

H11679

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.* ..... H11679

### LOCALITY

*State* ..... Alaska

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

*Sublocality* ..... Necker Bay

.....  
**2007**  
.....

### CHIEF OF PARTY

.....  
Commander Guy T. Noll, NOAA  
.....

### LIBRARY & ARCHIVES

DATE .....

**HYDROGRAPHIC TITLE SHEET**

H11679

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 AlaskaGeneral Locality Approaches to SitkaSublocality Necker BayScale 1:10,000Date of Survey 4/18/2007-7/22/2007Instructions Dated 3/28/2007Project No. OPR-O112-RA-07Vessel RA5(1006),RA6(1015),RA4(1016),RA3 (1021),RA1(1101),RA2(1103)Chief of Party Commander Guy T. Noll, NOAASurveyed by RAINIER PersonnelSoundings taken by echo sounder Reson Seabat 8101, Seabeam/Elac 1180, Reason SeaBat 8125Knudsen 320MGraphic record scaled by N/AGraphic record checked by N/ASAR by Grant Froelich Automated plot by N/ACompilation by Tyanne FaulkesSoundings in Fathoms and Feet at MLLWREMARKS: Time in UTC. UTM Projection Zone 8Revisions and annotations appearing as endnotes weregenerated during office processing.As a result, page numbering may be interrupted or non-sequentialAll separates are filed with the hydrographic data.

# Descriptive Report to Accompany Hydrographic Survey H11679

Project OPR-O112-RA-07  
 Approaches to Sitka, Alaska  
 Necker Bay  
 Scale 1:10,000  
 April - July 2007  
**NOAA Ship RAINIER (s221)**  
 Chief of Party: Commander Guy T. Noll, NOAA

## A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-O112-RA-07 dated March 28, 2007 and all other applicable direction, with the exception of deviations noted in this report. The survey area is the approaches to Sitka, Alaska in the vicinity of Necker Bay. This survey corresponds to sheet “C” (Figure 1) in the sheet layout provided with the Letter Instructions. OPR-O112-RA-07 addresses inadequate chart data and reduces the Critical Survey Backlog. The USCG 17<sup>th</sup> District, Aids to Navigation Branch identified the route south from Sitka “along a protected passage to Necker Bay and Crawfish Inlet, is seeing increased use by commercial fishing vessels, commercial charter vessels and recreational boaters.” As tour companies respond to the growing numbers of visitors that are looking for the “real Alaska”, this area will see increased passenger vessel traffic in the near future.

Complete multibeam echosounder (MBES) coverage was obtained in the survey area in waters 8 meters and deeper.<sup>1</sup> In depths less than 8 meters additional MBES coverage was acquired to obtain least depths over significant features or shoals, as appropriate for this survey. Vertical beam echo sounder (VBES) data were acquired in depths from approximately 4 to 20 meters to define the navigable area limit, aid in the planning of SWMB data acquisition, and provide inshore bathymetry in navigationally significant areas. Total mileage acquired by each vessel and system is referenced in Table 1.

Data Acquisition Type	Hull Number with Mileage (nm)						Total
	1101 RA-1	1021 RA-3	1103 RA-2	1015 RA-6	1016 RA-4	1006 RA-5	
VBES (mainscheme)	8.31		7.21	-	-	-	15.52
MBES (mainscheme)		54.24	-	32.16	11.04	51.26	148.7
SSS (mainscheme)			-	-	-	-	-
VBES + SSS (mainscheme)			-	-	-	-	-
Crosslines			-	7.62	-		7.62
Developments			.97	-	-		.97
Shoreline	12.97		18.8	-	-	-	31.77
Bottom Samples	14			-	-	-	14
Total Number of Items Investigated			-	-	-	-	4
Total Area Surveyed (sq. nm)			-	-	-	-	4.86

Table 1: Statistics for survey H11679

Data acquisition was conducted from April 18 to July 22, 2007 (DN 108 to 203).

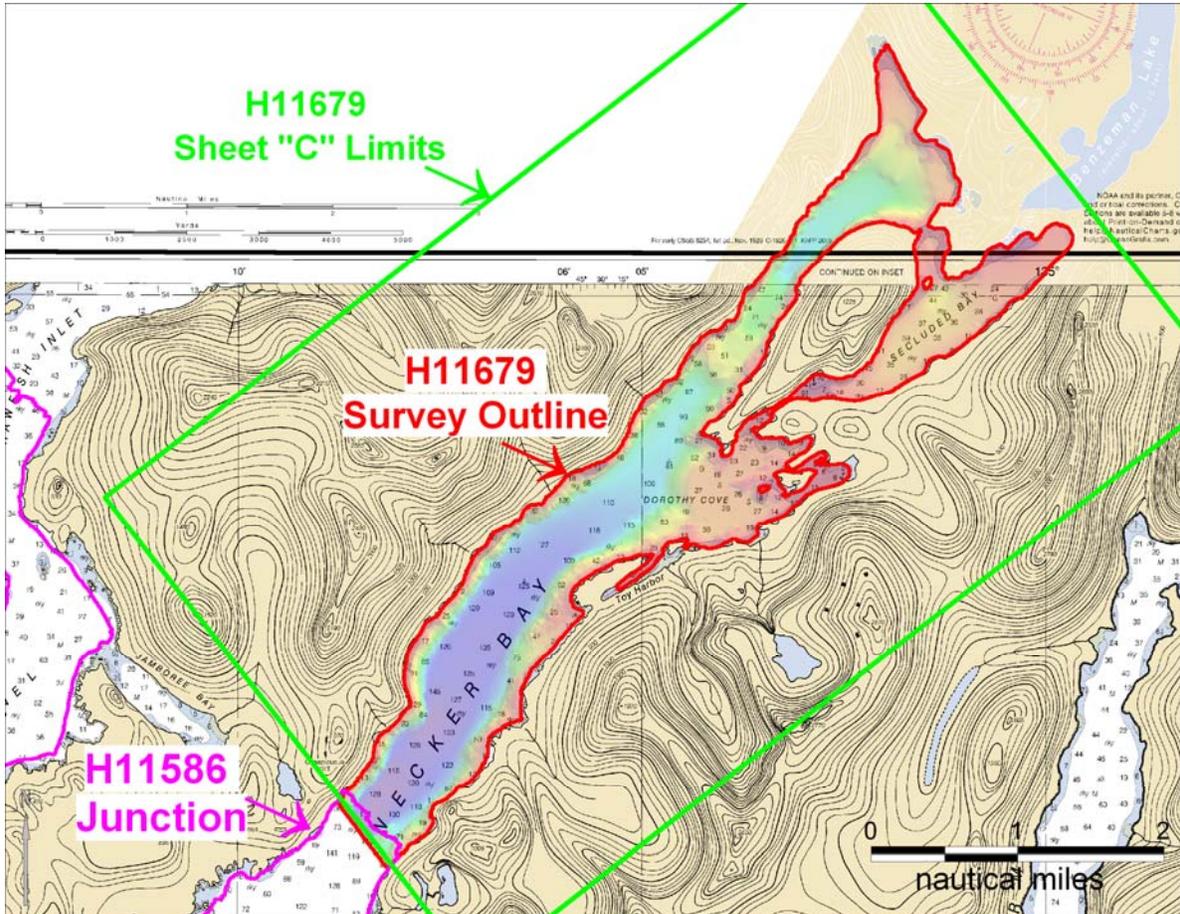


Figure 1: H11679 Survey Limits and junction overlaid on chart 17328).

## 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-O112-RA-07 Data Acquisition and Processing Report (DAPR)*<sup>2</sup>, submitted under separate cover. Items specific to this survey, and any deviations from the DAPR are discussed in the following sections.

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

### B1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

Hull Number	Name	Acquisition Type
1101	RA-1	Vertical-Beam Echosounder Detached Positions Bottom Sample
1103	RA-2	Vertical-Beam Echosounder Detached Positions
1021	RA-3	Multibeam Echosounder
1016	RA-4	Multibeam Echosounder
1006	RA-5	Multibeam Echosounder
1015	RA-6	Multibeam Echosounder

*Table 2. Data Acquisition Vessels for H11679.*

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

No unusual vessel configurations were used for data acquisition.<sup>3</sup>

### B2. Quality Control

#### Crosslines

Multibeam echosounder (MBES) crosslines totaled 7.62 nautical miles, comprising 5.1% of main scheme MBES hydrography. The mainscheme bathymetry was manually compared to the XL nadir beams in CARIS subset mode and generally agreed well with differences averaging approximately 0.5 meter. No gross discrepancies were detected.<sup>4</sup>

A statistical Quality Control Report has been conducted on representative data acquired with each system used on this survey. Results of these tests are included in the updated 2007 RAINIER Hydrographic System Readiness Review<sup>5</sup> package submitted with this survey.

## **Junctions**

In its southwest corner, survey H11679 junctions with survey H11586 (see Figure 1 and “H11679\_updated\_plan.eml.txt” in Appendix V, Supplemental\_Correspondence)<sup>6</sup>. This survey junction near the mouth of Necker Bay was manually compared using CARIS subset mode and showed excellent agreement with no discernable differences between the two surveys.<sup>7</sup>

## **Data Quality Factors**

### Sound Speed Artifacts

Due to freshwater influence from Benzeman Lake (Figure 2) and other sources, and the effects of tidal currents, a sharp demarcation of water masses was often observed in the field. This proved to be problematic in the acquisition and application of sound speed correctors. After correction for sound speed in HDCS, some lines still exhibited the characteristic "smiles" or "frowns" indicative of inaccurate sound speed corrections. This problem was particularly bad at the head of Necker Bay and in adjoining Secluded Bay.

In an effort to correct these sound speed problems, all CTD casts were combined into a single project-wide concatenated file. Although it is RAINIER's standard practice to concatenate each multibeam survey launches' CTD casts into launch specific files, it made sense to create a single sheet wide file due to multiple launches often working in the same area on H11679 on a given day. Correctors were applied based on the geographic position of the cast in addition to the time the cast was collected (nearest in distance within 4 hours).

Despite the best efforts of the Hydrographer to conduct sufficient sound speed casts distributed both spatially and temporally, and to correct for sound speed errors in post processing through methods previously mentioned, sound speed errors were still noticeable in Secluded Bay and the northern end of Necker Bay (see Figures 2-5).<sup>8</sup> To compensate, the Hydrographer, where possible, rejected soundings obviously in error on the outer beams. Additional survey lines were run and CTD casts made, in the southwest portion of Secluded Bay in an attempt to mitigate some of the issues mentioned above. The Hydrographer feels that the only viable solutions in the above mentioned areas would be near continuous sound speed profiling.

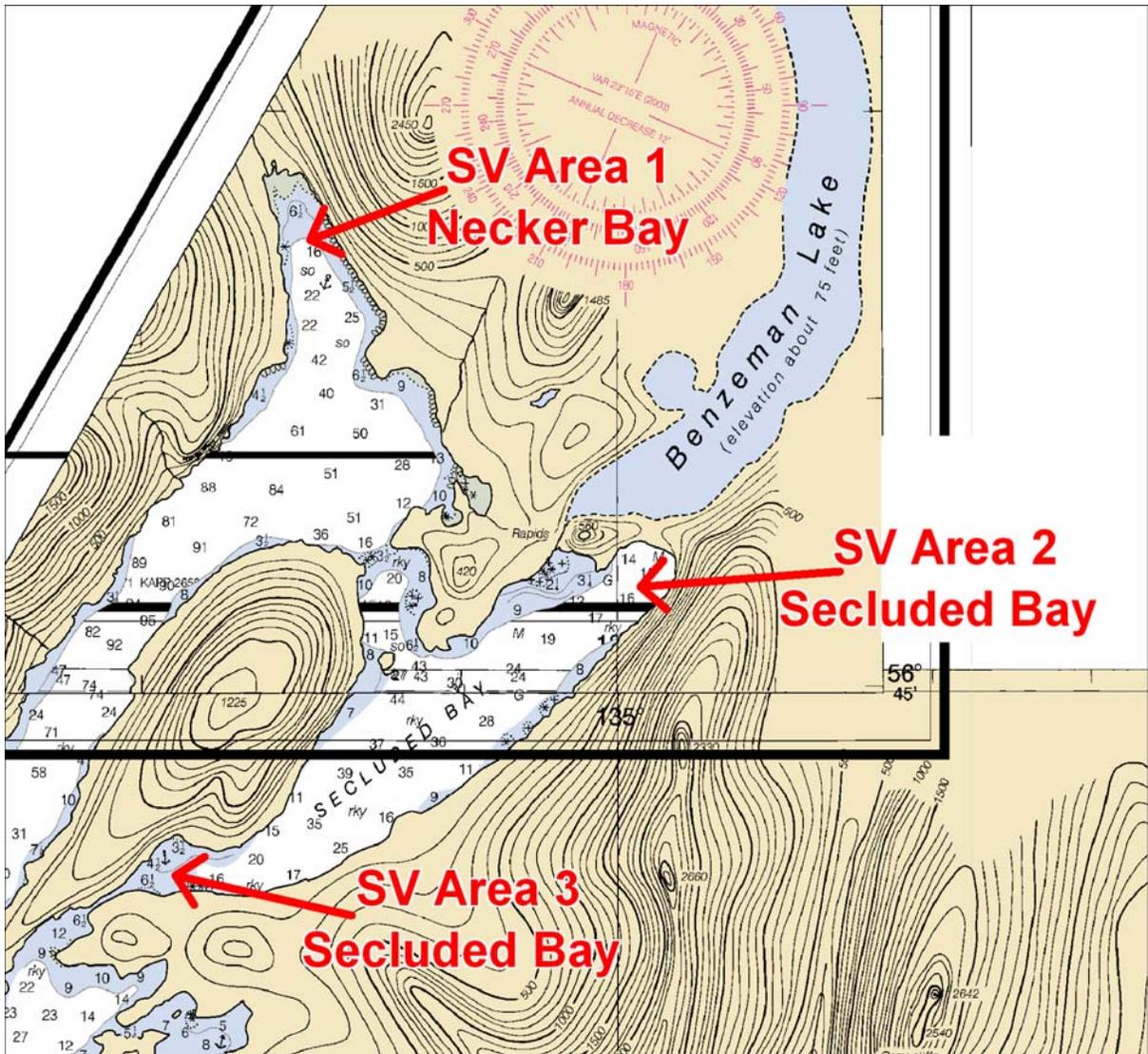
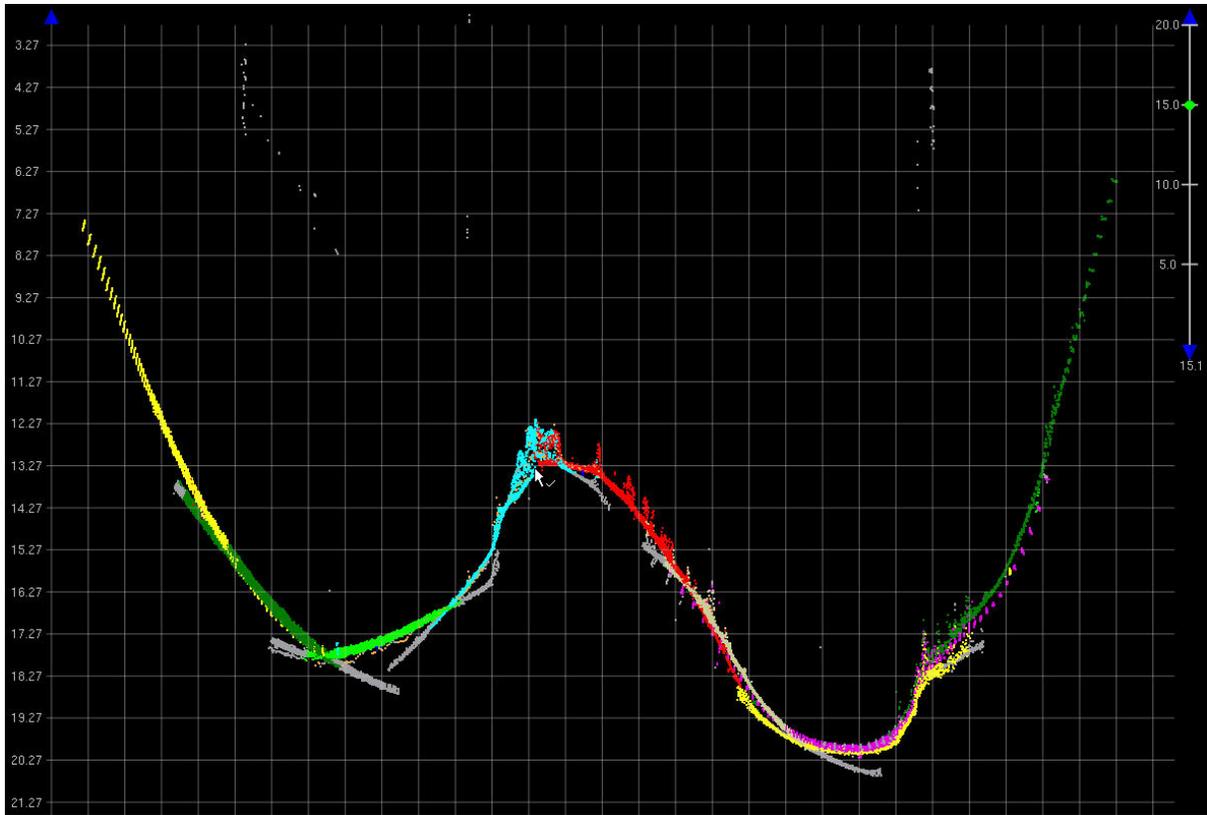
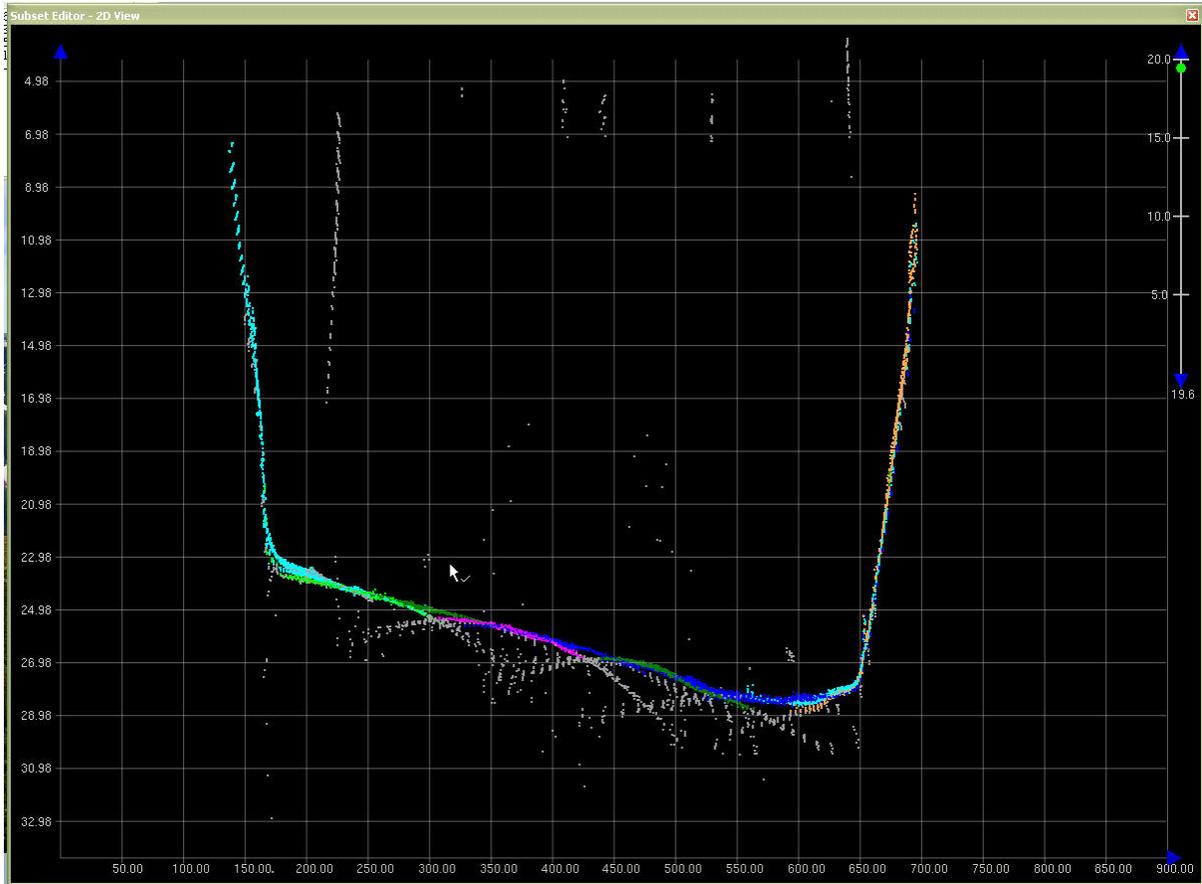


