

H11845

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-10-08-09

*Registry No.* ..... H11845

### LOCALITY

*State* ..... Alaska

*General Locality* ..... Approaches to Sitka

*Sublocality* ..... Vicinity of Rakof Islands

**2008**

### CHIEF OF PARTY

..... Commander Donald W. Haines, NOAA

### LIBRARY & ARCHIVES

DATE .....

**HYDROGRAPHIC TITLE SHEET**

H11845

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

FIELD NO.  
RA-10-09-08

State Alaska

General Locality Approaches to Sitka

Sublocality Vicinity of Rakof Islands

Scale 1:10,000

Date of Survey 5/22/2008 - 6/18/2008

Instructions Dated 4/21/2008

Project No. OPR-O112-RA-08

Vessel RA3 (1021), RA1 (1101), RA4 (2801), RA-5 (2802), RA2 (1103), RA-9 (915 Ceeducer),  
RAINIER (S221)

Chief of Party Commander Donald W. Haines, NOAA

Surveyed by RAINIER Personnel

Soundings taken by echo sounder Reson 8101, Tilted Reson 8125, Seabeam/Elac 1050D MKII,  
Reson 7125, Knudsen 320M

Graphic record scaled by N/A

Graphic record checked by N/A

Evaluation by G. Froelich Automated plot by N/A

Verification by G. Froelich, P Holmberg

Soundings in Fathoms and Feet at MLLW

REMARKS: Time in UTC. UTM Projection Zone 8

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

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

All separates are filed with the hydrographic data.

# Descriptive Report to Accompany Hydrographic Survey H11845

Project OPR-O112-RA-08

Approaches to Sitka, AK

Vicinity of Rakof Islands

Scale 1:10,000

May 22 – June 18, 2008

**NOAA Ship RAINIER (s221)**

Chief of Party: Commander Donald W. Haines, NOAA

## A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-O112-RA-08 dated April 21, 2008 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area includes the vicinity of Rakof Islands off the coast of Sitka, AK. This survey corresponds to sheet “B” in the sheet layout provided with the Letter Instructions.

This project, OPR-O112-RA-08, responds to a request from the USCG 17<sup>th</sup> District Aids to Navigation Branch. They have identified that the route south from Sitka “along a protected passage to Necker Bay and Crawfish Inlet, is seeing increased use by commercial fishing vessels, commercial charter vessels, and recreational boater.” As tour companies respond to the growing numbers of visitors that are looking for the “real Alaska”, this area will see increased passenger vessel traffic in the near future.

Data Acquisition Type	Hull Number with Mileage (nm)							Total
	S221	1021	1101	1103	2801	2802	915	
VBES (main scheme)	-	-	-	-	-	-	-	-
MBES (main scheme)	8.5	8.26	43.07	-	113.0	101.9	-	274.7
[MBES + SSS (main scheme)]	-	-	-	-	-	-	-	-
VBES + SSS (main scheme)	-	-	-	-	-	-	-	-
Cross lines	-	-	-	19.59	-	-	-	19.59
Developments	-	-	9.04	-	-	7.54	-	
Shoreline				.74			.68	1.42
Bottom Samples	-	-	-	-	-	-	-	-
Total Number of Items Investigated	-	-	-	29	-	-	10	39
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	-	12.35

*Table 1: Statistics for survey H11725*

Data acquisition was conducted from May 22 to June 18, 2008 (DN143 to DN170).

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

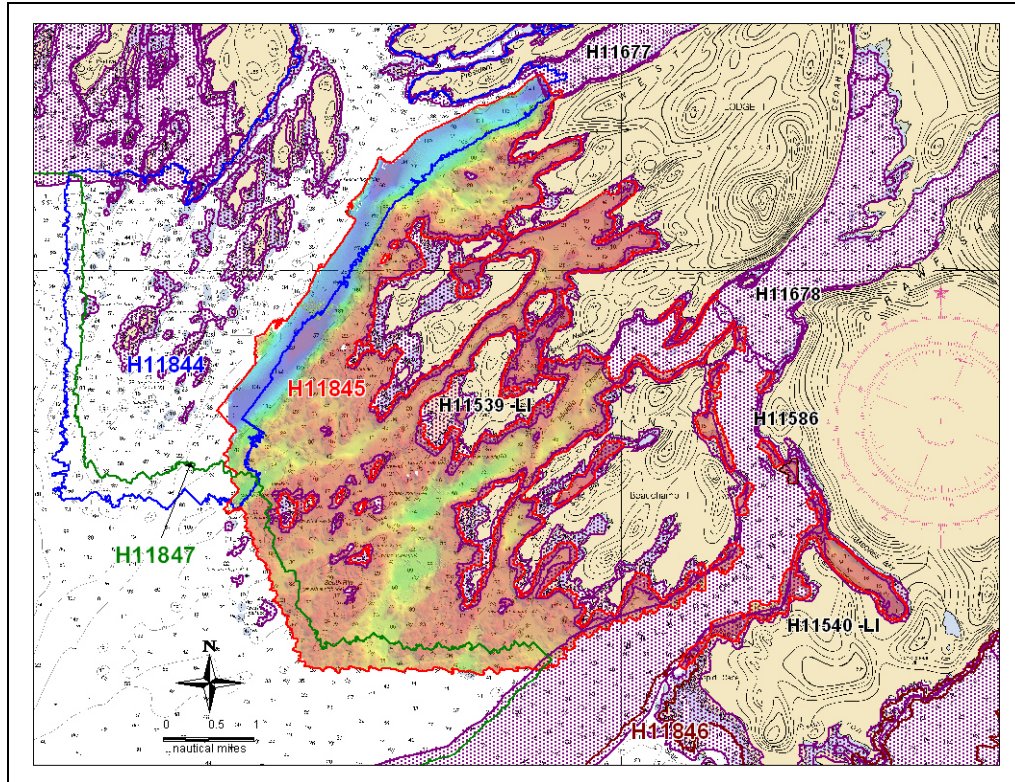


Figure 1. H11845 Survey Limits & Junction Surveys

**B. DATA ACQUISITION AND PROCESSING**

Refer to OPR-O112-RA-08 Data Acquisition and Processing Report (DAPR)<sup>1</sup> for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are included in this descriptive report.

**B 1. EQUIPMENT AND VESSELS**

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
1101	RA-1	Reson 8125 tilted Multibeam Echo Sounder
1103	RA-2	Vertical Beam Echo sounder Detached Positions
1021	RA-3	Reson 8101 Multibeam Echo sounder
2801	RA-4	Reson 7125 Multibeam Echo sounder
2802	RA-5	Reson 7125 Multibeam Echo Sounder
915	RA-9	Ceeducer Detached Positions
S221	RAINIER	Elac1050D Multibeam Echo Sounder

Table 2. Data Acquisition Vessels for H11845.

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

**B 2. QUALITY CONTROL**

**B 2.1 System Certification and Calibration**

Refer to OPR-O112-RA-08 DAPR and Hydrographic Systems Readiness Report (HSRR) for a complete description of system integration and initial calibration results for equipment and sensors used for this survey.

**B.2.2 Sounding Coverage**

Project instructions for this survey required 25 meter spaced lines coverage of either multibeam echosounder (MBES) or vertical beam echosounder (VBES) from the inshore limit to 8 meters water depth, and complete MBES in greater than 8 meters water depth. Complete multibeam coverage was acquired to further offshore of the inshore limit line or the junction survey lines, except as noted below.

**B 2.3 Crosslines**

The total distance of multibeam echo sounder (MBES) crosslines totaled 19.59 linear nautical miles, which is equal to 7.1% of mainscheme MBES lines. The mainscheme bathymetry was manually compared to the crossline nadir beams in CARIS subset mode. The agreement between the MBES mainscheme and MBES crossline soundings was adequate, with the majority of crossings differing by approximately 0.1 meters and not exceeding 0.5 meters. However, the Elac MBES and Reson 8101 crosslines had an error of up to 2.4 meters. This error is attributed to water depth and the quality of Elac data. Elac data were collected in water deeper then 150 meters. In all cases the Elac detected a deeper bottom then the Reson.<sup>2</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 2008 RAINIER Hydrographic System Readiness Review package submitted with this survey.

**B 2.4 Junctions and Prior Surveys**

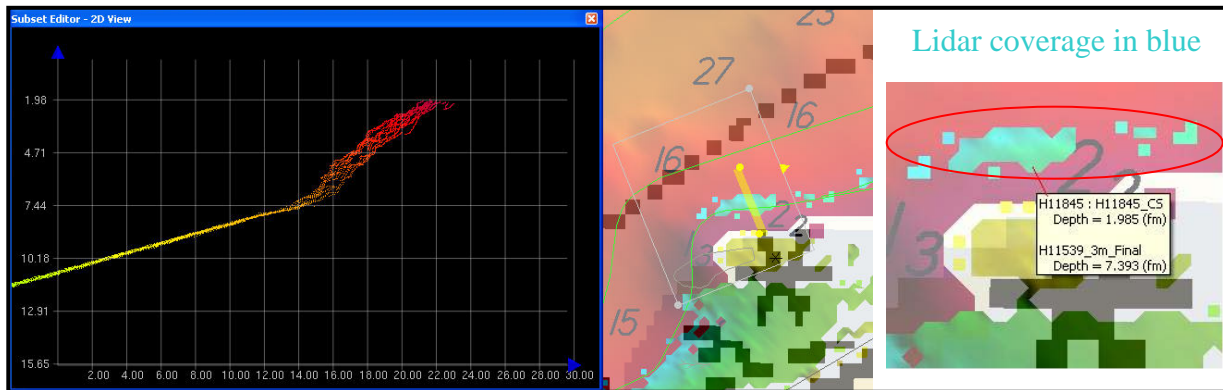
The following contemporary surveys junction with H11845:

<b>Registry #</b>	<b>Scale</b>	<b>Date</b>	<b>Field Party</b>	<b>Junction side</b>
(1) H11844	1:10,000	2008	RAINIER	Northwest
(2) H11846	1:10,000	2008	RAINIER	Southeast
(3) H11847	1:10,000	2008	RAINIER	Southwest
(4) H11586	1:10,000	2007	RAINIER	Southeast
(5) H11677	1:10,000	2007	RAINIER	North
(7) H11539	1:10,000	2006	KRL	Rakof Islands
(8) H11540	1:10,000	2006	KRL	North and South shore line Walker Channel & Jamboree Bay

Basic hydrographic surveys H11844, H11846 and H11847 were conducted along with this survey in 2008 by RAINIER. The Lidar surveys H11539 and H11540 were conducted in 2006 by contractor.

### H11539 and H11540

Comparisons were conducted manually between the Lidar surveys and H11845 by comparing the surfaces in CARIS HIPS and SIPS. Although, RAINIER met the provided Lidar limit junction line, due to sparse Lidar data it was difficult to junction the surveys together in all areas. In most cases, the Lidar soundings were equal to or up to two fathoms deeper. Although, in a few cases the Lidar was shoaler by .5 fathoms. In cases where the Lidar was very sparse the Lidar soundings differed by up to 7 fathoms. See figure 2 for an example of this. The Hydrographer recommends that current survey soundings supersede all areas where Lidar overlaps the survey.<sup>3</sup>



*Figure 2. H11845 Comparison with Lidar survey H11539.*

### H11844, H11846, H11847, H11677 and H11586

Comparisons between the HDCS data were conducted manually in CARIS subset mode with H11845 and H11844, H11846, H11847, H11677 and H11586. Agreement between survey soundings were within 0.6 meters, except when comparing H11844. When comparing H11844 and H11845, a 2.5 meter error was found between the Elac soundings and the Reson soundings. See B 2.5 ELAC for more details.<sup>4</sup>

## **B 2.5 Data Quality Factors**

The following data problems encountered during the survey led to data quality problems

### ELAC

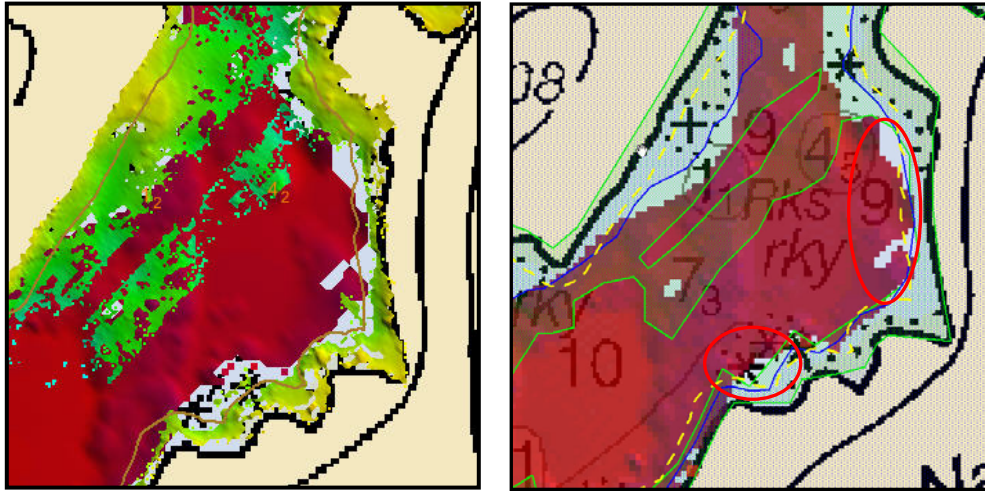
After conducting a crossline and junction comparison between data from the Reson 8101, Reson 7125 and the Elac it was evident that the Elac data is consistently 1.1 to 1.5 meters deeper than the Reson data in the same area. The Elac was only used in water 150 meters and deeper for updating bathymetric data and not for item investigations.

### Data gaps (Holidays)

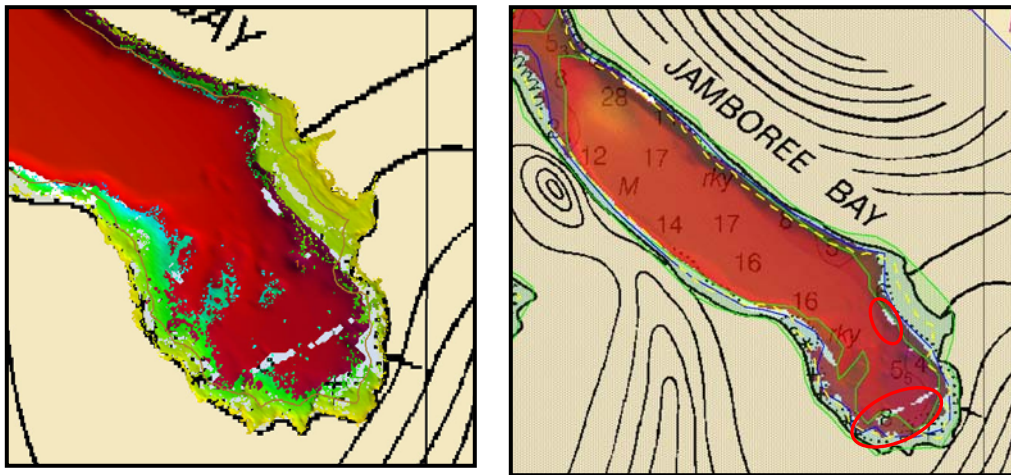
A few small holidays were found between the mainscheme data and Lidar coverage. The Lidar was sparse throughout the survey area. For the most part H11845 junctions with the Lidar Limit line except for in a few rare cases. When RAINIER first received the junction survey limits in MapInfo were used for survey planning and assessment. Near the end of acquisition it was noted



that the Notebook Lidar limit line and the MapInfo Lidar junctions lines were different, with the Notebook line generally inshore of the MapInfo line. Therefore, with the remaining time allotted for the project, some holidays were unable to be filled. See figure 3a and 3b for examples. The images on the left are from Caris with the H11845 DTM (red) and the Lidar DTM (green and yellow) overlaid on top. The images on the right are images from MapInfo, which shows the NALL Line (yellow dashed line), original MapInfo junctions limit lines (green) and the Notebook Lidar limit lines (blue).<sup>5</sup>



*Figure 3a. Holidays northwest of Second Narrows*



*Figure 3b. Holidays in Jamboree Bay*

### B 3. CORRECTIONS TO ECHO SOUNDING

HDCS sounding data were reduced to mean lower-low water (MLLW) using approved tides from the primary station at Sitka, AK (945-1600) adjusted for tidal constituents and residuals provided by CO-OPS as specified in the Letter Instructions.

All other datum reduction procedures conform to those outlined in the DAPR.

All methods and instruments used for sound velocity correction were as described in the DAPR. A table detailing all sound velocity casts is located in Separate II<sup>6</sup> of this Descriptive Report.

### B 4. DATA PROCESSING

#### B 4.1 BASE Surfaces and Mosaics

Table 3 describes all BASE Surfaces submitted as part of Survey H11845. This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configuration was set to Shallow for 1 meter resolution field sheets and Deep for the 2, 4 and 8 meter resolution field sheet for this survey. Final BASE surface resolutions and depth ranges were set in accordance with the Specification and Deliverables Complete Multibeam Coverage requirements. Field Sheets have a grid resolution of at least 10% of the depth and are smaller than 25x10<sup>6</sup> nodes.

