

H11850

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-10-07-08  
*Registry No.* ..... H11850

### LOCALITY

*State* ..... Alaska  
*General Locality* ..... West of Prince of Wales Island  
*Sublocality* ..... San Christoval Channel to San Alberto Bay

**2008**

### CHIEF OF PARTY

..... Captain Donald W. Haines, NOAA

### LIBRARY & ARCHIVES

**DATE** .....

<p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;"><b>HYDROGRAPHIC TITLE SHEET</b></p>	<p>REGISTRY No</p> <p style="text-align: center;"><b>H11850</b></p>
<p><b>INSTRUCTIONS</b> – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p>	<p>FIELD No:</p> <p style="text-align: center;"><b>RA-10-07-08</b></p>
<p>State <u>Alaska</u></p> <hr/> <p>General Locality <u>West of Prince of Wales Island</u></p> <hr/> <p>Sub-Locality <u>San Christoval Channel to San Alberto Bay</u></p> <hr/> <p>Scale <u>1:10,000</u> Date of Survey <u>May 17 2008 - June 16, 2008</u></p> <hr/> <p>Instructions dated <u>4/9/2008</u> Project No. <u>OPR-O190-RA-08</u></p> <hr/> <p>Vessel(s) <u>RA1 (1101), RA4 (2801), RA5 (2802), RA3 (2803)</u></p> <hr/> <p>Chief of party <u>Captain Donald W. Haines, NOAA</u></p> <hr/> <p>Surveyed by <u>RAINIER Personnel</u></p> <hr/> <p>Soundings by <u>Reson SeaBat 7125, Tilted Reson SeaBat 8125, Reson SeaBat 8101</u></p> <hr/> <p>SAR by <u>Andrew Clos</u> Compilation by <u>Katie Reser</u></p> <hr/> <p>Soundings compiled in <u>Fathoms</u></p> <hr/>	
<p><b>REMARKS:</b> <u>All times are UTC. UTM Zone 8N.</u></p> <hr/> <p><u>The purpose of this survey is to provide contemporary surveys to update</u></p> <hr/> <p><u>National Ocean Service (NOS) nautical charts.</u></p> <hr/> <p><u>Revisions and end notes in red were generated during office processing.</u></p> <hr/> <p><u>Page numbering may be interrupted or non sequential.</u></p> <hr/> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the</u></p> <hr/> <p><u>National Geophysical Data Center (NGDC) and can be retrieved via <a href="http://www.ngdc.noaa.gov/">http://www.ngdc.noaa.gov/</a>.</u></p> <hr/>	

# Descriptive Report to Accompany Hydrographic Survey H11850

Project OPR-O190-RA-08  
West of Prince of Wales Island, Alaska  
San Christoval Channel to San Alberto 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-O190-RA-08 dated April 9, 2008 and all other applicable direction<sup>1</sup>, with the exception of deviations noted in this report. The survey area is West of Prince of Wales Island, Alaska, San Christoval Channel to San Alberto Bay. This survey corresponds to sheet “J” in the sheet layout provided with the Letter Instructions. OPR-O190-RA-08 is being conducted in an area identified by the Hydrographic Survey Priorities as critical to navigation. Prince of Wales Island will likely see increased tourism and the associated marine traffic in the next decades. Modern hydrographic surveys of the area are required for transportation and tourism safety.

With the exception of limitations noted in this report, complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 4 meters or deeper and/or to inshore extents permitting adequate junction with bathymetry from previous LIDAR surveys. In depths less than 4 meters not covered by LIDAR bathymetry, additional MBES coverage was acquired to identify least depths over significant features or shoals, as appropriate for this survey. Total mileage acquired by each vessel and system is referenced in Table 1.

Due to time constraints, survey H11850 was “squared off” after completing the western two-thirds of the assigned survey area as per project instructions. After consultation with Operations Branch the remaining portion was added to H11851 and surveyed in the fall of 2008.

Limited shoreline verification was performed for the survey area in addition to resolving a list lidar shoreline items provided by the Pacific Hydrographic Branch for further investigation.

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

Data Acquisition Type	Hull Number with Mileage (nm)					Total
	1101	1103	1021	2801	2802	
VBES (mainscheme)	-	-	-	-	-	-
MBES (mainscheme)	-	-	38.8	60.5	82.0	181.3
SSS (mainscheme)	-	-	-	-	-	-
Crosslines -		-	-	1.8	13.6	15.4
Developments 3.5		-	-	10.4	-	13.9
Shoreline 15.6		-	-	-	-	15.6
Bottom Samples	-	-	-	-	-	-
Total Number of Items Investigated	6	-	-	-	-	36
Total Area Surveyed (sq. nm)	-	-	-	-	-	5.87

Table 1: Statistics for survey H11850

Data acquisition was conducted on May 17, 2008 (DN 138) and from June 13 to June 16, 2008 (DN 165 to 168).

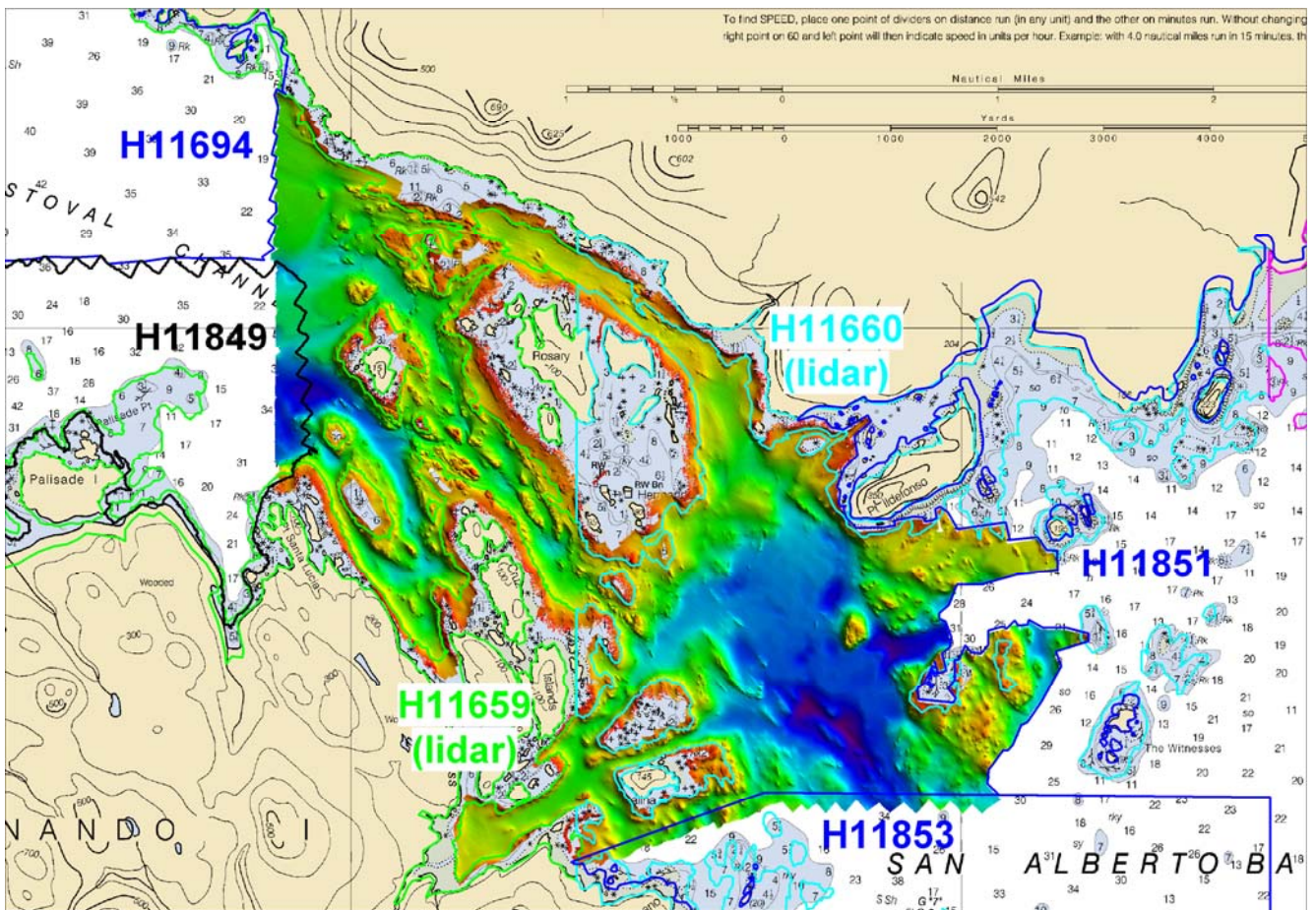


Figure 1: H11850 survey limits and junctions (Chart 17404).

## DATA ACQUISITION AND PROCESSING

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

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

### B1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
1101 RA-1		Tilted Multibeam Echosounder Detached Positions
1021 RA-3		Multibeam Echosounder
2801 RA-4		Multibeam Echosounder
2802 RA-5		Multibeam Echosounder

*Table 2: Data acquisition vessels utilized for H11850.*

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

No unusual vessel configurations were used for data acquisition.

### B2. Quality Control

#### Crosslines

Multi-Beam Echosounder (MBES) crosslines totaled 15.4 nautical miles, comprising 7.3% of main scheme MBES hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with differences ranging between 0.0 to 0.2 meters.<sup>1</sup>

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

#### Junctions

The following contemporary surveys junction with H11850 (See Figure 1).<sup>2</sup>

<b>Registry #</b>	<b>Scale</b>	<b>Date</b>	<b>Junction side</b>
H11659 (lidar)	1:10,000	2007	West
H11660 (lidar)	1:10,000	2007	East
H11849	1:10,000	2008 (spring)	West
H11694	1:10,000	2008 (fall)	Northwest
H11851	1:10,000	2008 (fall)	East

Survey operations for OPR-O190-RA-08 were broken up into two distinct timeframes. In the spring (May-June), work was concentrated on two sheets (H11849 & H11850). Later in the field season during fall (September-November), four additional sheets were assigned. Full comparisons between H11850 and junctioning sheets begun in the fall are problematic since only preliminary tides were applied at the time of comparison.

Survey H11659, a Tenix LADS lidar survey, was junctioned with H11850 by comparing BASE surfaces in CARIS HIPS. In areas with any sort of gentle slope or irregular seafloor, H11850 was 0.1 to 0.3 meters shoaler than the lidar data. In sharp contrast, in a few spots on particularly steep slopes H11850 was up to 1.0 meters deeper than the H11659 lidar data. Differences between BASE surfaces in areas with a flat bottom were generally within 0.1 meters.<sup>3</sup>

Survey H11660, a Tenix LADS lidar survey, was junctioned with H11850 by comparing BASE surfaces in CARIS HIPS. In areas with any sort of gentle slope or irregular seafloor, H11850 was 0.1 to 0.3 meters shoaler than the lidar data. In areas where thick kelp was present, differences of 0.2 to 0.4 meters were seen with no pattern of either the SWMB or lidar data being shoaler. Presumably this is due to digitization on kelp.<sup>4</sup>

Survey H11849 was completed concurrently with survey H11850 during project OPR-O190-RA-08. Survey data was compared in CARIS subset mode and agreed well with differences less than 0.3 meters.<sup>5</sup>

Survey H11694 was assigned for work during the fall and currently only preliminary tides have been applied. Survey data was compared in CARIS subset mode and agreed well with differences less than 0.3 meters.<sup>6</sup> Throughout the junction between these two sheets, the bottom was nearly flat and featureless.

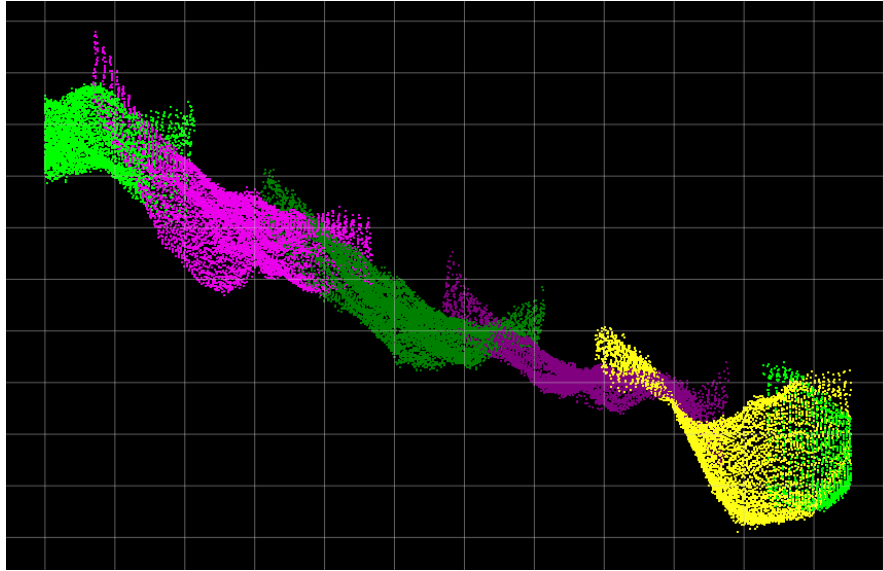
Survey H11851 was assigned for work during the fall and currently only preliminary tides have been applied. A preliminary junction comparison was performed in CARIS subset mode and differences between 0.0 to 0.3 meters were seen.<sup>7</sup>

## **Data Quality Factors**

### Sound Speed Artifacts

Due to freshwater runoff and the effects of tidal currents through the channel, application of sound velocity correctors initially proved inadequate in localized areas of the sheet. After correction for sound velocity in HDCS, some lines still exhibited the characteristic "smiles" and "frowns" indicative of inaccurate sound velocity corrections. To compensate, the Hydrographer, where possible, rejected soundings obviously in error on the outer beams.

After this cleaning of the outer beams, the sound velocity errors were reduced to a relatively minor problem and had only a minimal impact on data quality.<sup>8</sup>



*Figure 2: Sound speed artifacts east of the Hermanos Islands.*

#### Data Gaps

The only holidays of any note found in H11850 exist in isolated areas along the junctions with the lidar surveys (H11659 and H11660). Due to time constraints and inconsistencies in lidar extent data tables, the field unit did not acquire bathymetry to an inshore extent to junction with lidar coverage in all areas (see fig #3).<sup>9</sup>

Some of these holidays may also show up as thin bands of sparse coverage parallel to shore and were due to extensive kelp areas throughout the near-shore survey area. A few of these gaps can also be found around submerged offshore rocks that were also surrounded by kelp (see fig #4). These areas of kelp are well represented in the supplied Composite Source files and should be charted with kelp as indicated.<sup>10</sup>

During survey operations in the fall, an additional large holiday was observed near the eastern edge of H11850, between Sombrero Island and Pt. Ildefonso in the vicinity of 55°34'07" N 133°15'04" W. This data gap was found between survey H11850 and the seaward edge of the lidar coverage. The majority of this coverage gap was filled by additional work done on survey H11851 during fall 2008 although two small holidays remain (see fig #5).<sup>11</sup>

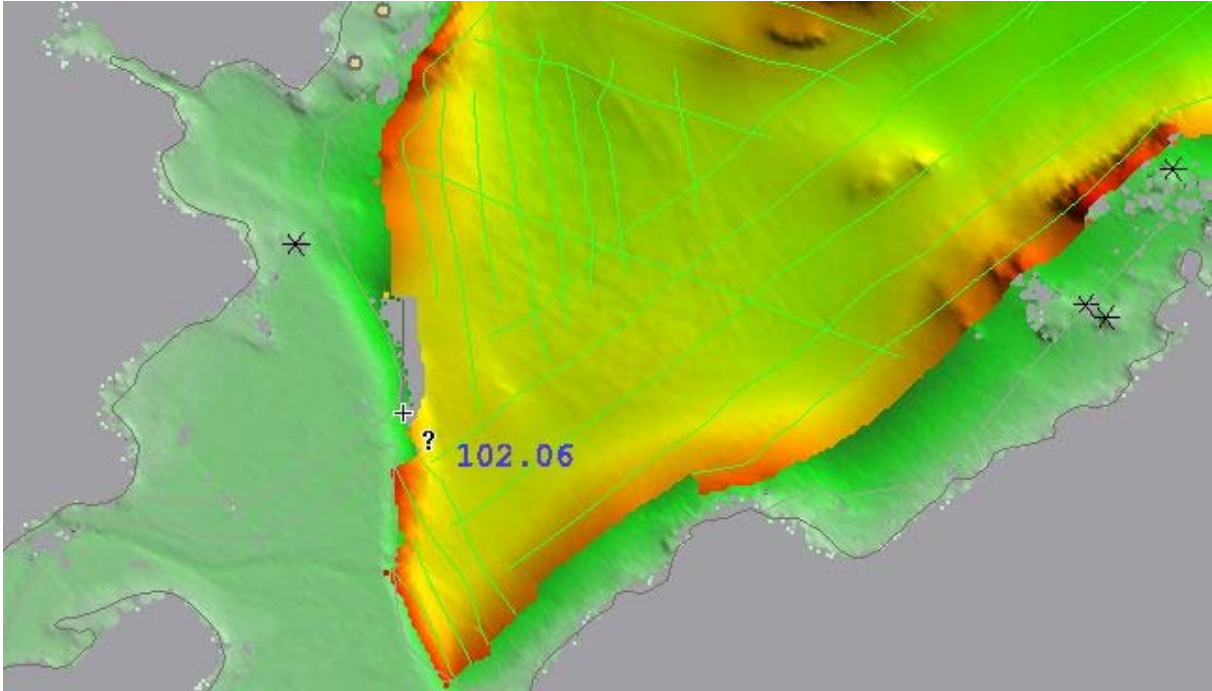


Figure 3: An example of a data gap (30x100m) in an unnamed cove just south of Cruz Pass. The H11850 BASE surface is rainbow colored while the lidar coverage is light green.

