H12035

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. RA-10-01-09

Registry No. H12035

LOCALITY

State Alaska

General Locality Keku Strait

Sublocality Southern Keku Strait

2009

CHIEF OF PARTY

Captain Donald W. Haines, NOAA

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DATE

NOAA FORM 77-28
(11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H12035

INSTRUCTIONS – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD No

RA-10-01-09

State **Alaska**

General Locality **Keku Strait**

Sub-Locality **Southern Keku Strait**

Scale **1:10,000** Date of Survey **5/20/2009 - 5/26/2009**

Instructions dated **4/2/2009** Project No. **OPR-O180-RA-09**

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

Chief of party **Captain Donald W. Haines, NOAA**

Surveyed by **RAINIER Personnel**

Soundings by echo sounder, hand lead, pole **Tilted Reson 8125, Knudsen 320M**
Reson SeaBat 7125

Graphic record scaled by **RAINIER Personnel**

Graphic record checked by **RAINIER Personnel** Automated Plot **N/A**

Sar by **Martha Herzog** Compilation By **Kurt Brown**

Soundings in **Feet** at **MLLW**

REMARKS: **All times are UTC. UTM Zone 8**

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. Revisions and end notes in red were generated during office processing.

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/.

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537

Descriptive Report to Accompany Hydrographic Survey H12035

Project OPR-O180-RA-09
Keku Strait, Alaska
Southern Keku Strait
Scale 1:10,000
May 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-O180-RA-09 dated April 2, 2009 and all other applicable direction[1], with the exception of deviations noted in this report. The survey area is the Southern Keku Strait, Alaska and corresponds to sheet "B" in the sheet layout provided with the Project Instructions. OPR-O180-RA-09 responds to a request from the USCG to determine more accurate extents of shoals and dangers to navigation for improved placement of aids to navigation.

Complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 8 meters and deeper.[1] 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 and vertical beam 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 referenced in Table 1.

Data Acquisition Type	Hull Number with Mileage (nm)						Total
	1101	1103	2801	2802	2803	2804	
VBES (main scheme)	-	18.95	-	-	-	-	18.95
MBES (main scheme)	16.99	-	74.52	62.20	65.11	107.07	325.89
SSS (main scheme)	-	-	-	-	-	-	-
Crosslines	-	-	8.99	10.60	-	-	19.59
Developments	-	2.73	-	-	-	-	2.73
Shoreline	-	-	-	-	-	-	-
Bottom Samples	-	62	-	-	-	-	62
Total Number of Items Investigated	-	13	-	-	-	-	13
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	8.03

Table 1: Statistics for survey H12035

Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12035, as per section 3.5.5 of the Field Procedures Manual April

[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.

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

Data acquisition was conducted from May 20 to May 26, 2009 (DN 140 to 146).

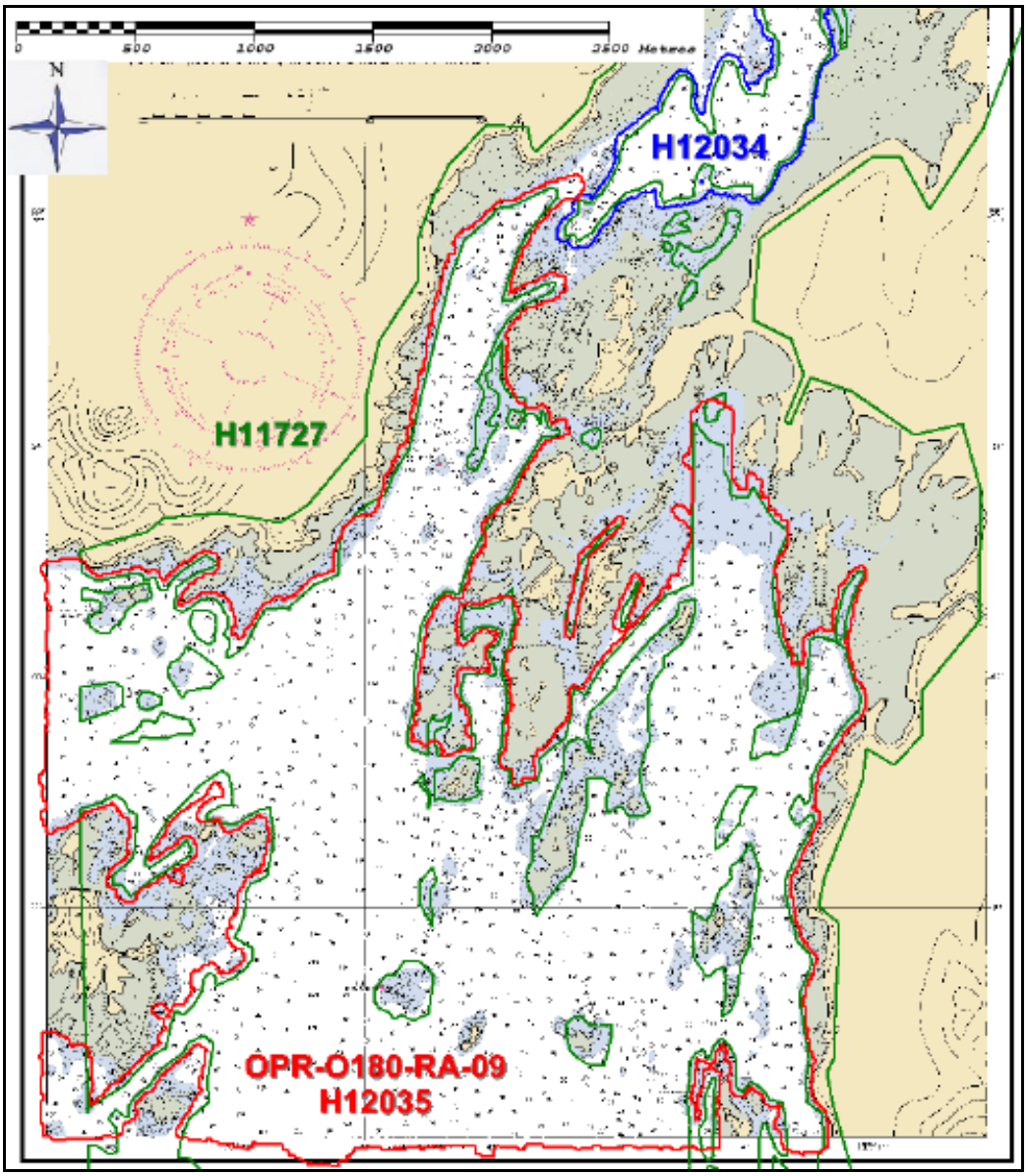


Figure 1: H12035 Survey Outline and Junctions overlaid on Chart 17372

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-O180-RA-09 Data Acquisition and Processing Report* (DAPR), submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

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

B.1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Length (ft)	Draft (ft)	Acquisition Type
1101	RA-1	29	2	Reson 8125 Multibeam Echosounder
1103	RA-2	29	2	Knudsen 320M Vertical Beam Echosounder Detached Positions Bottom Samples
2803	RA-3	29	3.5	Reson 7125 Multibeam Echosounder
2801	RA-4	29	3.5	Reson 7125 Multibeam Echosounder
2802	RA-5	29	3.5	Reson 7125 Multibeam Echosounder
2804	RA-6	29	3.5	Reson 7125 Multibeam Echosounder

Table 2: Data acquisition vessels and systems for H12035

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

Multibeam vessel navigation and attitude data were measured and recorded using Applanix POS/MV 320 systems, version 4. Vertical Beam echosounder navigation and attitude data were measured using a Trimble DSM212L GPS receiver and a TSS MAHRS system.

A complete description of survey vessels, hardware, and software systems is included in the *OPR-O180-RA-09 DAPR*.

No unusual vessel configurations were used for data acquisition.

B.2. Quality Control

B.2.a. Crosslines

Multibeam Echosounder (MBES) cross-lines totaled 19.59 nautical miles, comprising 6.0% of main scheme MBES hydrography.[2] The main scheme bathymetry was manually compared to the crossline nadir beams in CARIS subset mode. All crosslines were run on day 145 by 2801 (RA-4) and 2802 (RA-5) and are deeper than main scheme multibeam lines by 0.25 to 0.35 meters.[3] This offset can be attributed to tidal zone modeling as discussed in section B.2.e.

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 H12035_FinalCombined4m surface in CARIS HIPS for analysis. The uncertainty values of all finalized grids fall below the IHO levels as described in the NOS Specifications and Deliverables.

B.2.c. Junctions

Survey H12035 junctions with survey H11727, which is a FUGRO Lidar survey.[4] The sheet limits and area of overlap can be seen in Figure 1.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H11727	1:10,000	2007	Near-shore Areas

Table 3: Junction surveys

A CARIS BASE surface for H11727 was provided by Pacific Hydrographic Branch for junction comparison. H12035 BASE surfaces were compared to this junction surface in CARIS Notebook. Agreement was generally within 0.5 meters.[5] The areas of greatest difference tended to be gentle sloping sea floors, which ship surveyed depths were consistently shoaler than lidar depths.

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>Sound Speed Artifacts</u>
After correction for sound velocity in HDCS, 12 lines (001_1909 through 001_1955) run by RA-6 on DN 140 still exhibited the characteristic "frowns" indicative of inaccurate sound velocity corrections (Figure 2). These Errors are due to insufficient sound velocity casts distributed both spatially and temporally. Data affected by sound speed errors fall within IHO Order 1 specifications, generally agreeing within 0.15 meters.[6]

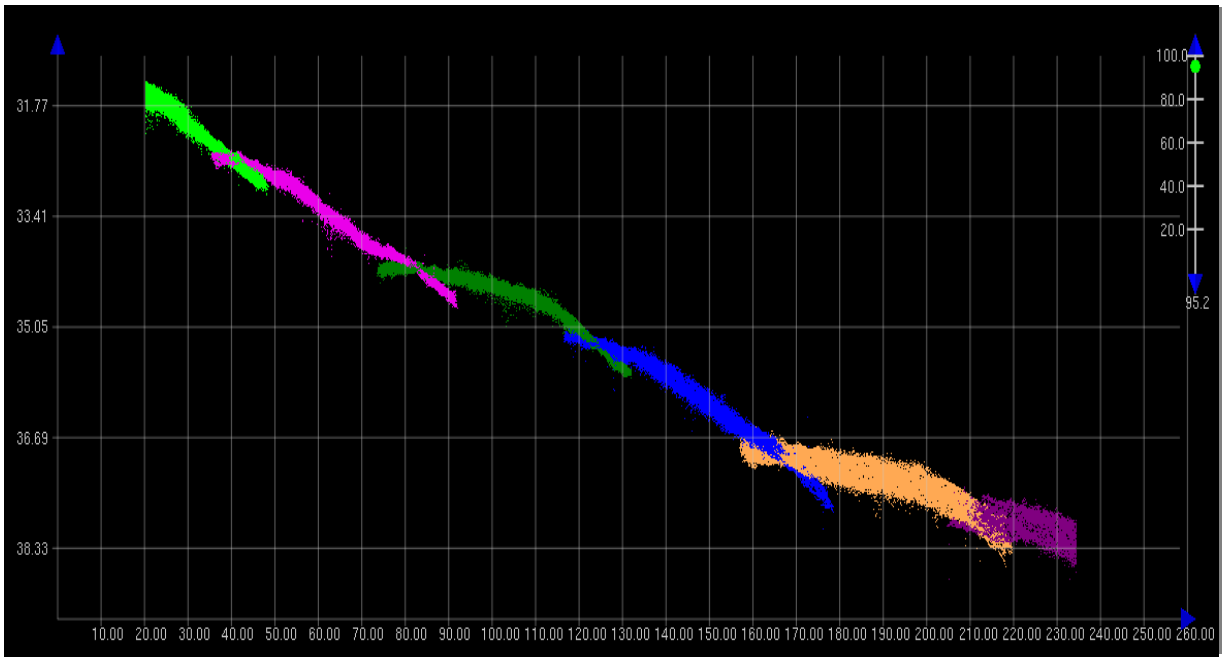


Figure 2: Sound speed errors

Sound Speed Blowouts

Data acquired by 1101 (RA-1) on DN 140 exhibited several significant sound velocity errors that occurred at random intervals during survey operations (Figure 3). These errors resulted from a failure of the Digibar surface velocimeter. The recurring failures were found after the Keku Strait project was concluded, and the faulty Digibar was replaced. Because this sonar uses surface sound speed input for beam forming, it was impossible to correct this data. In order to compensate, the Hydrographer has rejected soundings obviously in error.[7]

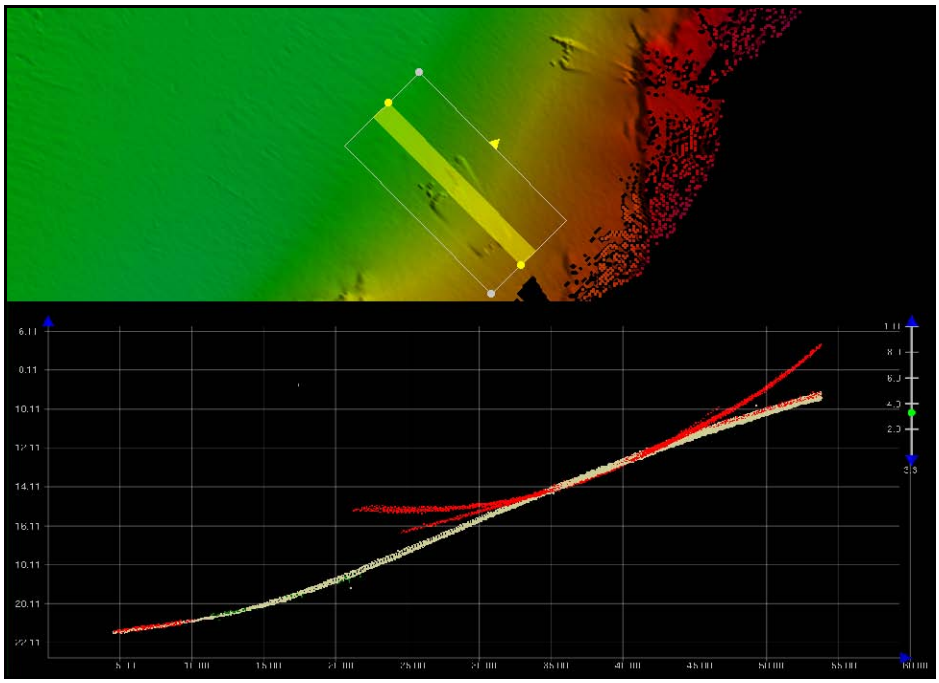


Figure 3: Sound Speed Blowouts

Vertical Offsets

Data collected for H12035 exhibited vertical offsets throughout the survey area, the most egregious errors occur in all crosslines run by RA-4 and RA-5 on DN145. Offsets fall within IHO Order 1 specifications, with the greatest difference of 0.35 meters in depth of 10 meters located on line 906_1744 (RA-4, DN145).[8] The varying nature of the offset leads to the conclusion that the vertical offset can be attributed to tide modeling error. Correspondence with the Center for Operational Oceanographic Products and Services (CO-OPS) regarding the tidal modeling of Keku Strait is included in Appendix V.

