

H11844

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-10-08-08

Registry No. H11844

LOCALITY

State Alaska

General Locality Approaches to Sitka

Sublocality Rachek Island to Big Bay

2008

CHIEF OF PARTY

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

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DATE

HYDROGRAPHIC TITLE SHEET

H11844

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-10-08-08

State Alaska

General Locality Approaches to Sitka

Sublocality Rachek Island to Big Bay

Scale 1:10,000

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

Instructions Dated 4/21/2008

Project No. OPR-O112-RA-08

Vessel RA3 (1021), RA1 (1101), RA-4 (2801), RA-5 (2802), 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, Elac 1180, Reson 7125, Knudsen 320M

Graphic record scaled by N/A

Graphic record checked by N/A

Evaluation by A. Raymond Automated plot by N/A

Verification by A. Raymond, 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 H11844

Project OPR-O112-RA-08
Approaches to Sitka, Alaska
Rachek Island to Big Bay
Scale 1:10,000

May – June, 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 direction¹, with the exception of deviations noted in this report. The survey area encompassed Approaches to Sitka, within the sub-locality of Rachek Island to Big Bay. This survey corresponds to sheet “A” in the sheet layout provided with the Letter Instructions.

Project OPR-O112-RA-08 responds to a request from the USCG 17th 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 boaters’”. The Project Instructions state that “[a]s 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”.

The Project Instructions called for complete multibeam echosounder (MBES) coverage in waters 8 meters and deeper. Complete MBES coverage was achieved in waters 4 meters and deeper, except as noted in this report. This was achieved without significantly increasing acquisition time in part due to the titled 8125 mount (please see the *OPR-O112-RA-08 Data Acquisition and Processing Report (DAPR)*¹ for further discussion). The survey area exhibits classic southeastern Alaska “steep and deep” topography, hence the 8 and 4 meter curves were typically coincident with or inside of the Navigable Area Limit Line (NALL). Complete MBES was acquired to either the NALL or the junction survey limit, whichever was further offshore, with the exceptions noted below.

Multibeam echosounder (MBES) data were not acquired at the head of President Bay, located on the eastern side of Windy Passage. Skiff 915 was able to enter the basin and acquire several lines of vertical beam echo sounder (VBES) data, but deemed the entry unfit for a MBES launch. The Coast Pilot notes that the “basin at the head of the bay is accessible only to skiffs”.

Total mileage acquired by each vessel and system is listed in Table 1.

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

Data Acquisition Type	Hull Number with Mileage (nm)						Total
	S221	1021	1101	2801	2802	915	
VBES (main scheme)	-	-	-	-	-	2.54	2.54
MBES (main scheme)	2.64	50.77	51.92	100.04	72.77	-	278.14
Cross lines	-	6.9	-	5.81	6.89	-	19.6
Developments/ Holidays	-	1.69	-	4.82	0.63	-	7.14
Shoreline	-	-	-	-	-	7.25	7.25
Bottom Samples	-	-	-	-	-	-	-
Total Number of Items Investigated	-	-	-	-	-	40	40
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	11.15

Table 1: Statistics for survey H11844

Traditional “limited shoreline verification” was not required for this survey area as discussed in Section D.2 of this report.

Data acquisition was conducted from May 18 to June 18, 2008 (DN139 to DN170).

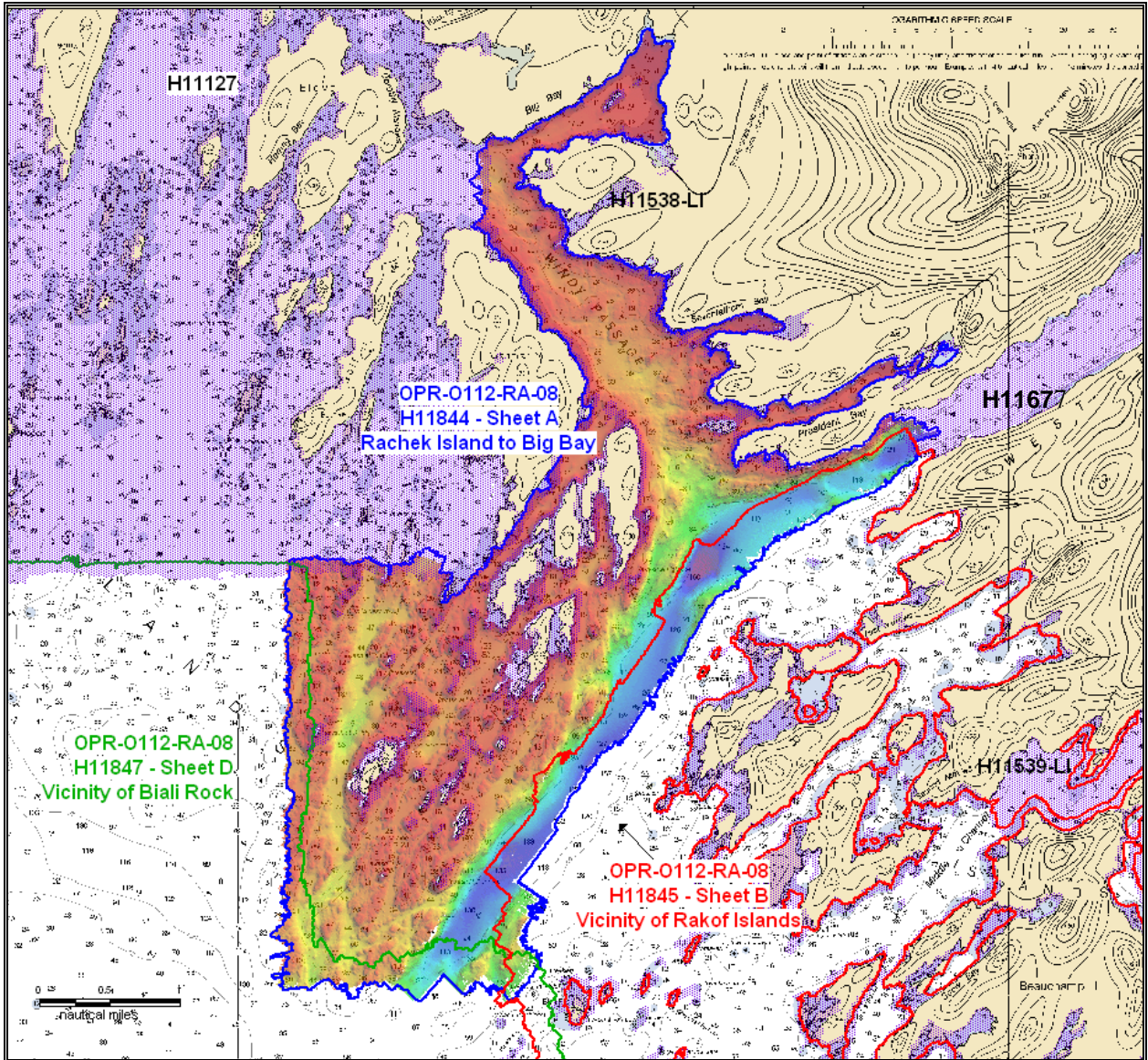


Figure 1: H11844 Survey Limits and Junction Surveys (Chart 17326)

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 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 using TCARI. See Section C for additional information.

B1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
1101	RA-1	Reson 8125 tilted Multibeam Echo Sounder
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 –VBES and Detached Positions
S221	<i>Rainier</i>	Elac1050D Multibeam Echo Sounder

Table 2: Data Acquisition Vessels for H11844

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

No unusual vessel configurations were used for data acquisition.

B2. Quality Control

System Certification and Calibration

Refer to the NOAA Ship *Rainier* DAPR and Hydrographic Systems Readiness Report (HSRR)² for a complete description of system integration and initial calibration results for equipment and sensors used for this survey.

Crosslines

Multi-Beam echo sounder (MBES) crosslines totaled 19.6 linear nautical miles. This comprises 7.05% of main scheme MBES hydrography. The mainscheme bathymetry was manually compared to the crossline nadir beams in CARIS subset mode and agreed well with differences averaging 0.2 meters and not exceeding 0.5 meters. Several crosslines acquired with Launch 2801 on DN169 exhibit significant sound velocity error. The outer beams on these lines were filtered in CARIS HIPS and SIPS. While artifacts in the surfaces are still apparent, the offset caused by this error is typically 0.1 meters and is within IHO Order 1 specifications.³

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

Junctions

The following contemporary surveys junction with H11844 (See Figure 1):

Registry #	Scale	Date	Field Party	Junction side
(1) H11845	1:10,000	2008	<i>Rainier</i>	East
(2) H11847	1:20,000	2008	<i>Rainier</i>	South/Southwest
(3) H11127	1:10,000	2006	<i>Rainier</i>	Northwest
(4) H11677	1:10,000	2007	<i>Rainier</i>	Northeast
(5) H11538	1:10,000	2006	TENIX LADS	Throughout survey area
(6) H11539	1:10,000	2006	TENIX LADS	Middle Channel

2008 Junction Surveys H11845 and H11847

Basic hydrographic survey H11845 and H11847, Sheet B and D respectively, were conducted concurrently with survey H11844 within project OPR-O112-RA-08. The sheet limits and area of overlap for Sheets A, B, and D are shown in Figure 1.

Data were reviewed in CARIS Subset Editor and depths were found to be consistent between the surveys, meeting the requirements as stated in the *Hydrographic Surveys Specifications and Deliverables Manual* (HSSDM). As discussed below in the Data Quality Factors section of this report, Elac data are consistently deeper than Reson data. This offset is observed in areas where H11844 Elac soundings overlap with H11845 Reson soundings, and where H11844 Reson soundings overlap with H11845 Elac soundings. In both cases, Elac data are consistently up to one meter deeper than Reson data. Reson soundings on both surveys agree within 0.5 meters. Survey depths for H11844 and H11847 generally agree within 0.1 to 0.5 meters.⁴

Lidar surveys H11538 and H11539

Junction analyses for H11844 with contemporary lidar surveys were conducted by comparing BASE surfaces in CARIS HIPS and SIPS. While *Rainier* met the provided lidar limit junction line when possible, the sparse nature of the lidar data makes it difficult to junction the surveys in all areas and to assess available junctions. The data generally agrees within 0.1 to 0.4 meters, although there is no identifiable trend as to which survey is shoaler. There are many areas where lidar coverage is very sparse, likely due either to kelp or increased depth, and H11844 data is also sparse, as is the nature of data on the edge of the survey. In these areas depths vary up to 2 meters. These discrepancies could also be attributed to the different resolution surfaces being compared, whereby a 1 meter surface for H11844 was compared with a 3 meter lidar surface (see Figure 2). The Hydrographer recommends charting soundings from the current survey in all areas of overlap with lidar data.⁵

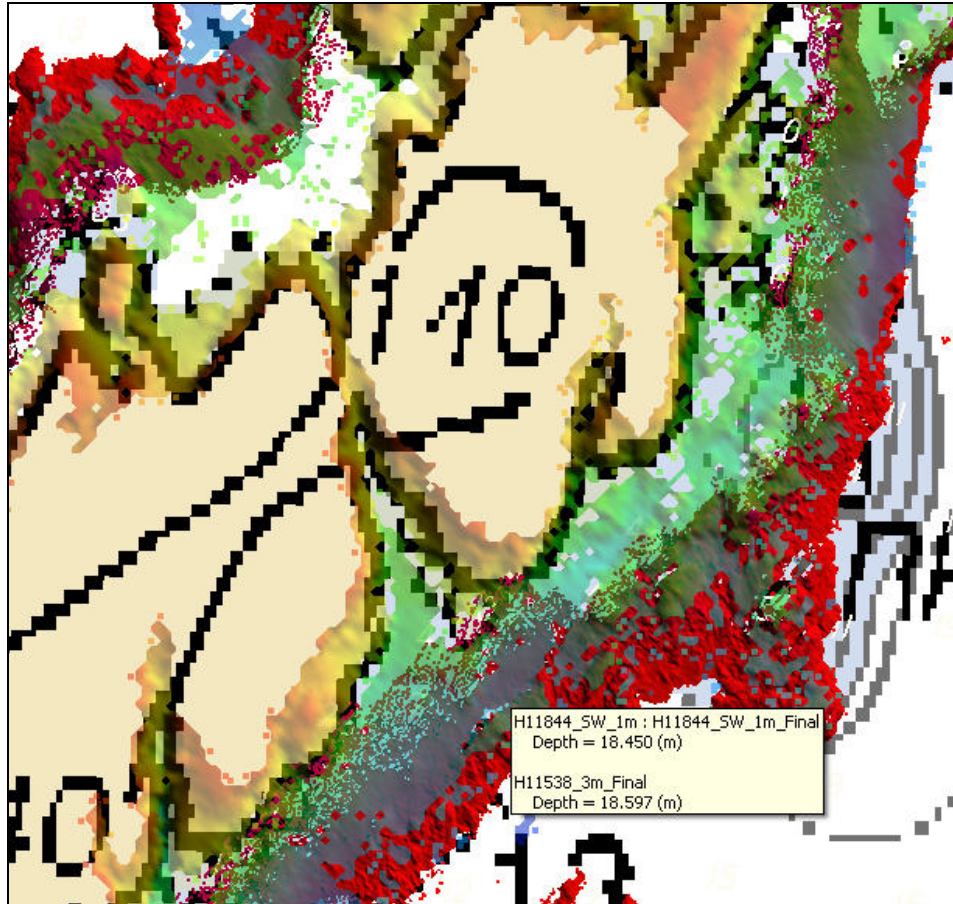


Figure 2: H11844 Comparison with lidar survey H11538

H11127 and H11677

Comparison with H11127 was conducted with Hydrographic Data Cleaning System (HDGS) data. There are three areas where these surveys junction: the north end of Windy Passage; near the west limit of H11844 and due south of The Beehive; and just southeast of The Beehive.

Data were reviewed in CARIS Subset Editor and agrees well, with any discernible difference within 0.1 to 0.5 meters. The data at the Windy Passage junction agree very well and within 0.1 meters for most of the junction.

Along the two boundaries to the southwest, south of The Beehive, the data agrees within 0.1 to 0.2 meters for most of the junction, which occurs in twenty (20) to fifty (50) meters of water. Occasionally, where the overlapping data consist of outer beams, differences reach 0.5 meters.

H11844 junctions with H11677 in West Crawfish Inlet. The ten-meter resolution Final Combined surface for H11677 was manually compared to the eight-meter resolution Final Combined surface for H11844.

In the middle of West Crawfish Inlet, where the bathymetry is deeper than 230 m and relatively flat, the surfaces differ by 1-2 m, well within the error allowed at these depths. The remaining junction areas for these surveys lie on the steep slopes of this fjord. The north and south slope

are both at approximately a 45 degree angle, i.e. a 10 m horizontal change results in a 10 m vertical distance. The vertical difference between the compared surfaces is due to the fact that the nodes of the surfaces are not co-located and the spacing between nodes is either 8 or 10 m. Therefore, the horizontal offset between nodes of the two surfaces results in a vertical offset of up to 10 m and does not reflect systematic error in either survey.

Data Quality Factors

Elac

The Elac data acquired are consistently up to one meter deeper than overlapping Reson data, as determined during a junction comparison with H11845. The Elac was only used in water 150 meters and deeper for updating bathymetric data and not for item investigations. The offset is within the error budget allowed at these depths.⁶

Data gaps (Holidays)

Several small holidays were found between the mainscheme data and lidar coverage. The lidar was sparse throughout the survey area. H11844 junctions with the lidar limit line with several exceptions. When *Rainier* first received the junction survey data, survey planning and coverage assessment occurred in MapInfo using the MapInfo limits table. Near the end of acquisition, *Rainier* personnel noted that the Notebook lidar limit line used for shoreline planning differed from the MapInfo lidar junction lines. Typically the Notebook lidar limit line (H1153X_LI_Extentdata are) was inshore of the MapInfo line. Consequently, with the remaining time allotted for the project, some holidays were not addressed. See Figure 3 for an example of the resulting holidays. This screen grab from MapInfo displays the H11844_Final_Combined DTM over chart 17326 with the NALL Line (yellow dashed line), original MapInfo junctions limit line (green) and the Notebook lidar limit line (blue).

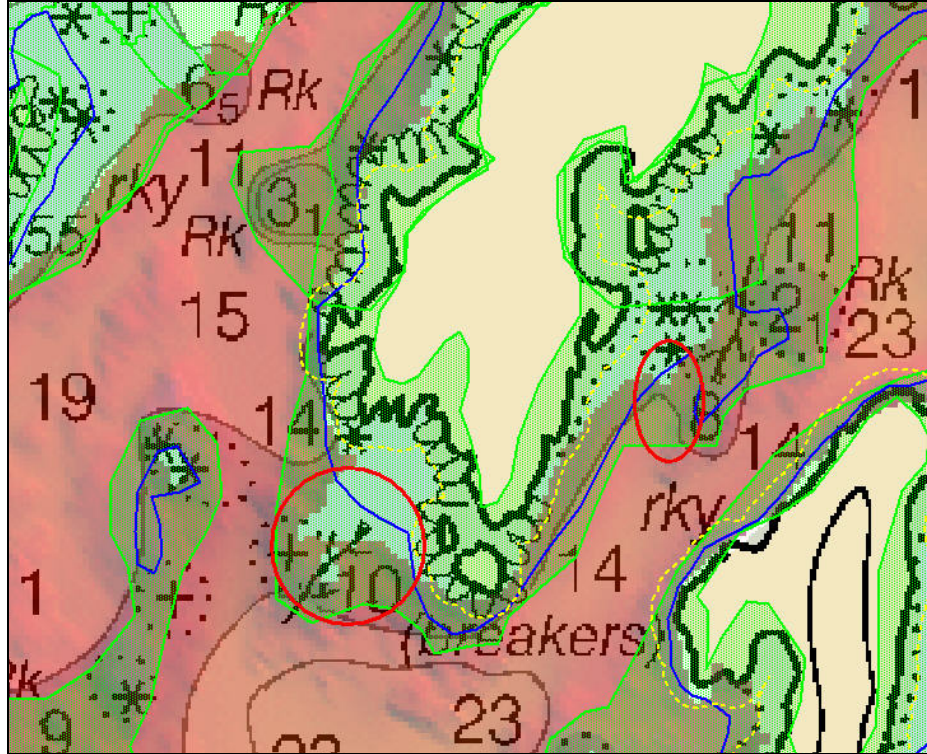


Figure 3: Example of holidays due to incorrect lidar limit line being used until late in the project [near $56^{\circ} 45' 29''\text{N}$, $135^{\circ} 21' 35''\text{W}$]. The green line represents the incorrect lidar limit used for planning at the start of survey operations; the blue line is the correct lidar limit.

There are several small coverage gaps along the eastern extent of the survey. The majority of these gaps occur where Elac data is sparse and where survey depths exceed 200 meters. They appear as one pixel squares in the 8-meter H11844_Final_Combined BASE surface (see Figure 4). All of these are within specifications and are not technically holidays.⁷

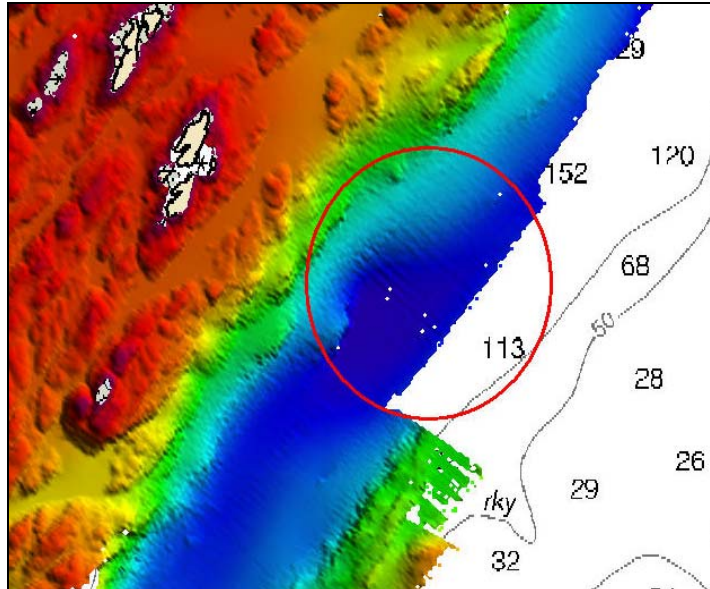


Figure 4: Example of one pixel holidays depicted in the 8-meter H11844 Final Combined surface [near 56° 43' 50"N, 135° 21' 18"W]

There are approximately a dozen other small holidays throughout the survey depicted as one pixel squares in the Final Combined surface. These occur either on the edge of the survey where data becomes sparser or where the “backside” of a submerged feature could not be ensonified. An example of the latter is pictured below in Figure 5. No significant undeveloped shoals appear to be coincident with these coverage gaps.⁸

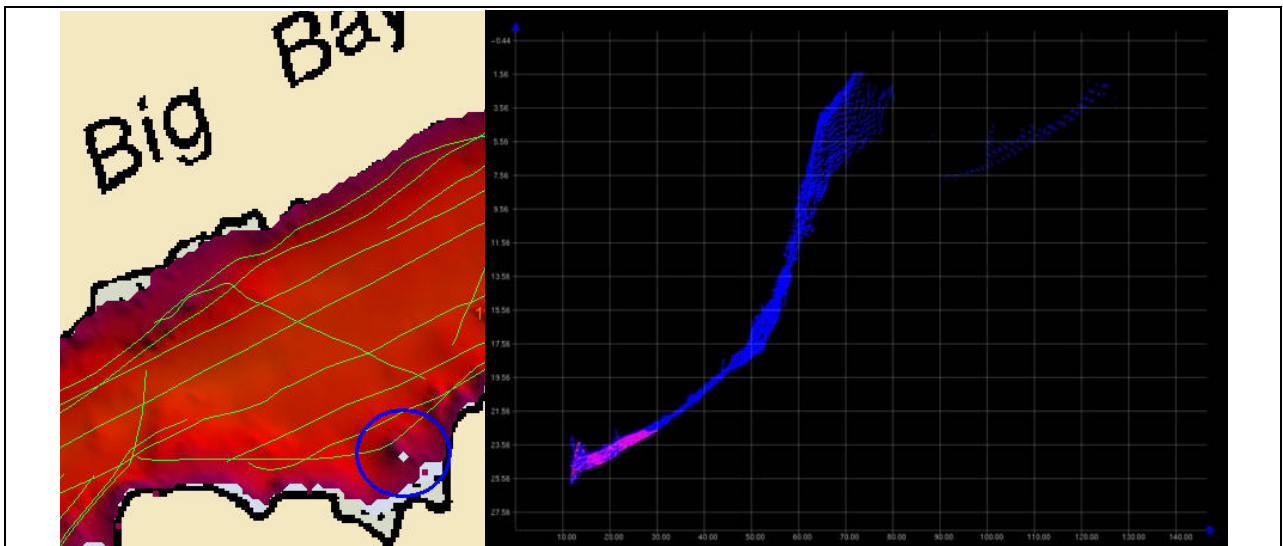


Figure 5: Example of one pixel gap where the backside or slope of a submerged feature fell in an acoustic shadow and was not or could not be ensonified

A small (less than 10 meters across) holiday exists at the head of Big Bay. Most of the holiday is shallower than 4 meters and the entirety of the holiday is in less than 6 meters of water. This is also true of two holidays at the head of Sevenfathom Bay measuring 20 meters and 30 meters across (see Figure 6). No significant shoals appear to be coincident with these coverage gaps.