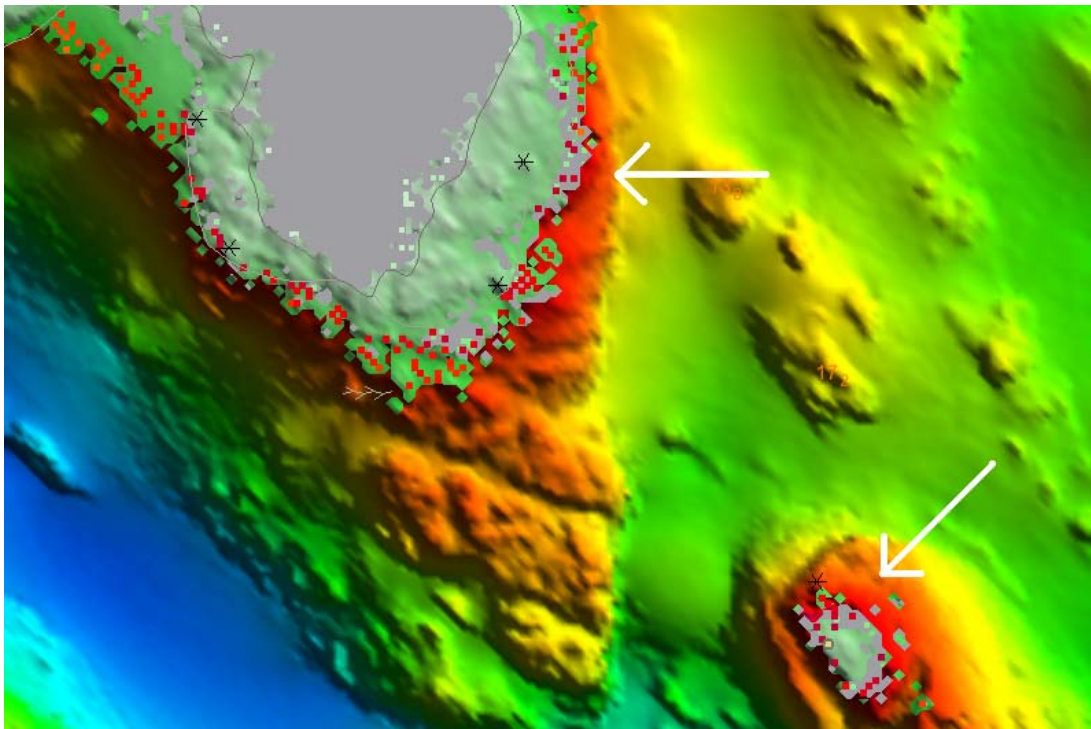


Figure 4: Two examples of data gaps due to kelp both alongshore and around an offshore rock. The H11850 BASE surface is rainbow colored while the lidar coverage is light green.



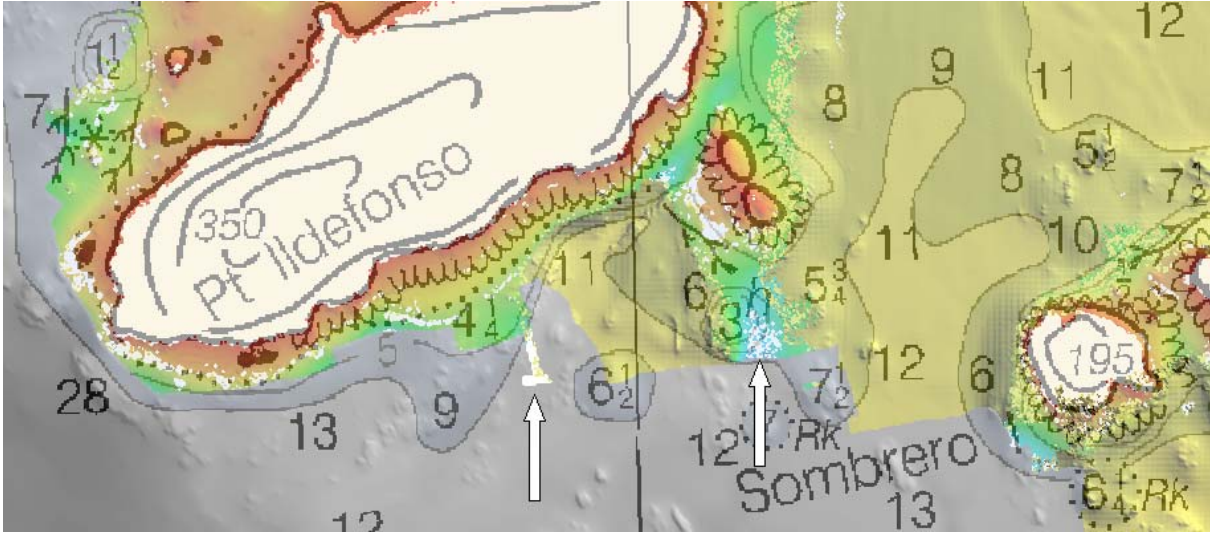


Figure 5: Two data gaps between Sombrero Island and Pt. Ildefonso. The H11850 BASE surface is grey; the H11851 surface is mustard and the lidar coverage is rainbow colored.

### B3. Data Reduction

Data reduction procedures for survey H11850 conform to those detailed in the *OPR-O190-RA-08 DAPR*.

At some point during their update cycle, CARIS corrected the long-standing problem that finalized CARIS BASE surfaces could not include negative soundings. Negative soundings are now honored in finalized surfaces as long as appropriate depth range values are entered during surface creation. Negative sounding are seen in the lines of shoreline hydrography which were run with tilted 8125 MBES at high tide along the shore of San Christoval Channel and in areas requiring junction with lidar data.<sup>12</sup>

### B4. Data Representation

Many BASE surfaces were used in processing H11850. Final BASE surface resolutions and depth ranges were set to most accurately represent the seafloor, with field sheets smaller than  $25 \times 10^6$  nodes. CUBE surfaces processed at one meter resolution were computed using “shallow” CUBE parameters whereas CUBE surfaces with resolutions of two and four meters were computed using “deep” CUBE parameters. The submission Field Sheet and BASE Surface structure are shown in Figures 6 and 7.

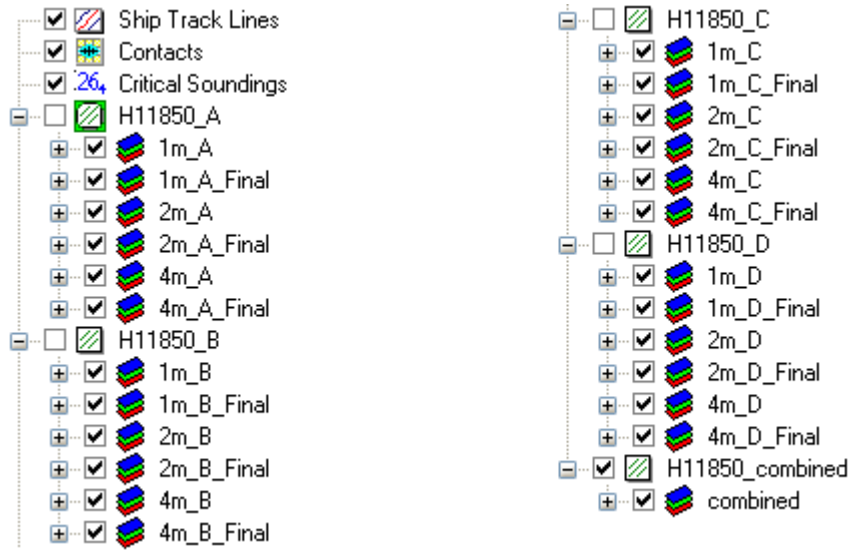


Figure 6: Field sheets and BASE surfaces submitted with H11850.

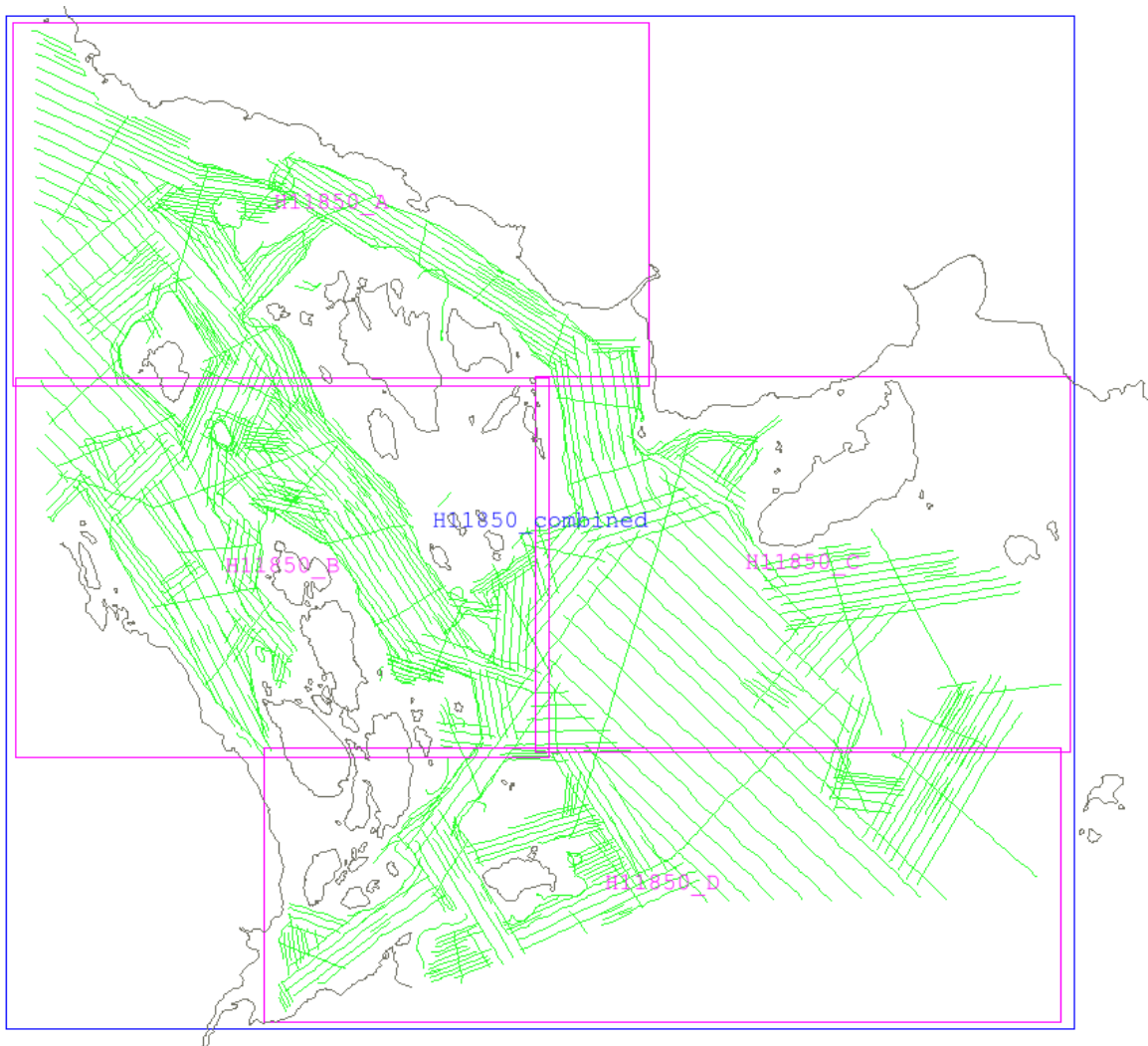


Figure 7: Layout of field sheets for H11850.

**C. VERTICAL AND HORIZONTAL CONTROL**

Initially, the OPR-O190-RA-08 Project Instructions called for a tide gauge to be installed in Big Salt Lake, located in the northeast corner of the project area. Although this tide gauge (945-0623) was installed by *Rainier* personnel, it was later determined that Big Salt Lake is separated from the survey area by a narrow channel which greatly restricts the tidal exchange. Due to this issue, it was determined that the data collected at the Big Salt Lake would not be used to determine tidal correctors for H11850, see supplemental correspondence for more information. Tide gauge 945-1600 at Sitka is the sole source of tide correctors for H11850.

Project OPR-O190-RA-08 did not require static GPS observations or other horizontal control work. Additionally, due to the afore mentioned issues with the Big Salt Lake tide gauge, 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 3. Any changes in the corrector source were noted in the data acquisition logs.

Location	Frequency	Operator	Distance	Priority
Level Island	295 kHz	USCG	60 nm	Primary
Biorka Island	305 kHz	USCG	125 nm	Backup

*Table 3: Differential Corrector Sources for H11850.*

**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, Alaska (945-1600) served as control for datum determination and as the primary source for water level reducers for survey H11850.

Although the Big Salt Lake tide gauge (945-0623) was installed by *Rainier* personnel, it was not used to determine either zoning or tide correctors for H11850.

All data were reduced to MLLW using final approved water levels from station Sitka, AK (945-1600) using the tide file 9451600.tid and final time and height correctors using the zone corrector file O190RA2008CORP.zdf.

The request for Final Approved Water Levels for H11850 was submitted to CO-OPS on June 19, 2008 and the Final Tide Note was received on July 3, 2008. This documentation is included in Appendix IV.<sup>13</sup>

## D. RESULTS AND RECOMMENDATIONS

### D.1. Chart Comparison

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

Survey H11850 was compared with the following charts:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17400	1:229,376	17 <sup>th</sup> Ed; Mar. 2007	3/08/2008
17404	1:40,000	13 <sup>th</sup> Ed; May 2006	3/08/2008
17405	1:40,000	15 <sup>th</sup> Ed; May 2006	5/9/2006

*Table 4: Charts compared with H11850*

#### Chart 17400

The scale of Chart 17400 is such that only a cursory comparison was made with survey H11850. As one would expect with a chart of this scale, many of the rocks and nearshore soundings have been cartographically shifted to such an extent that a detailed comparison is pointless. For the most part the offshore charted depths show good agreement, with soundings from H11850 generally 1-2 fathoms shoaler. One notable exception is a charted 9 fathom sounding in the vicinity of 55°33'38" N 133°15'42" W that appears to be positioned ~150 meters northeast of the actual position of the shoal (see fig #7). This error appears to have occurred during chart compilation since smaller scale chart covering the same area have the 9 fathom sounding positioned properly.<sup>14</sup> This misalignment of soundings on chart 17400 is by no means consistent. In the southwest corner of figure #8, a 40 fathom sounding on chart 17400 that has been shifted 220 meters north of the position shown on chart 17404 while the position of a 3 ¾ fathom sounding on the eastern edge of the same figure shows exact agreement between charts 17400 and 17404.

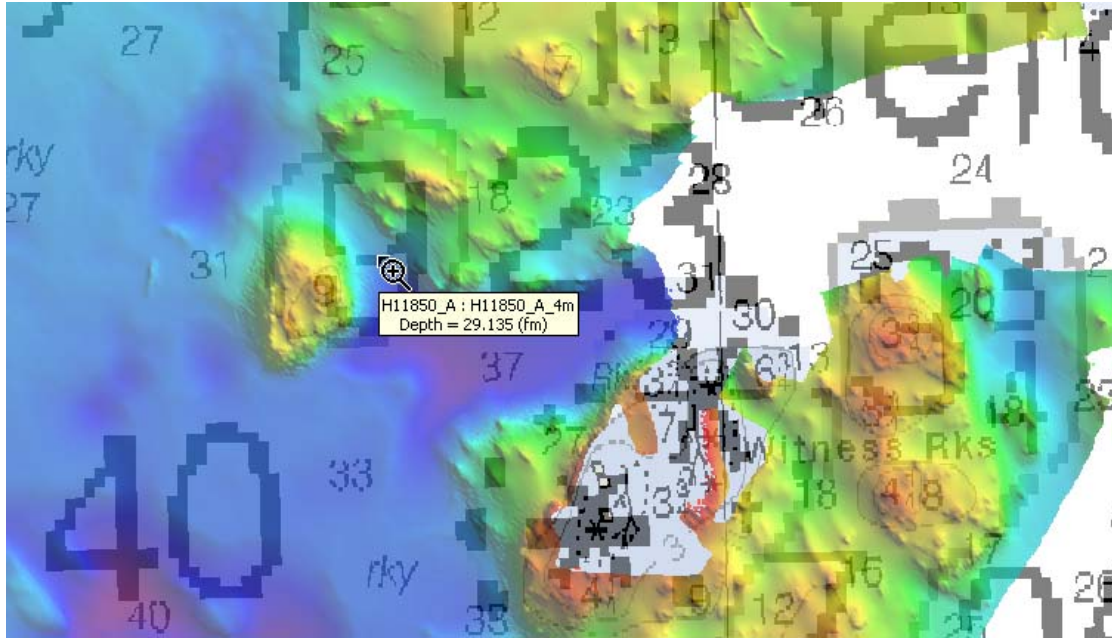


Figure 8: Poorly positioned nine fathom shoal on chart 17400 (larger sounding). Note the correctly positioned depth from chart 17404 (smaller soundings are from chart 17404)

#### Chart 17404

Chart 17404 covers all of survey H11850. For the most part charted depths follow the same general trend as soundings from the current survey but are anywhere from 1 to 4 fathoms deeper than soundings from H11850. H11850 also often found shoaler points between charted soundings but this difference can be attributed to complete SWMB coverage.<sup>15</sup>

The offshore shoals on chart 17404 are well depicted spatially although H11850 often found slightly shoaler high points. This difference can probably be attributed to complete SWMB coverage. One exception to this is the 3¼ fathom rock in the vicinity of 55°34'31" N 133°19'07" W marked with the San Christoval Three Fathom Buoy SC (see fig #9). In this case the charted position of the rock appears to have been shifted north by ~50 meters. This is probably a case of “cartographic license” in order not to obscure the charted buoy which lies directly on top of the surveyed position of the rock.<sup>16</sup>

The charted 17404 shoreline agrees very well with both the hydrographic data and composite source file.<sup>17</sup>

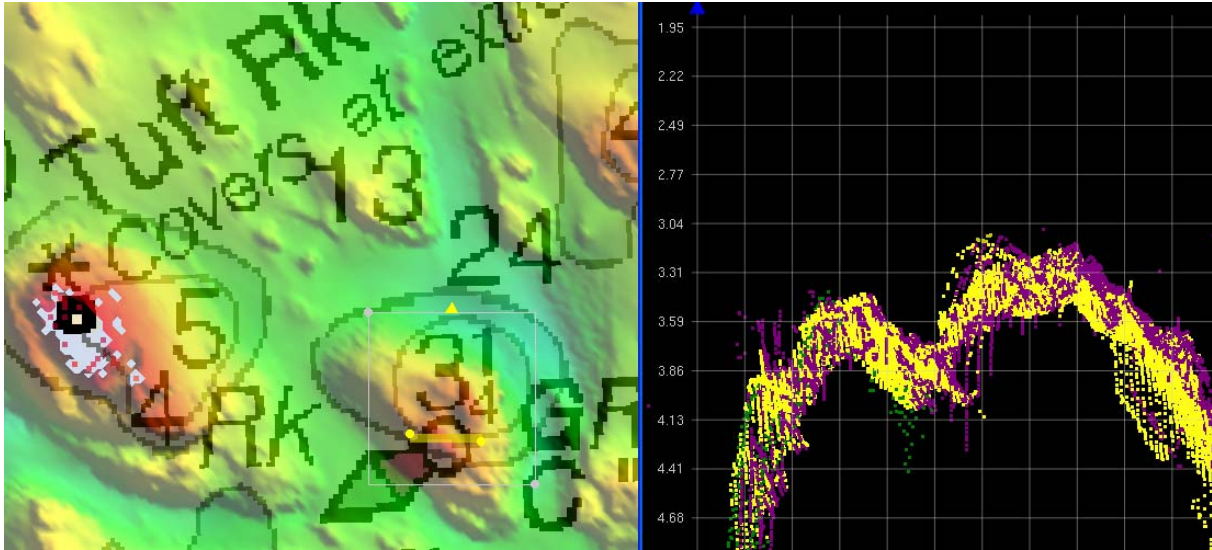


Figure 9: The subset slice south of the charted 3¼ fathom rock depicts the actual position of the high point. The 2D window to the right shows the profile view of the rock.