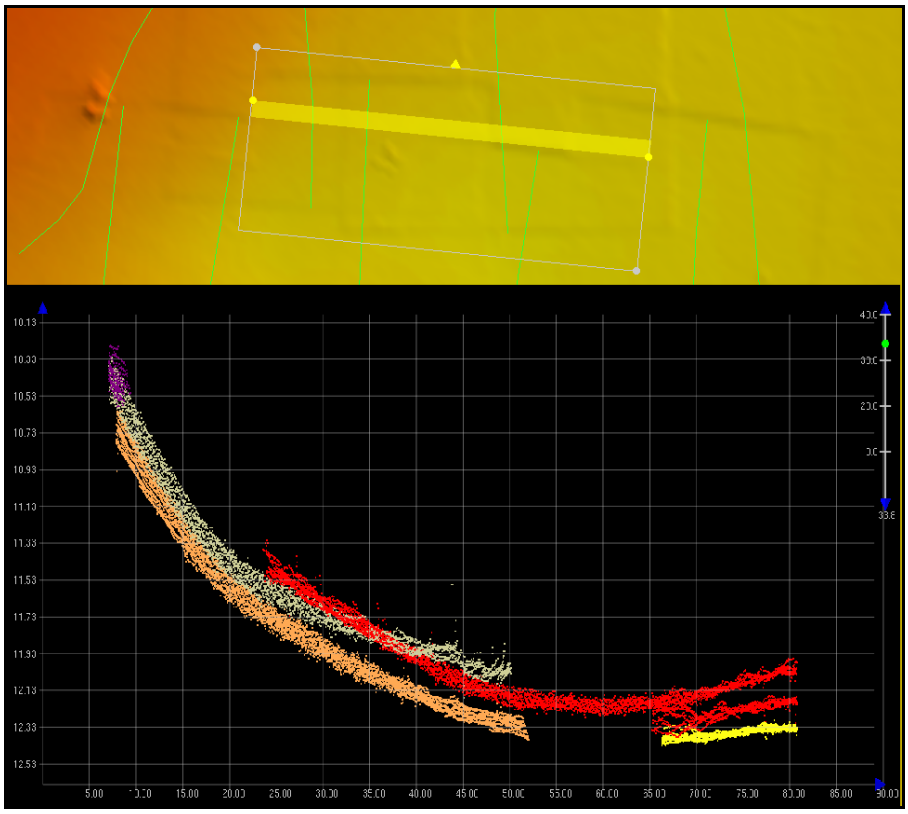


Figure 5: Vertical Offsets

True Heave

Data from the POS/MV system of Vessel 1101 was not logged for lines 000_1632 through 000_1800 (18 lines total) during DN 140. Consequently this multibeam data did not have True Heave applied. Lines were examined and no significant heave artifacts were present in the data.[9]

B.2.f. Object Detection and Coverage Assessment

Holidays

Within assigned sheet limits there is one observed holiday (Figure 6) that occurs in an area where significant shoaling indicates the likely presence of a rock. The holiday was likely caused by running "gate" filters too low on the Reson 7125 Sonar, causing the sonar to select noise over the bottom return. While conducting shoreline at a negative tide, the rock was not

visually observed. The shoalest sounding surveyed, at 3 feet, was selected and submitted as a Danger to Navigation (DTON) in report H12035_DTON1. The Hydrographer recommends charting the area as a rock awash.[10]

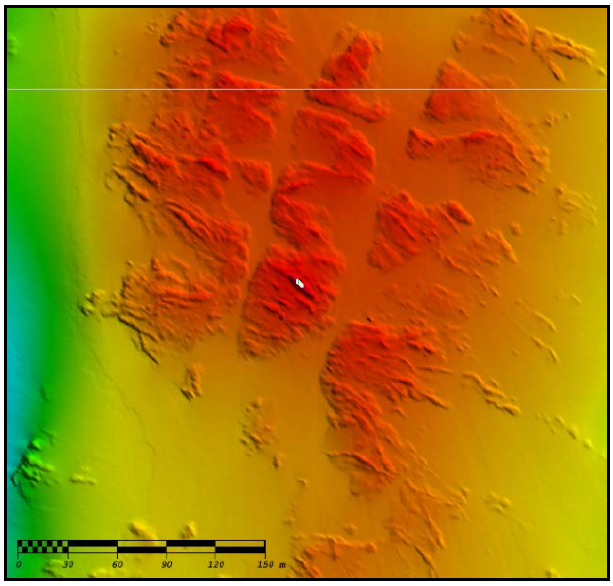


Figure 6: Holiday

Density

Data density for survey H12035 met the 5 sounding per node density requirement with 98.9% of nodes having greater than 5 contributing soundings.[11]

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 H12035 conform to those detailed in the *OPR-O180-RA-09 DAPR.*

B.4. Data Processing

Data processing procedures for survey H12035 conform to those detailed in the DAPR. Data were processed using CARIS HIPS & SIPS v6.1, Service Pack 2, and Hotfix 8. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

TPU VALUES:

The survey specific parameters used to compute TPU in CARIS for H12035 are listed in Table 4.

Tide values:	Measured	0.01 m	Zoning	0.182 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 H12035. Final BASE surface resolutions and depth ranges were set according to Table 5 below, with field sheets smaller than 25 million nodes. CUBE surfaces were processed with a parameter set corresponding to each resolution as per HTD 2009-2. The CUBE parameter XML file is included with the data deliverables. 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 submitted CUBE surfaces. The submission Field Sheet and BASE Surface structure are shown in figures 7, 8, and 9.

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

Table 5: Depth range and surface resolutions for H12035

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

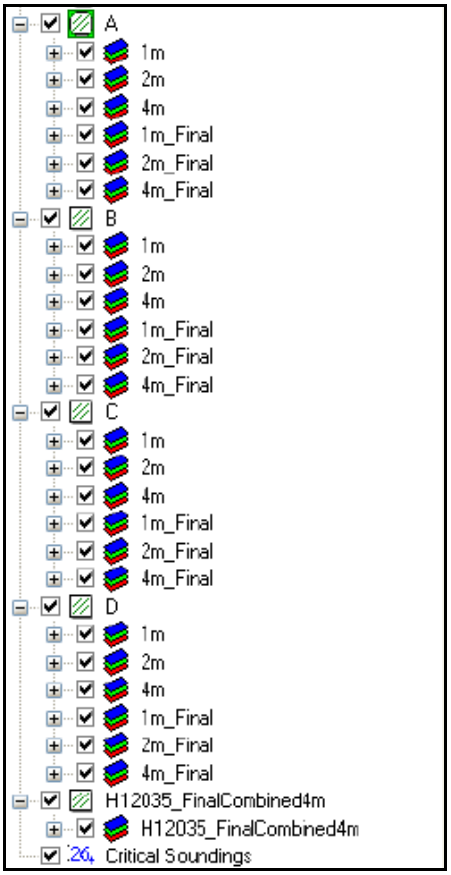


Figure 7: Field sheets and BASE surfaces submitted with H12035

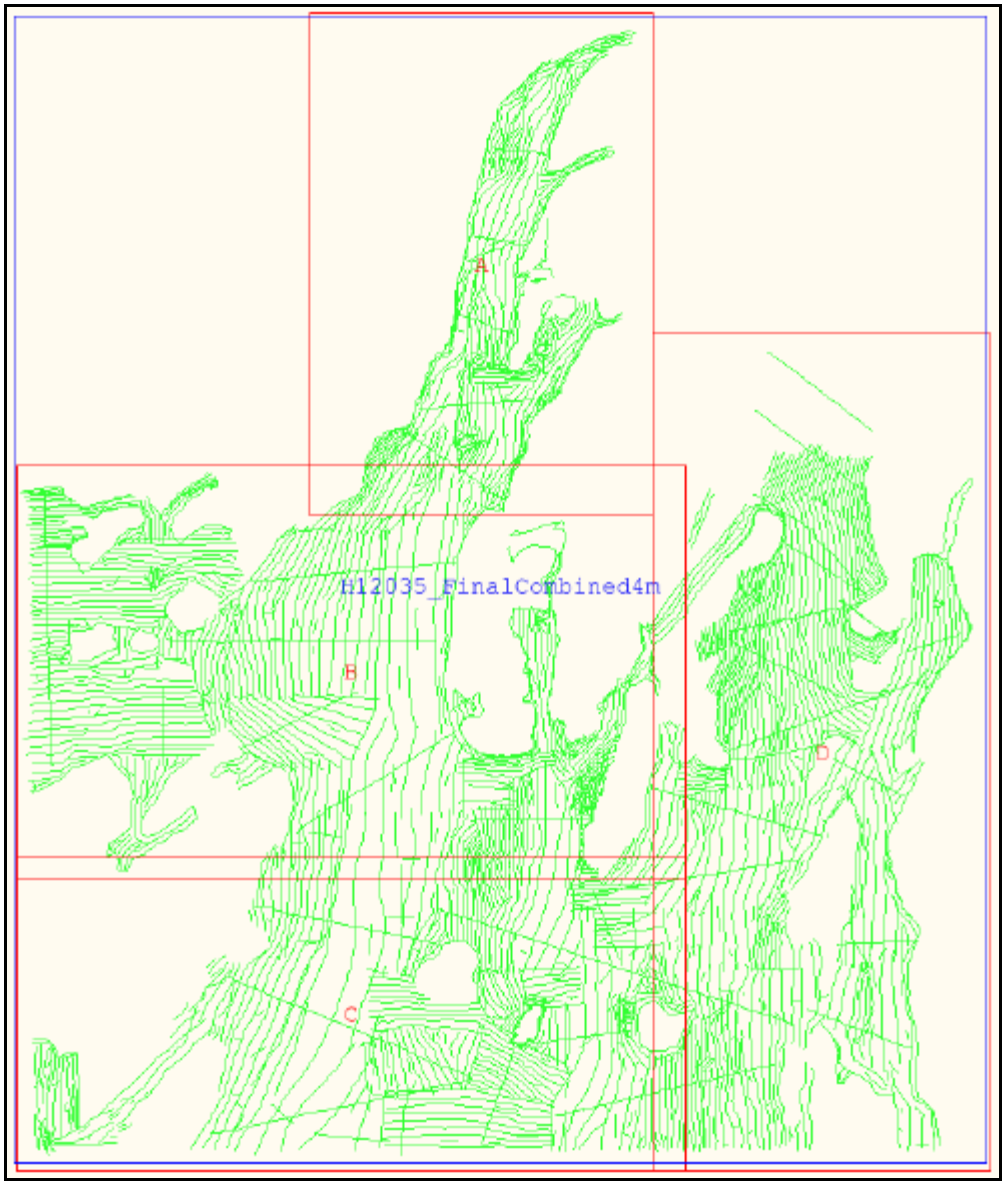


Figure 8: H12035 Field sheet layout (excluding VBES)

Figure 9: H12035 VBES Field Sheet Layout

C. VERTICAL AND HORIZONTAL CONTROL

A complete description of vertical and horizontal control for survey H12035 can be found in the *OPR-O180-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
Biorka Island	305 kHz	USCG	Secondary

Table 6: Differential Corrector Sources for H12035

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 Ketchikan, AK (945-0460) served as control for datum determination for survey H12035.

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-O180-RA-09 Horizontal and Vertical Control Report*.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
The Summit	945-1349	30-day	April 25, 2009	May 26, 2009

Table 7: Tide Stations installed by Rainier personnel for H12035

Contrary to project instructions, TCARI tides were deemed unusable by CO-OPS and tide correctors were applied using tide zoning models. All data were reduced to MLLW using the final approved water levels from the Ketchikan (954-0460) and The Summit (945-1349) stations by applying tide files 9450460.tid and 9451349.tid and time and height correctors through the zone corrector file H12035CORF.zdf. Correspondence with the Center for Operational Oceanographic Products and Services (CO-OPS) regarding the tidal modeling of Keku Strait is included in Appendix V.[12] **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 H12035 was submitted to CO-OPS on June 4, 2009 in accordance with the Field Procedures Manual (FPM), dated April, 2009. The Final Tide Note was received on August 25, 2009[13]. 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 & SIPS software program.