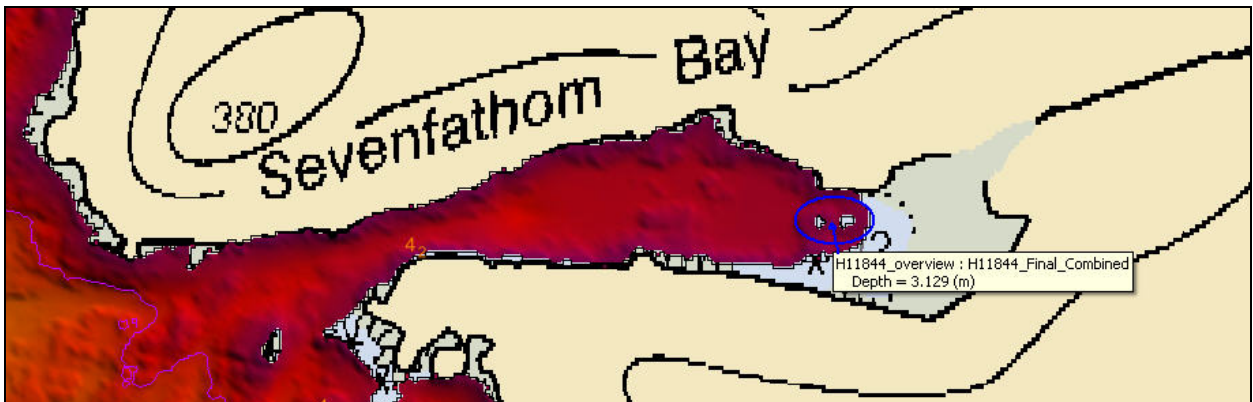


Figure 6: Holidays in less than 6 meters depth at the head of Sevenfathom Bay

There are four instances of downslope holidays along the western edge of the deep passage leading into West Crawfish Inlet (Figure 7).

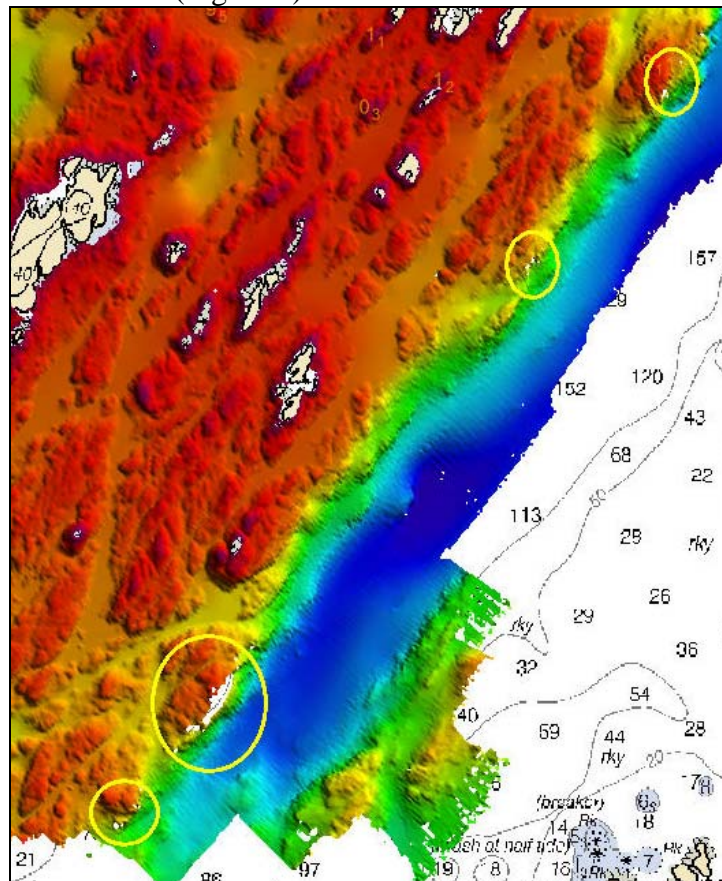


Figure 7: Downslope holidays on the western edge of the deep passage leading into West Crawfish Inlet

The largest of these is found near 56° 43' 13"N, 135° 22' 26"W and is approximately 300 meters in length and 65 meters wide at its widest point. This gap was not developed due to insufficient time. Of the four instances of downslope coverage gaps described here, this is the sole instance

in which the shoal point of the submerged outcrop appears questionable (see Figure 8). The shoalest survey depths here are 28 meters.⁹

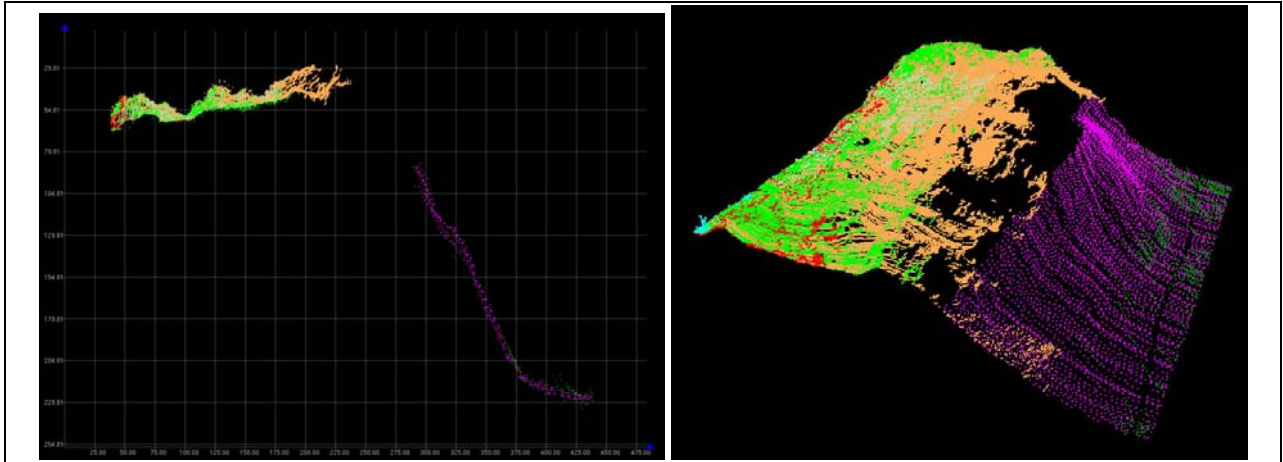


Figure 8: View in CARIS HIPS and SIPS of largest holiday on H11844

There is a holiday over a charted (Chart 17326) 1 fathom sounding and a 4.10 meter lidar rock at approximately $56^{\circ}46'50''\text{N}$, $135^{\circ}19'07''\text{W}$ in Windy Passage (Figure 9). There is kelp in the area and this is most likely the reason a split line was not obtained over the center of the feature. The least depth in adjoining multibeam data is 1.4 meters, but this cannot be confidently expressed as the least depth of the feature. The lidar rock was moved into the H11844_Field_Verified data are retaining its original SORIND and SORDAT, but attributed with a remark explaining that the least depth could not be obtained due to kelp.¹⁰

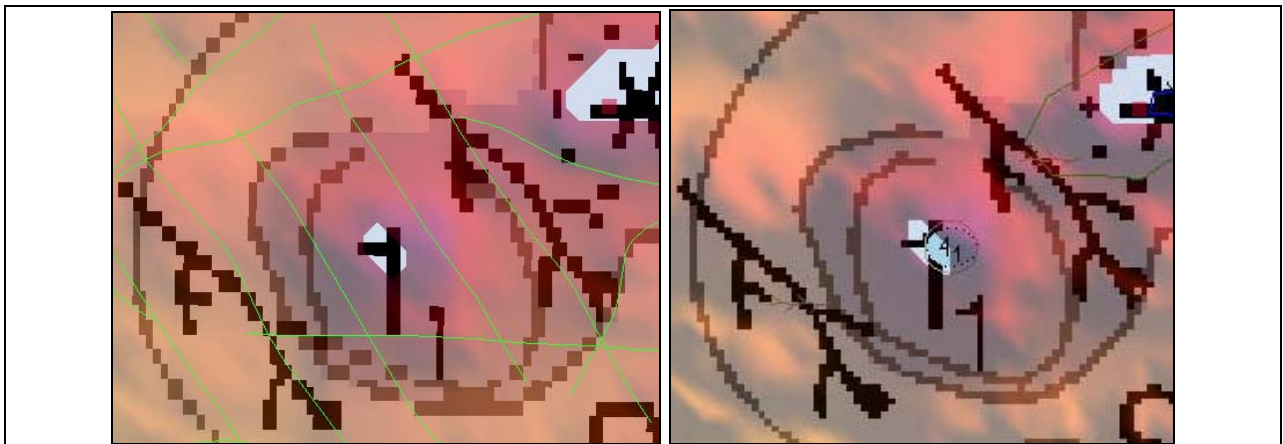


Figure 9: Holiday over charted (Chart 17326) 1 fathom sounding and 4.10 meter lidar rock at $56^{\circ}46'50''\text{N}$, $135^{\circ}19'07''\text{W}$

As discussed earlier in this report, SWMB data was not acquired at the head of President Bay. Skiff 915 was able to enter the basin and acquire several lines of VBES data, but deemed the entry unfit for a MBES launch. The multibeam coverage leading to the head of the bay becomes sparse behind the MapInfo lidar limit line. As discussed above, some holidays resulting from the incorrect lidar limit line file were not filled in.¹¹

The coverage gaps in the passage south of Gornoi Island are located behind the Notebook lidar limit line.¹²

TrueHeave

TrueHeave data could not be applied to MBES data acquired with Launch 2801 on May 19, 2008 (DN140) for unknown reasons. TrueHeave data could also not be applied to 27 lines of MBES data acquired with Launch 2801 on May 22, 2008 (DN143) for unknown reasons. There are no artifacts in the data associated with the lack of TrueHeave data on these days.¹³

B3. Corrections to Echo Sounding (Data Reduction)

Data reduction procedures for survey H11844 conform to those detailed in the *OPR-O112-RA-08 DAPR*.

B4. Data Processing (Data Representation)

Data processing procedures for survey H11844 conform to those detailed in the DAPR.

There are seven (7) total fieldsheets fulfilling the various resolution requirements for survey H11844. The submission Field Sheet and BASE Surface structure are shown in Figures 10 and 11. All BASE Surfaces are CUBE surfaces save for the 2m Uncertainty weighted grid created for the VBES data in President Bay.

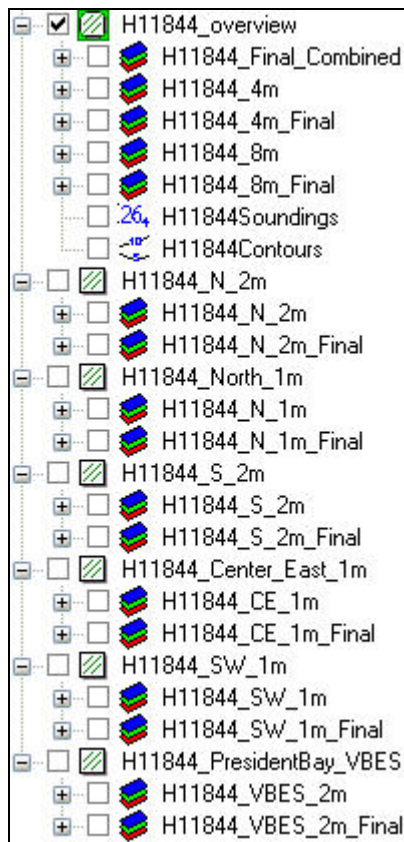


Figure 10: Field Sheets and BASE surfaces submitted with H11844

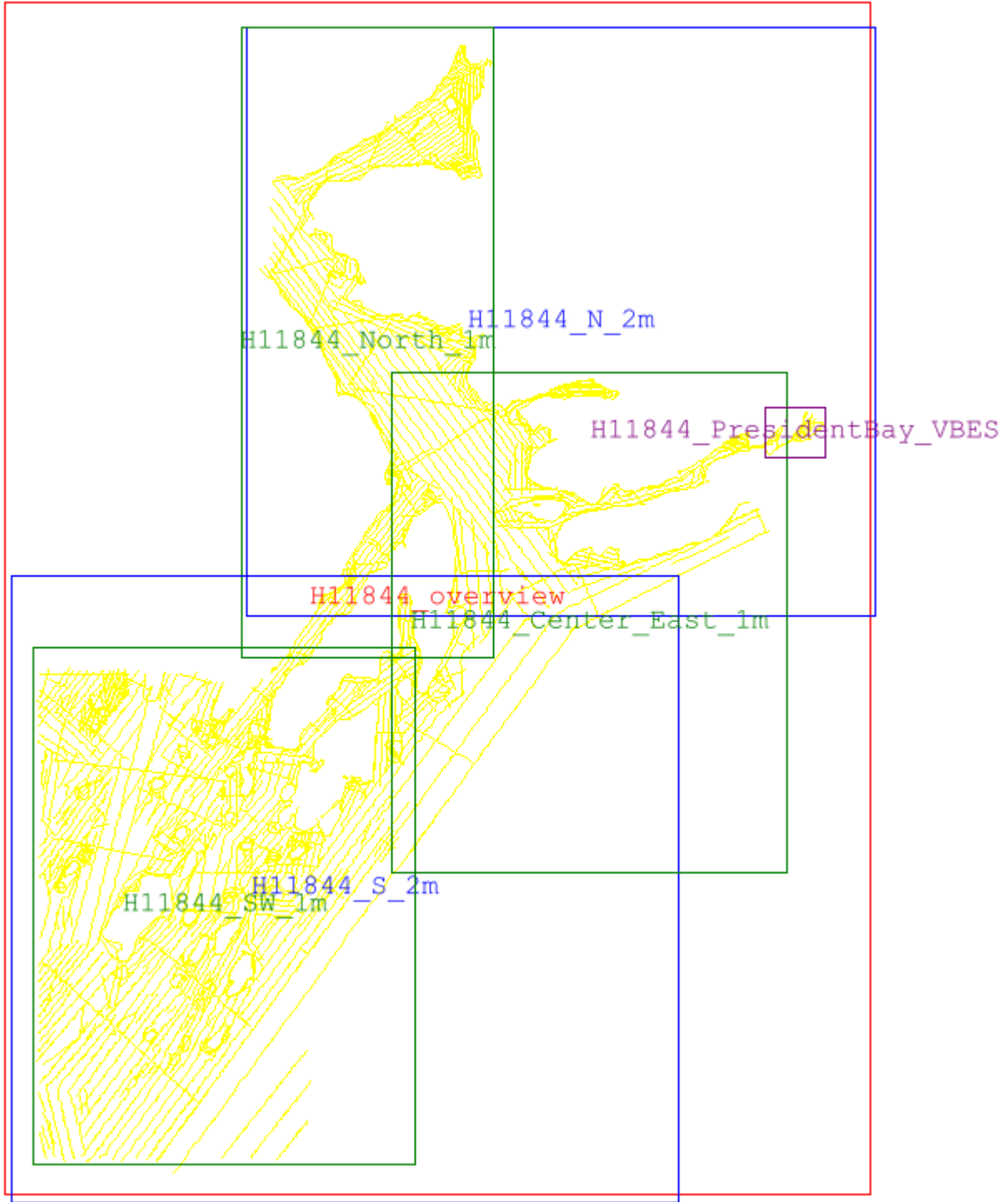


Figure 11: Field Sheet layout for H11844

Fieldsheets have a grid resolution of at least 10% of the depth and are smaller than 25×10^6 nodes. This survey utilized the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. As discussed in the DAPR, all 1 meter resolution surfaces use Shallow parameters,

while 2-, 4-, and 8- meter surfaces were created with an adjusted set of Deep parameters (see Figure 12).

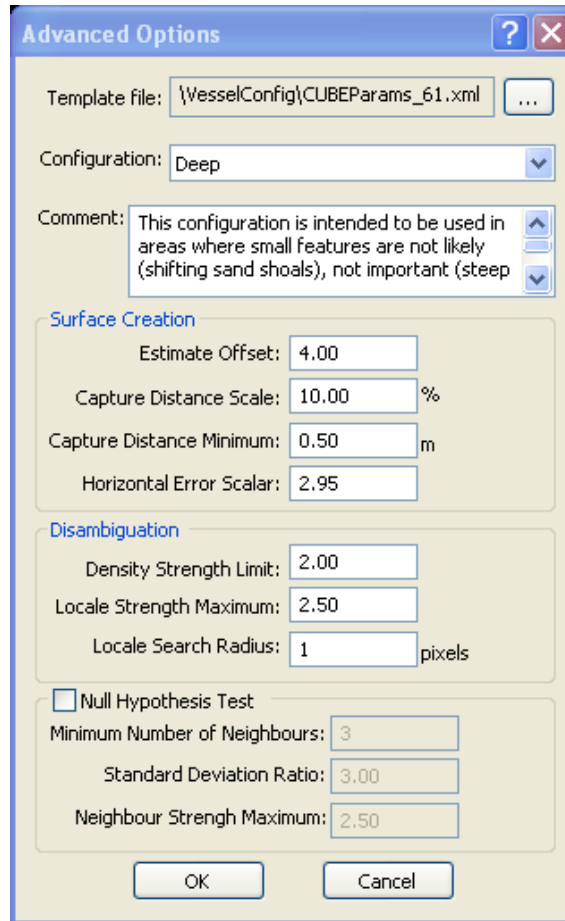


Figure 12: CUBE Deep parameters adjusted by Rainier personnel and used for 2-, 4-, and 8-meter surfaces representing H11844

Final BASE surface resolutions and depth ranges were set in accordance with the Specification and Deliverables Complete Multibeam Coverage requirements (see Table 3).

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

Table 3: Depth range and resolution of finalized surfaces

Soundings and contours were generated in CARIS HIPS from the 8-meter 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.

Horizontal Control

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

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

Table 4: Differential Corrector Sources for H11844

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 H11844.

No tertiary gauges were required.

All data were reduced to MLLW using final approved Tidal Constituent and Residual Interpolator (TCARI) water levels from O112RA2008P-TCARI.tc and station Sitka, AK (945-1600) using the tide file 9451600 verified_thru20080630.txt.

The request for Final Approved Water Levels for H11844 was submitted to CO-OPS on June 19th, 2008 and the Final Tide Note was received on July 3rd, 2008. This documentation is included in Appendix IV.¹⁴ The Final Tide Note includes the following in regards to the tide corrector: “Note 2: Due to inaccurate shoreline around Sevenfathom Bay and President Bay, survey tracklines fall outside of the TCARI grid boundaries in some areas. TCARI will extrapolate the tide corrector to cover these soundings.”

It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during final processing.

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Survey H11844 was compared with the following raster charts:

Chart	Edition	Edition Date	Local Notice to Mariners applied through	Scale
17326	16 th	Nov 2007	May 17, 2008	1:40,000
17320	17 th	Nov 2005	May 17, 2008	1:217,828

Table 5: Charts compared with H11844

Survey H11844 was compared with the provided composite source file, which was compiled from the associated Electronic Navigational Charts. No additional chart comparison was conducted for these Electronic Navigational Charts. Raster chart comparisons were conducted using BASE surfaces displayed in CARIS HIPS and SIPS with the associated charts in the background.

Chart 17326

Chart 17326 encompasses the entirety of survey H11844. Survey soundings agreed with charted depths within 0.5 to 5 fathoms. Due to the increased sounding density resulting from modern sonar technology, many uncharted shoals were developed during H11844. As a result, twenty-five Dangers to navigation have been submitted (see section D.1.b). In all cases, complete MBES was achieved over the soundings in question and the Hydrographer recommends charting per the digital data.¹⁵

Overall, survey soundings are typically shoaler than charted soundings. One significant exception to this is an inaccurately charted 10-fathom sounding and contour approximately 0.6 nautical miles east of Rachek Island (Figure 13). Survey depths here are at least five (5) to ten (10) fathoms deeper than the charted 10-fathom.

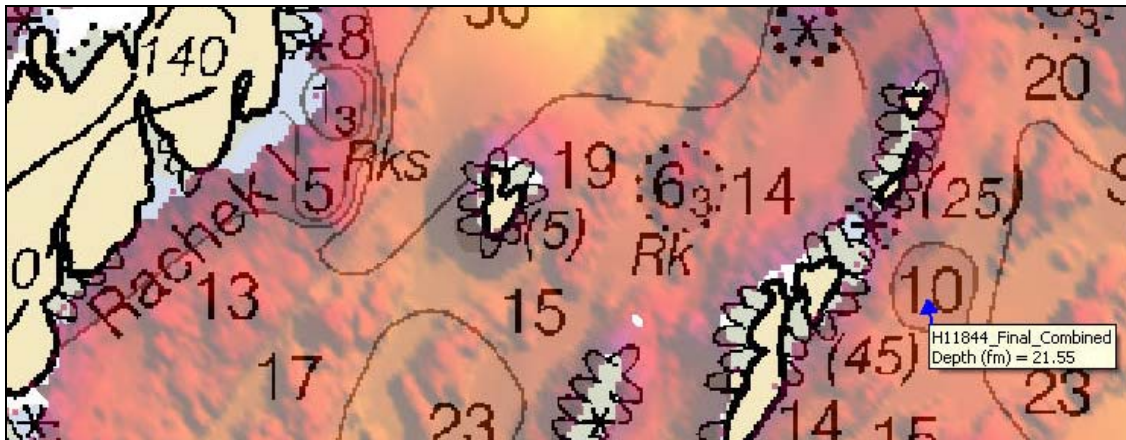


Figure 13: Inaccurately charted (Chart 17326) 10-fathom sounding

The charted contours, except for the charted 10-fathom curve, agree with the survey contours but can now be more accurately depicted with the increased density of soundings via this survey. As set forth in Chart 1, the 10-fathom contour and waters within shall have a light blue tint on nautical charts. Survey H11844 soundings indicate many instances near islands south of Windy Passage where the 10-fathom curve and associated tint are lacking. An example is the group of unnamed islands approximately one nautical mile south of Gornoi Island, pictured in Figure 14.