### Chart 17405

Chart 17405 covers all of survey H11850. Since both charts 17404 and 17405 are the same scale and share an overlapping area that entirely encompasses H11850, it is not surprising to find that both charts share the same soundings and shoreline in their common area.<sup>18</sup> Thus the chart 17404 comparison previously discussed applies equally well to chart 17405.

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.<sup>19</sup>

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

Nineteen (19) Dangers to Navigation (DTONs) were found on survey H11850, and reported to the Marine Chart Division via email on 12/10/2008.<sup>20</sup> The original DTON submission package is included in Appendix IV. Descriptions of each DTON are included in the Survey Feature Report in Appendix I.<sup>21</sup>

### D.1.c. Other Features

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

No AWOIS items fall within the survey limits of H11850.<sup>22</sup>

#### Additional Items

Thirty six (36) lidar investigations fell within the survey limits of H11850.<sup>23</sup> The bulk of these items were investigated using the tilted Reson 8125 mounted on 1101 although a few were covered with conventional SWMB. A description of these lidar item investigations is included in CARIS Notebook under the S57 attributes acronym “remrks” for each individual investigation.

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

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

Prior survey comparison was not performed.

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

#### Shoreline Source

The composite source S57 file “0\_1FME01.000” was provided on the project CD. This composite source file is comprised of ENC and prior survey features. In preparation for shoreline verification, this project wide composite source was cropped down to include only the shoreline and features that applied to H11850.

Pacific Hydrographic Branch provided *Rainier* with a list of features in *.hob* format from lidar surveys H11659 and H11660 selected for further investigation. All of the lidar investigations that pertain to sheet H11850 were selected from these *.hob* files and added to the sheet wide composite source file.

The resulting sheet wide composite source file, comprised of both the culled down project wide S57 file and the lidar investigations, was saved in both S57 format and as a CARIS Notebook *.hob* file. The composite source Notebook *.hob* file was used to print “boat sheets” on paper while the S57 file was displayed in Hypack for field reference and verification where necessary.

In addition, US5AK4AM, an Electronic Navigational Chart (ENC), was also provided by the Pacific Hydrographic Branch and was used for general reference.

#### Shoreline Verification

Traditional “limited shoreline verification” was not required for this survey, since much of the near-shore area was covered by junction lidar surveys H11659 and H11660 and thus outside the limits of H11850. H11659 and H11660 lidar items selected for further investigation were addressed by visual, Detached Position (DP) or MBES techniques as appropriate and feasible, near predicted low water. No AWOIS items were located within the limits of H11850.

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. DP forms are included in the Detached Position directory of the *Separates to be Included with Survey Data*.

Investigation methods and results are described in CARIS Notebook under the S57 attributes acronym “remrks”. In the event that charting confusion could result from just the “remrks” field, specific recommendations are described under the S57 attributes acronym “recomd”. All lidar investigations have the “remrks” attribute filled in, even if it is only to state that the

item was not addressed. Any composite source features or shoreline not addressed during shoreline verification are left untouched.

All shoreline data is submitted in Caris Notebook .hob files. The session H11850\_Notebook.wrk contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H11850_Comp_Source.hob	Original Source Data as filtered to the limits of survey H11850. Also contains all PHB assigned lidar investigations that fall within the survey bounds.
H11850_Field_Verified.hob Field	verified source features and shoreline, including edits, updates and DPs.
H11850_Disprovals.hob	Items removed from the field verified composite source which were disproved by DPs or SWMB coverage.

*Table 5: List and Description of Notebook HOB files.*

Source Shoreline Changes and New Features

Items for survey H11850 that either change source shoreline or add new features and are associated with a detached position, have been exported as Extensible Markup Language (XML) files. This XML file was then imported in CARIS Notebook and added to the H11850\_Field\_Verified.hob file.

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the CFF and charts as described above.<sup>24</sup>

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

Survey H11850 included six Aids to Navigation (ATONs). Each ATON’s position was visually checked in the field against the digital raster chart and/or verified by detached position. All aids to navigation (ATONs) were found to be correctly charted and serve their intended purpose.<sup>25</sup>

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

There are no overhead features within the limits of survey H11850.<sup>26</sup>

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

There are no submarine cables or pipelines charted within the limits of H11850, and none were detected by the survey.<sup>27</sup>

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

There are no ferry routes charted within the limits of survey H11850, and none were observed to be operating in the area.<sup>28</sup>




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

Bottom samples were not collected for survey H11850.<sup>29</sup>




**E. APPROVAL**

As Chief of Party, Field operations for hydrographic survey H11850 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 and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-O190-RA-08	July 28, 2008	N/CS34
Coast Pilot Report for OPR- O190-RA-08	TBD	N/CS26
Approved and Forwarded:	 CAPT/NOAA 2008.12.12 09:47:14 -08'00'	
	<hr/> 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:	 James B. Jacobson Chief Survey Technician, NOAA Ship <i>Rainier</i>	James B Jacobson I am the author of this document 2008.12.10 13:26:14 -09'00'
Chief Survey Technician:	 James B. Jacobson Chief Survey Technician, NOAA Ship <i>Rainier</i>	James B Jacobson I have reviewed this document 2008.12.10 13:25:56 -09'00'
Field Operations Officer:	 Lieutenant Charles J. Yoos, NOAA Field Operations Officer	I have reviewed this document 2008.12.10 15:58:45 -08'00'

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

<sup>1</sup> Concur.

<sup>2</sup> A common junction was made with H11694 and H11849, both of which have already been compiled. Portions of LIDAR surveys H11659 and H11660 that junction with H11850 and a piece of H11659 that was not compiled with H11694 were compiled concurrently and are part of the H11850 HCell. A common junction with H11851 will be made when that survey is compiled.

<sup>3</sup> Concur.

<sup>4</sup> Concur.

<sup>5</sup> Concur.

<sup>6</sup> Concur.

<sup>7</sup> Concur.

<sup>8</sup> Concur. The data is adequate to supersede charted data in the common area.

<sup>9</sup> In most cases, there was enough LIDAR data to cover the holidays. Only large holidays without multibeam or LIDAR coverage are preserved in the HCell coverage.

<sup>10</sup> Concur. Kelp is depicted in the HCell where the coverage gaps exist.

<sup>11</sup> The additional data collected in this area will be compiled with H11851.

<sup>12</sup> Concur. Negative soundings from both the combined multibeam surface and LIDAR surfaces are included in H11850\_SS.000.

<sup>13</sup> See attached Tide Note dated June 27, 2008.

<sup>14</sup> As noted in the Survey Acceptance Review, this error has been corrected on the latest edition of chart 17400.

<sup>15</sup> Concur.

<sup>16</sup> Concur. A 3fm 1ft rock is included in the HCell at 55-34-30.443N, 133-19-08.747W in a position that would be partially obscured by the buoy symbol. Despite this case the rock is included because it is the shoalest depth in the area and is navigationally significant in the event the buoy is damaged or removed.

<sup>17</sup> Concur.

<sup>18</sup> Concur with clarification. There are a few instances where there is a sounding or feature on one chart but not the other. In those rare cases, there may be a blue note in the HCell that only applies to one chart in order to create consistency between the charts.

<sup>19</sup> Concur.

<sup>20</sup> All but one DTON have been applied to the chart as reported. One DTON was reported as a shoal, but was applied to the chart as a rock awash and it was blue noted to be retained. One DTON was replaced with a shoaler sounding in the HCell and has been blue noted accordingly. The remaining 17 DTONs are included in the HCell as reported.

<sup>21</sup> See attached DTON report.

<sup>22</sup> Concur.

<sup>23</sup> No data from LIDAR included in HCell H11850 supersedes shoaler charted depths or has been used to disprove charted features.

<sup>24</sup> Concur with clarification. The submitted hob files were used in the compilation of HCell H11850. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.

<sup>25</sup> Chart per latest ATONIS information.

<sup>26</sup> Concur.

<sup>27</sup> Concur.

<sup>28</sup> Concur.

<sup>29</sup> Concur with clarification. All charted bottom samples have been imported into the HCell to be retained.

# H11850 DTON Report

**Registry Number:** H11850  
**State:** Alaska  
**Locality:** West of Prince Wales Island  
**Sub-locality:** San Christoval Channel to San Alberto Bay  
**Project Number:** OPR-1090-RA-08  
**Survey Dates:** 05/17/2008 - 06/16/2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	15th	05/01/2006	1:40,000 (17405_1)	[L]NTM: ?
17404	13th	05/01/2006	1:40,000 (17404_1)	[L]NTM: ?
17400	16th	06/02/2001	1:229,376 (17400_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	15.76 m	55° 33' 58.0" N	133° 19' 29.6" W	---
1.2	Rock	15.75 m	55° 34' 04.5" N	133° 18' 18.0" W	---
1.3	Shoal	-0.14 m	55° 34' 32.8" N	133° 16' 05.3" W	---
1.4	Shoal	2.76 m	55° 35' 35.5" N	133° 18' 52.4" W	---
1.5	Rock	1.76 m	55° 35' 33.4" N	133° 19' 18.1" W	---
1.6	Shoal	5.29 m	55° 33' 47.2" N	133° 17' 44.8" W	---
1.7	Rock	-0.36 m	55° 34' 28.9" N	133° 16' 37.7" W	---
1.8	Rock	9.80 m	55° 34' 23.3" N	133° 19' 05.2" W	---
1.9	Shoal	7.82 m	55° 34' 29.7" N	133° 15' 56.0" W	---
1.10	Rock	12.66 m	55° 33' 33.2" N	133° 15' 54.8" W	---

1.11	Shoal	16.19 m	55° 33' 59.7" N	133° 15' 28.2" W	---
1.12	Shoal	13.88 m	55° 34' 48.0" N	133° 17' 09.0" W	---
1.13	Shoal	17.37 m	55° 35' 37.6" N	133° 19' 53.4" W	---
1.14	Shoal	6.55 m	55° 34' 09.6" N	133° 19' 59.8" W	---
1.15	Rock	15.22 m	55° 33' 58.0" N	133° 14' 33.1" W	---
1.16	Rock	14.73 m	55° 33' 43.0" N	133° 15' 36.3" W	---
1.17	Rock	17.36 m	55° 33' 48.2" N	133° 15' 03.1" W	---
1.18	Shoal	13.08 m	55° 33' 14.0" N	133° 14' 58.6" W	---
1.19	Rock	16.16 m	55° 33' 08.8" N	133° 15' 08.2" W	---

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 346/11 from h11850 / 1021\_reson8101\_hvf / 2008-138 / 310\_1917

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 33' 58.0" N, 133° 19' 29.6" W  
**Least Depth:** 15.76 m (= 51.70 ft = 8.617 fm = 8 fm 3.70 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.377$  m ; **TVU (TPEv)**  $\pm 0.257$  m  
**Timestamp:** 2008-138.19:19:15.935 (05/17/2008)  
**Survey Line:** h11850 / 1021\_reson8101\_hvf / 2008-138 / 310\_1917  
**Profile/Beam:** 346/11  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

New submerged rock found with SWMB

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/1021_reson8101_hvf/2008-138/310_1917	346/11	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a submerged rock in the surveyed position

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

8 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

8fm 3ft (531\_1)

15.8m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20080616

SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 15.759 m

WATLEV - 3:always under water/submerged



### Feature Images

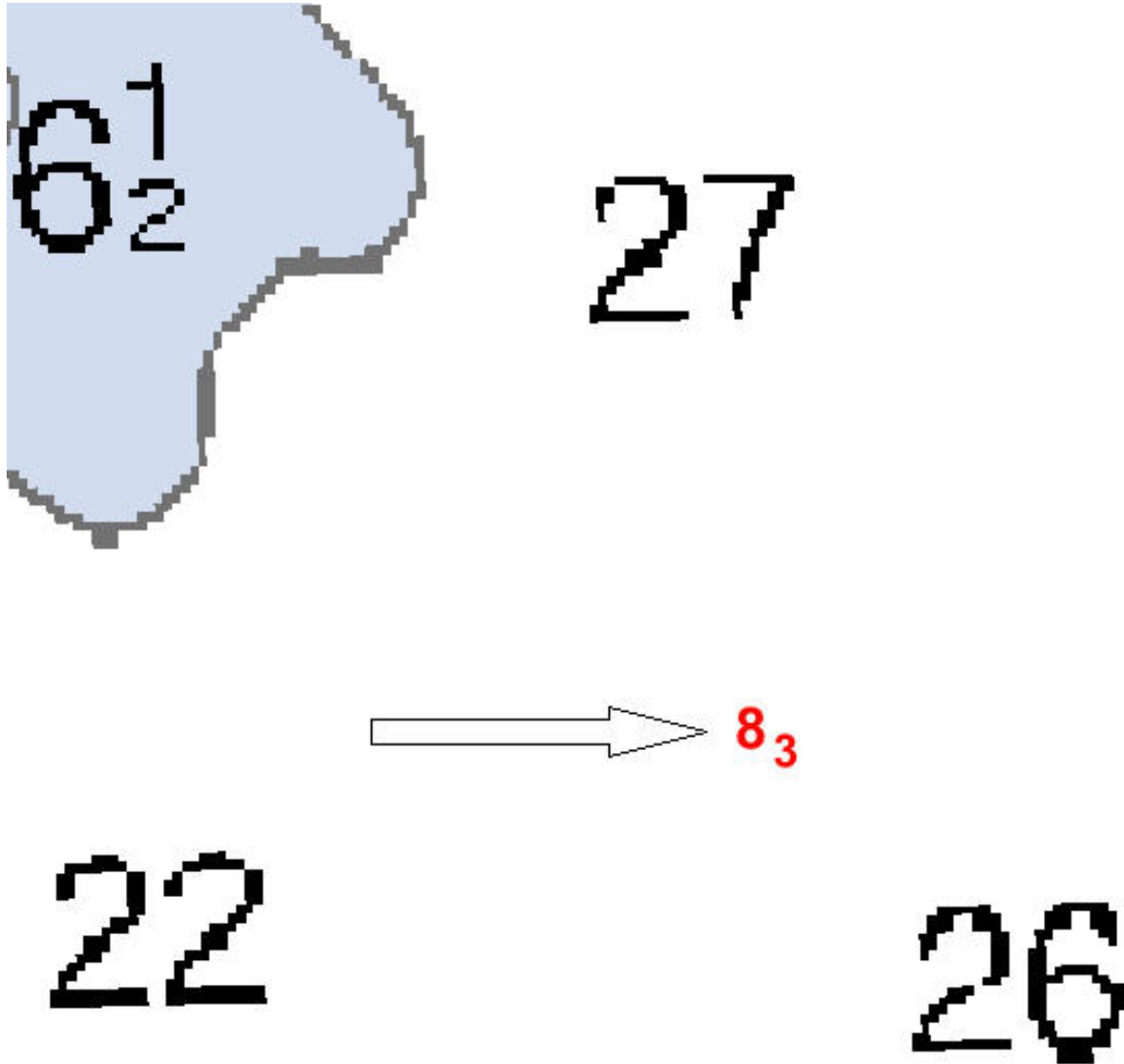


Figure 1.1.1

## 1.2) Profile/Beam - 989/91 from h11850 / 1021\_reson8101\_hvf / 2008-138 / 395\_1837

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 34' 04.5" N, 133° 18' 18.0" W  
**Least Depth:** 15.75 m (= 51.67 ft = 8.612 fm = 8 fm 3.67 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.378$  m ; **TVU (TPEv)**  $\pm 0.256$  m  
**Timestamp:** 2008-138.18:40:03.947 (05/17/2008)  
**Survey Line:** h11850 / 1021\_reson8101\_hvf / 2008-138 / 395\_1837  
**Profile/Beam:** 989/91  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

New submerged rock found with SWMB

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/1021_reson8101_hvf/2008-138/395_1837	989/91	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a submerged rock in the surveyed position.