Survey H12035 was compared with the following charts[14 15]:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17372	1:20,000	11th Ed, Sept 2003	06/2008

Table 8: Charts compared with H12035

Survey soundings were generally 1-5 feet deeper than charted depths (17372)[16]. In flat areas, which included the large bay in the north east area of H12035 and the channel to the north of Monte Carlo Island, survey sounding agreed within 0-2 feet of charted depths.[17]

The edges of channels and the ledges near islands showed soundings that were significantly shoaler than charted depths. Specifically, measured soundings on the east side of the main channel of Keku Strait were found to be in excess of 10 to 40 feet shoaler than charted depths.[18] In addition, the area to the east of the Keku Strait Entrance Light and the small boat channel to the east of the main channel were measured to be 10 to 20 feet shoaler than charted.[19]

In the area to the south of Monte Carlo Island and the shallow area to the northeast of Keku Strait Entrance Light shoaler soundings were found between accurately charted depths.[20] This can be attributed to increased coverage developed by multibeam sonar methods and rugged bottom characteristics.

The hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.[21]

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

No AWOIS items are located within the survey limits of H12035.[22]

D.1.c. Other Investigated Features

Additional Items
No additional charted items were investigated and no other features were located on survey H12035.[23]

D.1.d. Dangers to Navigation

Thirteen (13) Dangers to Navigation (DTONs) were found within the survey limits of H12035 and reported to the Marine Chart Division via email on November 23, 2009. The original DTON submission package is included in Appendix I.[24]

Due to the number of changes between the chart and the survey, it is recommended that this survey be considered for priority status. Dangers to Navigation (DTON) selection was discussed with Gary Nelson, Chief, Pacific Hydro Branch, and DTONs were chosen based upon the draft of the vessels expected to transit the area.

D.2. Additional Results

D.2.a. Shoreline Verification

Shoreline Source

Shoreline verification was accomplished using a combination of the composite source file (CSF) and project reference file (PRF) provided with the project instructions. The CSF has been created using 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. 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 field verification.

Shoreline Verification

Traditional "limited shoreline verification" was not required for this survey, since much of the near shore area was covered by junction Lidar survey H11727 and thus outside the limits of H12035. The following field procedures were followed:

- H11727 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 transiting between assigned H12035 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 H12035.
- All new, charted, and AWOIS items within the limits of H12035 (i.e. offshore of the limits prescribed in the Project Instructions and discussed in Section A) were addressed.

Detached positions (DPs) were recorded and s-57 attributed in CARIS Notebook. These DPs indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline, and transferred to the "remrks" attribute on the corresponding features in Notebook.

All shoreline data is submitted in CARIS Notebook HOB files. The session H12035_NTBK.wrk contains the following:

HOB File	Purpose and Contents
H12035_CSF.hob	Original Source Data as provided for project OPR-O180-RA-09 and filtered to the limits of survey H12035
H12035_Lidar_Features.hob	Extents of lidar junction survey H11727 and lidar investigation items.
H12035_Reference.hob	Survey outline and limit lines, and AWOIS item positions and radii.
H12035_FinalFeatureFile.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 "Lidar Investigation Features" that were confirmed to exist or were unable to be investigated.
H12035_Disproval.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.

Table 9: List and Description of Notebook HOB files

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook HOB files supersede and complement shoreline information compiled on the composite source file and charts as described above.[25]

D.2.b. Prior Survey Comparison

Prior survey comparison was not performed.

D.2.c. Aids to Navigation

There were five (5) aids to navigation (ATONs) located within the sheet limits of H12035. Each ATON's position was visually checked in the field against the digital raster chart. All ATONs were found to be correctly charted and serve their intended purpose.

In addition to basic inspection of ATONs, the Keku Strait Entrance Light was positioned using static GPS survey methods and the generated position can be seen in Table 10.[26]

Light List Name	Light List Number	Short Name	NAT (CORS96) (EPOCH: 2002.000)		Ellipsoid Ht (m)	NAVD88 Ortho Ht (m)
			N Lat (DMS)	W Long (DMS)		
Keku Strait Entrance Light	23305.1	KEKU	56 31 38.0918	133 43 48.62229	6.928	8.339

Table 10: Positioned ATON

D.2.d. Overhead Features

There are no overhead features within the survey limits of H12035.[27]

D.2.e. Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the survey limits of H12035, and none were detected by the survey.[28]

D.2.f. Ferry Routes

There are no ferry routes charted within the survey limits of H12035, and none were observed to be operating in the area.[29]

D.2.g. Bottom Samples

There were 62 bottom samples collected for survey H12035. In a joint project with Dr. Shachak Pe'eri from University of New Hampshire extremely dense bottom sampling was conducted in a target area on the eastern portion of the sheet to investigate the correlation of bottom type to Lidar reliability. This included the use of a traditional bottom sampling techniques using a grab sampler and the use of an underwater video camera to determine accurate bottom type when the sample failed to obtain a sample. Of the 15 historic bottom samples collected, 13 did not agree with the charted characteristics. In most cases the charted bottom type was incorrectly labeled as hard, which is likely due to the heavy vegetation observed in the area preventing a good sample. All bottom samples have been included in the H12035_Final_Features_File.hob in the CARIS Notebook session.[30]

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 H12035 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 May 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-O180-RA-09	20-Nov-2009	N/CS34
Coast Pilot Report for OPR- O180-RA-09	*To be submitted*	N/CS26
Horizontal and Vertical Control Report for OPR-O180-RA-09	20-Nov-2009	N/CS34
Tides and Water Levels Package for OPR-O180-RA-09	17-Jun-2009	N/OPS1

Approved and Forwarded: Donald W. Haines, CAPT/NOAA
I am approving this document
2010.01.13 14:07:53 -08'00'

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

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

Survey Sheet Manager: Adam Reed
I am the author of this document
2010.01.13 12:39:45 -08'00'

Ensign Adam R. Reed, NOAA
Junior Officer, NOAA Ship *Rainier*

Chief Survey Technician: James B Jacobson
I have reviewed this document
2010.01.13 20:14:55 Z

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

Field Operations Officer: Brent Pounds
I have reviewed this document
2010.01.13 11:16:12 -09'00'

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

Revisions Compiled During Office Processing and Certification

[1] Concur
[2] Concur
[3] Concur
[4] H12035 has been compiled in conjunction with LIDAR survey H11727. LIDAR data does not meet object detection requirements and is therefore not used to supersede shoaler data or features.
[5] Concur
[6] Concur
[7] Concur. Data is within spec after cleaning.
[8] Concur
[9] Concur
[10] Concur with clarification. A rock awash surrounded by a foul area are included in the HCell.
[11] Concur
[12] Attached to this report.
[13] Attached to this report.
[14] Chart 17372 (1:20,000, 11th Edition, NM 08/07/2010) was used for comparison during compilation.
[15] In several areas chart 17372 shows multiple islets in the intertidal zone which are not supported by the heights in the lidar data. In these areas the compiler recommends removing the islets and adding the note "Boulders" to the chart. The specific areas are bluenoted in the HCell.
[16] Concur
[17] Concur
[18] Concur. Chart according to HCell H12035.
[19] Concur with clarification. The Keku Strait entrance light referred to is charted as Sumner Strait Entrance Light (ENC). It is unclear where the small boat channel referred to is located.
[20] Concur. Chart according to HCell H12035.
[21] Concur. Chart according to HCell H12035.
[22] Concur
[23] Concur
[24] All DtoNs are charted and have been incorporated into the HCell. See attached DTON Report.
[25] Concur with clarification. The submitted hob files were used in the compilation of HCell H12035. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.
[26] Chart ATONs per latest ATONIS information.
[27] Concur
[28] Concur
[29] Concur
[30] Where appropriate, bottom samples from the survey were included in HCell H12035. Retain all charted bottom samples unless otherwise noted.

H12035 DTON Report

Registry Number: H12035

State: Alaska

Locality: Keku Strait

Sub-locality: Southern Keku Strait

Project Number: OPR-O180-RA-09

Survey Dates: 05/20/2009 - 05/26/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17372	11th	09/01/2003	1:20,000 (17372_4)	USCG LNM: 07/10/2007 (12/09/2008) CHS NTM: None (11/28/2008) NGA NTM: None (12/13/2008)
17360	35th	06/01/2008	1:217,828 (17360_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

Feature Type	Survey Depth	Survey Latitude	Survey Longitude
Shoal	1.45 m	56° 33' 14.8" N	133° 46' 11.1" W
Rock	9.88 m	56° 31' 09.8" N	133° 43' 07.2" W
Rock	1.07 m	56° 32' 00.6" N	133° 43' 29.4" W
Rock	6.57 m	56° 32' 20.4" N	133° 43' 09.7" W
Rock	2.94 m	56° 32' 10.0" N	133° 43' 22.8" W
Rock	4.95 m	56° 33' 37.5" N	133° 43' 25.0" W
Rock	4.59 m	56° 33' 57.8" N	133° 43' 19.4" W
Rock	9.07 m	56° 31' 27.6" N	133° 41' 26.8" W
Rock	0.13 m	56° 32' 17.1" N	133° 42' 42.6" W

Rock	7.46 m	56° 32' 48.3" N	133° 44' 51.5" W
Rock	7.21 m	56° 32' 54.2" N	133° 44' 50.1" W
Shoal	7.88 m	56° 31' 42.9" N	133° 41' 19.6" W
Rock	5.56 m	56° 32' 27.5" N	133° 41' 10.6" W

1 - Danger To Navigation

1.1) Profile/Beam - 162/233 from h12035 / 1101_reson8125 / 2009-140 / 000_0005

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 33' 14.8" N, 133° 46' 11.1" W

Least Depth: 1.45 m (= 4.77 ft = 0.795 fm = 0 fm 4.77 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.966 m ; **TVU (TPEv)** ±0.520 m

Timestamp: 2009-141.00:06:01.181 (05/21/2009)

Survey Line: h12035 / 1101_reson8125 / 2009-140 / 000_0005

Profile/Beam: 162/233

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Rocky ledge uncharted

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/1101_reson8125/2009-140/000_0005	162/233	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

5ft (17372_4)

0 ¾fm (17360_1, 16016_1, 530_1)

0fm 5ft (531_1)

1.5m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Feature Images

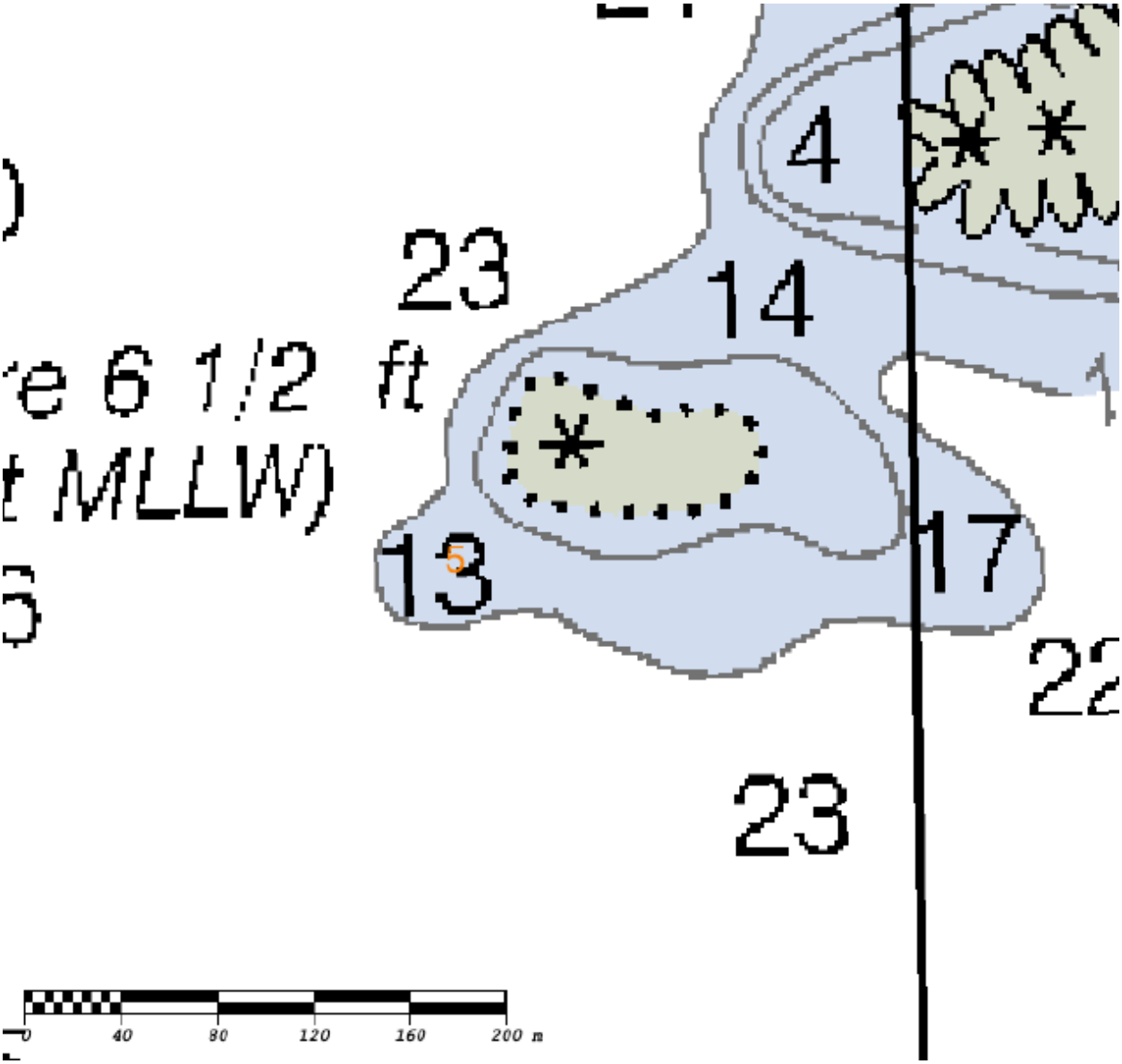


Figure 1.1.1

1.2) Profile/Beam - 1567/370 from h12035 / 2801_reson7125_hf_512 / 2009-142 / 000_1842

