H12027

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SERVICE

DESCRIPTIVE REPORT

Type of Survey Hydrographic Survey

Field No. N/A

Registry No. H12027

LOCALITY

State Alaska

General Locality West of Prince of Wales Island

Sublocality Cape Suspiro to Doyle Bay

2009

CHIEF OF PARTY

Captain Donald W. Haines, NOAA

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DATE

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12027

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: N/A

State Alaska

General Locality West of Prince of Wales Island

Sub-Locality Cape Surpiro to Doyle Bay

Scale 1:20,000 **Date of Survey** 4/28/2009 to 6/7/2009

Instructions dated 4/8/2009 **Project No.** OPR-O190-RA-09

Vessel RA1 (1101), RA2 (1103), RA4 (2801), RA5 (2802), RA3 (2803), RA6 (2804), RAINIER (S221)

Chief of party Captain Donald W. Haines, NOAA

Surveyed by RAINIER Personnel

Soundings by Tilted Reson 8125, Knudsen 320M, Reson SeaBat 7125, Seabeam/Elac 1050D MKII

SAR by Joe Tegeder **Compilation by** Toshi Wozumi

Soundings compiled in Fathoms

REMARKS: All times are UTC. UTM Projection 08

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes in red were generated during office processing. Page numbering may be interrupted or non sequential.

All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

Descriptive Report to Accompany Hydrographic Survey H12027

Project OPR-O190-RA-09
West of Prince of Wales Island, AK
Cape Suspiro to Doyle Bay
Scale 1:20,000
April – June 2009
NOAA Ship *Rainier* (s221)
Chief of Party: Captain Donald W. Haines, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-O190-RA-09 dated 8 April, 2009 and all other applicable direction[1], with the exception of deviations noted in this report. The survey area is Cape Suspiro to Doyle Bay, West of Prince of Wales Island, Alaska (figure 1). This survey corresponds to sheet "B" in the sheet layout provided with the Project Instructions. The purpose of OPR-O190-RA-09 is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.

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

Data Acquisition Type	Hull Number with Mileage (nm)							Total
	S221	1101	1103	2801	2802	2803	2804	
VBES (main scheme)	-	-	1.43	-	-	-	-	1.43
MBES (main scheme)	-	28.82	-	69.04	90.96	140	0.42	329.24
SSS (main scheme)	-	-	-	-	-	-	-	-
Crosslines	-	-	-	21.2	-	1.24	-	22.44
Developments	-	-	-	-	-	-	-	-
Bottom Samples	17	-	5	-	-	-	-	22
Total Number of Items Investigated	-	9	-	-	-	-	-	9
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	-	21.58

Table 1: Statistics for survey H12027

Limited Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12027, as per section 3.5.5 of the Field Procedures Manual April, 2009 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook .hob files.

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

Data acquisition was conducted from April 28 to June 9, 2009 (DN 118 to 160).

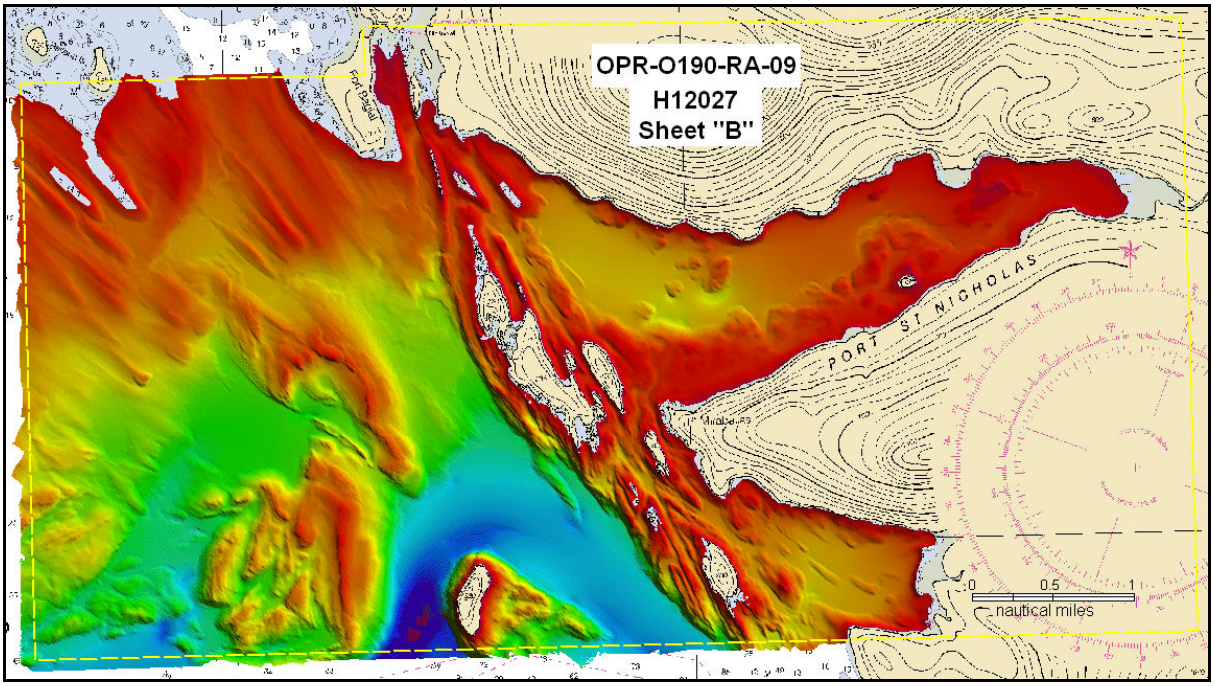


Figure 1: H12027 Survey Coverage, chart 17405.

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods can be found in the *OPR-O190-RA-09 Data Acquisition and Processing Report* (DAPR), submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

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

B.1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Length (ft)	Draft (ft)	Acquisition Type
s221	*Rainier*	231	15.5	Bottom Samples
1101	RA-1	29	2	Reson 8125 Multibeam Echosounder
1103	RA-2	29	2	Knudsen 320M VBES Bottom Samples
2801	RA-4	29	3.5	Reson 7125 Multibeam Echosounder
2802	RA-5	29	3.5	Reson 7125 Multibeam Echosounder
2803	RA-3	29	3.5	Reson 7125 Multibeam Echosounder

Table 2: Data acquisition vessels and systems for H12027

Sound speed profiles were measured in accordance with the Specifications and Deliverables using SEACAT SBE-19+ profilers. These profiles were concatenated for the H12027 survey area and applied using the "nearest in distance within 4 hours" option in CARIS HIPS.

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

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

No unusual vessel configurations were used for data acquisition.

B.2. Quality Control

B.2.a. Crosslines

Multibeam Echosounder (MBES) crosslines totaled 22.44 nautical miles, comprising 6.8% of main scheme MBES hydrography. The main scheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode; soundings agreed within 0.5m across all depth ranges[1].

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2009 *Rainier* Hydrographic System Readiness Review package submitted with this survey.

B.2.b. Final Uncertainty

Uncertainty values of submitted, finalized grids are calculated in CARIS using the "Greater of the Two" of total propagated uncertainty and standard deviation (scaled to 95%). An IHO_1 "child" attribute layer was created for the H12027_Final_Combined surface in CARIS HIPS for analysis. Throughout the vast majority of the survey, uncertainty values for H12027 fall below the IHO levels as described in the NOS Specifications and Deliverables. The exception to these results occurred along very near-shore areas when using the tilted Reson 8125 sonar configuration, refer to OPR-O190-RA-09 Data Acquisition and Processing Report for specifics.

B.2.c. Junctions

Survey H12027 junctions with surveys H12029, H12030, which are sheets D and E of the same project, respectively, and H12000 (Figure 2). Survey H12027 also junctions with Tenix LADS Lidar surveys H11661 and H11663, from OPR-O190-KRL-07 (Figure 3)[2]. Table 3 lists all H12027 junction surveys.

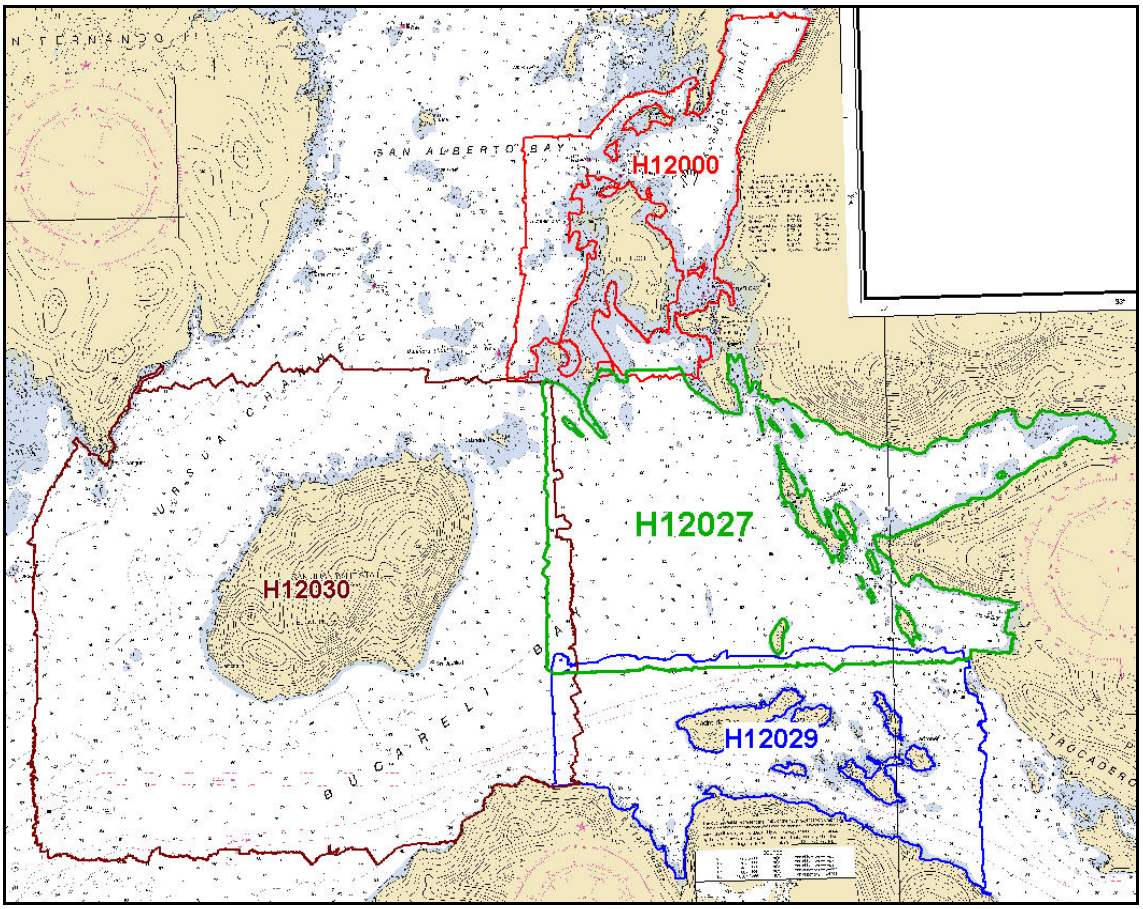


Figure 2: H12027 Multibeam junction surveys.

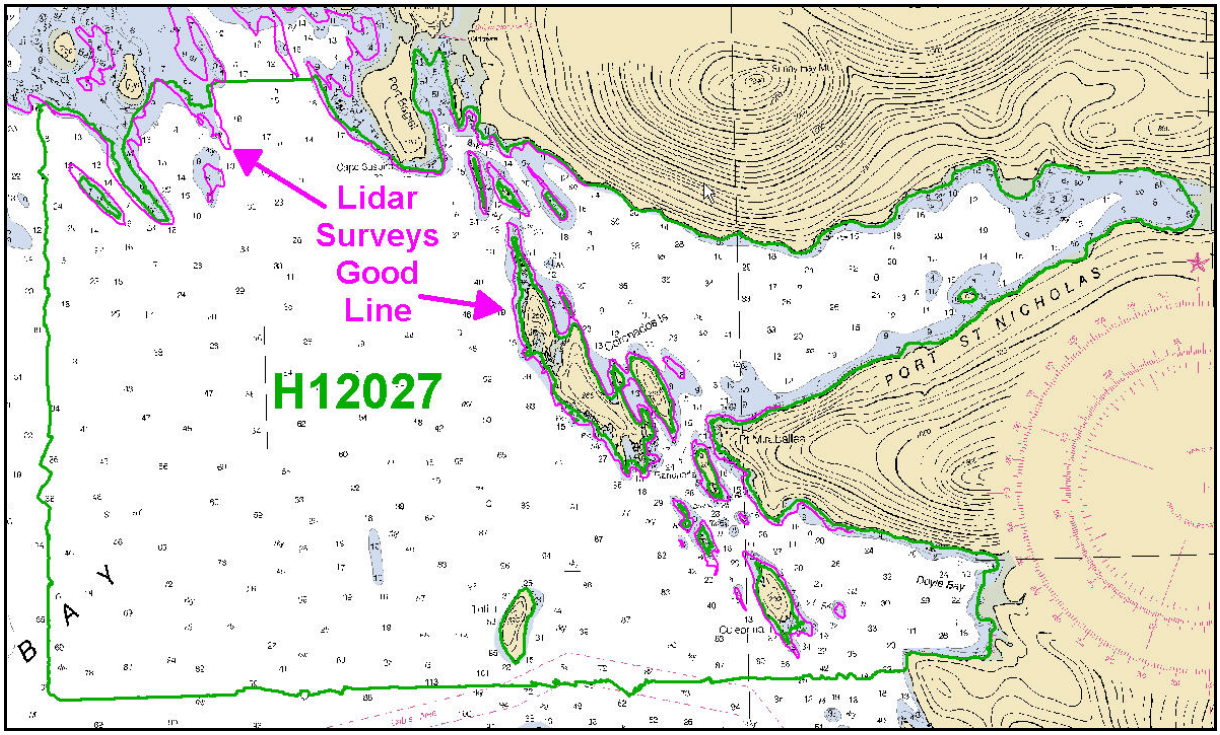


Figure 3: H12027 Lidar junction surveys "good line."

Junction Survey	Survey Scale	Date of Survey	Survey Location
H12000	1:10,000	2008	North
H12029	1:20,000	2009	South
H12030	1:20,000	2009	West
H11661	1:10,000	2007	Northwest
H11663	1:10,000	2007	Northwest to Southeast

Table 3: H12027 Junction Surveys

Survey data for survey H12000 were still archived aboard *Rainier* and were used for junction comparison. Soundings from H12027 were compared with sounding data from survey H12000 in CARIS HIPS using the curser information function. The area of overlap between H12027 and H12000 showed good general agreement within 0.6m across all depth ranges, with soundings from H12027 being consistently more shoal than H12000.

Survey H12029 was completed concurrently with survey H12027 during project OPR-O190-RA-09. Soundings from H12027 were compared with sounding data from survey H12029 in CARIS HIPS using the curser information function. The examined area of overlap between H12027 and H12029 showed agreement within 0.5m across most depth ranges; on steep slopes and in depths exceeding 80ftms soundings generally agreed within 1m.

Survey H12030 was completed concurrently with survey H12027 during project OPR-O190-RA-09. Soundings from H12027 were compared with sounding data from survey H12029 in CARIS HIPS using the curser information function. The area of overlap between H12027 and H12030 showed agreement within 0.5m throughout their common areas, across all depths[3].

CARIS 3m BASE surfaces for Lidar survey H11661 and H11663 were provided by Pacific Hydrographic Branch for junction comparison. H12027 BASE surfaces were compared to these junction surfaces in CARIS HIPS using the curser information function. All surfaces were found to be in good agreement within 1m, with soundings from H12027 generally being shoaler than corresponding Lidar data[4]. Differences were typically between 0.1m to 0.8m. On steep slopes where positional accuracy of measurements was less robust, differences of up to 1 meter were noted.

B.2.d. Quality Control Checks

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

B.2.e. Data Quality Factors

<u>True Heave</u>
Seventy eight (78) lines from launch 2803 (RA-3) on DN127 did not load true heave. The fix true heave utility did not correct the condition and therefore the lines have only real-time heave correctors applied. See the acquisition log for specifics. All lines were examined and no significant heave artifacts are present in the data.

Sound Speed Artifacts

Despite best efforts to conduct sufficient sound velocity casts distributed both spatially and temporally, isolated instances of inadequate sound velocity correction were observed in some areas of the survey. Figures 4 and 5 illustrate a SV issue near Ballena Island that was consistent with the effects of surface layer warming, tidal currents and related environmental causes. Figures 6 and 7 show the SV issue near the east end of Port Saint Nicholas which was likely due to fresh water influence. All vertical offsets were observed to be less than 0.5m. To address these sound velocity issues, the Hydrographer rejected outer beam soundings obviously in error where they were found to effect the CUBE surfaces accurate portrayal of the bottom.

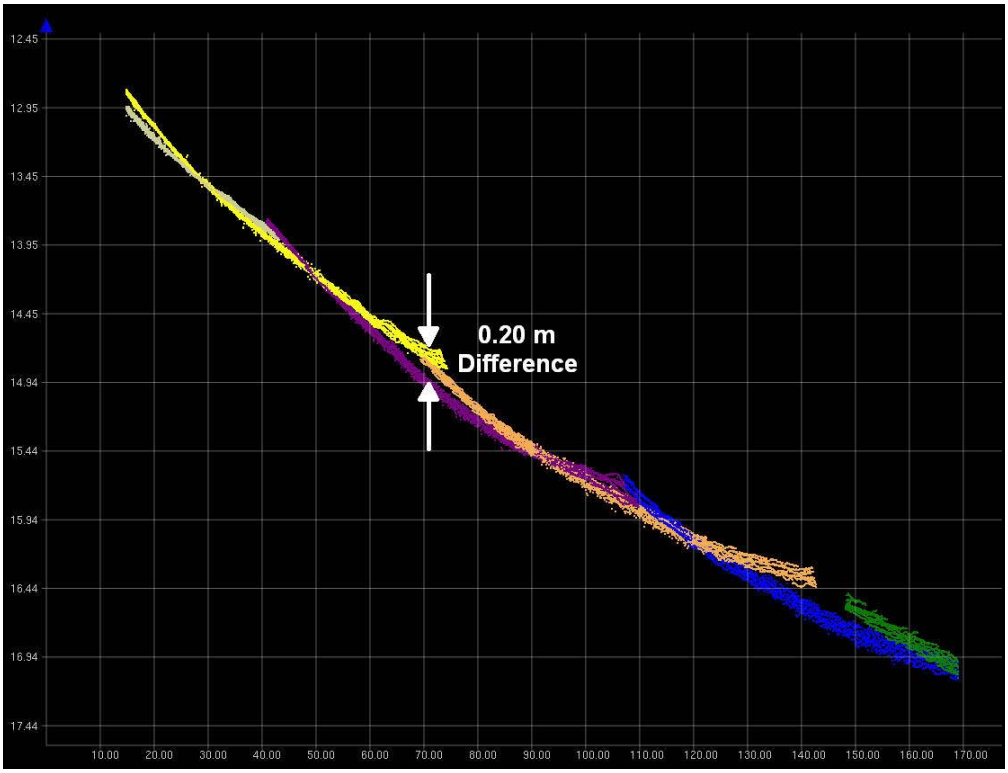


Figure 4: Example of Ballena Island sound velocity issue.