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

8 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

8fm 3ft (531\_1)

15.8m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20080616

SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 15.750 m

WATLEV - 3:always under water/submerged

### Feature Images

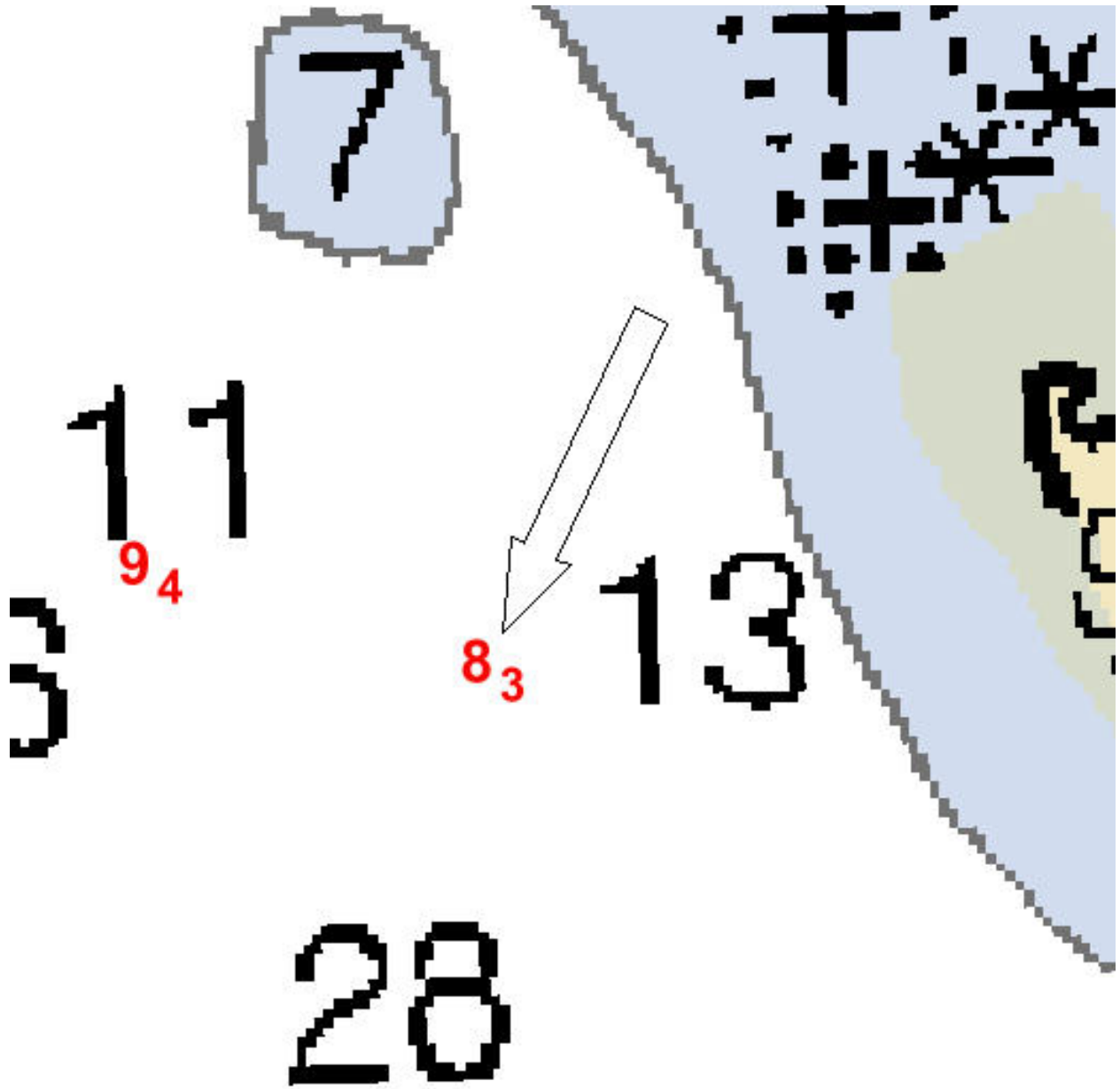


Figure 1.2.1

### 1.3) Profile/Beam - 307/239 from h11850 / 1101\_reson8125\_hvf / 2008-138 / 079\_2329

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 55° 34' 32.8" N, 133° 16' 05.3" W  
**Least Depth:** -0.14 m (= -0.46 ft = -0.077 fm = 0 fm 5.54 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 2.066$  m ; **TVU (TPEv)**  $\pm 9.803$  m  
**Timestamp:** 2008-138.23:31:07.783 (05/17/2008)  
**Survey Line:** h11850 / 1101\_reson8125\_hvf / 2008-138 / 079\_2329  
**Profile/Beam:** 307/239  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/1101_reson8125_hvf/2008-138/079_2329	307/239	0.00	000.0	Primary

### Hydrographer Recommendations

Chart with bathymetry from the current survey.

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

0fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

0fm 0ft (531\_1)

-.1m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam



### Feature Images

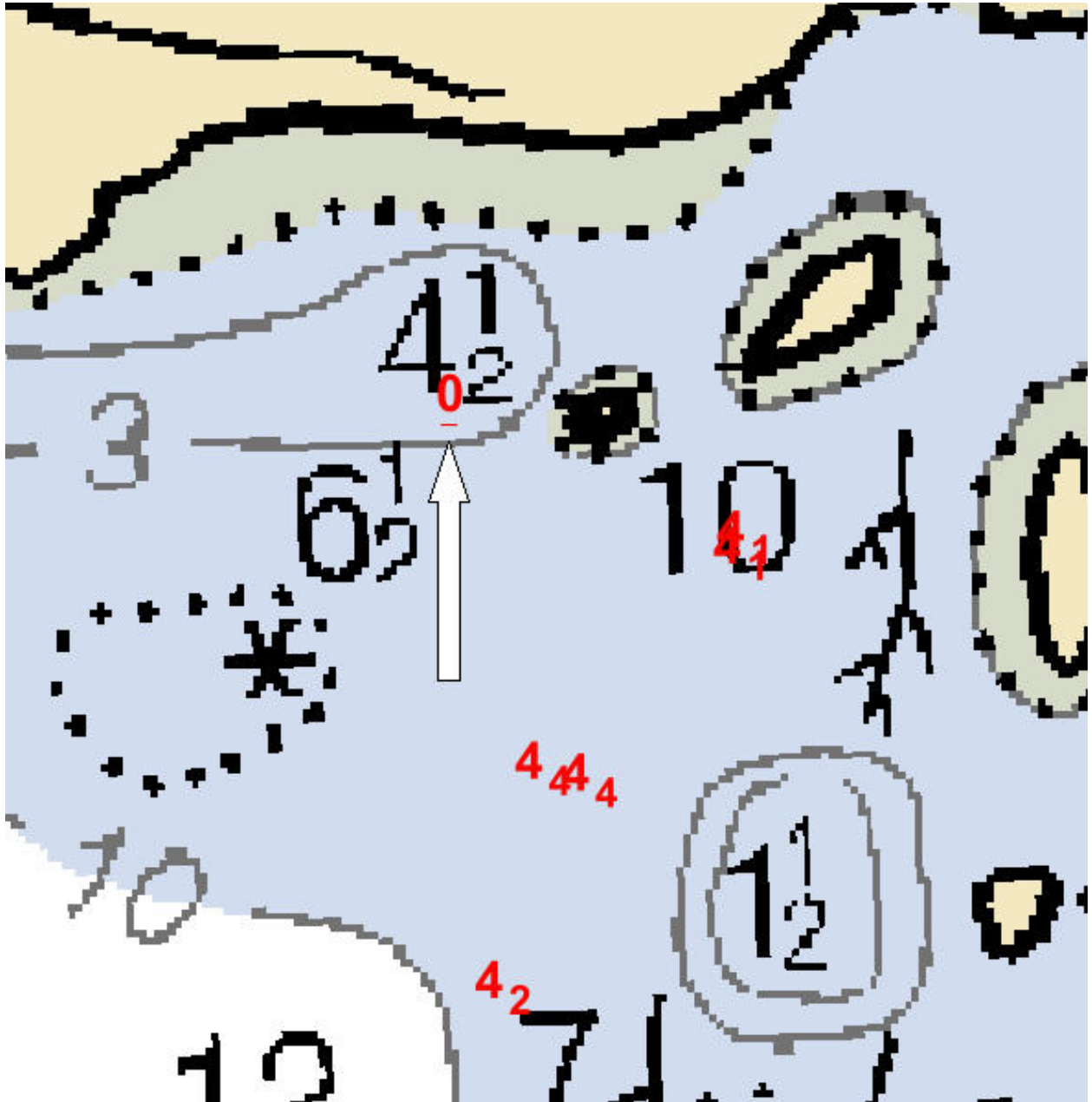


Figure 1.3.1

## 1.4) Profile/Beam - 4305/229 from h11850 / 1101\_reson8125\_hvf / 2008-138 / 080\_2341

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 35' 35.5" N, 133° 18' 52.4" W  
**Least Depth:** 2.76 m (= 9.06 ft = 1.510 fm = 1 fm 3.06 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.975$  m ; **TVU (TPEv)**  $\pm 0.508$  m  
**Timestamp:** 2008-138.23:56:54.276 (05/17/2008)  
**Survey Line:** h11850 / 1101\_reson8125\_hvf / 2008-138 / 080\_2341  
**Profile/Beam:** 4305/229  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

[None]

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/1101_reson8125_hvf/2008-138/080_2341	4305/229	0.00	000.0	Primary

#### Hydrographer Recommendations

[None]

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

1 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 1fm 3ft (531\_1)  
 2.8m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam





### Feature Images

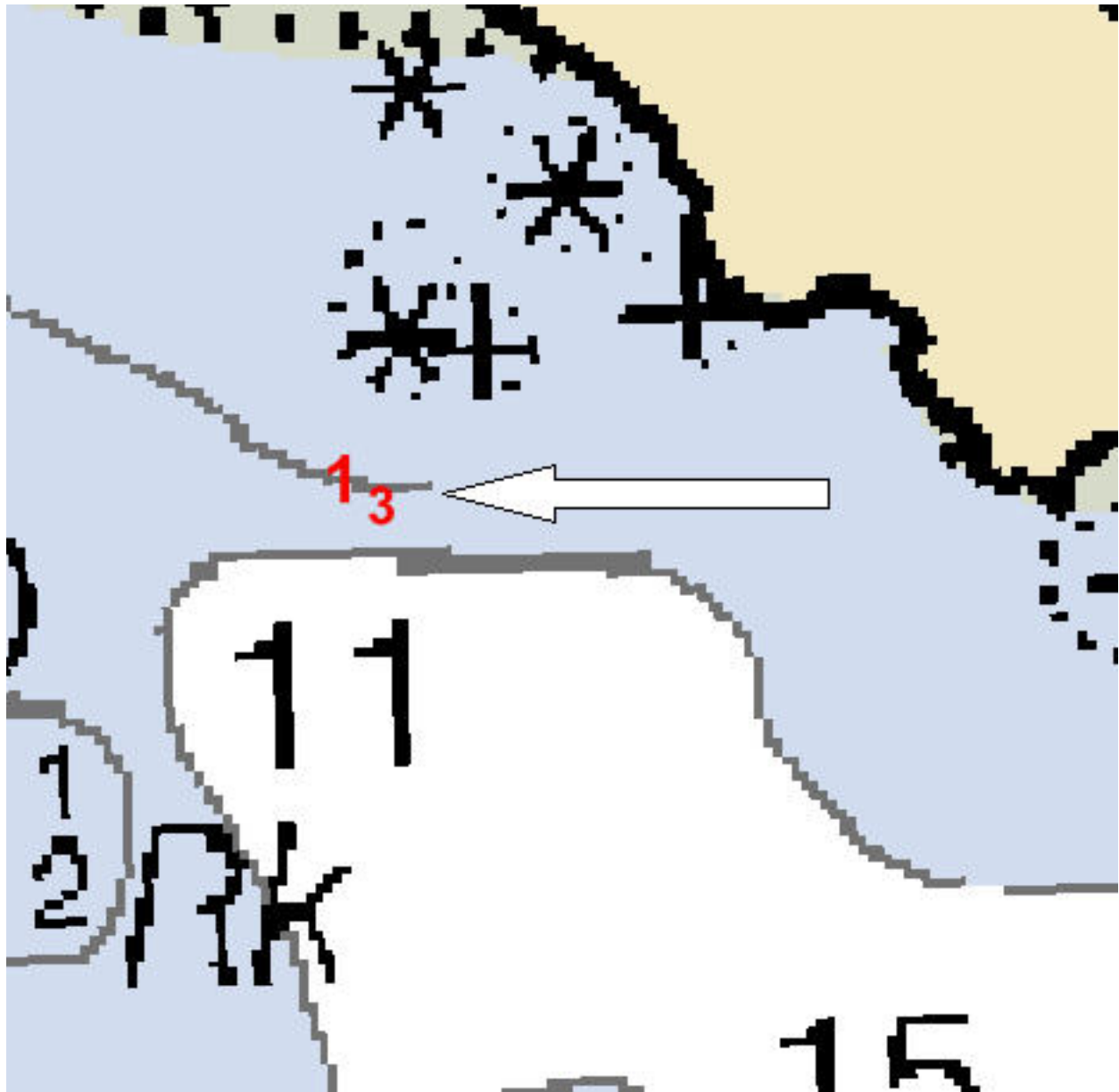


Figure 1.4.1

**1.5) Profile/Beam - 321/234 from h11850 / 1101\_reson8125\_hvf / 2008-138 / 305\_0000**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 35' 33.4" N, 133° 19' 18.1" W  
**Least Depth:** 1.76 m (= 5.76 ft = 0.961 fm = 0 fm 5.76 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.988 m ; **TVU (TPEv)** ±1.160 m  
**Timestamp:** 2008-139.00:01:12.500 (05/18/2008)  
**Survey Line:** h11850 / 1101\_reson8125\_hvf / 2008-138 / 305\_0000  
**Profile/Beam:** 321/234  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON  
 New submerged rock found with SWMB

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/1101_reson8125_hvf/2008-138/305_0000	321/234	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart a submerged rock in the surveyed position

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

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

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 1.757 m

WATLEV - 3:always under water/submerged

### Feature Images

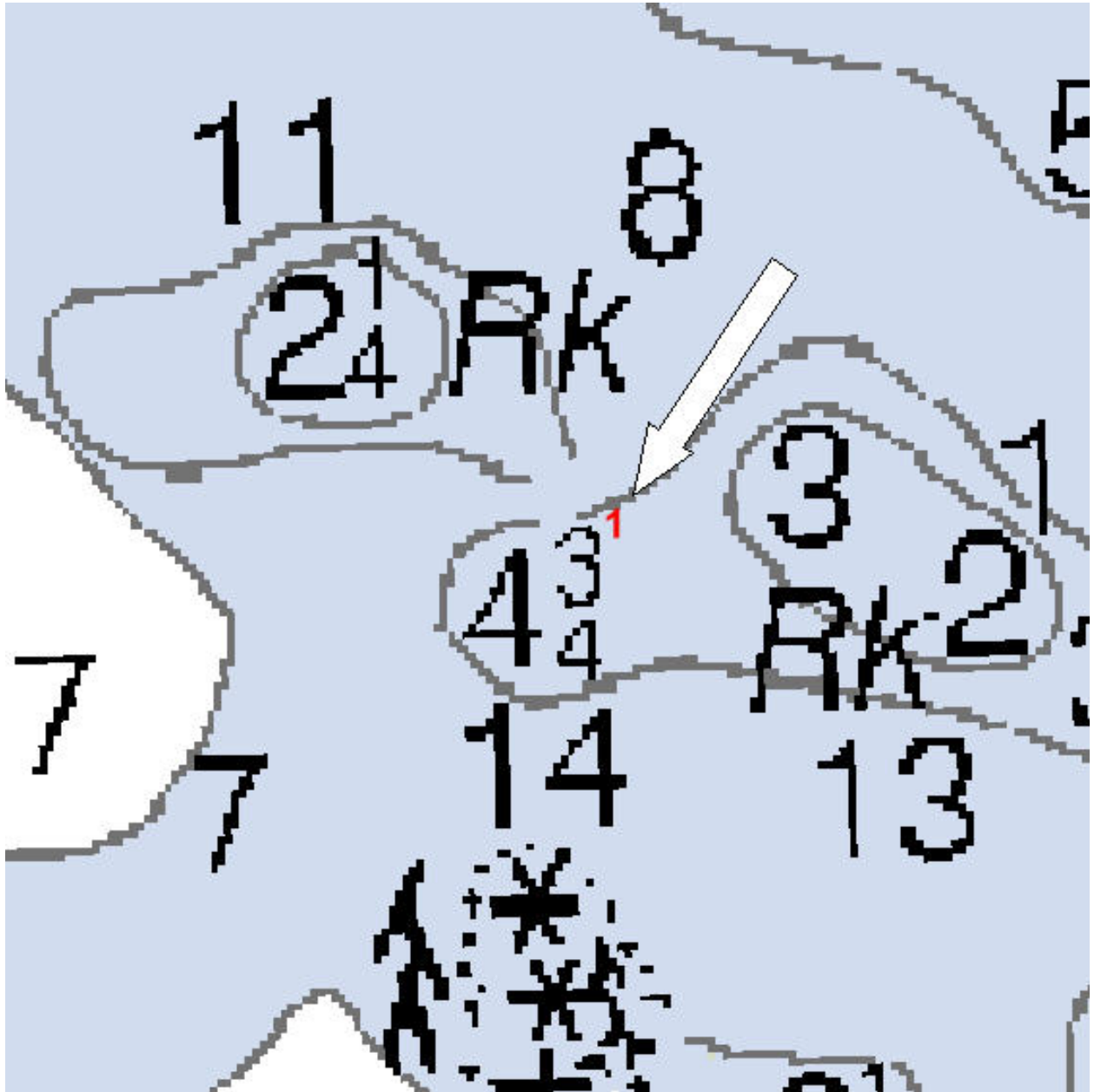


Figure 1.5.1

## 1.6) Profile/Beam - 704/233 from h11850 / 1101\_reson8125\_hvf / 2008-138 / 342\_2011

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 33' 47.2" N, 133° 17' 44.8" W  
**Least Depth:** 5.29 m (= 17.37 ft = 2.895 fm = 2 fm 5.37 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 2.077$  m ; **TVU (TPEv)**  $\pm 1.583$  m  
**Timestamp:** 2008-138.20:14:34.974 (05/17/2008)  
**Survey Line:** h11850 / 1101\_reson8125\_hvf / 2008-138 / 342\_2011  
**Profile/Beam:** 704/233  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/1101_reson8125_hvf/2008-138/342_2011	704/233	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart with bathymetry from the current survey.