This information is vitally important to the mariner and the Hydrographer recommends charting the contour as per digital data.¹⁶

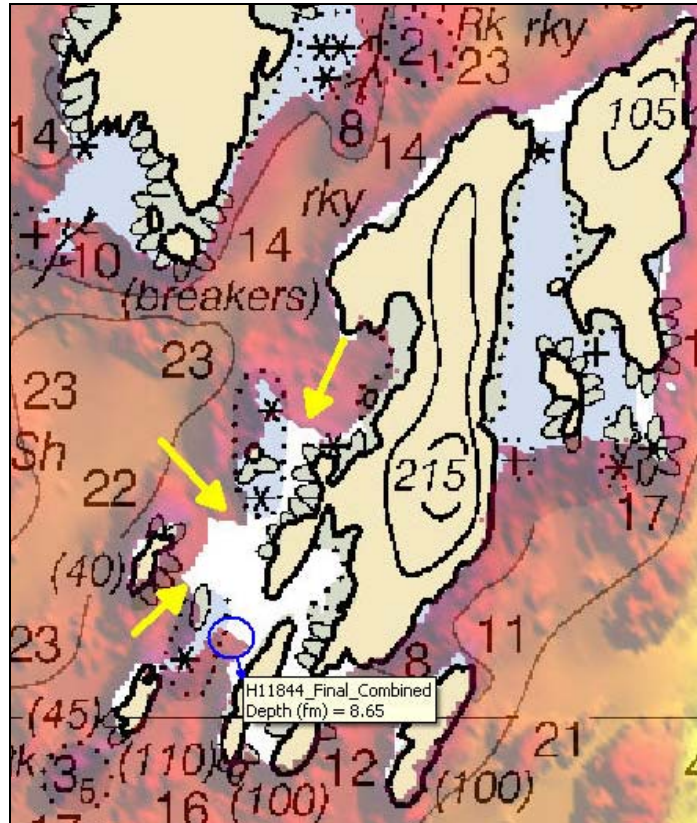


Figure 14: Example of an area on Chart 17326 where H11844 survey data indicate that the charted 10-fathom contour and associated blue tint are inaccurate and should be expanded

Chart 17326 has what appears to be an ink mark near a charted 19-fathom sounding on the northwest end of Rachek Island, located in the southern section of the survey area (Figure 15). This mark was compiled to the associated ENC and therefore this project’s composite source file as coastline. Complete multibeam was achieved over this coastline, revealing no depth shoaler than fifteen (15) fathoms. This coastline was placed in the H11844_Disprovals.hob and is recommended for removal from Chart 17326.¹⁷

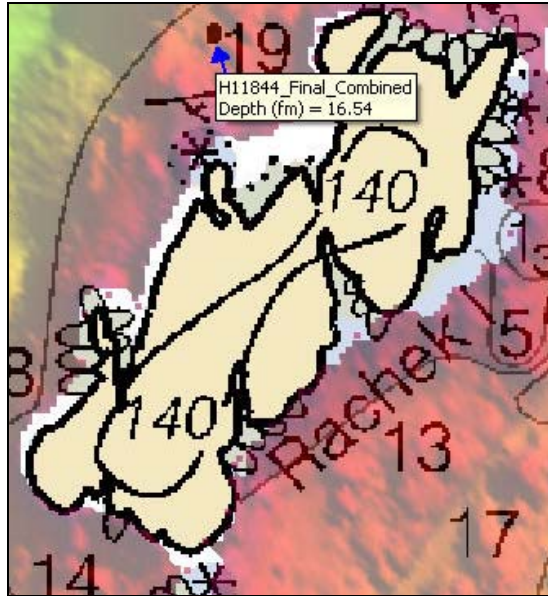


Figure 15: Complete MBES over ink mark digitized as islet on Chart 17326

Chart 17320

The small scale of Chart 17320 lends itself to large discrepancies when compared to a survey of such detail as H11844. The charted 50-fathom contour is roughly accurate but should be adjusted according to the more dense H11844 data. The 10-fathom contours along the southwestern extent of the survey area are inaccurate, with survey depths along these contours between two (2) and twenty (20) fathoms deeper than the 10-fathom curve. The scale at which the charted soundings are depicted is such that a single sounding covers approximately 300 by 400 meters. Within this area for each charted sounding on Chart 17320, a survey sounding that agrees within 1 fathom occurs. However, survey soundings up to 30 fathoms deeper occur over the same sounding. Hence survey soundings and charted depths on Chart 17320 agree within one (1) to thirty (30) fathoms.

See the Notebook session for a comprehensive listing of features recommended for removal, modification, and/or deletion from the chart (17326).

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.¹⁸

Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of H11844.¹⁹

D.1.b. Dangers to Navigation

Twenty-five (25) Dangers to Navigation (DTONs) were found on survey H11844, and reported to the Marine Chart Division via email on October 29th, 2008. No immediate DTONs were discovered or submitted during acquisition. The original DTON submission package is included

in Appendix I. Descriptions of each DTON are included in the H11844_DTON_Report produced in Pydro and included along with a copy of the DTON email from MCD in Appendix I of this Descriptive Report.²⁰

D.1.c. Other Features

No additional charted items were investigated and no other features were located on survey H11844.

D.2. Additional Results

D.2.a. Prior Survey Comparison

Prior survey comparison was not performed.

D.2.b. Shoreline Verification

Shoreline Source

Traditional “limited shoreline verification” was not required for this survey, since much of the nearshore area was covered by junction LIDAR surveys and was thus outside the limits of H11844. The Pacific Hydrographic Branch provided *Rainier* with a list of features selected for further investigation from LIDAR surveys H11538 and H11539. These were included in a discrepancy HOB file compiled from the H11538_LI_Investigation and H11539_LI_Investigation HOB files provided from the Pacific Hydrographic Branch. The six (6) features selected for further investigation during H11844 acquisition included charted rocks not detected by lidar, a feature in kelp with no least depth determined, and a doubtful sounding.

In addition, the source shoreline for project OPR-O112-RA-08 is a composite source file compiled from photogrammetric survey project GC10517 and charted features from the digital Electronic Navigational Chart (ENC) US5AK3GM and US5AK3SM. The composite source file (CSF) was provided in S57 format as 0_1FME01.000. This file was imported into a CARIS Notebook HOB file and was trimmed down to include only the shoreline and features that applied to H11844. The H11844_Original_Comp_Source HOB file was printed on paper “boat sheets” and displayed in Hypack for field verification.

Shoreline Verification

Although not required by the Project Instructions, limited shoreline verification was conducted near or as close to predicted low water as possible in accordance with FPM section 3.5.5. Detached positions (DPs) acquired during shoreline verification were recorded in HYPACK and on DP forms, initially processed in Pydro, and compiled to the deliverable Caris Notebook HOB files. These indicate revisions to source shoreline features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline. DP forms²¹ are included in the *Separates to be Included with Survey Data*.

All shoreline data is submitted in Caris Notebook HOB files. All source shoreline changes and new features for survey H11844 are addressed in the deliverable Caris Notebook HOB files. If a

source feature was edited in Notebook, the SORIND and SORDAT attribute fields were modified to reflect the survey number (US,US,survy,H11844) and final survey date (20080618). Remarks and recommendations are included in the HOB files when required. The session H11844_NTBK contains the following:

HOB File	Purpose and Contents
H11844_Original_Comp_Source.hob	Original Source Data as provided for project OPR-O112-RA-08 and clipped to H11844 survey limits with lidar investigation items included
H11844_Field_Verified.hob	Field verified source features and shoreline, including edits and updates not requiring DPs, as well as features that were not addressed.
H11844_Disprovals.hob	Composite Source and lidar items that were disproved and have been moved from the Field Verified HOB

Table 6: List and Description of Notebook .HOB files

The following field procedures were followed:

- H11844 LIDAR items selected for further investigation were addressed by visual, Detached Position (DP), VBES, or MBES techniques as appropriate and feasible, near predicted low water. Other LIDAR features and CSF features outside of the LIDAR extents and the NALL were also addressed. Features located outside the LIDAR extents but inside the NALL were not addressed. Additionally, features in areas deemed by the Hydrographer-in-Charge as unsafe to approach were not further investigated.
- The CSF shoreline was used for orientation and navigation while transiting between assigned H11844 items. CSF features noted to be both egregiously misrepresented in source data and significant to navigation were investigated.

Detached positions (DPs) were recorded in HYPACK and logged on DP forms, processed in Pydro, and then translated into CARIS Notebook. These DPs 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, and transferred to the “remrks” attribute on the corresponding features in Notebook. DP forms are included in the Detached Position directory of the *Separates to be Included with Survey Data*.

Source Shoreline Changes and New Features

The six (6) lidar features selected for further investigation during H11844 acquisition included charted rocks not detected by lidar, a feature in kelp with no least depth determined, and a doubtful sounding. Five (5) of the investigation items were disproved with VBES coverage and multibeam coverage if possible. Investigation methods and recommendations for these features are listed in the Remarks and Recommendation fields of the appropriate Notebook HOB files.

One investigation item (AS66) could not be addressed due to unsafe sea state conditions. The charted rock referenced by this lidar investigation item remains in the H11844_Field_Verified.HOB with a remark stating that the investigation could not be completed. The M_NPUB placeholder for the lidar investigation item was also moved into the H11844_Field_Verified.hob and attributed with the same remark.

As there were no AWOIS items located within the limits of H11844 and all features are addressed in the final deliverable HOB files, there is no traditional Pydro session or Survey Features Report included for H11844. There is a Pydro session containing designated soundings, H11844_Designated_Soundings.pss. This session includes the twenty-five (25) DTONs reported for the survey area (see Section D.1.b above).

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook HOB files supersede and complement shoreline information compiled on the CSF and charts as described above.²²

D.2.c. Aids to Navigation

There are no Aids to Navigation within the survey limits.²³

D.2.d. Overhead Features

There are no overhead features within the limits of survey H11844.²⁴

D.2.e. Submarine Pipelines and Cables

There are no submarine cables or pipelines charted within the limits of H11844, and none were detected by the survey.²⁵

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H11844, and none were observed to be operating in the area.²⁶

D.2.g. Bottom Samples


No bottom samples were collected during survey H11844.²⁷

E. APPROVAL

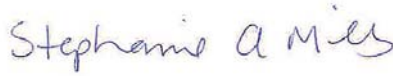
As Chief of Party, Field operations for hydrographic survey H11844 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic 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 June 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 and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

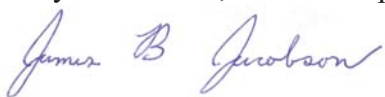
Listed below are supplemental reports submitted separately that contain additional information relevant to this survey:


<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-O112-RA-08	July 25, 2008	N/CS34
Coast Pilot Report for OPR-O112-RA-08	will be submitted under separate cover	N/CS26

Approved and Forwarded:  CAPT/NOAA
 CAPT Donald W. Haines, NOAA
 2008.12.09 15:24:04 -08'00'
 Captain Donald W. Haines, NOAA
 Commanding Officer

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

Survey Sheet Manager:  Stephanie Mills
 2008.12.09 10:19:44 -08'00'
 Stephanie A. Mills
 Survey Technician, NOAA Ship *Rainier*

Chief Survey Technician:  James B Jacobson
 2008.12.09 06:36:29 -09'00'
 James B. Jacobson
 Chief Survey Technician, NOAA Ship *Rainier*

Field Operations Officer:  LT/NOAA
 2008.12.09 13:25:07 -08'00'
 Lieutenant Charles J. Yoos, NOAA
 Field Operations Officer

Revisions

¹ DAPR filed with project records.

² HSRR filed with project records.

³ Concur.

⁴ Concur with clarification, all data meet IHO order 1 specifications.

⁵ Concur.

⁶ Concur.

⁷ Concur.

⁸ Concur.

⁹ This holiday is preserved in H11844_CS.000, however a 15 fathom sounding is selected on the edge of it. Due to the downslope holiday it is theoretically impossible that a shoaler point exists.

¹⁰ Cartographer recommends that the 1 fathom 1 foot charted sounding be retained at 56-46-50.4N, 135-19-06.7W as is depicted in H11844_CS.000.

¹¹ Chart area as depicted in H11844_CS.000.

¹² Chart area as depicted in H11844_CS.000.

¹³ Concur.

¹⁴ Tide note appended to this report.

¹⁵ Concur with clarification, chart as depicted in H11844_CS.000.

¹⁶ Concur with clarification, chart as depicted in H11844_CS.000 and H11844_SS.000.

¹⁷ Concur.

¹⁸ Concur.

¹⁹ Concur.

²⁰ DTON report appended to this report. All DTONs from H11844 and H11538 are blue noted in HCell H11844_CS.000. DTONs 1.4, 1.5, 1.6, 1.9, 1.18, and 1.19 from H11844 were deemed inappropriate for charting. Depths on DTONs from H11538 vary with 1 ft between what the DTON report list shows, what updated version of chart 17326 shows and what the depths are in H11844_CS.000. Chart all depths as depicted in H11844_CS.000.

²¹ Filed with hydrographic records.

²² Concur with clarification, chart as depicted in H11844_CS.000.

²³ Concur.

²⁴ Concur.

²⁵ Concur.

²⁶ Concur.

²⁷ Fiftyfive bottom samples were imported into H11844_CS.000 from ENC US5AK3GM.000. All charted bottom samples lying within areas categorized as rocky in H11844_CS.000 are recommended to be removed.

H11844 Danger to Navigation Report

Registry Number: H11844
State: Alaska
Locality: Approaches to Sitka
Sub-locality: Rachek Island to Big Bay
Project Number: OPR-O112-RA-08
Survey Dates: May 18, 2008 - June 18, 2008

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17326	16th	11/01/2007	1:40,000 (17326_1)	USCG LNM: 06/12/2007 (05/06/2008) CHS NTM: None (03/28/2008) NGA NTM: 07/11/1998 (05/17/2008)
17320	18th	03/01/2008	1:217,828 (17320_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	18.00 m	56° 47' 42.5" N	135° 20' 23.8" W	---
1.2	Rock	16.48 m	56° 45' 03.3" N	135° 23' 12.5" W	---
1.3	Shoal	8.22 m	56° 46' 58.1" N	135° 18' 29.3" W	---
1.4	Shoal	2.50 m	56° 46' 54.3" N	135° 19' 58.2" W	---
1.5	Shoal	15.74 m	56° 48' 37.0" N	135° 21' 24.7" W	---
1.6	Rock	7.93 m	56° 47' 33.4" N	135° 18' 48.2" W	---
1.7	Rock	1.06 m	56° 44' 45.6" N	135° 21' 44.0" W	---
1.8	Rock	2.32 m	56° 44' 56.7" N	135° 21' 42.7" W	---
1.9	Shoal	8.52 m	56° 45' 13.8" N	135° 21' 28.1" W	---

1.10	Rock	2.56 m	56° 45' 39.2" N	135° 21' 05.6" W	---
1.11	Rock	3.06 m	56° 45' 32.4" N	135° 22' 19.0" W	---
1.12	Shoal	11.76 m	56° 48' 17.6" N	135° 21' 42.3" W	---
1.13	Shoal	11.49 m	56° 43' 52.6" N	135° 24' 12.0" W	---
1.14	Shoal	19.05 m	56° 43' 39.2" N	135° 24' 18.7" W	---
1.15	Rock	16.90 m	56° 47' 15.2" N	135° 19' 06.3" W	---
1.16	Shoal	12.52 m	56° 45' 22.4" N	135° 21' 18.9" W	---
1.17	Rock	15.64 m	56° 47' 21.7" N	135° 19' 06.8" W	---
1.18	Shoal	10.75 m	56° 45' 41.9" N	135° 20' 37.2" W	---
1.19	Shoal	16.42 m	56° 48' 48.4" N	135° 21' 19.9" W	---
1.20	Rock	4.64 m	56° 49' 17.4" N	135° 19' 37.6" W	---
1.21	Shoal	3.26 m	56° 47' 57.9" N	135° 21' 18.7" W	---
1.22	Rock	3.07 m	56° 45' 32.5" N	135° 22' 34.2" W	---
1.23	Rock	2.40 m	56° 44' 49.9" N	135° 21' 23.5" W	---
1.24	Shoal	13.66 m	56° 44' 04.5" N	135° 24' 06.4" W	---
1.25	Rock	15.14 m	56° 44' 52.7" N	135° 20' 25.9" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 825/87 from h11844 / 1021_reson8101_hvf / 2008-139 / 303_2121

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 47' 42.5" N, 135° 20' 23.8" W
Least Depth: 18.00 m (= 59.04 ft = 9.840 fm = 9 fm 5.04 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 1.377 m ; **TVU (TPEv)** ± 0.166 m
Timestamp: 2008-139.21:24:57.524 (05/18/2008)
Survey Line: h11844 / 1021_reson8101_hvf / 2008-139 / 303_2121
Profile/Beam: 825/87
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1021_reson8101_hvf/2008-139/303_2121	825/87	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

9 ¼fm (17326_1, 17320_1, 16016_1, 530_1)
 9fm 5ft (531_1)
 18.0m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 17.995 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

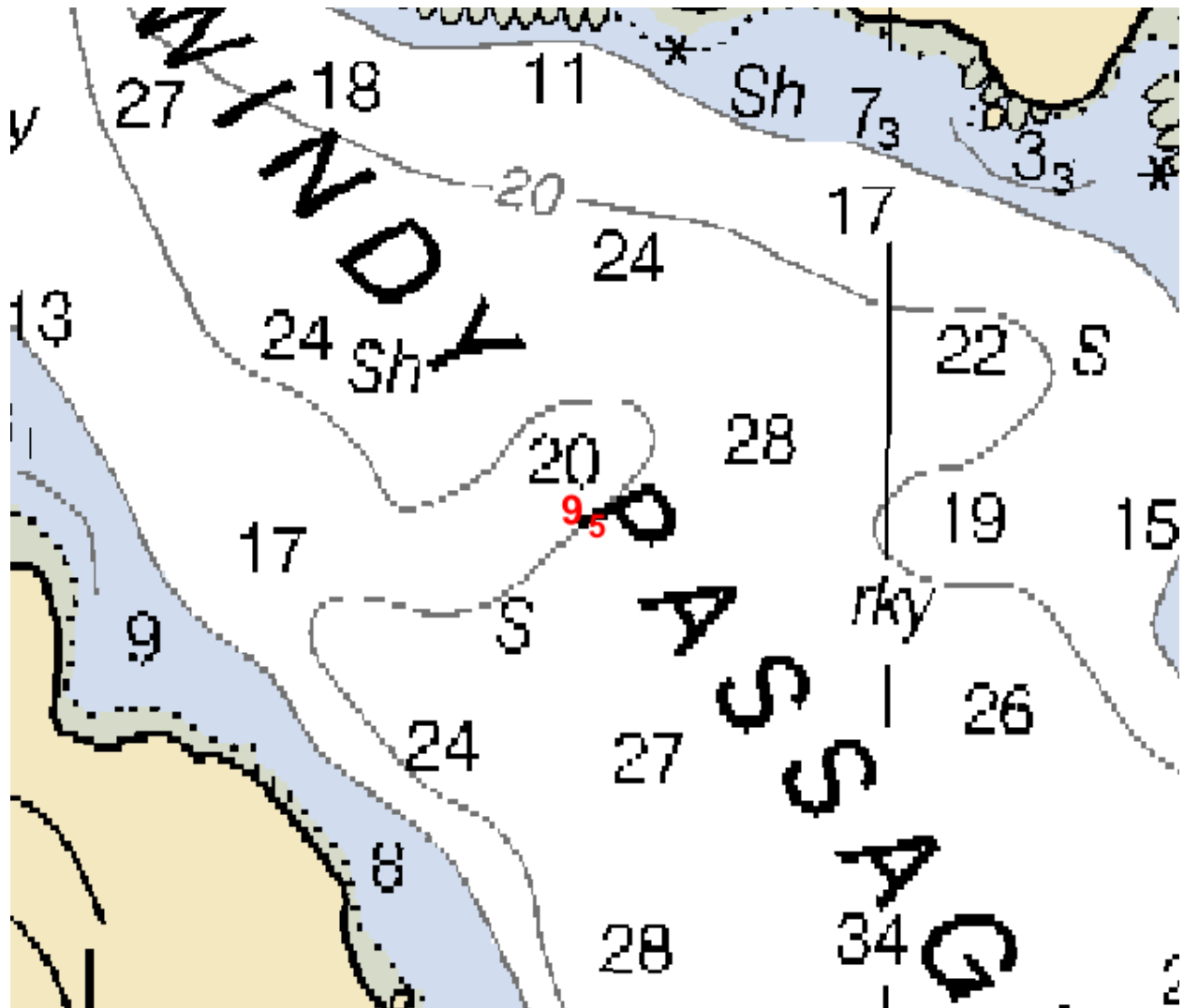


Figure 1.1.1

1.2) Profile/Beam - 112/6 from h11844 / 1021_reson8101_hvf / 2008-143 / 323_1737

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 03.3" N, 135° 23' 12.5" W
Least Depth: 16.48 m (= 54.08 ft = 9.014 fm = 9 fm 0.08 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.378 m ; TVU (TPEv) ± 0.171 m
Timestamp: 2008-143.17:38:17.754 (05/22/2008)
Survey Line: h11844 / 1021_reson8101_hvf / 2008-143 / 323_1737
Profile/Beam: 112/6
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1021_reson8101_hvf/2008-143/323_1737	112/6	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

9fm (17326_1, 17320_1, 16016_1, 530_1)

9fm 0ft (531_1)