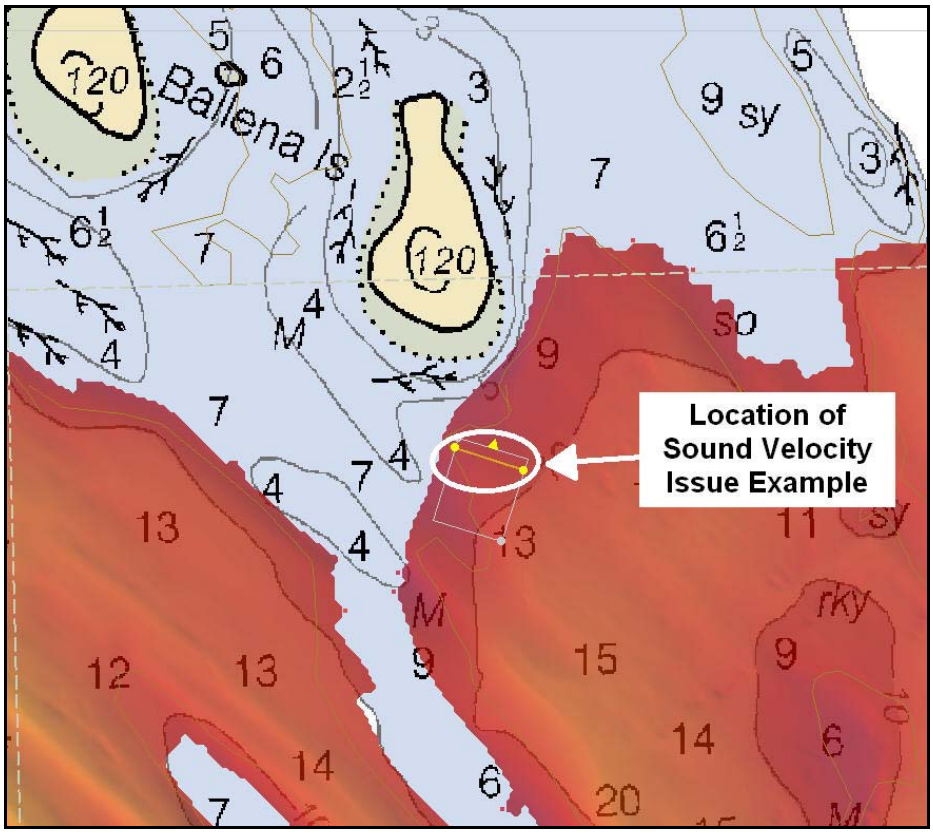


Figure 5: Location of Ballena Island sound velocity example.

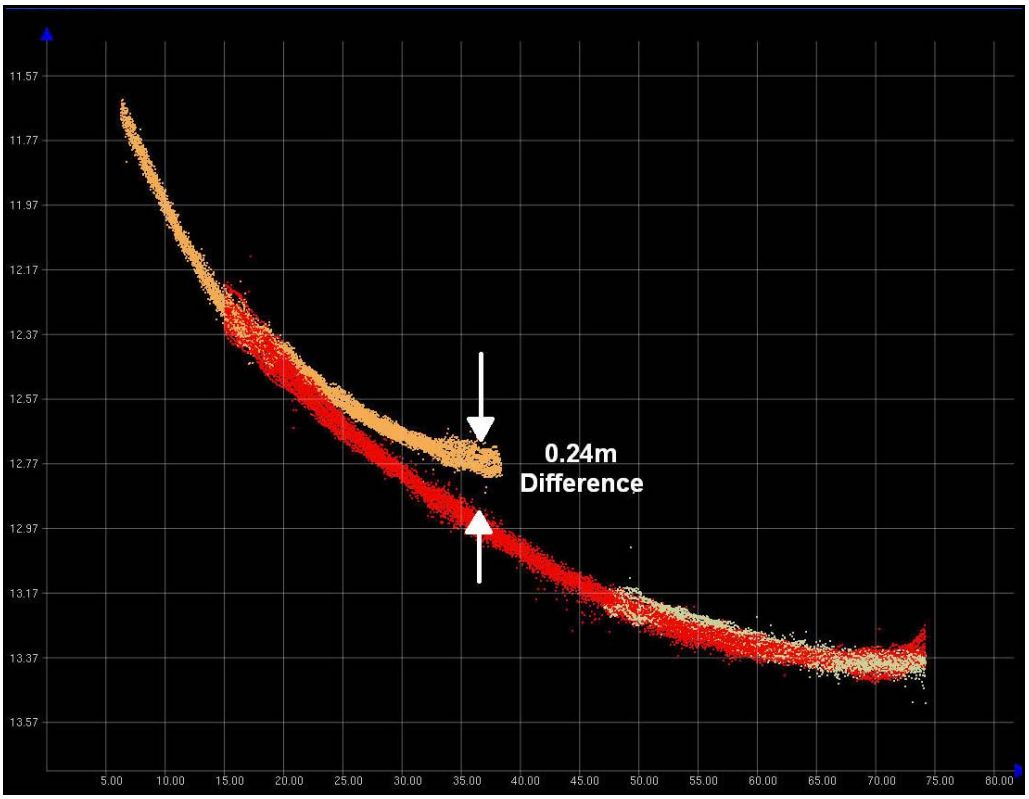


Figure 6: Example of Port Saint Nicholas SV issue.

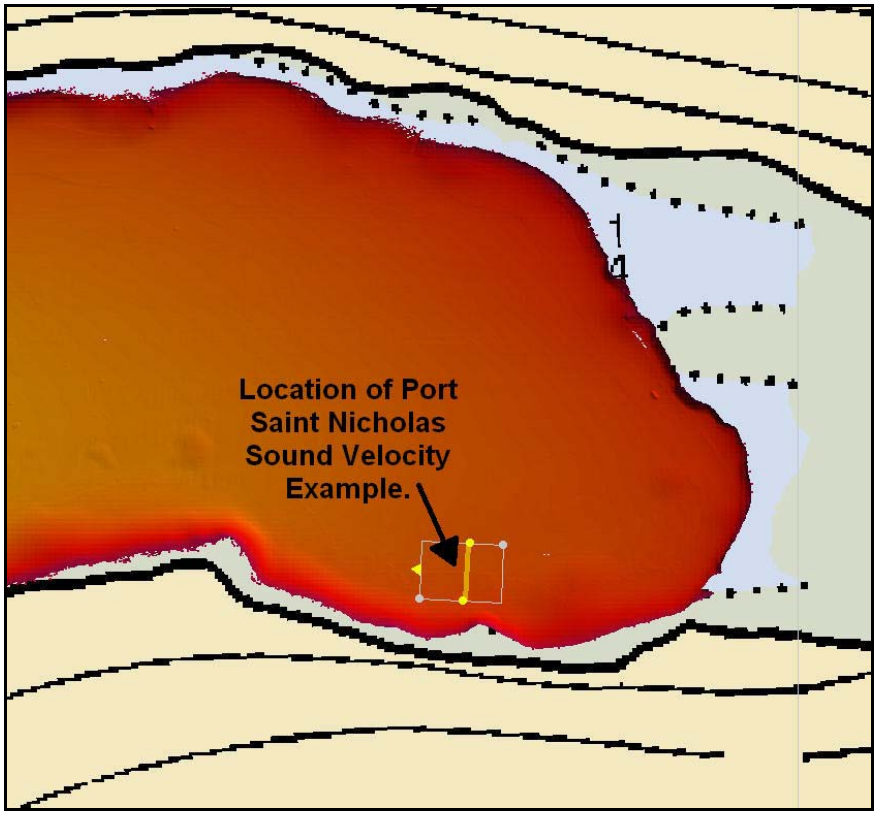


Figure 7: Location of Port Saint Nicholas SV example.

Bottom Penetration by Outer Beams

The bottom type found in the vicinity of San Juan Bautista contained areas of drastically-varying bottom type. In relatively deep waters at the interface of steep and apparently rocky slopes intersecting with a flat and presumably muddy flats soundings digitized below the apparent sea floor. Soundings continued to follow the trend of the steep slope and penetrate 10-20 meters beyond the real bottom. An example is shown in figures 8 and 9 of two low frequency Reson 7125 lines from vessel 2803 (RA-3) on day number 119. Beam numbers 146-160 and 192-214 of the 256 beams appear to penetrate the likely seafloor. The hydrographer theorizes that the issue is related to differences in bottom type found in places where soft and hard (mud/rock) materials meet. The hydrographer rejected those soundings that were inconsistent with the most probable seafloor profile. An example of this behavior was later shown to Mike Mutschler, a Reson representative. Although Mr. Mutschler could not offer the exact cause of this behavior, he stated definitively that due to the high frequencies used by the 7125 system, these errant soundings could not be caused by actual ground penetration.[5]

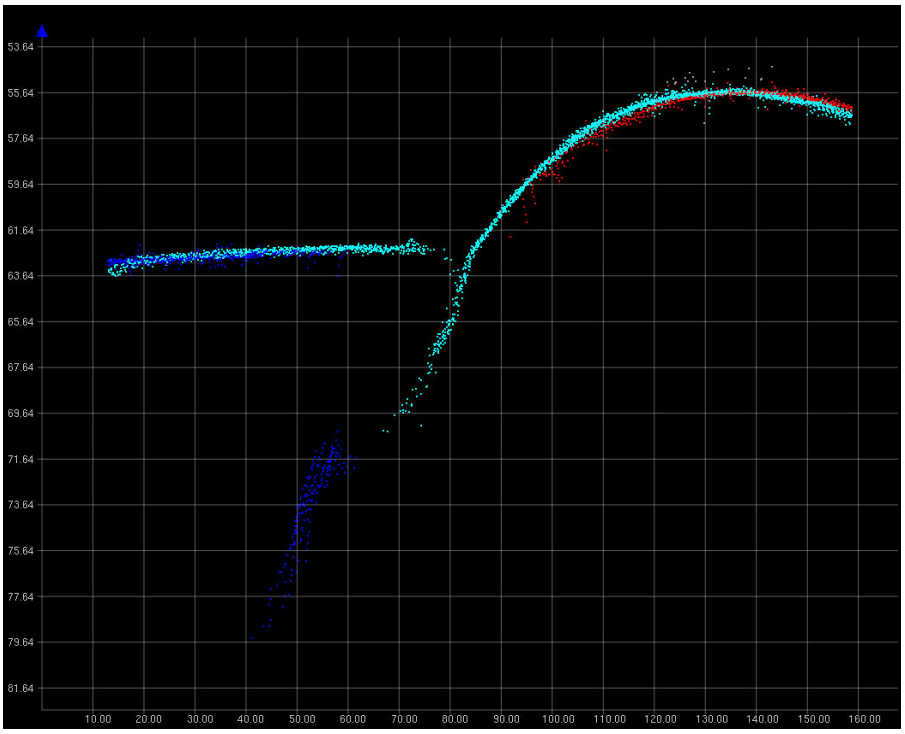


Figure 8: Example of digitizing below apparent sea floor.

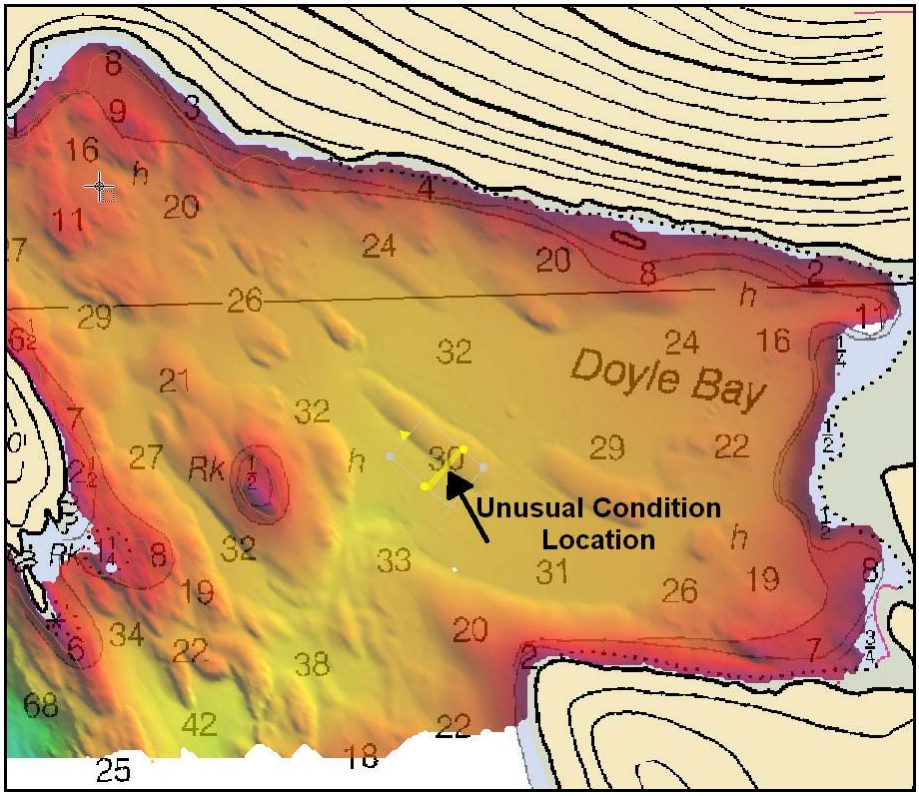


Figure 9: Location of digitizing below apparent sea floor example.

B.2.f. Object Detection and Coverage Assessment

Holidays

Coverage for this survey is essentially complete. Infrequent, isolated and non-navigationally significant holidays can be found mainly as a result of down-slope beam loss (figure 10-11). The locations of these holidays are listed below; least depths in these areas are represented by surrounding data.[6]

55-25-24.42N, 133-11-44.19W
55-25-10.27N, 133-10-24.11W
55-25-58.87N, 133-09-26.82W
55-26-10.49N, 133-09-16.13W
55-26-55.47N, 133-08-05.38W
55-27-43.55N, 133-07-58.39W
55-26-12.16N, 133-06-26.14W
55-24-30.44N, 133-07-20.27W
55-25-45.21N, 133-05-25.27W
55-26-40.88N, 133-04-30.52W
55-25-00.11N, 133-04-21.93W
55-24-38.16N, 133-04-16.64W
55-25-07.58N, 133-03-22.05W
55-24-42.87N, 133-02-38.73W

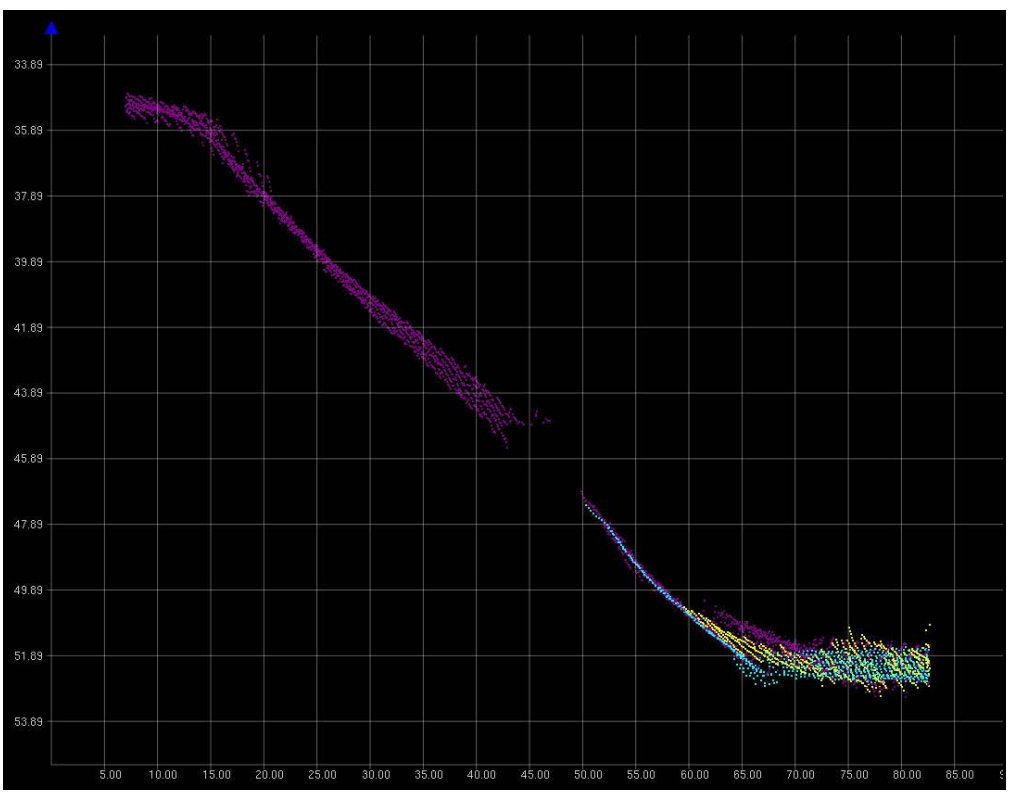


Figure 10: Example of down-slope beam loss holiday.

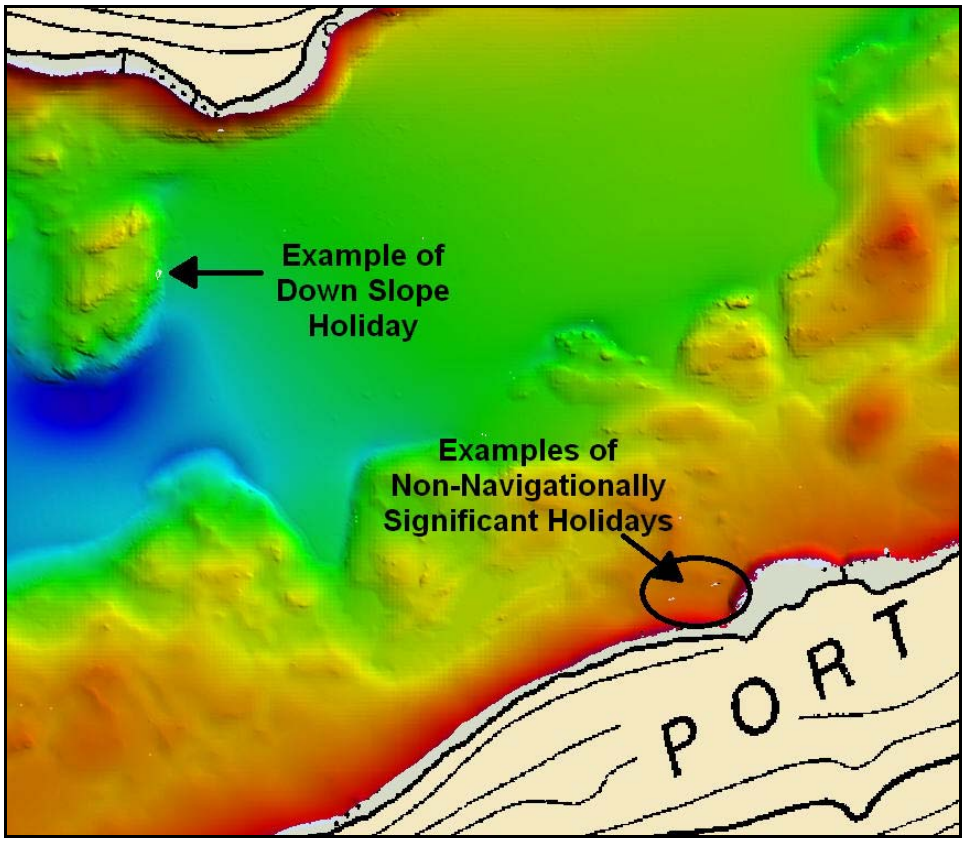


Figure 11: H12027 Holiday examples.

Density of Soundings

Figure 12 illustrates the number of soundings that contribute to each node of this survey: green indicates five (5) or more sounding per node, red represents less than five (5) soundings per node. Through visual inspection it was determined that 95 % of the nodes meet the 5 soundings per node requirement in accordance with the Specifications and Deliverables section 5.1.2.1. In most instances, nodes with fewer than 5 soundings are the result of the decreased sounding density from outer beams of the tilted Reson 8125 sonar configuration. In many cases, this situation occurred in close proximity to, or within areas covered by Lidar junction surveys, and thus, outside H12027 limits.

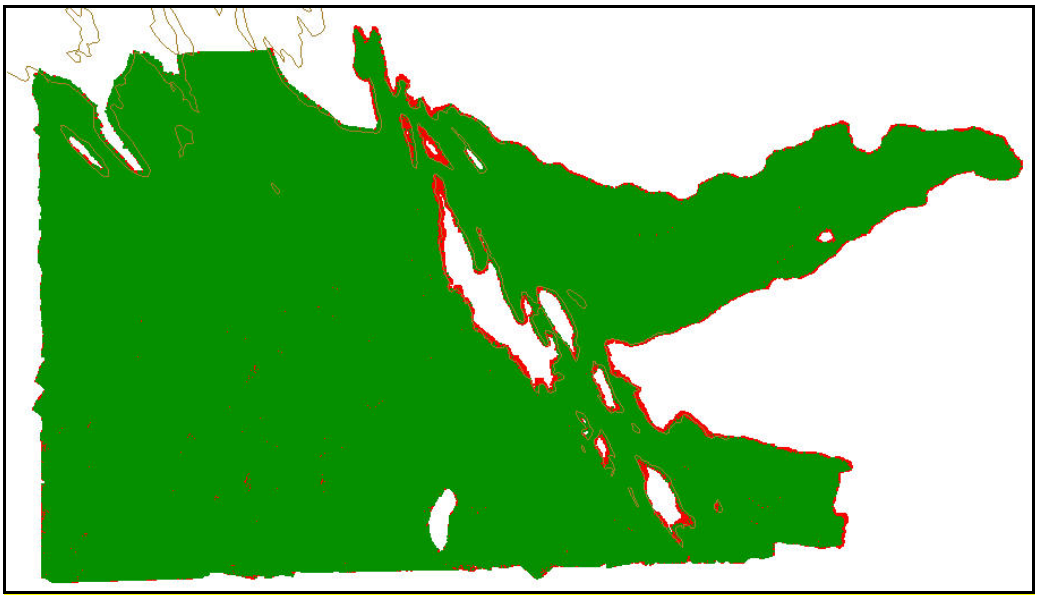


Figure 12: H12027 Sounding density per node. Green=5 or more, Red= less than 5

B.2.g. Unusual Conditions

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

B.3. Corrections to Echo soundings

Data reduction procedures for survey H12027 conform to those detailed in the *OPR-O190-RA-09 DAPR.*

B.4. Data Processing

Data processing procedures for survey H12027 conform to those detailed in the DAPR. Data were processed initially using CARIS HIPS & SIPS v6.1, Service Pack 2, and Hotfix 8. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

TPU VALUES:
The survey specific parameters used to compute CARIS TPU for H12027 are listed in table 4.