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

2  $\frac{3}{4}$ fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

2fm 5ft (531\_1)

5.3m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam



### Feature Images

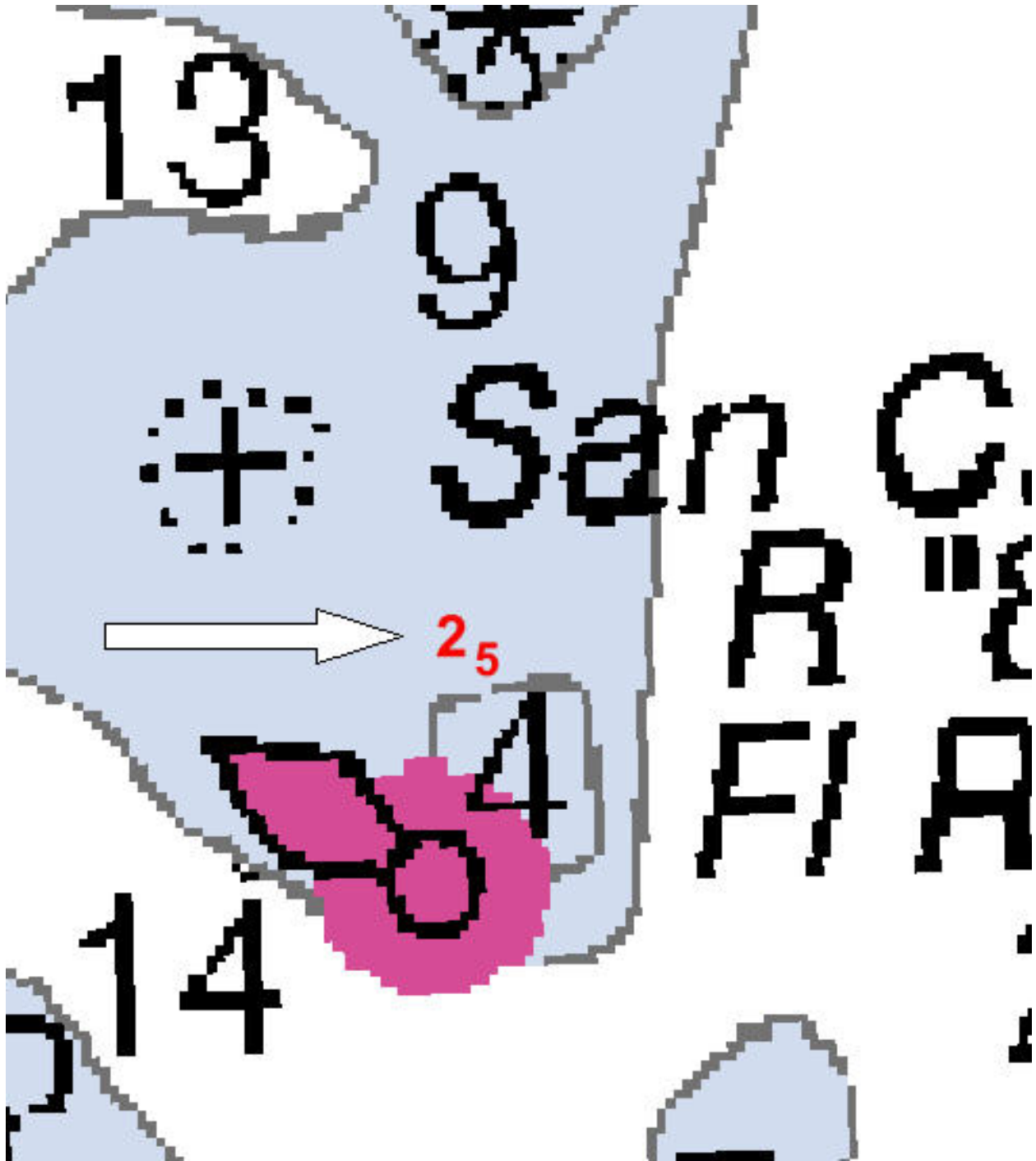


Figure 1.6.1



## 1.7) Profile/Beam - 426/235 from h11850 / 1101\_reson8125\_hvf / 2008-168 / 313\_2259

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 34' 28.9" N, 133° 16' 37.7" W  
**Least Depth:** -0.36 m (= -1.19 ft = -0.198 fm = 0 fm 4.81 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.969$  m ; TVU (TPEv)  $\pm 0.791$  m  
**Timestamp:** 2008-168.23:00:13.050 (06/16/2008)  
**Survey Line:** h11850 / 1101\_reson8125\_hvf / 2008-168 / 313\_2259  
**Profile/Beam:** 426/235  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

New rock found with SWMB

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/1101_reson8125_hvf/2008-168/313_2259	426/235	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a rock in the surveyed position

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

0 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

0fm 1ft (531\_1)

-.4m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20080616

SORIND - US,US,survey,H11850

VALSOU - -0.363 m

WATLEV - 5:awash

Feature Images

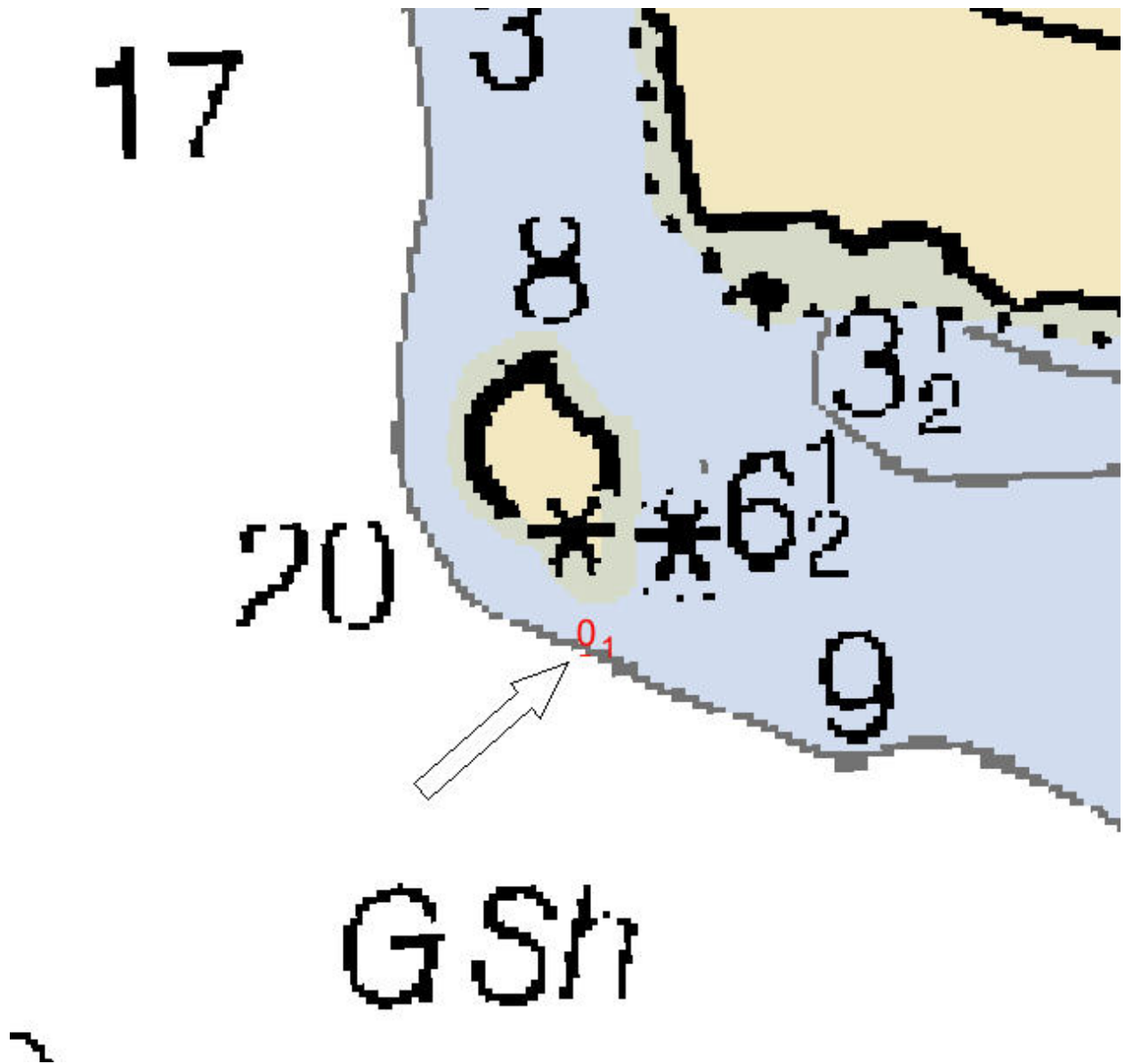


Figure 1.7.1

## 1.8) Profile/Beam - 443/1 from h11850 / 2801\_reson7125\_hf\_512beams / 2008-138 / 629\_2153

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 34' 23.3" N, 133° 19' 05.2" W  
**Least Depth:** 9.80 m (= 32.15 ft = 5.359 fm = 5 fm 2.15 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.969$  m ; **TVU (TPEv)**  $\pm 0.247$  m  
**Timestamp:** 2008-138.21:55:15.349 (05/17/2008)  
**Survey Line:** h11850 / 2801\_reson7125\_hf\_512beams / 2008-138 / 629\_2153  
**Profile/Beam:** 443/1  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

New submerged rock found with SWMB

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/2801_reson7125_hf_512beams/2008-138/629_2153	443/1	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a submerged rock in the surveyed position

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

5 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

5fm 2ft (531\_1)

9.8m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20080616

SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 9.800 m

WATLEV - 3:always under water/submerged

Feature Images

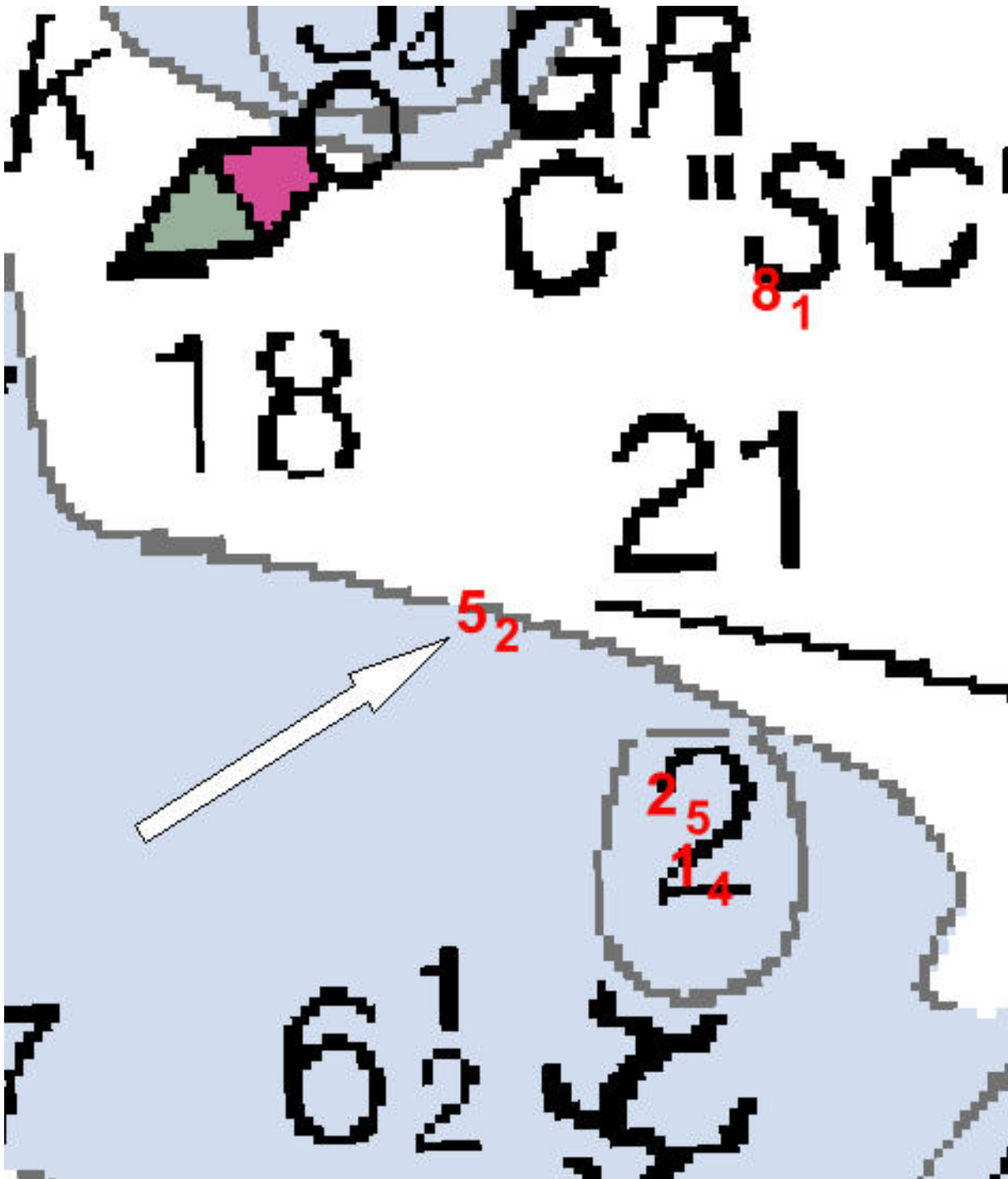


Figure 1.8.1

**1.9) Profile/Beam - 100/440 from h11850 / 2801\_reson7125\_hf\_512beams / 2008-168 / 045\_2135**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 34' 29.7" N, 133° 15' 56.0" W  
**Least Depth:** 7.82 m (= 25.65 ft = 4.275 fm = 4 fm 1.65 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.237 m  
**Timestamp:** 2008-168.21:35:42.279 (06/16/2008)  
**Survey Line:** h11850 / 2801\_reson7125\_hf\_512beams / 2008-168 / 045\_2135  
**Profile/Beam:** 100/440  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/2801_reson7125_hf_512beams/2008-168/045_2135	100/440	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart with bathymetry from the current survey.

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

4 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 4fm 1ft (531\_1)  
 7.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam





### Feature Images

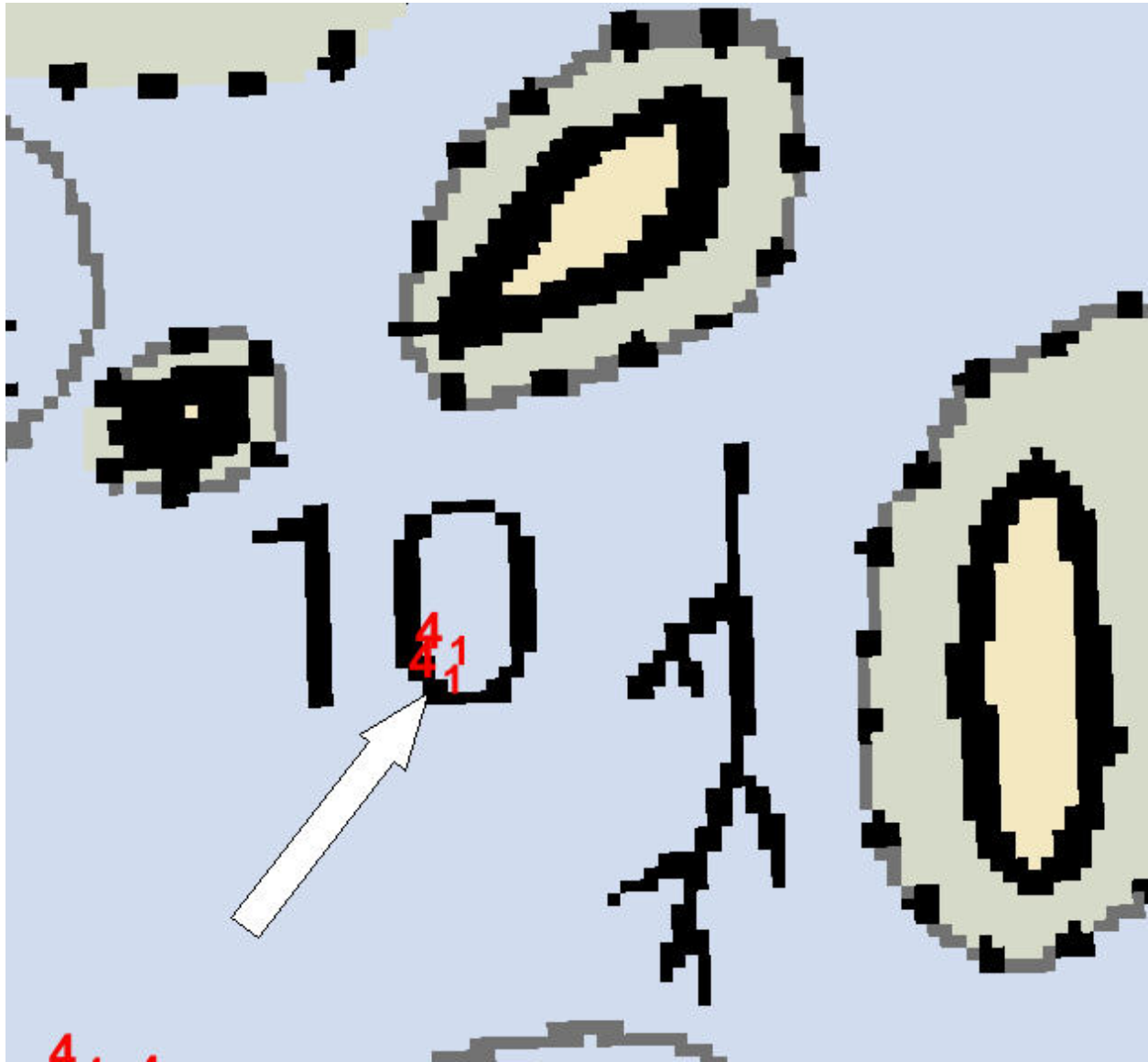


Figure 1.9.1

## 1.10) Profile/Beam - 189/184 from h11850 / 2801\_reson7125\_hf\_512beams / 2008-168 / 080\_2108

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 33' 33.2" N, 133° 15' 54.8" W  
**Least Depth:** 12.66 m (= 41.55 ft = 6.924 fm = 6 fm 5.55 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.963$  m ; **TVU (TPEv)**  $\pm 0.233$  m  
**Timestamp:** 2008-168.21:09:30.177 (06/16/2008)  
**Survey Line:** h11850 / 2801\_reson7125\_hf\_512beams / 2008-168 / 080\_2108  
**Profile/Beam:** 189/184  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