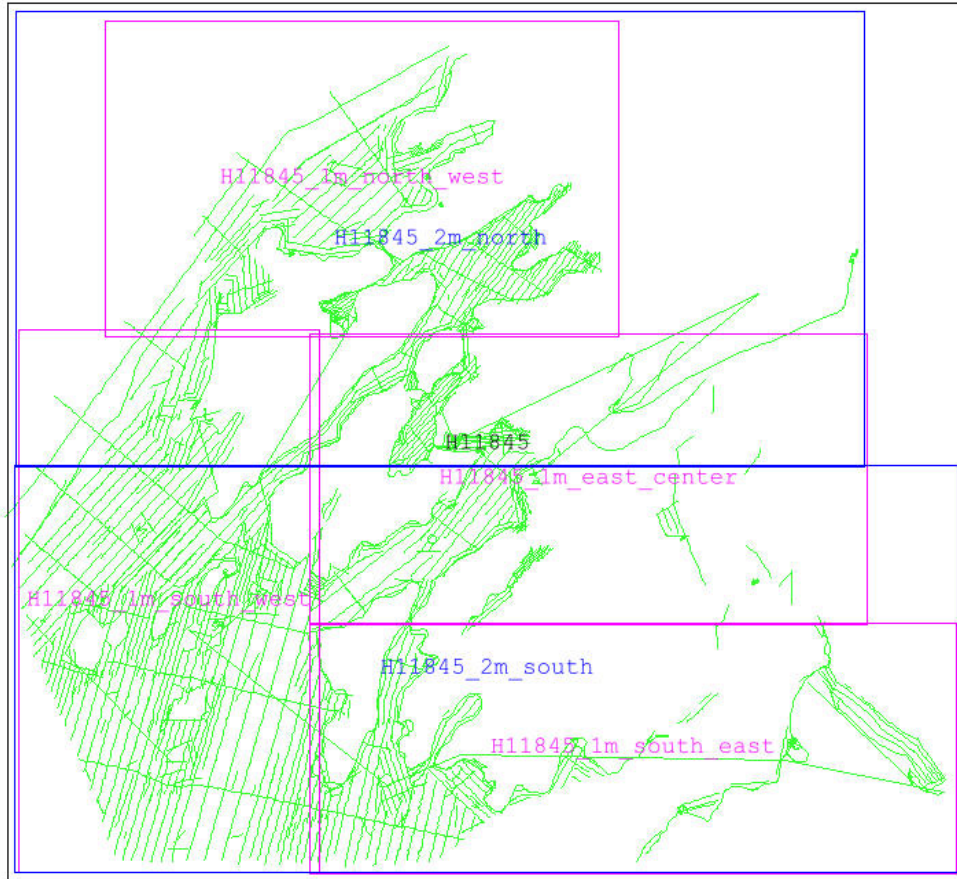
Name of Fieldsheet	Resolution	Type	Purpose
H11845			
- H11845_4m	4 meter	CUBE	Cube Base surface
- H11845_8m	8 meter	CUBE	Cube Base surface
- H11845_cs	8 meter		Combined Cube surfaces
H11845_1m_east_center	1 meter	CUBE	Cube Base Surface
H11845_1m_north_west	1 meter	CUBE	Cube Base Surface
H11845_1m_south_west	1 meter	CUBE	Cube Base Surface
H11845_1m_south_east	1 meter	CUBE	Cube Base Surface
H11845_2m_north	2 meter	CUBE	Cube Base Surface
H11845_2m_south	2 meter	CUBE	Cube Base Surface

*Table 3: All Mosaics and BASE Surfaces submitted as part of Survey H11845*

Depth Range of Finalized Surface	Resolution
0-21.5	1m
18.5-52	2m
46-115	4m
103-450	8m

*Table 4. Depth range and resolution of finalized surfaces*





**Figure 4: Layout of field sheets for BASE surfaces of H11845**

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.

**C. VERTICAL AND HORIZONTAL CONTROL**

Project OPR-O112-RA-08 did not require static GPS observations or other horizontal control work, and all tide corrections were generated from CO-OPS maintained tide stations. Thus, no Horizontal and Vertical Control Report will be submitted.

**C 1.1 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 5.

Location	Frequency	Operator	Distance	Priority
Biorka Islands	305 KHz	USCG	12nm	Primary

**Table 5: Differential Corrector Sources for H11845**

**C 1.2 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 and as the primary source for water level reducers for survey H11845.

No tertiary gauges were required.

All data were reduced to MLLW using final approved TCARI water levels using the TCARI file from O112RA2008P-TCARI.tc and stations Sitka, AK (945-1600) using the tide file 9451600 verified\_thru20080630.txt.

The request for Final Approved Water Levels for H11845 was submitted to CO-OPS on June 19<sup>th</sup> 2008 and the Final Tide Note was received on June 30<sup>th</sup> 2008. This documentation is included in Appendix IV.<sup>7</sup> In the Final Tide Note a statement in regards to the tide corrector was made “Note 2: Due to inaccurate shoreline around Scow Bay and Jamboree Bay, survey tracklines fall outside of the TCARI grid boundaries in some areas. TCARI will extrapolate the tide corrector to cover these soundings.”

**D. RESULTS AND RECOMMENDATIONS**

**D.1 Chart Comparison**

Survey H11845 was compared with the following charts:

<b>Chart</b>	<b>Edition</b>	<b>Edition Date</b>	<b>Local Notice to Mariners applied through</b>	<b>Scale</b>
17326	16 <sup>th</sup>	Nov 2007	March 08, 2008	1:40,000
17328	7 <sup>th</sup>	Nov 2003	March 08, 2008	1:40,000
17320	17 <sup>th</sup>	Nov 2005	March 08, 2008	1:217,828

*Table 6: Charts compared with H11845*

Chart comparisons were performed in CARIS, in Pydro using survey-scale excessed soundings, and in MapInfo using survey-scale and chart-scale excessed soundings exported from Pydro. In lieu of performing an ENC comparison, the survey was compared to the composite source file. Comparison between chart 17326 and 17328 determined a number of discrepancies between both 1:40,000 scaled charts. When the hydrographer overlaid the two charts in CARIS Notebook it was noted that the soundings, shoreline and charted features were not in the same locations. However, the shift was not consistent throughout the charts: in some cases the soundings were charted in the same position and in others the position was off by approximately 60 meters. See figure 5.<sup>8</sup>

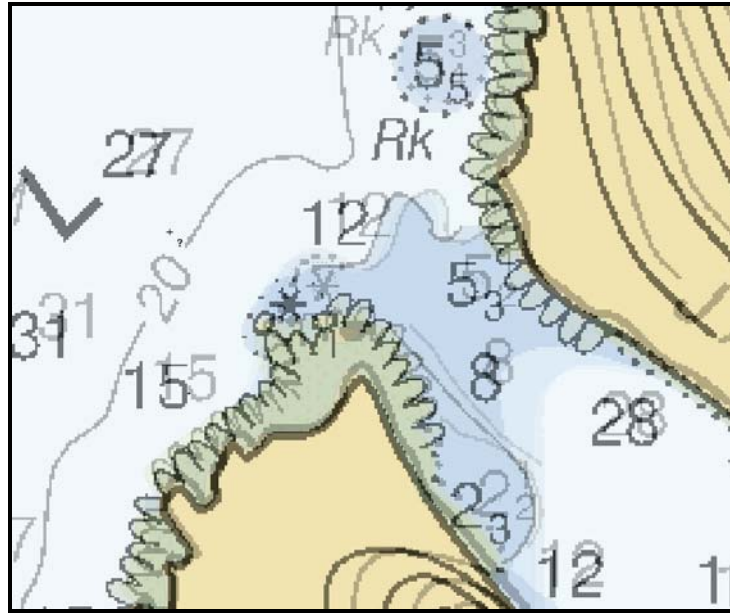


Figure 5. Comparison between chart 17326 & chart 17328.

**D.1.1 Chart 17326 Comparison**

The agreement between the survey soundings and the charted depths found on NOAA Chart 17326 agreed within 1 to 5 fathoms of approximately 1/2 of the currently charted depths. A number of discrepancies were seen throughout the chart, with differences of 15 to 20 fathoms. Furthermore, most of the currently charted depth curves do not agree with survey depth contours.<sup>9</sup>

South of Lodge Island

In the southern cove of Lodge Island Bay, charted depths are much shoaler than survey soundings. Complete MBES was achieved in the area and no shoaling was indicated. The Hydrographer recommends charting as per the digital data.<sup>10</sup> See figure 6.

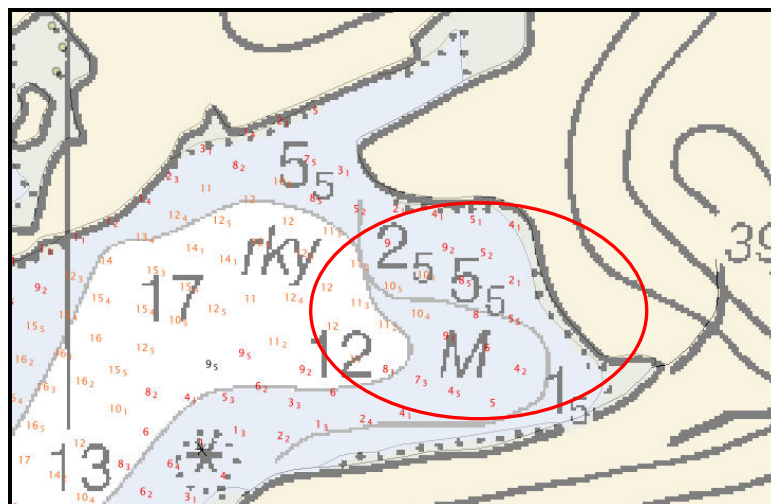


Figure 6. South of Lodge Island – discrepancy between chart and survey



Southwest extent of survey limits, west of Rakof Islands

Many charted discrepancies in the area west of Rakof Islands are highlighted in Figure 7. Survey soundings were often found to be considerably shoaler than charted depths due to modern bottom coverage techniques. Some of these discrepancies warranted immediate attention and were submitted as Dangers to navigation, see section D.3.1. There were also instances where the charted depths were significantly shoaler than survey soundings; these are possibly due to poor positioning, or old reports. Four such cases are shown in Figure 7. In all cases, complete Multibeam was achieved over the item or sounding in question and the Hydrographer recommends charting as per the digital data. Reference the submitted H11845\_deleted\_source.hob and H11845\_Field\_Verified.hob files for a comprehensive listing of features that are recommended to be modified and/or deleted from the chart.<sup>11</sup>

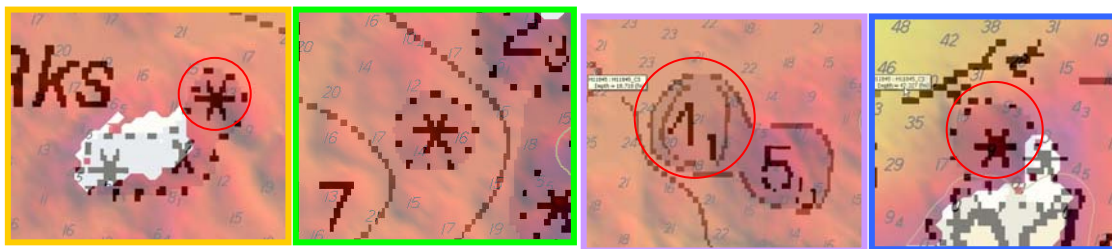
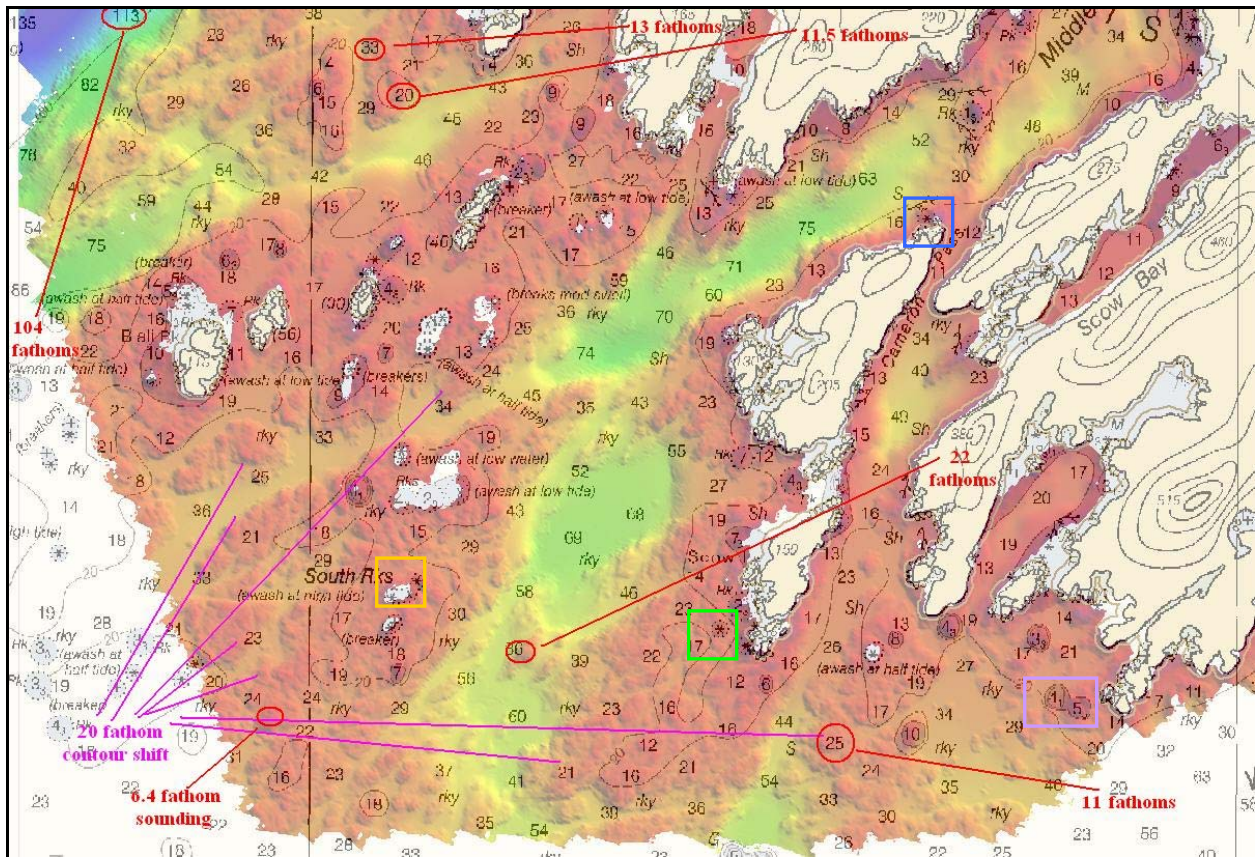


Figure 7. Chart 17328 Discrepancies

### **D.1.2 Chart 17328 Comparison**

The agreement between the survey soundings and the charted depths found on NOAA Chart 17328 agreed within 1 to 5 fathoms. A few discrepancies were seen throughout the survey limits on the chart, some with differences of up to 10 fathoms. In some areas the survey soundings between the charted depths revealed shoaler soundings. This is attributed to increased bottom coverage using multibeam echosounder methods. See Notebook for features that are recommended to be removed, modified and / or deleted from the chart.<sup>12</sup>

### **D.1.3 Chart 17320 Comparison**

The survey soundings and the charted depths found on the NOAA Chart 17320 agreed within 5 to 20 fathoms. This chart is a small scale chart, which made it difficult to compare to such a detailed survey. Most of the current charted depths were deeper than the survey soundings.

The Hydrographer recommends that current survey soundings supersede all prior survey and charted depths in the common area.<sup>13</sup>

## **D.2 Additional Results**

### **D.2.1 Automated Wreck and Obstruction Information Service (AWOIS) Items**

No AWOIS items fall within the survey limits of H11845.<sup>14</sup>

### **D.2.2 Shoreline**

#### Shoreline Source

The Pacific Hydrographic Branch provided RAINIER with a list of selected features for further investigation from LIDAR surveys H11539 and H11540. These features needed further investigation due to doubtful soundings or charted features not found in LIDAR survey data and recommended for removal from the chart. These features were placed in the “H11845\_Discrepancy” layer.

In addition, the source shoreline for project OPR-O112-RA-08 is a composite source file compiled from photogrammetric survey project GC10517, charted features from the digital Electronic Navigational Chart (ENC) US5AK3GM and US5AK3SM, as well as prior survey features. The composite source file was trimmed down to include only the shoreline and features that applied to each individual survey.

#### Shoreline Verification

Limited shoreline verification was conducted near or as close to predicted low water in accordance with the FPM section 3.5.5. Due to time constraints some shoreline was run after the predicted low water. Detached positions (DPs) acquired during shoreline verification were recorded in HYPACK and on DP forms, and processed in Pydro. These indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline. DP forms are included in the Separates to be Included with Survey Data.<sup>15</sup>

All shoreline data is submitted in Caris Notebook .hob files. The session H11845\_Notebook.wrk contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H11845_CompSource.hob	Original Source Data as filtered from ENC cells US5AK3GM and US5AK3SM and from photogrammetric survey project GC10517
H11845_Reference.hob	Survey outline and limit lines.
H11845_Field_Verify.hob	Field verified source features and shoreline.
H11845_Delete_Source.hob	Items disproved or modified.
H11845_discrepancy.hob	LIDAR disproval's or doubtful soundings.

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

#### Source Shoreline Changes and New Features

Items for survey H11845 that require further discussion and are associated with a detached position, have been flagged "Report" in Pydro in H11845.pss. Investigation methods and recommendations are listed in the Remarks and Recommendation tabs. These features are included in the Survey Feature Report in Appendix II.<sup>16</sup>

#### Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the GC, raster charts and ENC's as described above.<sup>17</sup>

### **D.2.3. Aids to Navigation**

Survey H11845 included two aids to navigation (ATONs). Each ATON's position was visually checked in the field against the digital raster chart. A detached position was taken on each ATON for check purposes to ensure that each were charted correctly. Each of the ATON's were found to serve their intended purpose.<sup>18</sup>

No GPS static surveys were conducted for Survey H11845.

### **D.2.4 Charted Features**

All other charted features and item investigations are described in detail in Appendix II of this report.<sup>19</sup>

#### **D.2.4.1 Charted Pipelines and Cables**

There are no pipelines or submarine cables within the limits of the survey.<sup>20</sup>

#### **D.2.4.2 Bridges, Ferry Routes, and Overhead Cables**

There are no ferry routes, bridges, or overhead cable crossings within the limits of the survey.<sup>21</sup>



### D.3 Dangers to Navigation and Shoals

#### D 3.1 Dangers to Navigation

Thirteen (13) Dangers to Navigation (DTONs) were found on survey H11845 and reported to the Marine Chart Division via email on; July 25<sup>th</sup>, 2008. A copy of each Danger to Navigation Report is included in Appendix I, and a copy of each DTON email to MCD is located in Appendix V of this Descriptive Report.<sup>22</sup>

A number of survey soundings were detected to be shoaler than currently charted depths. The most pertinent soundings were picked as DTONs for immediate action due to the location of the soundings and vessel traffic areas.

A table of all Dangers to Navigation identified in this survey, with their submission date to MCD, is included below.