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

Table 4: Survey specific CARIS TPU parameters

Many BASE surfaces were used in processing H12027. Final BASE surface resolutions and depth ranges were set according to Table 5 below, with field sheets smaller than $25x10^6$ nodes. CUBE surfaces were processed with a parameter set corresponding to each resolution

as per HTD 2009-2. The CUBE parameter XML file is included with the data deliverables. Vertical Beam data is submitted in a 2 meter resolution uncertainty surface and, with the exception of the final combined surface, was not included in individual (submitted) CUBE surfaces. VBES soundings averaged 1.2m deeper than SWMB soundings in water up to 15m deep. In 20-35m depths, VBES soundings averaged 0.5m deeper than SWMB measurements for the same area. The submission Field Sheet and BASE Surface structure are shown in figures 13, 14, and 15.

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

Table 5: Depth range and surface resolutions for H12027

In areas where multibeam data was acquired on charted cultural features (pilings, piers, etc) that were inshore of the NALL, all data were rejected on the feature itself to more accurately represent the seafloor below these features.

Contours and soundings were generated in CARIS HIPS from the final combined BASE surface for field unit review purposes. They are included for reference only and are not intended as a deliverable.

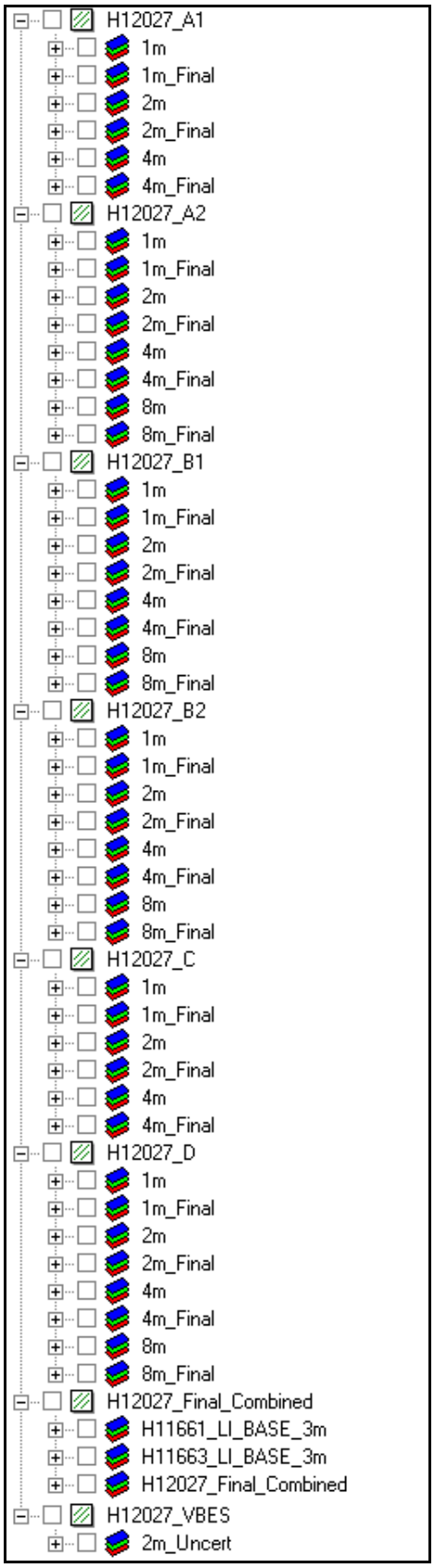


Figure 13: Field sheets and BASE surfaces submitted with H12027

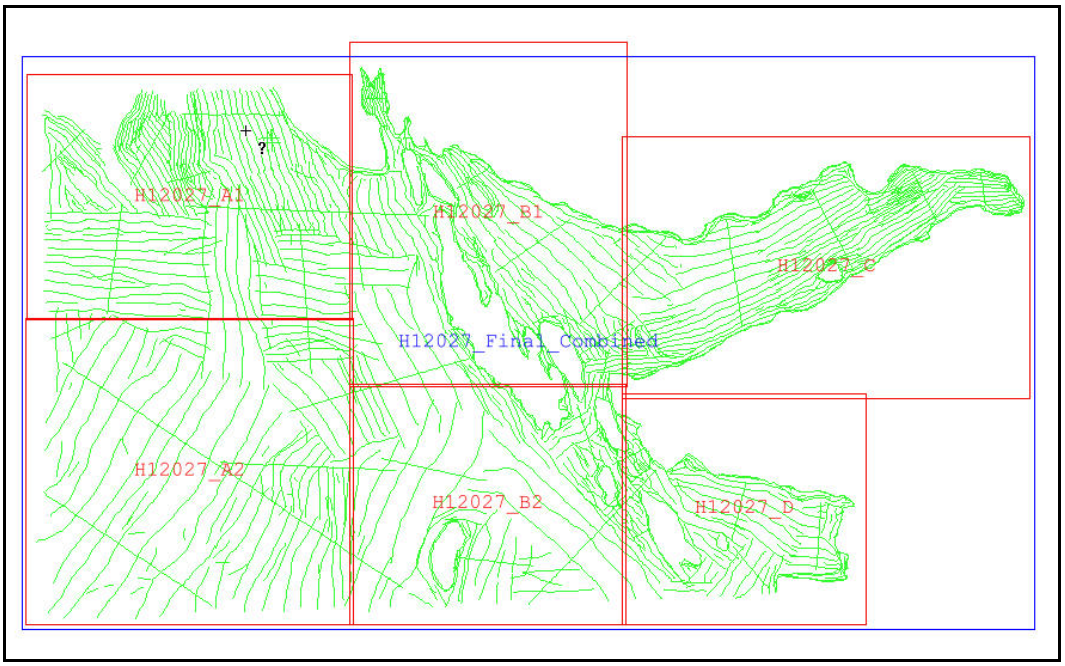


Figure 14: H11852 Field sheet layout (excluding VBES).

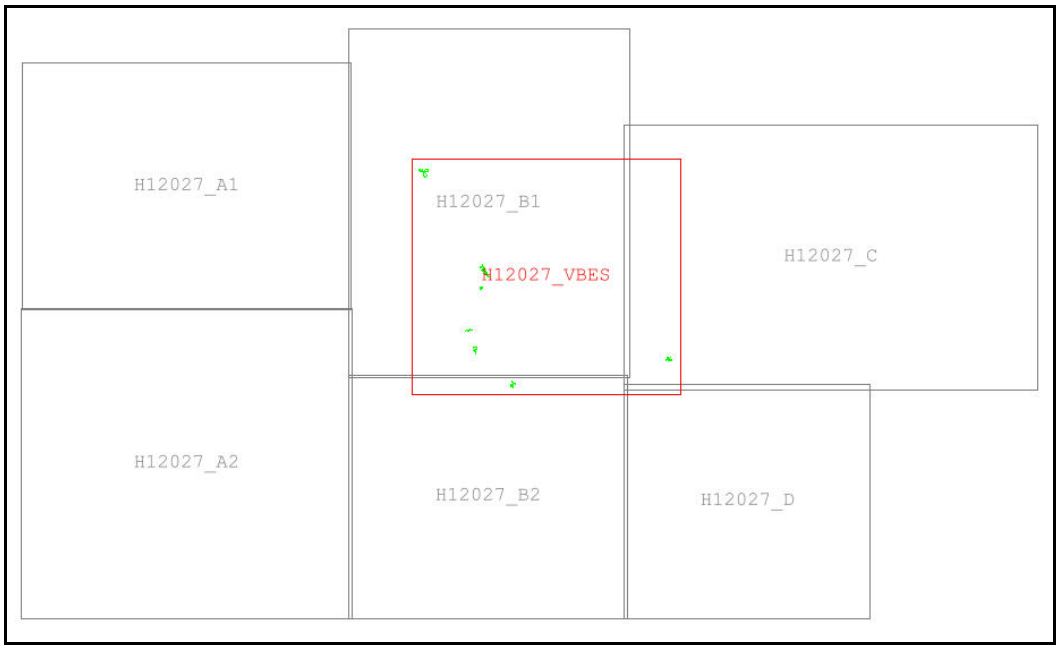


Figure 15: H11852 VBES field sheet layout.

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H12027 can be found in the *OPR-O190-RA-09 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

C.1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacons utilized for this survey are given in Table 6.

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

Table 6: Differential corrector sources for H12027

C.2. Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Sitka, AK (945-1600) served as control for datum determination and as the primary source for water level reducers for survey H12027.

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

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

Table 7: Tide Station installed by Rainier personnel for H12027

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels from the Trocadero Bay station (945-0463) by applying tide file 9450463.tid and time and height correctors through the zone corrector file H12027CORF.zdf. **It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during final processing.**

The request for Final Approved Water Levels for H12027 was submitted to CO-OPS on June 9, 2009 in accordance with the Field Procedures Manual (FPM), dated April 2009. The Final Tide Note is dated August 27, 2009[7]. This documentation is included in Appendix IV.

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Chart comparison procedures were followed as outlined in section 4.5 of the FPM and section 8.1.3-D.1 of the HSSDM, utilizing CARIS HIPS software program.

Survey H12027 was compared with the following chart[8]:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17405	1:40,000	16th Ed, Oct 2008	12/3/2008

Table 8: Chart compared with H12027

Chart 17405:
Charted (17405) depths agreed with soundings from this survey within two (2) fathoms except as indicated below. Figure 16 shows discrepancies between charted depths and H12027 soundings. A red ellipse marks areas where soundings were at least 2 fathoms shoaler than charted. A blue ellipse marks areas where soundings were at least 2 fathoms deeper than charted. No overall deepening or shoaling trends are apparent. In numerous instances, this survey found shoaler soundings between charted depths; this is most likely the result of increased bottom coverage using multibeam sonar for acquisition.[9] For examples, see figures 17-18.

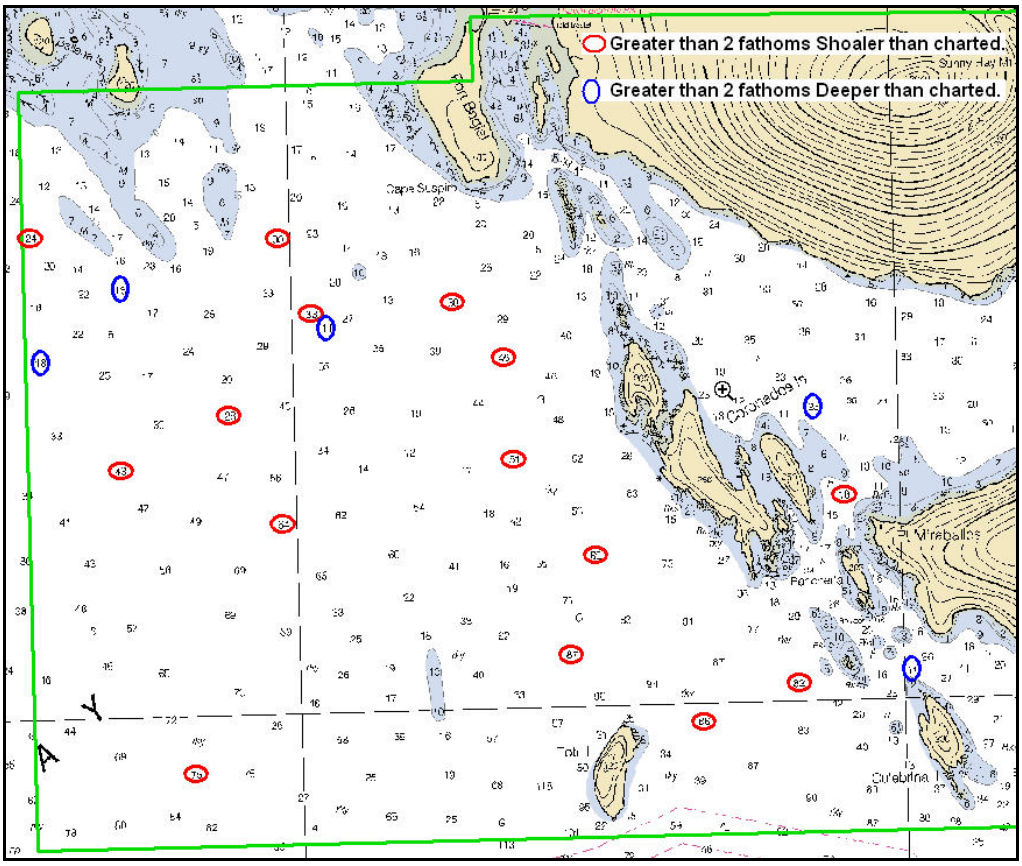


Figure 16: H12027 Charted depth / sounding comparison.

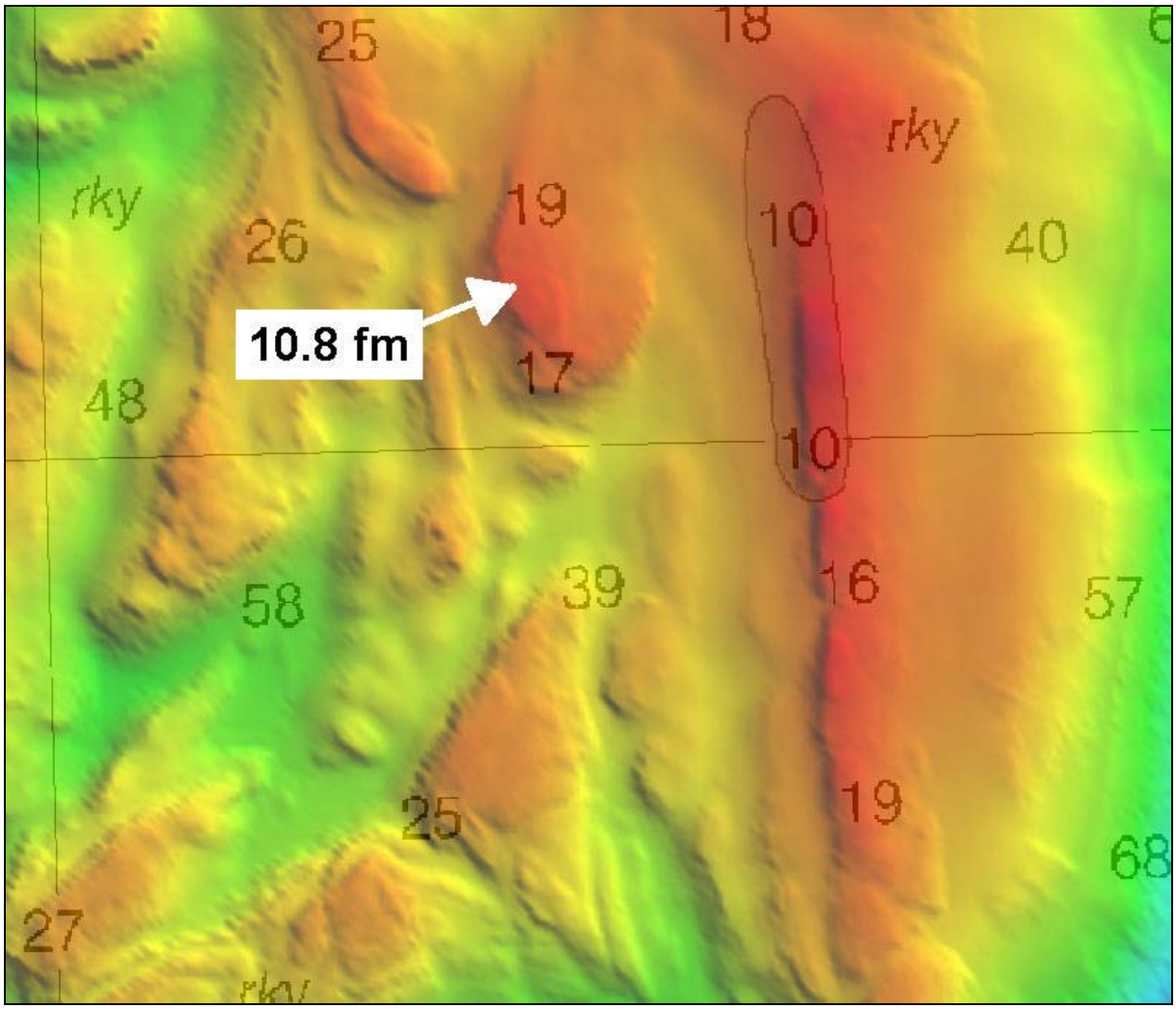


Figure 17: Example of shoaler sounding between charted (17405) depths

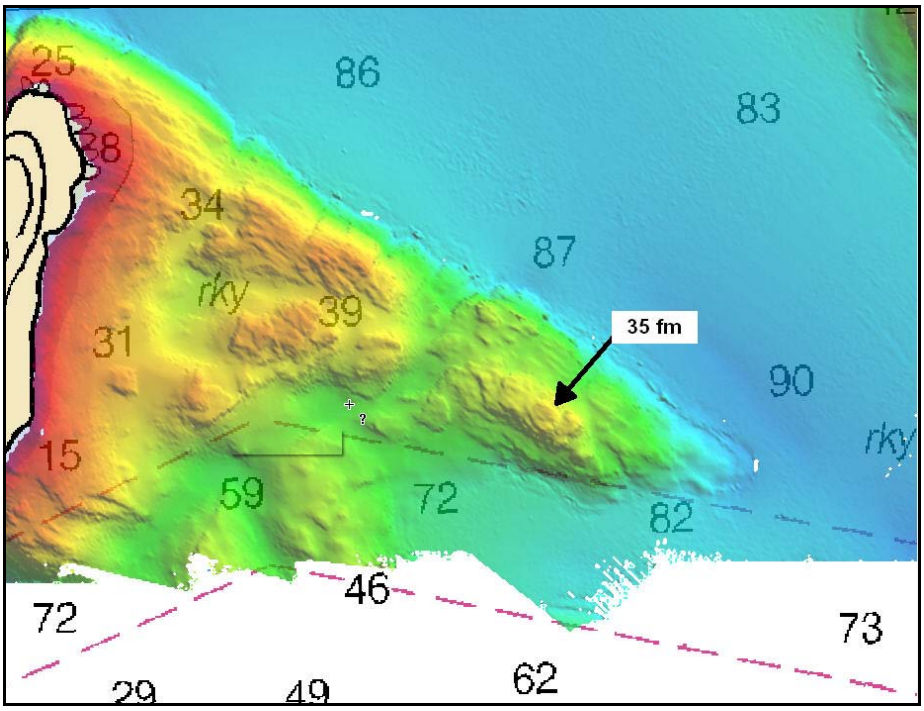


Figure 18: Example of Shoaler sounding between charted depths.

At the SE end of Doyle Bay, a segment of the zero fathom contour is symbolized with a solid magenta line (figure 19). This apparent mistake should be corrected to correctly denote the zero fathom curve with the standard black dotted line[10].