Charted 9 fathom shoal is larger and shallower than charted.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/2801_reson7125_hf_512beams/2008-168/080_2108	189/184	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a submerged rock in the surveyed position

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

6  $\frac{3}{4}$ fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

6fm 5ft (531\_1)

12.7m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20080616

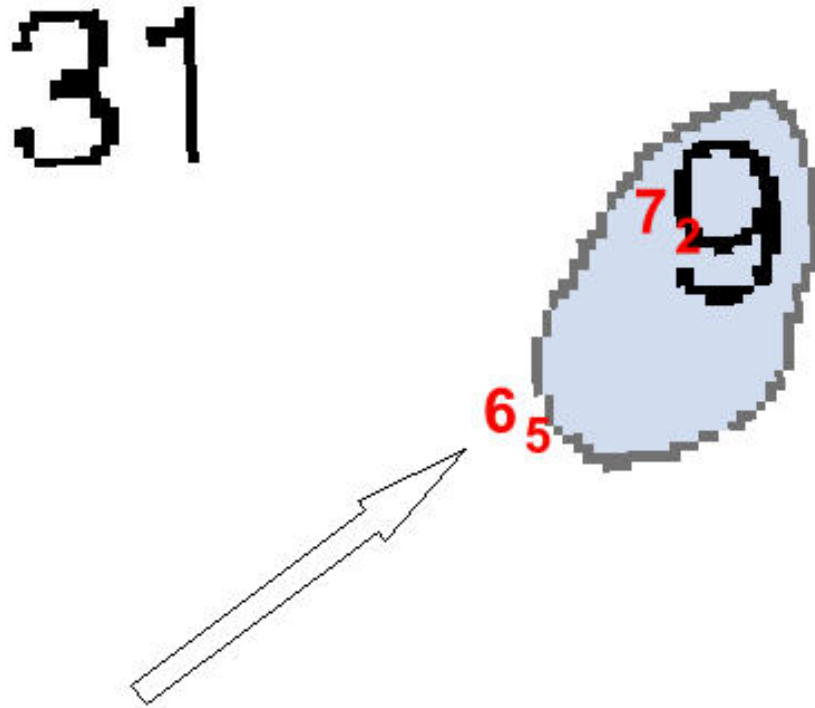
SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 12.663 m

WATLEV - 3:always under water/submerged

### Feature Images



*Figure 1.10.1*

**1.11) Profile/Beam - 1497/30 from h11850 / 2801\_reson7125\_hf\_512beams / 2008-168 / 914\_2308**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 33' 59.7" N, 133° 15' 28.2" W  
**Least Depth:** 16.19 m (= 53.11 ft = 8.851 fm = 8 fm 5.11 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.976 m ; **TVU (TPEv)** ±0.260 m  
**Timestamp:** 2008-168.23:13:39.254 (06/16/2008)  
**Survey Line:** h11850 / 2801\_reson7125\_hf\_512beams / 2008-168 / 914\_2308  
**Profile/Beam:** 1497/30  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/2801_reson7125_hf_512beams/2008-168/914_2308	1497/30	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart with bathymetry from the current survey.

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

8 ¾fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 5ft (531\_1)  
 16.2m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survy,H11850  
 TECSOU - 3:found by multi-beam



### Feature Images

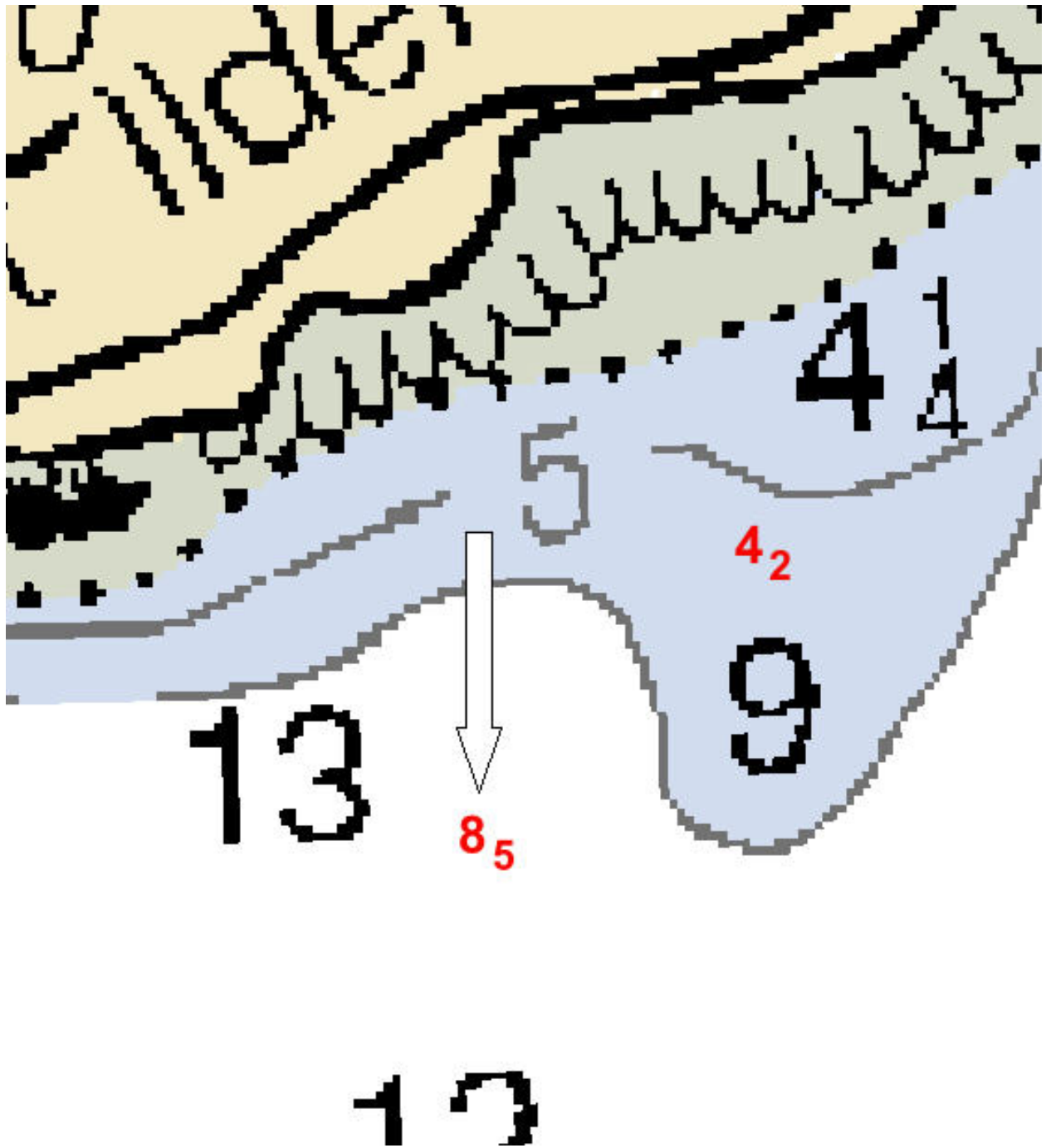


Figure 1.11.1

## 1.12) Profile/Beam - 169/238 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-165 / 386\_1942

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 34' 48.0" N, 133° 17' 09.0" W  
**Least Depth:** 13.88 m (= 45.53 ft = 7.588 fm = 7 fm 3.53 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.963$  m ; **TVU (TPEv)**  $\pm 0.231$  m  
**Timestamp:** 2008-165.19:42:24.931 (06/13/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-165 / 386\_1942  
**Profile/Beam:** 169/238  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-165/386_1942	169/238	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart with bathymetry from the current survey.

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

7 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

7fm 3ft (531\_1)

13.9m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam





### Feature Images

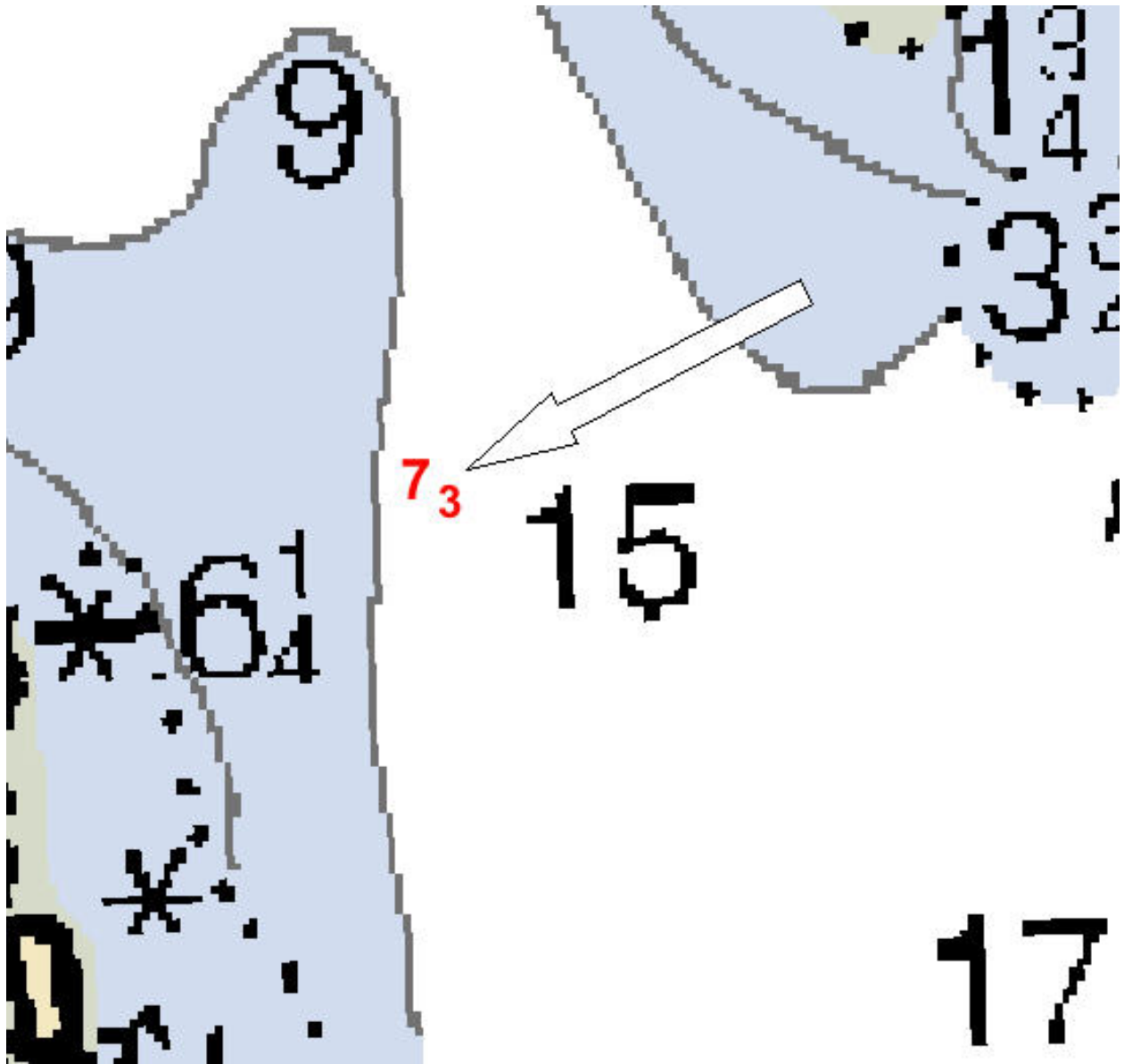


Figure 1.12.1

## 1.13) Profile/Beam - 470/212 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-166 / 377\_1726

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 35' 37.6" N, 133° 19' 53.4" W  
**Least Depth:** 17.37 m (= 56.98 ft = 9.497 fm = 9 fm 2.98 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.964$  m ; **TVU (TPEv)**  $\pm 0.232$  m  
**Timestamp:** 2008-166.17:27:36.352 (06/14/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-166 / 377\_1726  
**Profile/Beam:** 470/212  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-166/377_1726	470/212	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart with bathymetry from the current survey.

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

9 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

9fm 3ft (531\_1)

17.4m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam



### Feature Images

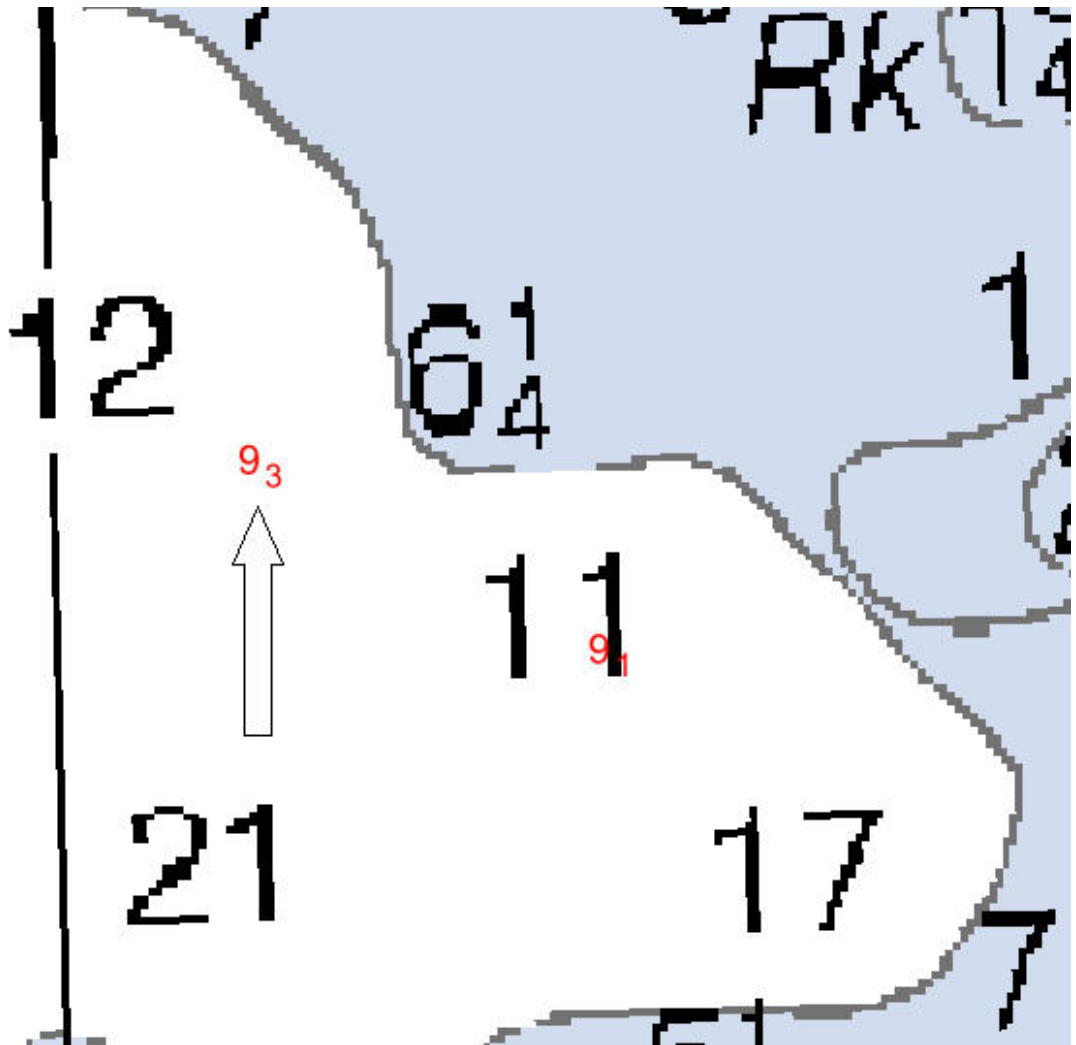


Figure 1.13.1

**1.14) Profile/Beam - 738/12 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-166 / 440\_2248**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 34' 09.6" N, 133° 19' 59.8" W  
**Least Depth:** 6.55 m (= 21.48 ft = 3.579 fm = 3 fm 3.48 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.237 m  
**Timestamp:** 2008-166.22:50:21.721 (06/14/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-166 / 440\_2248  
**Profile/Beam:** 738/12  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-166/440_2248	738/12	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart with bathymetry from the current survey.