<i>DtoN Number</i>	<i>Description</i>	<i>Latitude</i>	<i>Longitude</i>	<i>Date Submitted</i>
1.1	Rock	56° 43' 27.7" N	135° 16' 25.1" W	July 25 <sup>th</sup> , 2008
1.2	Shoal	56° 44' 19.4" N	135° 14' 11.5" W	July 25 <sup>th</sup> , 2008
1.3	Rock	56° 41' 58.0" N	135° 15' 51.0" W	July 25 <sup>th</sup> , 2008
1.4	Shoal	56° 45' 16.3" N	135° 18' 38.8" W	July 25 <sup>th</sup> , 2008
1.5	Shoal	56° 41' 56.1" N	135° 10' 16.2" W	July 25 <sup>th</sup> , 2008
1.6	Rock	56° 46' 01.3" N	135° 16' 36.0" W	July 25 <sup>th</sup> , 2008
1.7	Rock	56° 45' 32.3" N	135° 18' 17.9" W	July 25 <sup>th</sup> , 2008
1.8	Shoal	56° 43' 21.8" N	135° 18' 35.9" W	July 25 <sup>th</sup> , 2008
1.9	Rock	56° 41' 38.3" N	135° 20' 11.8" W	July 25 <sup>th</sup> , 2008
1.10	Rock	56° 43' 16.9" N	135° 15' 12.8" W	July 25 <sup>th</sup> , 2008
1.11	Sounding	56° 44' 25.8" N	135° 16' 34.2" W	July 25 <sup>th</sup> , 2008
1.12	Rock	56° 42' 15.2" N	135° 17' 42.2" W	July 25 <sup>th</sup> , 2008
1.13	Shoal	56° 44' 14.1" N	135° 19' 49.6" W	July 25 <sup>th</sup> , 2008

*Table 8: Dangers to Navigation*

### D.4 Miscellaneous

#### D. 4.1 Bottom Samples

Due to time constraints, no bottom samples were taken during survey H11845.<sup>23</sup>

**E. APPROVAL**

As Chief of Party, Field Operations for hydrographic survey H11845 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2008 edition), Field Procedures Manual (May 2008 edition), Standing and Letter Instructions, and all HSD Technical Directives issued through May 2008. These data are adequate to supersede charted data in their common areas. This survey is complete, with the exception of deficiencies noted in the Descriptive Report. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-O112-RA-08	July 25, 2008	N/CS34
Coast Pilot Report for OPR- O112-RA-08	TBD	

Approved and Forwarded:



Digitally signed by Donald W. Haines, CDR/NOAA  
 DN: cn=Donald W. Haines, CDR/NOAA, c=US, o=NOAA/NMAO/  
 MOC-P, ou=NOAA Ship RAINIER, email=co.rainier@noaa.gov  
 Reason: I am approving this document  
 Date: 2008.07.25 18:31:36 -08'00'

Commander Donald W. Haines, NOAA  
 Commanding Officer

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

Survey Sheet Manager:



I am the author of this document  
 2008.07.25 16:24:15 -08'00'

Ensign Caryn M. Arnold, NOAA  
 Junior Officer

Chief Survey Technician:



James B Jacobson  
 I have reviewed this document  
 2008.07.25 16:20:51 -08'00'

James B. Jacobson  
 Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:



I have reviewed this document  
 2008.07.25 16:59:01 -08'00'

Lieutenant Charles J. Yoos, NOAA  
 Field Operations Officer

## Revisions

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- <sup>1</sup> Filed with project records.
- <sup>2</sup> The Survey Acceptance Review (SAR) found all data from H11845 acceptable for charting.
- <sup>3</sup> Concur.
- <sup>4</sup> Areas where data was collected with the Elac system are all deeper than 100 fathoms. All data is suitable for charting.
- <sup>5</sup> Chart data extents as depicted in the M\_QUAL layer of H11845\_CS.000.
- <sup>6</sup> Filed with hydrographic records.
- <sup>7</sup> Tide note is appended to this report.
- <sup>8</sup> Compilation of H11845\_CS.000 was performed relative to chart 17326.
- <sup>9</sup> Concur, chart as depicted in H11845\_CS.000.
- <sup>10</sup> Concur with clarification, chart as depicted in H11845\_CS.000.
- <sup>11</sup> Concur with clarification. The comprehensive listing was reviewed by PHB. Chart survey data per H11845\_CS.000.
- <sup>12</sup> Concur with clarification. The notebook files were reviewed by PHB. Chart survey data per H11845\_CS.000.
- <sup>13</sup> Concur.
- <sup>14</sup> Concur with clarification, no AWOIS items were assigned for investigation within the survey limits of H11845.
- <sup>15</sup> Filed with hydrographic records.
- <sup>16</sup> The Survey Feature Report is filed with the hydrographic records. Note: the survey feature report does not include all features from H11845. Additional features were added, some emoved, and some modified in CARIS Notebook after the feature report was generated from Pydro. All features included in the compilation of H11845 have come directly from CARIS Notebook, which is the official features deliverable for this survey.
- <sup>17</sup> Do not concur. Compile shoreline data per H11845\_CS.000.
- <sup>18</sup> Chart per latest ATONIS information.
- <sup>19</sup> The Survey Feature Report is filed with the hydrographic records. Note: the survey feature report does not include all features from H11845. Additional features were added, some removed, and some modified in CARIS Notebook after the feature report was generated from Pydro. All features included in the compilation of H11845 have come directly from CARIS Notebook, which is the official features deliverable for this survey.
- <sup>20</sup> Concur.
- <sup>21</sup> Concur.
- <sup>22</sup> DTON report is appended to this report.
- <sup>23</sup> Five bottom samples were retained from chart 17326 in H11845\_CS.000.

# H11845 Dangers to Navigation

**Registry Number:** H11845  
**State:** Alaska  
**Locality:** Approaches to Sitka, AK  
**Sub-locality:** Vicinity of Rakof Islands  
**Project Number:** OPR-O112-RA-08  
**Survey Dates:** 05/22/2008 - 06/18/2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17328	7th	11/01/2003	1:40,000 (17328_1)	[L]NTM: ?
17326	15th	06/01/2006	1:40,000 (17326_1)	[L]NTM: ?
17320	17th	11/01/2005	1:217,828 (17320_1)	[L]NTM: ?
16016	20th	11/01/2003	1:969,756 (16016_1)	[L]NTM: ?
531	23rd	01/01/2006	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	31st	06/01/2005	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	0.73 m	56° 43' 27.7" N	135° 16' 25.1" W	---
1.2	Shoal	3.88 m	56° 44' 19.4" N	135° 14' 11.5" W	---
1.3	Rock	0.50 m	56° 41' 58.0" N	135° 15' 51.0" W	---
1.4	Shoal	4.73 m	56° 45' 16.3" N	135° 18' 38.8" W	---
1.5	Shoal	2.12 m	56° 41' 56.1" N	135° 10' 16.2" W	---
1.6	Rock	1.03 m	56° 46' 01.3" N	135° 16' 36.0" W	---
1.7	Rock	6.73 m	56° 45' 32.3" N	135° 18' 17.9" W	---
1.8	Shoal	6.87 m	56° 43' 21.8" N	135° 18' 35.9" W	---
1.9	Rock	12.17 m	56° 41' 38.3" N	135° 20' 11.8" W	---
1.10	Rock	3.10 m	56° 43' 16.9" N	135° 15' 12.8" W	---

1.11	Sounding	1.69 m	56° 44' 25.8" N	135° 16' 34.2" W	---
1.12	Sounding	9.30 m	56° 42' 15.2" N	135° 17' 42.2" W	---
1.13	Rock	17.73 m	56° 44' 14.1" N	135° 19' 49.6" W	---

# **1 - Danger To Navigation**



## 1.1) Profile/Beam - 454/238 from h11845 / 1101\_reson8125\_hvf / 2008-149 / 275\_2209

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 43' 27.7" N, 135° 16' 25.1" W  
**Least Depth:** 0.73 m (= 2.39 ft = 0.398 fm = 0 fm 2.39 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 2.015$  m ; TVU (TPEv)  $\pm 4.558$  m  
**Timestamp:** 2008-149.22:10:37.895 (05/28/2008)  
**Survey Line:** h11845 / 1101\_reson8125\_hvf / 2008-149 / 275\_2209  
**Profile/Beam:** 454/238  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Currently charted rock verified with with MBES, least depth shoaler then charted.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/1101_reson8125_hvf/2008-149/275_2209	454/238	0.00	000.0	Primary

#### Hydrographer Recommendations

Update chart with least depth.

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

0 ¼fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)  
 0fm 2ft (531\_1)  
 .7m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080528  
 SORIND - US, US, survy, H11845

TECSOU - 3:found by multi-beam

VALSOU - 0.728 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

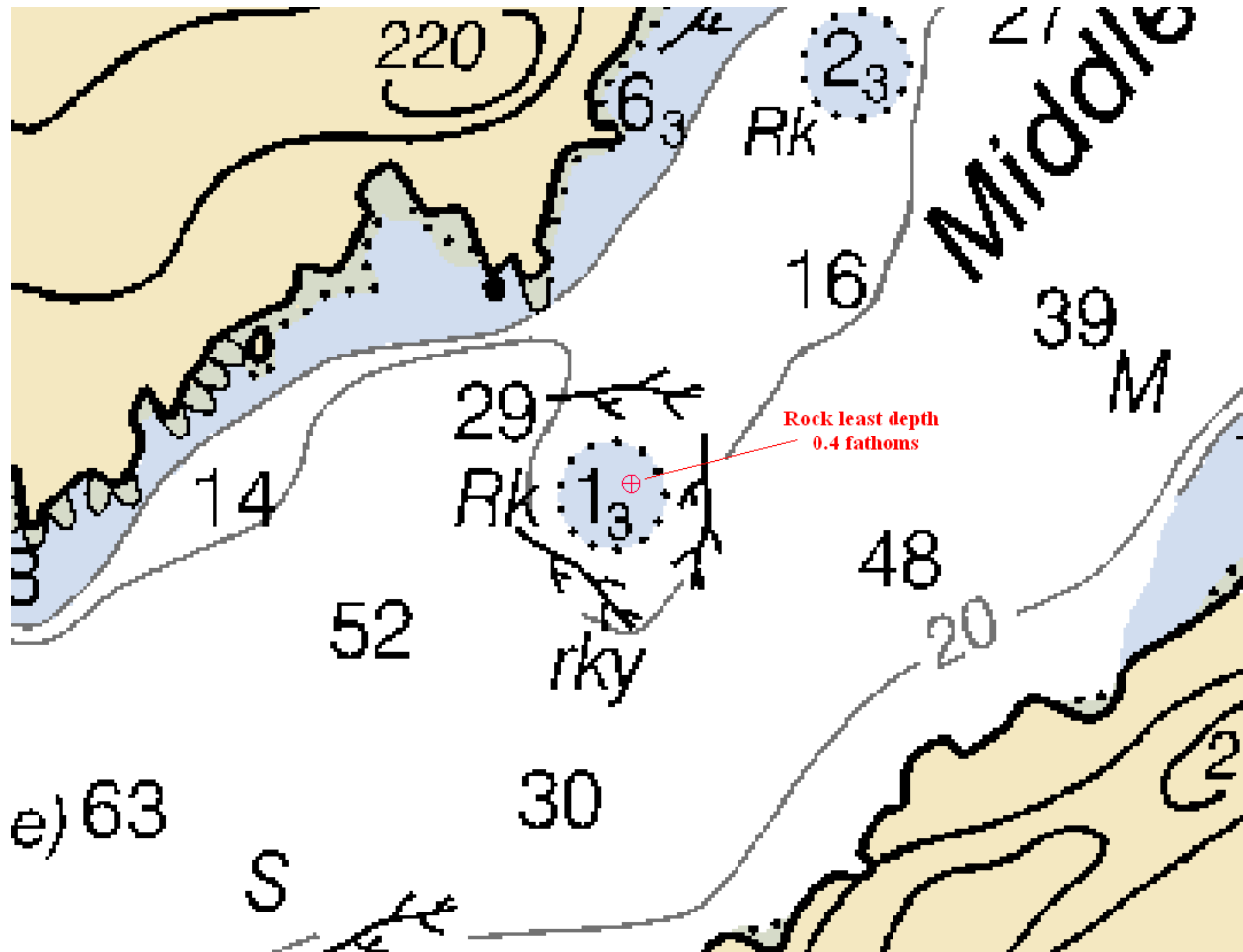


Figure 1.1.1

## 1.2) Profile/Beam - 5902/200 from h11845 / 1101\_reson8125\_hvf / 2008-149 / 277\_2306

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 44' 19.4" N, 135° 14' 11.5" W  
**Least Depth:** 3.88 m (= 12.75 ft = 2.124 fm = 2 fm 0.75 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.963$  m ; TVU (TPEv)  $\pm 0.132$  m  
**Timestamp:** 2008-149.23:17:02.349 (05/28/2008)  
**Survey Line:** h11845 / 1101\_reson8125\_hvf / 2008-149 / 277\_2306  
**Profile/Beam:** 5902/200  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Least depth of 2 fathoms determined with MBES.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/1101_reson8125_hvf/2008-149/277_2306	5902/200	0.00	000.0	Primary

#### Hydrographer Recommendations

Update chart with least depth.

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

2fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)

2fm 0ft (531\_1)

3.9m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area  
 QUASOU - 6:least depth known  
 SORDAT - 20080528

SORIND - US,US,survey,H11845

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

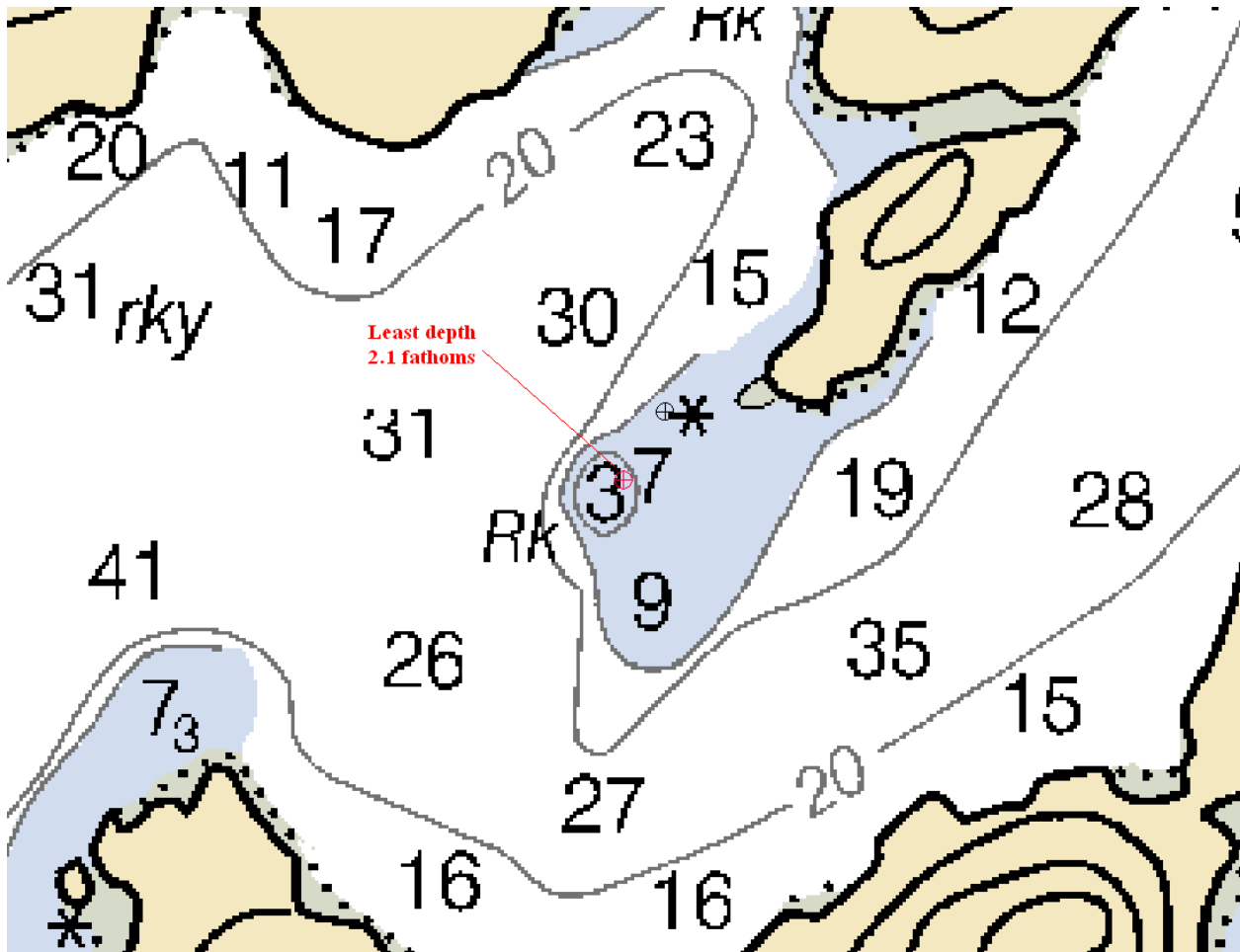


Figure 1.2.1



### 1.3) Profile/Beam - 3361/238 from h11845 / 1101\_reson8125\_hvf / 2008-152 / 375\_2156

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 56° 41' 58.0" N, 135° 15' 51.0" W  
**Least Depth:** 0.50 m (= 1.63 ft = 0.271 fm = 0 fm 1.63 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.978$  m ; TVU (TPEv)  $\pm 2.328$  m  
**Timestamp:** 2008-152.22:18:39.188 (05/31/2008)  
**Survey Line:** h11845 / 1101\_reson8125\_hvf / 2008-152 / 375\_2156  
**Profile/Beam:** 3361/238  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous rock initially detected via Lidar. Investigated with MBES during H11845 survey operations, rock confirmed.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/1101_reson8125_hvf/2008-152/375_2156	3361/238	0.00	000.0	Primary

### Hydrographer Recommendations

Chart this rock based on the depth, position, and S-57 attribution specified in this report.