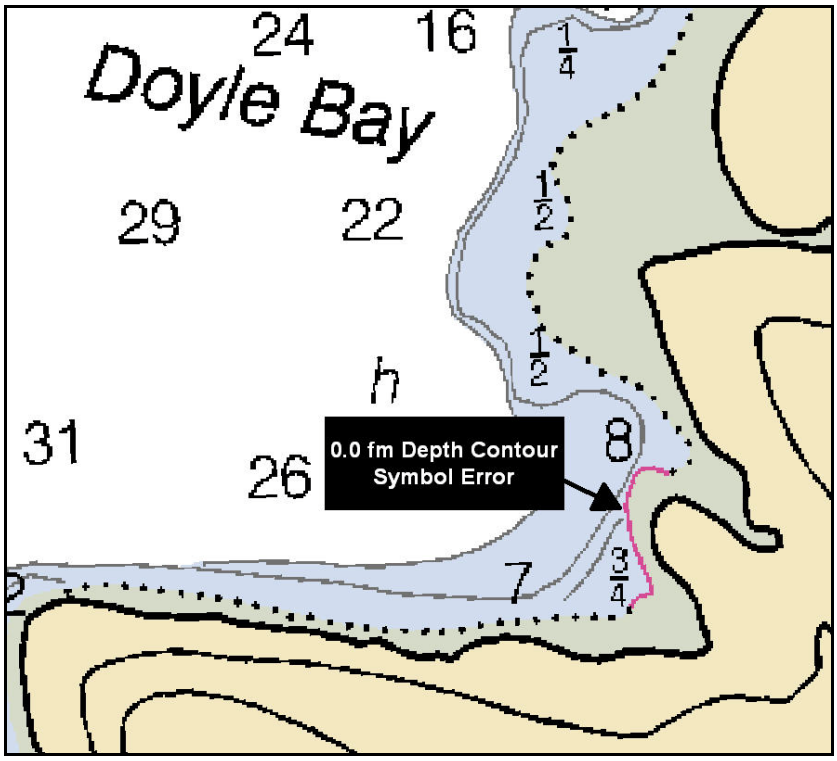


Figure 19: Incorrect symbol for zero fathom contour line.

The 100 meter long island charted (17405) at the north end of Doyle Bay that was not seen. This island was disproved with complete multibeam sonar coverage (figure 20)[11].

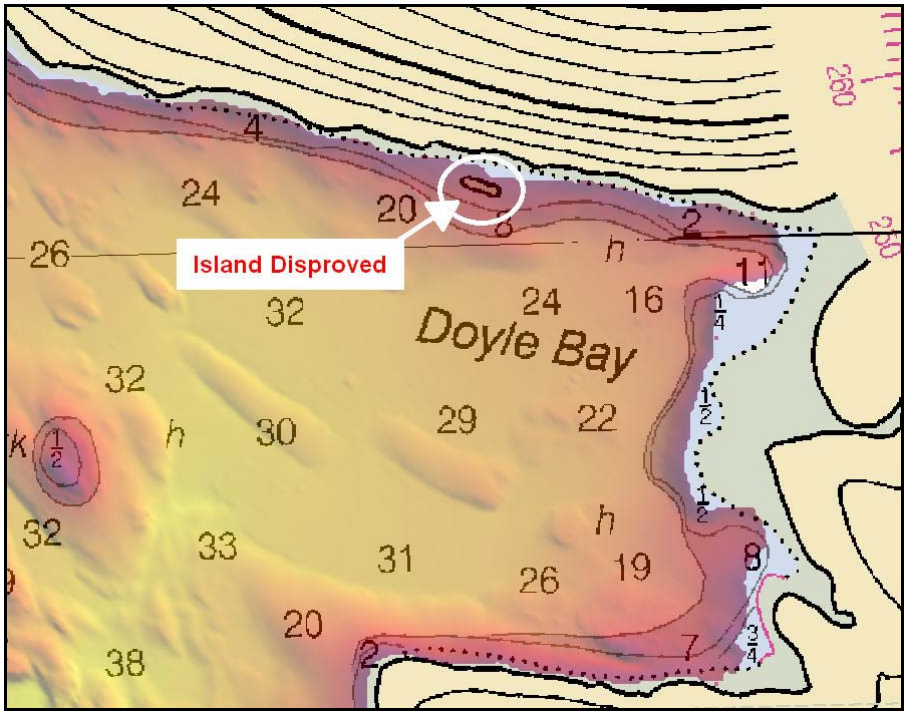


Figure 20: Disproved Island.

The Hydrographer recommends that H12027survey soundings supersede all prior survey and charted depths in the common area.

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

No AWOIS items were located within the survey limits of H12027[12].

D.1.c. Other Investigated Features

<u>Additional Items</u>

Nine (9) Lidar investigation items were within H12027 survey limits. They were addressed using a combination of VBES, MBES or visual methods. The results of these investigations can be found in the CARIS Notebook .hob files submitted with the session file H12027_Notebook.wrk.

A non-dangerous wreck was located near the south shore of Port Saint Nicholas (figures 21-22). The craft is approximately 8.75m in length, rises 2m off the seafloor and has a least depth of 12.1 meters. A sounding was designated on its shoal point and the feature was added to H12027_Final_Feature.hob file[13].

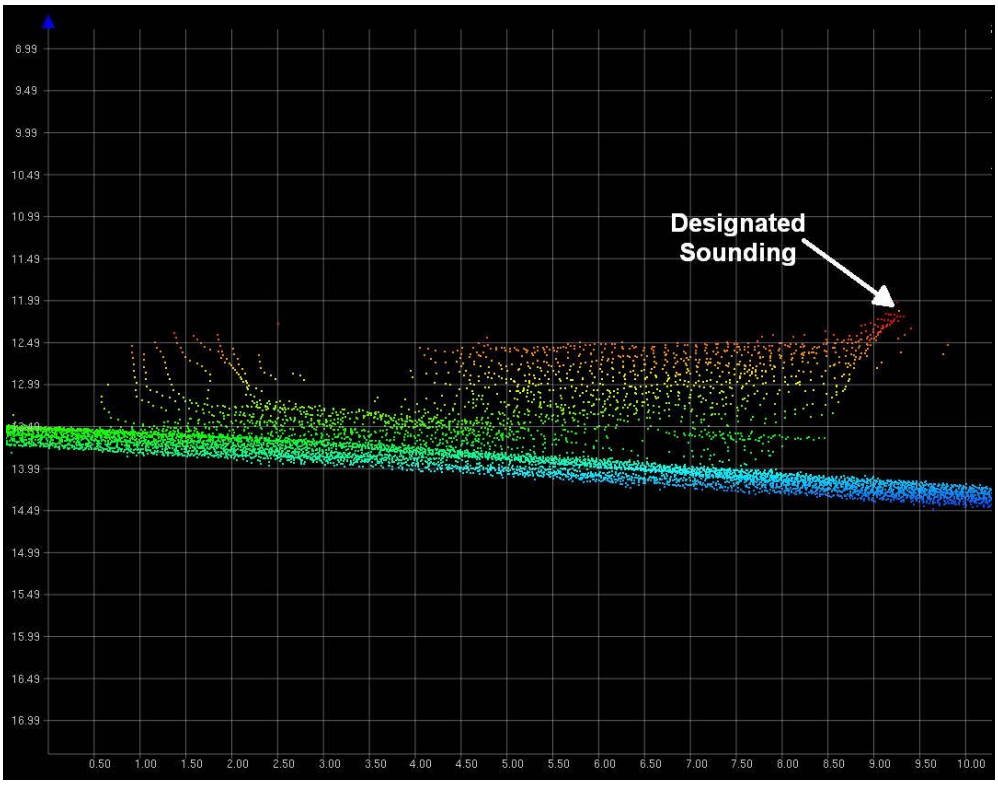


Figure 21: Port St Nicholas wreck, least depth 12.1 meters.

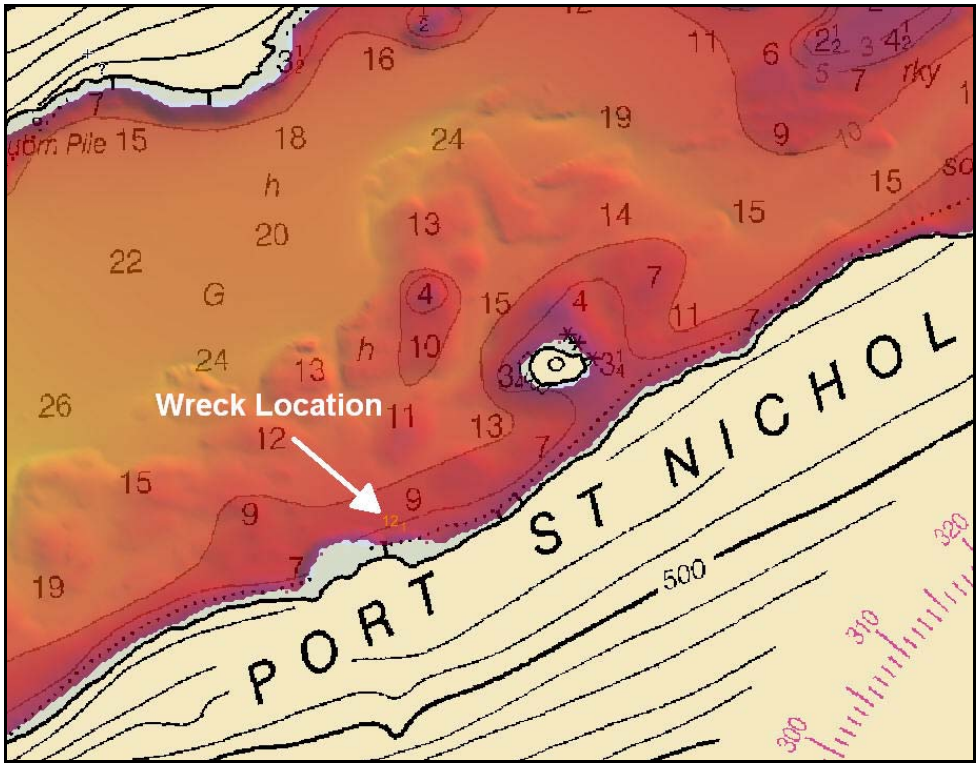


Figure 22: Location of wreck

D.1.d. Dangers to Navigation

Fifteen (15) Dangers to Navigation (DTONs) were found within the survey limits of H12027, and reported to the Marine Chart Division via email on October 19, 2009. The original DTON submission package is included in Appendix I[14].

D.2. Additional Results

D.2.a. Shoreline Verification

Shoreline Source
Limited shoreline verification/Lidar junction survey was accomplished using a combination of the composite source file (CSF) and project reference file (PRF) provided with the project instructions. CSF are created using various data including the latest ENCs, most recent aerial photogrammetry, prior hydrographic surveys, and accepted Lidar survey features. Prior survey and Lidar features in the CSF are for reference.

Lidar items assigned to the ship for further investigation were provided in the PRF as features with s-57 feature acronym BUAARE. Although Lidar data were collected over sections of H12027, the entire sheet area was not covered. Port St. Nicholas, the head of Doyle Bay and Toti Island had no Lidar coverage. Traditional shoreline verification was conducted in those areas. The composite source along with Lidar items for further investigation are printed on paper "boat sheets" and displayed in CARIS Notebook and/or Hypack for use during field verification. Refer to OPR-O190-RA-09 DAPR for extent of Lidar "good line."

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

- Lidar items selected for further investigation and provided in the PRF were addressed by visual, Detached Position (DP), VBES, or MBES techniques as appropriate and feasible, near predicted low water. Note that some of these features were located in areas unsafe to approach and/or were considered insignificant to navigation, and were not further investigated.
- The composite source file was used for orientation and navigation while in transit between assigned H12027 items. Composite source features noted to be both egregiously misrepresented in source data and significant to navigation were investigated. In some cases these items were inshore of the limits of H12027.
- All new, charted, and AWOIS items within the limits of H12027 (i.e., offshore of the limits prescribed in the Project Instructions and discussed in Section A.) were addressed.

All shoreline data is submitted in CARIS Notebook .hob files. The session H12027_Notebook.wrk contains the following:

HOB File	Contents
H12027_Original_Comp_Source.hob	Original Source Data as provided for project OPR-O190-RA-09 filtered to the limits of H12027.
H12027_Final_Features.hob	Composite source data modified by the field to best represent the shoreline at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey. This file contains PRF Lidar Investigation Features that were confirmed to exist or were unable to be investigated.
H12027_Disprovals.hob	Composite source items that were deleted or modified in position or geographic type. This file contains Lidar investigation items that were found in the field to not exist.
H12027_LIDAR_Good_Line.hob	Extents of Lidar junction survey data for H12027.
H12027_LIDAR_Investigations	PRF Lidar investigation items clipped to H12027.

Table 9: List and description of H12027 Notebook files

Recommendations
The Hydrographer recommends that the shoreline as depicted in the Notebook .hob files supersede and complement shoreline information compiled on the composite source file and charts as described above[15].

D.2.b. Prior Survey Comparison

A prior survey comparison was not performed.

D.2.c. Aids to Navigation

There are no Aids to Navigation within the limits of H12027[16].

D.2.d. Overhead Features

A charted (17405) "Old trestle" south of Shelter Cove, at the north end of Port Bagial was outside of Navigable Area Limit Line (NALL), as seen in figure 23. No indication of a trestle structure was observed in the field[17].

D.2.e. Submarine Cables and Pipelines

A submerged pipeline PA is charted (17405) at the north end of Port Bagial outside of the Navigable Area Limit Line (NALL), as seen in figure 23. Thus no data was acquired over this feature and the survey was unable to verify the pipeline. The Hydrographer recommends retaining the pipeline area as charted[18].

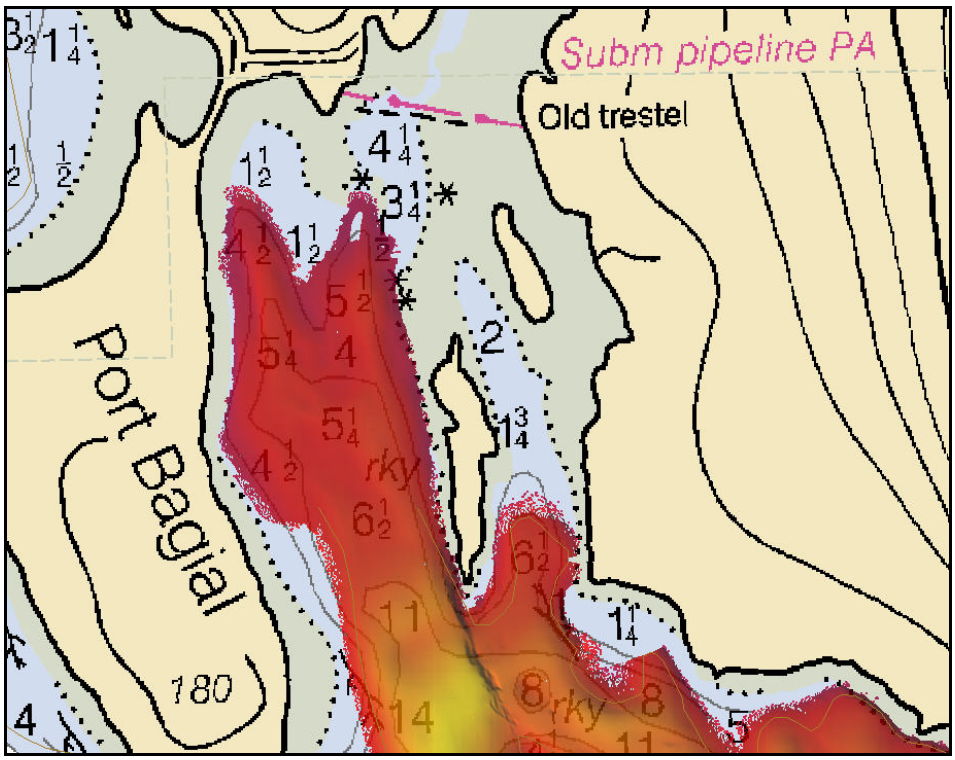


Figure 23: Old trestle and submerged pipeline outside NALL.

A charted (17405) cable area extends approximately 230 meters into the south end of the survey sheet, east of Toti Island (figure 24). No visible indication of cables was evident in the MBES data in the cable area depicted on chart 17405. The Hydrographer recommends retaining the cable area as charted[19].

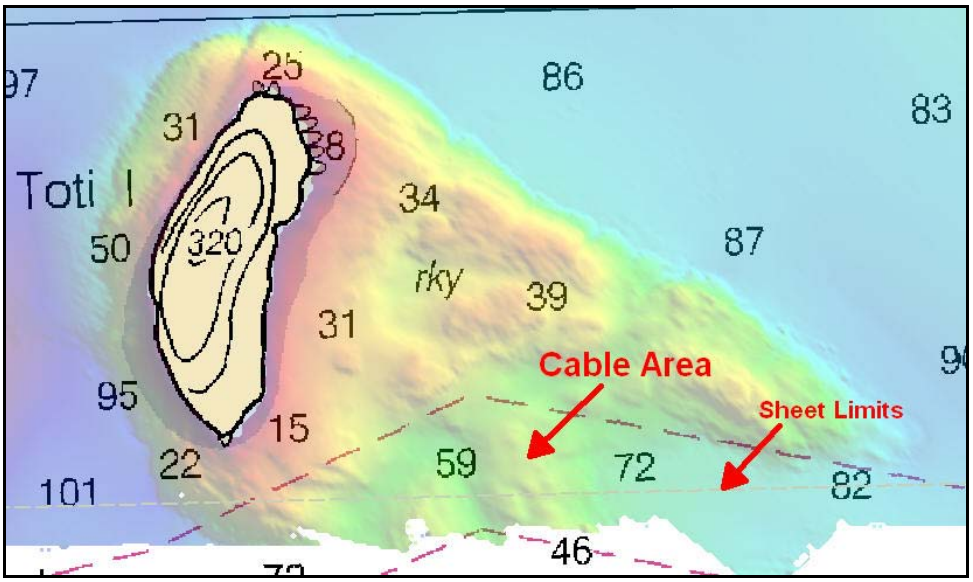


Figure 24: H12027 Cable area.

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H12027, and none were observed to be operating in the area[20].

D.2.g. Bottom Samples

Twenty two (22) bottom samples were collected on H12027 (figure 23), the location and attributes of which are submitted with H12027_Final_Features.hob. A red dot in figure 23 marks the location of each bottom sample, the top line of accompanying text indicates H12027 findings, and the lower line shows the nature of seabed as charted (17405)[21].

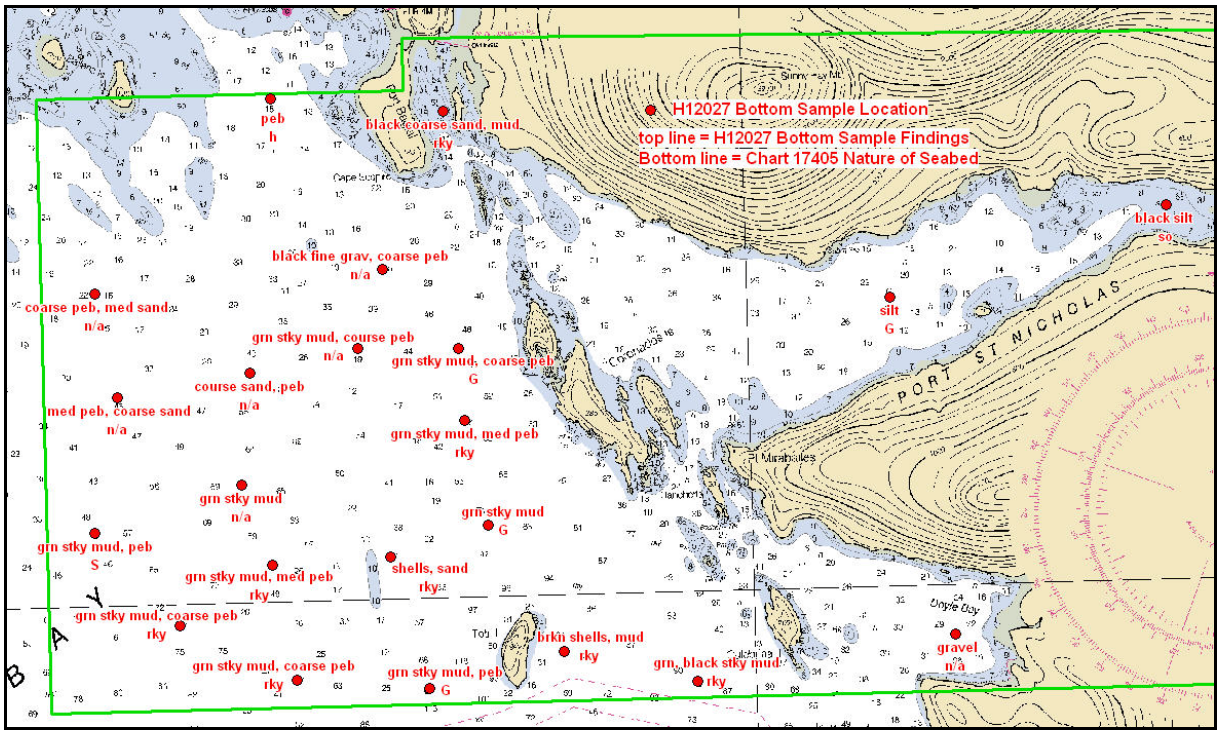


Figure 23: H12027 Bottom sample locations and findings

D.2.h. Other Findings

There are no other findings to report for this survey.