16.5m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20080618

SORIND - US,US,survy,H11844

TECSOU - 3:found by multi-beam

VALSOU - 16.484 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

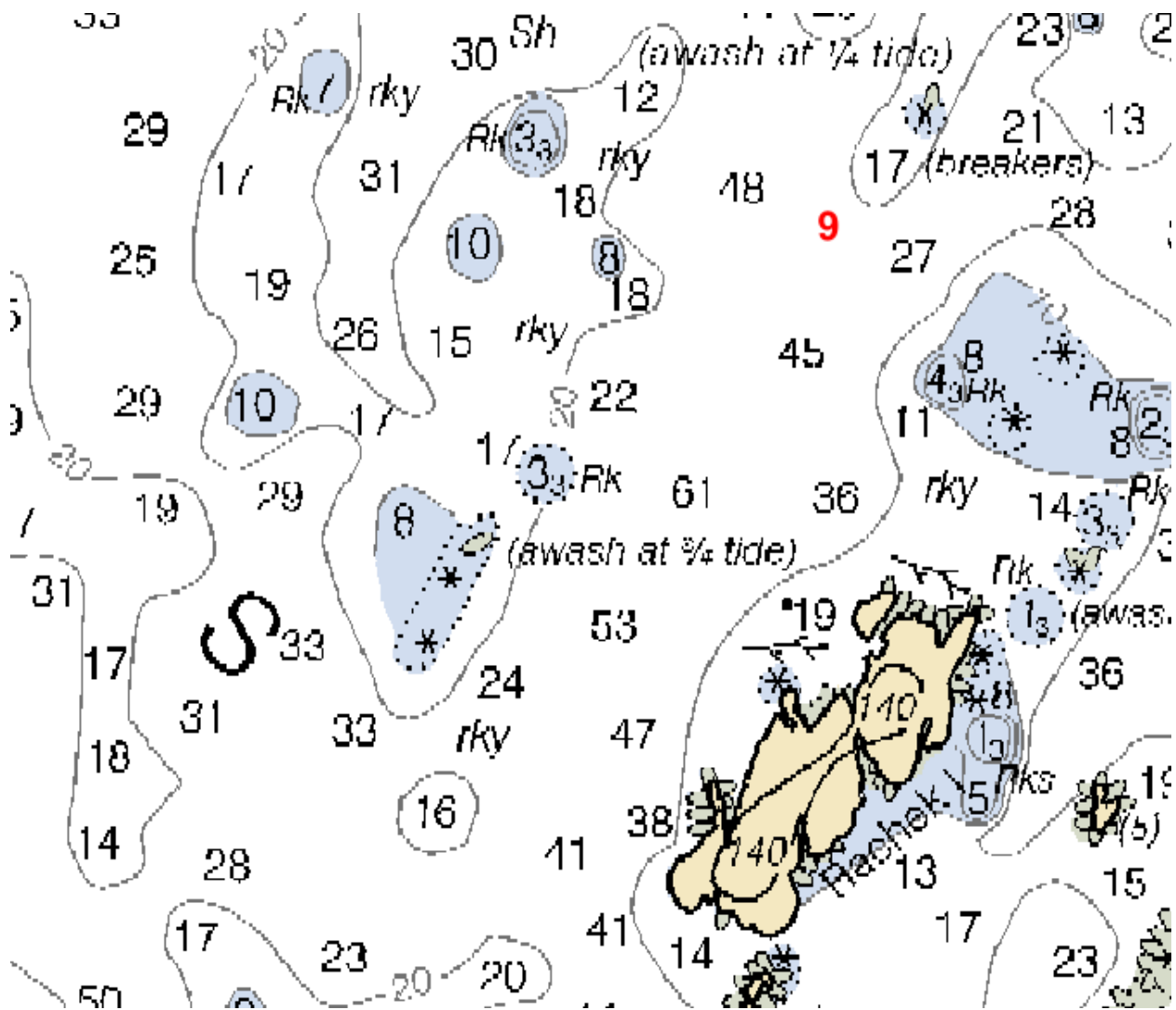


Figure 1.2.1

1.3) Profile/Beam - 336/28 from h11844 / 1021_reson8101_hvf / 2008-170 / 023_1831

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 46' 58.1" N, 135° 18' 29.3" W
Least Depth: 8.22 m (= 26.96 ft = 4.493 fm = 4 fm 2.96 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 1.376 m ; **TVU (TPEv)** ± 0.160 m
Timestamp: 2008-170.18:31:46.680 (06/18/2008)
Survey Line: h11844 / 1021_reson8101_hvf / 2008-170 / 023_1831
Profile/Beam: 336/28
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1021_reson8101_hvf/2008-170/023_1831	336/28	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

4 ½fm (17326_1, 17320_1, 16016_1, 530_1)
 4fm 3ft (531_1)
 8.2m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

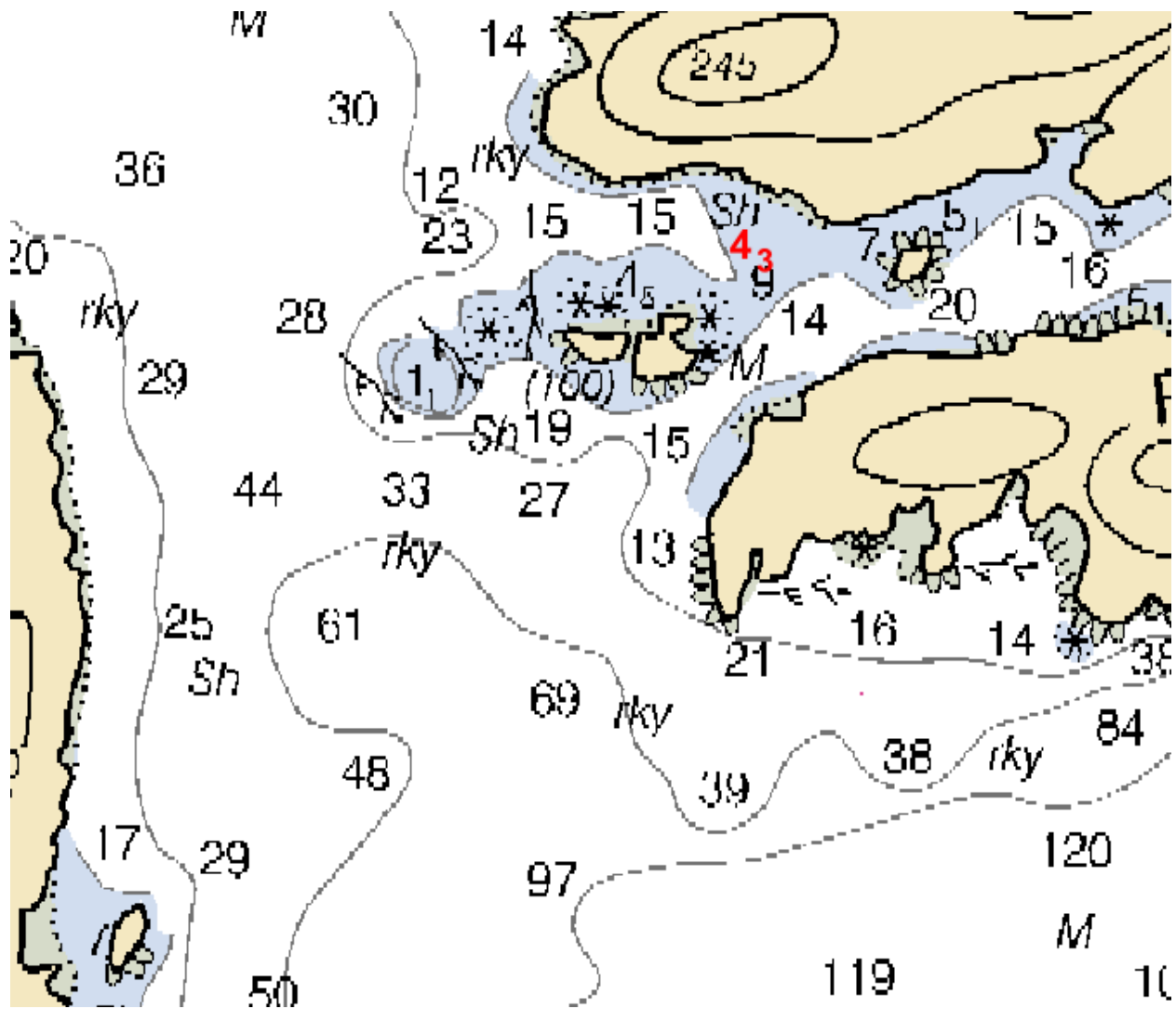


Figure 1.3.1

1.4) Profile/Beam - 1935/207 from h11844 / 1101_reson8125_hvf / 2008-139 / 581_1830

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 46' 54.3" N, 135° 19' 58.2" W
Least Depth: 2.50 m (= 8.20 ft = 1.367 fm = 1 fm 2.20 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.138 m
Timestamp: 2008-139.18:34:47.652 (05/18/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-139 / 581_1830
Profile/Beam: 1935/207
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON emphasizes incorrect charting of 10-fathom curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-139/581_1830	1935/207	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey and update charted contours.

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (17326_1, 17320_1, 16016_1, 530_1)

1fm 2ft (531_1)

2.5m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

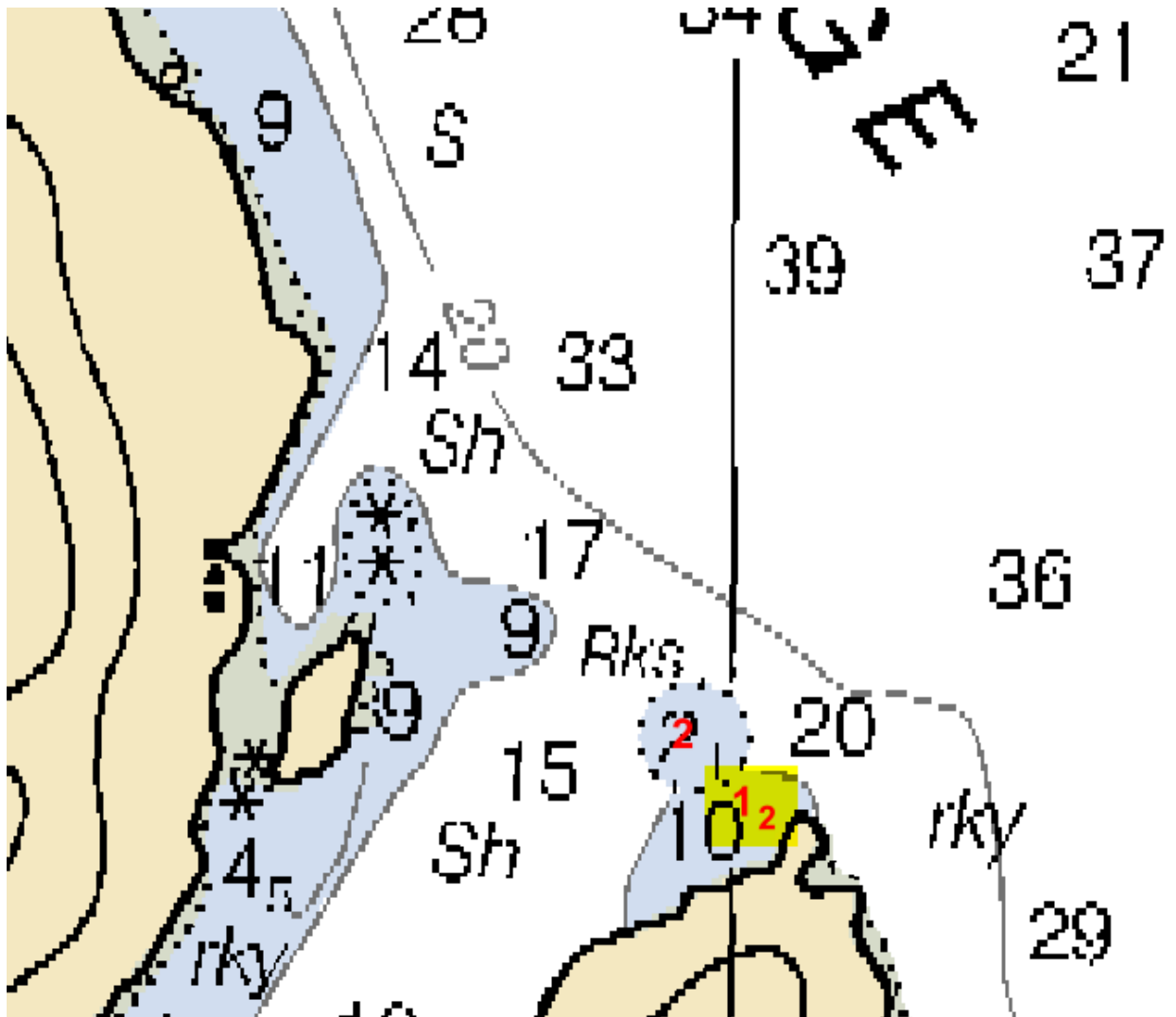


Figure 1.4.1

1.5) Profile/Beam - 3857/2 from h11844 / 1101_reson8125_hvf / 2008-139 / 756_2242

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 48' 37.0" N, 135° 21' 24.7" W
Least Depth: 15.74 m (= 51.63 ft = 8.605 fm = 8 fm 3.63 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 1.964 m ; **TVU (TPEv)** ± 0.126 m
Timestamp: 2008-139.22:57:44.796 (05/18/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-139 / 756_2242
Profile/Beam: 3857/2
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-139/756_2242	3857/2	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

8 ½fm (17326_1, 17320_1, 16016_1, 530_1)
 8fm 3ft (531_1)
 15.7m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

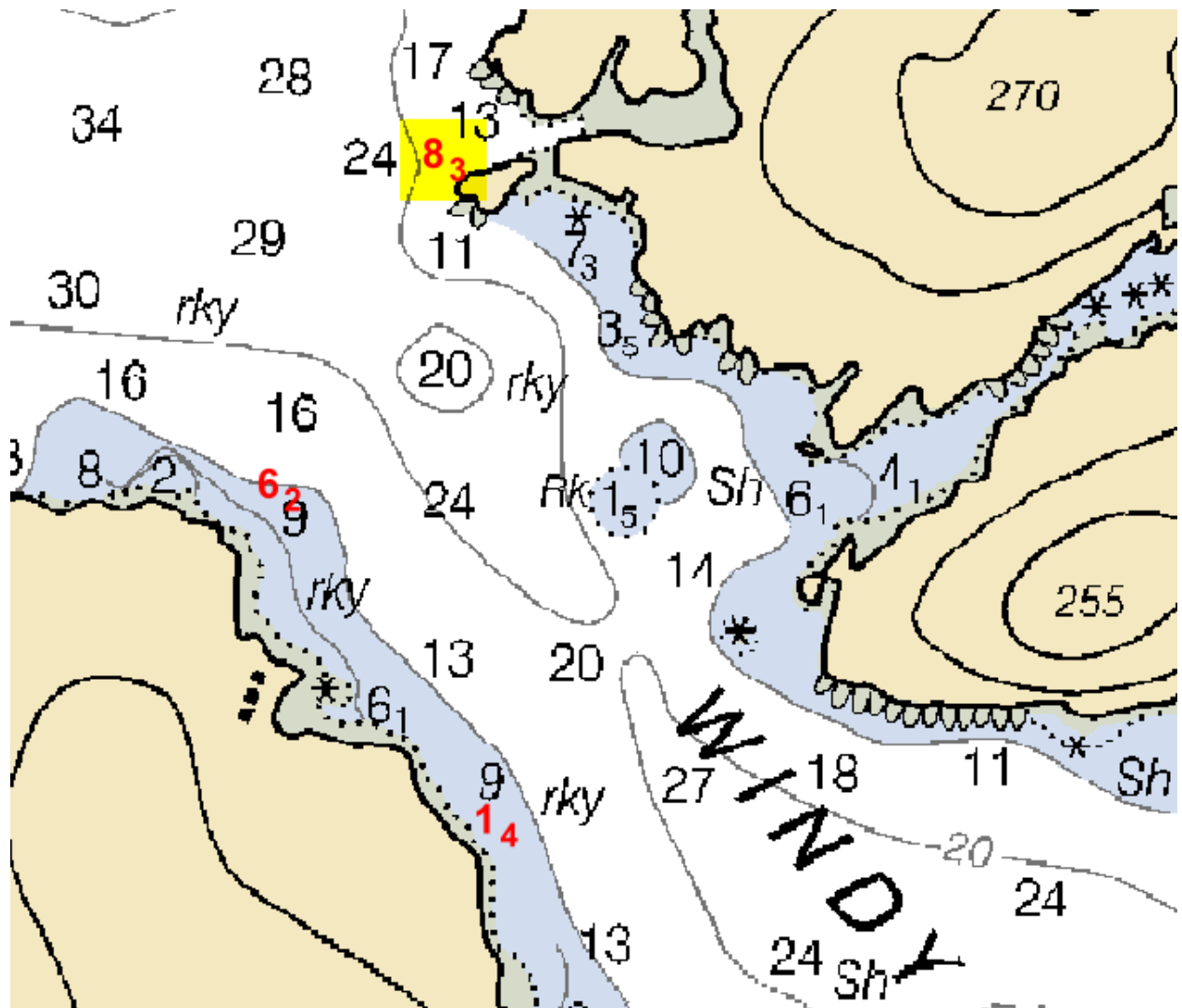


Figure 1.5.1

1.6) Profile/Beam - 5176/135 from h11844 / 1101_reson8125_hvf / 2008-139 / 788_2125

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 47' 33.4" N, 135° 18' 48.2" W
Least Depth: 7.93 m (= 26.02 ft = 4.337 fm = 4 fm 2.02 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.963 m ; TVU (TPEv) ± 0.126 m
Timestamp: 2008-139.21:41:59.773 (05/18/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-139 / 788_2125
Profile/Beam: 5176/135
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-139/788_2125	5176/135	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

4 ¼fm (17326_1, 17320_1, 16016_1, 530_1)

4fm 2ft (531_1)

7.9m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20080618

SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 7.931 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

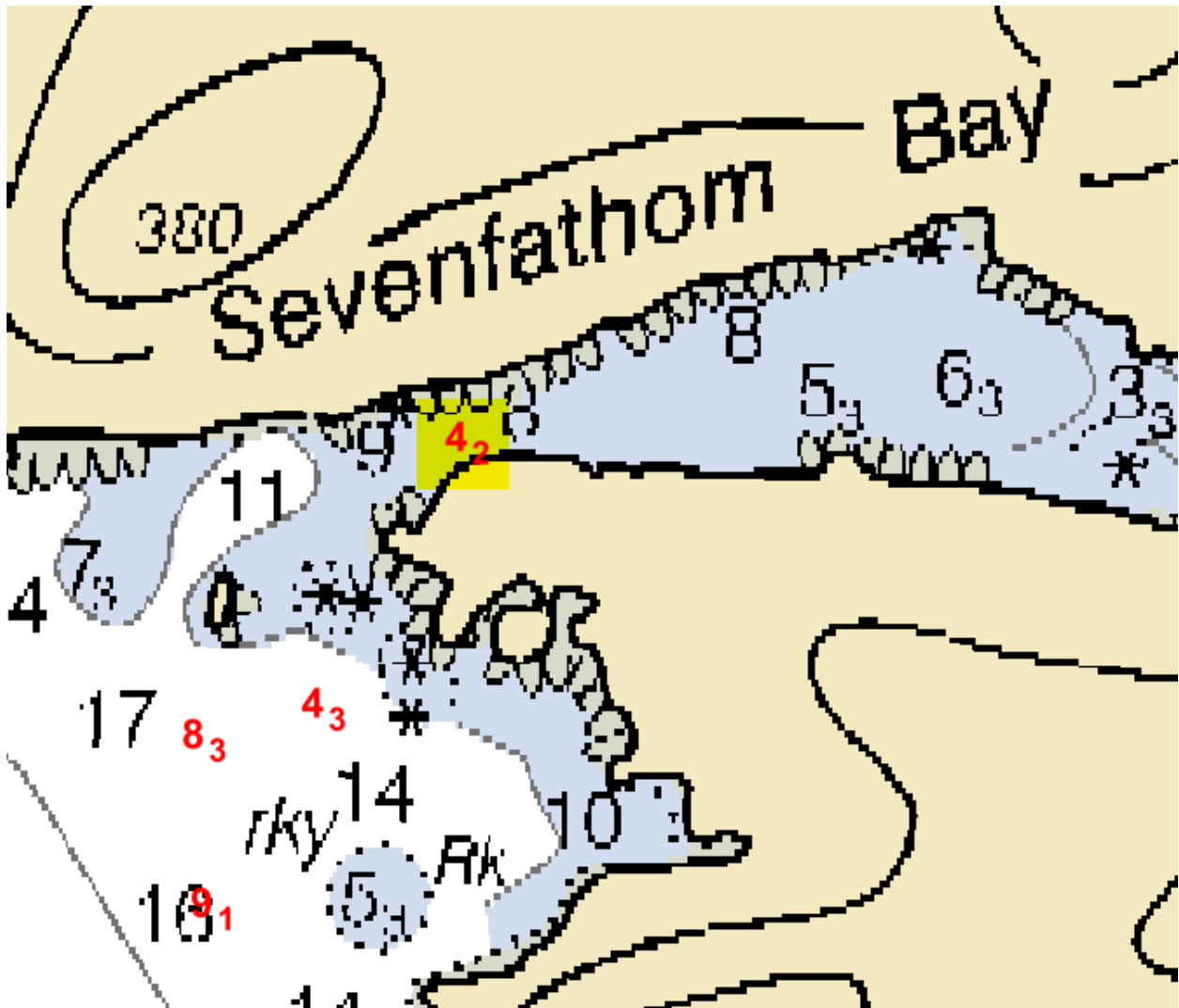


Figure 1.6.1

1.7) Profile/Beam - 697/229 from h11844 / 1101_reson8125_hvf / 2008-140 / 470_2211

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 44' 45.6" N, 135° 21' 44.0" W
Least Depth: 1.06 m (= 3.49 ft = 0.582 fm = 0 fm 3.49 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 2.027 m ; TVU (TPEv) ± 0.922 m
Timestamp: 2008-140.22:14:15.045 (05/19/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-140 / 470_2211
Profile/Beam: 697/229
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-140/470_2211	697/229	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

0 ½fm (17326_1, 17320_1, 16016_1, 530_1)

0fm 3ft (531_1)