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

0 ¼fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)

0fm 1ft (531\_1)

.5m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080531

SORIND - US, US, survy, H11845

TECSOU - 3:found by multi-beam

VALSOU - 0.496 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images

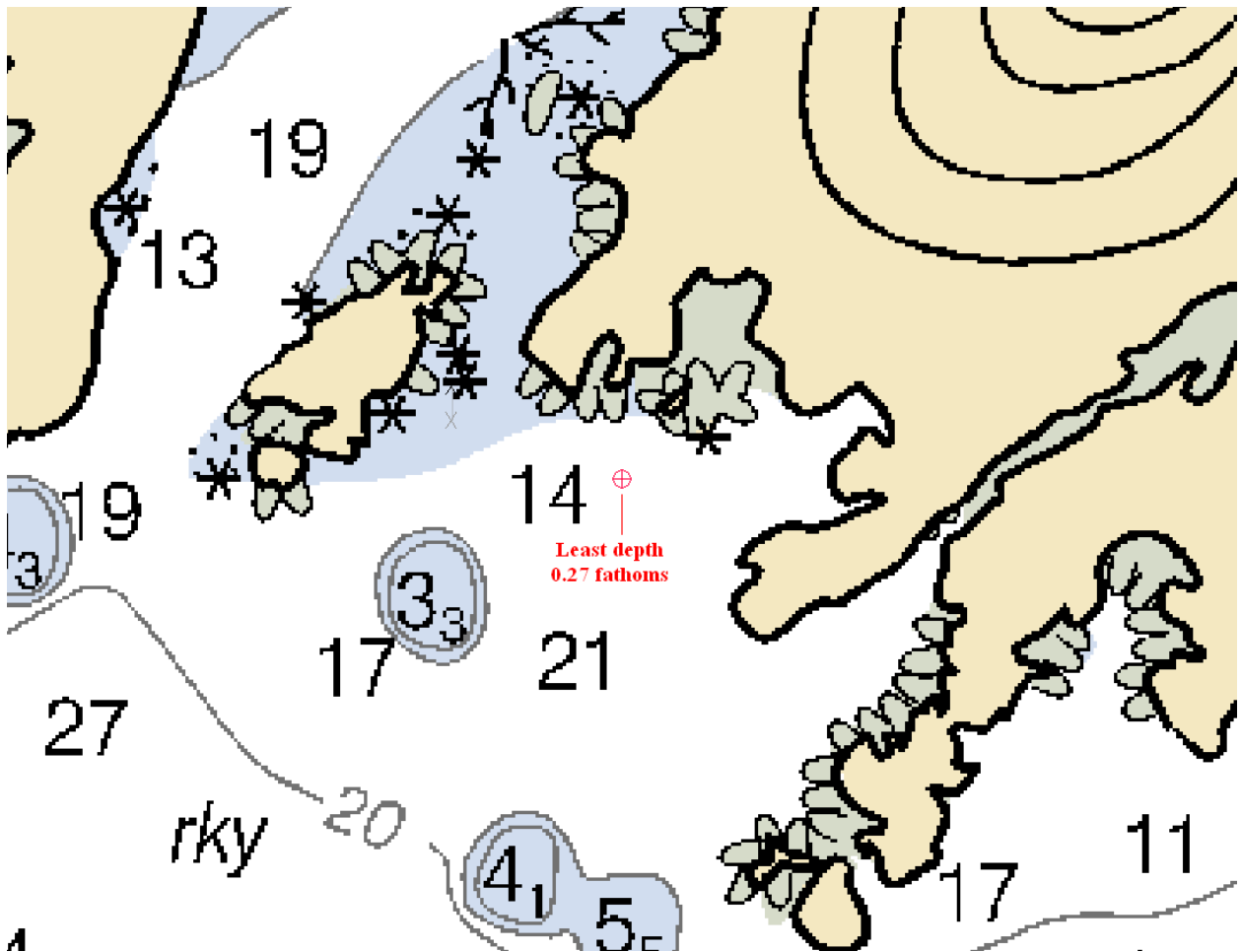


Figure 1.3.1

## 1.4) Profile/Beam - 558/159 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-155 / 280\_1914

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 45' 16.3" N, 135° 18' 38.8" W  
**Least Depth:** 4.73 m (= 15.53 ft = 2.589 fm = 2 fm 3.53 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.963$  m ; TVU (TPEv)  $\pm 0.234$  m  
**Timestamp:** 2008-155.19:16:09.370 (06/03/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-155 / 280\_1914  
**Profile/Beam:** 558/159  
**Charts Affected:** 17326\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous shoal located during H1145 survey operations. Shoal developed with Reson 7125 MBES determined a least depth of 2.6 fathoms which is currently charted with surrounding depth of 13 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-155/280_1914	558/159	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this shoal based on the depth, position, and S-57 attribution specified in this report.

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

2 ½fm (17326\_1, 17320\_1, 16016\_1, 530\_1)

2fm 3ft (531\_1)

4.7m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area  
 QUASOU - 6:least depth known

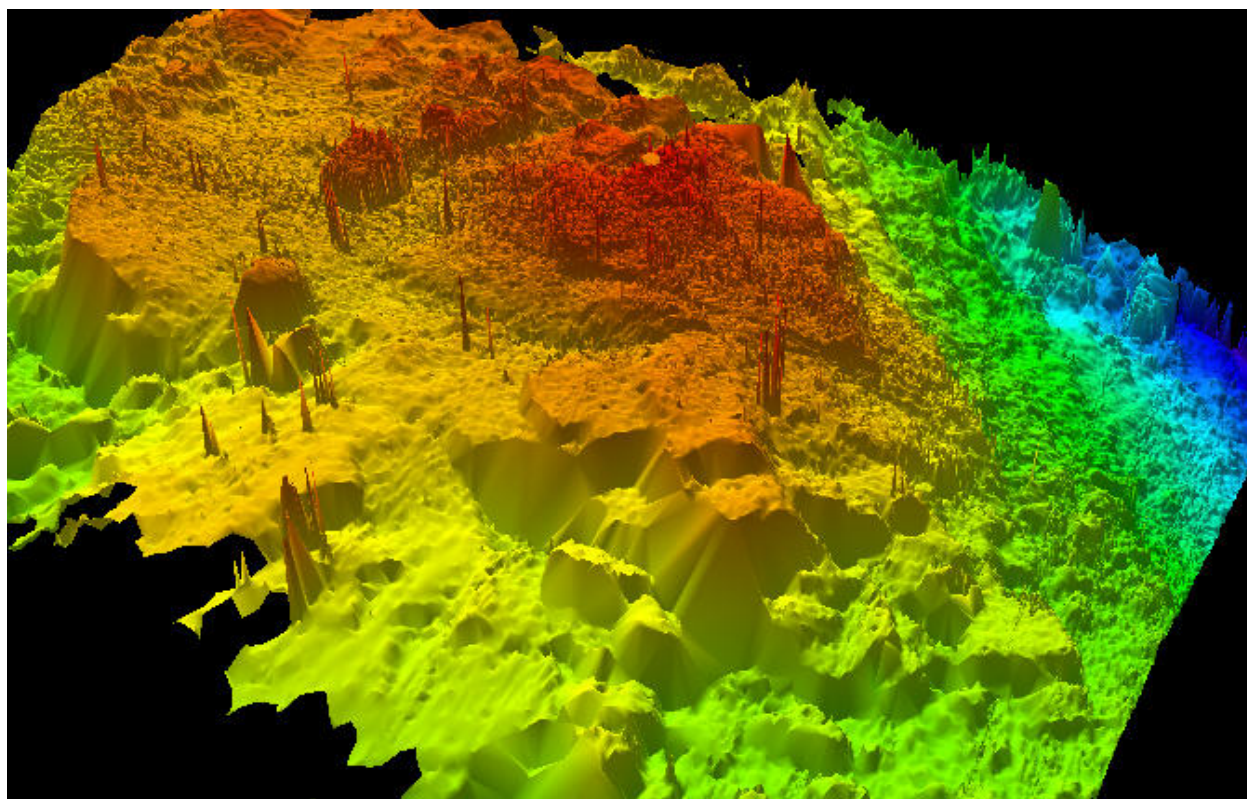
SORDAT - 20080603

SORIND - US,US,survey,H11845

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

## Feature Images



*Figure 1.4.1*

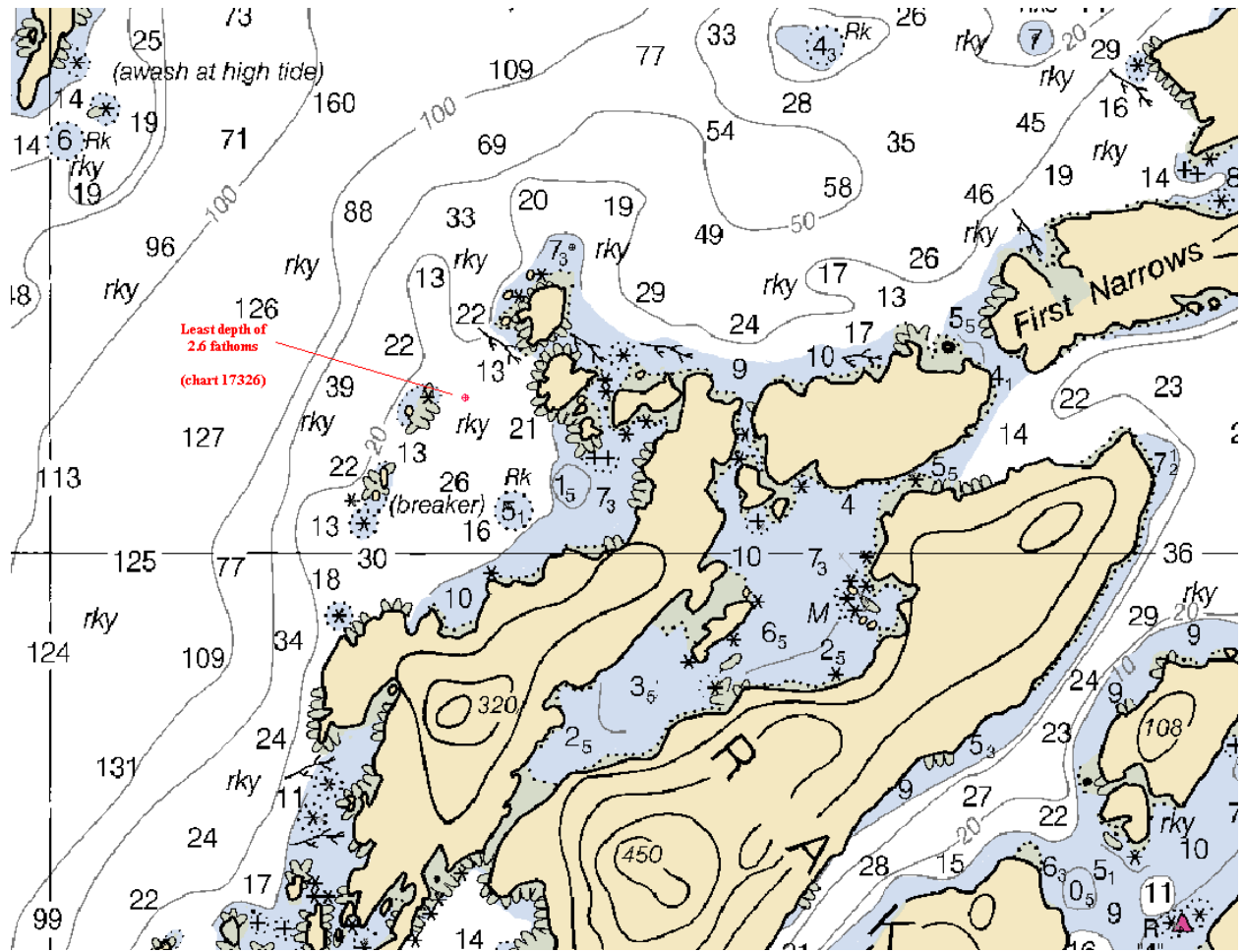


Figure 1.4.2

## 1.5) Profile/Beam - 523/289 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-156 / 248\_2101

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 41' 56.1" N, 135° 10' 16.2" W  
**Least Depth:** 2.12 m (= 6.96 ft = 1.160 fm = 1 fm 0.96 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.962$  m ; TVU (TPEv)  $\pm 0.243$  m  
**Timestamp:** 2008-156.21:02:18.056 (06/04/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-156 / 248\_2101  
**Profile/Beam:** 523/289  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Shoal area detected with MBES during H11845 survey operations.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-156/248_2101	523/289	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this shoal based on the depth, position, and S-57 attribution specified in this report.

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

1fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)  
 1fm 1ft (531\_1)  
 2.1m (500\_1, 50\_1)

#### S-57 Data

[None]



Feature Images

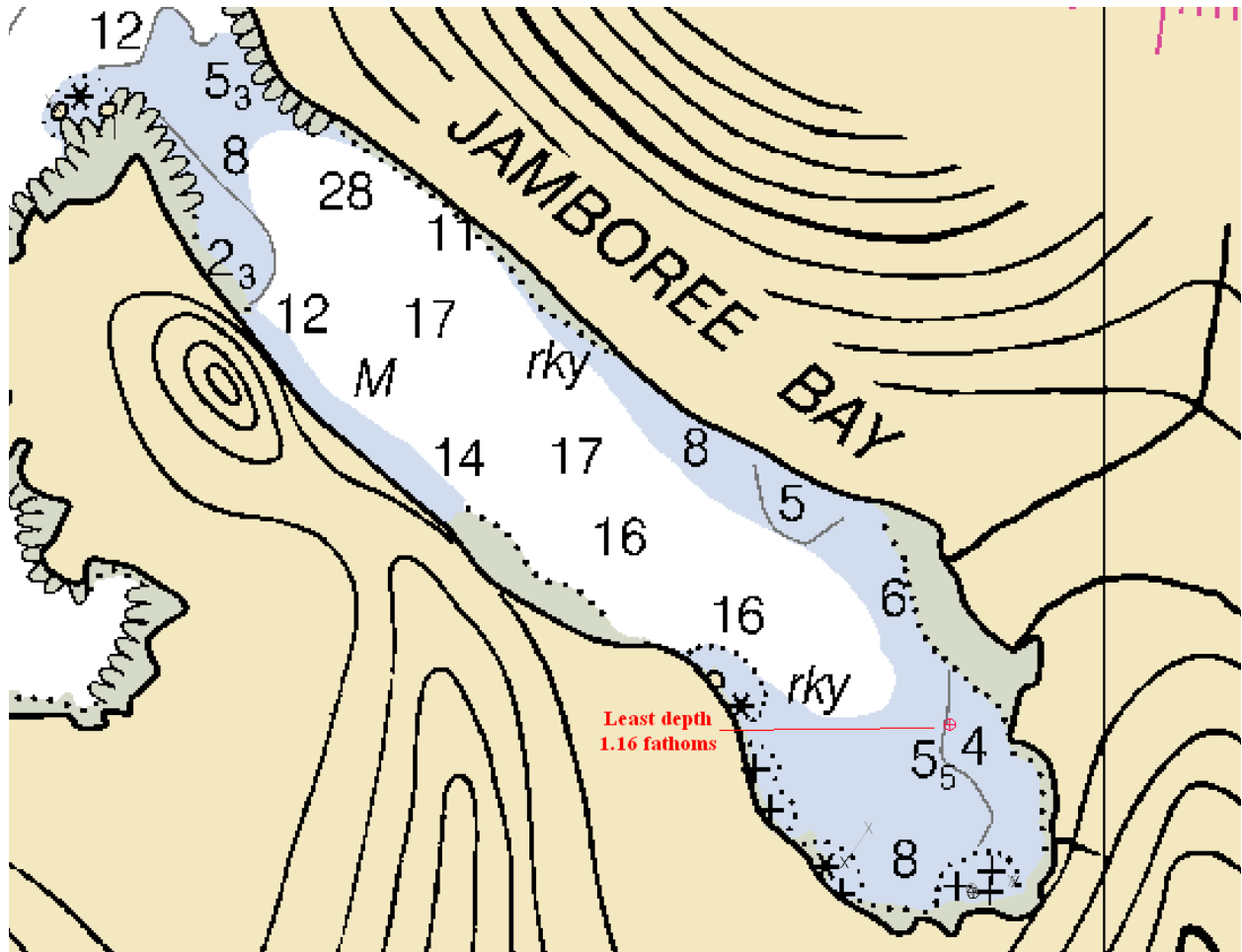


Figure 1.5.1

## 1.6) Profile/Beam - 151/157 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 862\_0043

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 46' 01.3" N, 135° 16' 36.0" W  
**Least Depth:** 1.03 m (= 3.37 ft = 0.561 fm = 0 fm 3.37 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.963$  m ; TVU (TPEv)  $\pm 0.233$  m  
**Timestamp:** 2008-170.00:43:56.590 (06/18/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 862\_0043  
**Profile/Beam:** 151/157  
**Charts Affected:** 17326\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Charted Rock verified with MBES, least depth shoaler than charted.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-169/862_0043	151/157	0.00	000.0	Primary

#### Hydrographer Recommendations

Update chart with least depth.