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

3 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 3fm 3ft (531\_1)  
 6.5m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survy,H11850  
 TECSOU - 3:found by multi-beam



### Feature Images

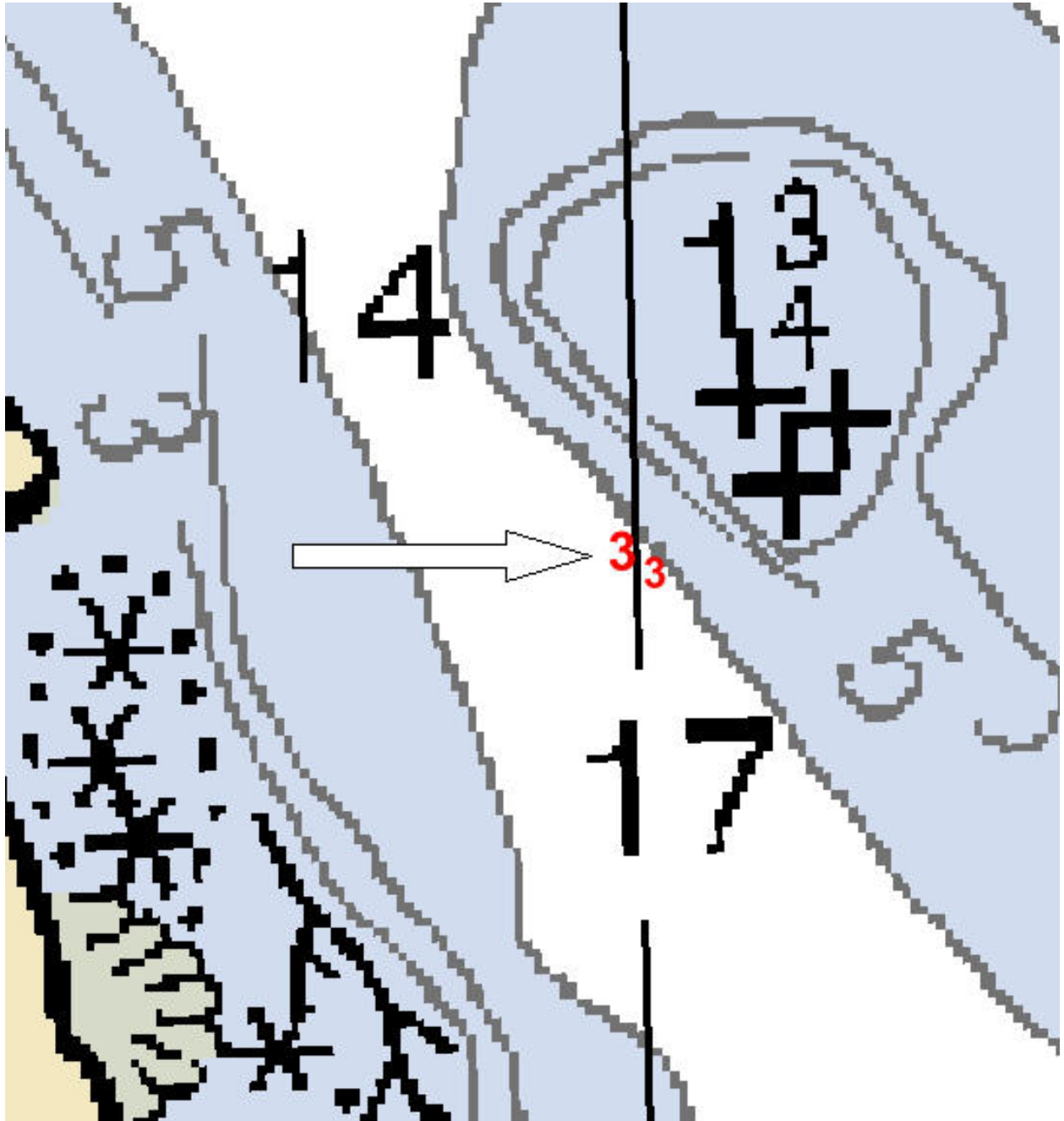


Figure 1.14.1



**1.15) Profile/Beam - 472/42 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 313\_2136**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 33' 58.0" N, 133° 14' 33.1" W  
**Least Depth:** 15.22 m (= 49.93 ft = 8.322 fm = 8 fm 1.93 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.969 m ; **TVU (TPEv)** ±0.245 m  
**Timestamp:** 2008-167.21:37:20.669 (06/15/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 313\_2136  
**Profile/Beam:** 472/42  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON  
 New submerged rock found with SWMB

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-167/313_2136	472/42	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart a submerged rock in the surveyed position

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

8 ¼fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 2ft (531\_1)  
 15.2m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 15.220 m

WATLEV - 3:always under water/submerged

### Feature Images

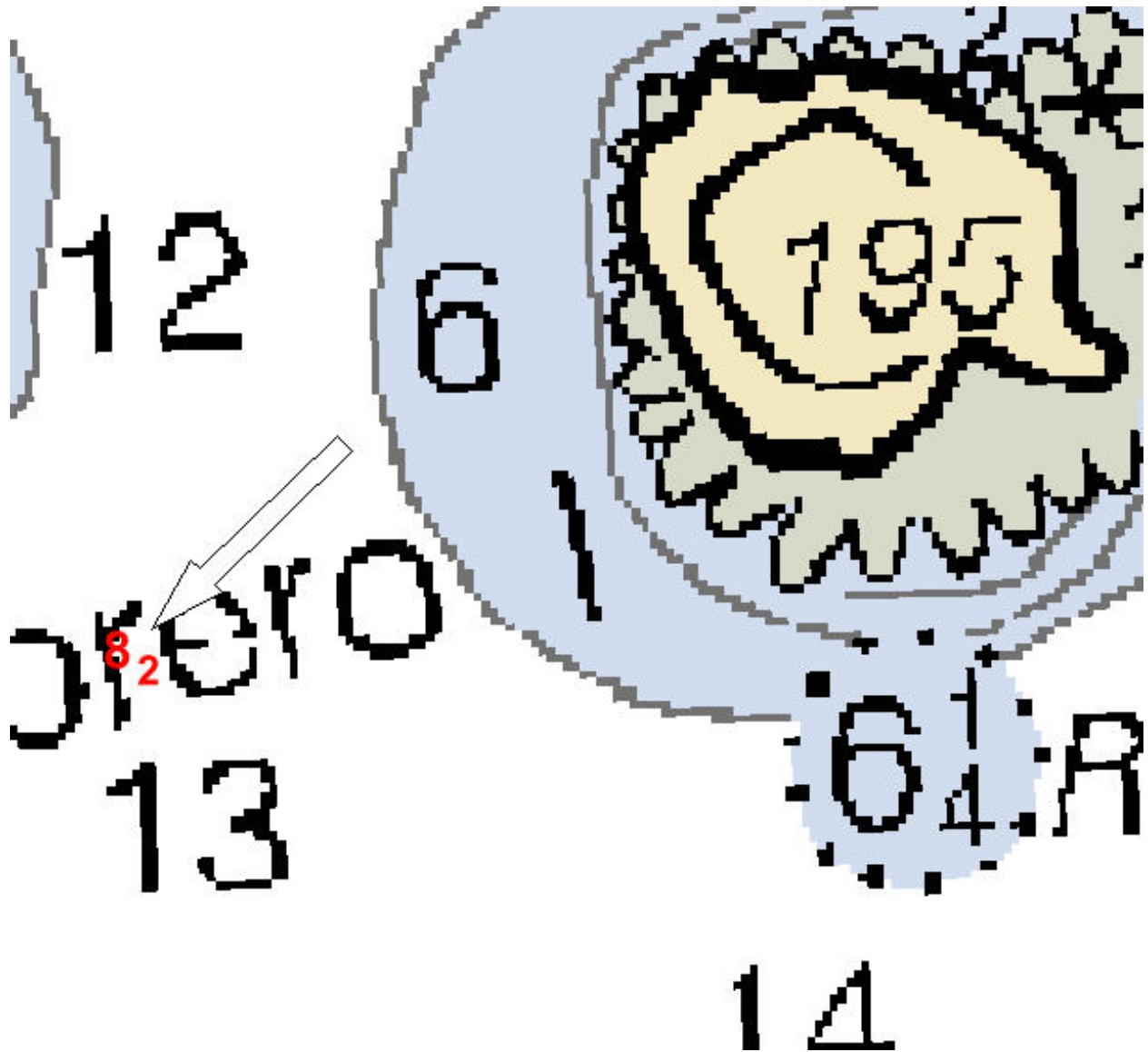


Figure 1.15.1

## 1.16) Profile/Beam - 166/59 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 319\_2222

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 33' 43.0" N, 133° 15' 36.3" W  
**Least Depth:** 14.73 m (= 48.32 ft = 8.053 fm = 8 fm 0.32 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.967$  m ; **TVU (TPEv)**  $\pm 0.240$  m  
**Timestamp:** 2008-167.22:23:06.795 (06/15/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 319\_2222  
**Profile/Beam:** 166/59  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

New submerged rock found with SWMB

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-167/319_2222	166/59	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart a submerged rock in the surveyed position

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

8fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

8fm 0ft (531\_1)

14.7m (500\_1, 50\_1)

#### S-57 Data

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

**Attributes:** SORDAT - 20080616

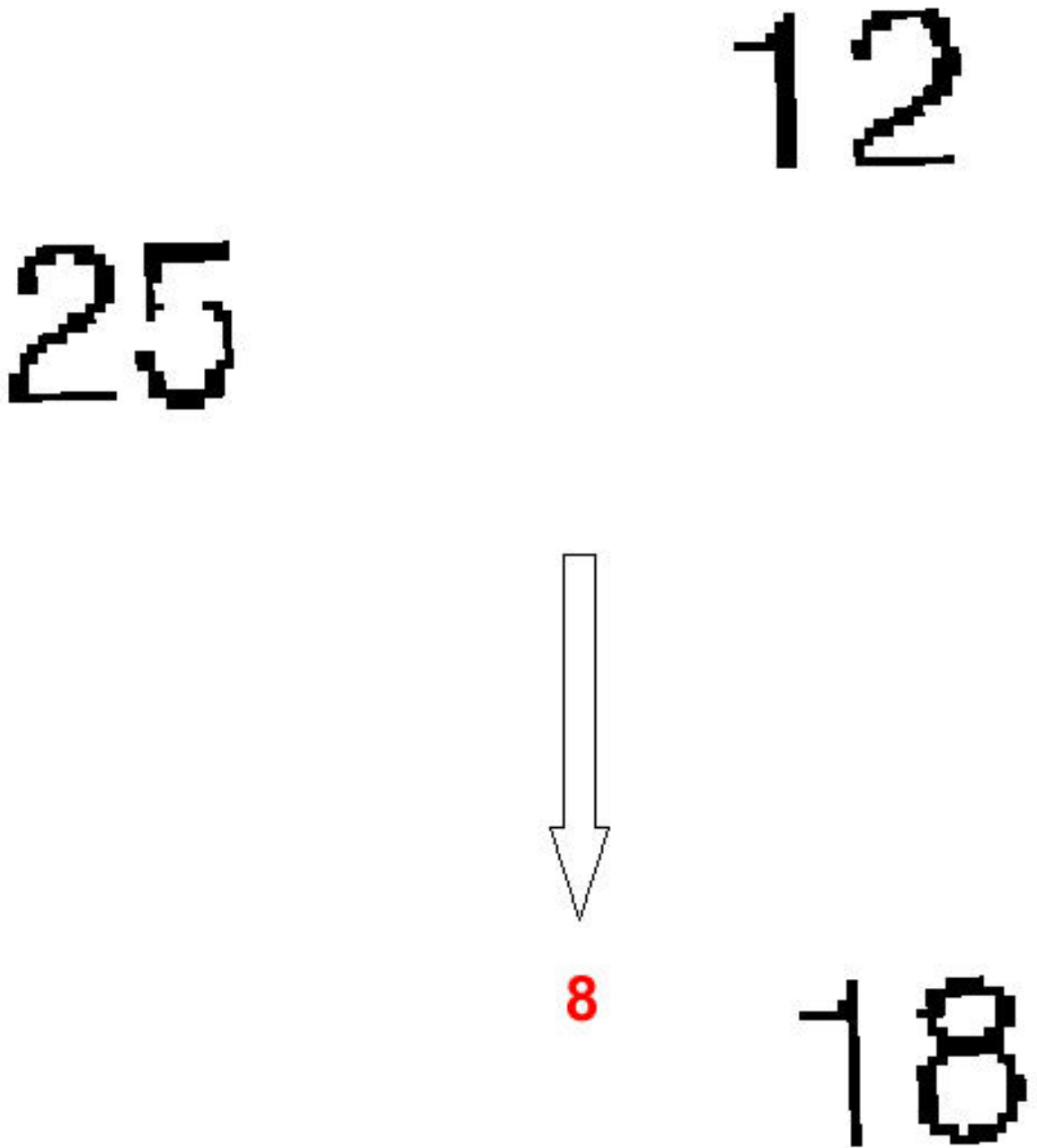
SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 14.728 m

WATLEV - 3:always under water/submerged

### Feature Images



*Figure 1.16.1*

**1.17) Profile/Beam - 283/8 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 322\_2210**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 33' 48.2" N, 133° 15' 03.1" W  
**Least Depth:** 17.36 m (= 56.95 ft = 9.491 fm = 9 fm 2.95 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.978 m ; **TVU (TPEv)** ±0.266 m  
**Timestamp:** 2008-167.22:11:03.294 (06/15/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 322\_2210  
**Profile/Beam:** 283/8  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON  
 New submerged rock found with SWMB

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-167/322_2210	283/8	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart a submerged rock in the surveyed position

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

9 ½fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 9fm 3ft (531\_1)  
 17.4m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 17.358 m

WATLEV - 3:always under water/submerged



### Feature Images

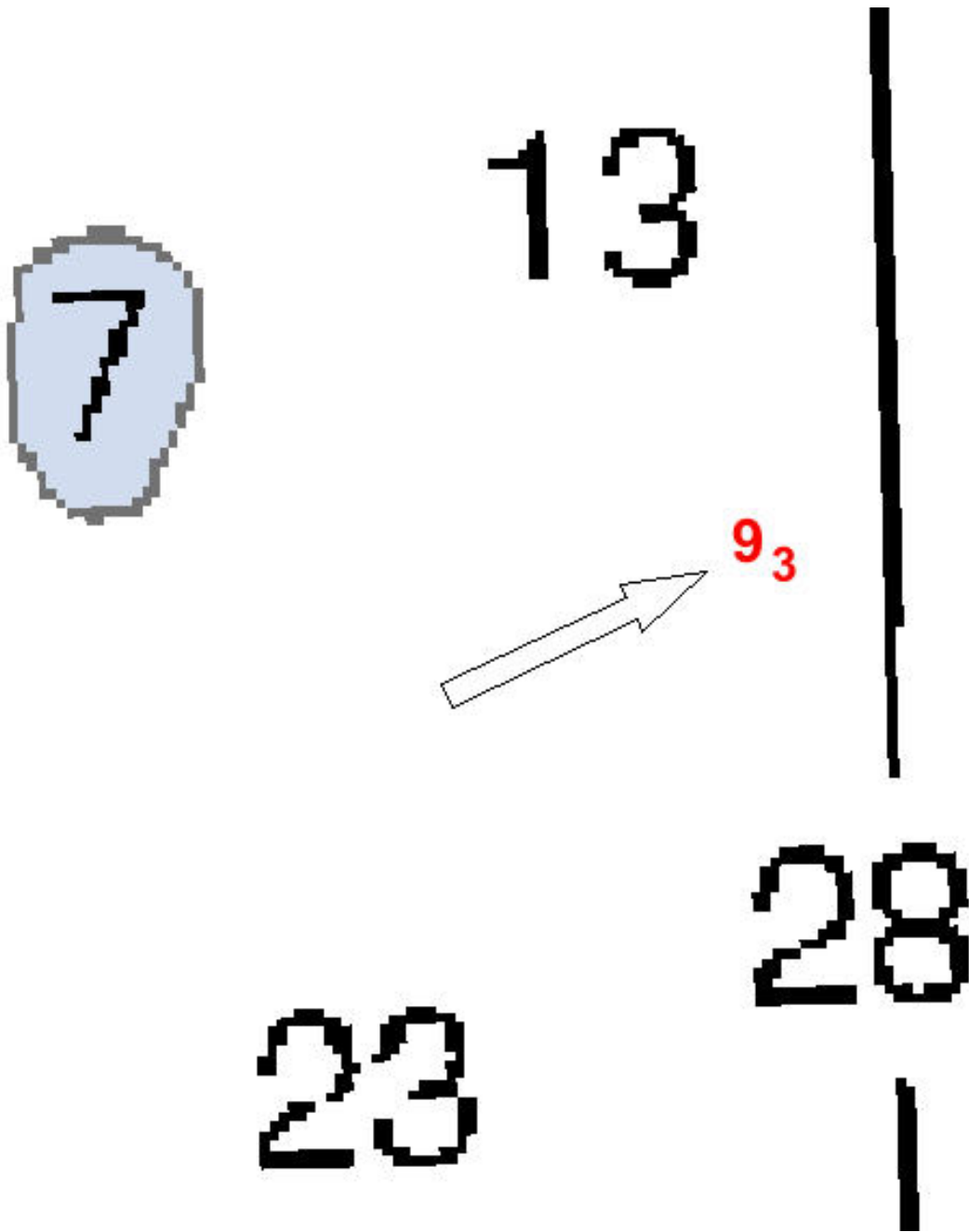


Figure 1.17.1

## 1.18) Profile/Beam - 1943/323 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 477\_2316

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 55° 33' 14.0" N, 133° 14' 58.6" W  
**Least Depth:** 13.08 m (= 42.92 ft = 7.153 fm = 7 fm 0.92 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.962$  m ; **TVU (TPEv)**  $\pm 0.231$  m  
**Timestamp:** 2008-167.23:20:21.102 (06/15/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 477\_2316  
**Profile/Beam:** 1943/323  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

DTON

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-167/477_2316	1943/323	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart with bathymetry from the current survey.