1.1m (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,H11844

TECSOU - 3:found by multi-beam

VALSOU - 1.064 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

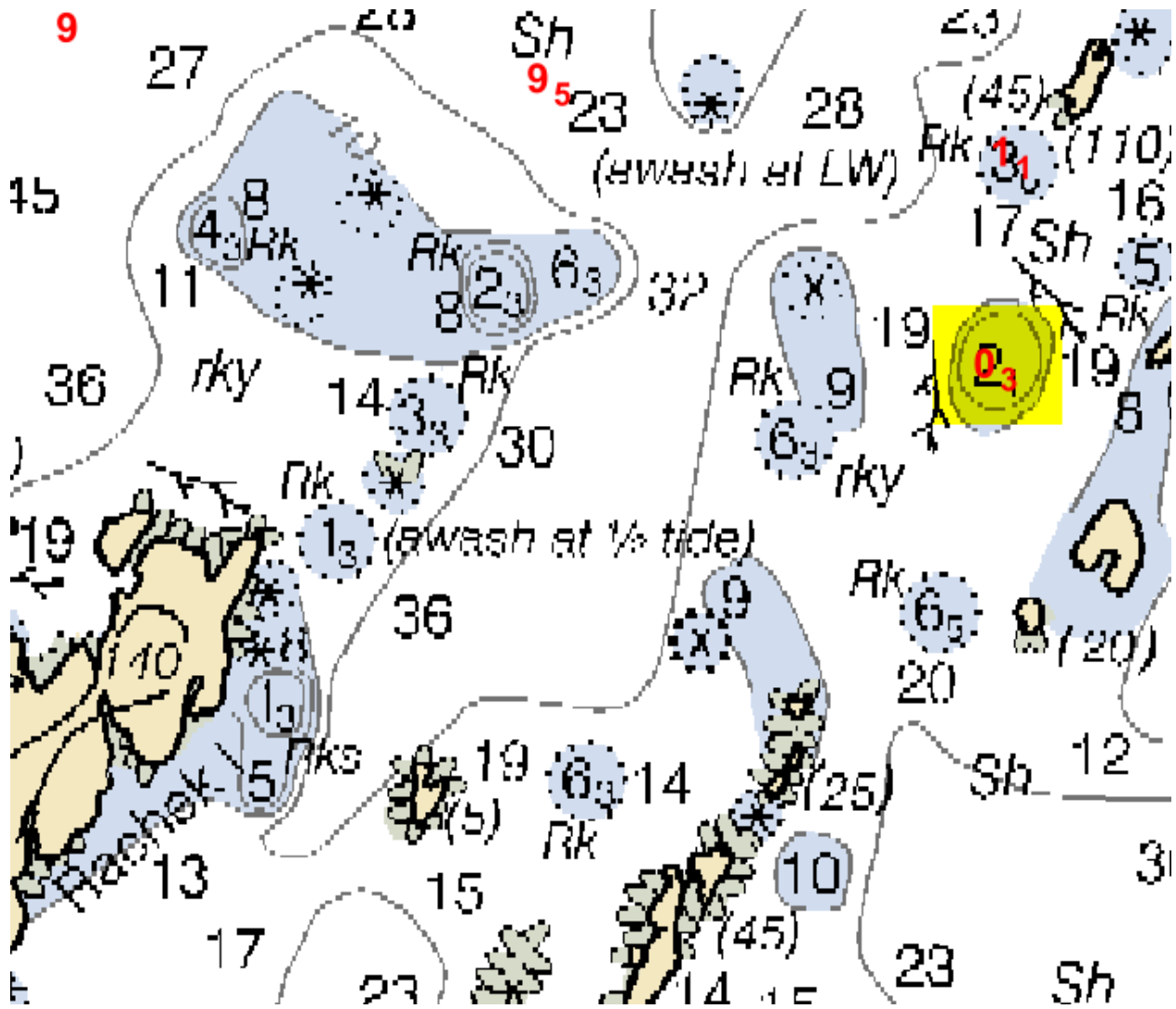


Figure 1.7.1

1.8) Profile/Beam - 511/231 from h11844 / 1101_reson8125_hvf / 2008-140 / 490_2249

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 44' 56.7" N, 135° 21' 42.7" W
Least Depth: 2.32 m (= 7.60 ft = 1.267 fm = 1 fm 1.60 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 2.017 m ; **TVU (TPEv)** ± 0.954 m
Timestamp: 2008-140.22:51:01.551 (05/19/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-140 / 490_2249
Profile/Beam: 511/231
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-140/490_2249	511/231	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (17326_1, 17320_1, 16016_1, 530_1)
 1fm 1ft (531_1)
 2.3m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 2.318 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

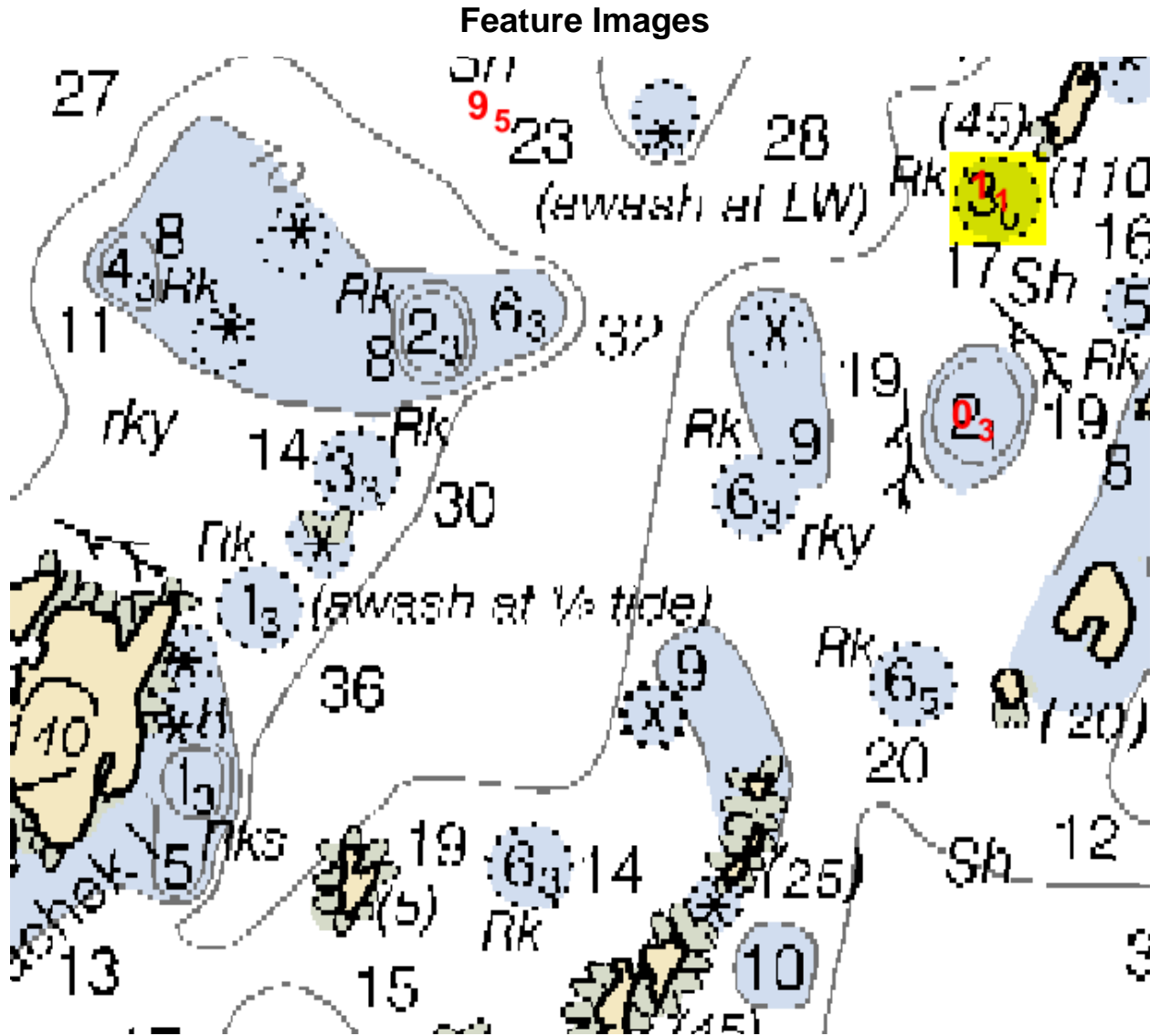


Figure 1.8.1

1.9) Profile/Beam - 113/62 from h11844 / 1101_reson8125_hvf / 2008-140 / 546_2259

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 13.8" N, 135° 21' 28.1" W
Least Depth: 8.52 m (= 27.94 ft = 4.657 fm = 4 fm 3.94 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.962 m ; TVU (TPEv) ± 0.120 m
Timestamp: 2008-140.22:59:50.953 (05/19/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-140 / 546_2259
Profile/Beam: 113/62
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON emphasizes incorrect charting of 10-fathom curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-140/546_2259	113/62	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey and update charted 10-fathom contour.

Cartographically-Rounded Depth (Affected Charts):

4 ½fm (17326_1, 17320_1, 16016_1, 530_1)

4fm 4ft (531_1)

8.5m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

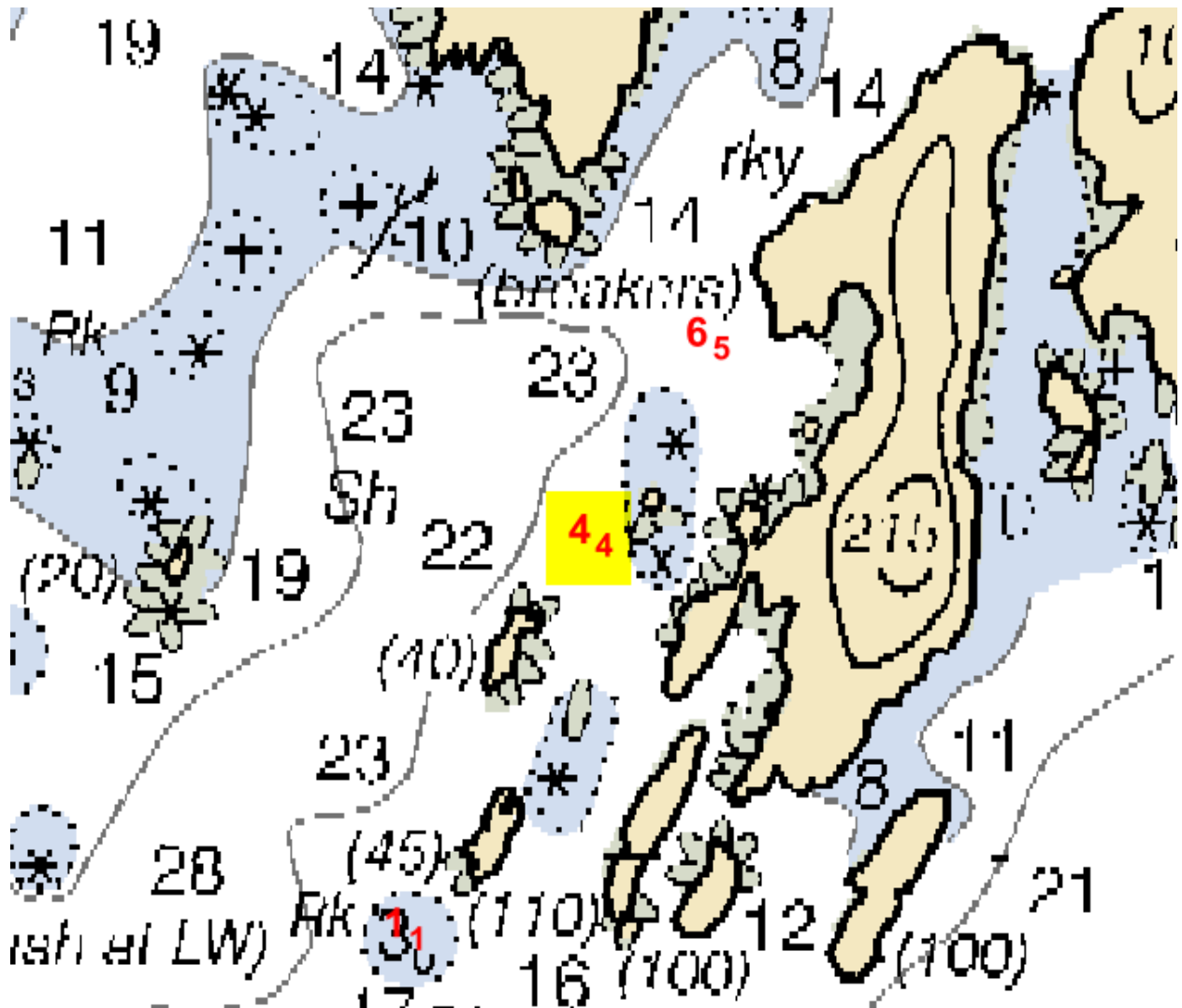


Figure 1.9.1

1.10) Profile/Beam - 1800/224 from h11844 / 1101_reson8125_hvf / 2008-153 / 301_2149

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 39.2" N, 135° 21' 05.6" W
Least Depth: 2.56 m (= 8.39 ft = 1.398 fm = 1 fm 2.39 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.968 m ; TVU (TPEv) ± 0.250 m
Timestamp: 2008-153.21:54:42.810 (06/01/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-153 / 301_2149
Profile/Beam: 1800/224
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-153/301_2149	1800/224	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (17326_1, 17320_1, 16016_1, 530_1)

1fm 2ft (531_1)

2.6m (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,H11844

TECSOU - 3:found by multi-beam

VALSOU - 2.557 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

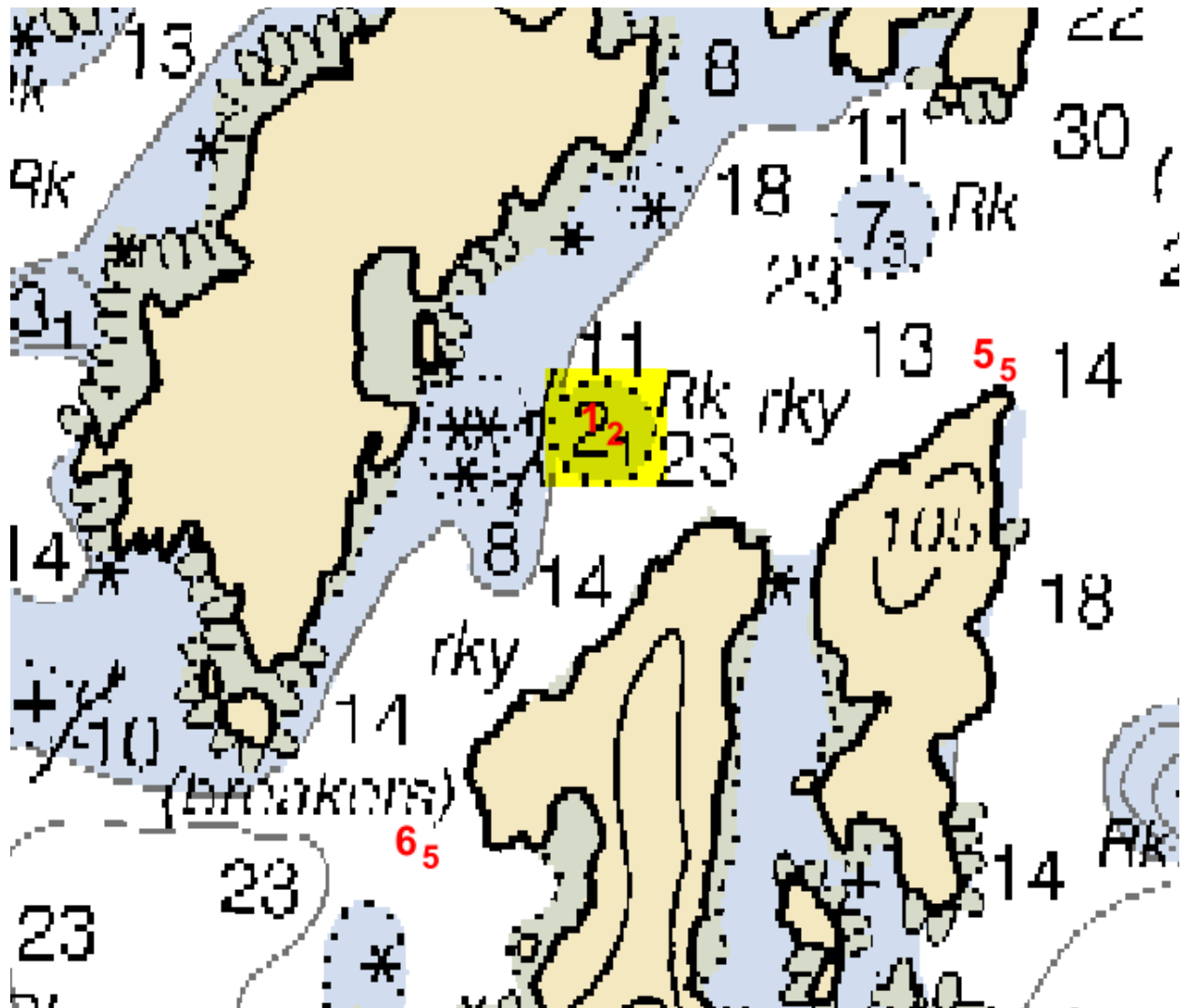


Figure 1.10.1

1.11) Profile/Beam - 128/224 from h11844 / 1101_reson8125_hvf / 2008-153 / 420_2046

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 32.4" N, 135° 22' 19.0" W
Least Depth: 3.06 m (= 10.03 ft = 1.672 fm = 1 fm 4.03 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 1.973 m ; **TVU (TPEv)** ± 0.297 m
Timestamp: 2008-153.20:46:49.097 (06/01/2008)
Survey Line: h11844 / 1101_reson8125_hvf / 2008-153 / 420_2046
Profile/Beam: 128/224
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/1101_reson8125_hvf/2008-153/420_2046	128/224	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

- 1 ½fm (17326_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 - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 3.058 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

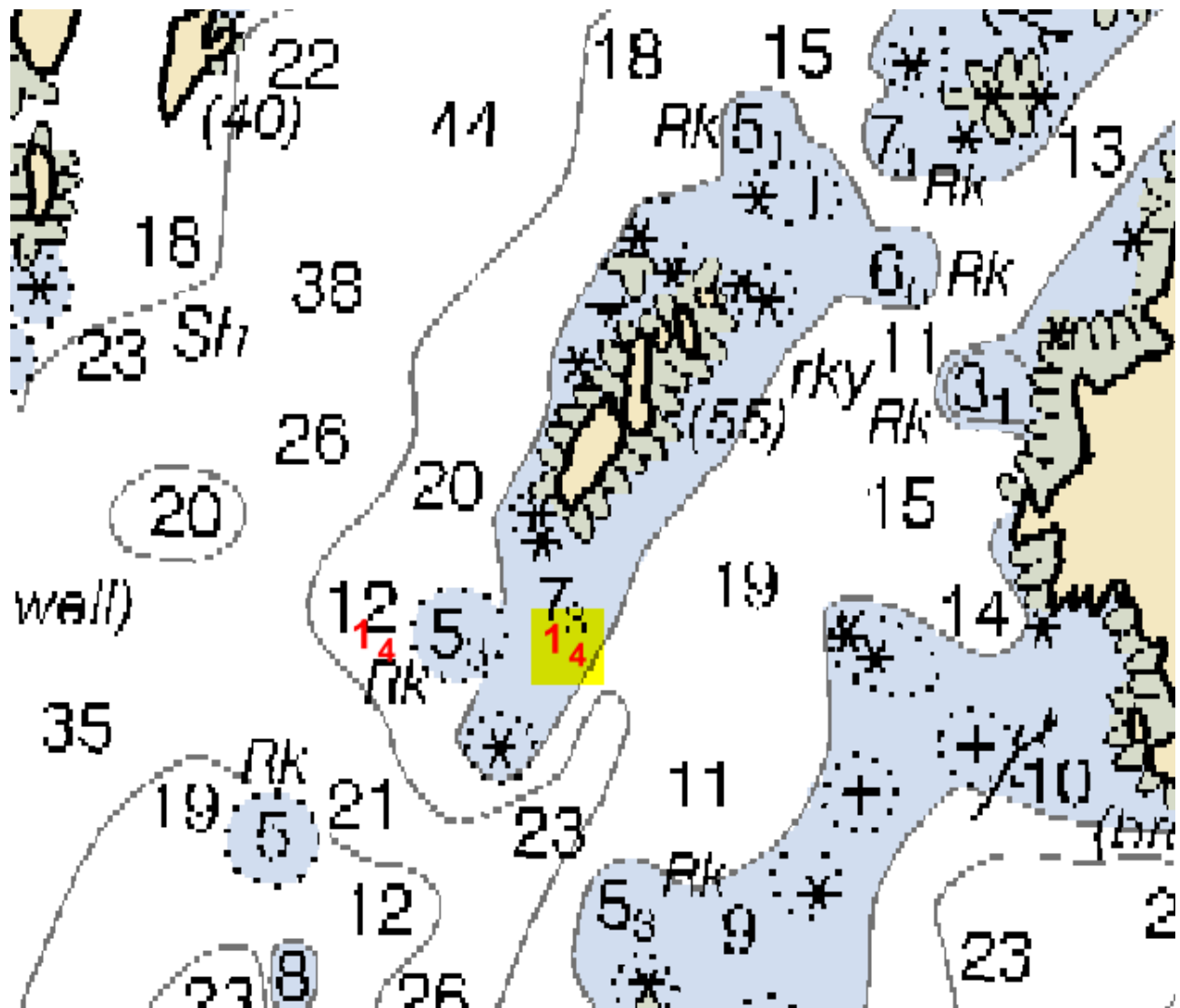


Figure 1.11.1

1.12) Profile/Beam - 3825/412 from h11844 / 2801_reson7125_hf_512beams / 2008-139 / 325_1752

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 48' 17.6" N, 135° 21' 42.3" W
Least Depth: 11.76 m (= 38.58 ft = 6.430 fm = 6 fm 2.58 ft)
TPU (±1.96σ): **THU (TPEh)** ±1.974 m ; **TVU (TPEv)** ±0.188 m
Timestamp: 2008-139.18:01:19.990 (05/18/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-139 / 325_1752
Profile/Beam: 3825/412
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-139/325_1752	3825/412	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

6 ¼fm (17326_1, 17320_1, 16016_1, 530_1)
 6fm 2ft (531_1)
 11.8m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