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

0 ½fm (17326\_1, 17320\_1, 16016\_1, 530\_1)  
 0fm 3ft (531\_1)  
 1.0m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080618  
 SORIND - US,US,survey,H11845

TECSOU - 3:found by multi-beam

VALSOU - 1.026 m

VERDAT - 12:Mean lower low water

Feature Images

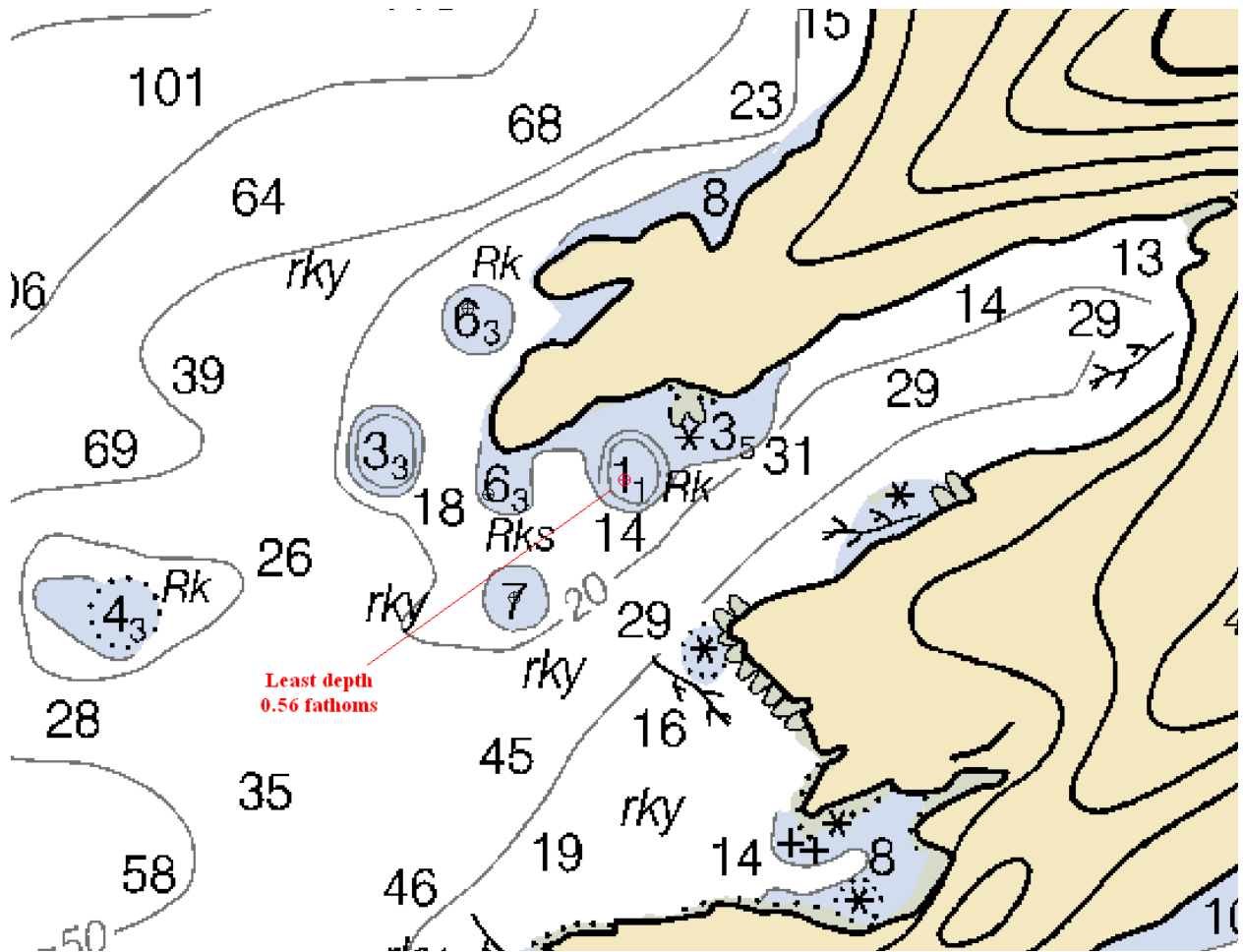


Figure 1.6.1

## 1.7) Profile/Beam - 141/87 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 813\_0112

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 45' 32.3" N, 135° 18' 17.9" W  
**Least Depth:** 6.73 m (= 22.07 ft = 3.679 fm = 3 fm 4.07 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.967$  m ; TVU (TPEv)  $\pm 0.204$  m  
**Timestamp:** 2008-170.01:13:19.228 (06/18/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 813\_0112  
**Profile/Beam:** 141/87  
**Charts Affected:** 17326\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous rock located during H11845 survey operations. Item developed with Reson 7125 MBES determined a least depth of 3.7 fathoms with a surrounding depth of 6.5 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-169/813_0112	141/87	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this rock based on the depth, position, and S-57 attribution specified in this report.

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

3 ½fm (17326\_1, 17320\_1, 16016\_1, 530\_1)

3fm 4ft (531\_1)

6.7m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080618

SORIND - US,US,survey,H11845

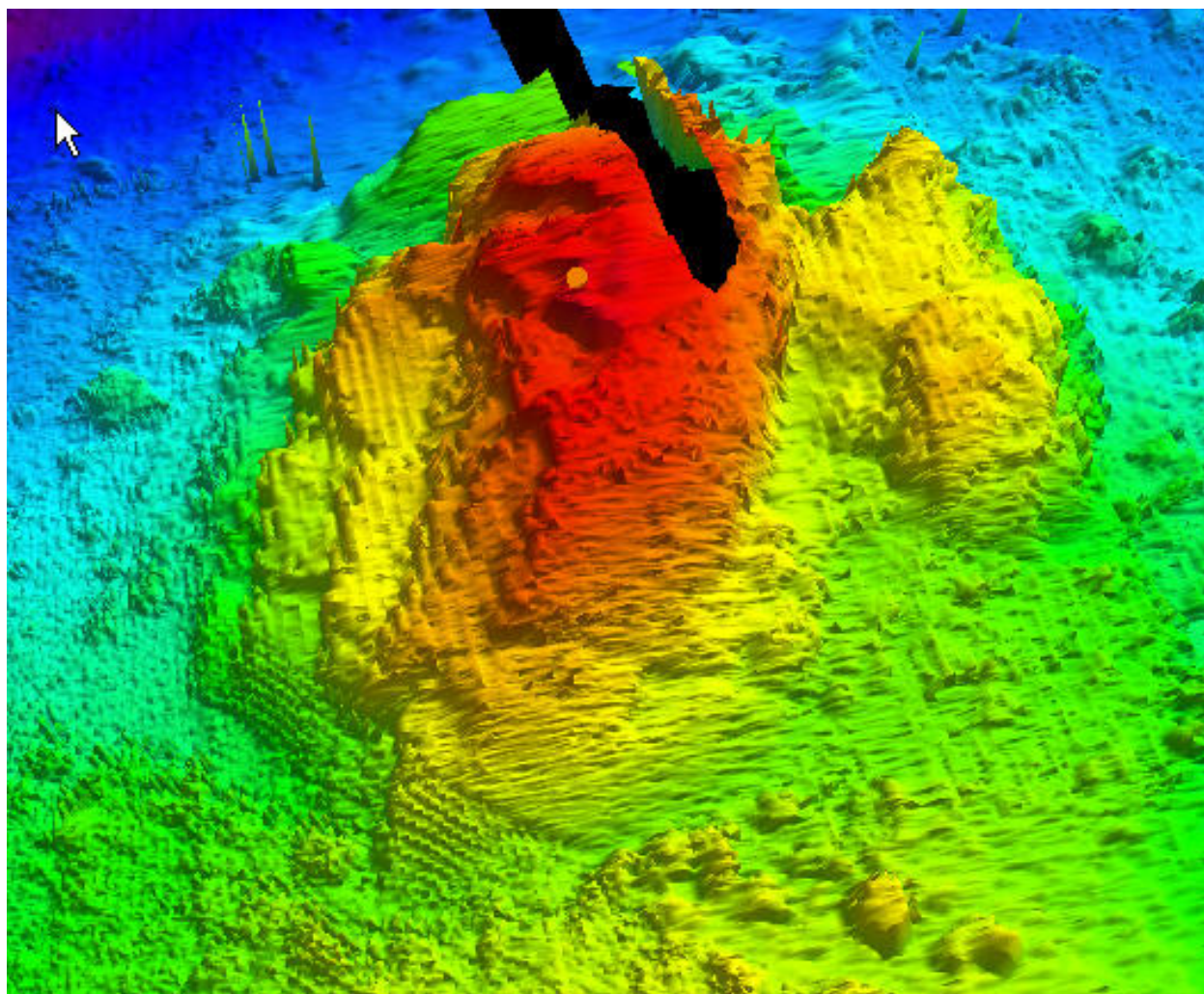
TECSOU - 3:found by multi-beam

VALSOU - 6.728 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

### Feature Images



*Figure 1.7.1*

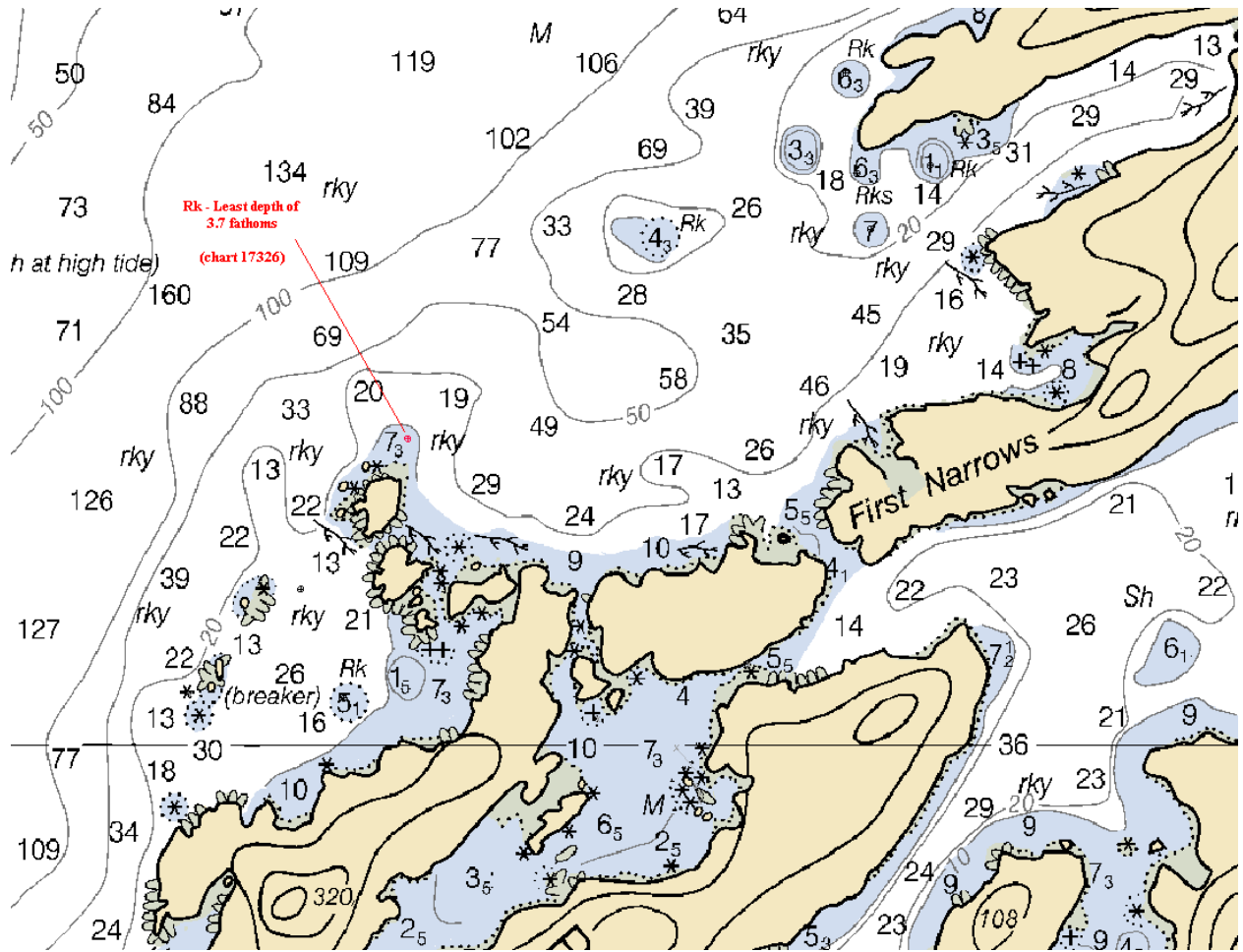


Figure 1.7.2



## 1.8) Profile/Beam - 772/1 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-149 / 327\_2219

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 43' 21.8" N, 135° 18' 35.9" W  
**Least Depth:** 6.87 m (= 22.53 ft = 3.755 fm = 3 fm 4.53 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.973$  m ; TVU (TPEv)  $\pm 0.162$  m  
**Timestamp:** 2008-149.22:22:27.017 (05/28/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-149 / 327\_2219  
**Profile/Beam:** 772/1  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous shoal located during H11845 survey operations. Area was developed with Reson 7125 MBES determined a least depth of 3.7 fathoms with a surrounding depth of 6.6 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-149/327_2219	772/1	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this shoal area based on the depth, position, and S-57 attribution specified in this report.

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

3  $\frac{3}{4}$ fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)

3fm 4ft (531\_1)

6.9m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080528

SORIND - US,US,survey,H11845

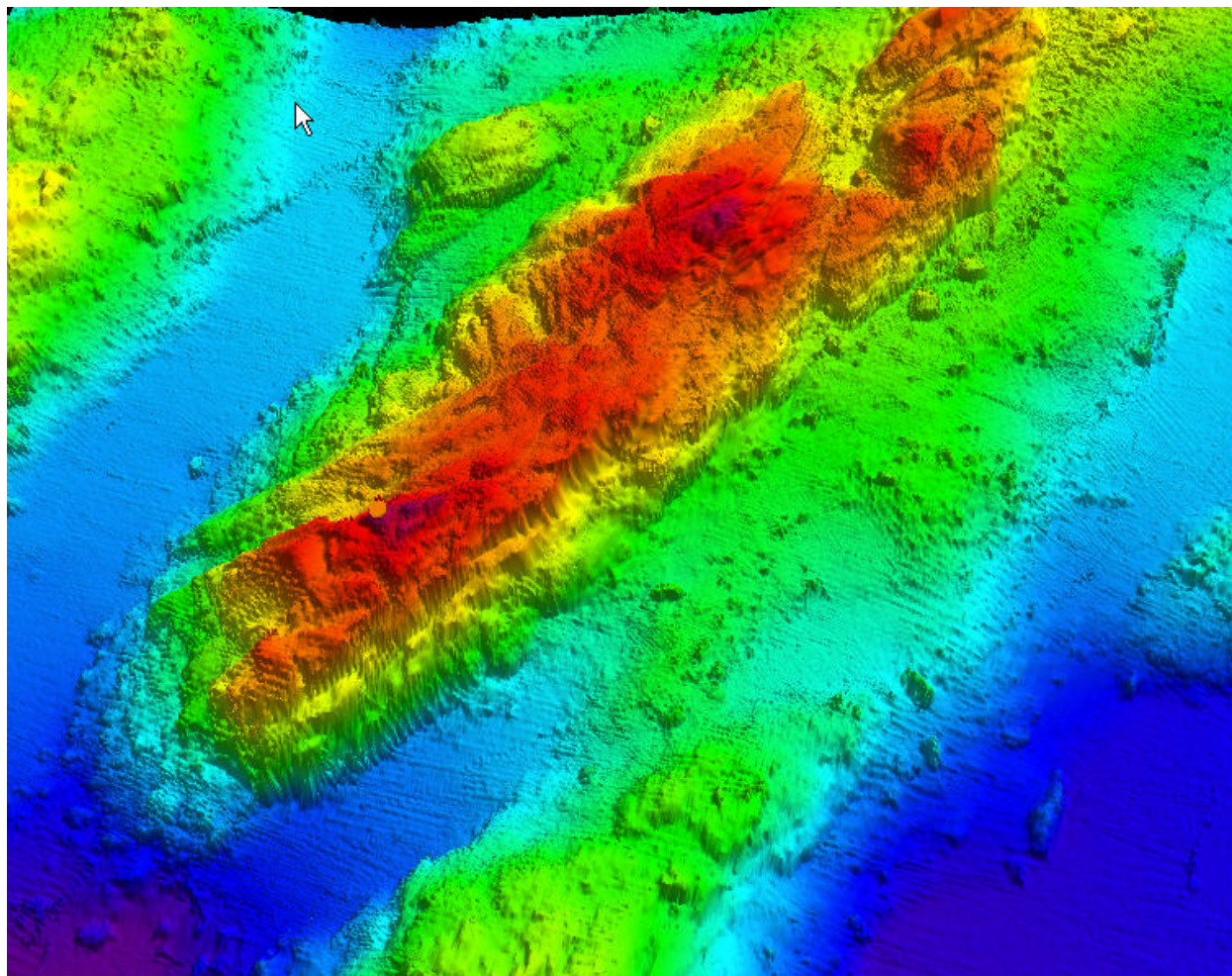
TECSOU - 3:found by multi-beam

VALSOU - 6.868 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Feature Images



*Figure 1.8.1*

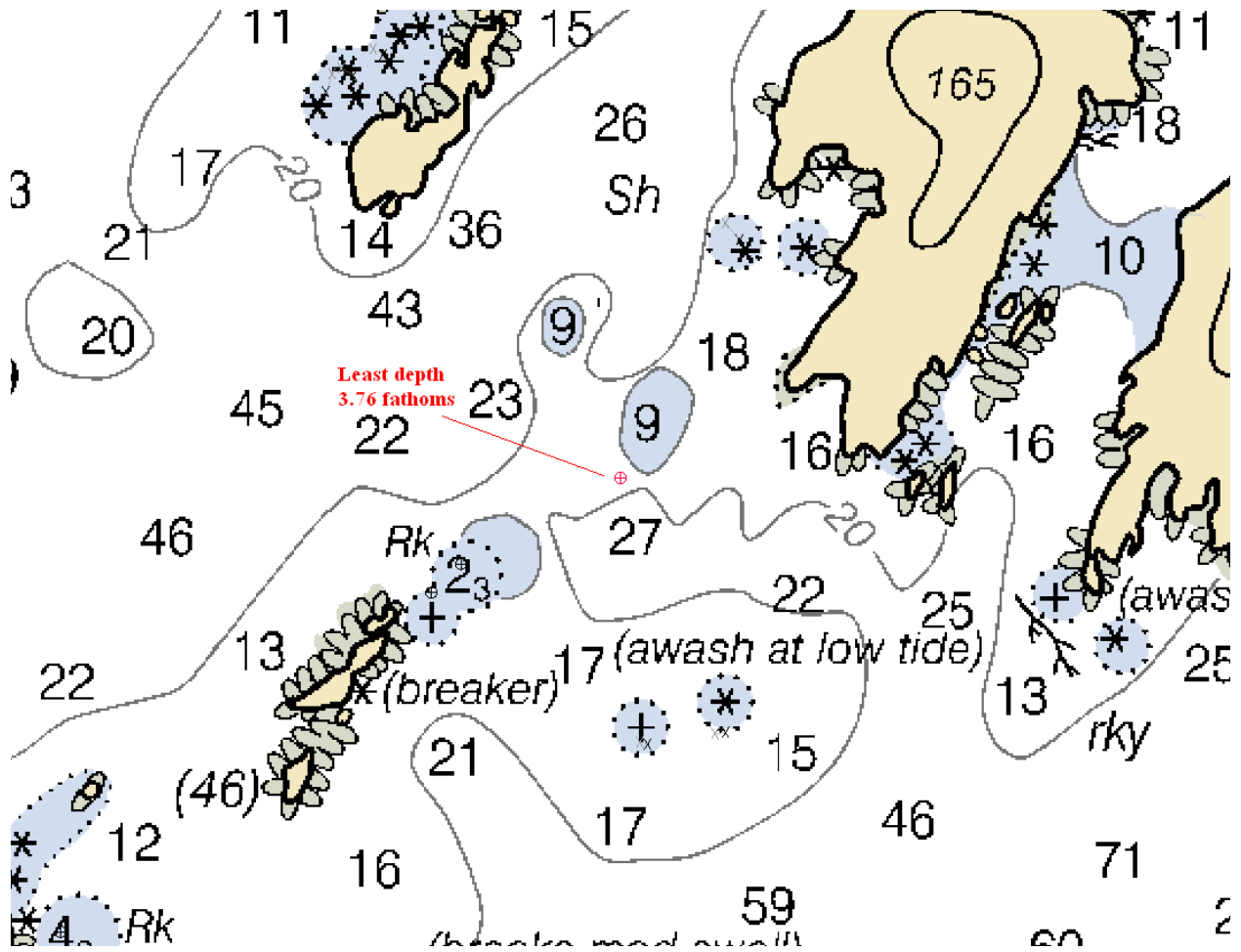


Figure 1.8.2

## 1.9) Profile/Beam - 456/394 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 829\_2345

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 41' 38.3" N, 135° 20' 11.8" W  
**Least Depth:** 12.17 m (= 39.92 ft = 6.654 fm = 6 fm 3.92 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.967$  m ; TVU (TPEv)  $\pm 0.220$  m  
**Timestamp:** 2008-169.23:48:03.090 (06/17/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 829\_2345  
**Profile/Beam:** 456/394  
**Charts Affected:** 17326\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous rock located during H11845 survey operations. Item developed with Reson 7125 MBES determined a least depth of 6.6 fathoms with a surrounding depth of 8 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-169/829_2345	456/394	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this rock based on the depth, position, and S-57 attribution specified in this report.