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

7fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)

7fm 1ft (531\_1)

13.1m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850  
 TECSOU - 3:found by multi-beam



### Feature Images

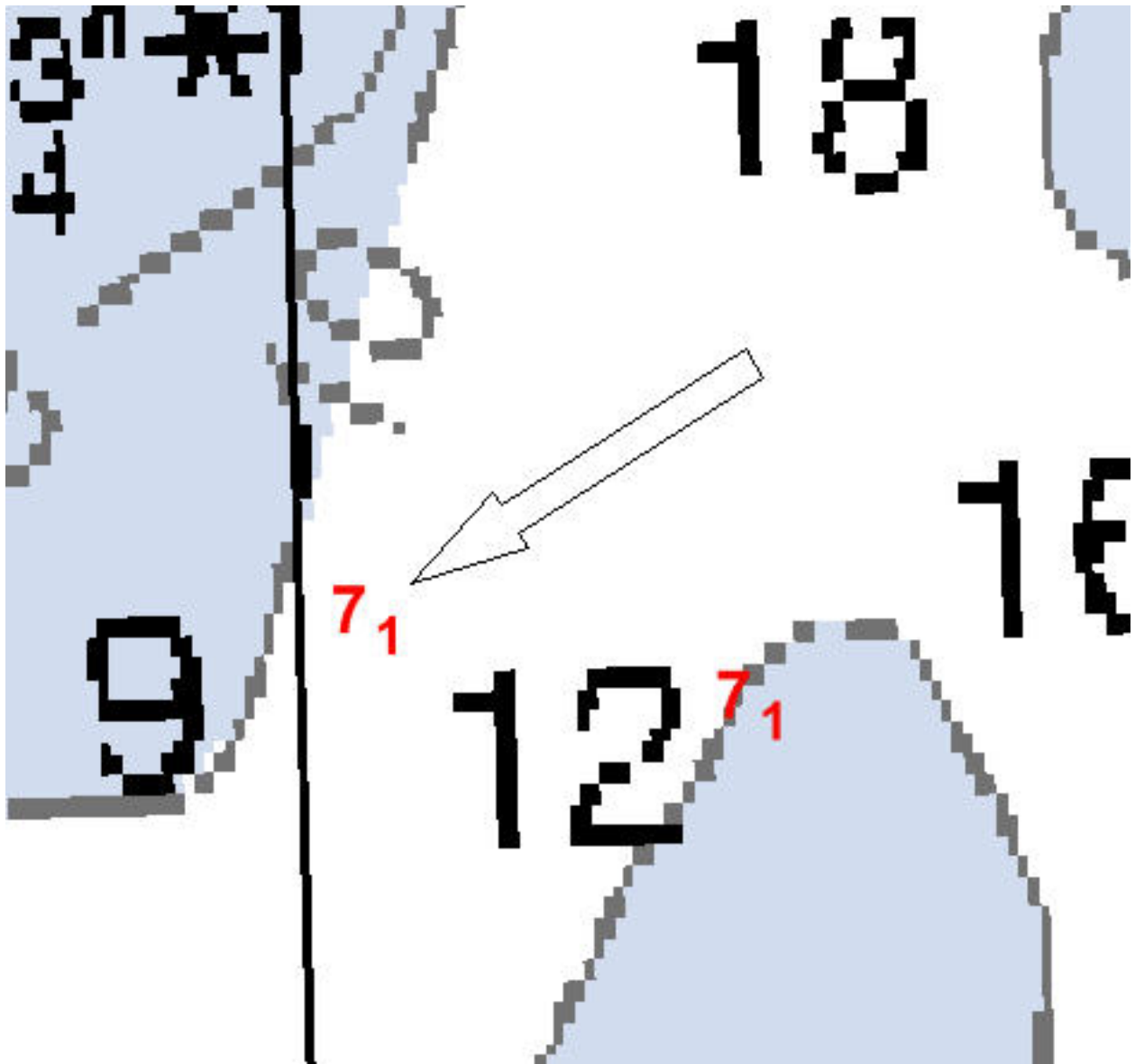


Figure 1.18.1

**1.19) Profile/Beam - 377/197 from h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 479\_2310**

**DANGER TO NAVIGATION**

**Survey Summary**

**Survey Position:** 55° 33' 08.8" N, 133° 15' 08.2" W  
**Least Depth:** 16.16 m (= 53.01 ft = 8.835 fm = 8 fm 5.01 ft)  
**TPU (±1.96σ):** **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.231 m  
**Timestamp:** 2008-167.23:11:56.798 (06/15/2008)  
**Survey Line:** h11850 / 2802\_reson7125\_hf\_512beams / 2008-167 / 479\_2310  
**Profile/Beam:** 377/197  
**Charts Affected:** 17404\_1, 17405\_1, 17400\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

DTON  
 New submerged rock found with SWMB

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11850/2802_reson7125_hf_512beams/2008-167/479_2310	377/197	0.00	000.0	Primary

**Hydrographer Recommendations**

Chart a submerged rock in the surveyed position

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

8 ¾fm (17404\_1, 17405\_1, 17400\_1, 16016\_1, 530\_1)  
 8fm 5ft (531\_1)  
 16.2m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20080616  
 SORIND - US,US,survey,H11850

TECSOU - 3:found by multi-beam

VALSOU - 16.158 m

WATLEV - 3:always under water/submerged

### Feature Images

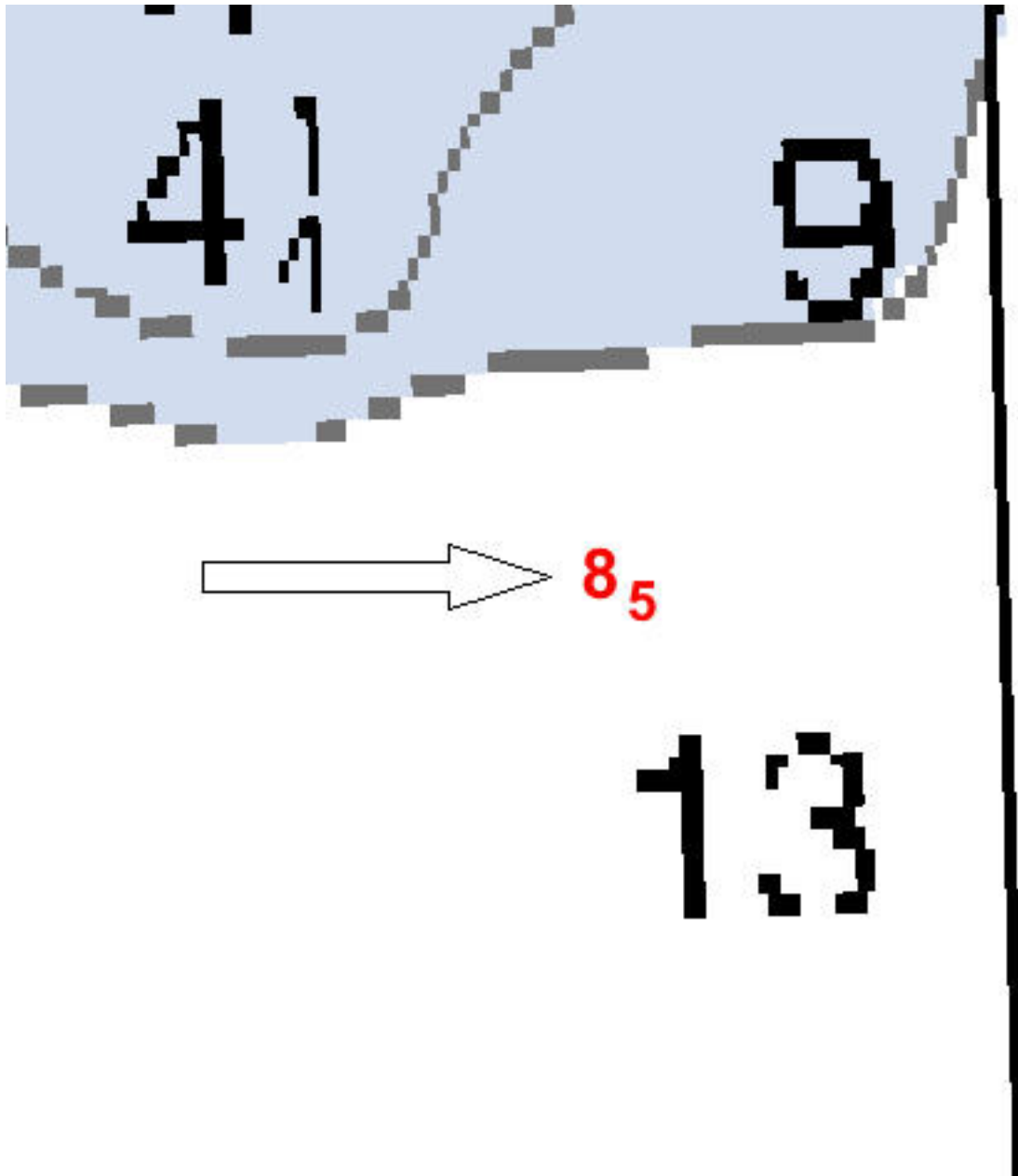


Figure 1.19.1



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** June 27, 2008

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-O190-RA-2008  
**HYDROGRAPHIC SHEET:** H11850

**LOCALITY:** San Christoval Channel, AK  
**TIME PERIOD:** May 17 - June 16, 2008

**TIDE STATION USED:** 945-1600 Sitka, AK  
Lat. 57° 03.1'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**

Preliminary zoning is accepted as the final zoning for project OPR-O190-RA-2008, H11850, during the time period between May 17 and June 16, 2008.

Please use the zoning file "O190RA2008CORP" submitted with the project instructions for West of Prince Wales Island, AK. Zones SA227, SA228, & SA250 are the applicable zones for H11850.

**Refer to attachments for zoning information.**

**Note 1:** Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

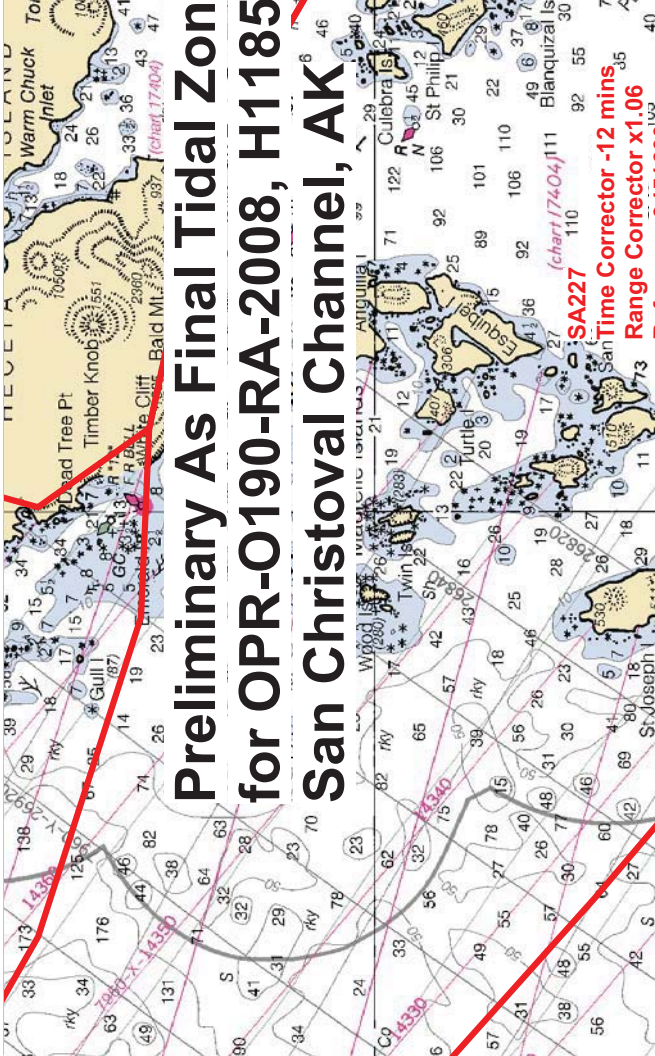
**Peter J. Stone**  
Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=CO-OPS,  
ou=NOAA/NOS, email=peter.  
stone@noaa.gov, c=US  
Date: 2008.07.02 07:18:37 -04'00'

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CHIEF, PRODUCT AND SERVICES DIVISION

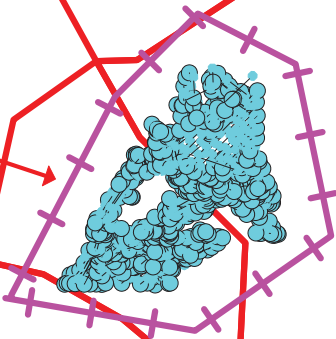






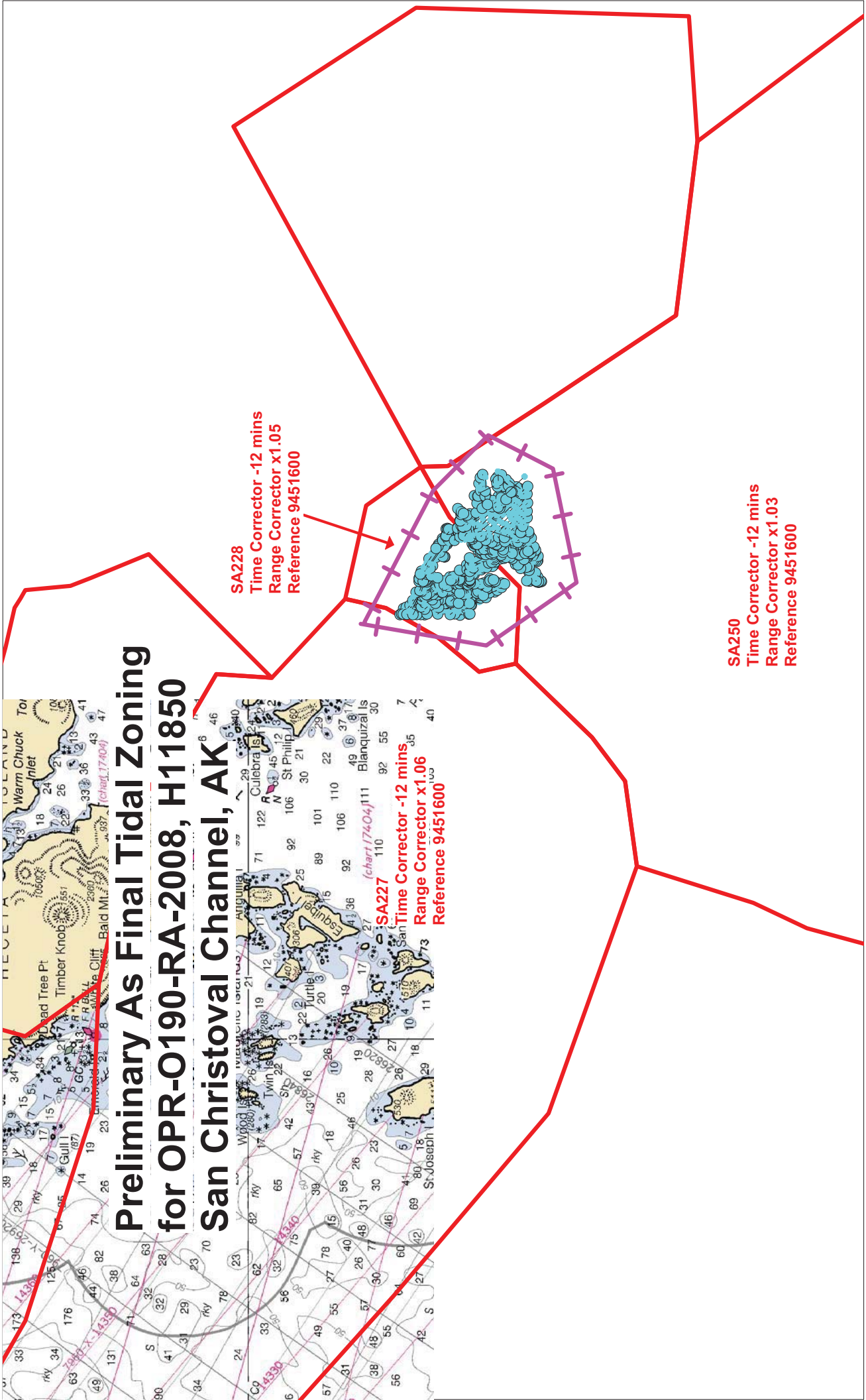
# Preliminary As Final Tidal Zoning for OPR-0190-RA-2008, H11850 San Cristoval Channel, AK

**SA228**  
Time Corrector -12 mins  
Range Corrector x1.05  
Reference 9451600



**SA227**  
Time Corrector -12 mins  
Range Corrector x1.06  
Reference 9451600

**SA250**  
Time Corrector -12 mins  
Range Corrector x1.03  
Reference 9451600



**H11850 HCell Report**  
Katie Reser, Physical Scientist  
Pacific Hydrographic Branch

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

HCell compilation of survey H11850 used:

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

**2. Compilation Scale**

Depths and features for HCell H11850 were compiled to the largest scale raster charts shown below:

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

The following ENC was also used during compilation:

Chart	Scale
US5AK4AM	1:40,000

**3. Soundings**

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

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

In CARIS BASE Editor soundings were manually selected from the high density sounding layer (SS) and imported into a new layer (CS) created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology. In areas where there was an overlap between multibeam and LIDAR data, multibeam data was honored over LIDAR data except in cases where the LIDAR data was shoaler.

#### 4. Depth Contours

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

Chart Contour Intervals in Fathoms	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H11850_SS.000
0	0.0000	0.2286	0.125	0
3	5.4864	5.715	3.125	3
5	9.144	9.373	5.125	5
10	18.288	18.517	10.125	10

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

#### 5. Meta Areas

The following Meta object areas are included in HCell H11850:

M\_QUAL

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

#### 6. Features

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

## 7. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue notes
COALNE	GC and charted coastline
DEPCNT	Zero contours
LNDARE	Islets and islands
LNDELV	Heights on islets/islands
M_QUAL	Data quality meta object
OBSTRN	Foul areas
SBDARE	Ledges, reefs, rocky seabed areas and bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WEDKLP	Kelp

The \*\_SS HCell contains the following Objects:

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

## 8. Spatial Framework

### 8.1 Coordinate System

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

### 8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

## **9. Data Processing Notes**

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

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

H11850 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**

H11850_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H11850_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H11850_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11850_Outline.gml	Survey outline
H11850_Outline.xsd	Survey outline

## 11.2 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, meta area objects, and blue notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Northport Systems, Inc., Fugawi Marine ENC Ver.3.1.0.435	Independent inspection of final HCells using a COTS viewer.

## 12. Contacts

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

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

APPROVAL SHEET  
H11850

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

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

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