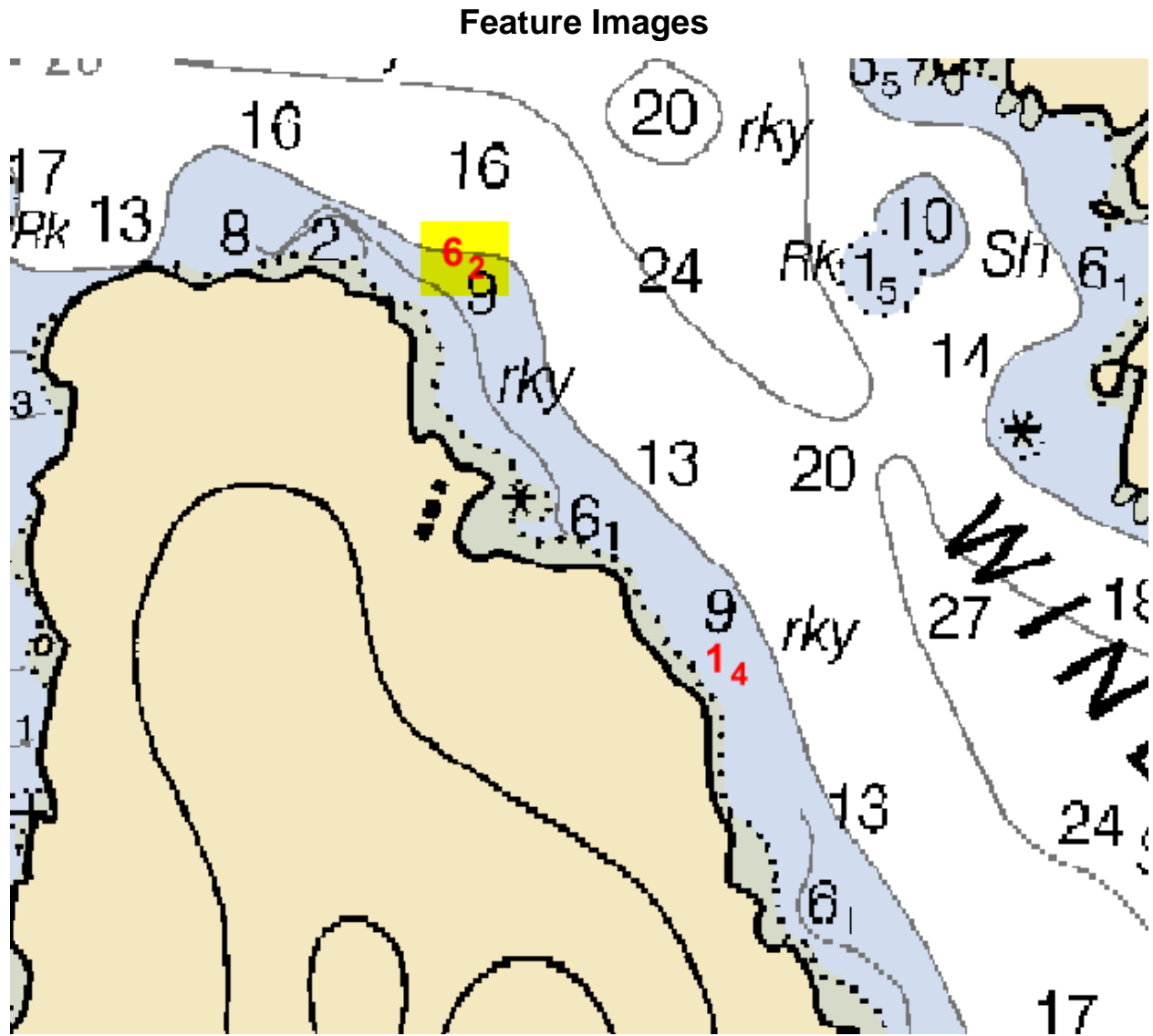


Figure 1.12.1

1.13) Profile/Beam - 291/146 from h11844 / 2801_reson7125_hf_512beams / 2008-140 / 539_2056

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 43' 52.6" N, 135° 24' 12.0" W
Least Depth: 11.49 m (= 37.70 ft = 6.283 fm = 6 fm 1.70 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.971 m ; TVU (TPEv) ± 0.207 m
Timestamp: 2008-140.20:57:33.364 (05/19/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-140 / 539_2056
Profile/Beam: 291/146
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-140/539_2056	291/146	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

6 $\frac{1}{4}$ fm (17326_1, 17320_1, 16016_1, 530_1)

6fm 1ft (531_1)

11.5m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

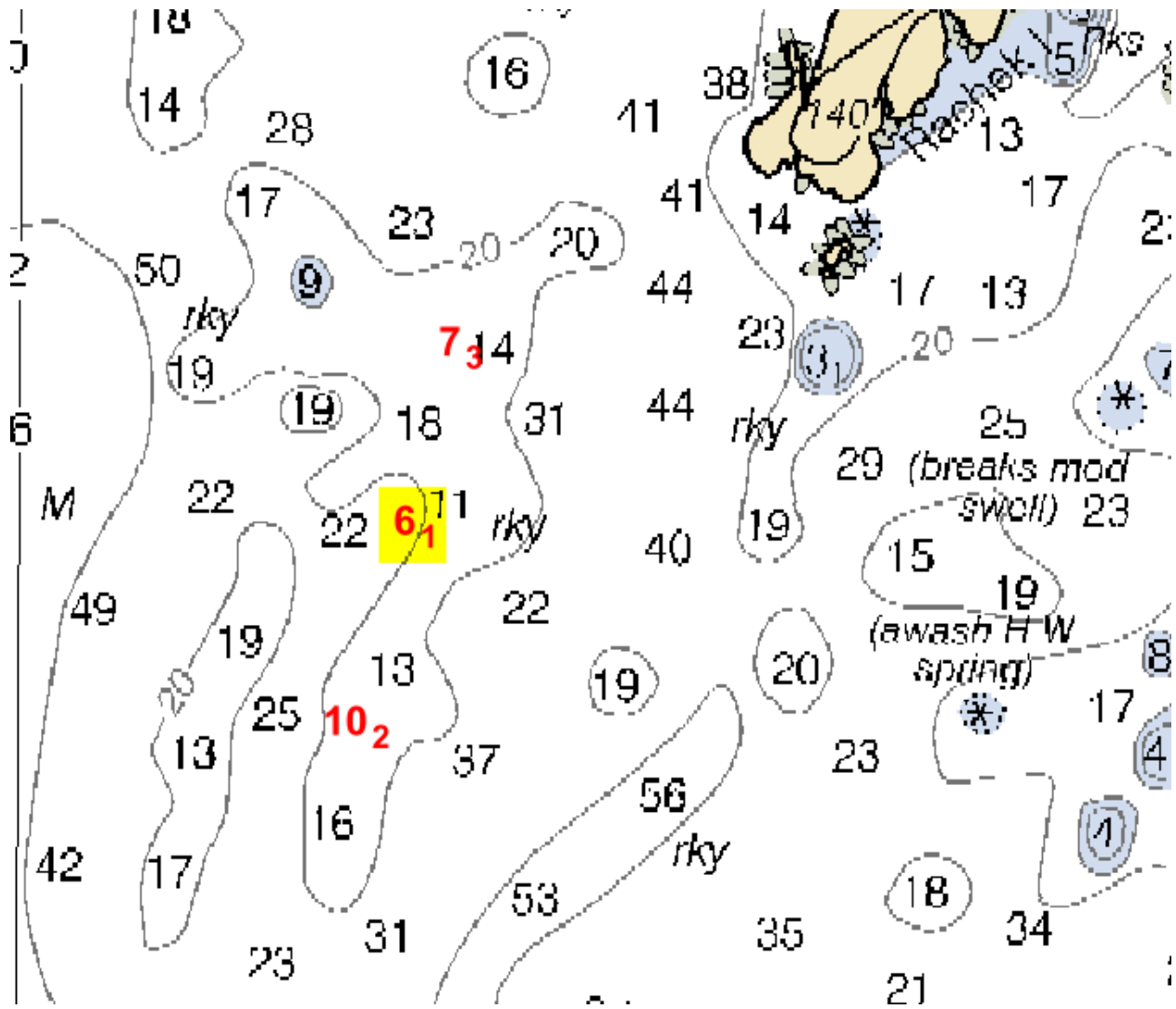


Figure 1.13.1

1.14) Profile/Beam - 269/434 from h11844 / 2801_reson7125_hf_512beams / 2008-140 / 673_2107

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 43' 39.2" N, 135° 24' 18.7" W
Least Depth: 19.05 m (= 62.49 ft = 10.414 fm = 10 fm 2.49 ft)
TPU (±1.96σ): **THU (TPEh) ±1.990 m ; TVU (TPEv) ±0.226 m**
Timestamp: 2008-140.21:08:34.369 (05/19/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-140 / 673_2107
Profile/Beam: 269/434
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-140/673_2107	269/434	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

10 ¼fm (17326_1, 17320_1, 16016_1, 530_1)
 10fm 2ft (531_1)
 19.0m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

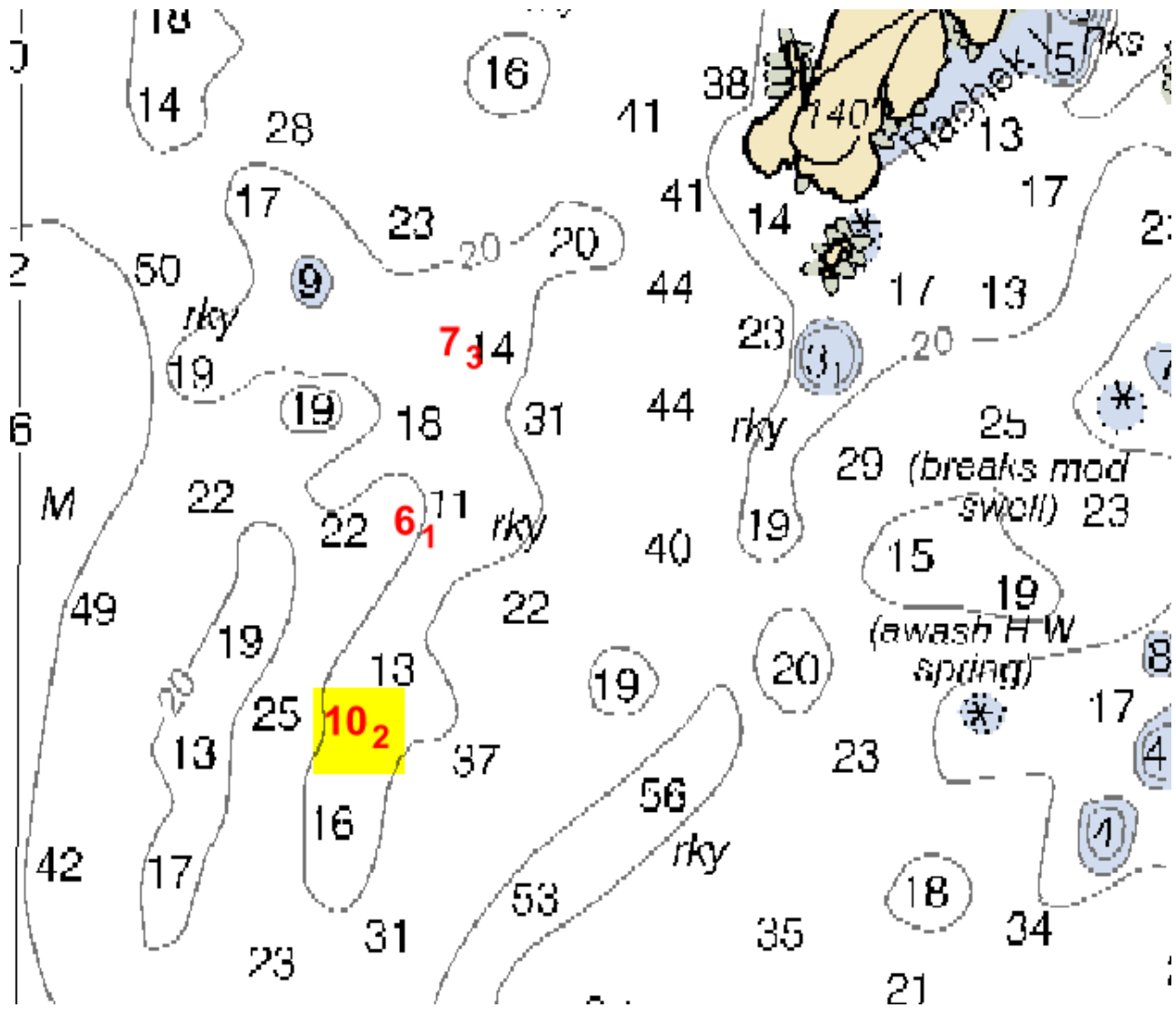


Figure 1.14.1

1.15) Profile/Beam - 180/461 from h11844 / 2801_reson7125_hf_512beams / 2008-142 / 446_2352

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 47' 15.2" N, 135° 19' 06.3" W
Least Depth: 16.90 m (= 55.43 ft = 9.239 fm = 9 fm 1.43 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.987 m ; TVU (TPEv) ± 0.208 m
Timestamp: 2008-142.23:52:57.140 (05/21/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-142 / 446_2352
Profile/Beam: 180/461
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-142/446_2352	180/461	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

9 ¼fm (17326_1, 17320_1, 16016_1, 530_1)

9fm 1ft (531_1)

16.9m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20080618

SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 16.896 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

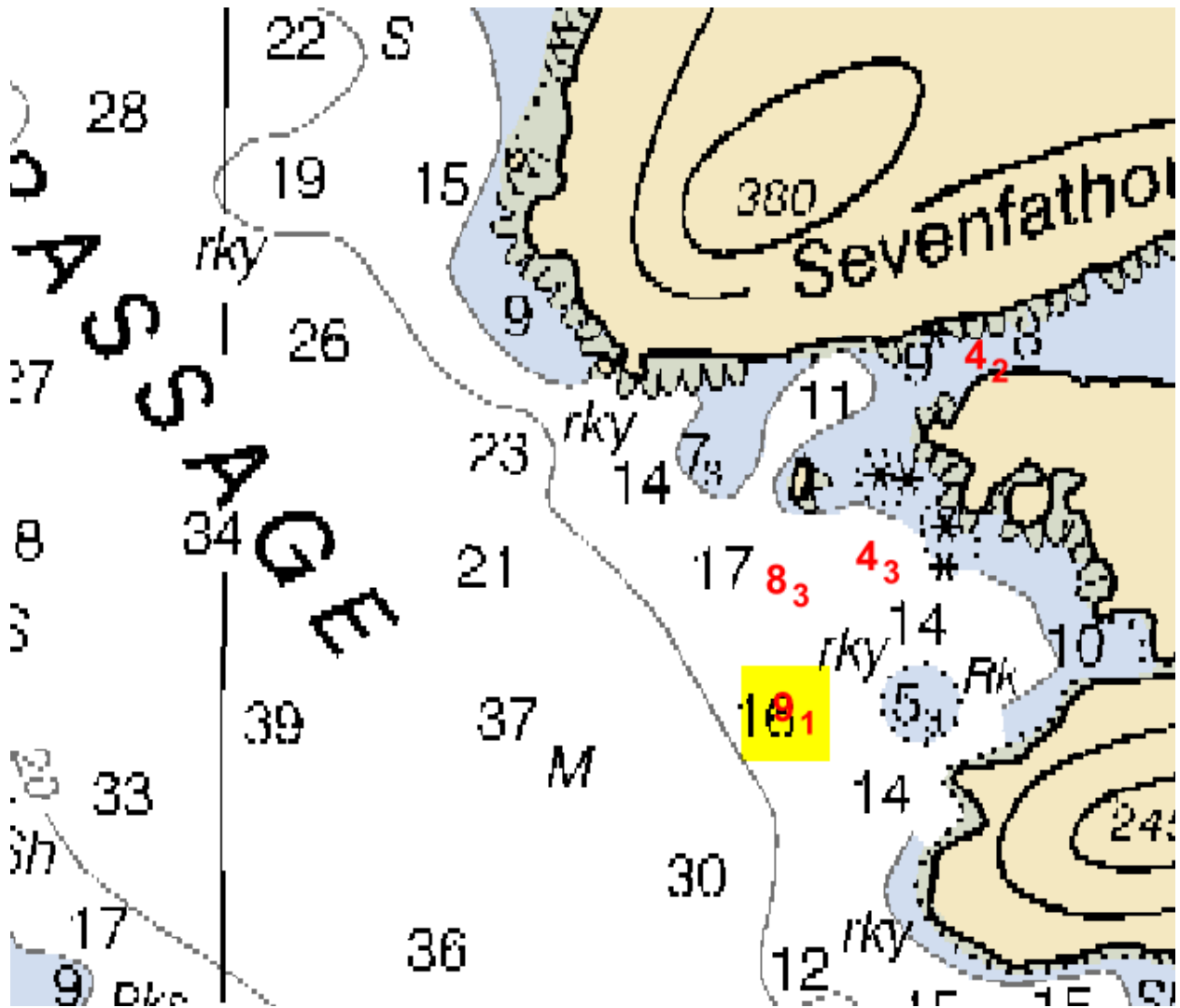


Figure 1.15.1

1.16) Profile/Beam - 244/314 from h11844 / 2801_reson7125_hf_512beams / 2008-143 / 386_2106

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 22.4" N, 135° 21' 18.9" W
Least Depth: 12.52 m (= 41.07 ft = 6.845 fm = 6 fm 5.07 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.965 m ; TVU (TPEv) ± 0.231 m
Timestamp: 2008-143.21:07:11.018 (05/22/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-143 / 386_2106
Profile/Beam: 244/314
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON emphasizes incorrect charting of 10-fathom curve.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-143/386_2106	244/314	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey and update charted 10-fathom contour.

Cartographically-Rounded Depth (Affected Charts):

6 $\frac{3}{4}$ fm (17326_1, 17320_1, 16016_1, 530_1)

6fm 5ft (531_1)

12.5m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

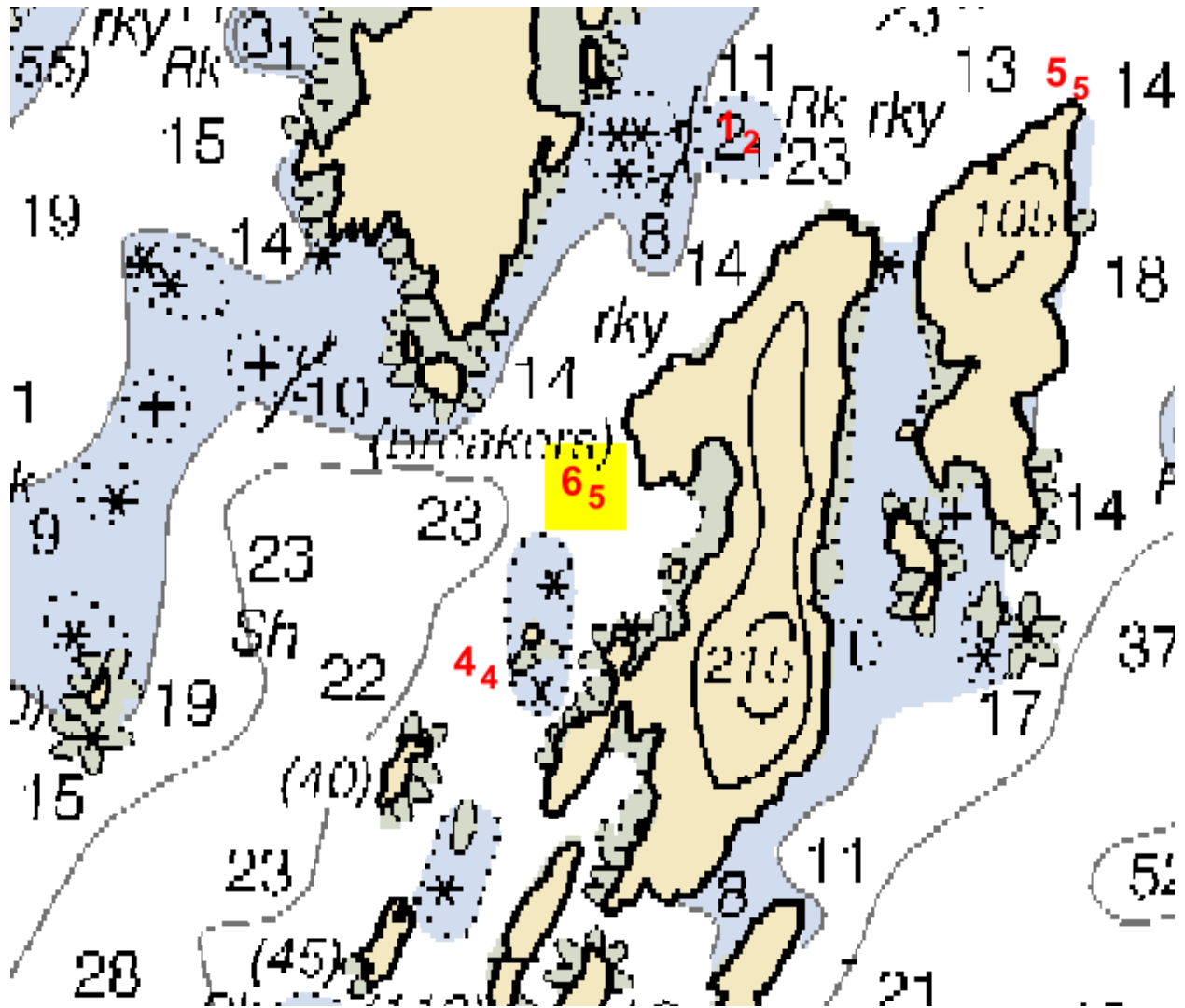


Figure 1.16.1

1.17) Profile/Beam - 574/323 from h11844 / 2801_reson7125_hf_512beams / 2008-143 / 444_2146

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 47' 21.7" N, 135° 19' 06.8" W
Least Depth: 15.64 m (= 51.32 ft = 8.554 fm = 8 fm 3.32 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.967 m ; TVU (TPEv) ± 0.228 m
Timestamp: 2008-143.21:48:11.801 (05/22/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-143 / 444_2146
Profile/Beam: 574/323
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-143/444_2146	574/323	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

8 ½fm (17326_1, 17320_1, 16016_1, 530_1)

8fm 3ft (531_1)