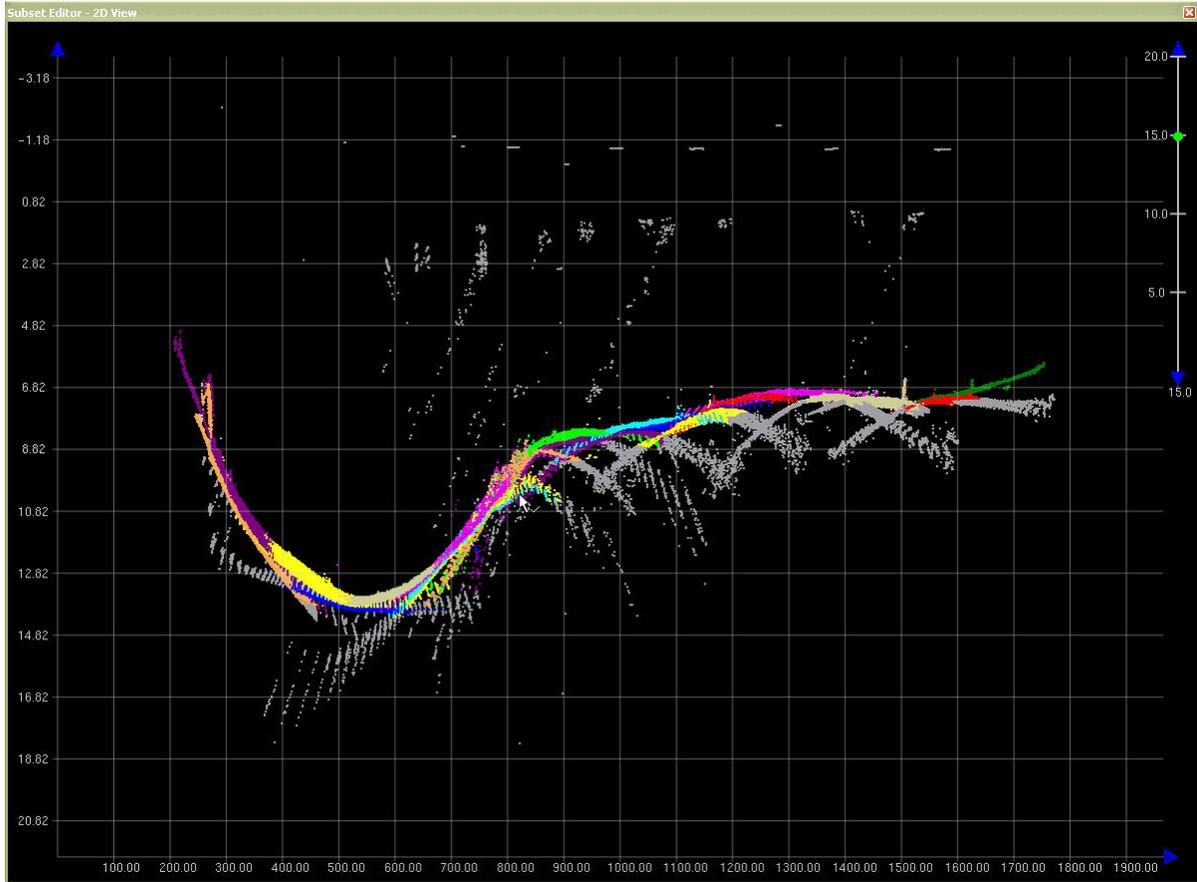
Figure 2: H11679 Sound Velocity Artifact areas.



**Figure 3:** *H11679 Sound Velocity Area 1, Necker Bay*



**Figure 4:** *H11679 Sound Velocity Area 2, Secluded Bay.*



**Figure 5:** *H11679 Sound Velocity Area 3, Secluded Bay.*

### DGPS Dropout

Due to the topography of the survey area, DGPS positional accuracy was sometimes adversely affected during acquisition. The steep-sided and narrow (30m wide) entrance to Secluded Bay from Dorothy Cove produced a significant DGPS dropout error (Figure 6). In CARIS subset editor, the hydrographer rejected those soundings affected by the signal dropout and retained the data for lines or sections of lines where positional accuracy was not degraded (Figure 7).<sup>9</sup>

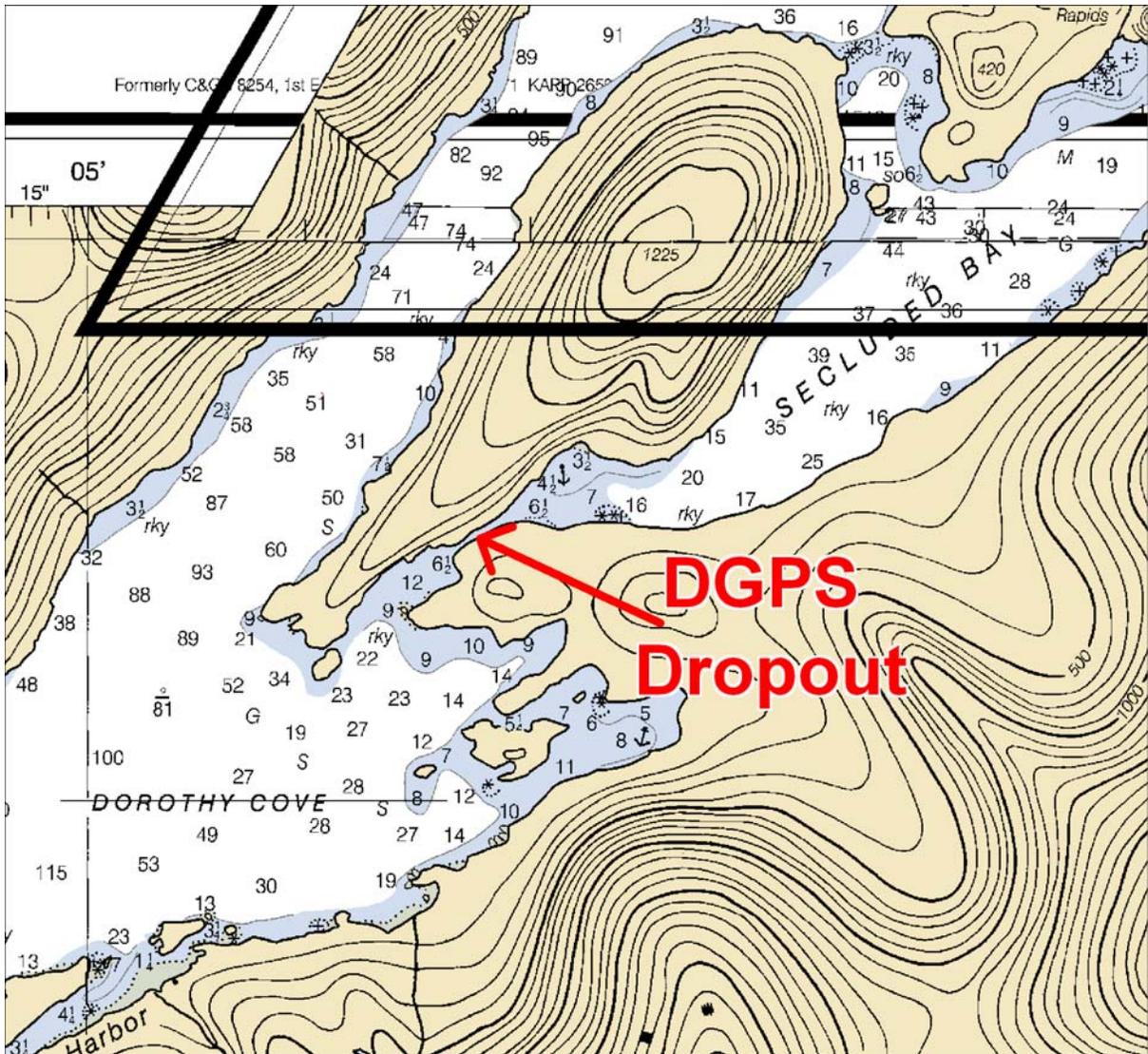
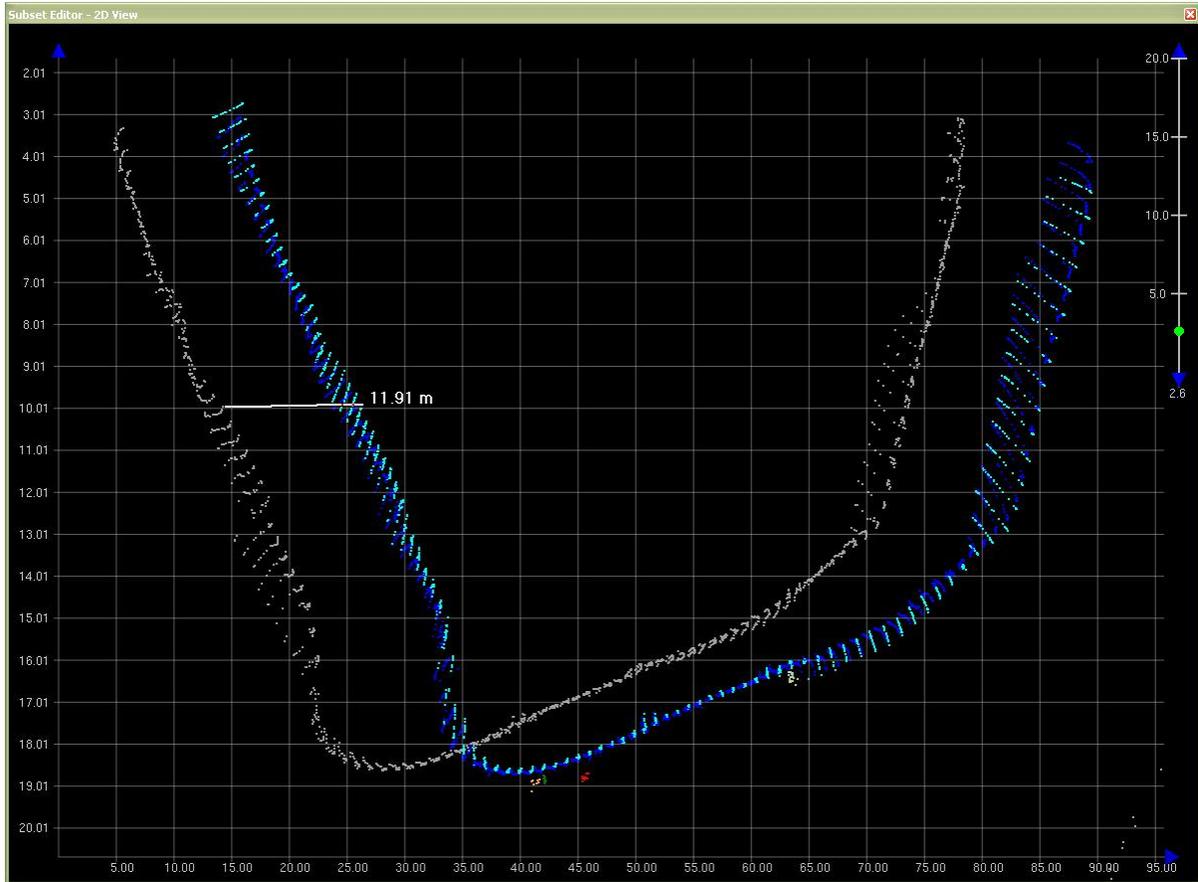


Figure 6: H11679 DGPS Dropout Area.



**Figure 7:** *H11679DGPS Dropout rejected soundings.*

### Coverage

Much of survey H11679 encompasses a deep fiord, a glacier cut U-shaped submerged landform with sharply sloping sides. The result is that deep water extends virtually to the shoreline making complete multibeam coverage as defined in Specs and Deliverables (to the 8 meter contour) difficult in some areas. In other instances, survey operations were terminated when the hydrographer or boat coxswain deemed it unsafe to continue sufficiently inshore to acquire SWMB coverage entirely to the MHW buffer (Figures 8-10). It is the hydrographer's opinion that the areas shown in figures 8-10 and any other small holidays, occur in areas which are not navigationally significant.<sup>10</sup>

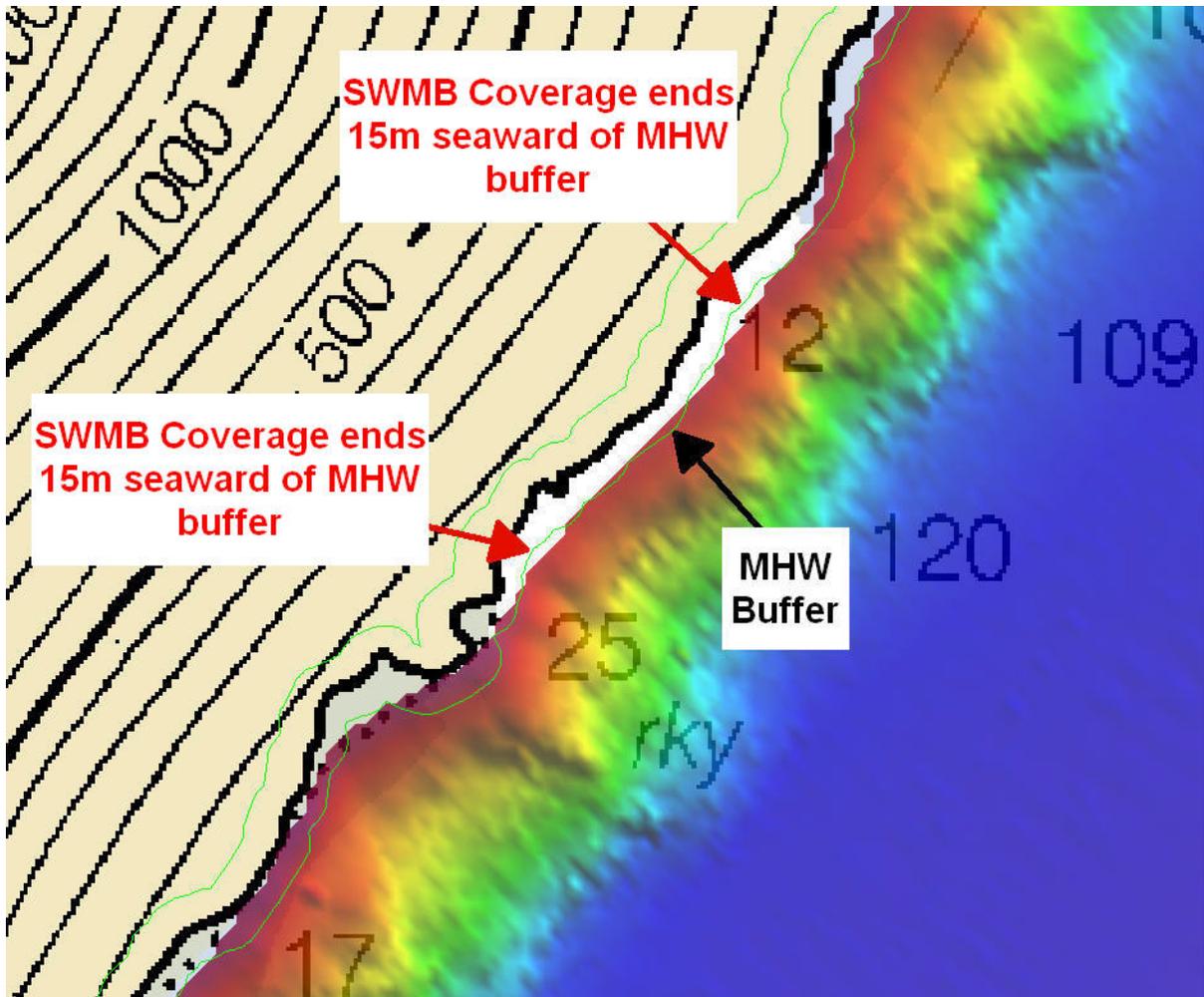


Figure 8: Examples of H11679 Holidays.