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

6 ½fm (17326\_1, 17320\_1, 16016\_1, 530\_1)

6fm 4ft (531\_1)

12.2m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080617

SORIND - US,US,survey,H11845

TECSOU - 3:found by multi-beam

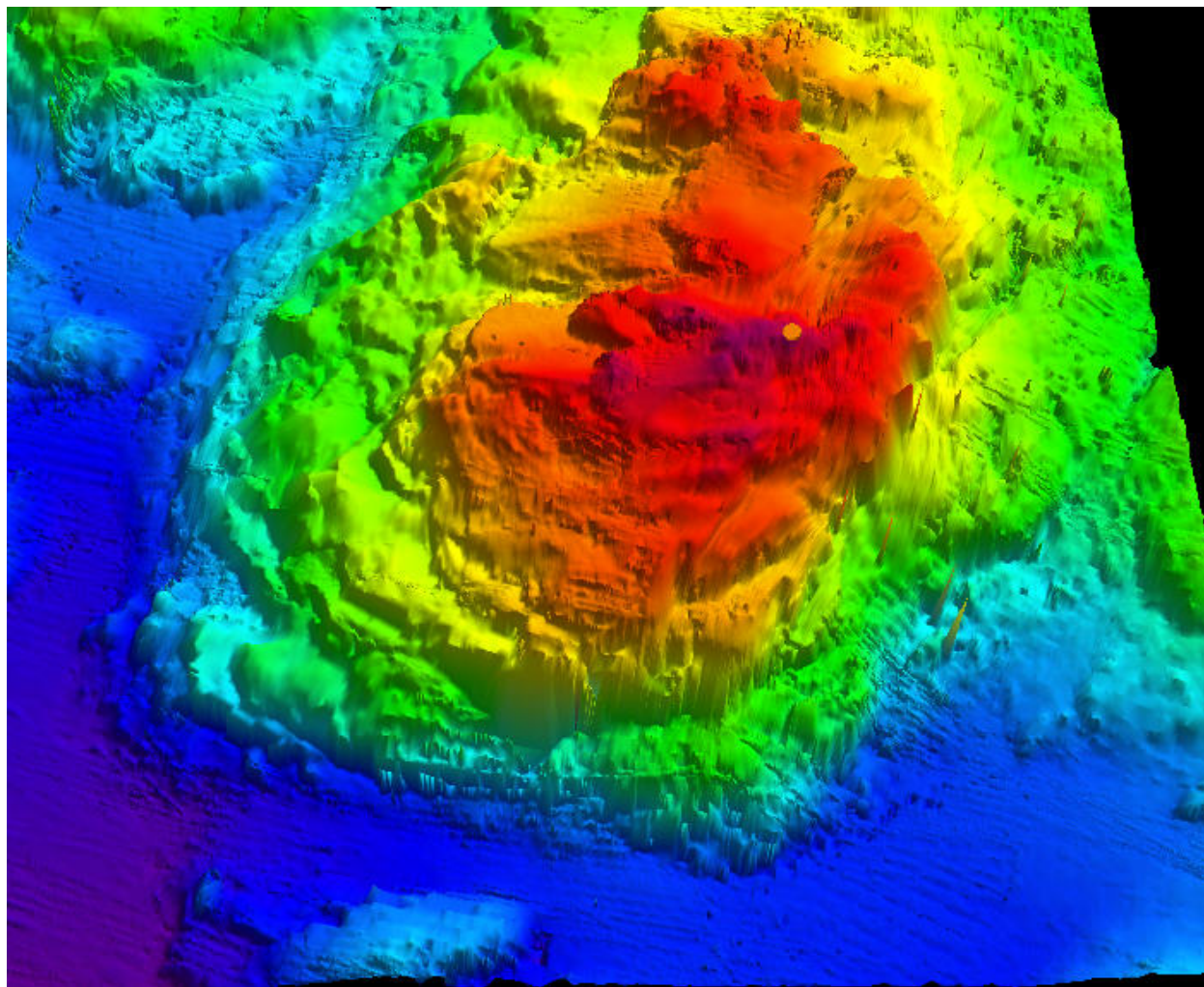
VALSOU - 12.169 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged



## Feature Images



*Figure 1.9.1*





## 1.10) Profile/Beam - 175/143 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 1124a

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 43' 16.9" N, 135° 15' 12.8" W  
**Least Depth:** 3.10 m (= 10.17 ft = 1.695 fm = 1 fm 4.17 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.964$  m ; TVU (TPEv)  $\pm 0.228$  m  
**Timestamp:** 2008-169.23:01:03.664 (06/17/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-169 / 1124a  
**Profile/Beam:** 175/143  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous rock located during H11845 survey operations. Item developed with Reson 7125 MBES determined a least depth of 1.7 fathoms with a surrounding depth of 3.6 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-169/1124a	175/143	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this rock based on the depth, position, and S-57 attribution specified in this report.

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

1  $\frac{3}{4}$ fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)

1fm 4ft (531\_1)

3.1m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** QUASOU - 6:least depth known

SORDAT - 20080617

SORIND - US,US,survey,H11845

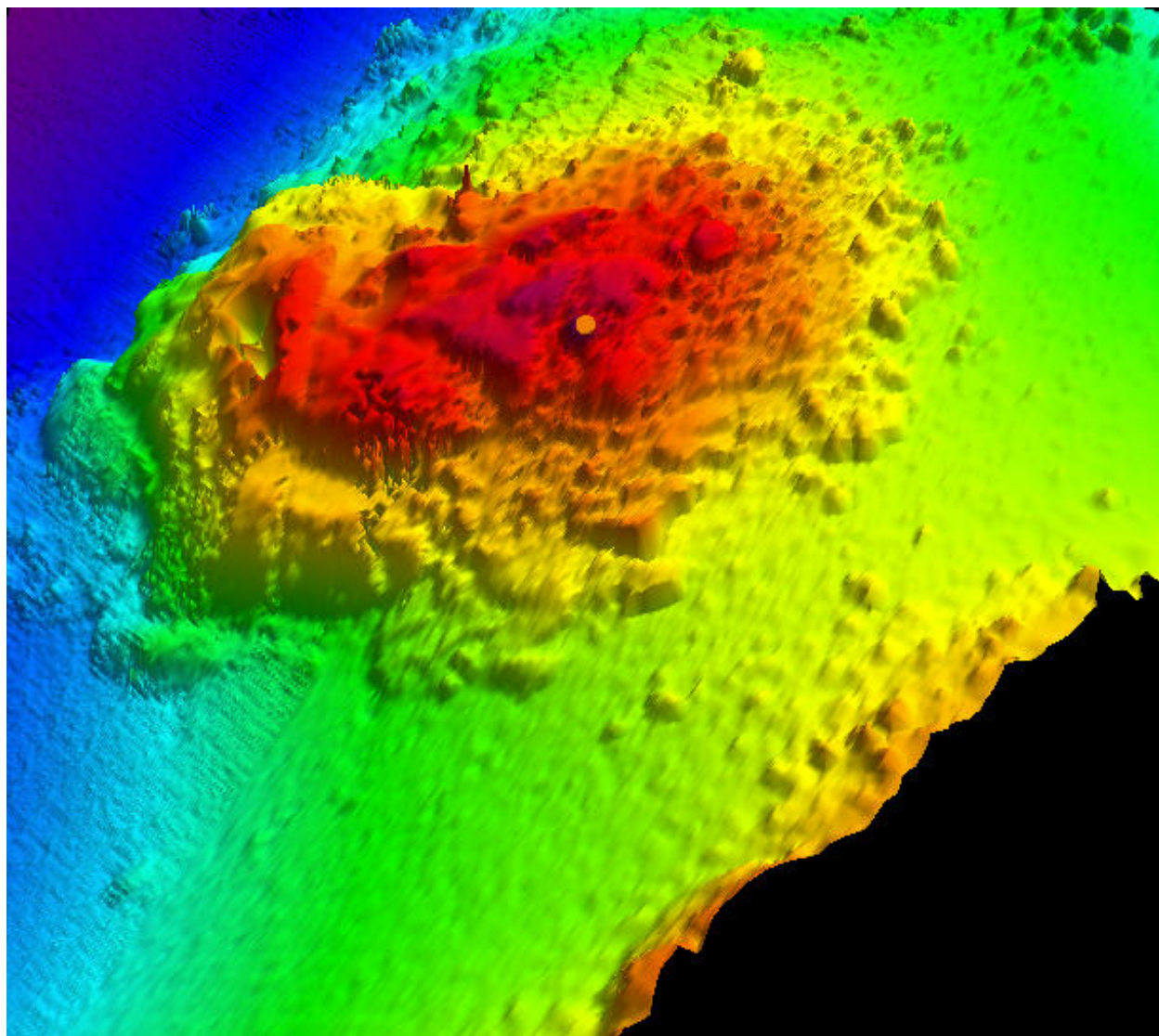
TECSOU - 3:found by multi-beam

VALSOU - 3.099 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Feature Images



*Figure 1.10.1*

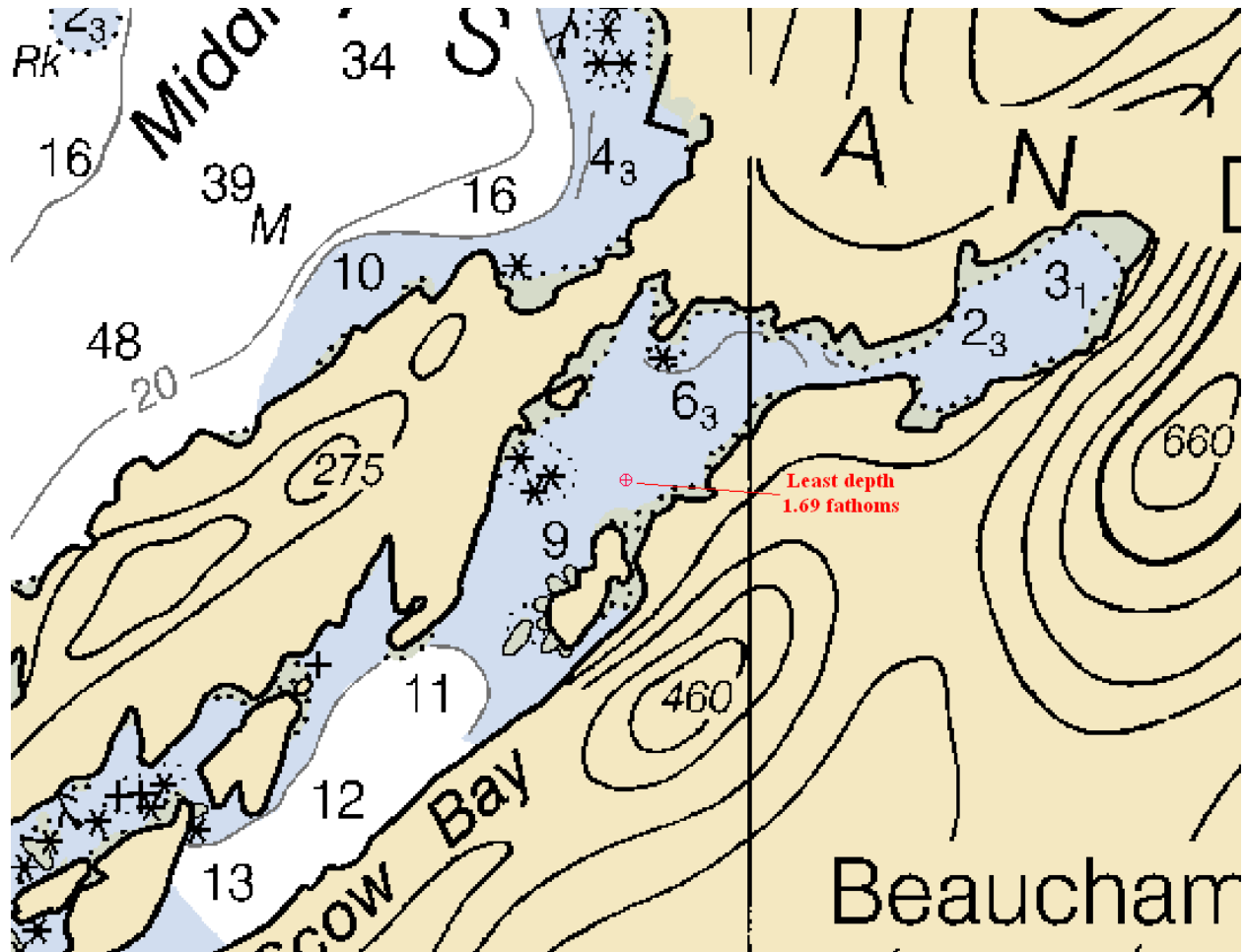


Figure 1.10.2

## 1.11) Profile/Beam - 3561/235 from h11845 / 1101\_reson8125\_hvf / 2008-149 / 271\_2046

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 44' 25.8" N, 135° 16' 34.2" W  
**Least Depth:** 1.69 m (= 5.53 ft = 0.921 fm = 0 fm 5.53 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.989$  m ; TVU (TPEv)  $\pm 1.274$  m  
**Timestamp:** 2008-149.20:55:54.424 (05/28/2008)  
**Survey Line:** h11845 / 1101\_reson8125\_hvf / 2008-149 / 271\_2046  
**Profile/Beam:** 3561/235  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous shoal, approximately 100 meters northeast of a charted .8 fathom feature, located during H11845 survey operations. Item developed with Reson 8125 MBES determined a least depth of 0.9 fathoms with a surrounding depth of 2.1 fathoms. However, this area is within the Lidar coverage and the least depth was detected from the MBES outer beams. The Lidar data coverage calculated a deeper least depth of 2.5 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/1101_reson8125_hvf/2008-149/271_2046	3561/235	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this shoal based on the depth, position, and S-57 attribution specified in this report.

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

0  $\frac{3}{4}$ fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)

0fm 5ft (531\_1)