15.6m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 15.643 m

Feature Images

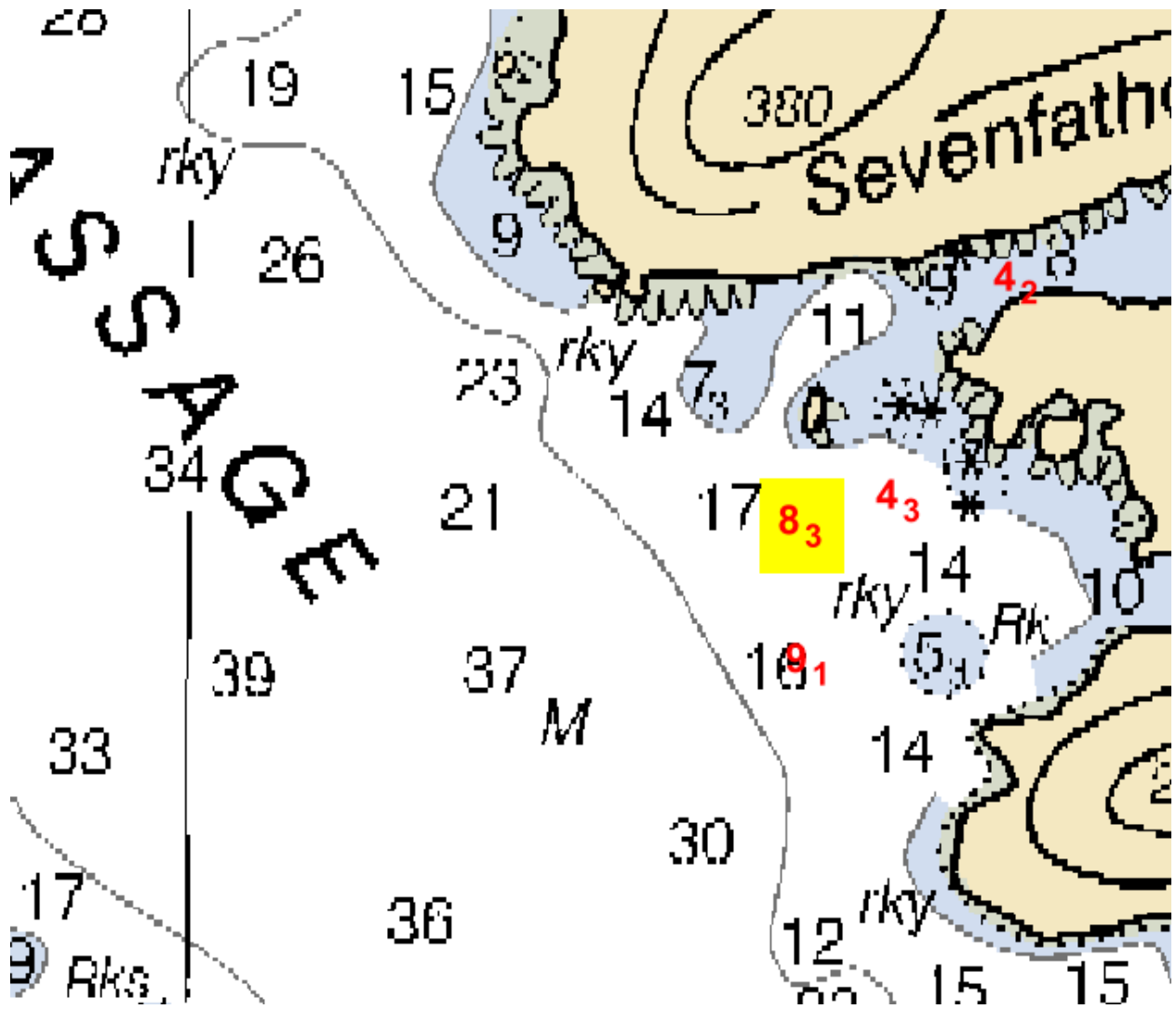


Figure 1.17.1

1.18) Profile/Beam - 516/487 from h11844 / 2801_reson7125_hf_512beams / 2008-143 / 454_1904

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 41.9" N, 135° 20' 37.2" W
Least Depth: 10.75 m (= 35.28 ft = 5.880 fm = 5 fm 5.28 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.977 m ; TVU (TPEv) ± 0.175 m
Timestamp: 2008-143.19:05:59.671 (05/22/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-143 / 454_1904
Profile/Beam: 516/487
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-143/454_1904	516/487	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

5 $\frac{3}{4}$ fm (17326_1, 17320_1, 16016_1, 530_1)

5fm 5ft (531_1)

10.8m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

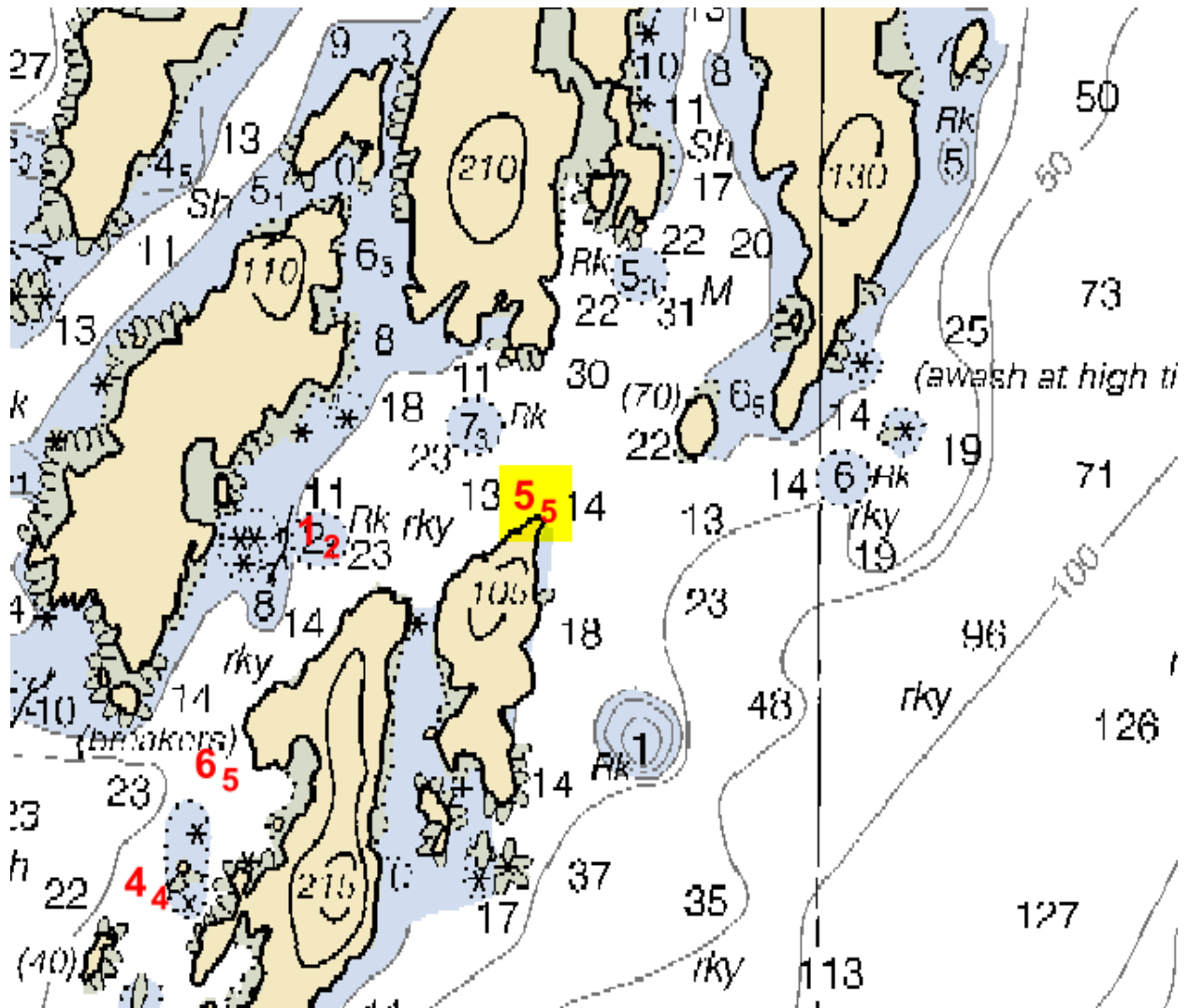


Figure 1.18.1

1.19) Profile/Beam - 193/129 from h11844 / 2801_reson7125_hf_512beams / 2008-155 / 314_1732

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 48' 48.4" N, 135° 21' 19.9" W
Least Depth: 16.42 m (= 53.87 ft = 8.979 fm = 8 fm 5.87 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.973 m ; TVU (TPEv) ± 0.201 m
Timestamp: 2008-155.17:33:29.250 (06/03/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-155 / 314_1732
Profile/Beam: 193/129
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-155/314_1732	193/129	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

9fm (17326_1, 17320_1, 16016_1, 530_1)

7fm 0ft (531_1)

16.4m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

Feature Images

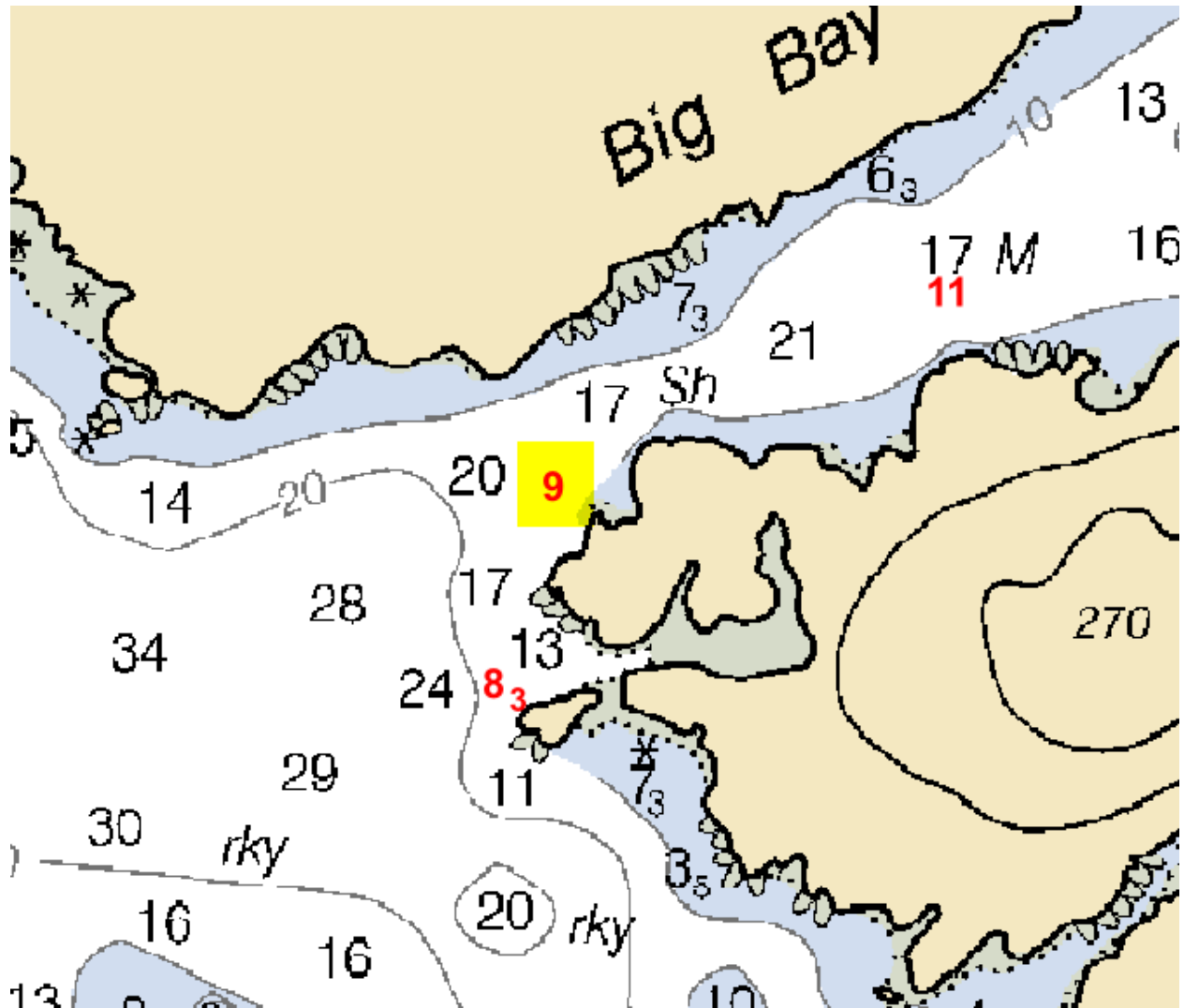


Figure 1.19.1

1.20) Profile/Beam - 255/246 from h11844 / 2801_reson7125_hf_512beams / 2008-169 / 001_0031

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 49' 17.4" N, 135° 19' 37.6" W
Least Depth: 4.64 m (= 15.24 ft = 2.539 fm = 2 fm 3.24 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.961 m ; TVU (TPEv) ± 0.250 m
Timestamp: 2008-170.00:31:33.333 (06/18/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-169 / 001_0031
Profile/Beam: 255/246
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-169/001_0031	255/246	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

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

2fm 3ft (531_1)

4.6m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20080618

SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 4.644 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

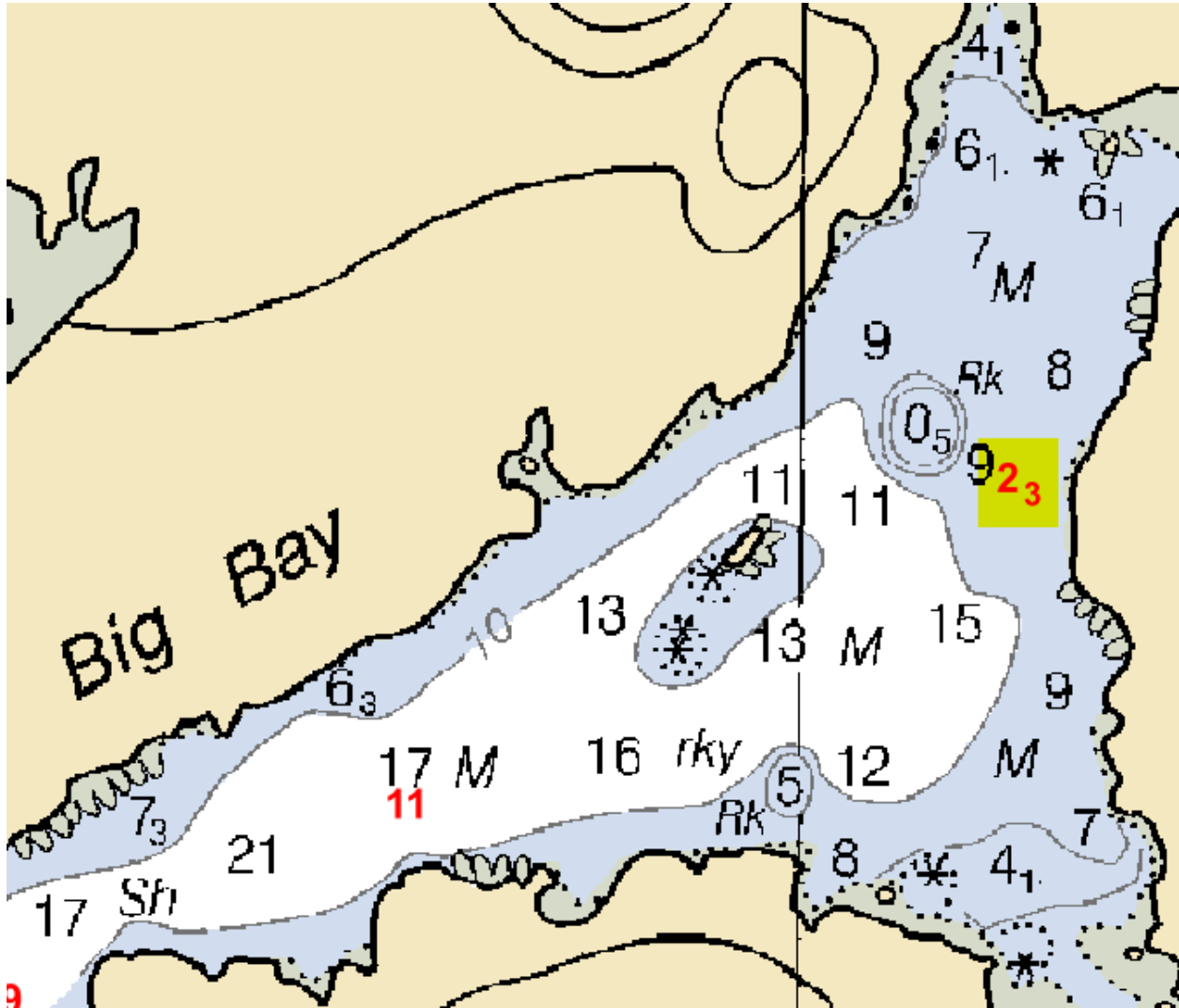


Figure 1.20.1

1.21) Profile/Beam - 134/84 from h11844 / 2801_reson7125_hf_512beams / 2008-169 / 030_0058

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 47' 57.9" N, 135° 21' 18.7" W
Least Depth: 3.26 m (= 10.69 ft = 1.781 fm = 1 fm 4.69 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.970 m ; TVU (TPEv) ± 0.172 m
Timestamp: 2008-170.00:58:30.605 (06/18/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-169 / 030_0058
Profile/Beam: 134/84
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-169/030_0058	134/84	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

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

1fm 4ft (531_1)

3.3m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

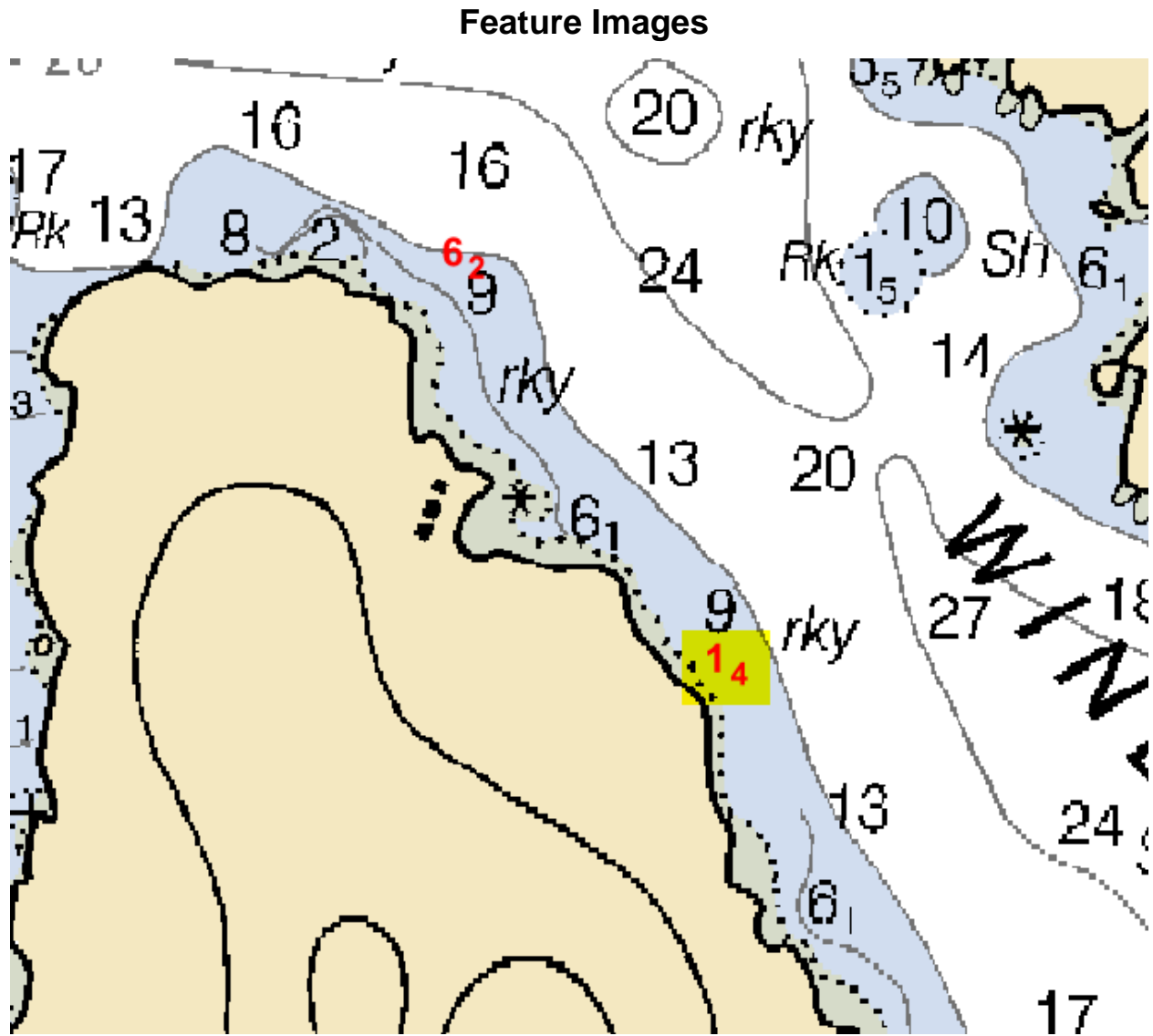


Figure 1.21.1

**1.22) Profile/Beam - 174/309 from h11844 /
2801_reson7125_hf_512beams / 2008-169 / 034_2209**

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 45' 32.5" N, 135° 22' 34.2" W
Least Depth: 3.07 m (= 10.06 ft = 1.677 fm = 1 fm 4.06 ft)
TPU ($\pm 1.96\sigma$): **THU (TPEh)** ± 1.963 m ; **TVU (TPEv)** ± 0.233 m
Timestamp: 2008-169.22:09:59.015 (06/17/2008)
Survey Line: h11844 / 2801_reson7125_hf_512beams / 2008-169 / 034_2209
Profile/Beam: 174/309
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2801_reson7125_hf_512beams/2008-169/034_2209	174/309	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

- 1 ½fm (17326_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 - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 3.067 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