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 31' 09.8" N, 133° 43' 07.2" W

Least Depth: 9.88 m (= 32.41 ft = 5.401 fm = 5 fm 2.41 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.129 m

Timestamp: 2009-142.18:45:35.215 (05/22/2009)

Survey Line: h12035 / 2801_reson7125_hf_512 / 2009-142 / 000_1842

Profile/Beam: 1567/370

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Shoaler depth than charted, rocky feature

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2801_reson7125_hf_512/2009-142/000_1842	1567/370	0.00	000.0	Primary

Hydrographer Recommendations

Update chart depth

Cartographically-Rounded Depth (Affected Charts):

32ft (17372_4)

5 ¼fm (17360_1, 16016_1, 530_1)

5fm 2ft (531_1)

9.9m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 9.878 m

Feature Images

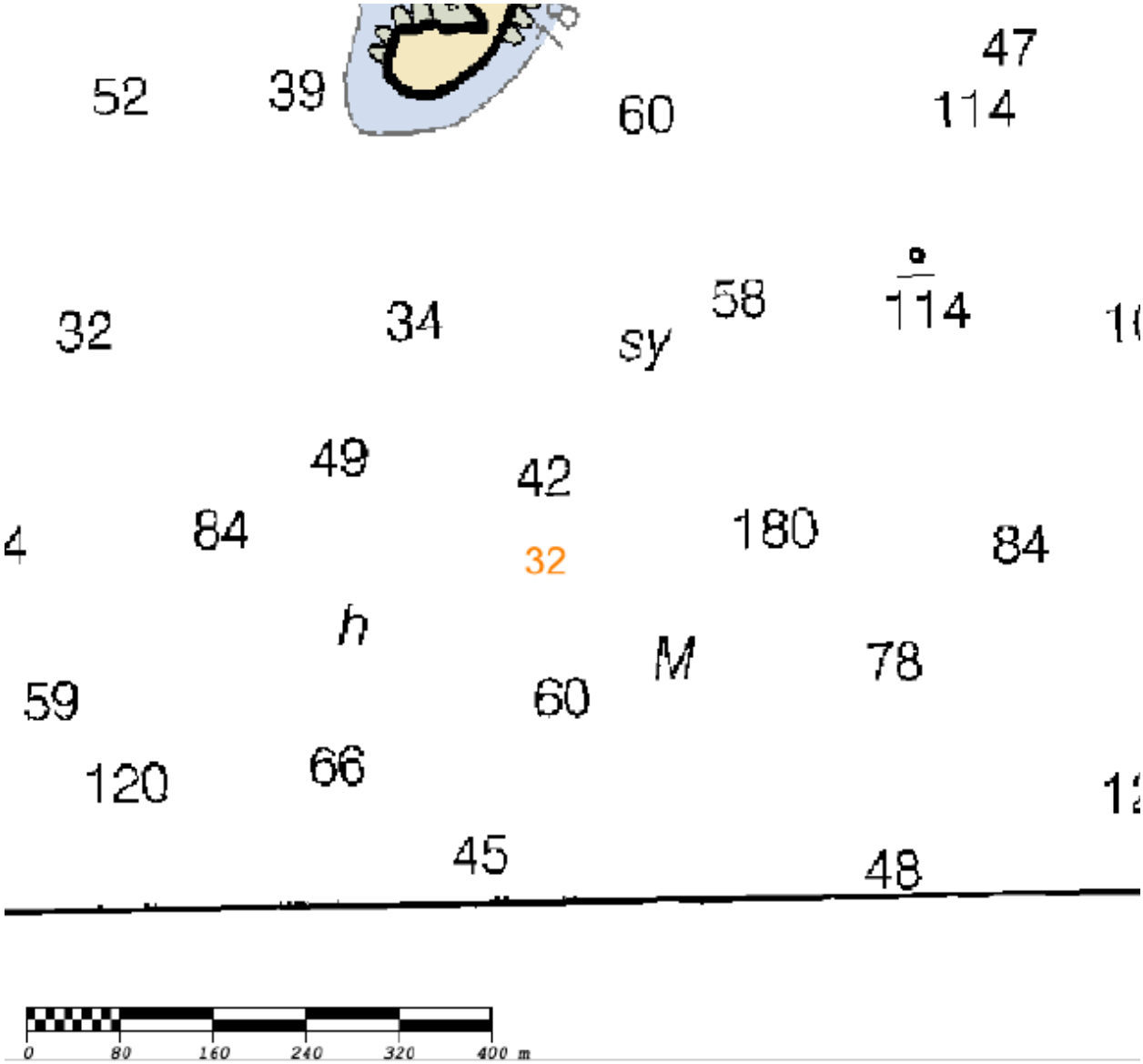


Figure 1.2.1

1.3) Profile/Beam - 1337/1 from h12035 / 2801_reson7125_hf_512 / 2009-142 / 000_2055

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 00.6" N, 133° 43' 29.4" W

Least Depth: 1.07 m (= 3.52 ft = 0.586 fm = 0 fm 3.52 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.123 m

Timestamp: 2009-142.20:56:22.857 (05/22/2009)

Survey Line: h12035 / 2801_reson7125_hf_512 / 2009-142 / 000_2055

Profile/Beam: 1337/1

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Dangerous Rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2801_reson7125_hf_512/2009-142/000_2055	1337/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart at hight specified in report

Cartographically-Rounded Depth (Affected Charts):

3ft (17372_4)

0 ½fm (17360_1, 16016_1, 530_1)

0fm 3ft (531_1)

1.1m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 1.072 m

Feature Images

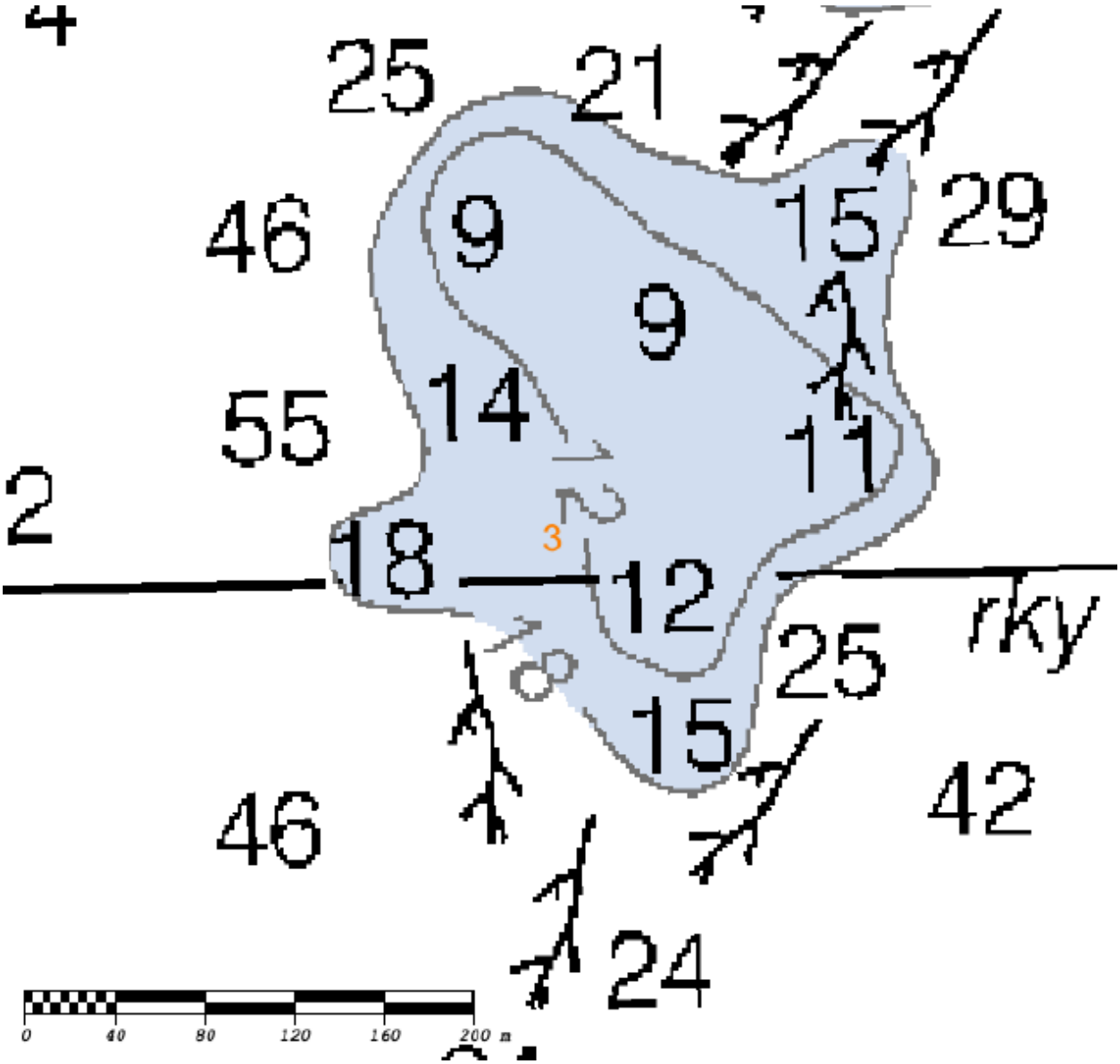


Figure 1.3.1

1.4) Profile/Beam - 1397/189 from h12035 / 2801_reson7125_hf_512 / 2009-142 / 000_2338

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 20.4" N, 133° 43' 09.7" W

Least Depth: 6.57 m (= 21.56 ft = 3.593 fm = 3 fm 3.56 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.122 m

Timestamp: 2009-142.23:41:02.257 (05/22/2009)

Survey Line: h12035 / 2801_reson7125_hf_512 / 2009-142 / 000_2338

Profile/Beam: 1397/189

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Shoaler than charted, Rocky seabed

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2801_reson7125_hf_512/2009-142/000_2338	1397/189	0.00	000.0	Primary

Hydrographer Recommendations

Chart new sounding

Cartographically-Rounded Depth (Affected Charts):

21ft (17372_4)

3 ½fm (17360_1, 16016_1, 530_1)

3fm 3ft (531_1)

6.6m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 6.571 m

Feature Images

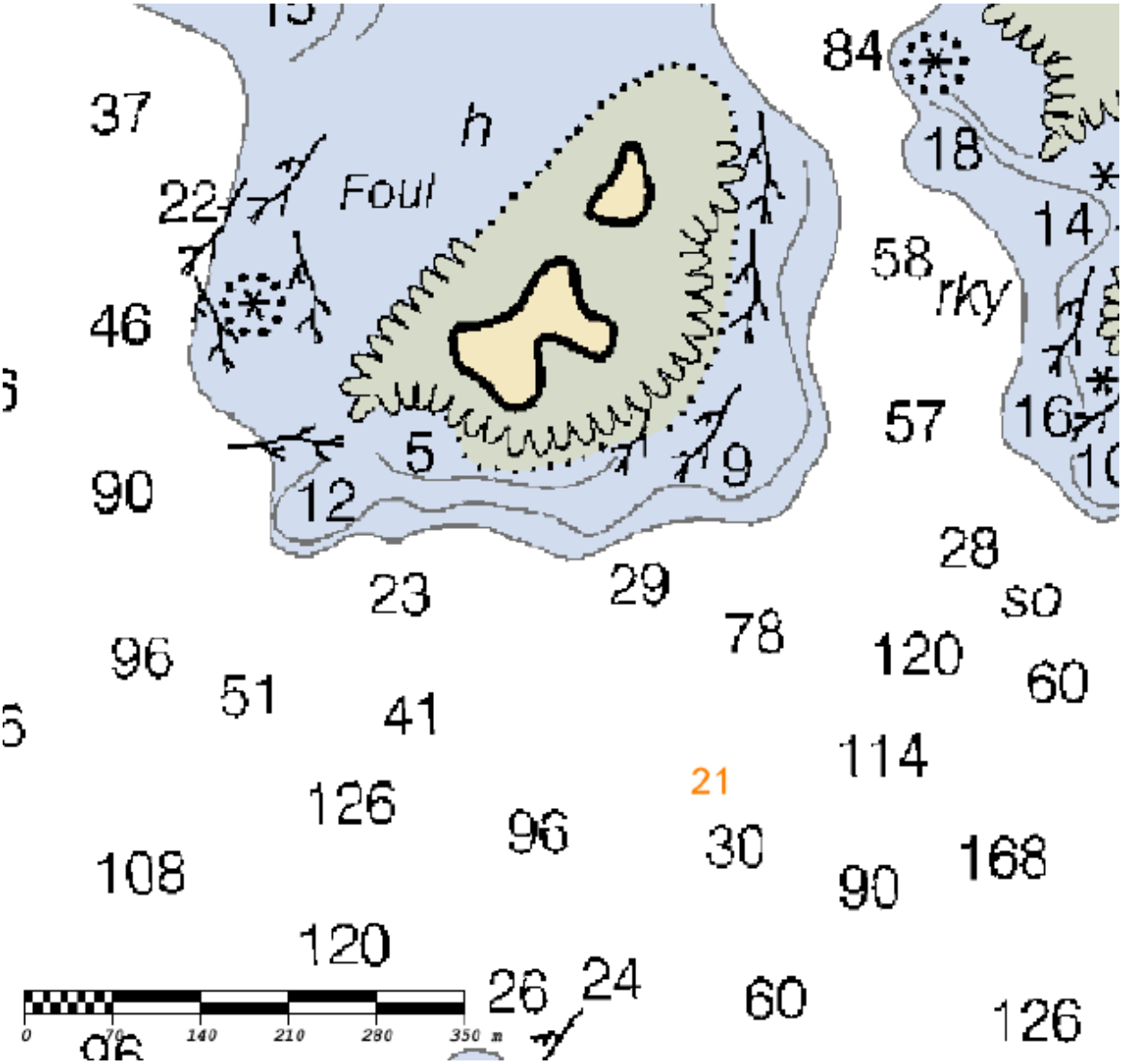


Figure 1.4.1

1.5) Profile/Beam - 659/139 from h12035 / 2801_reson7125_hf_512 / 2009-142 / 000b2030

