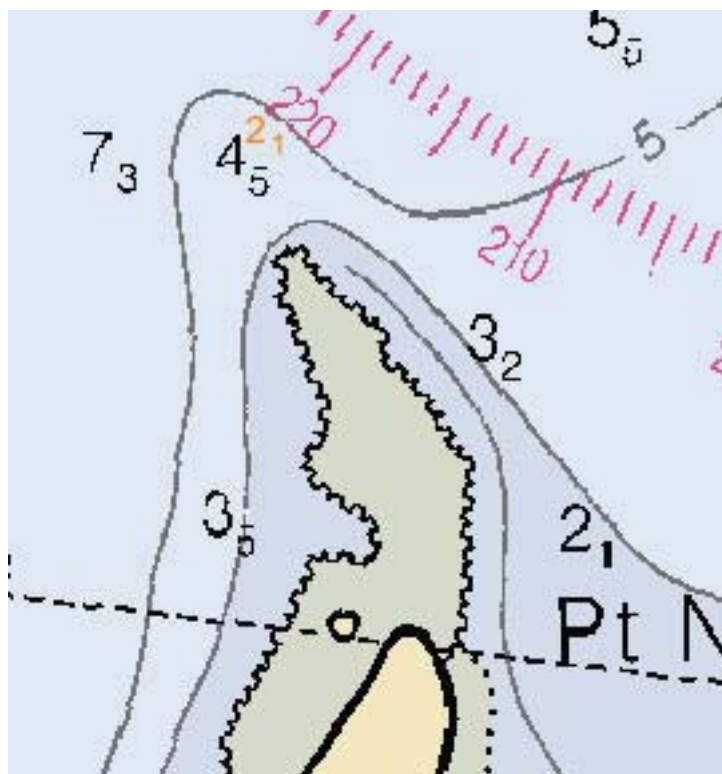


Figure 1.4.1

## 1.5) Profile/Beam - 308/254 from h12088 / 2804\_reson7125\_hf\_512 / 2009-231 / 000\_2321

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 59° 27' 24.0" N, 151° 43' 09.3" W  
**Least Depth:** 6.66 m (= 21.86 ft = 3.644 fm = 3 fm 3.86 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.961$  m ; TVU (TPEv)  $\pm 0.183$  m  
**Timestamp:** 2009-231.23:22:00.359 (08/19/2009)  
**Survey Line:** h12088 / 2804\_reson7125\_hf\_512 / 2009-231 / 000\_2321  
**Profile/Beam:** 308/254  
**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Underwater rock found with complete MBES with a depth of 3 fathoms 4 feet next to a charted sounding of 5 fathoms 3 feet.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12088/2804_reson7125_hf_512/2009-231/000_2321	308/254	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart as per depth, location, and S-57 attribution

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

3 ½fm (16645\_1, 16640\_1, 16013\_1, 530\_1)

3fm 4ft (16646\_5, 16647\_1, 531\_1)