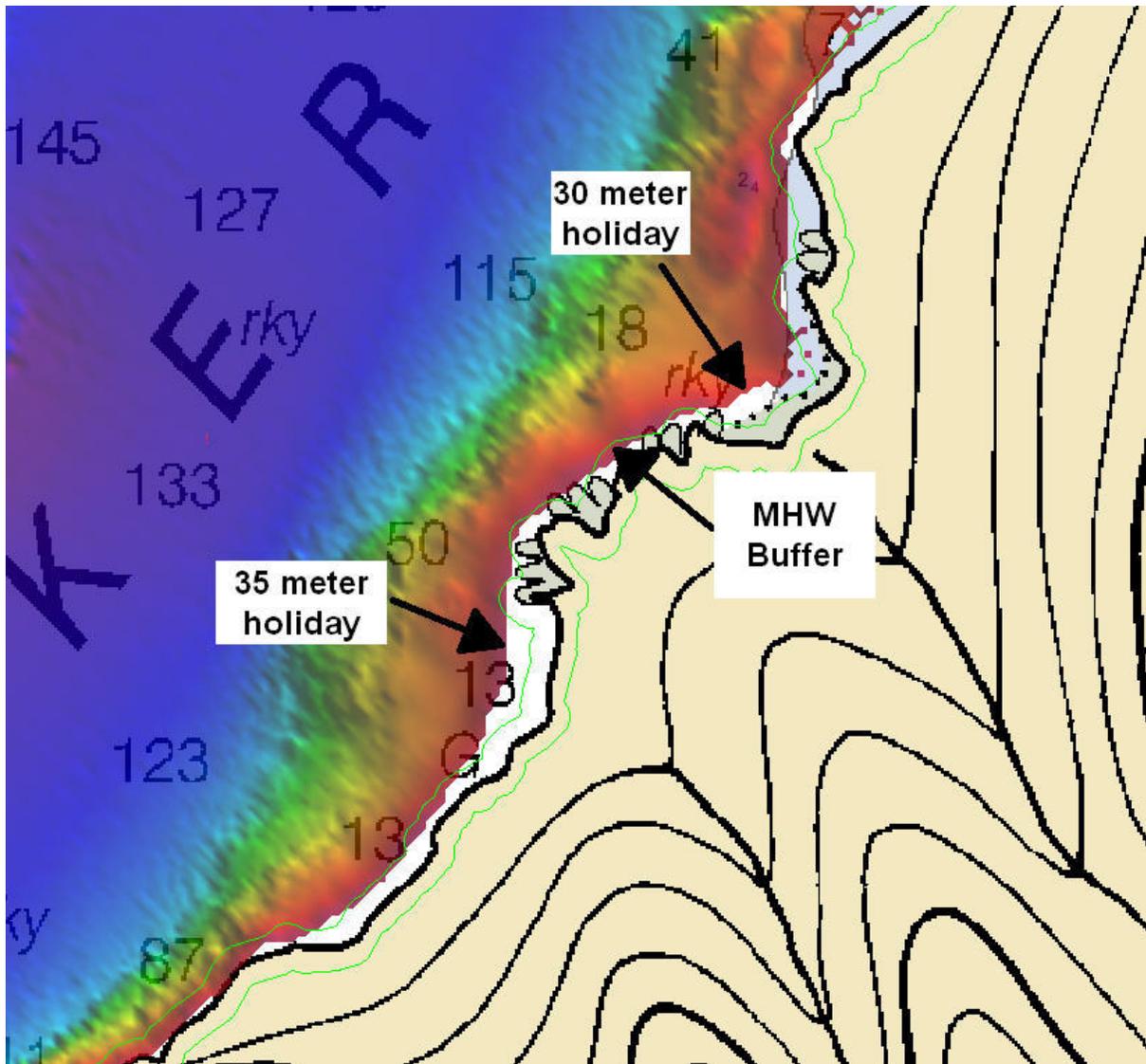
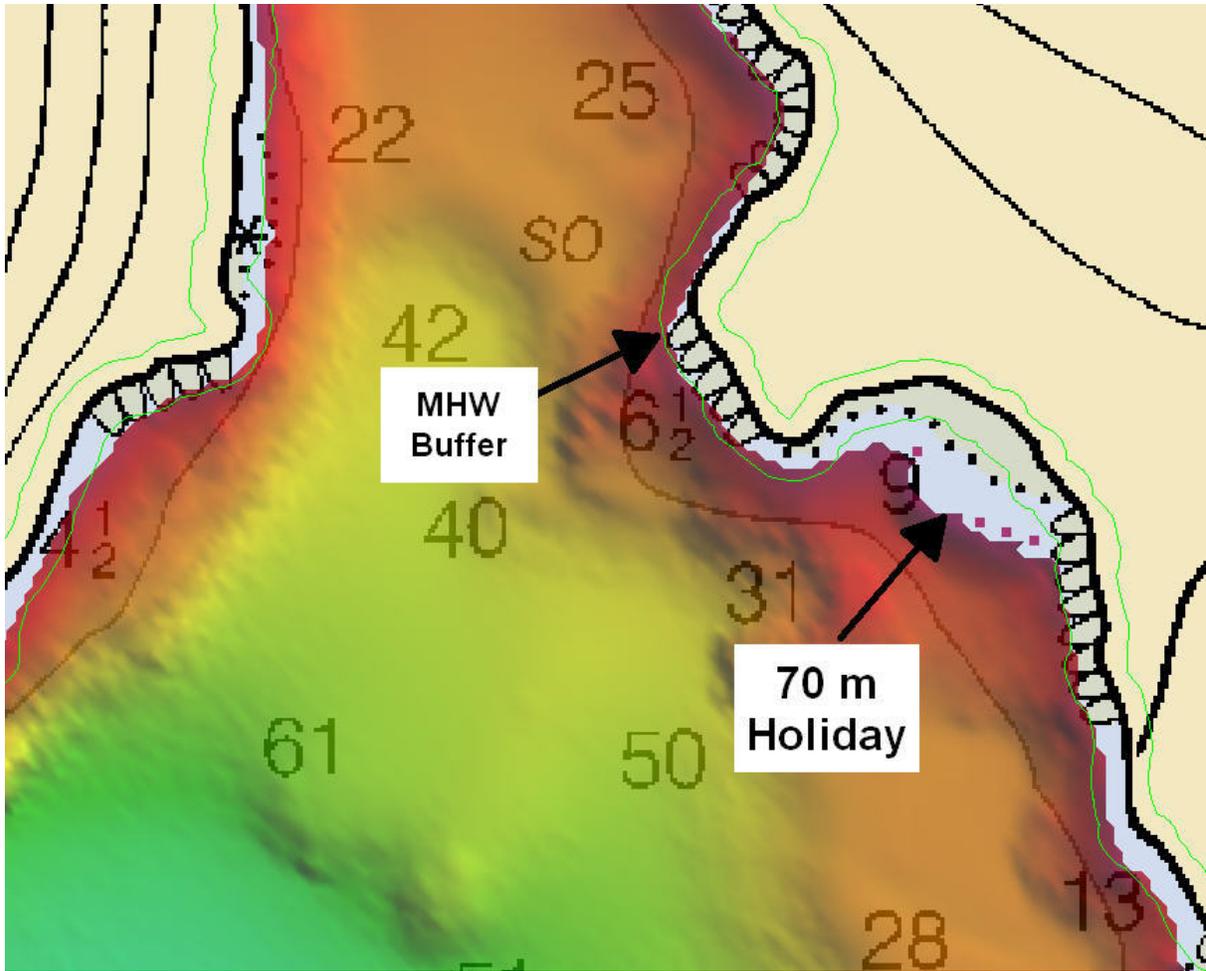


Figure 9: Examples of H11679 Holidays.



**Figure 10:** H11679 70m Holiday.

No other unusual conditions were encountered during the survey that affected the expected accuracy and quality of survey data.<sup>11</sup>

### **B3. Data Reduction**

Data reduction procedures for survey H11679 conform to those detailed in the *OPR-O112-RA-07 DAPR*.

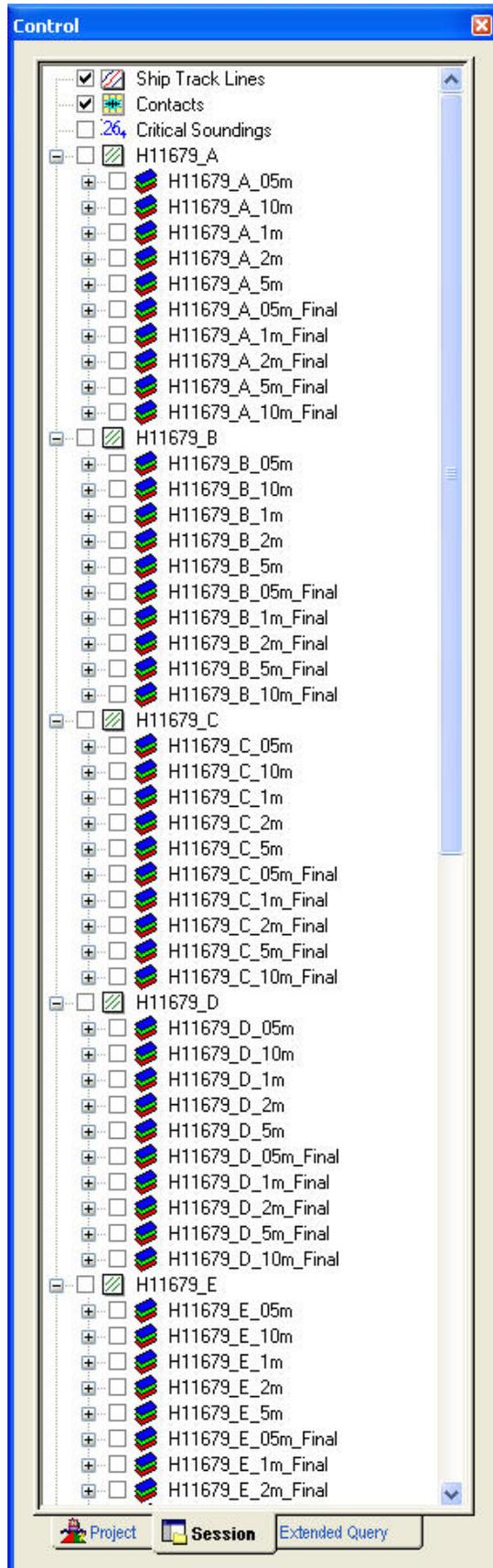
### **B4. Data Representation**

Although many CUBE surfaces were used during processing of H11679, the final submission Filed Sheet and BASE surface structure is shown in Figures 11 through 13. Finalized CUBE surface resolutions (see Table 3 below) were chosen as a function of depth range to ensure accurate representation of the dynamic seafloor within the survey limits; their final size does not exceed  $38 \times 10^6$  nodes.

<b>Depth Range of Finalized Surface</b>	<b>Resolution</b>
0.0 – 16.0 m	0.5 m
14.0 – 31.5 m	1 m
28.5 – 63 m	2 m
57 – 158 m	5 m
> 143 m	10 m

**Table 3:** *Depth ranges and resolution of H11679 BASE surfaces.*

In accordance with the 2007 NOAA Specs and Deliverables, all BASE surfaces were visually examined for areas of high uncertainty. There are minute occurrences of high uncertainty values found along the steep slopes of Necker Bay, which is expected in areas of dramatically changing depth. In addition, there are areas of moderate uncertainty, generally found in the deepest section of the survey, related to sparse Elac soundings.<sup>12</sup>