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 10.0" N, 133° 43' 22.8" W

Least Depth: 2.94 m (= 9.64 ft = 1.607 fm = 1 fm 3.64 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.122 m

Timestamp: 2009-142.20:31:55.372 (05/22/2009)

Survey Line: h12035 / 2801_reson7125_hf_512 / 2009-142 / 000b2030

Profile/Beam: 659/139

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Rock shoaler than charted

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2801_reson7125_hf_512/2009-142/000b2030	659/139	0.00	000.0	Primary

Hydrographer Recommendations

Update sounding on chart

Cartographically-Rounded Depth (Affected Charts):

9ft (17372_4)

1 ½fm (17360_1, 16016_1, 530_1)

1fm 3ft (531_1)

2.9m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 2.939 m

Feature Images

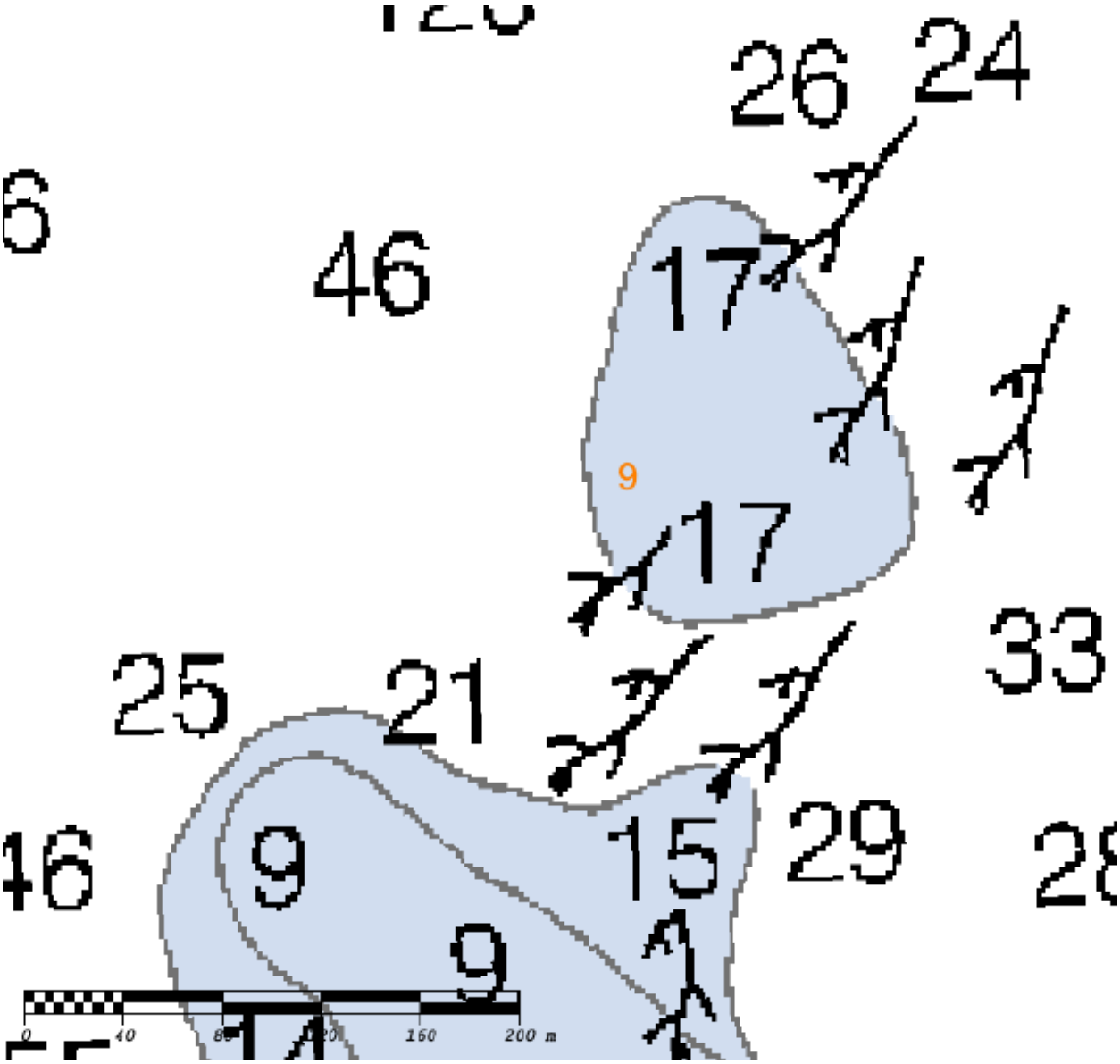


Figure 1.5.1

1.6) Profile/Beam - 466/32 from h12035 / 2801_reson7125_hf_512 / 2009-143 / 000_1742

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 33' 37.5" N, 133° 43' 25.0" W

Least Depth: 4.95 m (= 16.23 ft = 2.705 fm = 2 fm 4.23 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.126 m

Timestamp: 2009-143.17:43:23.774 (05/23/2009)

Survey Line: h12035 / 2801_reson7125_hf_512 / 2009-143 / 000_1742

Profile/Beam: 466/32

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Shoaler depth than charted, contour line extention needed

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2801_reson7125_hf_512/2009-143/000_1742	466/32	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

16ft (17372_4)

2 ¾fm (17360_1, 16016_1, 530_1)

2fm 4ft (531_1)

4.9m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 4.947 m

Feature Images

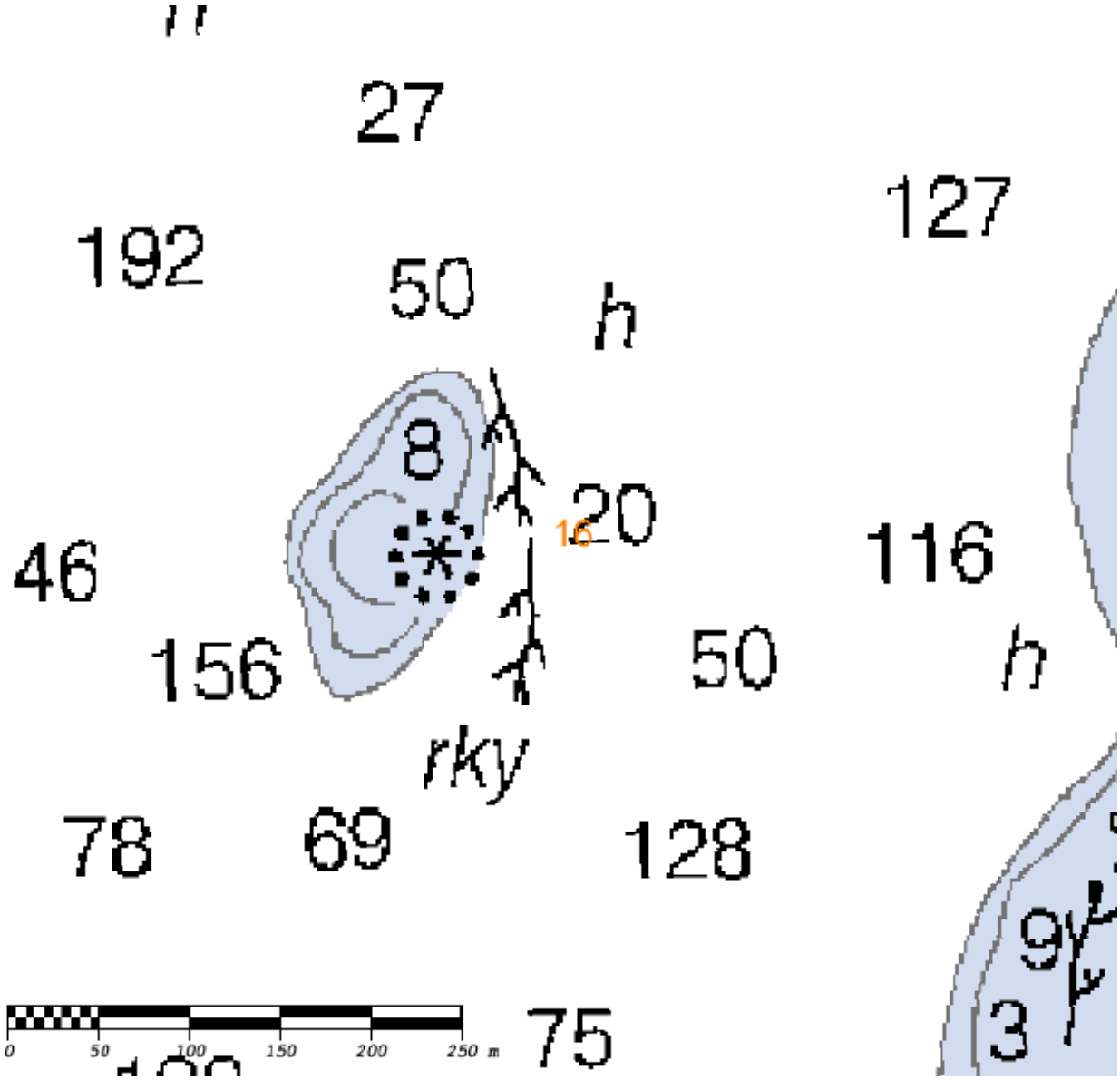


Figure 1.6.1

1.7) Profile/Beam - 526/7 from h12035 / 2801_reson7125_hf_512 / 2009-143 / 000_2156

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 33' 57.8" N, 133° 43' 19.4" W

Least Depth: 4.59 m (= 15.05 ft = 2.509 fm = 2 fm 3.05 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.964 m ; **TVU (TPEv)** ±0.133 m

Timestamp: 2009-143.21:57:35.266 (05/23/2009)

Survey Line: h12035 / 2801_reson7125_hf_512 / 2009-143 / 000_2156

Profile/Beam: 526/7

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Significantly shoaler sounding than charted, Rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2801_reson7125_hf_512/2009-143/000_2156	526/7	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

15ft (17372_4)

2 ½fm (17360_1, 16016_1, 530_1)

2fm 3ft (531_1)

4.6m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 4.588 m

Feature Images

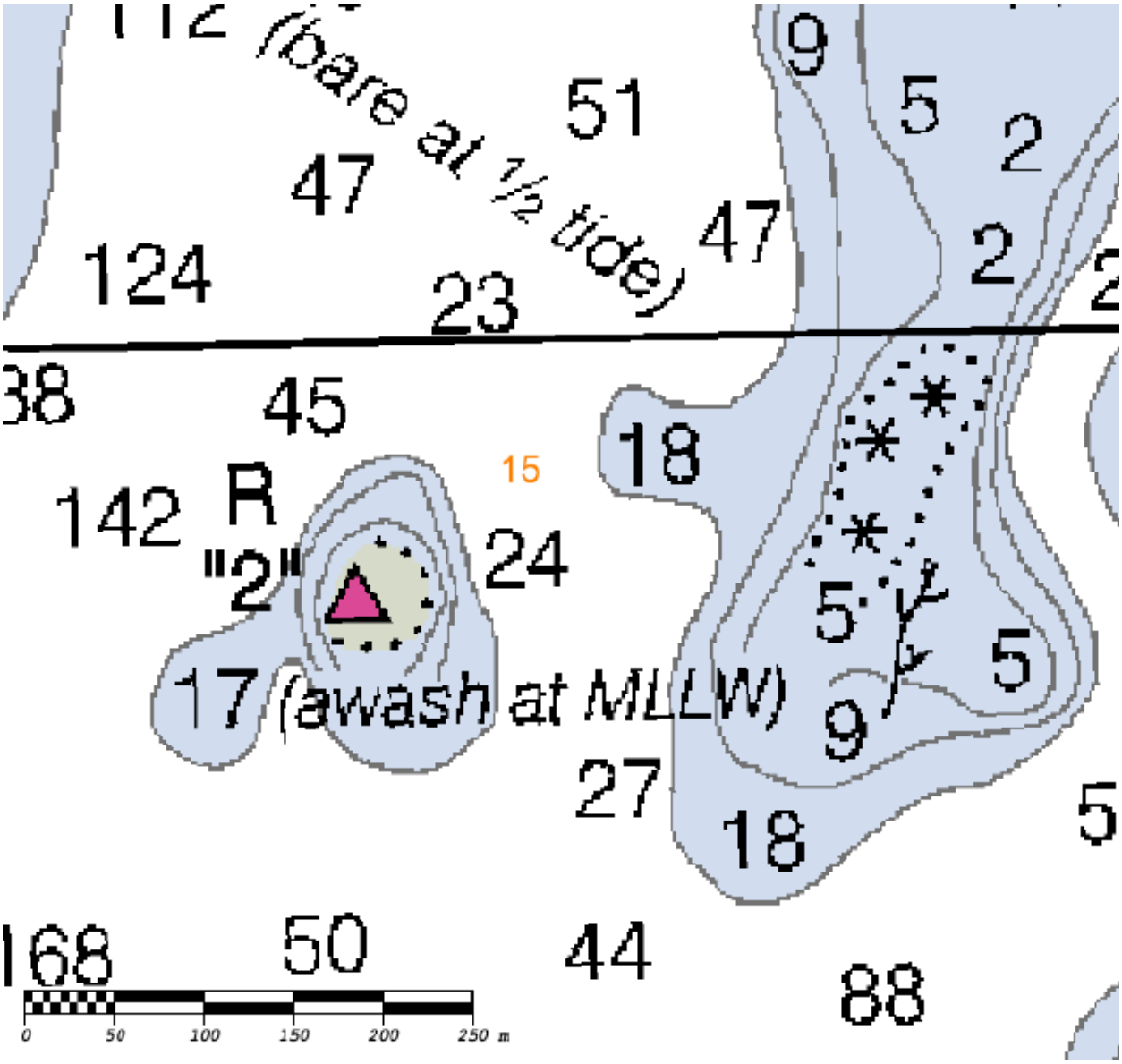


Figure 1.7.1

1.8) Profile/Beam - 843/192 from h12035 / 2802_reson7125_hf_512 / 2009-142 / 000_2058