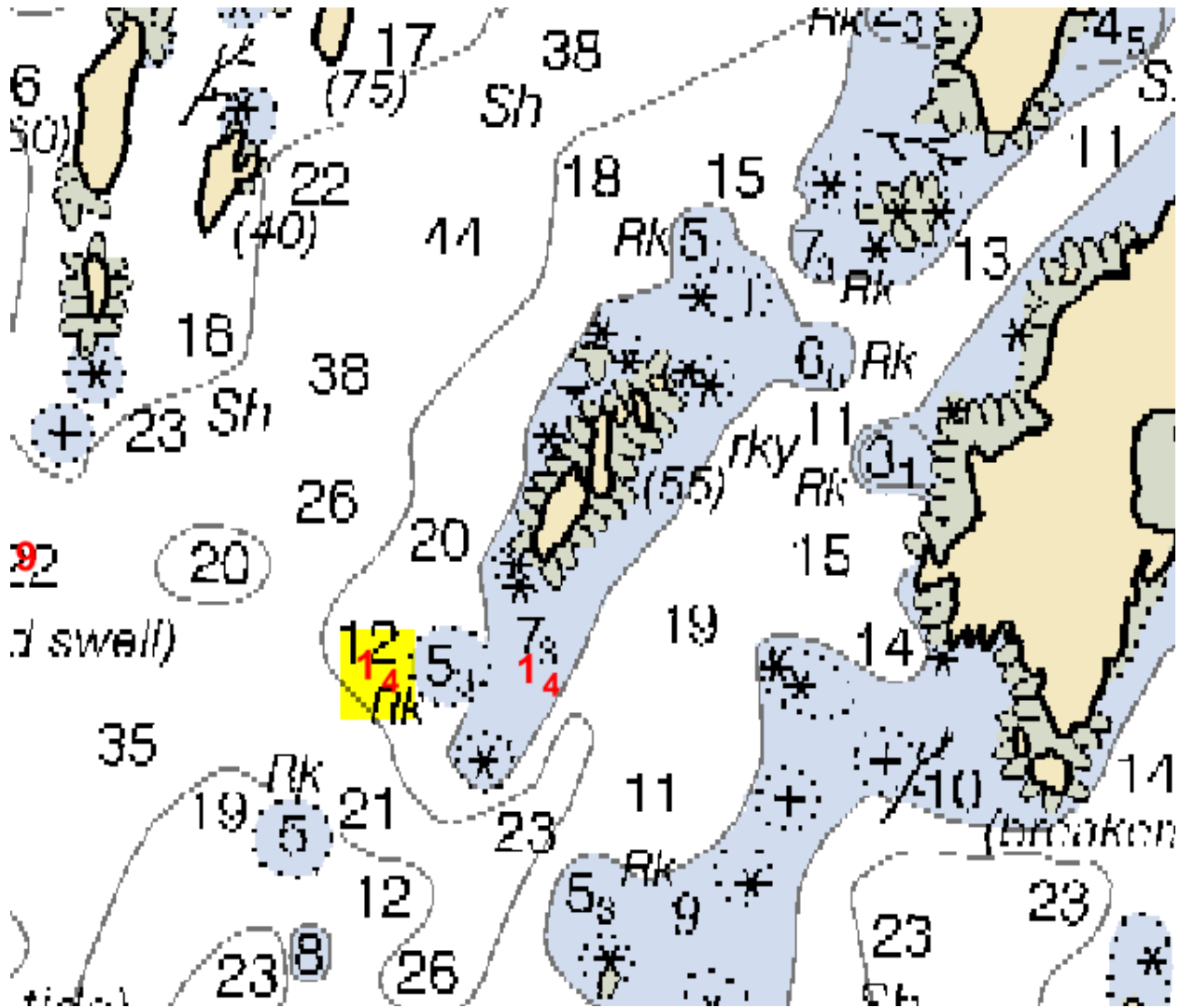


Figure 1.22.1

1.23) Profile/Beam - 76/439 from h11844 / 2802_reson7125_hf_512beams / 2008-152 / 412_1837

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 44' 49.9" N, 135° 21' 23.5" W
Least Depth: 2.40 m (= 7.87 ft = 1.312 fm = 1 fm 1.87 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.970 m ; TVU (TPEv) ± 0.168 m
Timestamp: 2008-152.18:38:03.612 (05/31/2008)
Survey Line: h11844 / 2802_reson7125_hf_512beams / 2008-152 / 412_1837
Profile/Beam: 76/439
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2802_reson7125_hf_512beams/2008-152/412_1837	76/439	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

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

1fm 2ft (531_1)

2.4m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20080618

SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 2.400 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

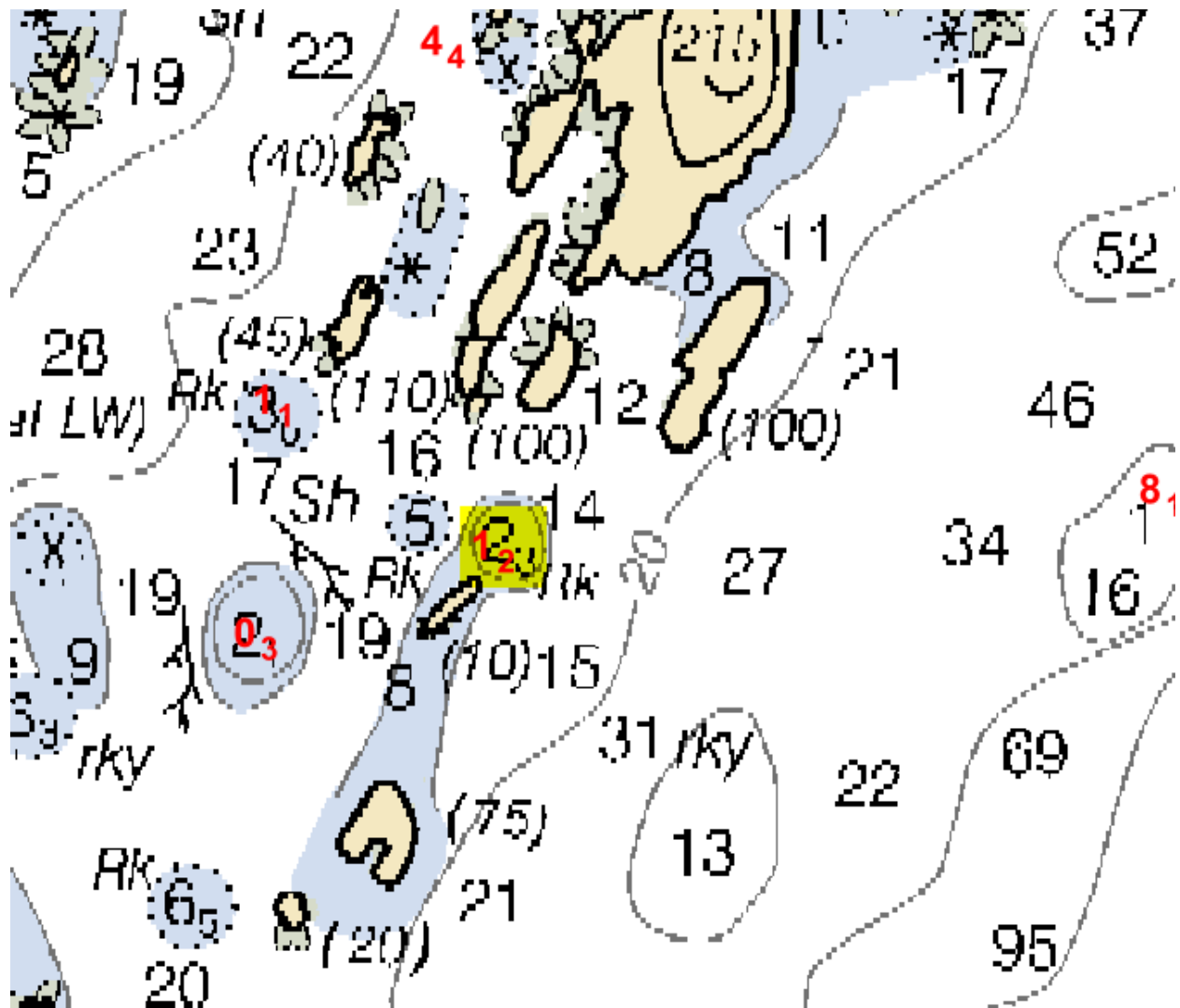


Figure 1.23.1

1.24) Profile/Beam - 76/303 from h11844 / 2802_reson7125_hf_512beams / 2008-153 / 320_2154

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 44' 04.5" N, 135° 24' 06.4" W
Least Depth: 13.66 m (= 44.83 ft = 7.472 fm = 7 fm 2.83 ft)
TPU (±1.96σ): **THU (TPEh) ±1.965 m ; TVU (TPEv) ±0.237 m**
Timestamp: 2008-153.21:55:00.608 (06/01/2008)
Survey Line: h11844 / 2802_reson7125_hf_512beams / 2008-153 / 320_2154
Profile/Beam: 76/303
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2802_reson7125_hf_512beams/2008-153/320_2154	76/303	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

7 ½fm (17326_1, 17320_1, 16016_1, 530_1)
 7fm 3ft (531_1)
 13.7m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)
Attributes: QUASOU - 1:depth known
 SORDAT - 20080618
 SORIND - US,US,survy,H11844

TECSOU - 3:found by multi-beam

VERDAT - 12:Mean lower low water

1.25) Profile/Beam - 134/4 from h11844 / 2802_reson7125_lf_256beams / 2008-143 / 352_1818

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 44' 52.7" N, 135° 20' 25.9" W
Least Depth: 15.14 m (= 49.68 ft = 8.280 fm = 8 fm 1.68 ft)
TPU ($\pm 1.96\sigma$): THU (TPEh) ± 1.983 m ; TVU (TPEv) ± 0.208 m
Timestamp: 2008-143.18:19:19.609 (05/22/2008)
Survey Line: h11844 / 2802_reson7125_lf_256beams / 2008-143 / 352_1818
Profile/Beam: 134/4
Charts Affected: 17326_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

DTON

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11844/2802_reson7125_lf_256beams/2008-143/352_1818	134/4	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry and deliverable Notebook files from the current survey.

Cartographically-Rounded Depth (Affected Charts):

8 $\frac{1}{4}$ fm (17326_1, 17320_1, 16016_1, 530_1)

8fm 1ft (531_1)

15.1m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known

SORDAT - 20080618

SORIND - US,US,survey,H11844

TECSOU - 3:found by multi-beam

VALSOU - 15.142 m

VERDAT - 12:Mean lower low water

WATLEV - 3:always under water/submerged

Feature Images

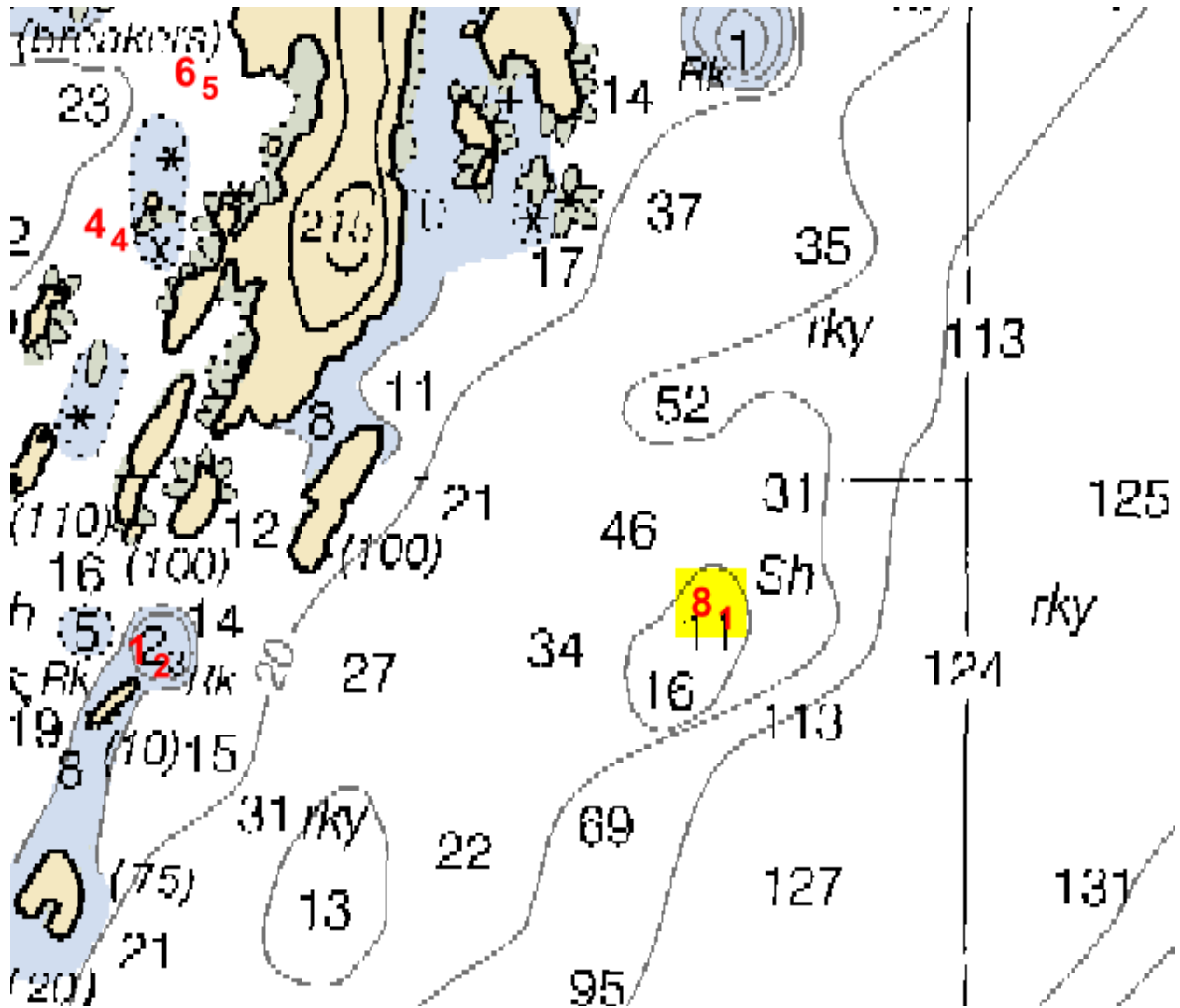


Figure 1.25.1



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: H11844

LOCALITY: Rachek Island to Big Bay, Approaches to Sitka, AK
TIME PERIOD: May 18 - 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, H11844 during the time period between May 18 - 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 Sevenfathom Bay and President 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 15:48:32 -04'00'

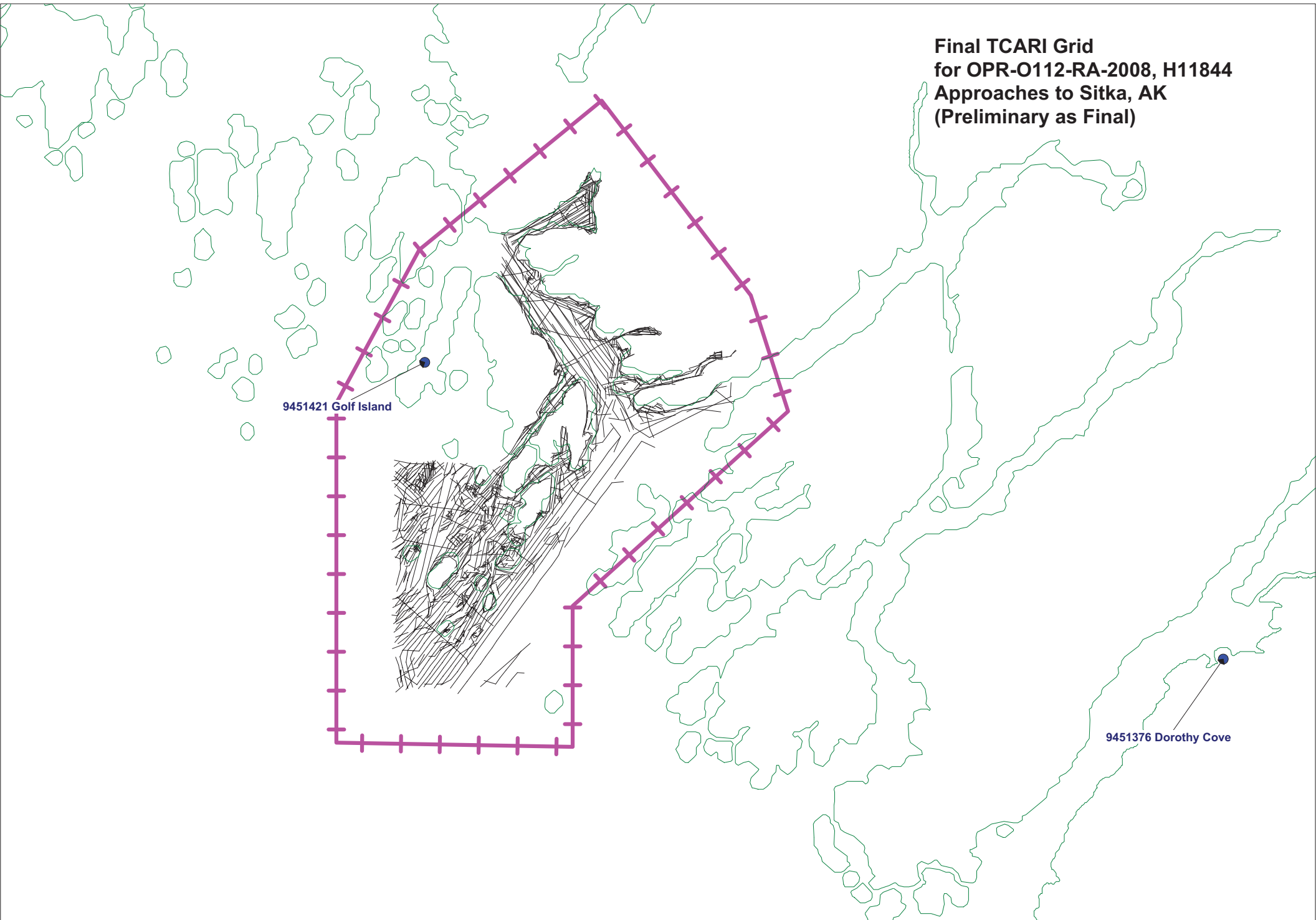
CHIEF, PRODUCT AND SERVICES DIVISION



**Final TCARI Grid
for OPR-O112-RA-2008, H11844
Approaches to Sitka, AK
(Preliminary as Final)**

9451421 Golf Island

9451376 Dorothy Cove



H11844 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 and RNC in the region: NOAA ENC US5AK3VM and NOAA RNC 17326.

HCell compilation of survey H11844 used Office of Coast Survey HCell Specifications Version 4.0 and HCell Reference Guide Version 1.0.

1. Compilation Scale

Depths for HCell H11844 were compiled to the largest scale chart in the region, 17326, 1:40,000. The density and distribution of soundings from H11844 were selected to emulate the distribution on chart 17326. Non-bathymetric features have been generalized to chart scale.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layers were built from the 8-meter combined surface, **H11844_Combined_8m**, 3-meter surface H11538_3m, and 3-meter surface H11539_3m in CARIS BASE Editor. For all three surfaces a shoal-biased selection was made at 1:10,000 scale for the main chart area using a Radius Table file with values shown in the table, below. The resultant sounding layers contains depths ranging from -17.374 to 279.806 meters.

Upper limit (m)	Lower limit (m)	Radius (mm)
-20	10	3
10	20	4
20	50	4.5
50	300	5

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

3. Depth Areas and Depth Contours

3.1 Depth Areas

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize the hydrographic extents, which were then used to create the single, all encompassing depth area (DEPARE). One depth range, from 0.0 to 300.0 meters, was used for the depth area object. Several intertidal depth areas were created ranging from -2.7 to 0.0 meters.

3.2 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 generalized metric and fathom equivalent contour values are shown in the table below.

Chart Contours in Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
0	0.00	0.2286	0.00
5	9.144	9.3726	5.125
10	18.288	18.5166	10.125
20	36.576	37.9476	20.750
50	91.44	92.8116	50.750
100	182.88	184.2516	100.750

Contours delivered in the *_SS file 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 results in conflicts between the *_SS file contours and HCell features at or near the survey limits. Conflicts with M_QUAL, DEPARE and COALNE, 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 area is included in HCell 11844:

M_QUAL

The M_QUAL displays which portions of the survey came from H11844, H11538, and H11539.

Meta area objects were constructed on the basis of the limits of the hydrography. (See 3.1 *Depth Areas*.)

5. Features

Shoreline features for H11844 were delivered from the field in three hob files defining new features, modification to GC or charted features, disprovals and LIDAR investigations. An additional hob file addressing conflicts with disprovals was created during the survey acceptance review. All of these were deconflicted against GC shoreline, the chart and hydrography during office processing.

Features from junctioning LIDAR surveys H11538 and H11539 were delivered in a .000 features file and were de-conflicted against the features and bathymetry submitted with H11844.

There were 25 DTONs reported from survey H11844.

There were 41 DTONs reported from LIDAR survey H11538. There were 53 DTONs reported from LIDAR survey H11539, however none of the DTONs from H11539 fall within the region of data used for the compilation of this survey. All DTONs from H11538 are addressed in HCell H11844.

There were no AWOIS items within the limits of survey H11844.

No bottom samples were collected during survey H11844. Refer to section D.2.g of the Descriptive Report for further details.

H11844_CS.000 is a very complicated survey. Data from H11844 (sonar), H11538 and H11539 (lidar), and chart 17326 were blended together during compilation in a conservative fashion. Despite the extents of contributing coverage from H11844, H11538, and H11539 depicted via the M_QUAL layer some isolated point features are located outside their main M_QUAL areas to supplement otherwise sparse sections of data. The source of all features included in the H11844_CS.000 is identified by the object's SORIND field.

6. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

SOUNDG	Chart scale soundings
DEPARE	All-encompassing depth area
DEPCNT	Zero contours
COALNE	GC and charted MHW line
LNDARE	Islet features
WATTUR	Breakers
LNDELV	Height features for islets
UWTROC	Rock features
WEDKLP	Kelp features
SBDARE	Bottom samples, and rocky seabed areas
M_QUAL	Data quality Meta object
\$CSYMB	Blue notes

The *_SS HCell contains the following Objects:

SOUNDG	Soundings at the survey scale density
DEPCNT	NOAA rounded contours at chart scale intervals

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

7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features with the Blue Note information located in the INFORM field. The NINFOM field is populated with the charting disposition

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, and therefore have lower precision. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

Sounding Units:	Meters rounded to the nearest millimeter
Spot Height Units:	Meters rounded to the nearest decimeter

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

Conversion to 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 MLLW (0 fathoms) 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.
- All height units (HUNI) which have been converted to charting units, and that are 2.0 feet above MHW and greater, are shown in feet.

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

9. Data Processing Notes

9.1 Junctions

Refer to section B.2 of the descriptive report for information on junction surveys.

9.2 Conflicts between Shoreline and Hydrography

There are instances of GC shoreline in conflict with hydrography. These were examined using the highest resolution Surfaces. Conflicts were resolved making modifications to the GC shoreline.

10. QA/QC and ENC Validation Checks

H11844 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they have been approved by MCD as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11844 Base Cell File, Chart Units, Soundings compiled to 1:40,000
- H11844 Base Cell File, Chart Units, Soundings compiled to 1:10,000
- H11844 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11844 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11844_CS.000
- Chart units base cell file, survey scale soundings H11844_SS.000
- Descriptive Report package H11844_DR.pdf
- Survey outline H11844_Outline.gml & *.xsd

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

12. Contacts

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

Peter Holmberg, Physical Scientist, PHB, Seattle, WA; 206-526-6864;
Peter.Holmberg@noaa.gov.

APPROVAL SHEET
H11844

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.