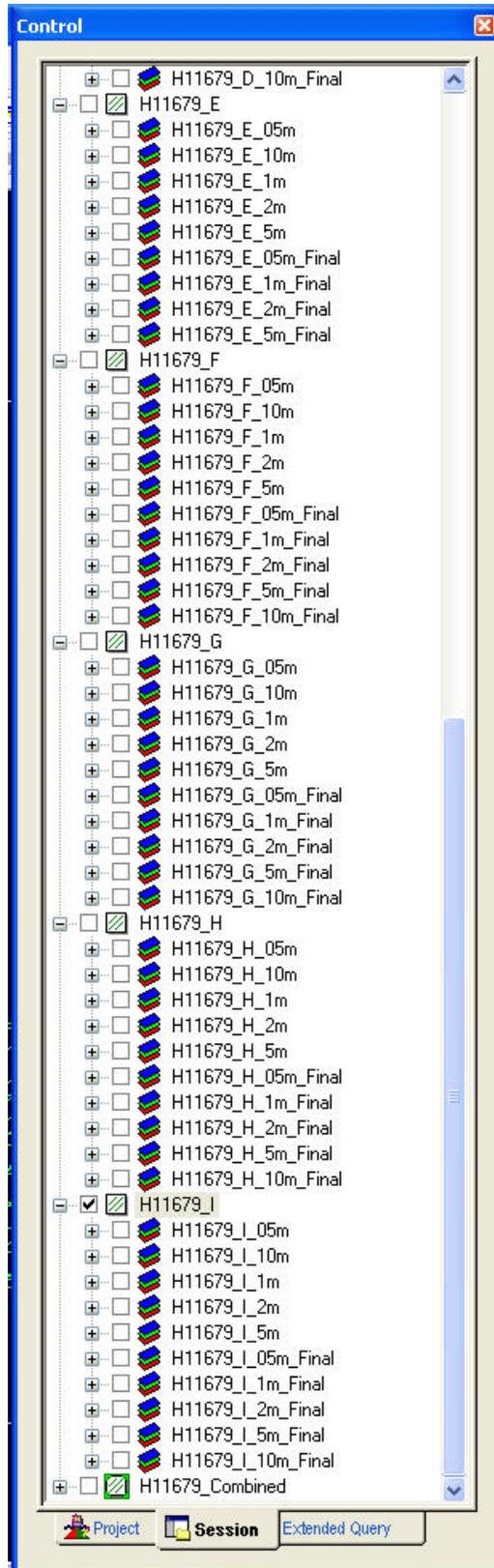
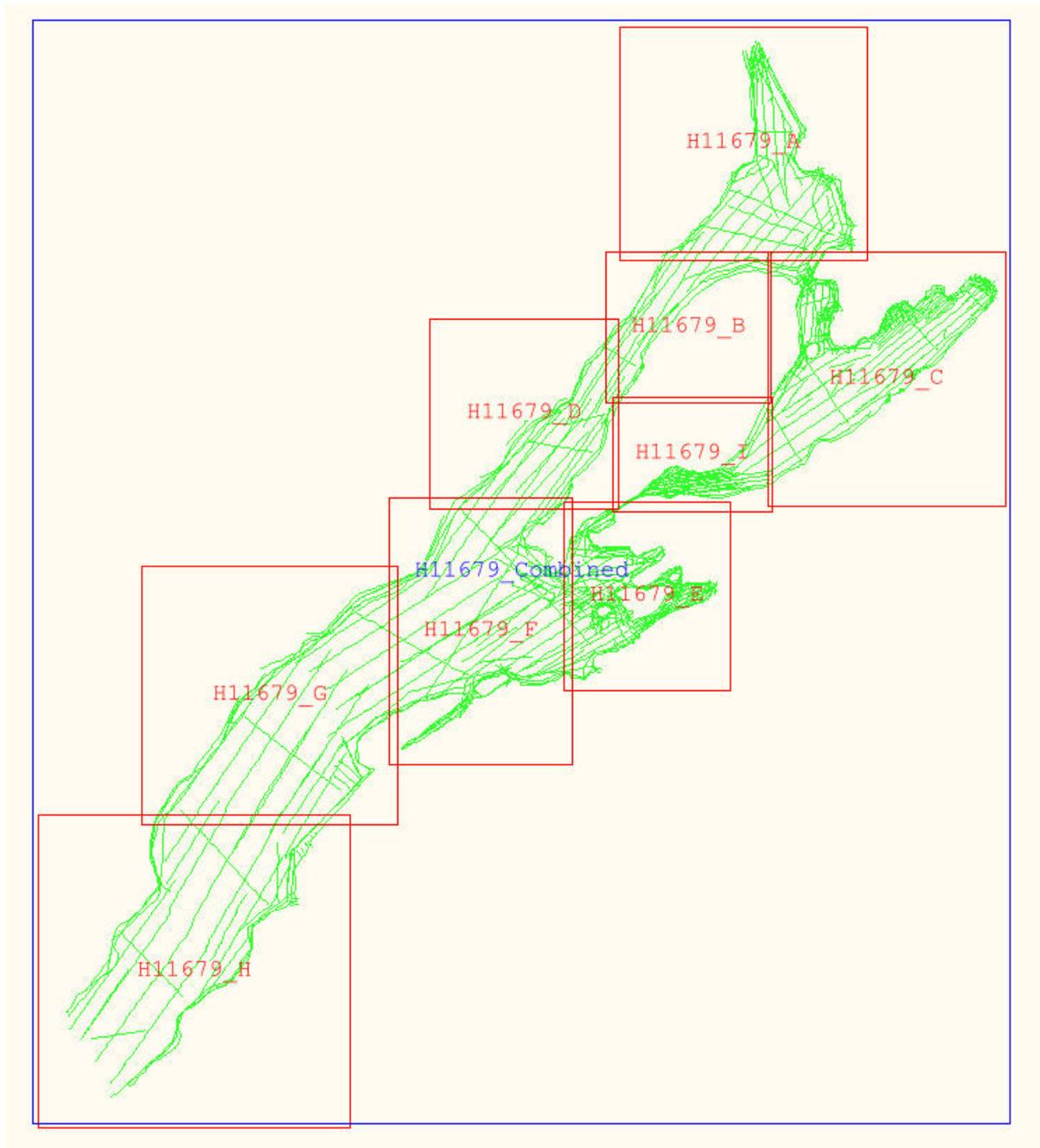
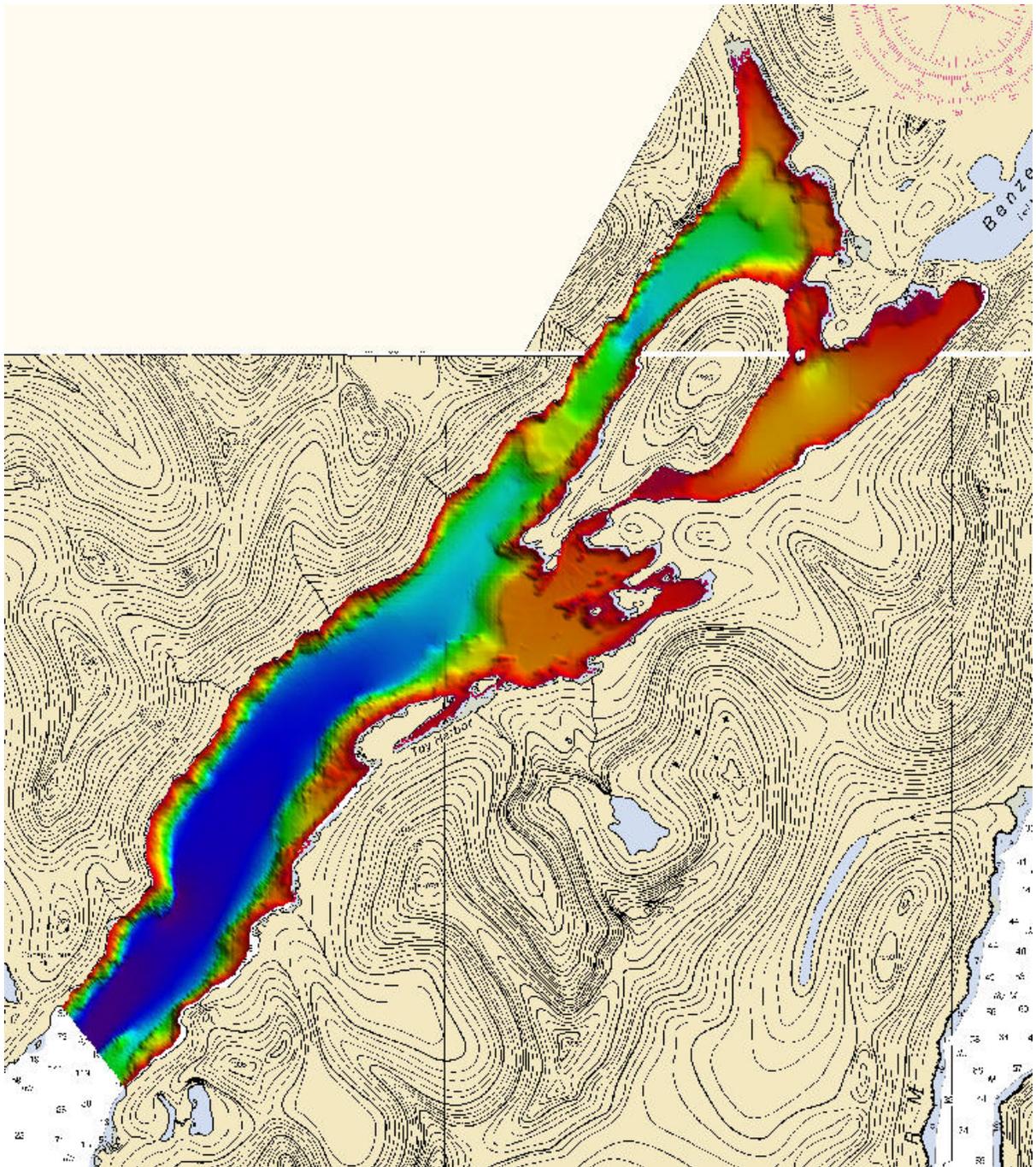


Figure 11: Field sheets and CUBE surfaces submitted with H11679.



**Figure 12:** *Layout of single resolution (red) and combined (blue) field sheets for H11679.*



**Figure 13:** *Layout of finalized, combined CUBE surface for H11679, overlaid on chart 17328.*

**C. VERTICAL AND HORIZONTAL CONTROL**

A complete description of vertical and horizontal control for survey H11679 can be found in the *OPR-O112-RA-07 Horizontal and Vertical Control Report*,<sup>13</sup> submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

**Horizontal Control**

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

Location	Frequency	Operator	Distance	Priority
Biorka Island	305 KHz	USCG	12nm	Primary
Level Island	295 KHz	USCG	72nm	Secondary

**Table 4:** *Differential Corrector Sources for H11679.*

**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 H11679.

RAINIER personnel installed a Sutron 8210 “bubbler” tide gauge at the following subordinate station in accordance with the Letter Instructions. This station is described in detail in the *OPR-O112-RA-07 Horizontal and Vertical Control Report*.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Dorothy Cove, AK	945-1376	30-day	April 18, 2007	July 22, 2007

**Table 5:** *Tide Stations installed by RAINIER personnel for H11679.*

All data were reduced to MLLW using final verified TCARI water levels, using TCARI file 0112RA2007-TCARI-F.tc and stations Sitka, AK (945-1600) and Dorothy Cove, AK (945-1376) using the tide files 9451376\_Verified\_MSL.txt and 9451600\_Verified\_MSL.txt.

The request for Final Approved Water Levels for H11679 was submitted to CO-OPS on September 6, 2007, and the Final Tide Note was received on September 27, 2007. This documentation is included in Appendix IV.<sup>14</sup>

## D. RESULTS AND RECOMMENDATIONS

### D.1. Chart Comparison

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

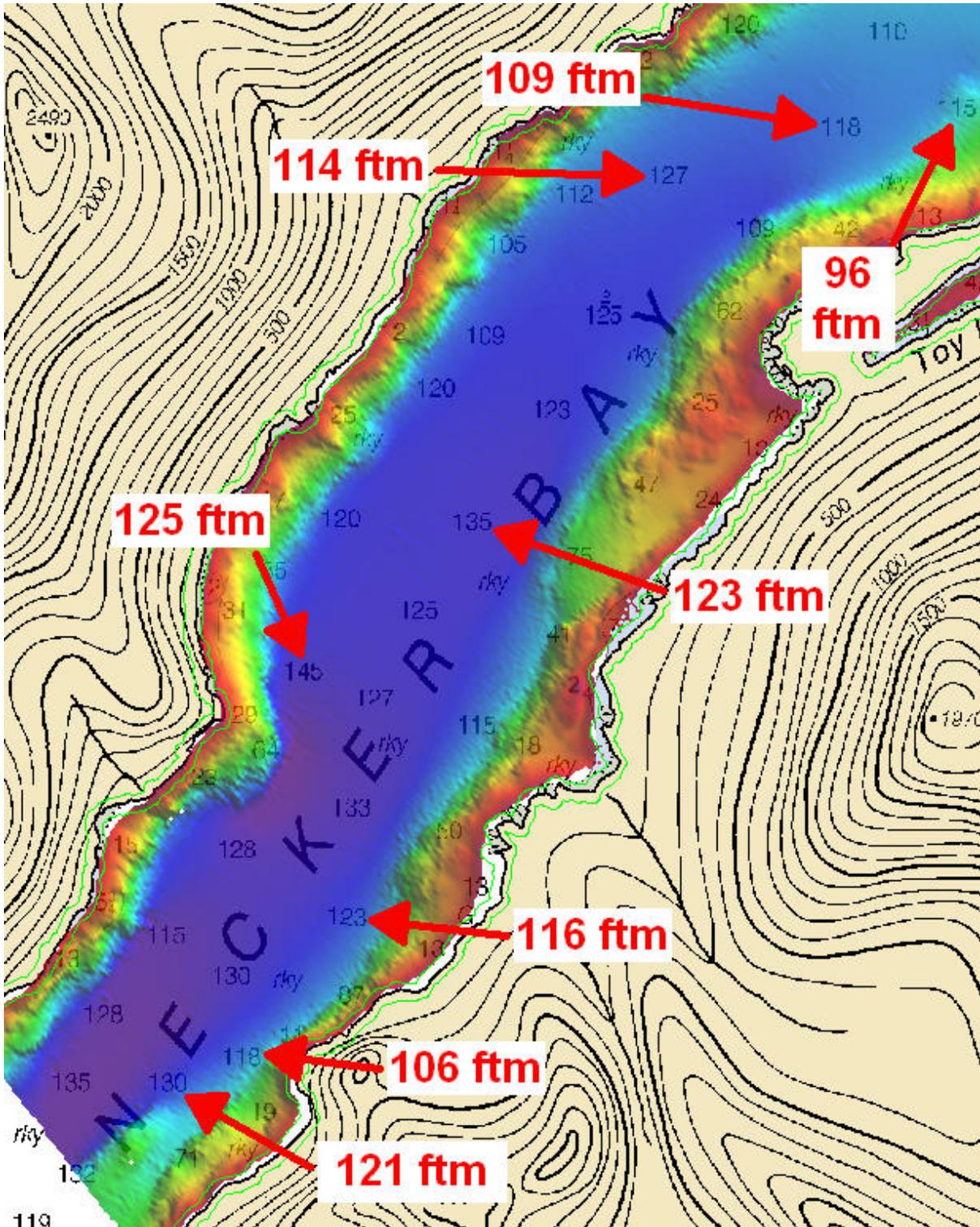
Survey H11679 was compared with the following charts:<sup>15</sup>

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
17328	1:40,000	7 <sup>th</sup> Ed, Nov 2003	11/11/2003
17320	1:217,828	17 <sup>th</sup> Ed; Nov 2005	10/25/2005

**Table 6:** *Charts compared with H11679.*

#### Chart 17328

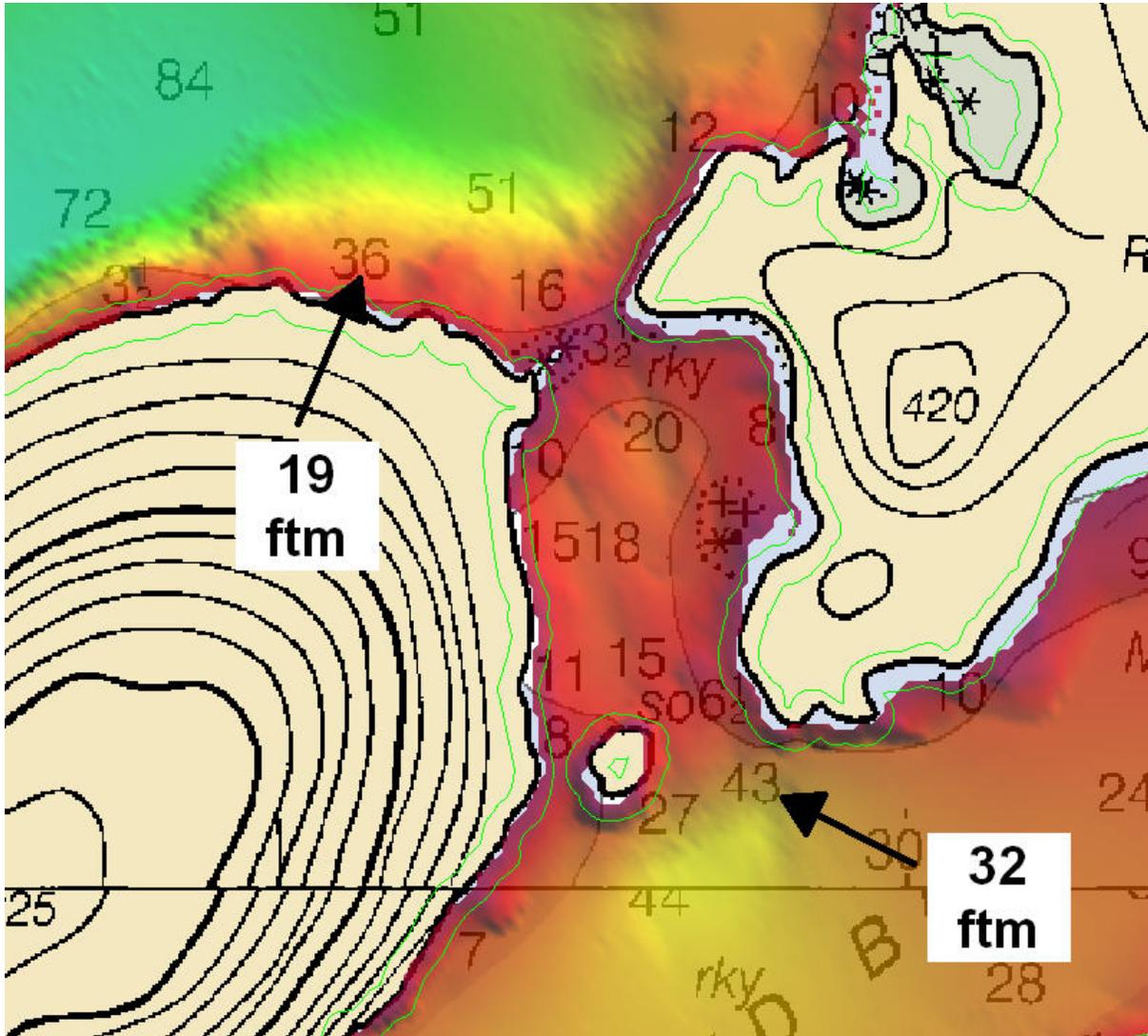
Survey H11679 encompasses a deep water (>100 fathoms) fiord with far shoaler areas at its northern and eastern limits including Dorothy Cove and Secluded Bay. H11679 survey depths acquired at the entrance to Necker Bay revealed numerous soundings approximately 10 fathoms shoaler than presently charted (figure 14) depths.<sup>16</sup>