6.7m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20090905

SORIND - US,US,nsurf,H12088

VALSOU - 6.664 m

WATLEV - 3:always under water/submerged

### Feature Images

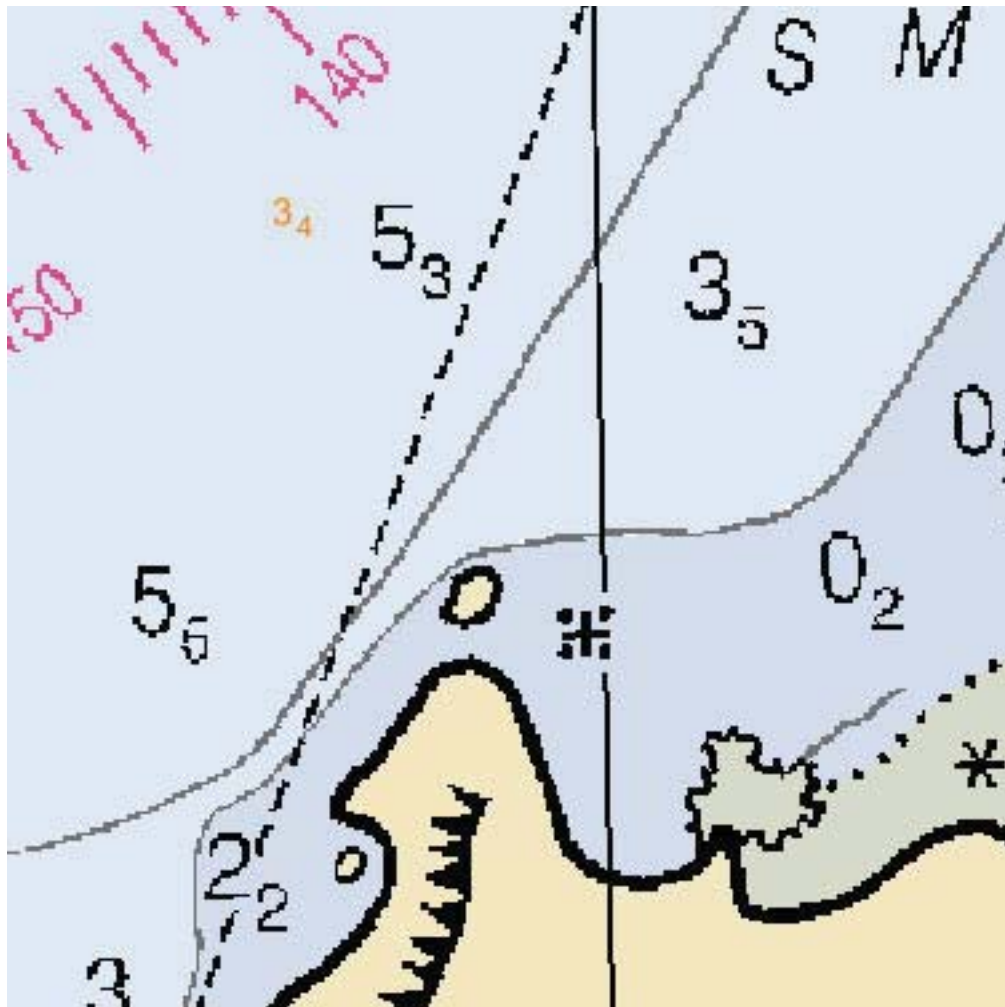


Figure 1.5.1

## 1.6) Profile/Beam - 1755/482 from h12088 / 2804\_reson7125\_hf\_512 / 2009-236 / 000\_1751

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 59° 27' 47.8" N, 151° 42' 40.1" W  
**Least Depth:** 4.48 m (= 14.71 ft = 2.451 fm = 2 fm 2.71 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.961$  m ; TVU (TPEv)  $\pm 0.184$  m  
**Timestamp:** 2009-236.17:53:47.139 (08/24/2009)  
**Survey Line:** h12088 / 2804\_reson7125\_hf\_512 / 2009-236 / 000\_1751  
**Profile/Beam:** 1755/482  
**Charts Affected:** 16646\_5, 16645\_1, 16647\_1, 16640\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted shoaling with a depth of 2 fathoms found in the vicinity of a 3 fathoms 5 feet and 5 fathom charted soundings

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12088/2804_reson7125_hf_512/2009-236/000_1751	1755/482	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart as per depth, location, and S-57 attribution

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

2 ½fm (16645\_1, 16640\_1, 16013\_1, 530\_1)

2fm 2ft (16646\_5, 16647\_1, 531\_1)

4.5m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20090905  
 SORIND - us,us,nsurf,H12088