E. APPROVAL

As Chief of Party, Field operations for hydrographic survey H12027 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2009 edition), Field Procedures Manual (April 2009 edition), Standing and Project Instructions, and all HSD Technical Directives issued through June 2009. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

Title	Date Sent	Office
Hydrographic Systems Readiness Review Package	*Under separate cover*	N/CS34
Data Acquisition and Processing Report for OPR-O190-RA-09	27-Oct-2009	N/CS34
Coast Pilot Report for OPR- O190-xx-09	*To be submitted*	N/CS26
Horizontal and Vertical Control Report for OPR-O190-RA-09	27-Oct-2009	N/CS34
Tides and Water Levels Package for OPR-O190-RA-09	20-Jun-2009	N/OPS1

Approved and Forwarded: Donald W. Haines, CAPT/NOAA
I am approving this document
2009.11.19 08:52:21 -08'00'

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

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

Survey Sheet Manager: Barry Jackson
I am the author of this document
2009.11.16 07:46:13 -08'00'

Barry D. Jackson
Senior Survey Technician, NOAA Ship *Rainier*

Chief Survey Technician: James B Jacobson
I have reviewed this document
2009.11.16 17:51:08 Z

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

Field Operations Officer: Brent Pounds
I have reviewed this document
2009.11.16 07:00:57 -09'00'

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

Revisions and Corrections Compiled During Office Processing and Certification

[1] Concur.
[2] Concur. A common junction has been established between HCell H12027 and HCell H12029. Common junctions will be made to the north and east of the HCell with survey H12000 and H12030 during HCell compilation of these surveys. A portion of Lidar survey H11661 and all of Lidar survey H11663 were compiled concurrently with H12027 and are included in the HCell.
[3] Concur with all junction comparison results reported by the hydrographer.
[4] Concur with clarification. In areas with both Lidar and SWMB coverage, the compiler used SWMB data for sounding selection. In the areas with only Lidar coverage, rocks and soundings were compiled to the HCell using Lidar data. No charted features were disproved using Lidar data.
[5] The erroneous soundings were rejected by the hydrographer and the data is within specs.
[6] Concur with clarification, these holidays were deemed insignificant and were not preserved in the HCell.
[7] The Final Tide Note is appended to this report.
[8] H12027 was compared to chart 17405 16th edition, October 2008 (Notice to Mariners: 9/25/2010)
[9] Concur.
[10] Concur.
[11] Concur, chart area as seen in the HCell.
[12] Concur.
[13] This wreck is included in the HCell.
[14] Dton report is appended to this report. All Dtons have been applied to the chart. It is recommended that soundings on HCell H12027 supersede the charted Dtons.
[15] Concur with clarification. The submitted .hob files were used in the compilation of HCell H12027. During compilation some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.
[16] Concur.
[17] This item is blue noted in the HCell to be removed.
[18] Concur.
[19] Concur.
[20] Concur.
[21] Twenty two (22) new bottom samples have been included in the HCell along with the office delineated rocky seabed areas. Conflicting bottom samples were removed and thirty seven (37) charted bottom samples were retained in the HCell.

H12027_DTON_Report

Registry Number: H12027

State: Alaska

Locality: West of Prince of Wales Island

Sub-locality: Cape Suspiro to Doyle Bay

Project Number: OPR-O190-RA-09

Survey Dates: 04/29/2009 - 06/09/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17405	16th	10/01/2008	1:40,000 (17405_1)	USCG LNM: 10/23/2007 (12/09/2008) CHS NTM: None (11/28/2008) NGA NTM: None (12/13/2008)
17400	17th	03/01/2007	1:229,376 (17400_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	-0.14 m	55° 27' 14.9" N	133° 07' 20.1" W	---
1.2	Rock	2.37 m	55° 25' 52.4" N	133° 05' 20.1" W	---
1.3	Rock	5.22 m	55° 24' 29.1" N	133° 04' 30.6" W	---
1.4	Rock	12.42 m	55° 26' 29.4" N	133° 03' 01.1" W	---
1.5	Rock	16.60 m	55° 24' 49.4" N	133° 08' 50.7" W	---
1.6	Rock	14.51 m	55° 26' 11.7" N	133° 09' 15.6" W	---
1.7	Rock	13.52 m	55° 26' 13.1" N	133° 08' 51.6" W	---
1.8	Shoal	16.06 m	55° 24' 58.4" N	133° 05' 18.8" W	---

1.9	Rock	16.06 m	55° 24' 42.5" N	133° 04' 58.9" W	---
1.10	Rock	16.02 m	55° 27' 02.3" N	133° 09' 21.5" W	---
1.11	Shoal	9.43 m	55° 27' 09.6" N	133° 07' 13.0" W	---
1.12	Rock	2.30 m	55° 26' 40.7" N	133° 02' 35.3" W	---
1.13	Rock	10.96 m	55° 25' 05.3" N	133° 08' 51.6" W	---
1.14	Rock	[None]	55° 26' 07.4" N	133° 06' 11.7" W	---
1.15	Rock	[None]	55° 24' 28.1" N	133° 02' 28.7" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 1427/240 from h12027 / 1101_reson8125 / 2009-125 / 000_1925

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 27' 14.9" N, 133° 07' 20.1" W
Least Depth:	-0.14 m (= -0.44 ft = -0.074 fm = 0 fm 5.56 ft)
TPU (±1.96σ):	**THU (TPEh)** ±2.023 m ; **TVU (TPEv)** ±24.333 m
Timestamp:	2009-125.19:32:57.940 (05/05/2009)
Survey Line:	h12027 / 1101_reson8125 / 2009-125 / 000_1925
Profile/Beam:	1427/240
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/1101_reson8125/2009-125/000_1925	1427/240	0.00	000.0	Primary

Hydrographer Recommendations

Chart a rock awash in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

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

0fm 0ft (531_1)

-.1m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - -0.135 m

WATLEV - 5:awash

Feature Images

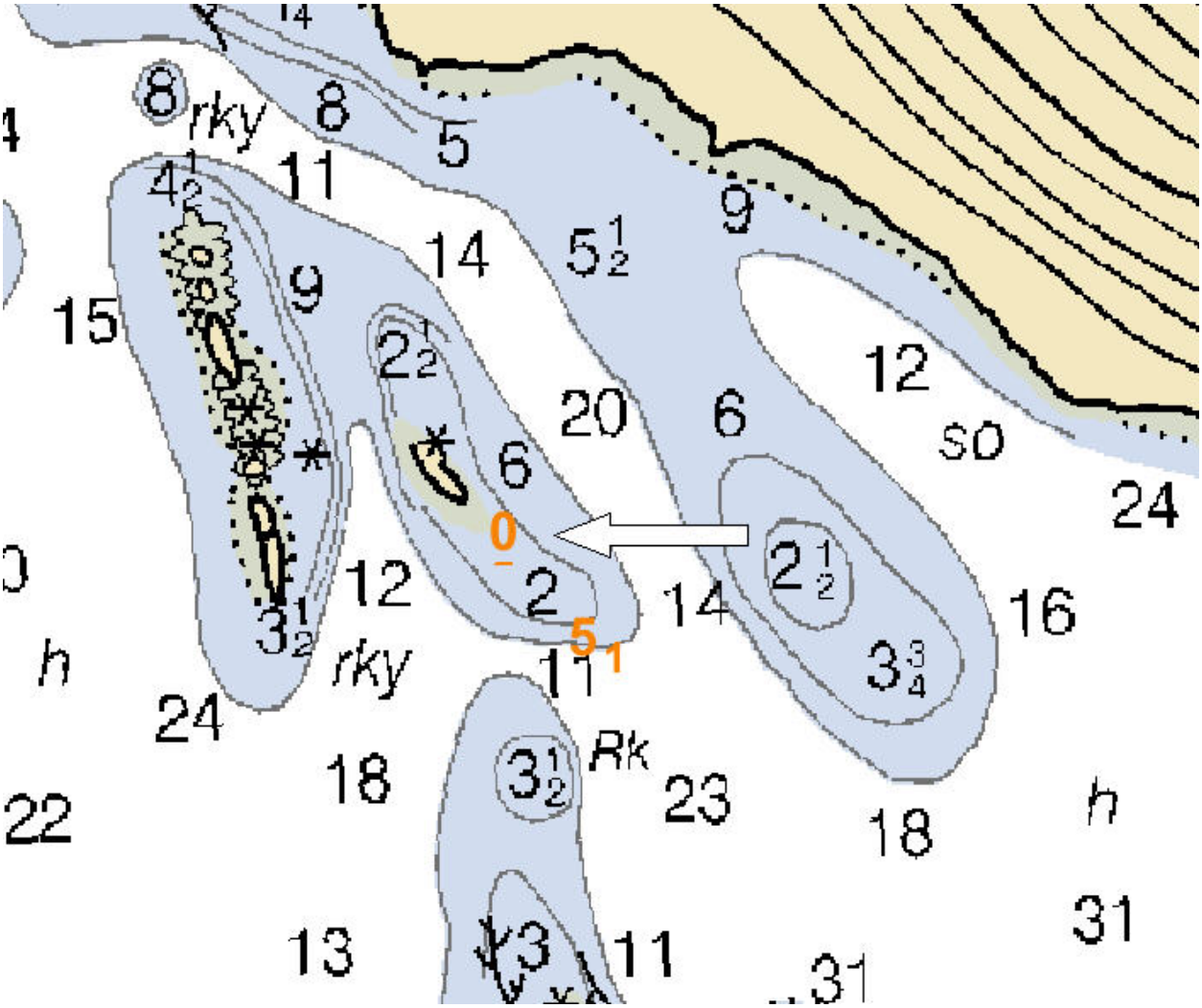


Figure 1.1.1

1.2) Profile/Beam - 2126/240 from h12027 / 1101_reson8125 / 2009-126 / 000_0011

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 25' 52.4" N, 133° 05' 20.1" W
Least Depth:	2.37 m (= 7.76 ft = 1.293 fm = 1 fm 1.76 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.991 m ; **TVU (TPEv)** ±15.395 m
Timestamp:	2009-127.00:18:35.666 (05/07/2009)
Survey Line:	h12027 / 1101_reson8125 / 2009-126 / 000_0011
Profile/Beam:	2126/240
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/1101_reson8125/2009-126/000_0011	2126/240	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (17405_1, 17400_1, 16016_1, 530_1)

1fm 2ft (531_1)

2.4m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 2.365 m

WATLEV - 3:always under water/submerged

Feature Images

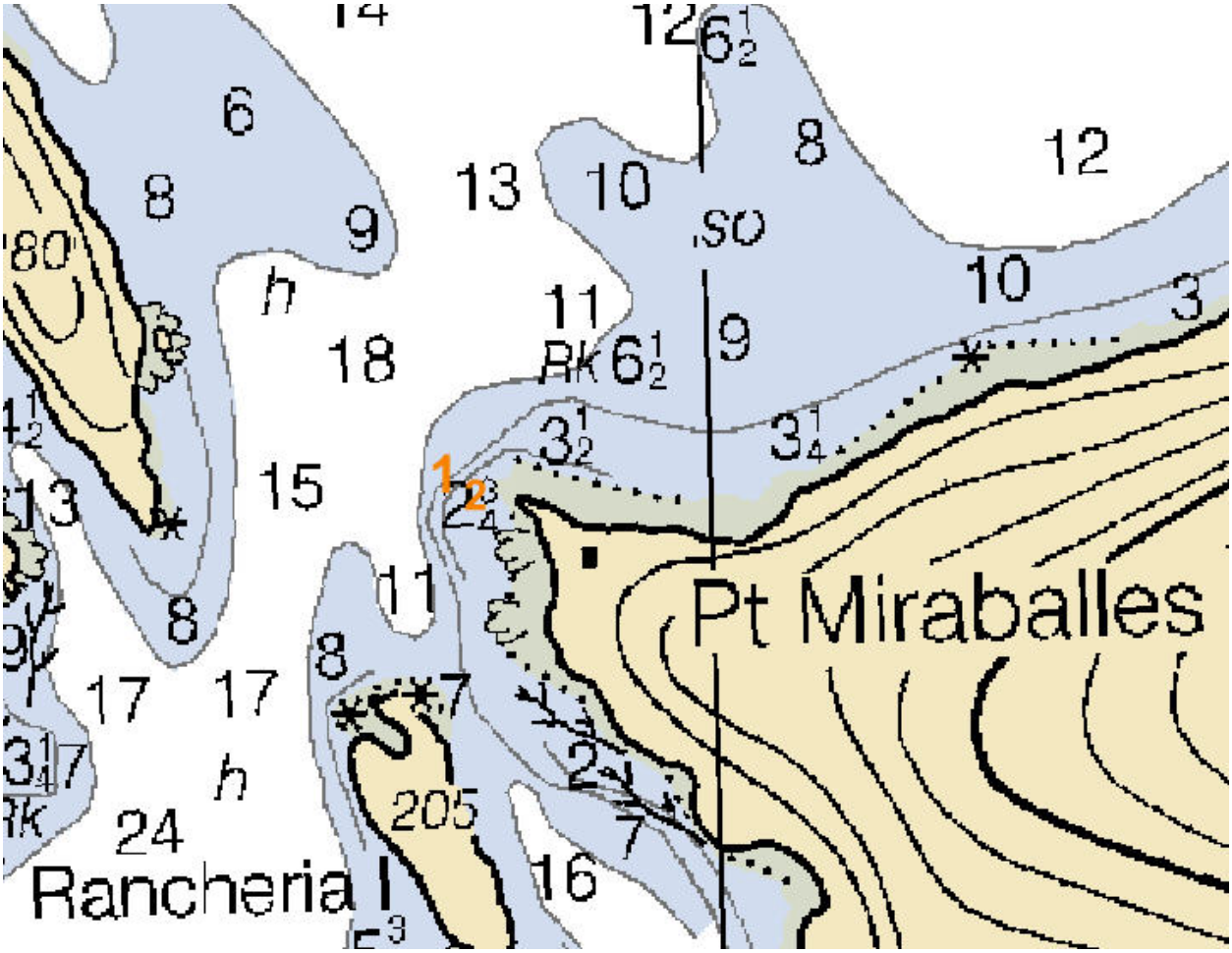


Figure 1.2.1

1.3) Profile/Beam - 161/226 from h12027 / 1101_reson8125 / 2009-126 / 000_2229

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 24' 29.1" N, 133° 04' 30.6" W

Least Depth: 5.22 m (= 17.14 ft = 2.857 fm = 2 fm 5.14 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.984 m ; **TVU (TPEv)** ±0.521 m

Timestamp: 2009-126.22:29:56.627 (05/06/2009)

Survey Line: h12027 / 1101_reson8125 / 2009-126 / 000_2229

Profile/Beam: 161/226

Charts Affected: 17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/1101_reson8125/2009-126/000_2229	161/226	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

2 ¾fm (17405_1, 17400_1, 16016_1, 530_1)

2fm 5ft (531_1)

5.2m (500_1, 501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090609

SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 5.225 m

WATLEV - 3:always under water/submerged

Feature Images

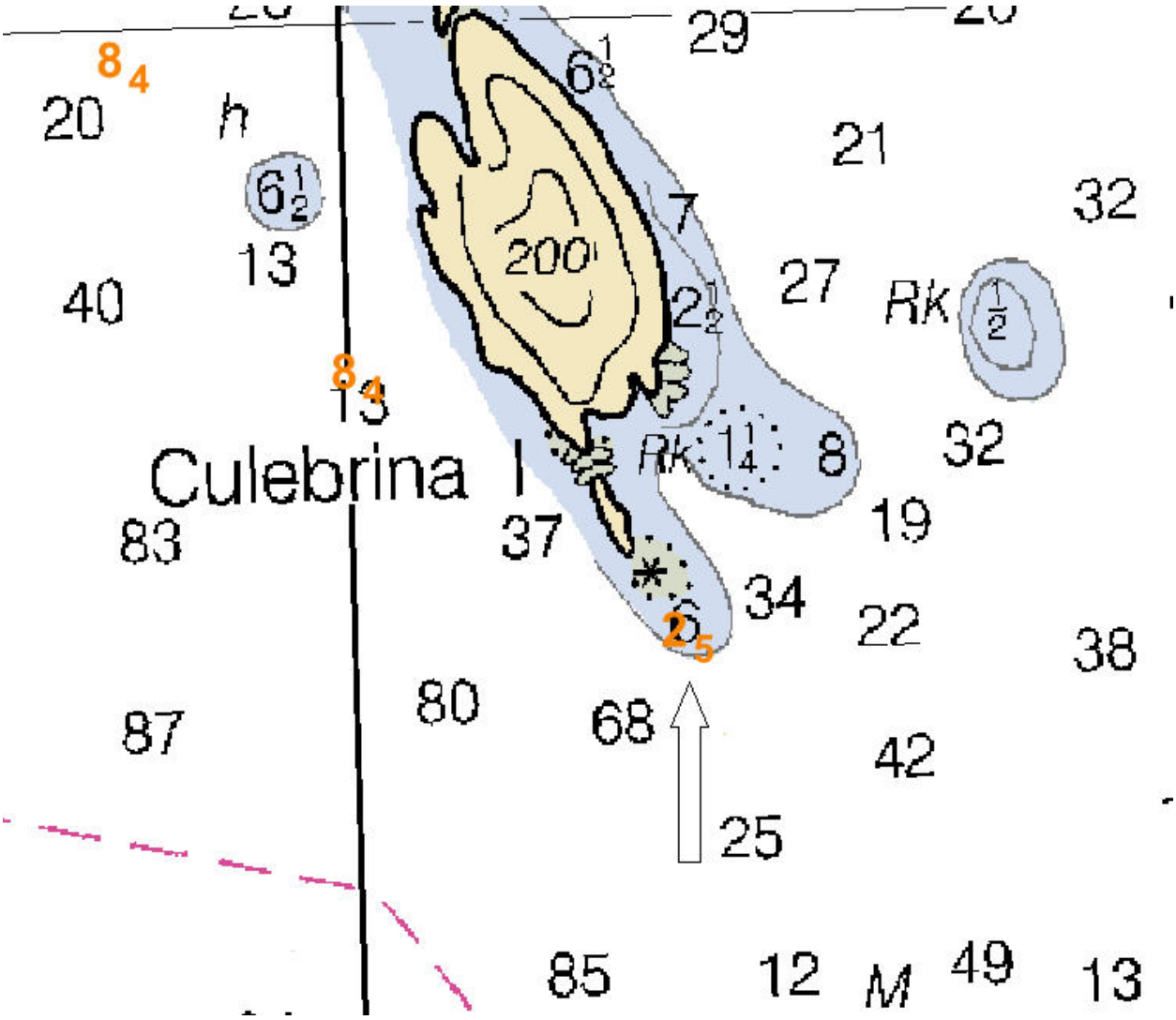


Figure 1.3.1

1.4) Profile/Beam - 483/20 from h12027 / 2801_reson7125_lf_256 / 2009-147 / 000_0014

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 26' 29.4" N, 133° 03' 01.1" W
Least Depth:	12.42 m (= 40.74 ft = 6.790 fm = 6 fm 4.74 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.970 m ; **TVU (TPEv)** ±0.281 m
Timestamp:	2009-148.00:15:23.686 (05/28/2009)
Survey Line:	h12027 / 2801_reson7125_lf_256 / 2009-147 / 000_0014
Profile/Beam:	483/20
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2801_reson7125_lf_256/2009-147/000_0014	483/20	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

6 ¾fm (17405_1, 17400_1, 16016_1, 530_1)

6fm 4ft (531_1)