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 31' 27.6" N, 133° 41' 26.8" W

Least Depth: 9.07 m (= 29.75 ft = 4.958 fm = 4 fm 5.75 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.124 m

Timestamp: 2009-142.21:00:20.354 (05/22/2009)

Survey Line: h12035 / 2802_reson7125_hf_512 / 2009-142 / 000_2058

Profile/Beam: 843/192

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Shoaler sounding than charted, Rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2802_reson7125_hf_512/2009-142/000_2058	843/192	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

30ft (17372_4)

5fm (17360_1, 16016_1, 530_1)

3fm 0ft (531_1)

9.1m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 9.068 m

Feature Images

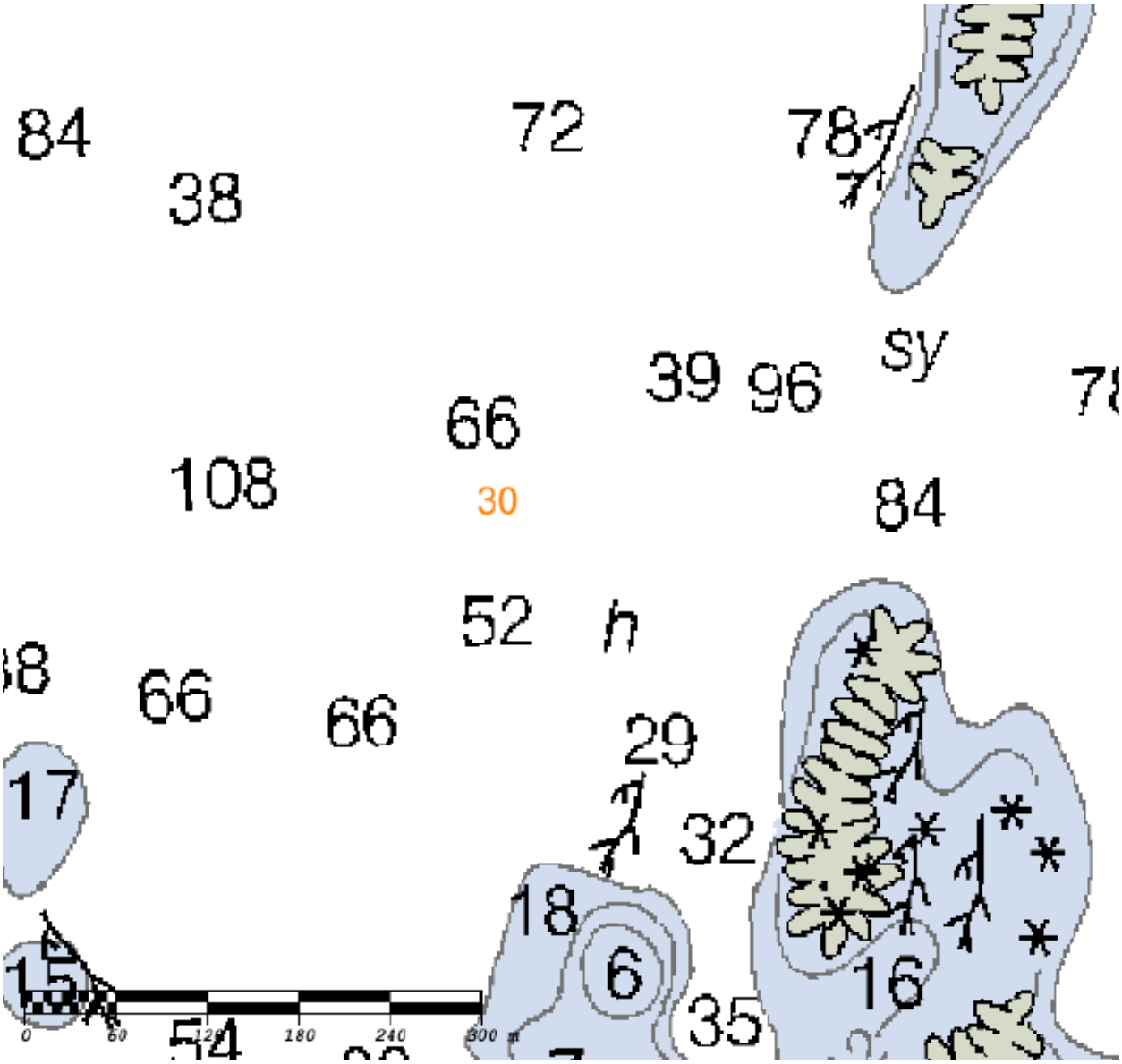


Figure 1.8.1

1.9) Profile/Beam - 217/383 from h12035 / 2803_reson7125_hf_512 / 2009-146 / 001_2302

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 17.1" N, 133° 42' 42.6" W

Least Depth: 0.13 m (= 0.43 ft = 0.071 fm = 0 fm 0.43 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.121 m

Timestamp: 2009-146.23:02:40.261 (05/26/2009)

Survey Line: h12035 / 2803_reson7125_hf_512 / 2009-146 / 001_2302

Profile/Beam: 217/383

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Dangerous and shoal rock area

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2803_reson7125_hf_512/2009-146/001_2302	217/383	0.00	000.0	Primary

Hydrographer Recommendations

Update chart

Cartographically-Rounded Depth (Affected Charts):

0ft (17372_4)

0fm (17360_1, 16016_1, 530_1)

0fm 0ft (531_1)

.1m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 0.130 m

Feature Images

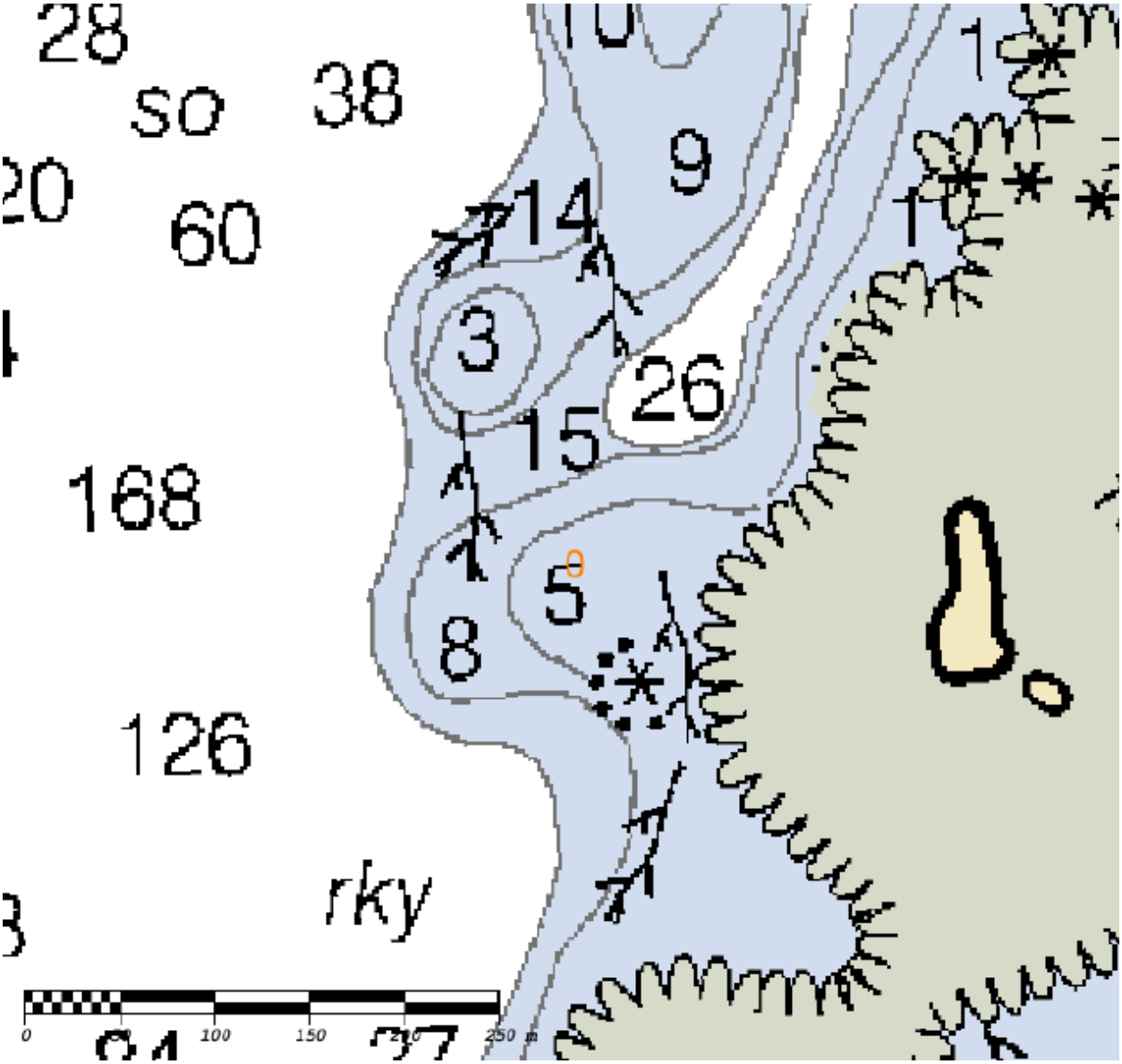


Figure 1.9.1

1.10) Profile/Beam - 3534/246 from h12035 / 2804_reson7125_hf_512 / 2009-140 / 001_1800

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 48.3" N, 133° 44' 51.5" W

Least Depth: 7.46 m (= 24.47 ft = 4.078 fm = 4 fm 0.47 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.122 m

Timestamp: 2009-140.18:05:48.574 (05/20/2009)

Survey Line: h12035 / 2804_reson7125_hf_512 / 2009-140 / 001_1800

Profile/Beam: 3534/246

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Significantly shoaler sounding than charted, Rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2804_reson7125_hf_512/2009-140/001_1800	3534/246	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

24ft (17372_4)

4fm (17360_1, 16016_1, 530_1)

4fm 0ft (531_1)