### Feature Images

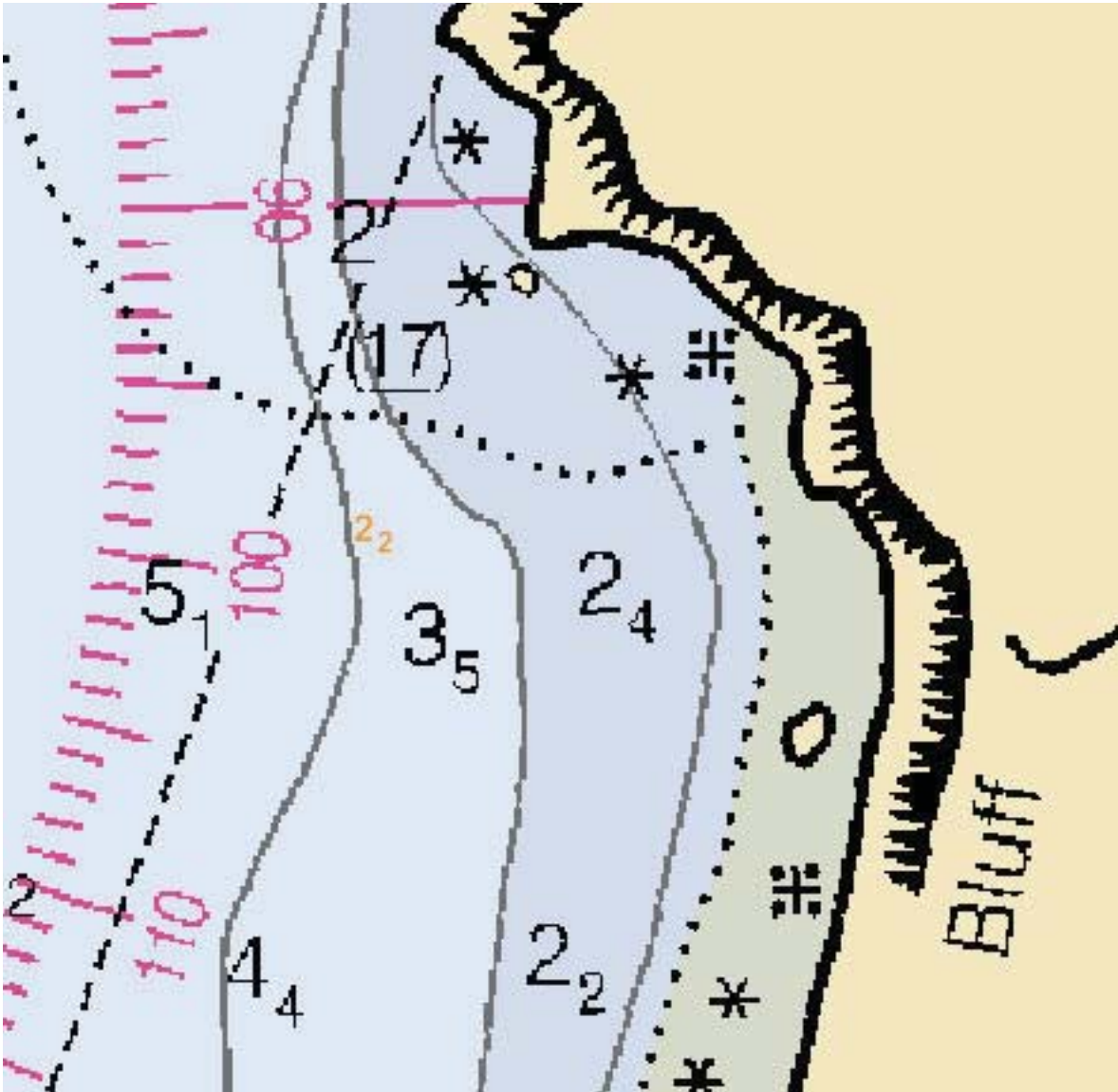


Figure 1.6.1

---

**From:** "foo.rainier" <foo.rainier@noaa.gov>  
**To:** <Andrew.Kampia@noaa.gov>  
**Cc:** <Doug.Baird@noaa.gov>; <laurie.bennett@noaa.gov>; "CO Rainier" <co.rainier@noaa.gov>; "Gary Nelson" <Gary.Nelson@noaa.gov>; "james.m.crocker" <James.M.Crocker@noaa.gov>  
**Sent:** Wednesday, March 03, 2010 4:07 PM  
**Subject:** Chart 16645 and 16647 Discrepancies from OPR-P357-RA-FA-09  
Andrew,

During shoreline acquisition for the Katchemak Bay Project (OPR-P357-RA-FA-09) it was noted that significant discrepancies existed between chart 16645 (1:82,662 scale) and chart 16647 (1:100,000 scale) throughout the survey project area. At the time these discrepancies were identified they were brought to the attention of Laurie Bennett, who was visiting the ship from the Marine Charting Division (MCD). The inconsistencies between these two charts have again been noted during final processing of the surveys from this project and this e-mail is intended to reiterate the inaccuracies in this area.