**Figure 14:** Entrance to Necker Bay, charted and surveyed depth comparison.

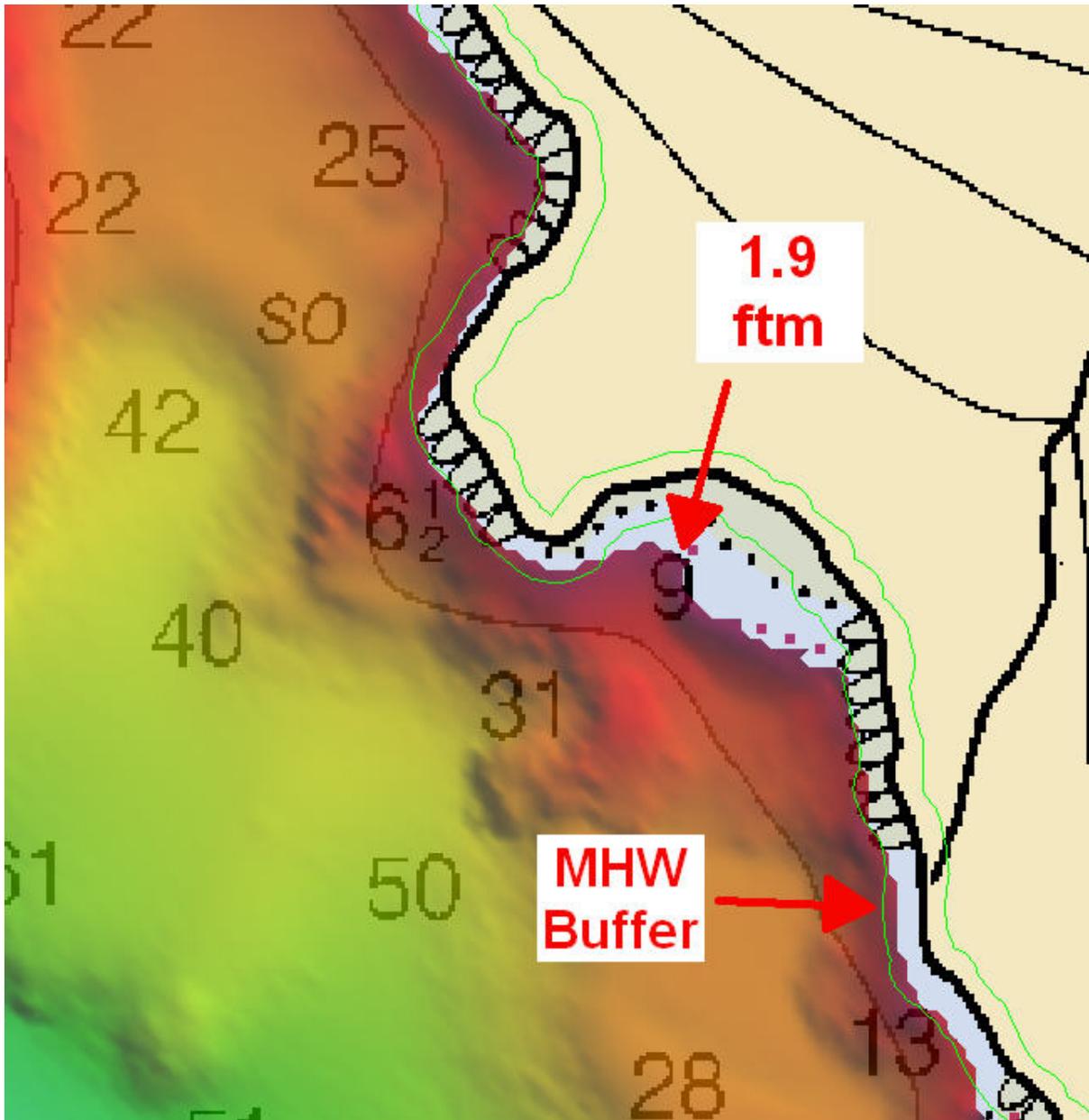
The examples that follow (Figures 15-18) are representative of a common condition where significant differences exist between charted depths and survey soundings due to the steep

slope of the seafloor and of the horizontal accuracy of the data. Two depths, significantly shoaler than charted, were found near the northern entrance to Secluded Bay: a survey sounding of **19** fathoms was found at a 36 fathom charted depth and a survey sounding of **32** fathoms was acquired over a 43 fathom charted depth (figure 15).<sup>17</sup>



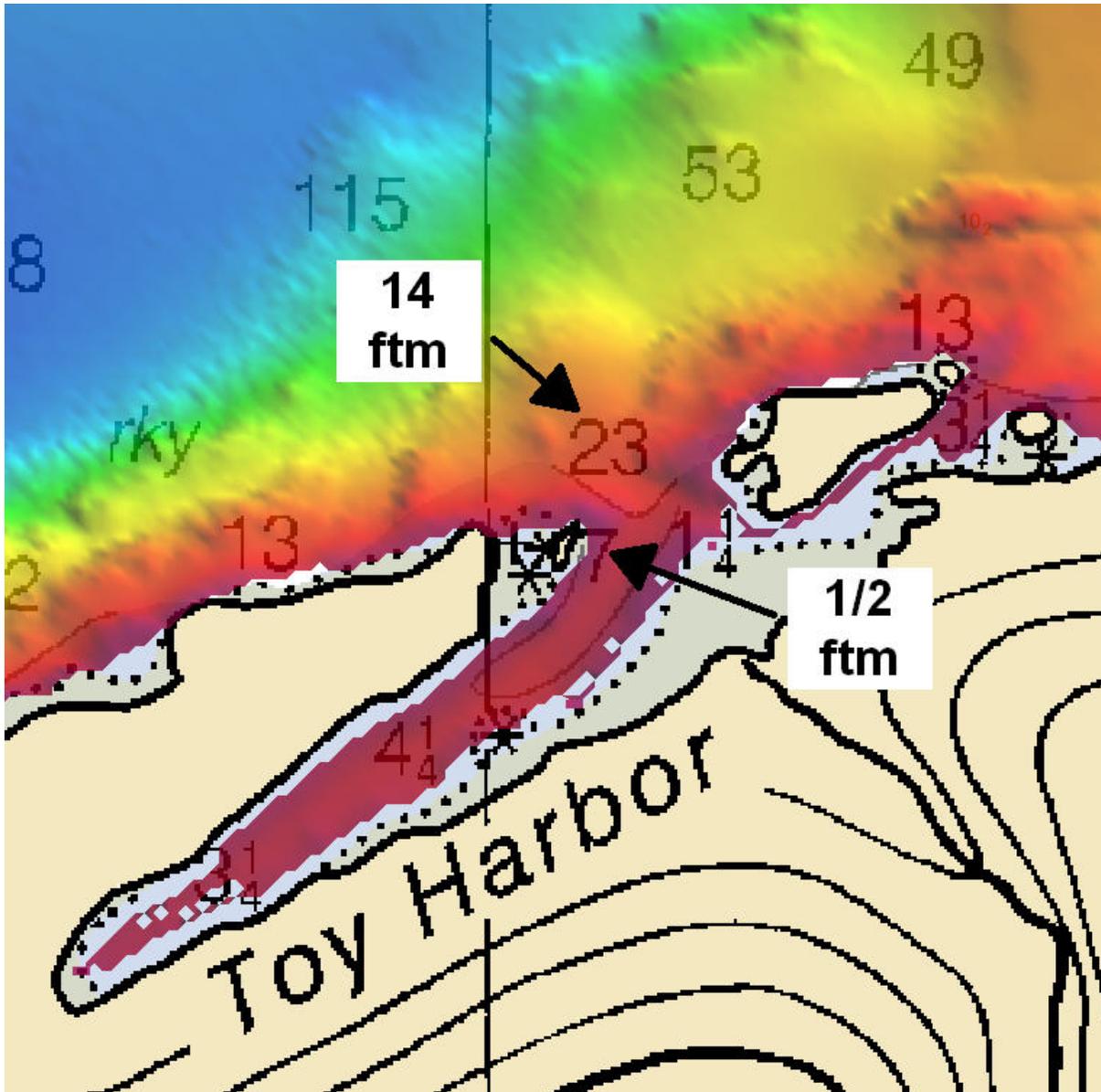
**Figure 15:** Northern entrance to Secluded Bay Area Soundings.

Near the eastern shoreline of northern Necker Bay, a **1.9** fathom sounding was surveyed over a 9 fathom charted depth (figure 16).<sup>18</sup>



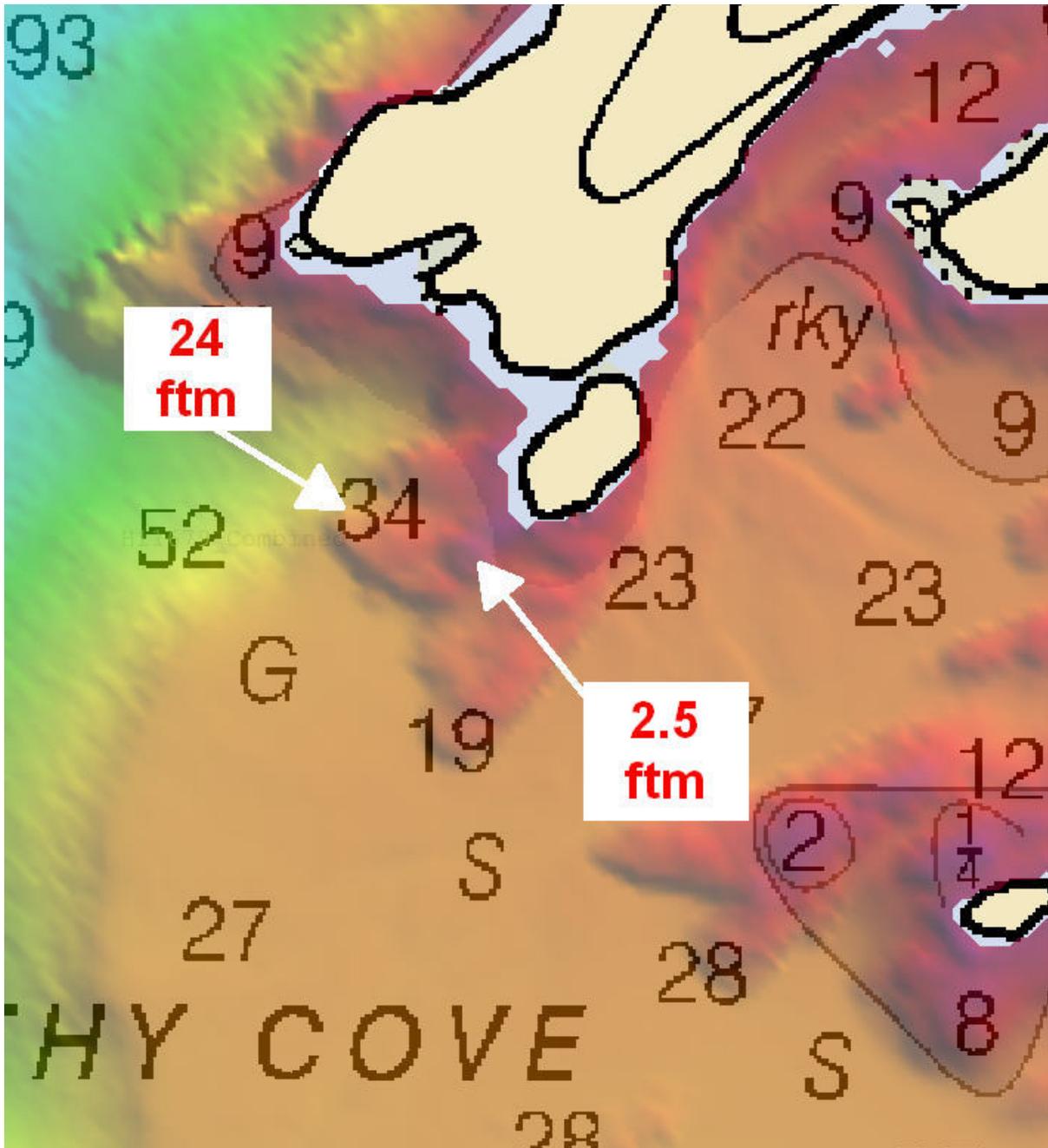
**Figure 16:** Eastern shoreline, northern Necker Bay sounding.

In the vicinity of Toy Harbor, a ½ fathom sounding was recorded over a 7 fathom charted depth, and a 14 fathom sounding was acquired over a 23 fathom charted depth (figure 17).<sup>19</sup>



**Figure 17:** Vicinity of Toy Harbor.

A shoal area was found within Dorothy Cove that is more extensive than charted. A 2.5 fathom sounding was recorded between charted 34 and 23 fathom depth. At the 34 fathom charted depth previously sited, a 24 fathom depth was acquired during survey H11679 (figure 18).<sup>20</sup>



**Figure 18:** H11679 Dorothy Cove soundings.

At approximately 340 meters inside the northern entrance to Secluded Bay, complete multibeam coverage was acquired over an area of rocks which were not found at their charted position (figure 19), however rocks were observed just to the east of their charted location. The hydrographer recommends deleting the charted rocks and adding a new foul area with rocks as indicated in H11679\_FieldVerified\_Source layer (figure 20).<sup>21</sup>

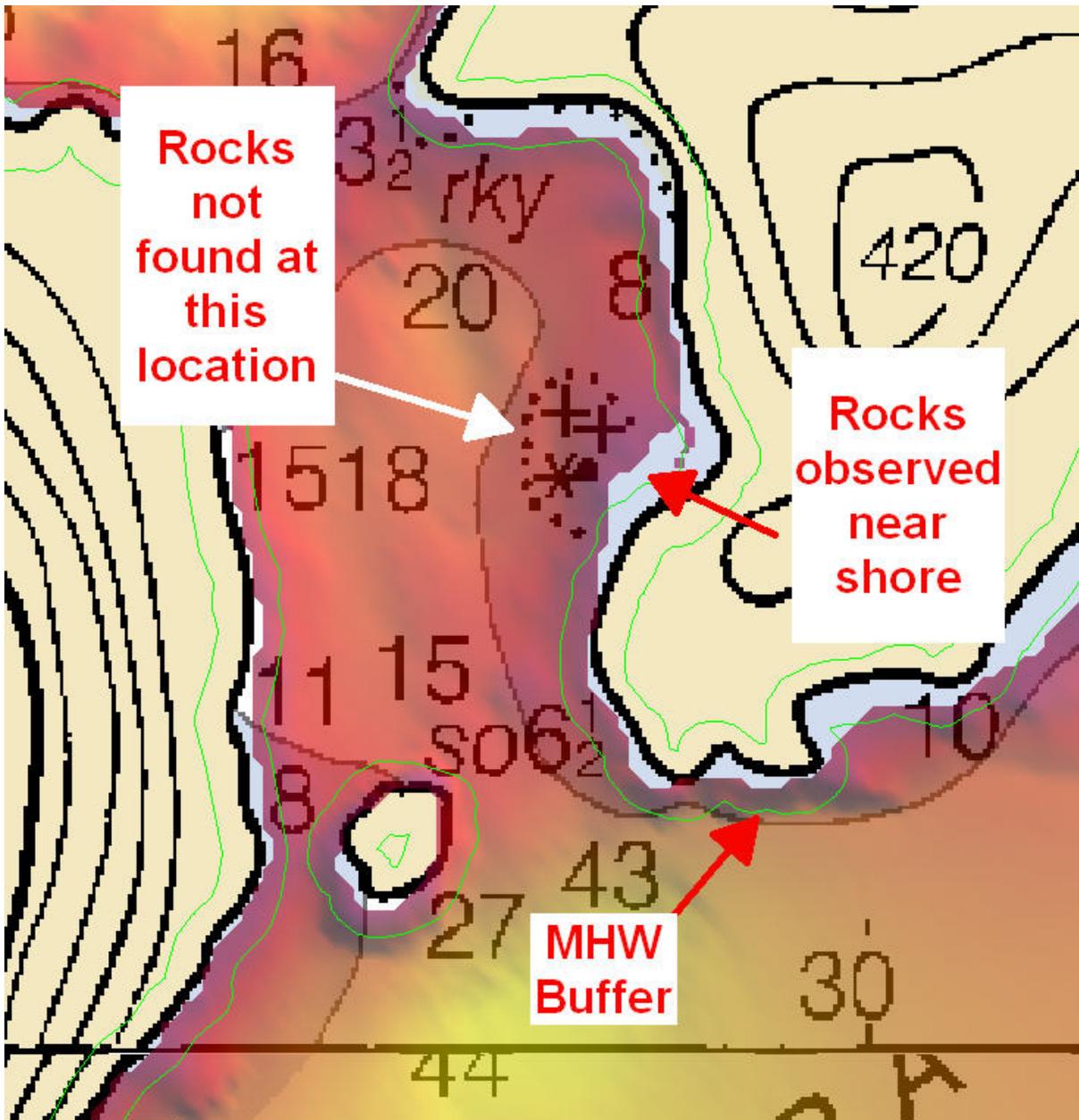


Figure 19: Rocks not found at charted position.