7.5m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 7.457 m

Feature Images

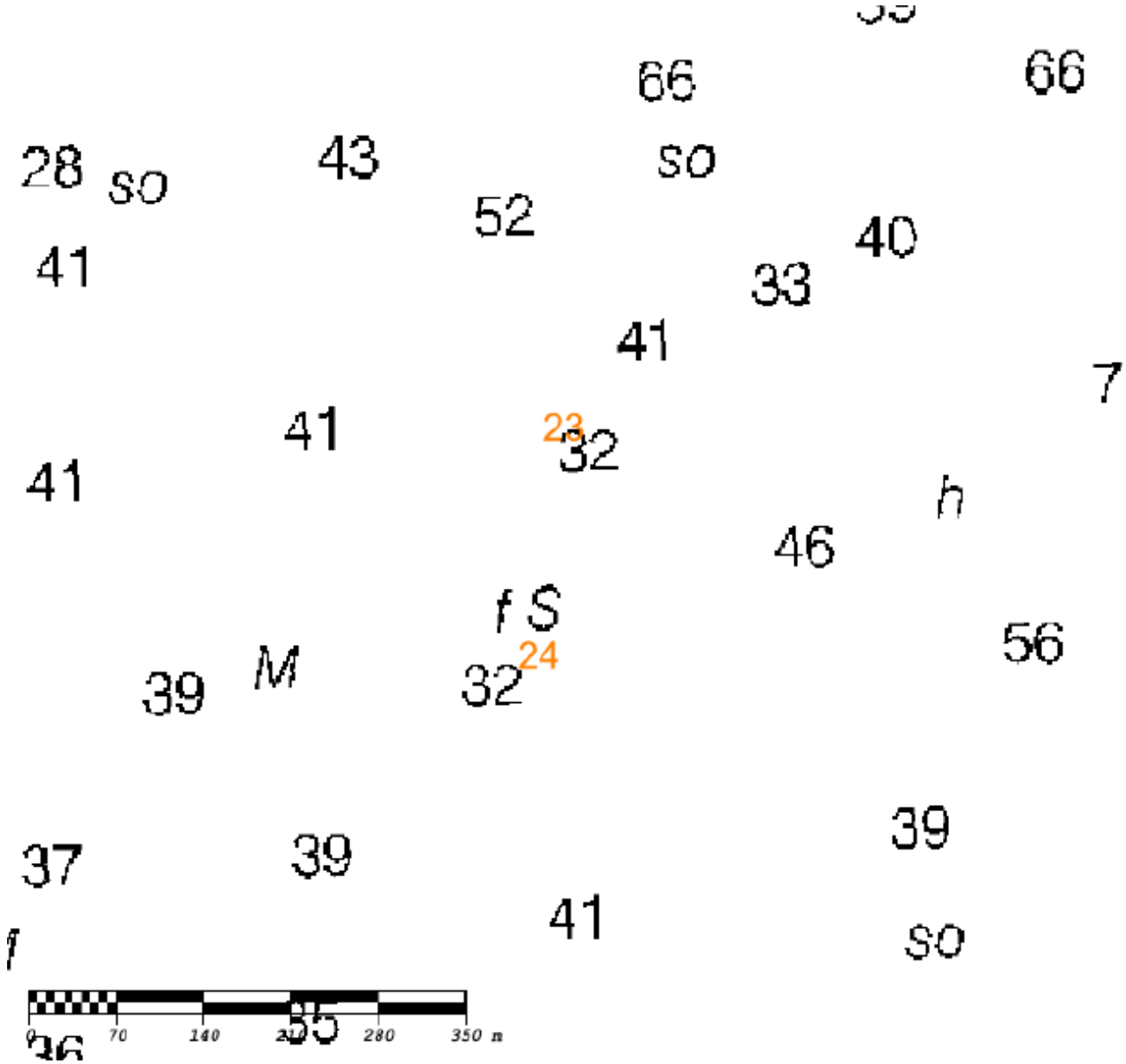


Figure 1.10.1

1.11) Profile/Beam - 120/231 from h12035 / 2804_reson7125_hf_512 / 2009-140 / 001_1845

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 54.2" N, 133° 44' 50.1" W

Least Depth: 7.21 m (= 23.65 ft = 3.941 fm = 3 fm 5.65 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.122 m

Timestamp: 2009-140.18:46:08.675 (05/20/2009)

Survey Line: h12035 / 2804_reson7125_hf_512 / 2009-140 / 001_1845

Profile/Beam: 120/231

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Significantly shoaler sounding than charted, Rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2804_reson7125_hf_512/2009-140/001_1845	120/231	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

23ft (17372_4)

4fm (17360_1, 16016_1, 530_1)

3fm 5ft (531_1)

7.2m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 7.208 m

Feature Images

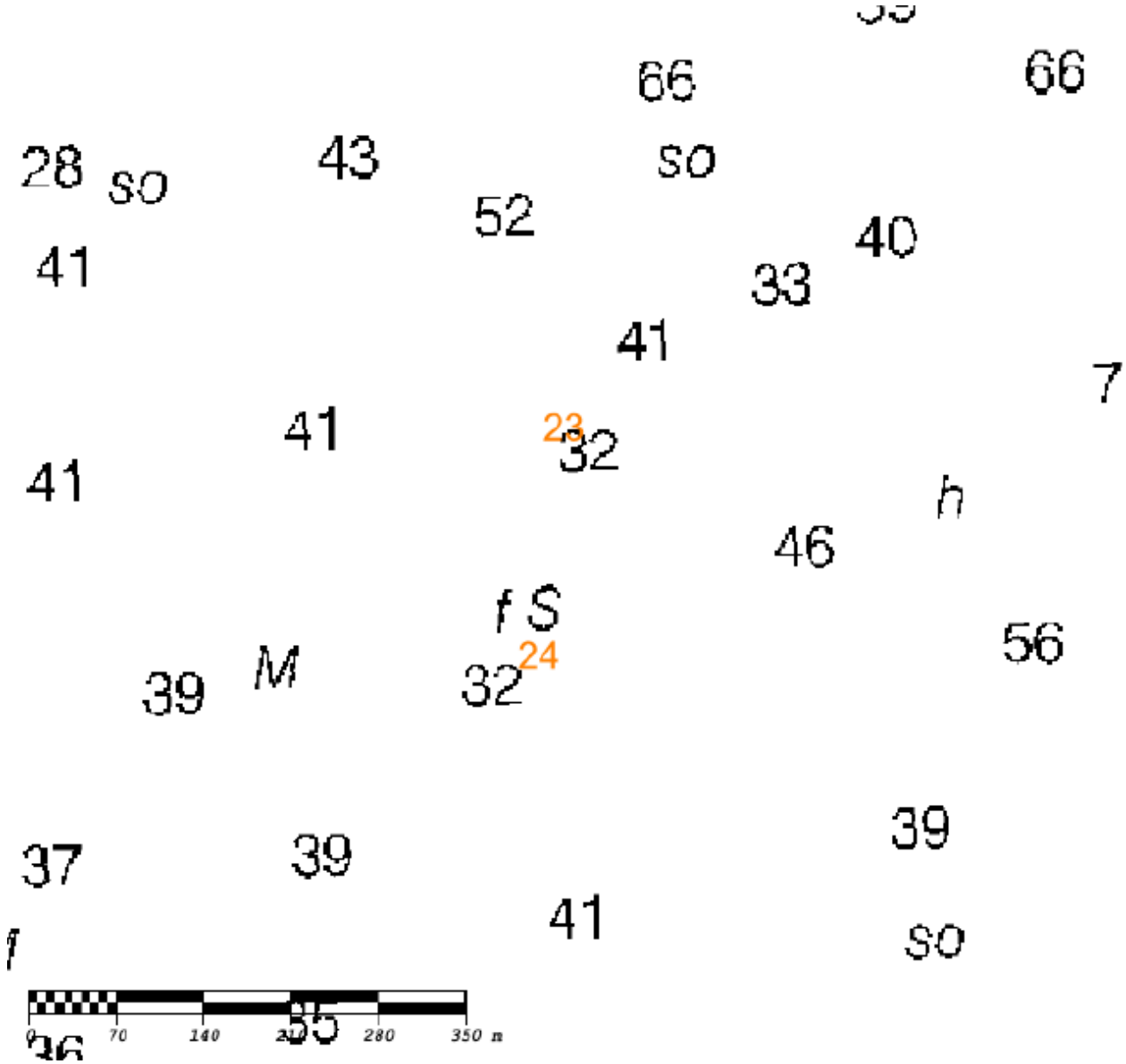


Figure 1.11.1

1.12) Profile/Beam - 118/480 from h12035 / 2804_reson7125_hf_512 / 2009-143 / 000_1916

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 31' 42.9" N, 133° 41' 19.6" W

Least Depth: 7.88 m (= 25.86 ft = 4.310 fm = 4 fm 1.86 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.966 m ; **TVU (TPEv)** ±0.141 m

Timestamp: 2009-143.19:16:34.834 (05/23/2009)

Survey Line: h12035 / 2804_reson7125_hf_512 / 2009-143 / 000_1916

Profile/Beam: 118/480

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Significantly shoaler depth than charted, Rocky ledge

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2804_reson7125_hf_512/2009-143/000_1916	118/480	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

26ft (17372_4)

4 ¼fm (17360_1, 16016_1, 530_1)

4fm 2ft (531_1)

7.9m (500_1, 50_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Feature Images

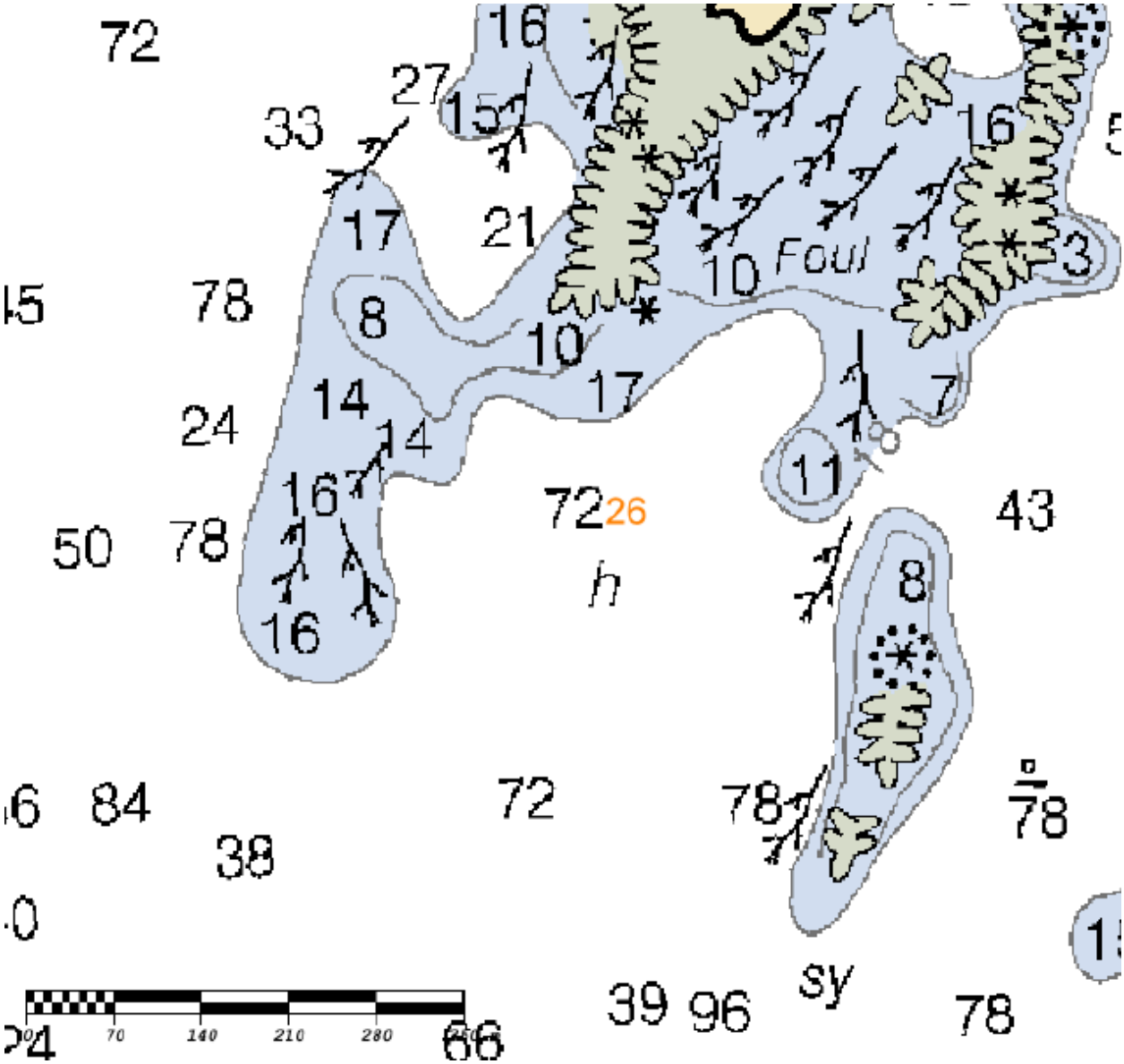


Figure 1.12.1

1.13) Profile/Beam - 679/487 from h12035 / 2804_reson7125_hf_512 / 2009-144 / 000_1807

DANGER TO NAVIGATION

Survey Summary

Survey Position: 56° 32' 27.5" N, 133° 41' 10.6" W

Least Depth: 5.56 m (= 18.24 ft = 3.040 fm = 3 fm 0.24 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.127 m

Timestamp: 2009-144.18:08:00.617 (05/24/2009)

Survey Line: h12035 / 2804_reson7125_hf_512 / 2009-144 / 000_1807

Profile/Beam: 679/487

Charts Affected: 17372_4, 17360_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Significantly shoaler sounding then charted, Rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12035/2804_reson7125_hf_512/2009-144/000_1807	679/487	0.00	000.0	Primary

Hydrographer Recommendations

Update charted depth

Cartographically-Rounded Depth (Affected Charts):

18ft (17372_4)

3fm (17360_1, 16016_1, 530_1)

3fm 0ft (531_1)

5.6m (500_1, 50_1)