In spite of the fact that chart 16645 is larger scale than chart 16647, the shoreline of chart 16647 appears to have been compiled at a higher resolution than that of chart 16645. Shoreline as depicted on chart 16647 appears to be consistent with shoreline features from the most recent prior surveys and observations made during this season's shoreline acquisition. Chart 16645 has numerous inaccuracies in comparison to prior surveys and observed shoreline during this project, including many mischarted islets and rocks. While charted depths were far less dense on chart 16647, significant bathymetric features and least depths appeared to agree with survey soundings from this project and prior survey soundings far better than charted depths on chart 16645.

It appears that the most recent prior survey data may not have been applied to chart 16645, but was applied to chart 16647.

Additionally, an apparent compilation error was noted on chart 16647 in the area covered by survey H09941. While low water features are depicted on the smooth sheet for survey H09941, the mean high water (MHW) line is conspicuously absent from the smooth sheet. Chart 16647 reproduces this error depicting reefs or mean lower-low water (MLLW) lines in the place of islands. While chart 16645 does correctly depict the MHW features as islands, the location of these islands often does not match with actual observed location or the location as depicted on survey H09941.

If you would like specific examples of the discrepancies between these charts or have any other questions regarding this matter, please do not hesitate to contact me.

V/R,  
LT Brent Pounds  
Field Operations Officer  
NOAA Ship /Rainier/

---

**From:** "Gary Nelson" <Gary.Nelson@noaa.gov>  
**To:** "Andrew Kampia" <Andrew.Kampia@noaa.gov>  
**Cc:** <CO.Rainier@noaa.gov>; "FOO Rainier" <FOO.Rainier@noaa.gov>; "Laurie Bennett" <Laurie.Bennett@noaa.gov>; "James M Crocker" <James.M.Crocker@noaa.gov>; "Doug Baird" <Doug.Baird@noaa.gov>; "Jeffrey Ferguson" <Jeffrey.Ferguson@noaa.gov>; "Mik >> "Michael B. Brown" <Mike.Brown@noaa.gov>  
**Sent:** Friday, March 05, 2010 3:01 PM  
**Attach:** gary\_nelson.vcf  
**Subject:** Re: Chart Issues 16645 and 16647  
Andy,

Just a quick comment. We have just received the RA surveys for this area - actually they are still being submitted. It will be quite awhile before we get to compilation. That being said - would it help your process if we prioritize surveys that fall on 16645 so the "fixed" version will have the new data. Should a Notice to Mariners be sent out for some of the items or for the chart in general? Would it help to have a conference call at some point next week? PHB will assist as much as possible.

Regards,

Gary

> All,

>

> I want give an update on this even though I haven't diagnosed all the  
> problems yet. This is a very special case, but here is the bottom line:

>

> Chart 16645 needs to be fixed.

>

> There was a lengthy period of time when updates of all kinds were not  
> made to 16645. All source on that chart needs to be re-evaluated,  
> reapplied in many cases, and it needs to be reconciled to 16647 and  
> other overlapping charts.

>

> This will take time, likely 3 - 6 months. Just the plan of  
> recompiling all the various sources will take a few weeks. In the  
> meantime, would PHB prefer to wait for us to finish? Is it possible  
> that PHB can create H-Cells for 16645 using 16647 as an accurate  
> substitute for features while soundings will be all new anyway? There  
> are probably more questions that need to be asked and I don't  
> anticipate easy answers.

>

> I will appreciate any input. I want to have a solid plan by the end of  
> next week (Mar. 12.)

>

> Thanks.

>

> Gary Nelson wrote:

>> Andy,

>>  
>> I have attached plots concerning the chart discrepancies I discussed  
>> with you this morning. The RA has found more discrepancies and it is  
>> likely there are even more we haven't seen yet. Hopefully these will  
>> help you find the source of the problem. The RA noted that their  
>> most recent survey agreed better with chart 16447 and with the most  
>> contemporary prior surveys than chart 16445. This would suggest the  
>> possibility of some surveys not being compiled to 16445.  
>>  
>> Figures 1 and 2: Chart 16447 (1:100,000) shows a 1 fm 2 ft RK at  
>> 59/10/37.2N, 151/23/56.4W. At the same location on chart 16445  
>> (1:80,000) shows a 14 fm sounding.  
>>  
>> Figures 3 and 4: Chart 16647 shows at 3 fm 2 ft sounding at the  
>> entrance to Jakolot Bay 59/28/2.46N, 151/32/1.5W. Chart 16645 has  
>> two rocks and an islet in the same vicinity.  
>>  
>> Chart 16647 shows a 2 ft RK at 59/29/33.0N, 151/28/57.4W. In the  
>> same area chart 16645 shows a 4 fm 4 ft Rk  
>>  
>> Lastly, the buoy issue. Chart 16647 shows the area near the buoy (N  
>> "2"), 59/29/31.8N, 151/33/25.6W with a blue tint. The same area on  
>> Chart 16645 show white space. Rainier current survey showed 16647  
>> depicts the area more accurately.  
>>  
>> Let me know if you have any questions.  
>>  
>> Regards,  
>>  
>> Gary  
>

**Subject:** Re: Fwd: [Fwd: Re: H12088]

**From:** Matthew Forney <Matthew.Forney@noaa.gov>

**Date:** Fri, 07 Jan 2011 09:51:47 -0900

**To:** Fernando Ortiz <Fernando.Ortiz@noaa.gov>, Brent Pounds <Brent.Pounds@noaa.gov>

Good Morning Brent and Fernando,

I will relay the graphic and photo of the derelict ATON to CDR Jay Boyer, chief of waterways 17th district with the USCG. I appreciate the effort. The USCG always appreciates our communication about these issues. I hope both of you a great weekend.

Regards,

Matthew Forney  
NOAA Office of Coast Survey  
Navigation Manager - Alaska Region  
222 West 7th Street, #23  
Anchorage, AK 99513

Matthew Forney wrote:

----- Forwarded message -----

From: **\*fernando ortiz\*** <[Fernando.Ortiz@noaa.gov](mailto:Fernando.Ortiz@noaa.gov) <mailto:Fernando.Ortiz@noaa.gov>>>

Date: Fri, Jan 7, 2011 at 7:23 AM

Subject: [Fwd: Re: H12088]

To: Matthew Forney <[forneymm@gmail.com](mailto:forneymm@gmail.com) <mailto:forneymm@gmail.com>>>

Hi Matt,

I'm looking for additional information regarding an ATON (remains of a CG daylight). please  
See attached PDF for additional information.

Thank you.

Fernando,

This was not reported to the Coast Guard. It appeared as if the fixed daymark had been replaced by the buoy and we assumed the Coast Guard was aware of the condition of the old metal stanchion.

-Brent

----- Original Message -----

From: fernando ortiz <[Fernando.Ortiz@noaa.gov](mailto:Fernando.Ortiz@noaa.gov) <mailto:Fernando.Ortiz@noaa.gov>>>

Date: Friday, January 7, 2011 7:42 am

Subject: H12088

> Hi Brent,  
> I am working in the compilation of survey H12088 Southern Portion  
> of  
> Cook Inlet, Alaska and I'm looking for additional information  
> regarding  
> an apparent "derelict ATON" at 59°26'51.88" N 151°43'22.95" W. The  
> DR  
> does not mention if the feature was reported to the Coast Guard.  
>  
> Thank you and your feedback and comments will be appreciated.  
> See attached PDF for additional information.  
>

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

At the mouth of Seldovia Bay, in the vicinity of 59°26'51.88" N 151°43'22.95" W, an apparent derelict AToN was positioned near an existing Coast Guard buoy (G "1"). This metal stanchion was built on top of an offshore rock is now badly damaged and sticking up at an angle. See figures 10 and 11.