1.7m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 6:least depth known

SORDAT - 20080528

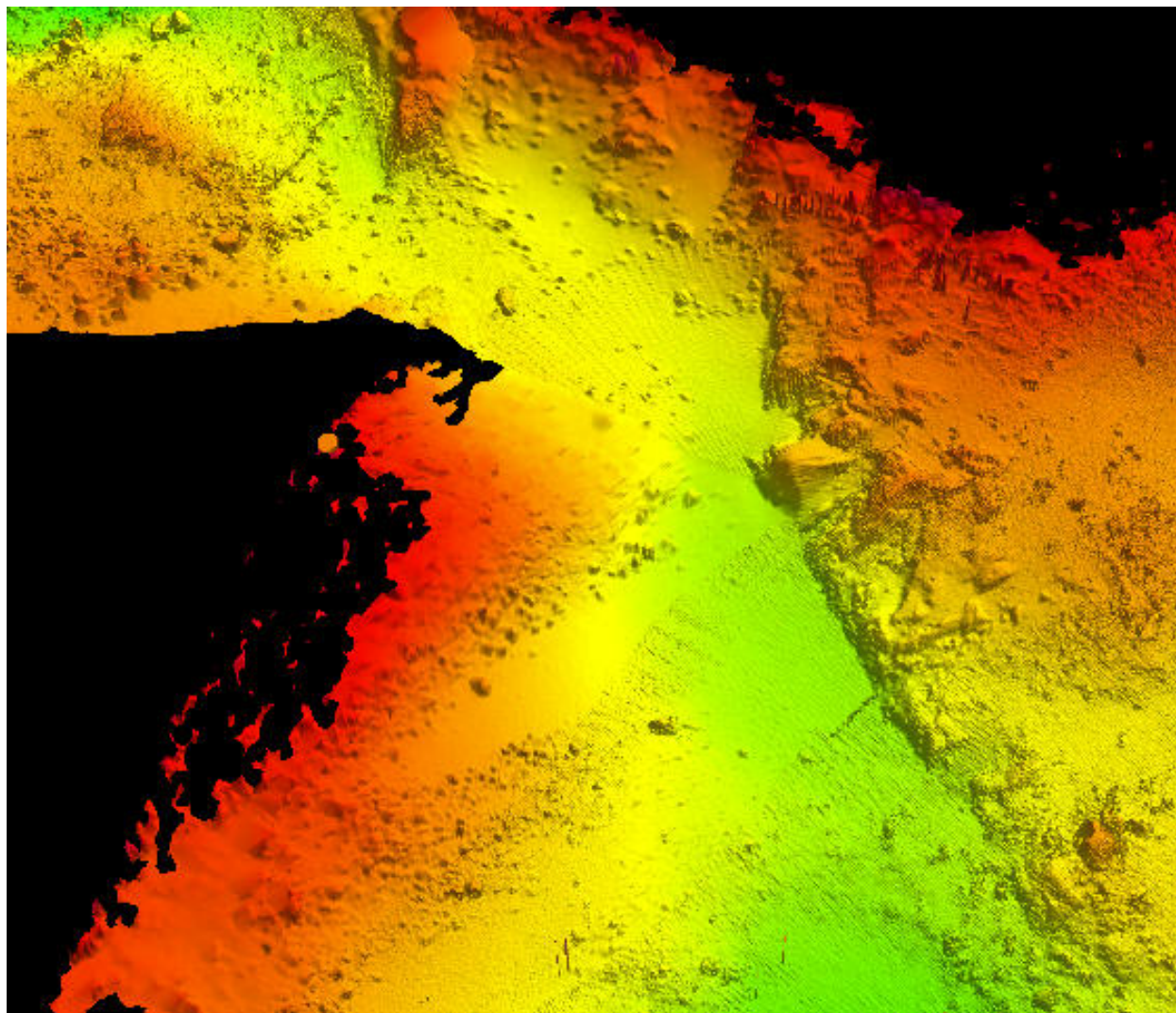
SORIND - US,US,survey,H11845

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water



## Feature Images



*Figure 1.11.1*



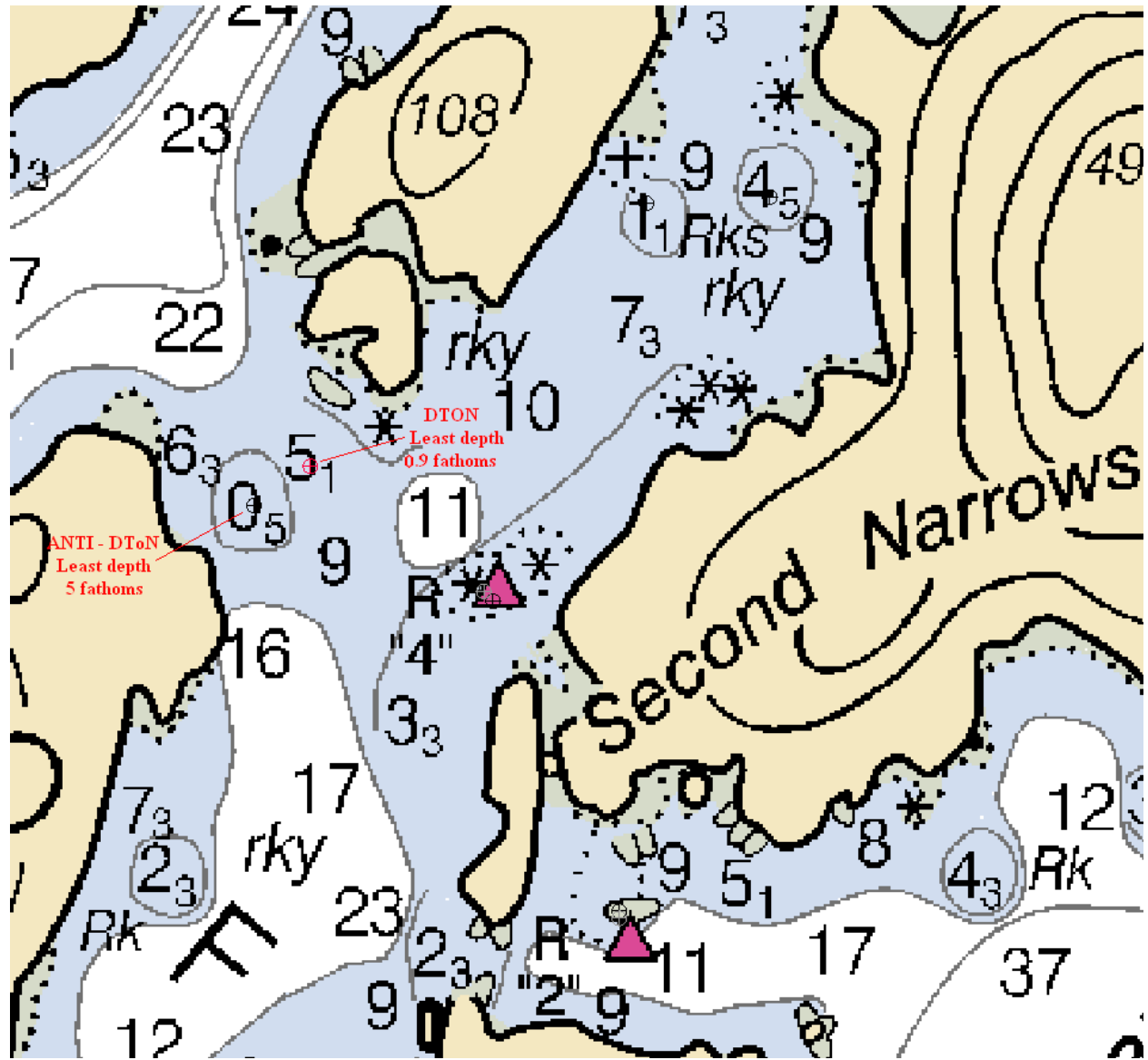


Figure 1.11.2

## 1.12) Profile/Beam - 279/183 from h11845 / 2801\_reson7125\_hf\_512beams / 2008-152 / 335\_2215

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 42' 15.2" N, 135° 17' 42.2" W  
**Least Depth:** 9.30 m (= 30.50 ft = 5.084 fm = 5 fm 0.50 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.966$  m ; TVU (TPEv)  $\pm 0.222$  m  
**Timestamp:** 2008-152.22:16:16.259 (05/31/2008)  
**Survey Line:** h11845 / 2801\_reson7125\_hf\_512beams / 2008-152 / 335\_2215  
**Profile/Beam:** 279/183  
**Charts Affected:** 17326\_1, 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous rock located during H11845 survey operations. Item developed with Reson 7125 MBES determined a least depth of 5 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2801_reson7125_hf_512beams/2008-152/335_2215	279/183	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this rock based on the depth, position, and S-57 attribution specified in this report.

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

5fm (17326\_1, 17328\_1, 17320\_1, 16016\_1, 530\_1)

5fm 0ft (531\_1)

9.3m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080531

SORIND - US,US,survey,H11845

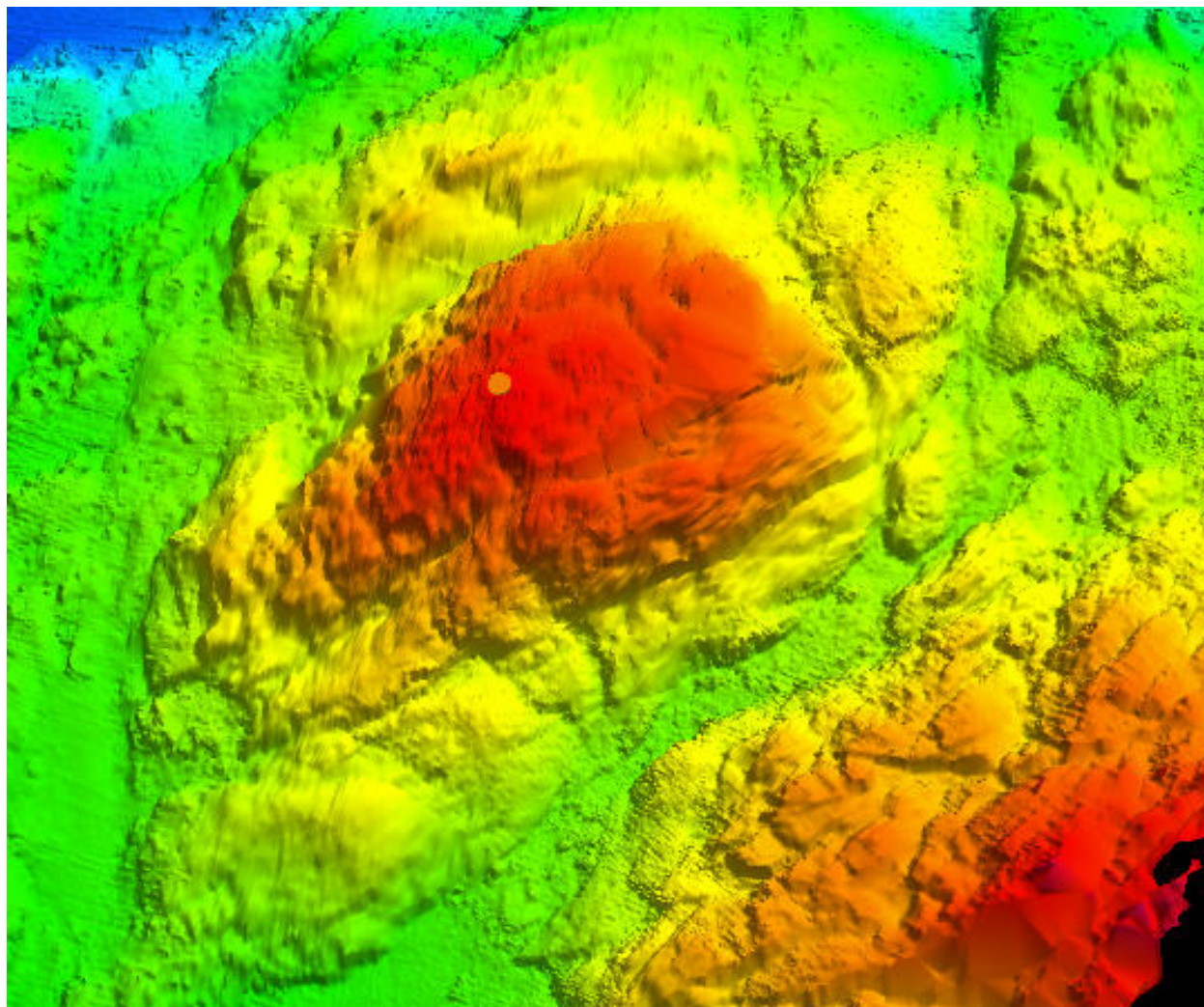
TECSOU - 3:found by multi-beam

VALSOU - 9.297 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

## Feature Images



*Figure 1.12.1*

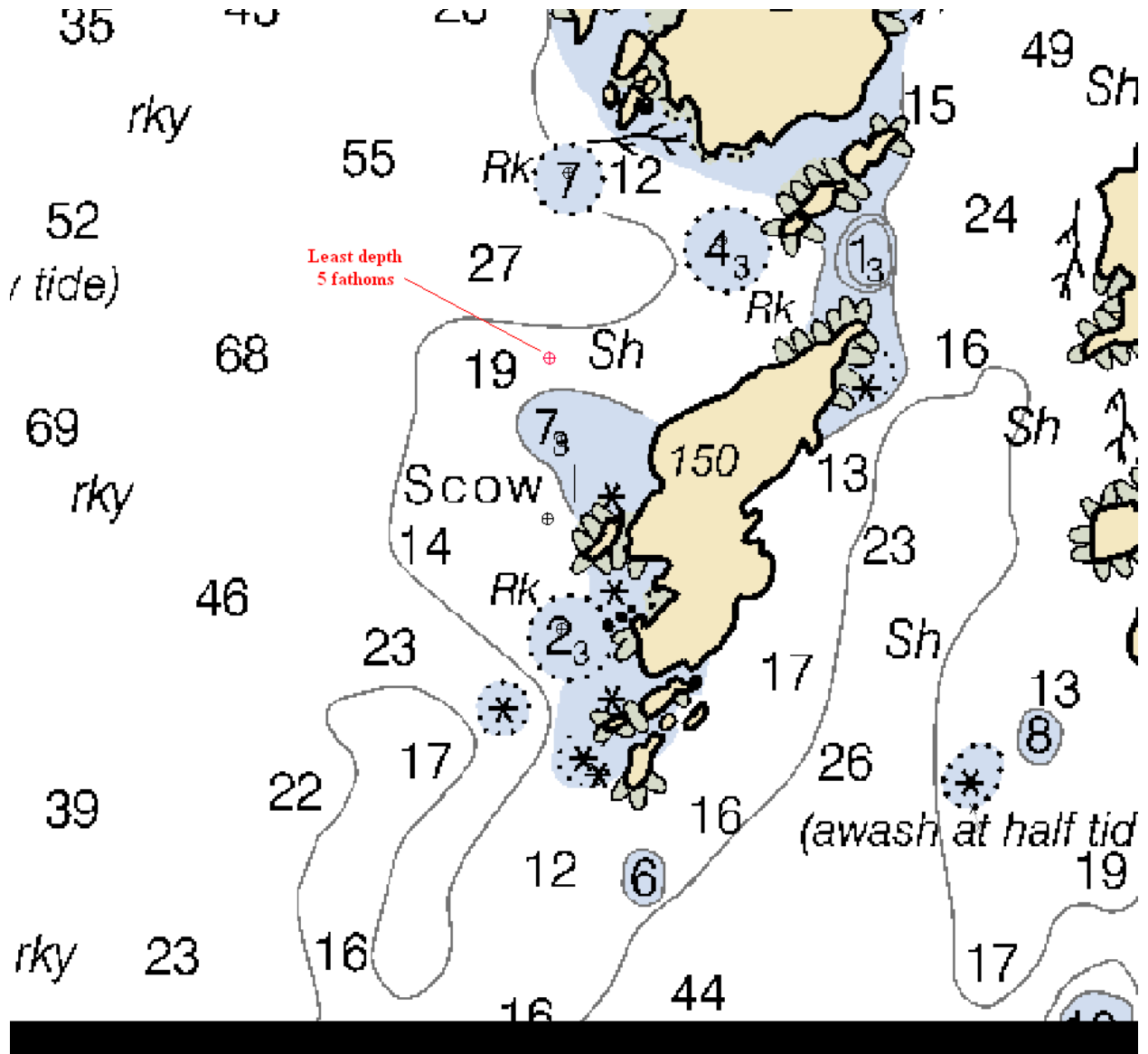


Figure 1.12.2

## 1.13) Profile/Beam - 58/36 from h11845 / 2802\_reson7125\_hf\_512beams / 2008-155 / 291\_2110

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 56° 44' 14.1" N, 135° 19' 49.6" W  
**Least Depth:** 17.73 m (= 58.16 ft = 9.693 fm = 9 fm 4.16 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.980$  m ; TVU (TPEv)  $\pm 0.201$  m  
**Timestamp:** 2008-155.21:10:55.571 (06/03/2008)  
**Survey Line:** h11845 / 2802\_reson7125\_hf\_512beams / 2008-155 / 291\_2110  
**Profile/Beam:** 58/36  
**Charts Affected:** 17326\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

Uncharted dangerous rock located during H11845 survey operations. Item developed with Reson 7125 MBES determined a least depth of 9.6 fathoms.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11845/2802_reson7125_hf_512beams/2008-155/291_2110	58/36	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart this rock based on the depth, position, and S-57 attribution specified in this report.

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

9  $\frac{3}{4}$ fm (17326\_1, 17320\_1, 16016\_1, 530\_1)

9fm 4ft (531\_1)

17.7m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20080603

SORIND - US,US,survey,H11845

TECSOU - 3:found by multi-beam

VALSOU - 17.726 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

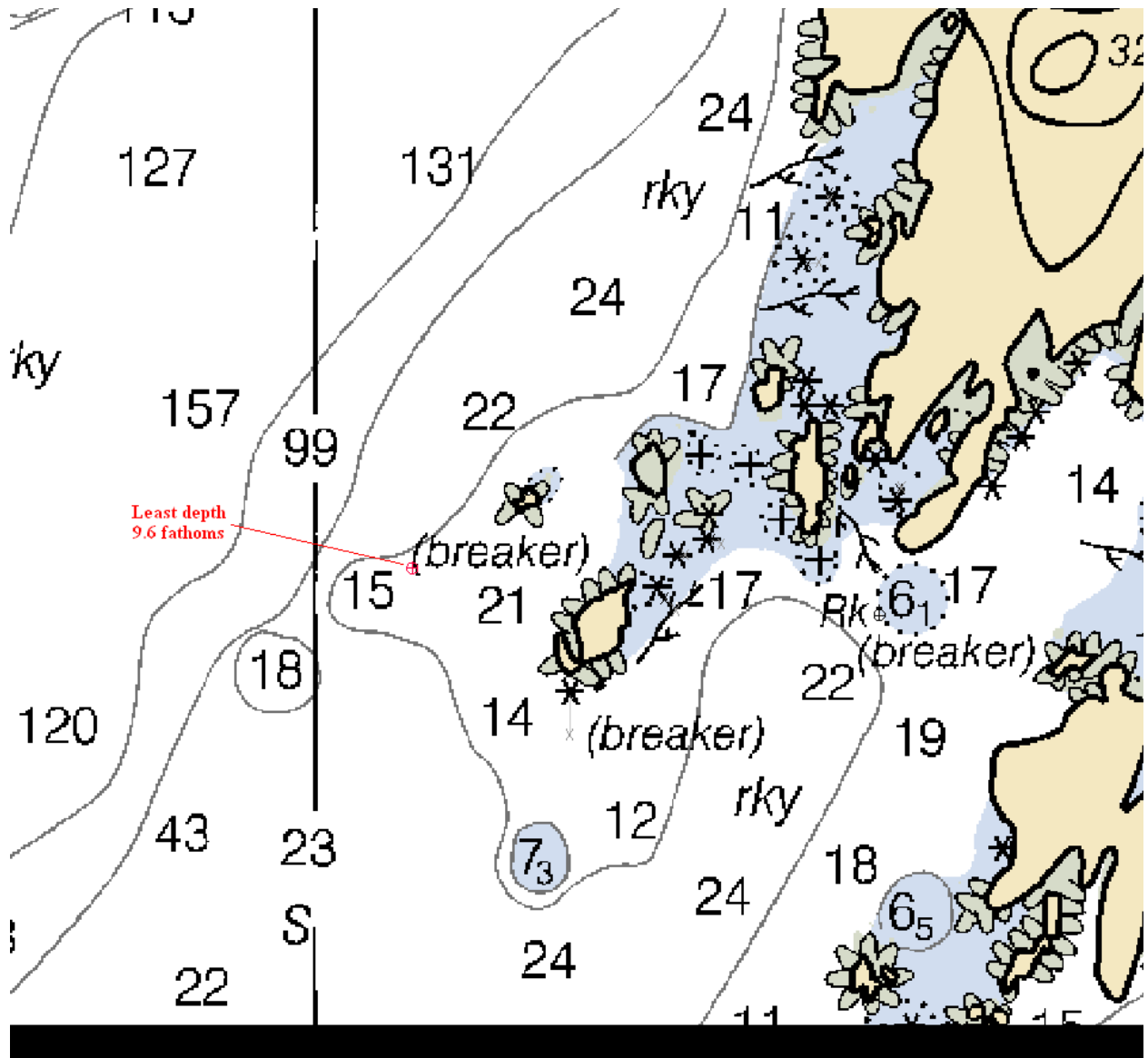
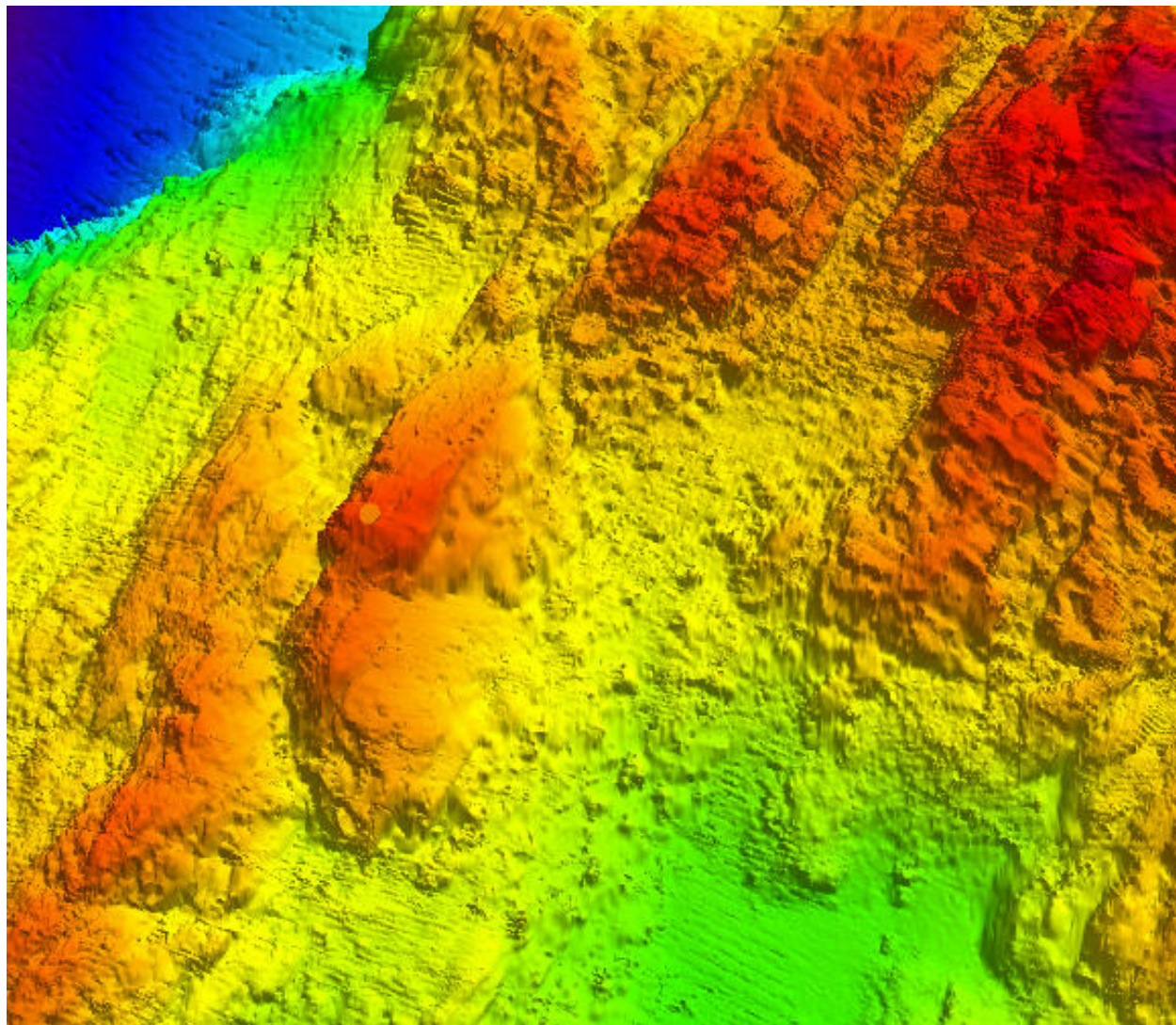