S-57 Data

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

Attributes: VALSOU - 5.559 m

Feature Images

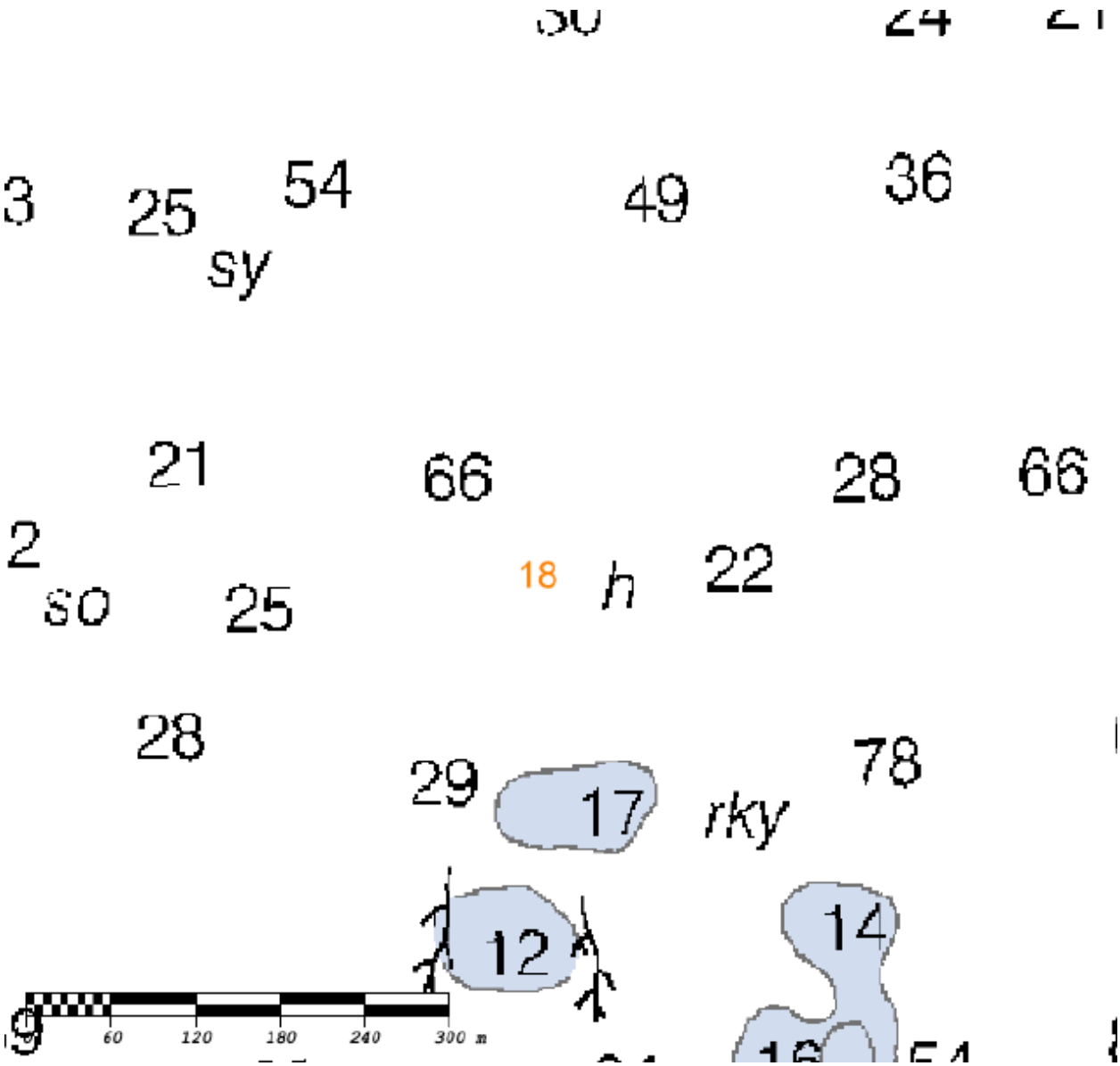


Figure 1.13.1

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

TIDE NOTE FOR HYDROGRPHIC SURVEY

DATE: August 19, 2009

HYDROGRPHIC BRANCH: Pacific
HYDROGRPHIC PROJECT: OPR-O180-RA-2009
HYDROGRPHIC SHEET: H12035

LOCALITY: Southern Keku Strait, AK
TIME PERIOD: May 20-26, 2009

TIDE STATION USED: Ketchikan, AK 945-0460
Lat. 55°19.9′ Long. 131°37.6′
PLANE OF REFERNECE (MEAN LOWER LOW DATUM): 0.000m
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.433m

TIDE STATION USED: The Summitt, AK 945-1349
Lat. 56°40.9′ Long. 133°44.2′
PLANE OF REFERNECE (MEAN LOWER LOW DATUM): 0.000m
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.365m

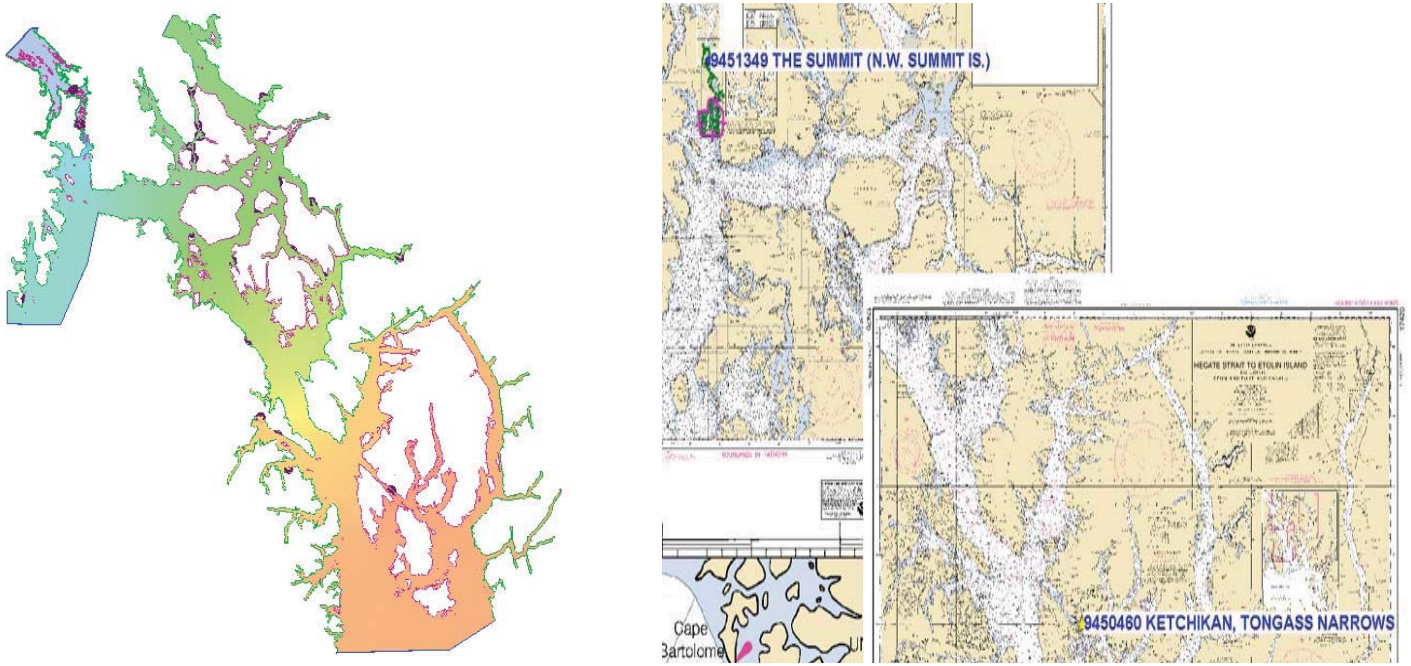
REMARKS: The Summitt (945-1349) is not running on one day of data acquisition. However, the TCARI grid was computed using 'Solve Combinations' so it can still be applied to the bathymetric data even when The Summitt was off-line.

Refer to attachments for zoning information.
Note 1: Provide time series data are tabulated in metric units (meters), relative to MLLW 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: 2009.08.20 17:36:17 -04'00'

CHIEF, PRODUCTS AND SERVICES DIVISION



Final TCARI grid for OPR-O180-RA-2009, H12035 Keku Strait, AK

Subject: [Fwd: Re: [Fwd: Re: Final Tides for OPR-O180-RA-2009 H12034 & H12035]]
From: FOO Rainier <FOO.Rainier@noaa.gov>
Date: Wed, 28 Oct 2009 10:23:24 -0800
To: ChiefST.Rainier@noaa.gov

Subject: Re: [Fwd: Re: Final Tides for OPR-O180-RA-2009 H12034 & H12035]
From: Lijuan Huang <Lijuan.Huang@noaa.gov>
Date: Tue, 08 Sep 2009 16:06:52 -0400
To: _OMAO MOP FOO RAINIER <FOO.Rainier@noaa.gov>
CC: NOS.COOPS.HPT@noaa.gov

Hi Brent,
The estimated tidal error (TPU/TPE) for O180 is 0.364 m. Let me know if you have any questions.

Lijuan
Carolyn Lindley wrote:

> FYI, anyone have a chance to address this today? I have HAB this morning and need to move this afternoon.
>
> ---
>
> **Subject:**
> Re: Final Tides for OPR-O180-RA-2009 H12034 & H12035
> **From:** FOO Rainier <FOO.Rainier@noaa.gov>
> **Date:** Fri, 04 Sep 2009 20:37:00 -0800
> **To:** Carolyn.Lindley@noaa.gov
> **To:** Carolyn.Lindley@noaa.gov
>
> Carolyn,
>
> We have received the discrete zoning files for Keku, but I am not sure what TPU (formerly TPE) values should be associated with this zoning? Could you please provide this information or direct me to where I can locate it?
>
> Thanks,
> LT Brent Pounds, NOAA
> Field Operations Officer
> NOAA Ship Rainier
>
> Carolyn Lindley wrote:
>
> > Just wanted to give you a heads up that we found an issue today in terms of how well the TCARI grid interpolates through the narrow passage way near Beck Island that is of concern. We will generate discrete zoning for the survey area and send it out as final tides for these two registry sheets.
> > Thanks,
> > Carolyn
> >
> > FOO Rainier wrote:
> >
> > > I am unable to open the zipped files available on the ftp server. H12035 downloads as 0-bytes and appears to be empty and H12034 downloads as 1.00-MB, but will not open and gives the following error

"Cannot open file: it does not appear to be a valid archive." Please advise. Thank you for your attention to this matter.

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

Carolyn Lindley wrote:

DATE: 08/21/2009 MEMORANDUM FOR: CDR David Neander
Chief, Pacific Hydrograhic Branch

FROM: Gerald Hovis
Oceanographic Division/Requirements and Development Division, N/OPS1

SUBJECT: Delivery of Tide Requirements for Hydrographic Surveys

Attached are Final Tide Notes for hydrographic survey project OPR-O180-RA-2009, registry Nos. H12034 & H12035. A final TCARI Grid for OPR-O180-RA-2009, H12034 & H12035 are being provided at ftp://140.90.121.83/pub/outgoing/HPT/Smooth_Tides_TCARI/O180RA2009/H12034 and ftp://140.90.121.83/pub/outgoing/HPT/Smooth_Tides_TCARI/O180RA2009/H12035. Six minutes verified data for Ketchikan, AK (945-0460) and The Summitt, AK (945-1349) may be retrieved in one month increments over the internet from the CO-OPS Home Page at http://tidesandcurrents.noaa.gov/olddata by clicking on "Verified Data".

Please let us know when you have retrieved all files.

--
Name: Lijuan Huang
Title: IMSG Contractor
Organization: NOAA/NOS/CO-OPS
Address: 1305 East-West Highway
N/OPS3, Sta. 6342, SSMC4
Silver Spring, MD 20910-3218
Email: lijuan.huang@noaa.gov
Phone: 1-301-713-2890 x192

Re: [Fwd: Re: Final Tides for OPR-O180-RA-2009 H12034 & H12035].eml	**Content-Type:** message/rfc822 **Content-Encoding:** 7bit

H12035 HCell Report

Kurt Brown, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12035 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 H12035 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17372	1:20,000	11th	9/01/2003	08/7/2010

The following ENCs were also used during compilation:

Chart	Scale
US5AK3JM	1:20,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the H12035 4-meter Combined Surface and the junction LIDAR survey H11727 3-meter combined surface in CARIS BASE Editor. A shoal-biased selection was made at 1:5,000 survey scale using a Radius Table file with values shown in the table below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0	30	2.25

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

4. Depth Contours

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

Chart Contour Intervals in Feet from Chart 17372	Metric Equivalent to Chart Feet, Arithmetically Rounded	Metric Equivalent of Chart Feet, with NOAA Rounding Applied	Feet with NOAA Rounding Applied	Feet with NOAA Rounding Removed for Display on H12035_SS.000
0	0	0.2286	0.75	0
6	1.8288	2.0574	6.75	6
12	3.6576	3.8862	12.75	12
18	5.4864	5.715	18.75	18

The MLLW contour was digitized by hand based on the H11727 SS layer and the 0.75m rounded contours derived from the H11727 LIDAR 3m gridded surface.

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 area is included in HCell H12035:

M_QUAL

The Meta area object was constructed on the basis of the limits of the hydrography.

6. Features

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

7. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

$CSYMB	Blue Notes
COALNE	Coastline, MHW
DEPCNT	MLLW
LNDARE	Islands and islets
LNDELV	Height of islands and islets
M_QUAL	Data quality Meta object
OBSTRN	Obstruction objects
SBDARE	Ledges and reefs, bottom samples, and rocky seabed areas
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features

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):	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

H12035 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

H12035_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:20,000
H12035 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:5,000
H12035 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12035 _outline.gml	Survey outline
H12035 _outline.xsd	Survey outline

11.2 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 3.0	Creation of soundings and bathy-derived features, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

12. Contacts

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

Kurt Brown
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6839
kurt.brown@noaa.gov.

APPROVAL SHEET
H12035

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.

Digitally signed by
Kurt Brown
Date: 2010.12.21
08:10:58 -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 Pete
Holmberg
DN: cn=Pete Holmberg,
o=NOAA, ou=PHB,
email=peter.holmberg@noaa.go
v, c=US
Date: 2010.12.21 10:58:17 -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: 2010.12.21 10:42:39 -08'00'

Megan Greenaway
AWOIS and SURF Check
Complete
2010.12.30 09:29:49
-05'00'