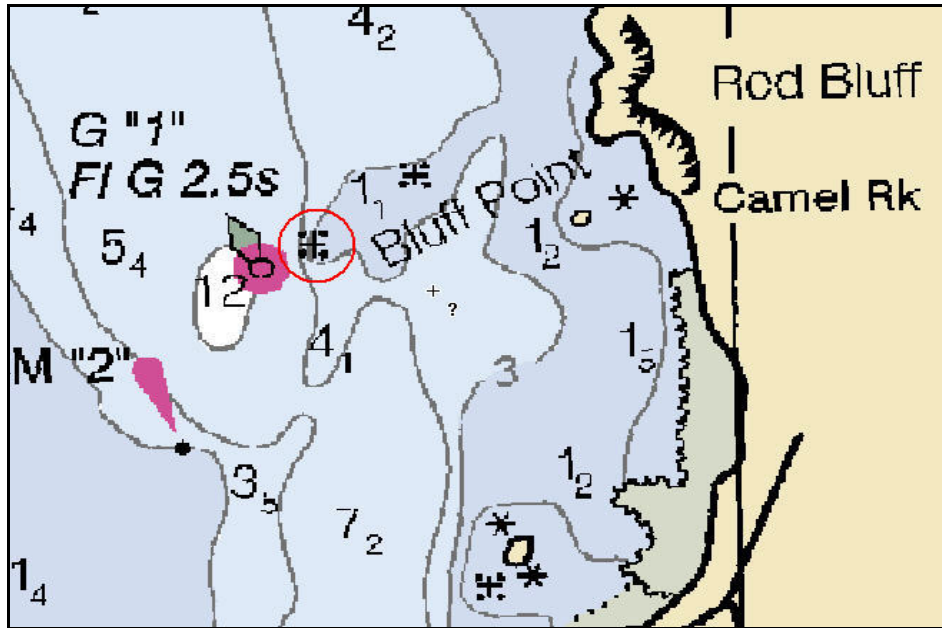


Figure 10: Chart location of Derelict AToN



Figure 11: Derelict AToN



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** October 6, 2009

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-P357-RAFA-2009  
**HYDROGRAPHIC SHEET:** H12088

**LOCALITY:** Kachemak Bay, AK  
**TIME PERIOD:** August 12 - September 5, 2009

**TIDE STATION USED:** 945-5500 Seldovia, Cook Inlet, AK  
Lat. 59° 26.4'N Long. 151° 43.2' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 5.252 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project OPR-P357-RAFA-2009, H12088, during the time period between August 12 to September 5, 2009.

Please use the zoning file "P357FARA2009CORP" submitted with the project instructions for OPR-P357-RAFA-2009 Kachemak Bay, AK. Zones CIC39, CIC40, and CIC41 are the applicable zones for H12088.

**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: 2009.10.09 16:29:00 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION





**H12088 HCell Report**  
Fernando Ortiz, Physical Scientist  
Pacific Hydrographic Branch

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

HCell compilation of survey H12088 used:

Office of Coast Survey HCell Specifications: Draft, Version: 4.0, 17 March 2010.  
HCell Reference Guide: Version 2.0, July 29, 2010.

**2. Compilation Scale**

Depths and features for HCell H12088 were compiled to the largest scale raster charts shown below:

Charts	Scale	Edition	Edition Date	NTM Date
16645	1:82,662	19th	07/2010	09/07/2010
16646	1:20,000	13th	11/2007	01/04/2011

The following ENC's were also used during compilation:

Chart	Scale
US5AK1BM	
US4AK1AM	

**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 for the 16646\_5 chart at survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-5	10	2
10	20	3
20	50	3.5
50	500	4

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 16646 16645	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 H12088_SS.000
0	0	0.2286	0	0
1	1.8288	2.0574	1.125	1
2	3.6576	3.8862	2.125	2
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.5166	10.125	10
50	91.44	92.8116	50.75	50

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, COALNE and 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 H12088:

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. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue Notes-Notes to the MCD chart Compiler
DEPCNT	Zero contour lines
M_CSCL	Compilation Scale of Data
M_QUAL	Data quality Meta object
OBSTRN	Obstructions
PILPNT	Piles
SBDARE	Bottom samples- rocky seabed areas
SLCONS	Shoreline Construction
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WEDKLP	Kelp

The \*\_SS HCell contains the following Objects:

DEPCNT	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**

H12088 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**

H12088_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:20,000
H12088_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H12088_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12088_outline.gml	Survey outline
H12088_outline.xsd	

**11.2 Software**

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.0	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	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, 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.

## **12. Contacts**

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

Fernando Ortiz

Physical Scientist

Pacific Hydrographic Branch

Seattle, WA

206.526.6859

[Fernando.ortiz@noaa.gov](mailto:Fernando.ortiz@noaa.gov).

APPROVAL SHEET  
H12088

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.