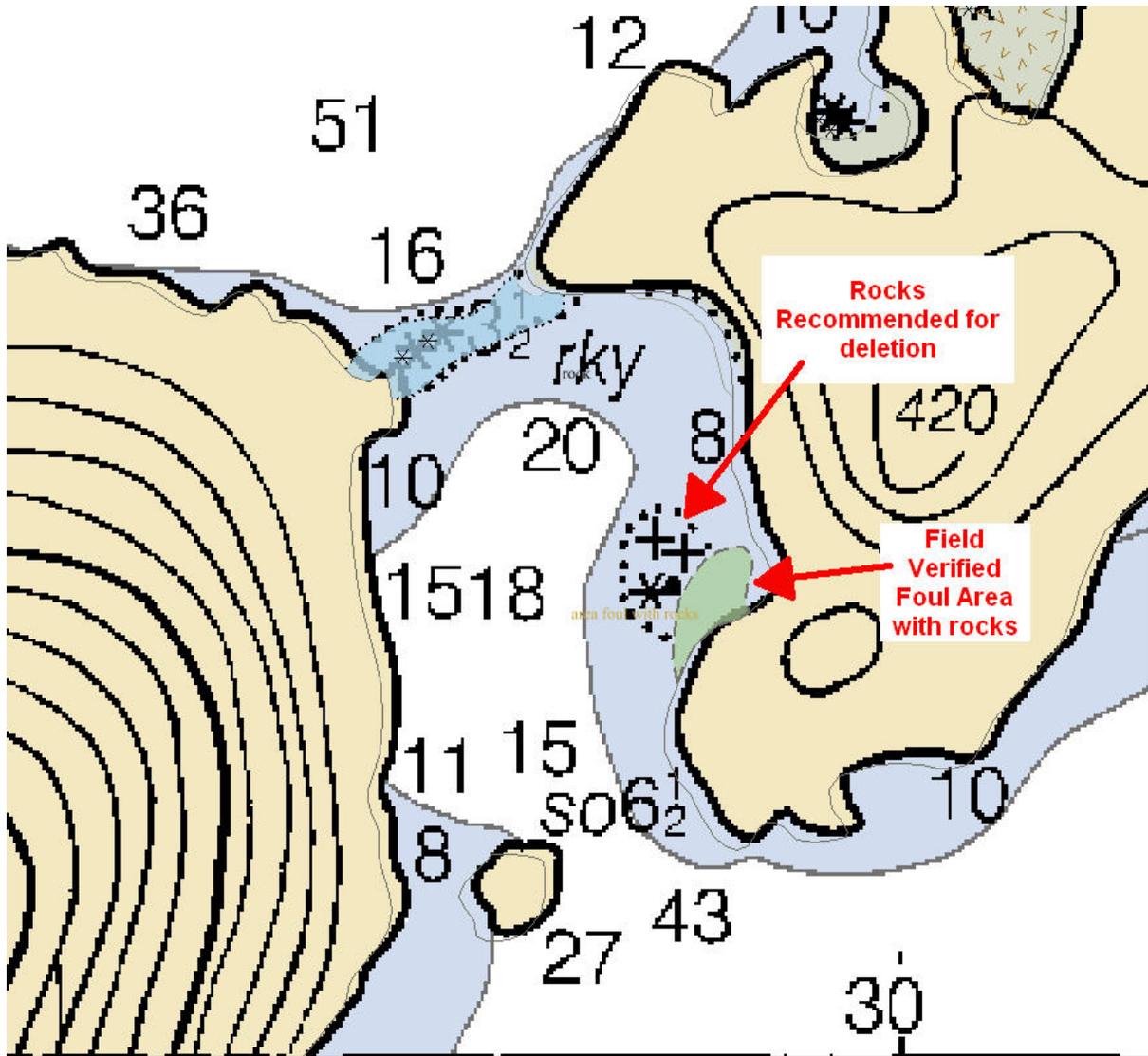
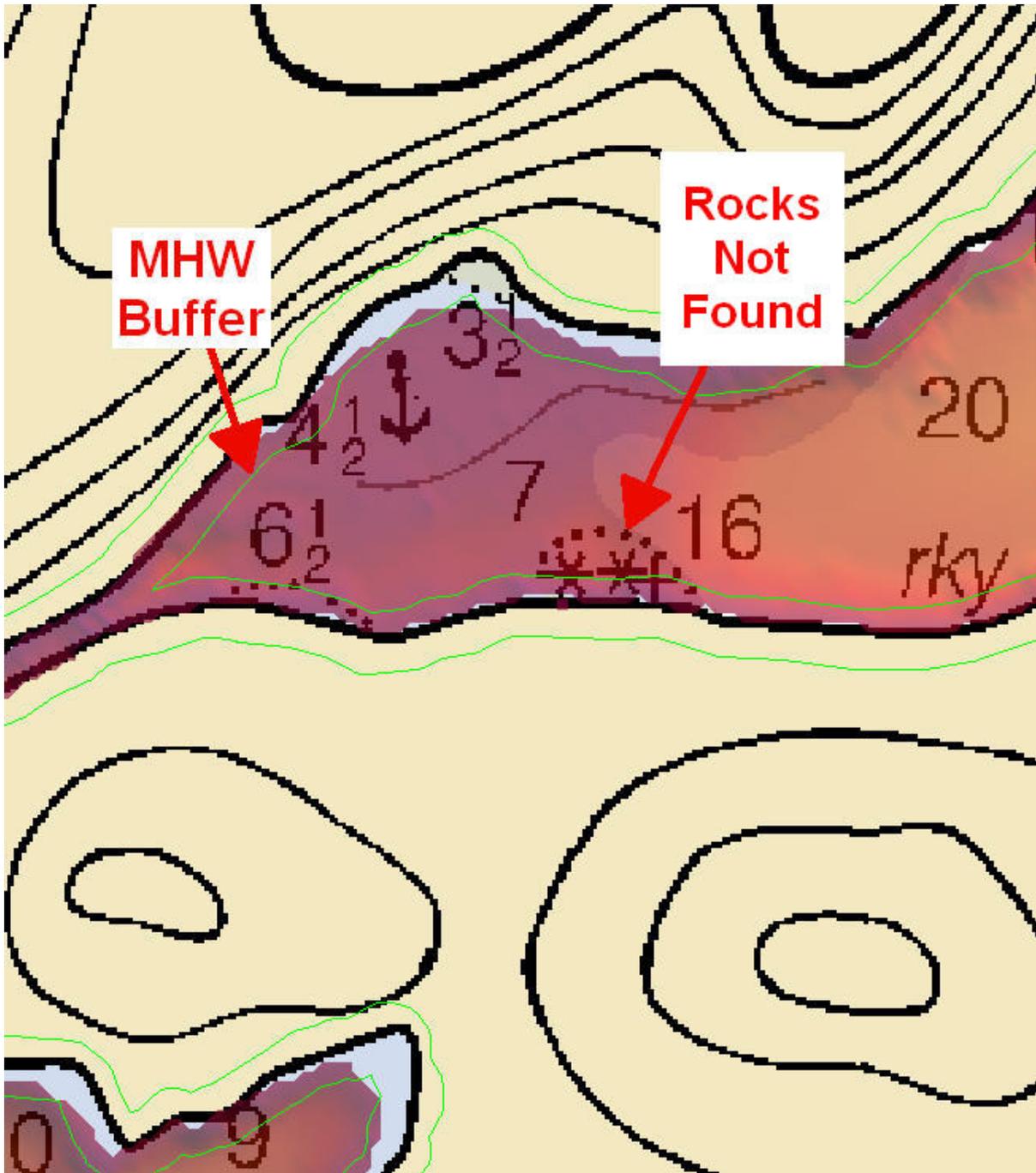


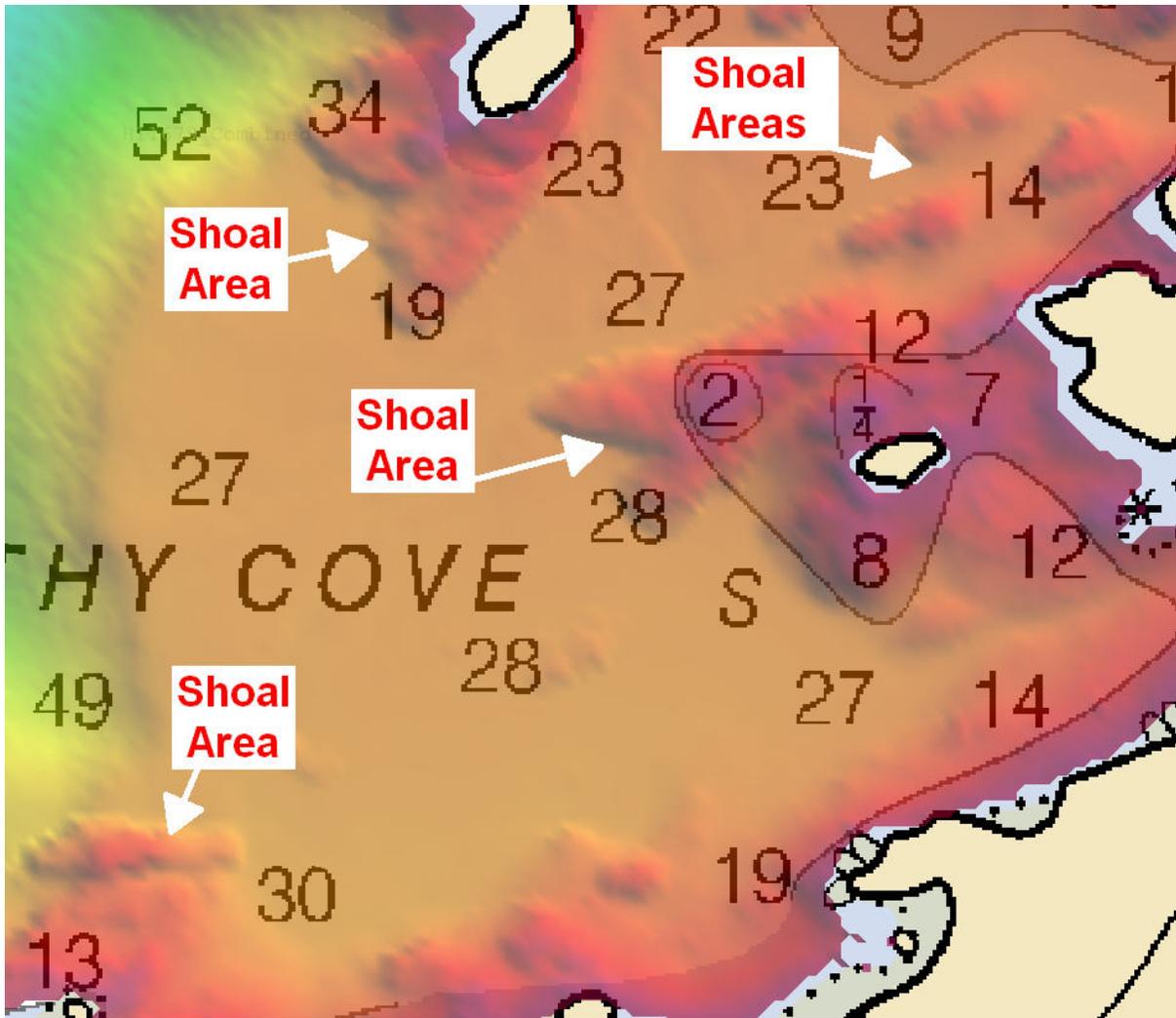
Figure 20: Verified rock location.

Near the southwestern entrance to Secluded Bay, along its south shoreline, complete multibeam coverage was acquired over a pair of charted rocks; the rocks were not found at the charted position (figure 21). The hydrographer recommends deleting charted rocks.<sup>22</sup>



**Figure 21:** *Secluded Bay rocks not found.*

Several areas within Dorothy Cove, which provides anchorage, were found to be shoaler than previously charted. The two DTONs (see section D.1.b) submitted as part of this survey relate to the shoal areas with  $\frac{1}{4}$  and 2 fathom soundings shown on the updated raster chart (figure 22).<sup>23</sup>



**Figure 22:** Dorothy Cove shoal areas.

Elsewhere in the survey area, H11679 depths agreed within approximately 2 fathoms with charted depths or were deeper. The hydrographer recommends that H11679 survey soundings supersede all previously charted depths.<sup>24</sup>

#### Anchorage

Three anchorage areas are currently charted, one in Dorothy Cove, another at the south end of Secluded Bay, and the third at the north end of Necker Bay. The hydrographer recommends changing the symbol in Dorothy Cove to a small vessel anchorage, removing the charted anchorage in Secluded Bay due to rocky conditions there, and retaining the northern Necker Bay anchorage.<sup>25</sup> The Coast Pilot revision (CP-06-28Ed-pages333-345\_Rev07\_2007.doc) contains additional details regarding anchorage within survey area H11679.

#### **Chart 17320**

#### Depth Comparison

Depths from this survey were generally shoaler than previously charted. Figure 22 depicts H11679 shoaler depths in red boxes, deeper than charted values in green boxes.<sup>26</sup>

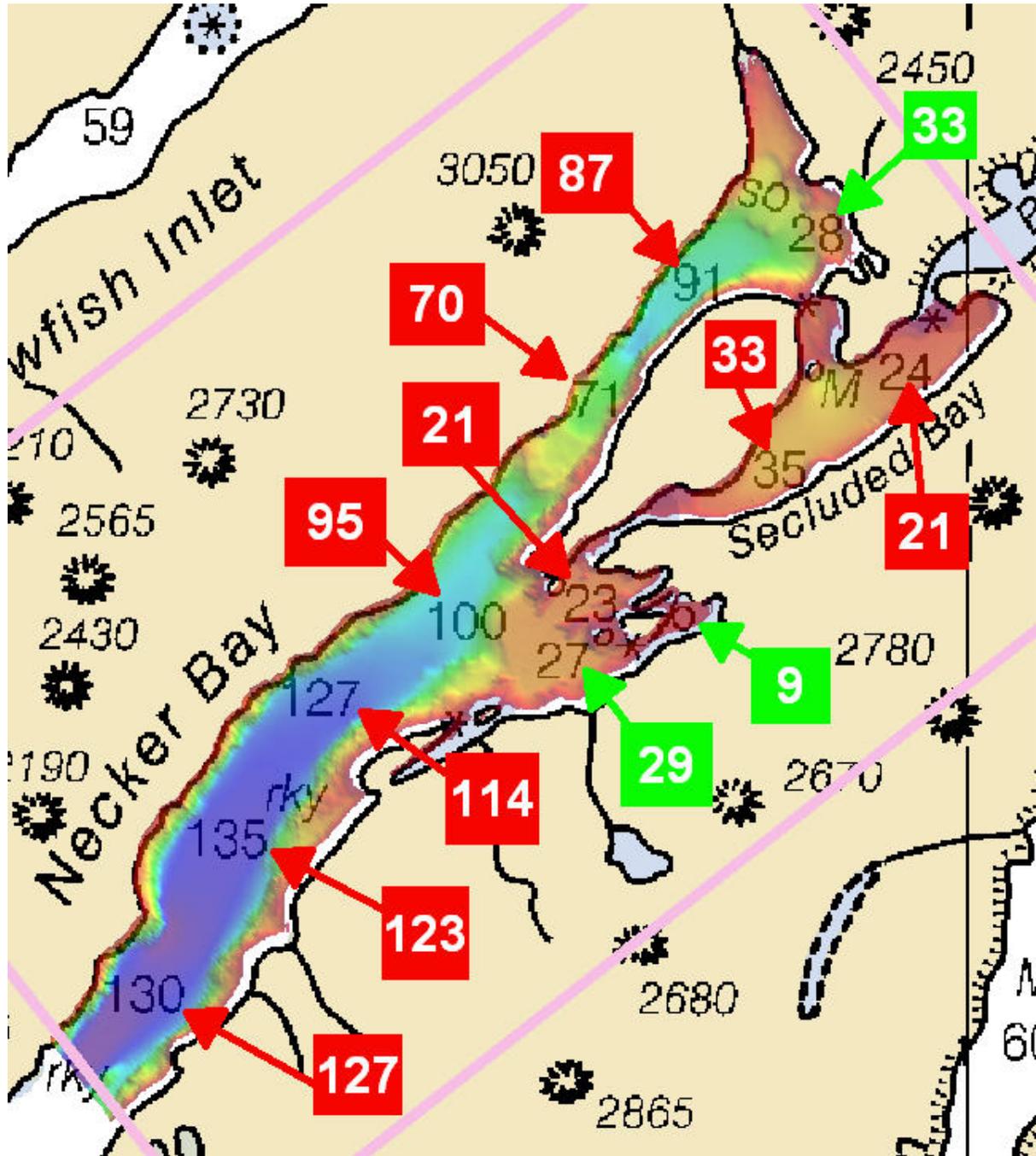


Figure 22: H11679 depth comparison with chart 17320.

Horizontal Offset

A horizontal offset of approximately 60 meters exists between the CARIS BASE surface for H11679 and chart 17320 (figure 23). The hydrographer recommends updating chart 17320

shoreline from RSD's photogrammetry vector source data (GC-10517) and H11679\_FieldVerified\_Source.hob.<sup>27</sup>

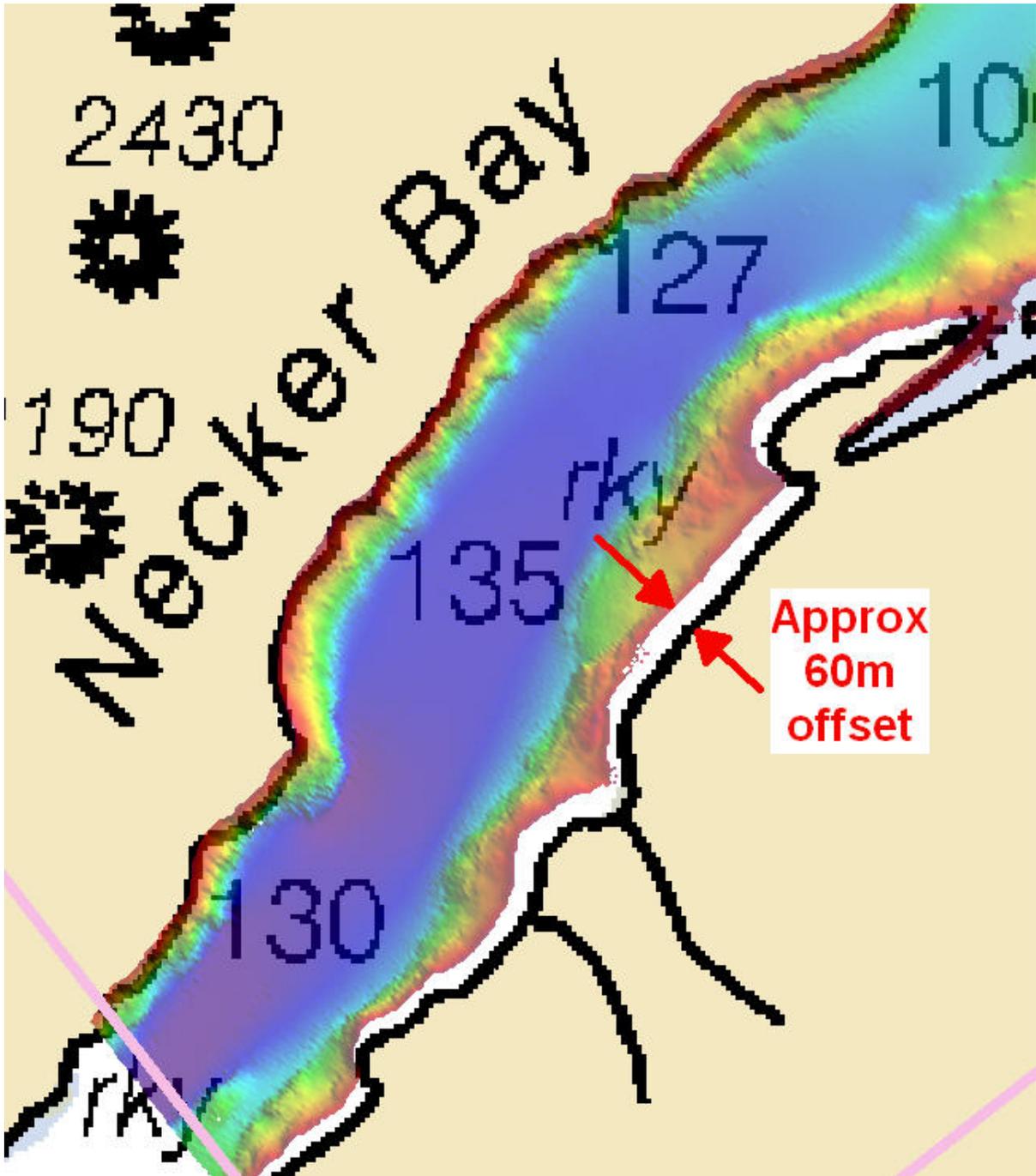


Figure 23: H11679BASE Surface Horizontal offset with chart 17320.