12.4m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 12.418 m

WATLEV - 3:always under water/submerged

Feature Images

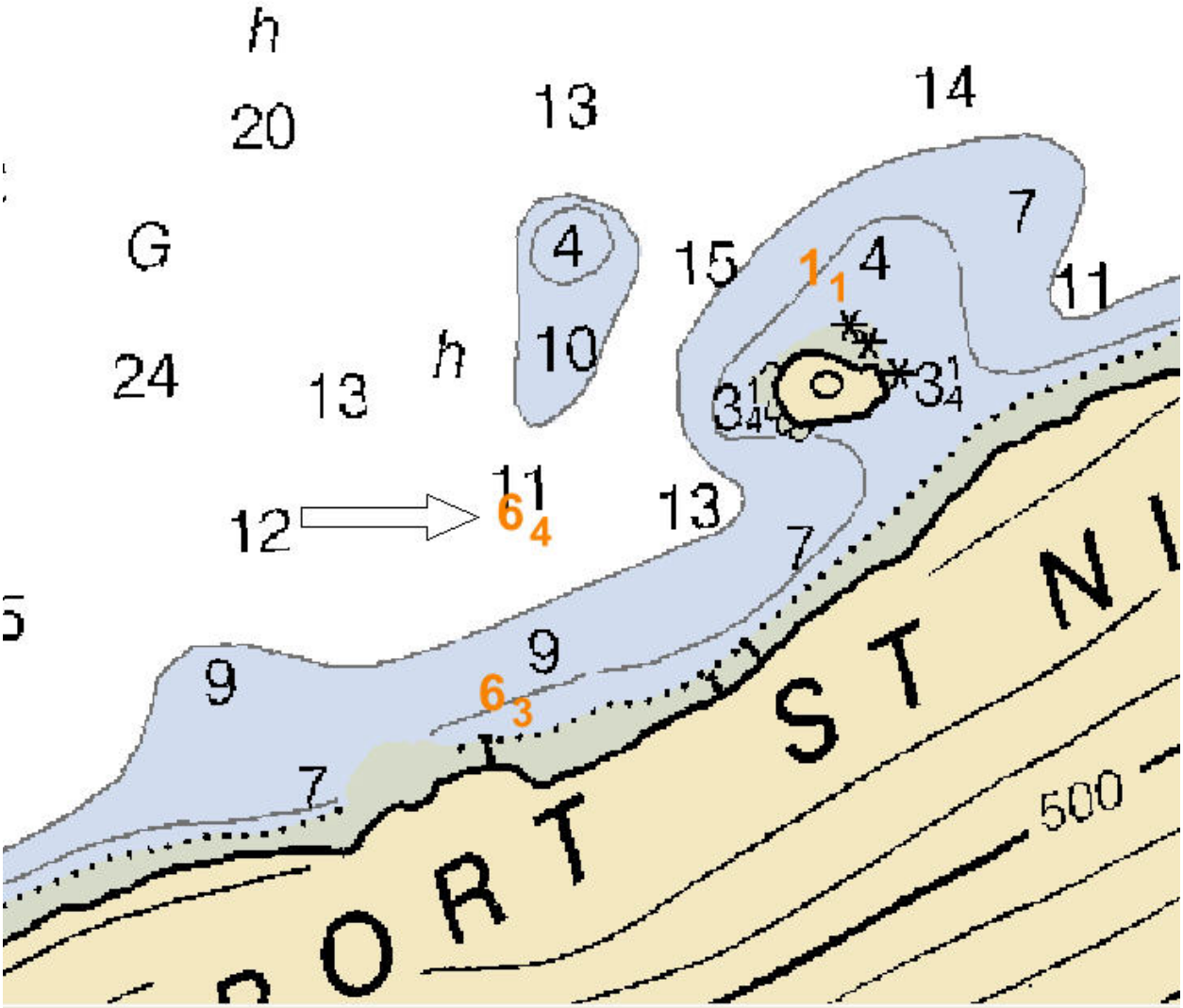


Figure 1.4.1

1.5) Profile/Beam - 2374/76 from h12027 / 2801_reson7125_lf_256 / 2009-147 / 305_1725

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 24' 49.4" N, 133° 08' 50.7" W
Least Depth:	16.60 m (= 54.45 ft = 9.075 fm = 9 fm 0.45 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.965 m ; **TVU (TPEv)** ±0.269 m
Timestamp:	2009-147.17:42:51.583 (05/27/2009)
Survey Line:	h12027 / 2801_reson7125_lf_256 / 2009-147 / 305_1725
Profile/Beam:	2374/76
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2801_reson7125_lf_256/2009-147/305_1725	2374/76	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

9fm (17405_1, 17400_1, 16016_1, 530_1)

9fm 0ft (531_1)

16.6m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 16.597 m

WATLEV - 3:always under water/submerged

Feature Images

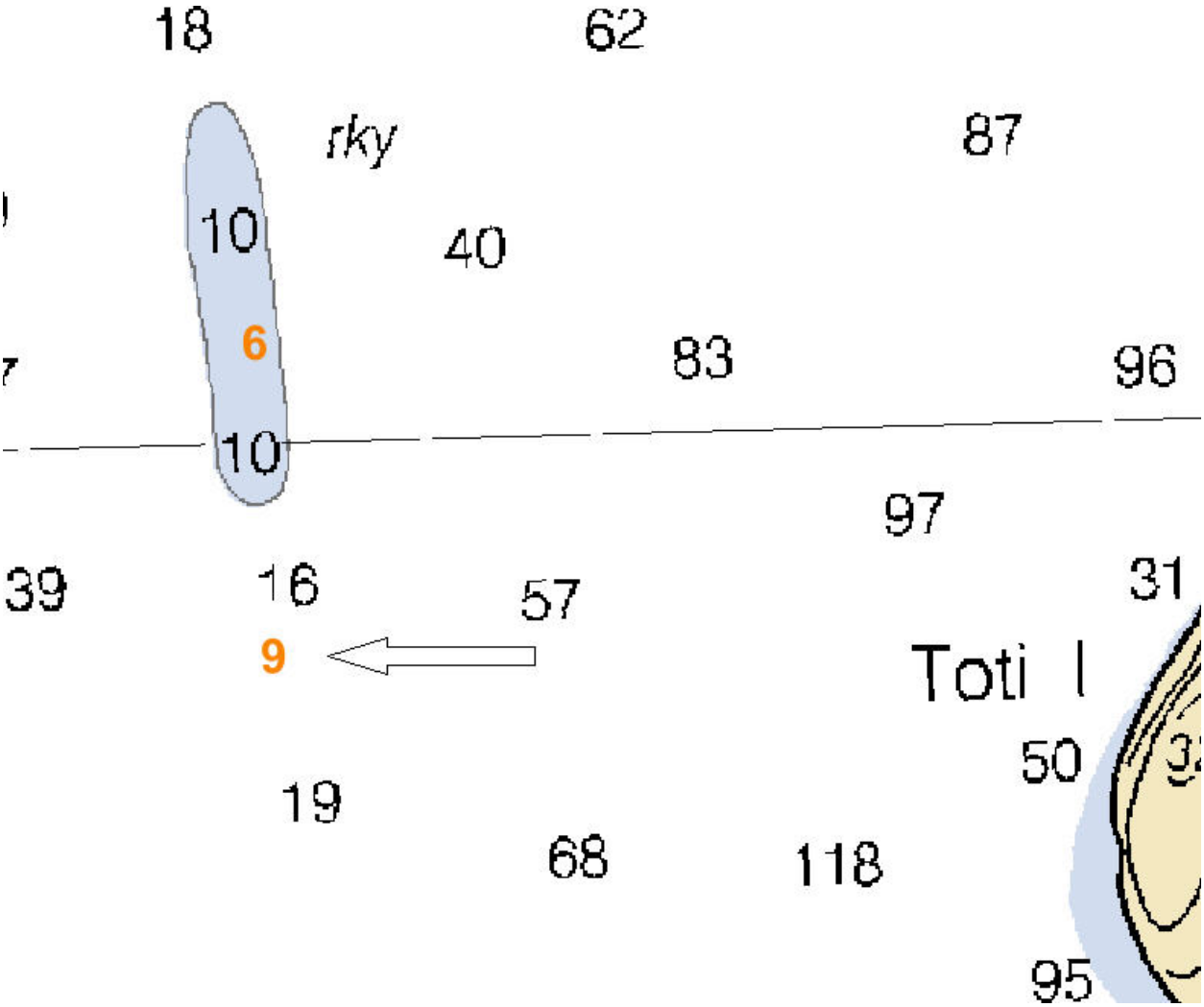


Figure 1.5.1

1.6) Profile/Beam - 205/115 from h12027 / 2801_reson7125_lf_256 / 2009-147 / 341_2035

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 26' 11.7" N, 133° 09' 15.6" W
Least Depth:	14.51 m (= 47.59 ft = 7.932 fm = 7 fm 5.59 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.265 m
Timestamp:	2009-147.20:36:16.744 (05/27/2009)
Survey Line:	h12027 / 2801_reson7125_lf_256 / 2009-147 / 341_2035
Profile/Beam:	205/115
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2801_reson7125_lf_256/2009-147/341_2035	205/115	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

7 ¾fm (17405_1, 17400_1, 16016_1, 530_1)

7fm 5ft (531_1)

14.5m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 14.506 m

WATLEV - 3:always under water/submerged

Feature Images

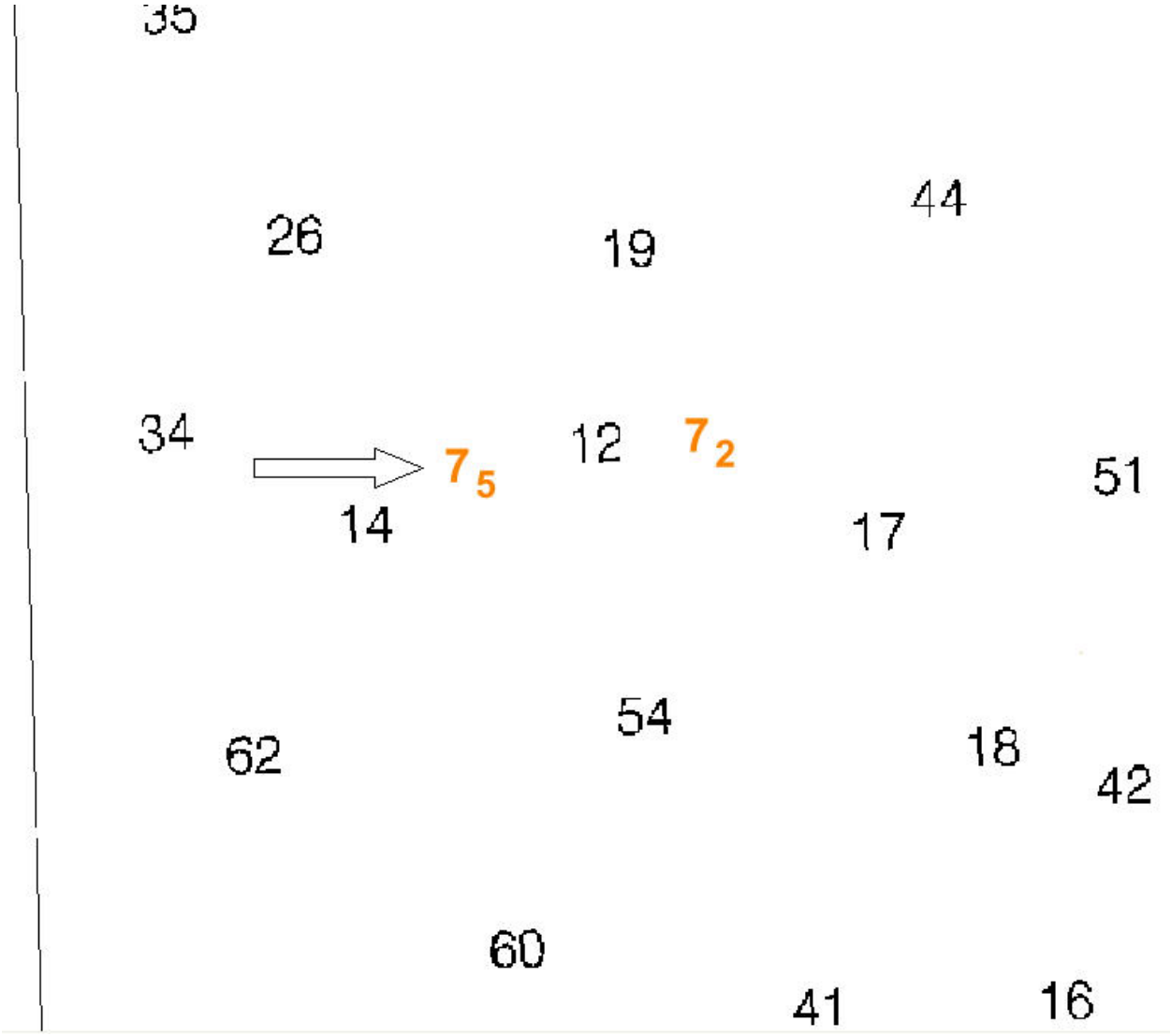


Figure 1.6.1

1.7) Profile/Beam - 81/170 from h12027 / 2802_reson7125_hf_512 / 2009-126 / 000_2205

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 26' 13.1" N, 133° 08' 51.6" W

Least Depth: 13.52 m (= 44.37 ft = 7.394 fm = 7 fm 2.37 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.268 m

Timestamp: 2009-126.22:05:40.297 (05/06/2009)

Survey Line: h12027 / 2802_reson7125_hf_512 / 2009-126 / 000_2205

Profile/Beam: 81/170

Charts Affected: 17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2802_reson7125_hf_512/2009-126/000_2205	81/170	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

7 ¼fm (17405_1, 17400_1, 16016_1, 530_1)

7fm 2ft (531_1)

13.5m (500_1, 501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090609

SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 13.523 m

WATLEV - 3:always under water/submerged

Feature Images

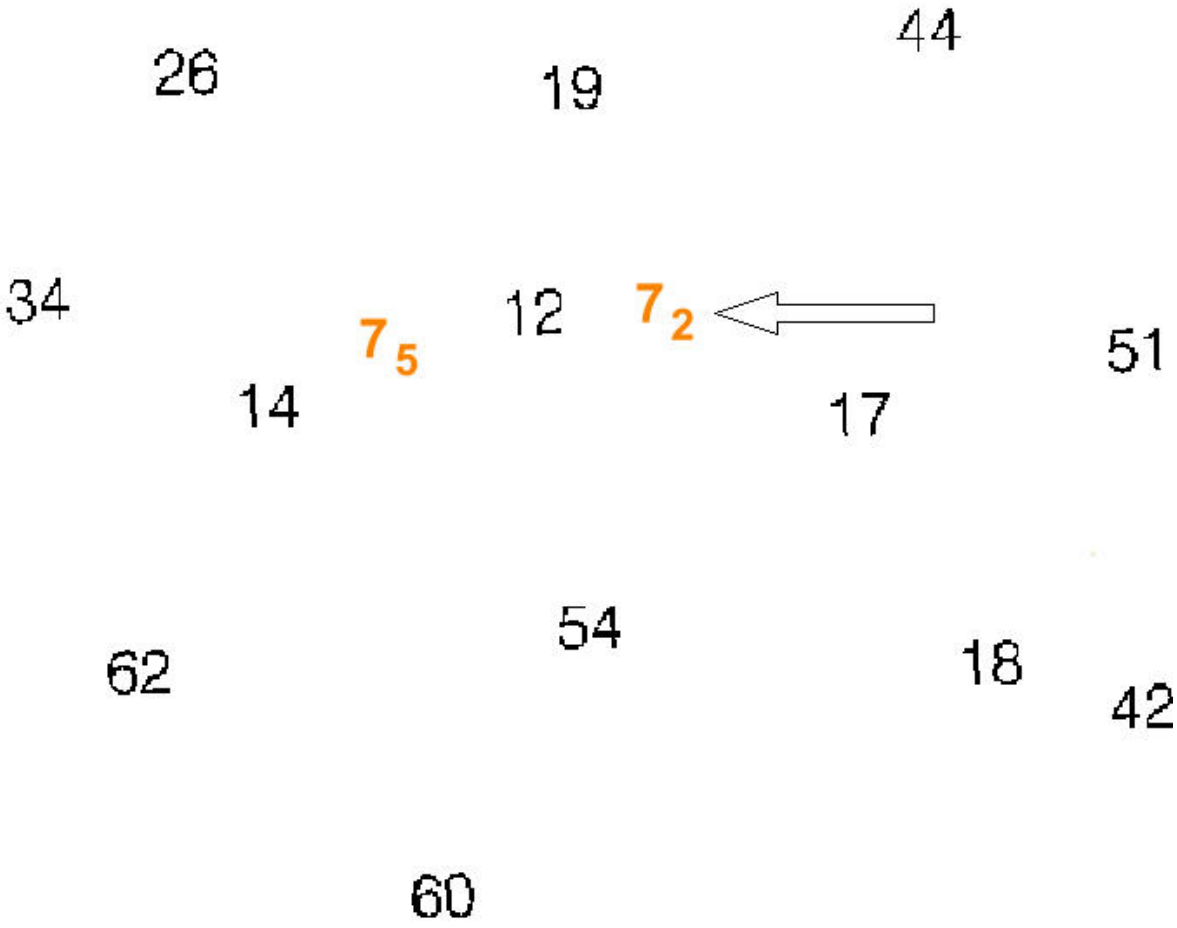


Figure 1.7.1

1.8) Profile/Beam - 253/201 from h12027 / 2803_reson7125_hf_512 / 2009-119 / 000_2002

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 24' 58.4" N, 133° 05' 18.8" W
Least Depth:	16.06 m (= 52.69 ft = 8.782 fm = 8 fm 4.69 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.278 m
Timestamp:	2009-119.20:03:17.896 (04/29/2009)
Survey Line:	h12027 / 2803_reson7125_hf_512 / 2009-119 / 000_2002
Profile/Beam:	253/201
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New shoal sounding found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2803_reson7125_hf_512/2009-119/000_2002	253/201	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey

Cartographically-Rounded Depth (Affected Charts):

8 ¾fm (17405_1, 17400_1, 16016_1, 530_1)

8fm 4ft (531_1)

16.1m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

Feature Images

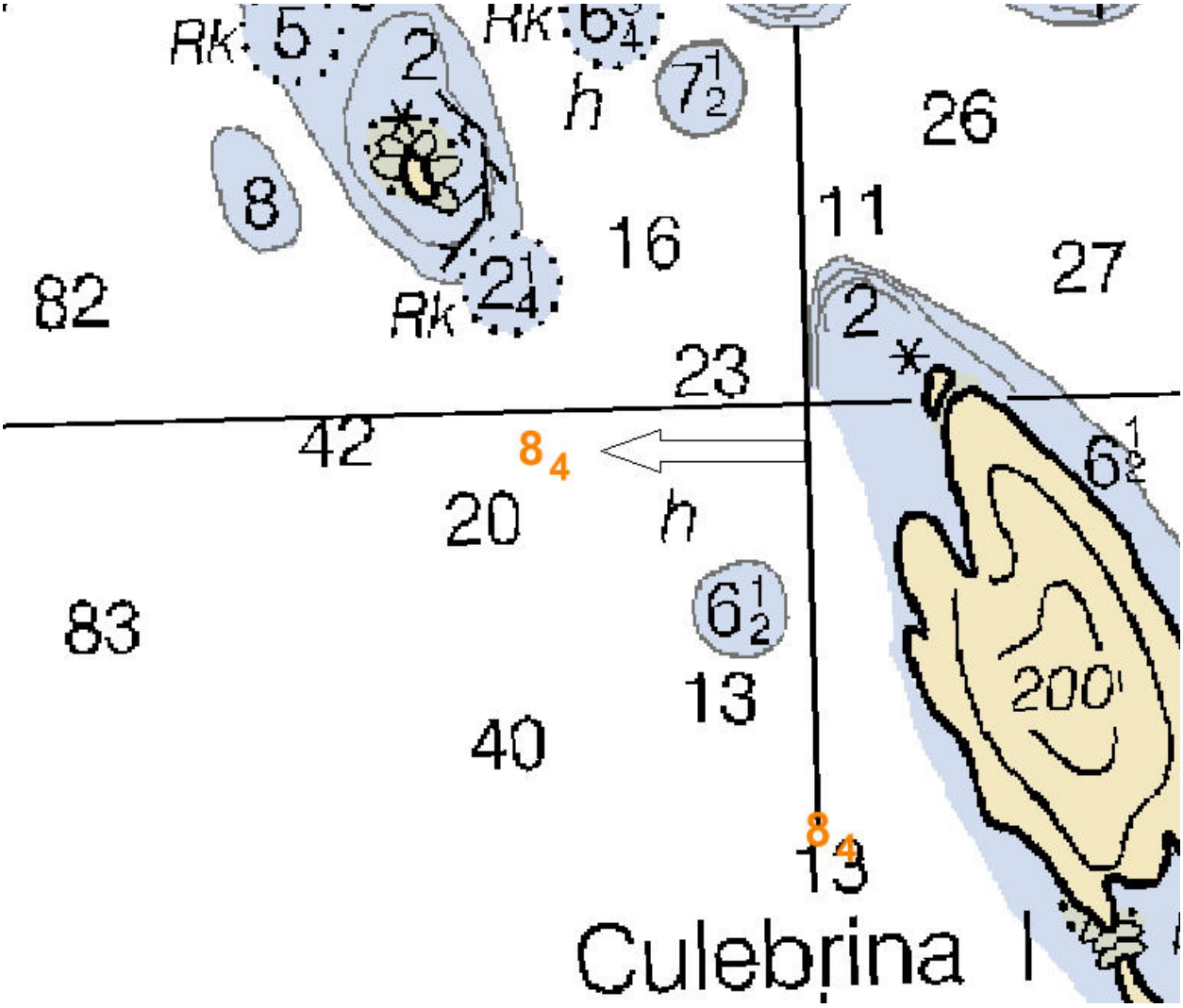


Figure 1.8.1

1.9) Profile/Beam - 36/461 from h12027 / 2803_reson7125_hf_512 / 2009-119 / 000_2029