Figure 1.13.1





*Figure 1.13.2*



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** June 24, 2008

**HYDROGRAPHIC BRANCH:** Pacific Hydrographic Branch  
**HYDROGRAPHIC PROJECT:** OPR-O112-RA-2008  
**HYDROGRAPHIC SHEET:** H11845

**LOCALITY:** Vicinity of Rokof Islands, Approaches to Sitka, AK  
**TIME PERIOD:** May 20 - June 18, 2008

**TIDE STATION USED:** 945-1600 Sitka, AK  
Lat. 57° 3.1'N Long. 135° 20.5' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.791 meters

**REMARKS: RECOMMENDED ZONING**

Please use the TCARI grid "O112RA2008P-TCARI.tc" submitted with the project instructions as the final grid for project OPR-O112-RA-2008, H11845 during the time period between May 20 - June 18, 2008.

**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).
- Note 2:** Due to inaccurate shoreline around Scow Bay and Jamboree Bay, survey tracklines fall outside of the TCARI grid boundaries in some areas. TCARI will extrapolate the tide corrector to cover these soundings.

**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: 2008.06.30 15:50:08 -04'00'

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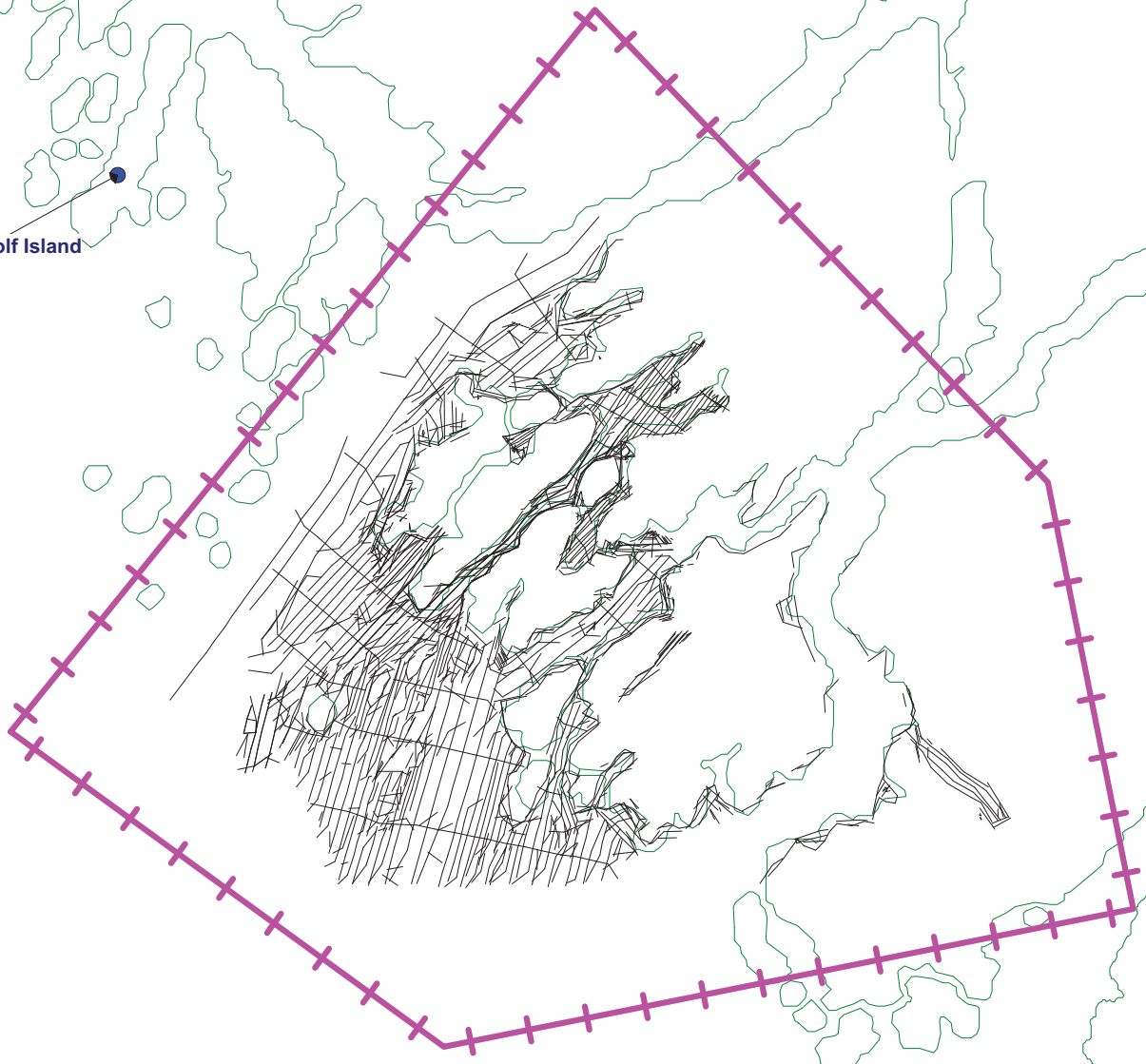
CHIEF, PRODUCT AND SERVICES DIVISION



**Final TCARI Grid  
for OPR-O112-RA-2008, H11845  
Approaches to Sitka, AK  
(Preliminary as Final)**

9451421 Golf Island

9451376 Dorothy Cove



**H11845 HCell Report**  
Peter Holmberg, Physical Scientist  
Pacific Hydrographic Branch

**Introduction**

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC's and RNC's in the region: NOAA RNCs, 17326 (1:40,000) , and 17328 (1:40,000), and corresponding NOAA ENC's, US5AK3GM, and US5AK3SM. (See section 4. Meta Areas.)

In addition to two lidar surveys, H11845 also contains two large areas of multibeam data from H11586. The remaining portion of data from H11586 extends far off shore and will be compiled as a separate HCell (see figure 1 in section 4).

HCell compilation of survey H11845 utilized Office of Coast Survey DRAFT HCell Specifications Version 4.0. For additional information on the standards and protocols used for HCell Compilation, see the DRAFT A/PHB HCell Reference Guide, version 2.0, 22 February, 2010.

**1. Compilation Scale**

Depths and features for HCell H11845 were compiled to the largest scale chart in the region, 17326, 1:40,000. Chart 17328 covers a portion of H11845 as well, however it is also a 1:40,000 scale chart. Some differences were noted between the two charts, see Descriptive Report section D1.

**2. Soundings**

Survey-scale sounding (SOUNDG) feature object layers were built from two separate surfaces. A 10-meter combined surface H11845\_H11586.csar from the multibeam surveys and a 3-meter combined surface H11539\_H11540.csar from the lidar surveys in CARIS BASE Editor. From both surfaces, a shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table below. The resultant sounding layers contain a total of 25,164 depths ranging from 0 to 285.149 meters.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	300	5

Soundings from multibeam and lidar surfaces were generated separately in order to accurately attribute their TECSOU, SORDAT, and SORIND. As a result of generating separate sounding sets from partially overlapping surfaces, some overlap of soundings can be seen in the survey scale sounding set.

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

### 3. Depth 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 17326	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 H11845_SS.000
0	0	0.000	0.000	0
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.517	10.125	10
20	36.576	37.9476	20.750	20
50	91.44	92.812	50.750	50
100	182.88	184.252	100.750	100

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.

### 4. Meta Areas

The following Meta object areas are included in HCell H11845:

M\_QUAL

Due to the fact that data from four different surveys were used in the compilation of H11845 and the varied topography of the area, there are 146 separate M\_QUAL objects (see figure 1). Through correspondence with MCD it was agreed that a single \$AREAS polygon object be included in the HCell to aid in application of the HCell (see section 6).

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



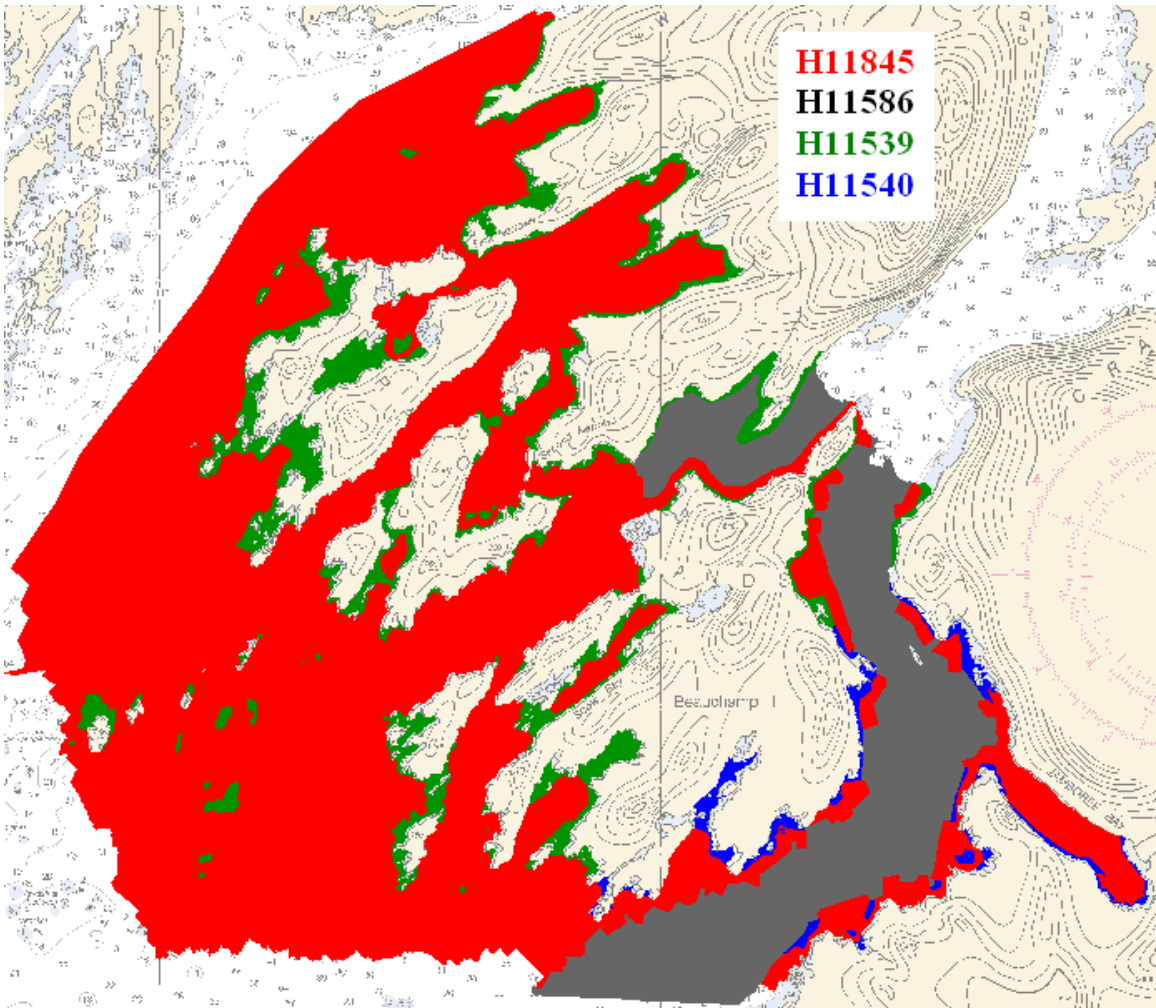


Figure 1. Data sources for H11845

## 5. Features

### 5.1 Generalization of Features to Chart Scale

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 is modified to emulate chart scale.

Feature generalization to emulate chart scale is accomplished primarily through reduction in the number of features included in the HCell, and in some cases generalizing area features to point objects. Some instances of reduction of area features to point objects is entrusted to the RNC division, for example rocky seabed areas that will display as point features on the RNC. Where line and area objects are included in the HCell, complexity of the lines and edges comprising the features have been smoothed to be commensurate with chart scale.

## 5.2 Compilation of Features to the HCell

Shoreline features for H11845 were delivered from the field in four different hob files defining new features, modification to GC or charted features, and disprovals. These were deconflicted against GC shoreline, the chart and hydrography during office processing.

During office processing, several submerged rocks, and numerous rocky seabeds were digitized from the high resolution BASE Surfaces.

The source of all features included in the H11845 HCell can be determined by the SORIND field.

## 5.2 Mean High Water Used for HCells

For the purposes of determining the height at which a rock becomes an islet, the CO-OPS “*Tide Note for Hydrographic Survey*”, “*Height of High Water Above the Plane of Reference*” is used.

## 6.S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$AREAS	Single polygon covering survey extents
\$CSYMB	Blue Notes
COALNE	MHW line from Lidar
DEPCNT	From Lidar and Multibeam
LNDARE	Islands and islets retained from the chart
LNDELV	Elevations of islets and islands
M_QUAL	Data quality Meta objects
OBSTRN	Obstruction area objects
SBDARE	Ledges and reefs, bottom samples, and rocky seabed areas
SLCONS	Pier
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features
WATTUR	Breakers
WEDKLP	New and retained kelp areas

The \*\_SS HCell contains the following Objects:

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

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

## 7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features. By agreement with MCD, the NINFOM field is populated with an abbreviated version of the Blue Note (30 characters or less), describing the chart disposition, to be used by MCD in generating their Chart History spreadsheet.

## 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

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

Conversion to fathoms and feet charting units with NOAA rounding ensures that:

- All depths deeper or equal to 11 fathoms display as whole fathoms.
- All depth units between 0 fathoms (MLLW) and 11 fathoms display as fathoms and whole feet.
- All depth units above 0 fathoms (MLLW) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet above that. (This is a deviation from the traditional 'fathoms and feet' charting rule that requires that all depths above MLLW will be shown in feet. The display in fathoms and feet for depths between MLLW and 2 feet above MHW accommodates S-57 rules that require the same charting units to be used for all depth units (DUNI) in an ENC.)
- All height units (HUNI) which have been converted to charting units, and that are 2.00 feet above MHW and greater, are shown in feet.

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



## **9. Data Processing Notes**

### **9.1 Junction with H11845**

H11845 junctions with H11844, H11677, H11678, and H11847. An effort was made among compilers to pick soundings appropriately at adjoining edges between the five surveys during the compilation processes. However there are a few soundings on junctioning surveys that that have already been submitted should be removed due to adjacent shoaler soundings selected from H11845. Blue notes submitted with H11845 mark the positions and contain recommendations of which soundings to remove from adjoining surveys.

### **9.2 Conflicts between Shoreline and Hydrography**

There are numerous instances of GC shoreline in conflict with hydrography. These were examined using the highest resolution Surfaces. CARIS HIPS was also used to resolve ambiguities in some cases. Conflicts were resolved by either rejecting the hydrography and adjusting the survey limits accordingly, or by making modifications to the GC shoreline.

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

H11845 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**

H11845_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H11845_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H11845_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11845_outline.gml	Survey outline to populate SURDEX

### 11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.3	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	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

### 12. Contacts

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

Peter Holmberg  
Physical Scientist  
Pacific Hydrographic Branch  
Seattle, WA  
206-526-6843  
[peter.holmberg@noaa.gov](mailto:peter.holmberg@noaa.gov).

APPROVAL SHEET  
H11845

Initial Approvals:

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

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

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