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

Two (2) Dangers to Navigation (DTONs) were found on survey H11679, and reported to the Marine Chart Division via email on April 21, 2007 (figure 24). The original DTON submission package is included in Appendix IV. Descriptions of each DTON are included in the Survey Feature Report in Appendix I.

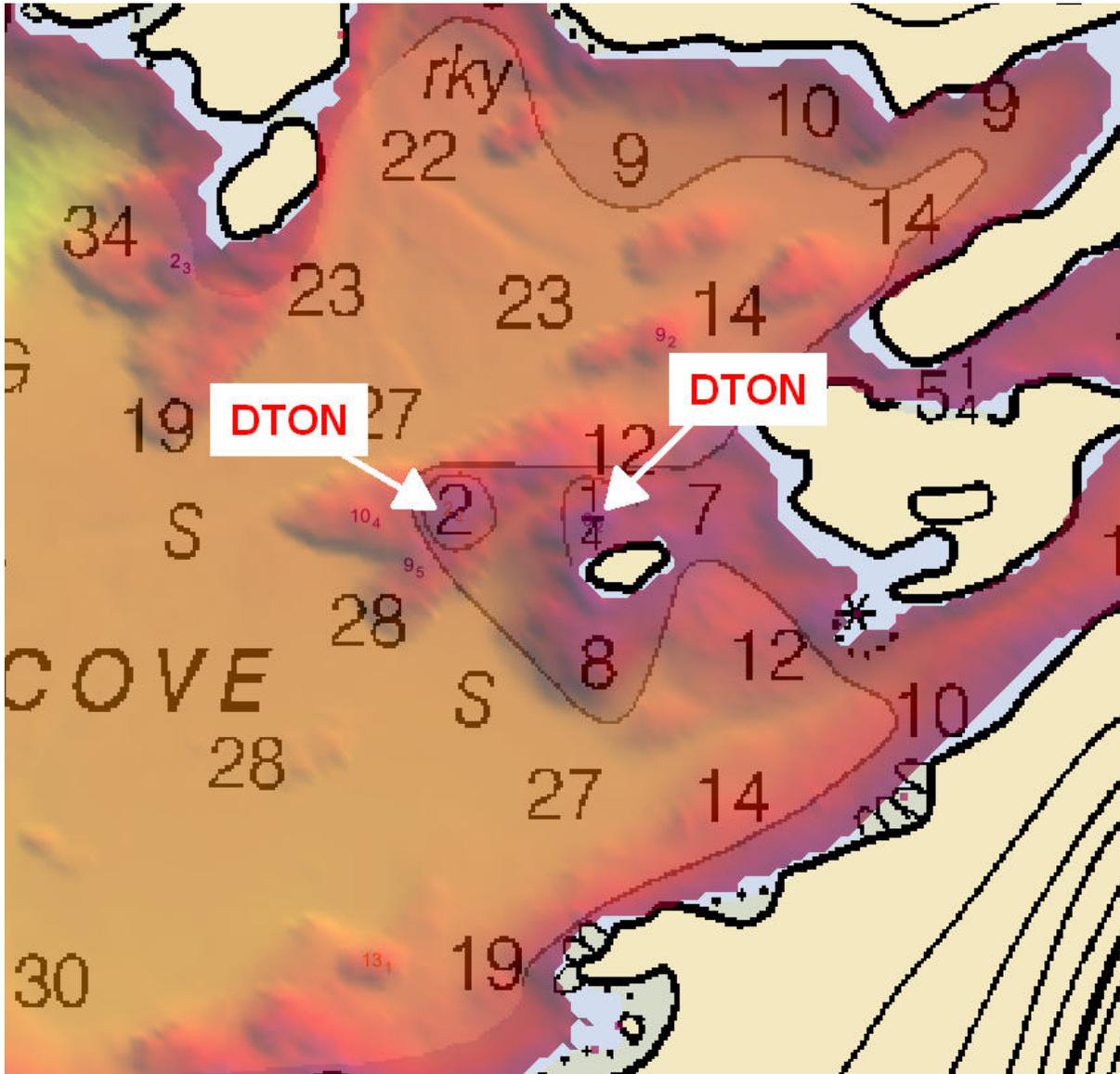


Figure 23: H11679 DTONs.

### D.1.c. Other Features

No AWOIS items fell the within the survey limits of H11679.<sup>28</sup>

No additional charted items were investigated and no other features were located on survey H11679.

**D.2. Additional Results**

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

Prior survey comparison was not performed.

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

Shoreline Source

The Pacific Hydrographic Branch provided RAINIER with ENC's US2AK30M and US5AK3SM for shoreline reference and verification purposes. Both electronic charts have been adequately updated according to photogrammetric survey project GC-10517 (NAD 83).

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables and FPM section 3.4.6. Detached positions (DPs) acquired during shoreline verification were recorded in HYPACK, on DP forms, and processed in Pydro. These indicate revisions to features and features not found on the verified shoreline. In addition, annotations describing shoreline were recorded on hard copy plots of digital shoreline. DP forms are included in the *Separates to be Included with Survey Data*.<sup>29</sup>

All shoreline data is submitted in Caris Notebook .hob files. The session H11679\_Notebook.wrk contains the following:

<b>HOB File</b>	<b>Purpose and Contents</b>
H11679_CompositeSource.hob	Original Source Data as filtered from ENC cell US2AK30M
H11679_Reference.hob	Survey limits.
H11679_FieldVerified_Source.hob	Field verified source features and shoreline, including edits and updates not requiring DPs.
H11679_Pydro_Updates.hob	New or modified items processed through Pydro.
H11679_Pydro_Deleted_Source.hob <sup>30</sup>	Deleted items from Field Verified Source.

**Table 7:** *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 GC, raster charts, and ENC's as described above.<sup>31</sup>

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

There are no Aids to Navigation within the limits of H11679.<sup>32</sup>

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

There are no overhead features within the limits of survey H11679.<sup>33</sup>

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

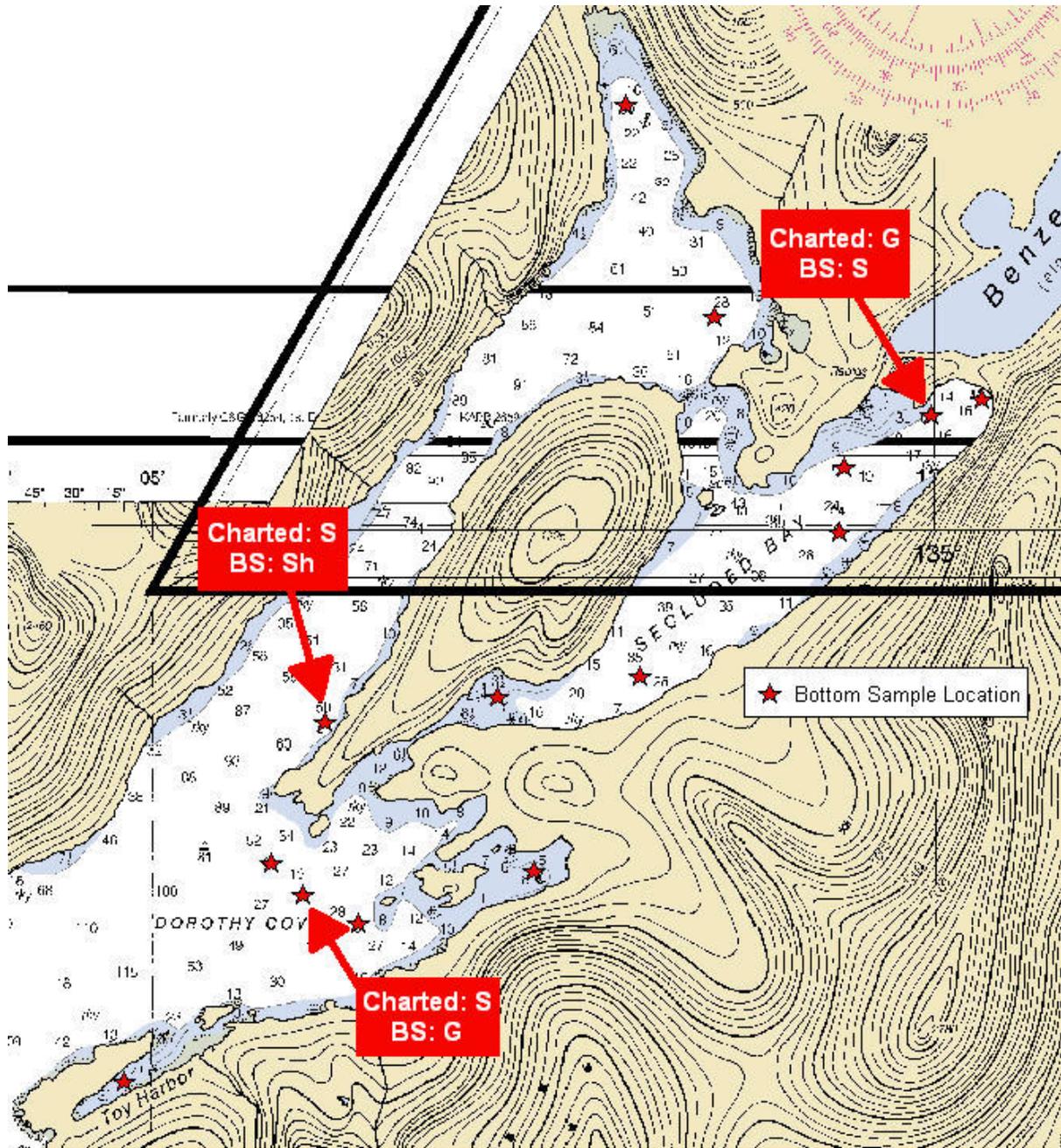
There are no submarine cables or pipelines charted within the limits of H11679, and none were detected by the survey.<sup>34</sup>

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

There are no ferry routes charted within the limits of survey H11679, and none were observed to be operating in the area.<sup>35</sup>

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

Fourteen (14) bottom samples were collected during survey H11679 (figure 24). Nine (9) samples were taken over or near currently charted bottom types/bottom characteristics. The remaining samples were taken in potential anchorages, in less than 70 meters of water. All but three (3) samples agreed well with currently charted bottom types/characteristics. Figure 24 illustrates where H11679 bottom samples (BS) differed with those currently charted. Further information can be found in the Survey Feature Report in Appendix II.<sup>36</sup>



**Figure 24:** H11679 Bottom Sample Locations and differences in bottom type.

**D.2.h. Other Findings**

There are no other findings within the limits of survey H11679 to report.

**E. APPROVAL**

As Chief of Party, Field operations for hydrographic survey H11679 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 2007 edition), Field Procedures Manual (March 2007 edition), Standing and Letter Instructions, and all HSD Technical Directives issued through July 2007. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Data Acquisition and Processing Report for OPR-O112-RA-07	11/02/07	N/CS34
Coast Pilot Report for OPR-O112-RA-07 <i>(Will be submitted under separate cover)</i>		N/CS26

Approved and Forwarded:  CDR/NOAA  Digitally signed by Donald W. Haines, CDR/NOAA  
 DN: cn=Donald W. Haines, CDR/NOAA, c=US, o=NOAA/  
 NMAO/MOC-P, ou=NOAA Ship RAINIER, email=co.  
 rainier@noaa.gov  
 Reason: I am approving this document for CDR Noll  
 Date: 2008.02.06 16:15:48 -08'00'

Guy T. Noll  
 Commander, NOAA  
 Commanding Officer

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  
 2008.02.06 21:09:56 Z

B. Jackson  
 Hydrographic Survey Technician, NOAA.

Chief Survey Technician:  James B. Jacobson  
 I have reviewed this document  
 2008.02.06 20:23:45 Z

James B. Jacobson  
 Chief Survey Technician, NOAA Ship RAINIER

Field Operations Officer:  Charles Yoos  
 I have reviewed this document  
 2008.02.06 16:13:29 -08'00'

Charles J. Yoos  
 Lieutenant, NOAA

## Revisions Compiled During Office Processing and Certification

---

- <sup>1</sup> Do not concur. Complete multibeam coverage was not obtained to the 8-meter curve due to the steep and deep nature of the survey area.
- <sup>2</sup> Filed with the project records.
- <sup>3</sup> Concur with clarification. Roll bias for Vessel 1021 was changed after tightening transducer bolts. This was not documented in the DR or DAPR. No roll artifacts were found in the data.
- <sup>4</sup> Concur.
- <sup>5</sup> Filed with project records.
- <sup>6</sup> Appended to this report.
- <sup>7</sup> Concur.
- <sup>8</sup> Concur.
- <sup>9</sup> Concur.
- <sup>10</sup> Concur.
- <sup>11</sup> Concur.
- <sup>12</sup> Concur.
- <sup>13</sup> Filed with project records.
- <sup>14</sup> Tide note is appended to this document.
- <sup>15</sup> Chart 17328 (1:40,000), 7<sup>th</sup> Edition dated November 2003 and Local Notice to Mariners dated 3/13/2010 were used for chart comparison and compilation.
- <sup>16</sup> Concur.
- <sup>17</sup> Concur.
- <sup>18</sup> Concur.
- <sup>19</sup> Concur.
- <sup>20</sup> Concur.
- <sup>21</sup> Concur.
- <sup>22</sup> Concur with clarification. Chart foul area as compiled to the HCell.
- <sup>23</sup> DtoN report has been appended to this document.
- <sup>24</sup> Concur.
- <sup>25</sup> Concur.
- <sup>26</sup> Concur.
- <sup>27</sup> Concur.
- <sup>28</sup> Concur.
- <sup>29</sup> Filed with hydrographic records.
- <sup>30</sup> Concur with clarification. Submitted file name is H11679\_Deleted\_Source.hob.
- <sup>31</sup> Concur with clarification. Chart as depicted in HCell.
- <sup>32</sup> Concur.
- <sup>33</sup> Concur.
- <sup>34</sup> Concur.
- <sup>35</sup> Concur.
- <sup>36</sup> Filed with hydrographic records. Chart as depicted in the HCell.

# H11679 Danger to Navigation Report 1

**Registry Number:**

**State:**

**Locality:**

**Sub-locality:**

**Project Number:**

**Survey Dates:** 04/18/2007 - 04/19/2007

## Charts Affected

Number	Version	Date	Scale
17328	7th Ed.	11/01/2003	1:40000
17320	17th Ed.	11/01/2005	1:217828
16016	20th Ed.	11/01/2003	1:969756
531	23rd Ed.	01/01/2006	1:2100000
500	8th Ed.	06/01/2003	1:3500000
530	31st Ed.	06/01/2005	1:4860700
50	6th Ed.	06/01/2003	1:10000000

## Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Sounding	0.67 m	056° 43' 43.336" N	135° 03' 31.627" W	---
1.2	Sounding	3.94 m	056° 43' 43.736" N	135° 03' 42.317" W	---

## **1 - Danger To Navigation**

## 1.1) Profile/Beam - 1/1 from h11679 / 1103\_nonechosounder\_dp / 2007-108 / dp\_1103\_108

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 056° 43' 43.336" N, 135° 03' 31.627" W  
**Least Depth:** 0.67 m  
**Timestamp:** 2007-108.16:50:00.000 (04/18/2007)  
**DP Dataset:** h11679 / 1103\_nonechosounder\_dp / 2007-108 / dp\_1103\_108  
**Profile/Beam:** 1/1  
**Charts Affected:** 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

new rock Visual depth estimate.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11679/1103_nonechosounder_dp/2007-108/dp_1103_108	1/1	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart rock with sounding.