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 24' 42.5" N, 133° 04' 58.9" W

Least Depth: 16.06 m (= 52.68 ft = 8.780 fm = 8 fm 4.68 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.977 m ; **TVU (TPEv)** ±0.319 m

Timestamp: 2009-119.20:29:57.238 (04/29/2009)

Survey Line: h12027 / 2803_reson7125_hf_512 / 2009-119 / 000_2029

Profile/Beam: 36/461

Charts Affected: 17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2803_reson7125_hf_512/2009-119/000_2029	36/461	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

8 ¾fm (17405_1, 17400_1, 16016_1, 530_1)

8fm 4ft (531_1)

16.1m (500_1, 501_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090609

SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 16.057 m

WATLEV - 3:always under water/submerged

Feature Images

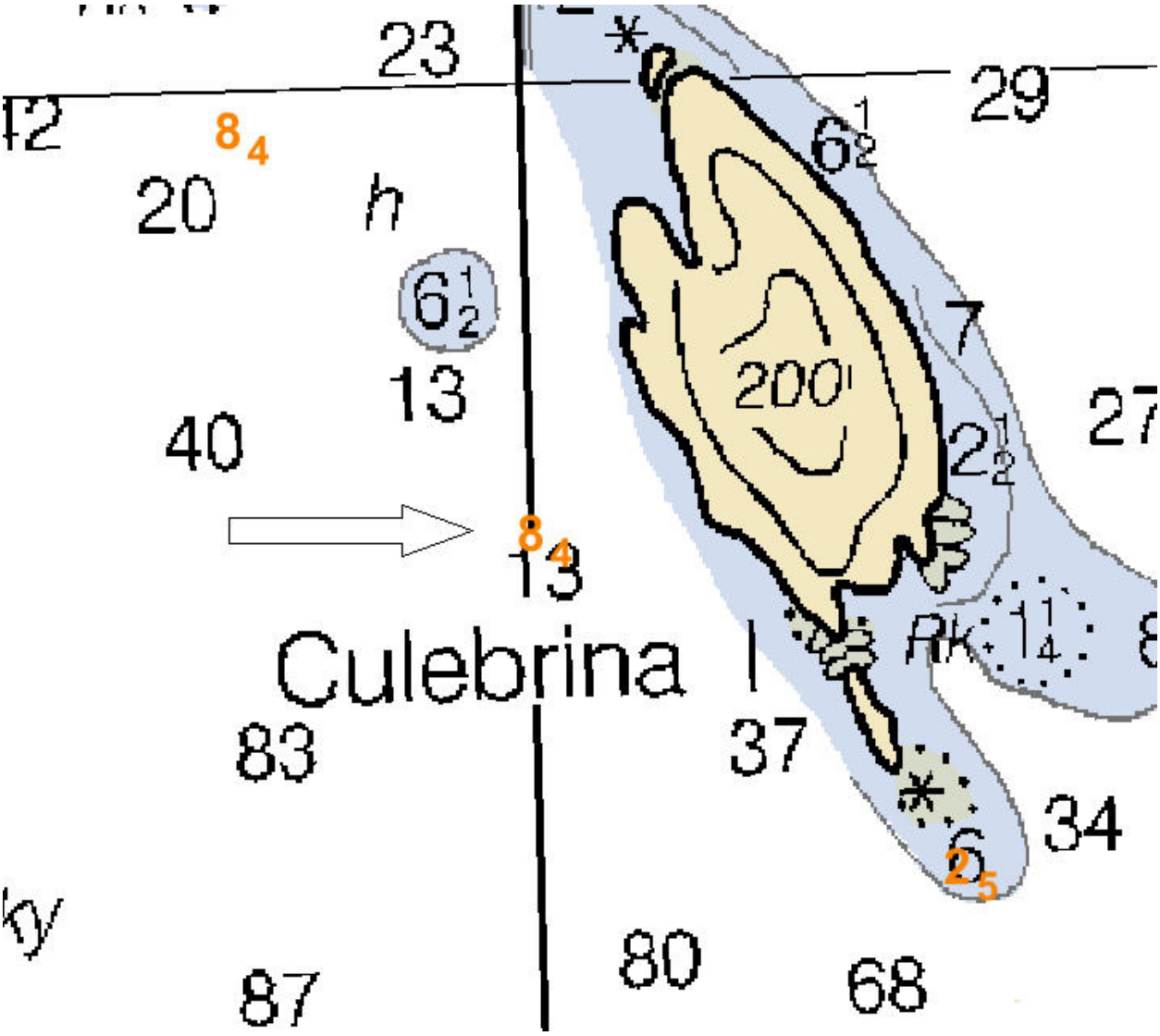


Figure 1.9.1

1.10) Profile/Beam - 138/265 from h12027 / 2803_reson7125_hf_512 / 2009-127 / 000_2002

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 27' 02.3" N, 133° 09' 21.5" W
Least Depth:	16.02 m (= 52.56 ft = 8.759 fm = 8 fm 4.56 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.265 m
Timestamp:	2009-127.20:03:02.451 (05/07/2009)
Survey Line:	h12027 / 2803_reson7125_hf_512 / 2009-127 / 000_2002
Profile/Beam:	138/265
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2803_reson7125_hf_512/2009-127/000_2002	138/265	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

8 ¾fm (17405_1, 17400_1, 16016_1, 530_1)

8fm 4ft (531_1)

16.0m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 16.019 m

WATLEV - 3:always under water/submerged

Feature Images

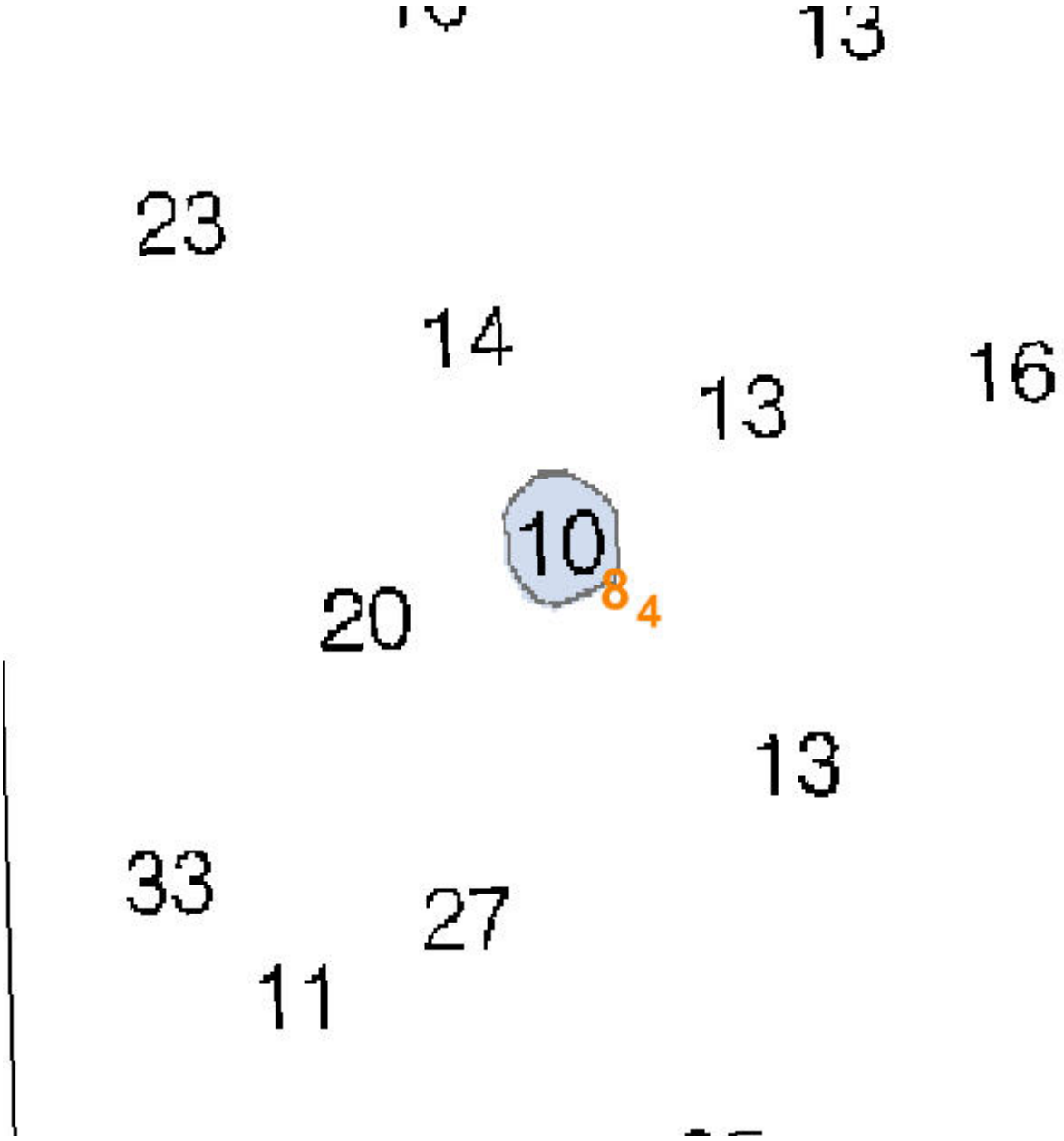


Figure 1.10.1

1.11) Profile/Beam - 1737/1 from h12027 / 2803_reson7125_hf_512 / 2009-134 / 000_1816

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 27' 09.6" N, 133° 07' 13.0" W
Least Depth:	9.43 m (= 30.93 ft = 5.155 fm = 5 fm 0.93 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.966 m ; **TVU (TPEv)** ±0.275 m
Timestamp:	2009-134.18:21:23.437 (05/14/2009)
Survey Line:	h12027 / 2803_reson7125_hf_512 / 2009-134 / 000_1816
Profile/Beam:	1737/1
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New shoal sounding found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2803_reson7125_hf_512/2009-134/000_1816	1737/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey

Cartographically-Rounded Depth (Affected Charts):

5fm (17405_1, 17400_1, 16016_1, 530_1)

5fm 1ft (531_1)

9.4m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

Feature Images

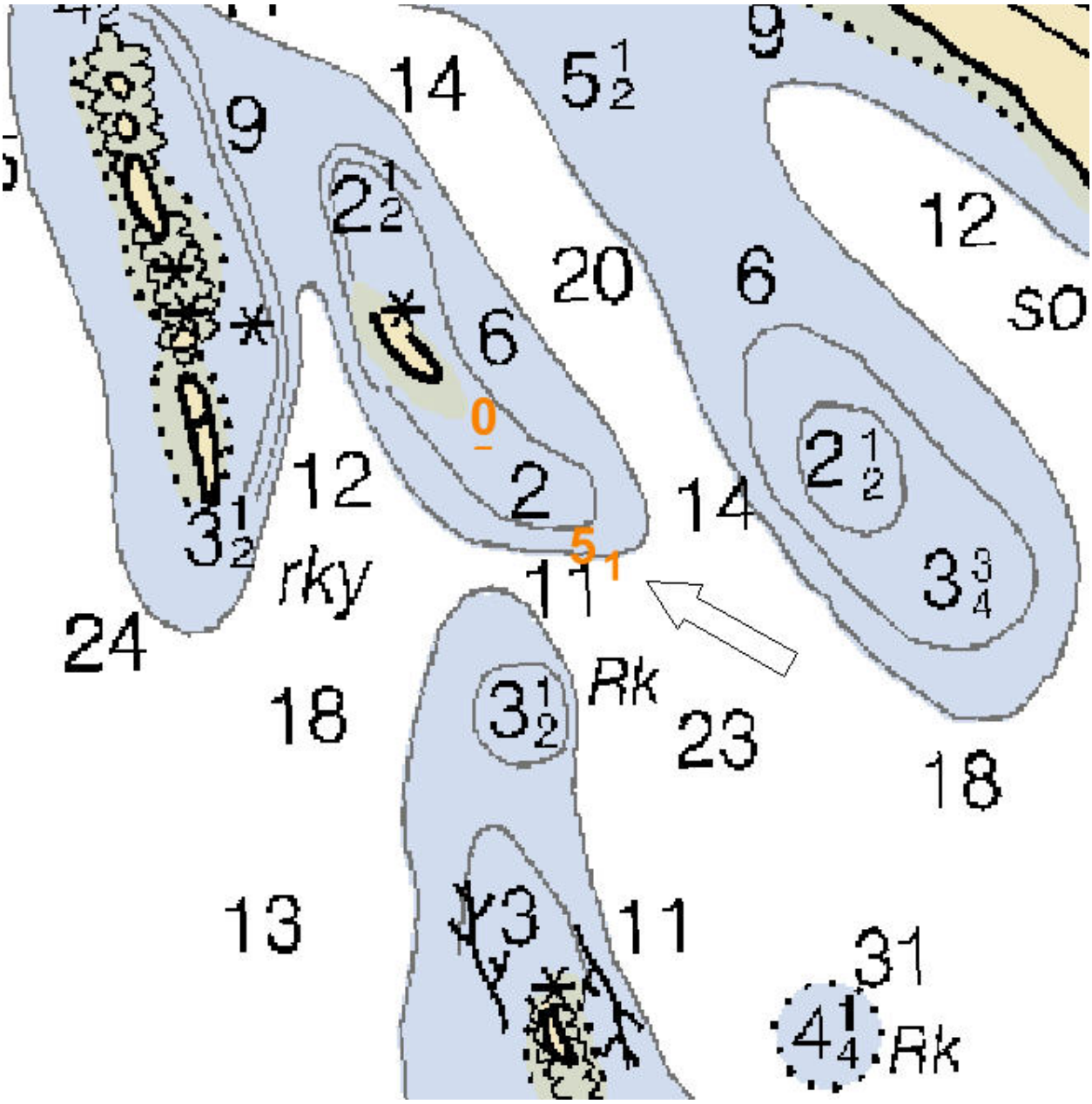


Figure 1.11.1

1.12) Profile/Beam - 409/45 from h12027 / 2803_reson7125_hf_512 / 2009-153 / 300_2033

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 26' 40.7" N, 133° 02' 35.3" W
Least Depth:	2.30 m (= 7.53 ft = 1.255 fm = 1 fm 1.53 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.264 m
Timestamp:	2009-153.20:34:21.336 (06/02/2009)
Survey Line:	h12027 / 2803_reson7125_hf_512 / 2009-153 / 300_2033
Profile/Beam:	409/45
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2803_reson7125_hf_512/2009-153/300_2033	409/45	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (17405_1, 17400_1, 16016_1, 530_1)

1fm 1ft (531_1)

2.3m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 2.296 m

WATLEV - 3:always under water/submerged

Feature Images

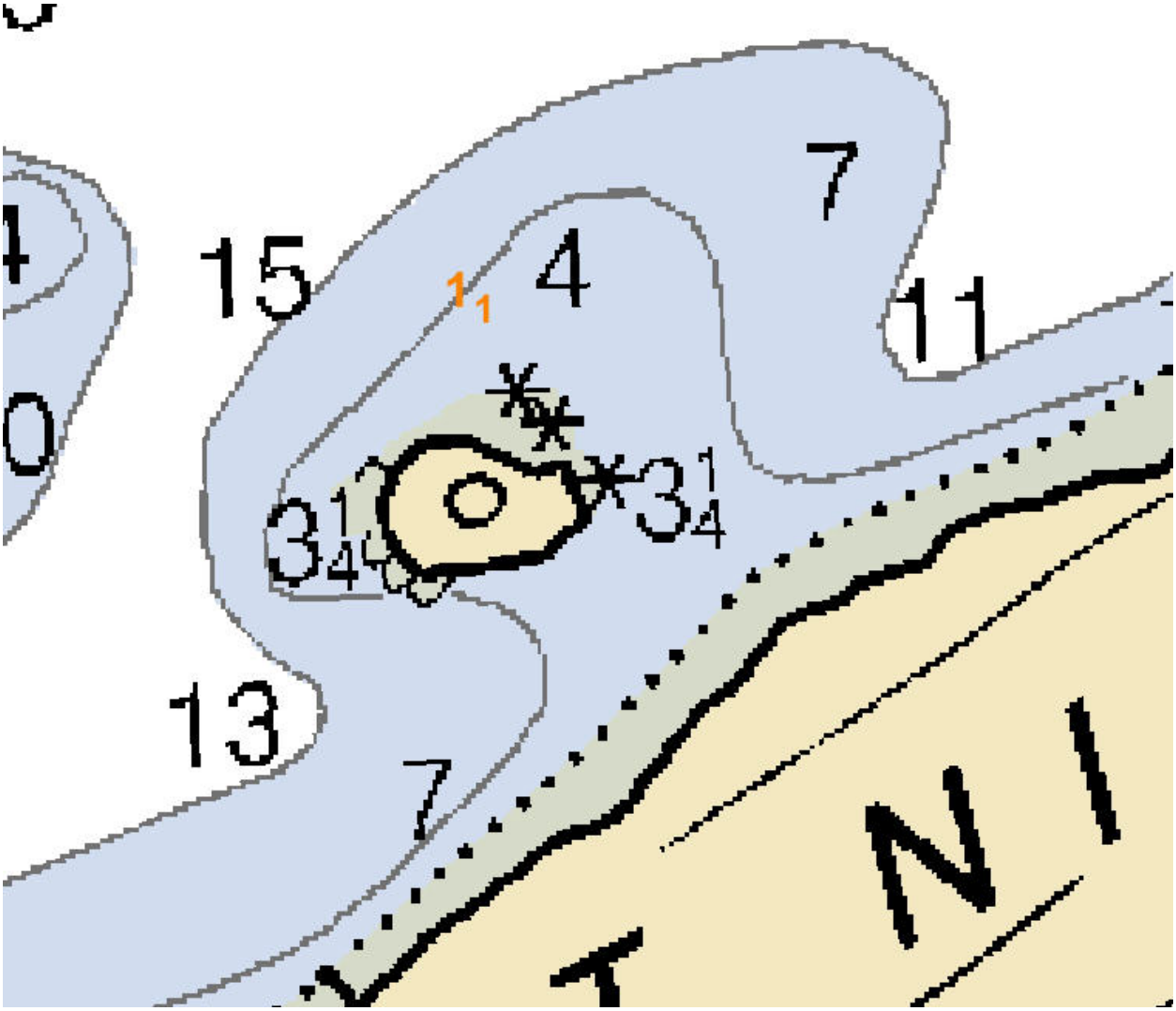


Figure 1.12.1

1.13) Profile/Beam - 322/3 from h12027 / 2803_reson7125_lf_256 / 2009-129 / 000_1714

DANGER TO NAVIGATION

Survey Summary

Survey Position:	55° 25' 05.3" N, 133° 08' 51.6" W
Least Depth:	10.96 m (= 35.94 ft = 5.991 fm = 5 fm 5.94 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.968 m ;**TVU (TPEv)** ±0.283 m
Timestamp:	2009-129.17:15:02.302 (05/09/2009)
Survey Line:	h12027 / 2803_reson7125_lf_256 / 2009-129 / 000_1714
Profile/Beam:	322/3
Charts Affected:	17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

DTON

New submerged rock found with SWMB

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12027/2803_reson7125_lf_256/2009-129/000_1714	322/3	0.00	000.0	Primary

Hydrographer Recommendations

Chart a submerged rock in the surveyed position

Cartographically-Rounded Depth (Affected Charts):

6fm (17405_1, 17400_1, 16016_1, 530_1)

6fm 0ft (531_1)

11.0m (500_1, 501_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	SORDAT - 20090609
	SORIND - US,US,nsurf,H12027

TECSOU - 3:found by multi-beam

VALSOU - 10.956 m

WATLEV - 3:always under water/submerged

Feature Images

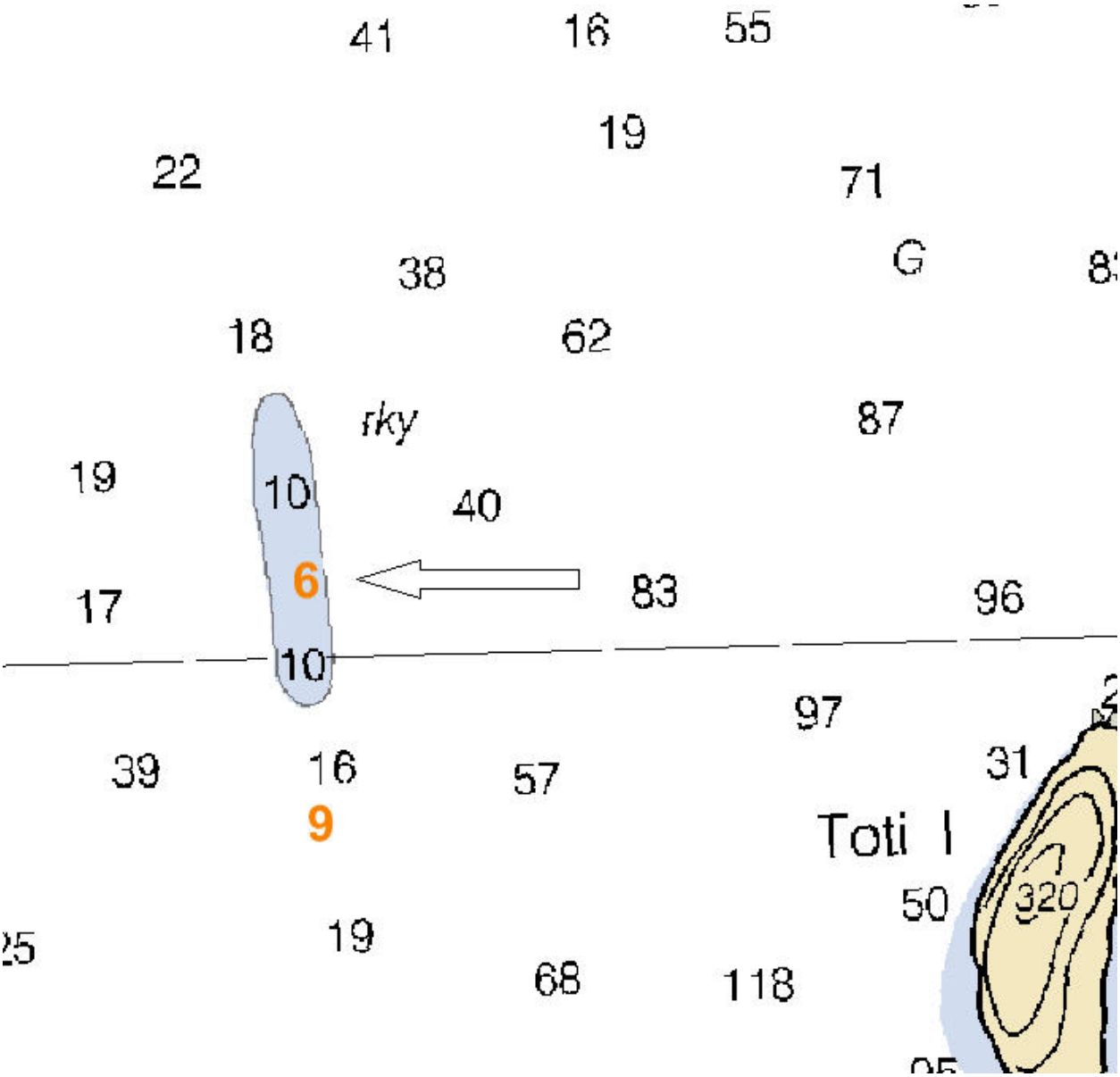


Figure 1.13.1

1.14) Profile/Beam - 1/1 from H12027 / 1103_nonechosounder_dp / 20090428-000 / asci-export-test2.txt

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 26' 07.4" N, 133° 06' 11.7" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 20090428-000.08:04:08.000 (00/30/20090428)

DP Dataset: H12027 / 1103_nonechosounder_dp / 20090428-000 / asci-export-test2.txt

Profile/Beam: 1/1

Charts Affected: 17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

new rock (lidar shoal is actually an even shoaler rock)

Feature Correlation

Address	Feature	Range	Azimuth	Status
H12027/1103_nonechosounder_dp/20090428-000/asci-export-test2.txt	1/1	0.00	000.0	Primary

Hydrographer Recommendations

chart a rock in the surveyed position

S-57 Data

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

Attributes: SORDAT - 20090609

SORIND - US,US,survy,H12027

WATLEV - 5:awash

Feature Images

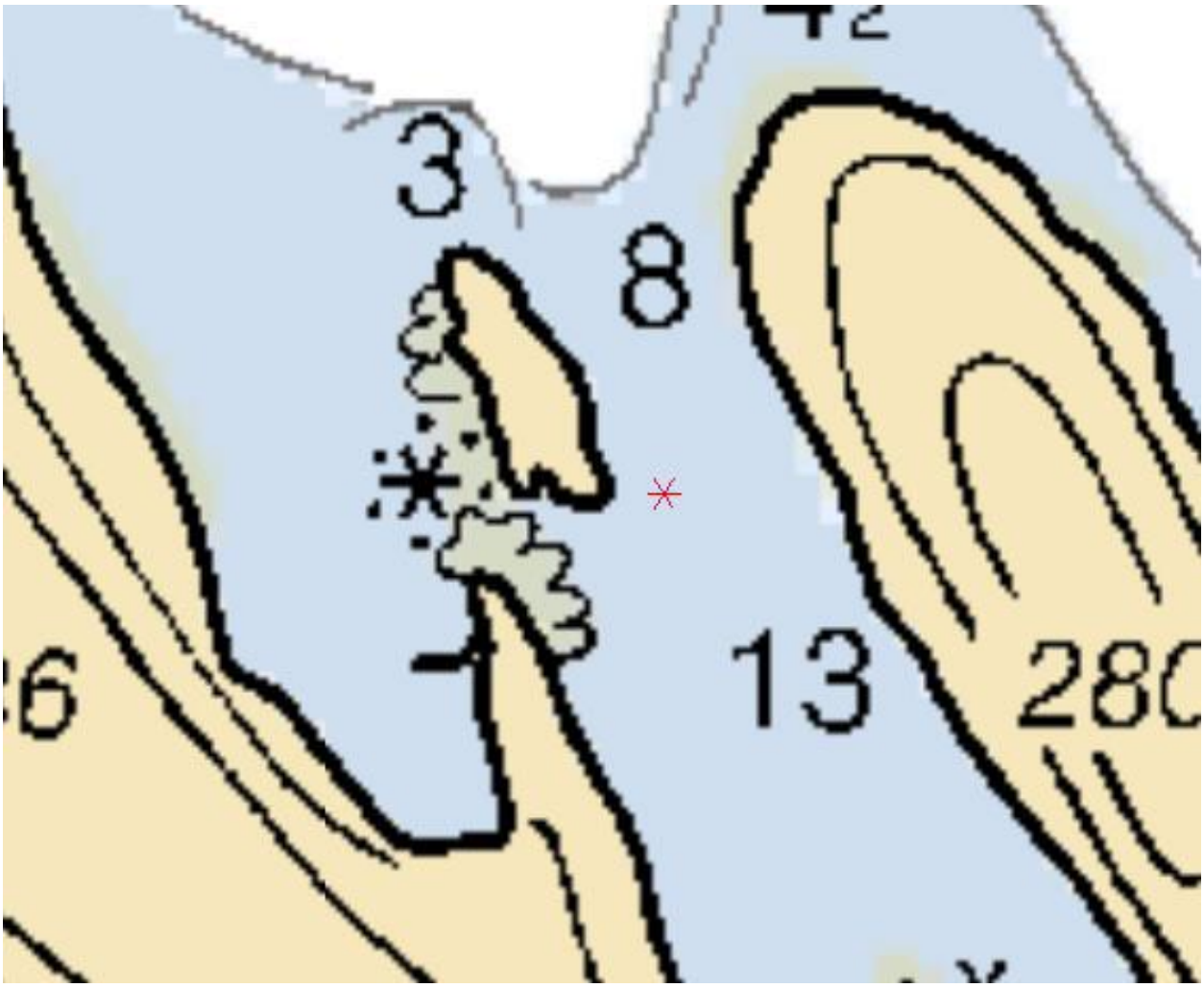


Figure 1.14.1

1.15) Profile/Beam - 2/1 from H12027 / 1103_nonechosounder_dp / 20090428-000 / asci-export-test2.txt

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 24' 28.1" N, 133° 02' 28.7" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 20090511-000.01:01:09.000 (00/30/20090511)

DP Dataset: H12027 / 1103_nonechosounder_dp / 20090428-000 / asci-export-test2.txt

Profile/Beam: 2/1

Charts Affected: 17405_1, 17400_1, 16016_1, 531_1, 500_1, 501_1, 530_1, 50_1

Remarks:

New rock (see photos 2323, 2524, 2525.)

Feature Correlation

Address	Feature	Range	Azimuth	Status
H12027/1103_nonechosounder_dp/20090428-000/asci-export-test2.txt	2/1	0.00	000.0	Primary

Hydrographer Recommendations

[None]

S-57 Data

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

Attributes: SORDAT - 20090609

SORIND - US,US,survy,H12027

WATLEV - 4:covers and uncovers

Feature Images

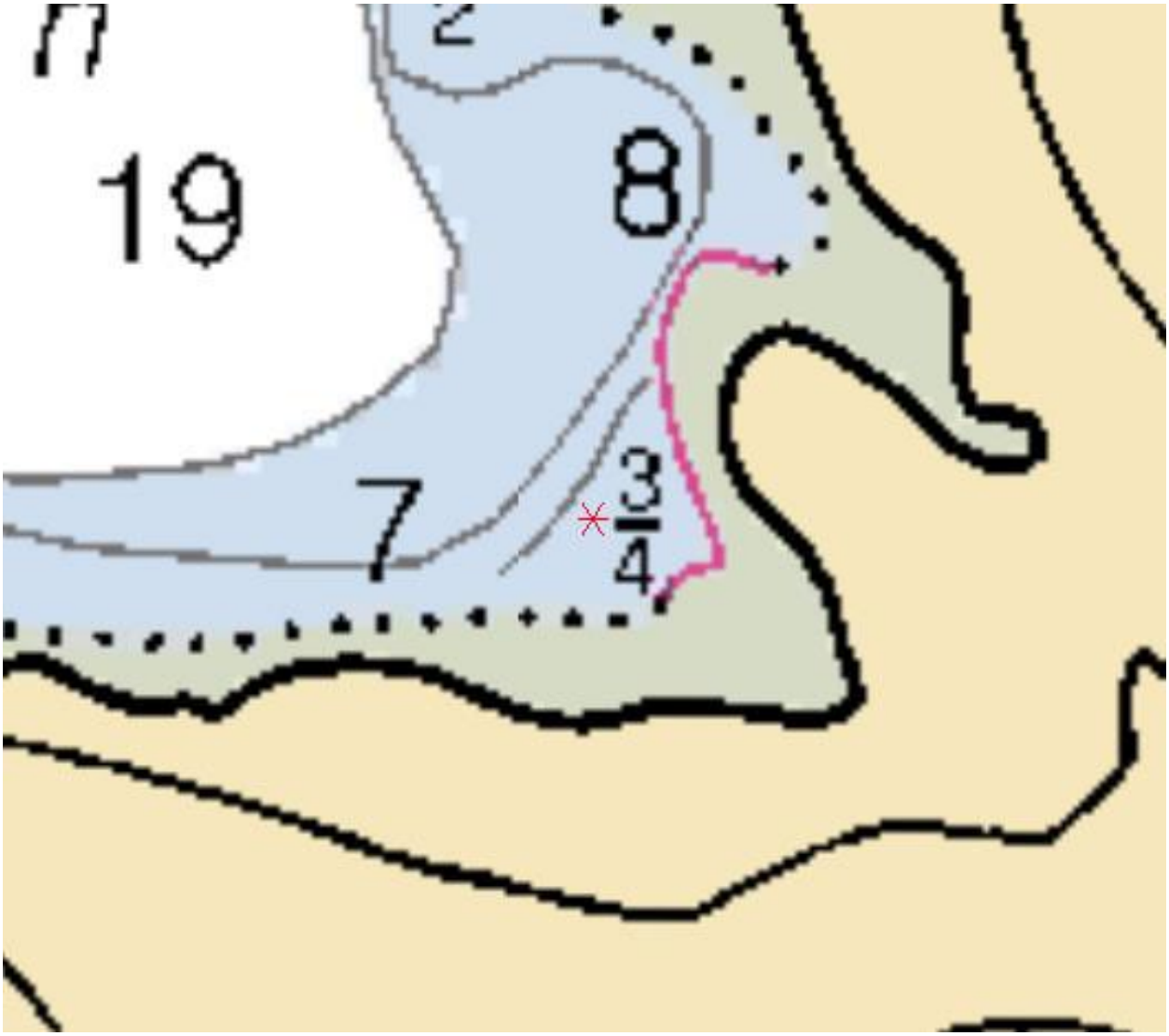


Figure 1.15.1

Figure 1.15.2

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 27, 2009

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O190-RA-2009
HYDROGRAPHIC SHEET: H12027

LOCALITY: West of Prince of Wales Island Cape Suspiro-Doyle Bay
TIME PERIOD: April 28 - June 7, 2009

TIDE STATION USED: 945-0463 Trocadero Bay
Lat. 55° 21.1'N Long. 132° 56.3' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.825 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SA250

Refer to attachments for zoning information.

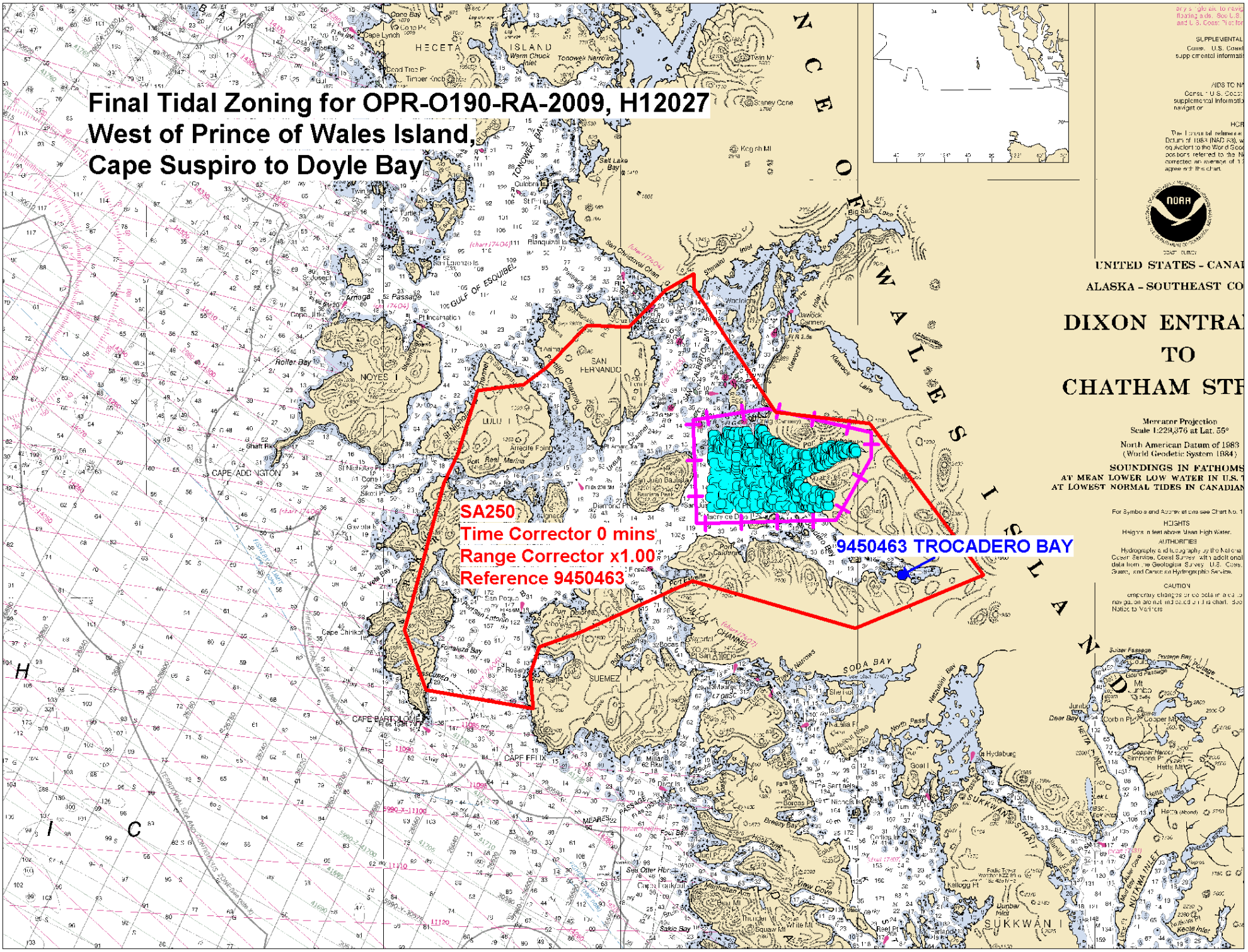
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2009.08.27 16:03:45 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION

Final Tidal Zoning for OPR-O190-RA-2009, H12027
West of Prince of Wales Island,
Cape Suspiro to Doyle Bay



H12027 HCell Report

Toshi Wozumi, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12027 used:

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

2. Compilation Scale

Depths and features for HCell H12027 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17405	1:40,000	16th	10/01/2008	09/25/2010

The following ENCs were also used during compilation:

Chart	Scale
US5AK4BM	1:10,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 8-meter Combined Surface 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)
-10.0	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 layers (SS) and imported into a new layer (CS) created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.

4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H12027_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 17405	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 H12027_SS.000
0	0	0.000	0.000	0
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.517	10.125	10
50	91.44	92.812	50.750	50
100	184.2516	182.88	100.750	100

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

5. Meta Areas

The following Meta object areas are included in HCell H12027:

M_QUAL

The Meta area objects were constructed on the basis of the limits of the hydrography. There are 40 separate M_QUAL objects in HCell H12027 due to multiple surveys compiled into one HCell. A single $AREA object representing the combined area of all the M_QUAL objects is included in the HCell.

6. Features

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

7. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

$AREAS	Single polygon covering survey extents
$CSYMB	Blue Notes-Notes to the MCD chart Compiler
COALNE	Modified GC coastline
DEPCNT	Modified GC MLLW
LNDARE	Islands and islets retained from the chart
LNDELV	Islands and islets retained from the chart
M_QUAL	Data quality Meta object
PILPNT	Piles
PONTON	Floating structures
SBDARE	Modified GC ledges and reefs, bottom samples, and rocky seabed areas
SLCONS	Piers
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features
WEDKLP	New and retained kelp areas
WRECKS	Wrecks

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 (except in areas where Lidar coverage is available). 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

H12027 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

H12027_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H12027 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H12027 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12027 _outline.gml	Survey outline
H12027 _outline.xsd	Survey outline

11.2 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.0	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

Toshi Wozumi
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
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APPROVAL SHEET
H12027

Initial Approvals:

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

Toshi Wozumi
2011.01.31
09:46:58 -08'00'

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 disproval 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.

Digitally signed by
Kurt Brown
Date: 2011.01.31
10:25:25 -08'00'

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.

Digitally signed by Gary C. Nelson
DN: cn=Gary C. Nelson, o=NOAA,
ou=Pacific Hydrographic Branch,
email=gary.nelson@noaa.gov,
c=US
Date: 2011.01.31 10:40:05 -08'00'

Megan Greenaway
AWOIS and SURF Check
Complete
2011.02.03 13:24:47
-05'00'