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

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

0fm 2ft (531\_1)

.6m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 STATUS - 1:permanent  
 VALSOU - 0.669 m  
 VERDAT - 12:Mean lower low water

WATLEV - 4:covers and uncovers

Feature Images

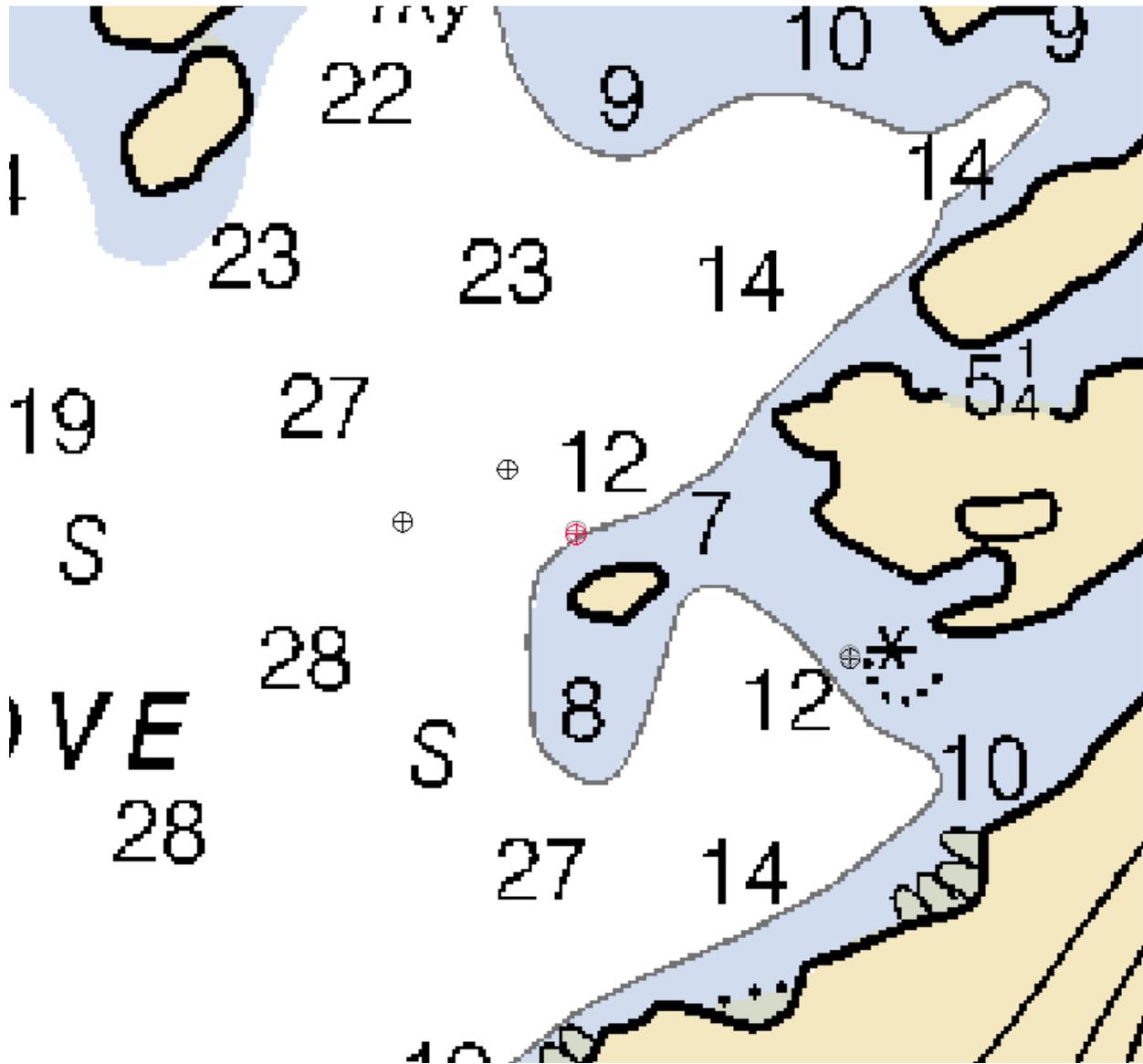
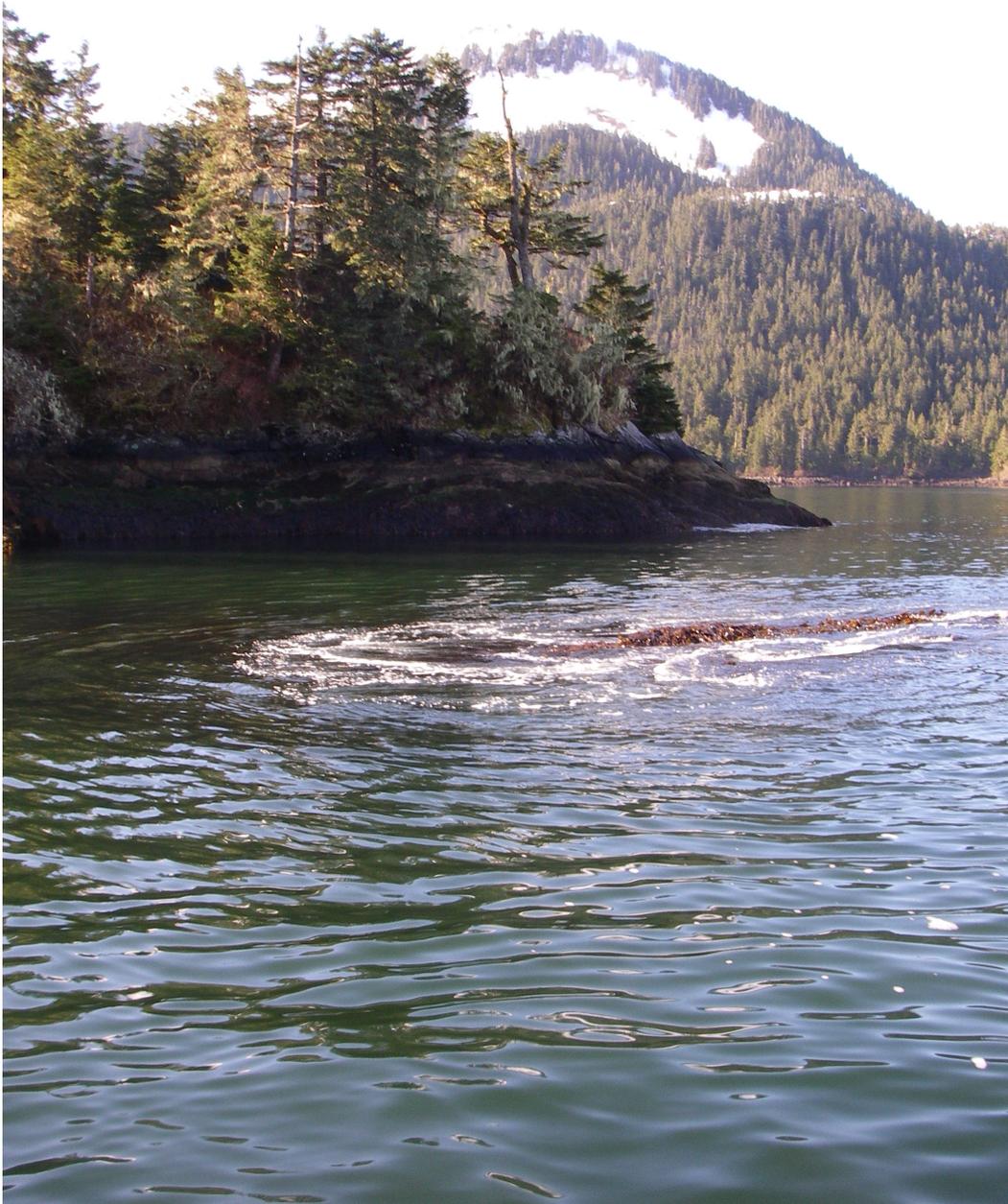


Figure 1.1.1



*Figure 1.1.2*

## 1.2) Profile/Beam - 626/8 from h11679 / 1021\_reson8101\_hvf / 2007-109 / 121\_2043

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 056° 43' 43.736" N, 135° 03' 42.317" W  
**Least Depth:** 3.94 m  
**Timestamp:** 2007-109.20:45:00.429 (04/19/2007)  
**Survey Line:** h11679 / 1021\_reson8101\_hvf / 2007-109 / 121\_2043  
**Profile/Beam:** 626/8  
**Charts Affected:** 17328\_1, 17320\_1, 16016\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

MBES least depth on uncharted reef complex.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11679/1021_reson8101_hvf/2007-109/121_2043	626/8	0.00	000.0	Primary

#### Hydrographer Recommendations

Chart shoal sounding.

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

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

2fm 1ft (531\_1)

3.9m (500\_1, 50\_1)

#### S-57 Data

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



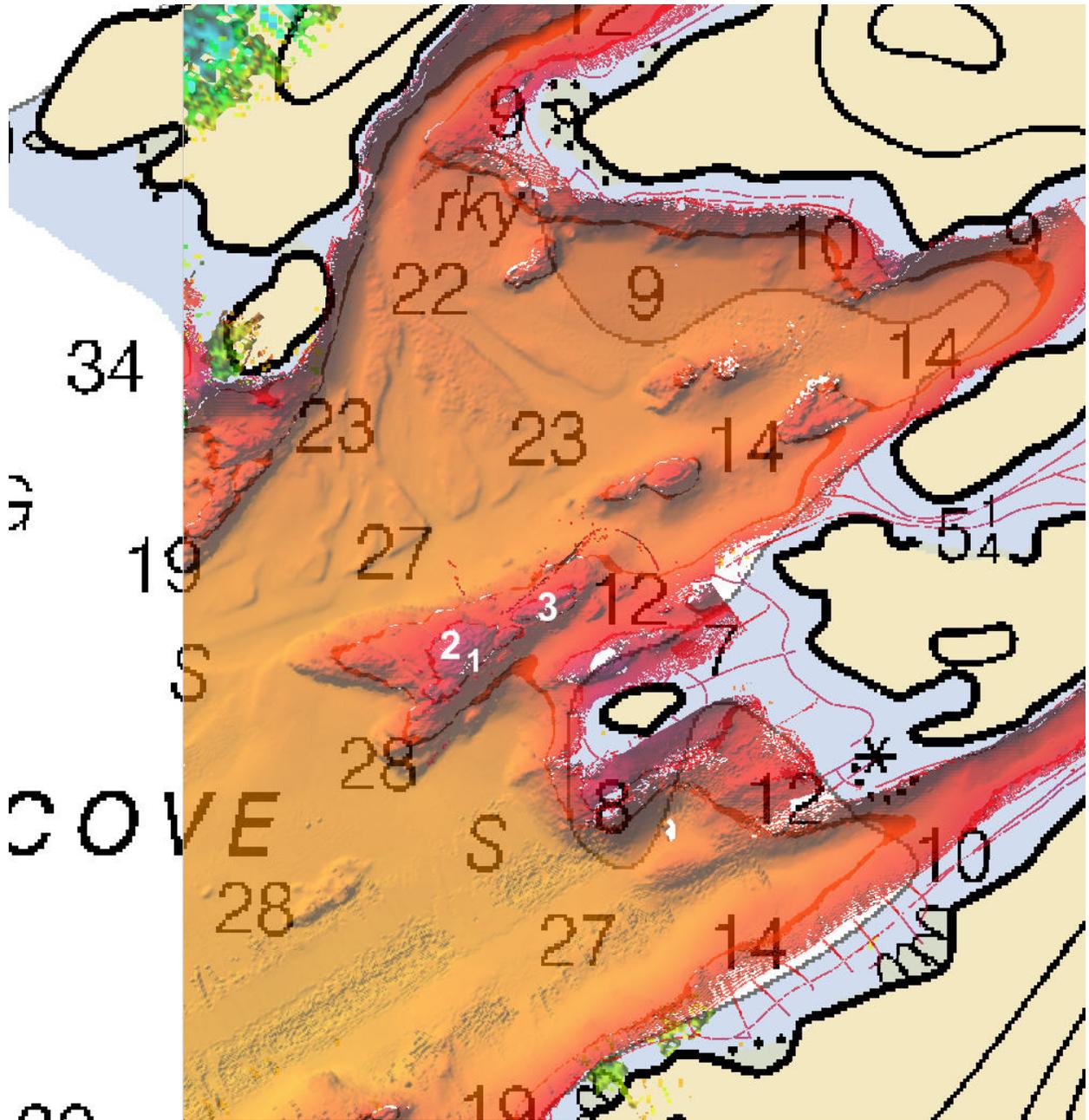


Figure 1.2.2

---

**From:** "don haines" <Don.Haines@noaa.gov>  
**To:** "Brooke McMahon" <brooke.mcmahon@noaa.gov>  
**Cc:** "abigail higgins" <Abigail.Higgins@noaa.gov>; "Gary Nelson" <Gary.Nelson@noaa.gov>  
**Sent:** Tuesday, July 10, 2007 10:44 AM  
**Attach:** New Limits.zip  
**Subject:** [Fwd: Re: [Fwd: Re: Recommended update to expected accomplishment on OPR-O112-RA-07]]

pls add correspondence and new project limits to the files.

----- Original Message -----

**Subject:** Re: [Fwd: Re: Recommended update to expected accomplishment on OPR-O112-RA-07]  
**Date:** Tue, 10 Jul 2007 12:55:19 -0400  
**From:** Kyle.Ward <[Kyle.Ward@noaa.gov](mailto:Kyle.Ward@noaa.gov)>  
**Organization:** Hydrographic Survey Division  
**To:** Doug Baird <[Doug.Baird@noaa.gov](mailto:Doug.Baird@noaa.gov)>, \_NMAO MOP CO Rainier  
 <[CO.Rainier@noaa.gov](mailto:CO.Rainier@noaa.gov)>, Don Haines <[Don.Haines@noaa.gov](mailto:Don.Haines@noaa.gov)>  
**References:** <[4693ABDF.9010308@noaa.gov](mailto:4693ABDF.9010308@noaa.gov)>

Guy,

I have attached the new limits for sheet D. Doug ask me to cut off sheet D at the bottom of chart 17326 to reduce production headaches at PHB and MCD.

Kyle

Doug Baird wrote:

Kyle,

Gerd and I have discussed Guy's request (stated below); let's amend the O112 sheet layout so that sheet D exists as shown on the attached RA progress sketch files - but only as appears on chart 17320. In other words, any part of the sheet extent that appears on 17326 should be deferred until 2008. I didn't state that well - come see me for details.

Doug

----- Original Message -----

**Subject:** Re: Recommended update to expected accomplishment on OPR-O112-RA-07  
**Date:** Tue, 10 Jul 2007 07:11:41 -0800  
**From:** CO Rainier <[CO.Rainier@noaa.gov](mailto:CO.Rainier@noaa.gov)>  
**Organization:** NOAA Ship RAINIER  
**To:** Doug Baird <[Doug.Baird@noaa.gov](mailto:Doug.Baird@noaa.gov)>  
**References:** <[op.tu8fexgwov797k@ra-co.rainier.nmao.ship](mailto:op.tu8fexgwov797k@ra-co.rainier.nmao.ship)><[469386CD.6010507@noaa.gov](mailto:469386CD.6010507@noaa.gov)>

I made the change on the attached progress sketch files.

We "extended" the sheet D to include the extra areas on the approaches

after  
finding that it was pretty scary coming in there, earlier this year.

On Tue, 10 Jul 2007 05:17:01 -0800, Doug Baird <[Doug.Baird@noaa.gov](mailto:Doug.Baird@noaa.gov)> wrote:

> Guy,  
>  
> Could you send a graphic to display your suggestion? The current layout  
> here at HSD does not show Walker Channel being in the 2007 survey area.  
> The channels leading to West Crawfish and Crawfish Inlets and Necker Bay  
> were to be surveyed in 2008 due to the lidar junctioning delay.  
> Surveying in those areas this year (and guessing on the appropriate  
> coverage) could lead to holidays and duplicative work.  
>  
> If time is running out for the project, only start areas of the square  
> sheet D that can be finished (square it off).  
>  
> regards,  
> Doug  
>  
> CO Rainier wrote:  
>> Doug,  
>> With the loss of RA-3's 8101 earlier in May and recent loss of RA-5  
>> capability, my contingency time is all gone, and there is still work  
>> to do at OPR-0190 after OPR-0112 Sheet D. Thus, I recommend cutting  
>> off the northern part of Sheet D in favor of getting 92.5 of the  
>> expected 112 SNM in the main block from about Walker Channel south and  
>> west. This will entail use of RA-3/4/6 and the ship, as weather  
>> allows. The northern part leftover is easily reachable during next  
>> year's final work in the Windy Passage to Cape Aspid region. I believe  
>> I can still complete the leftover FAIRWEATHER sheets here in Esquibel  
>> after 0112 is complete on or about July 23 by working here July 24-28.  
>> I will be picking up Don and Olivia July 26 out of Craig, and  
>> transiting to meet RADM De Bow in Ketchikan July 29, enroute Seattle  
>> arrival planned Wednesday morning August 1, assuming my pilotage  
>> waiver is granted by Captain Ablondi.  
>> Regards,  
>> Guy  
>>  
>>  
>> --CO-RAINIER

--  
CO-RAINIER



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** September 19, 2007

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-O112-RA-2007  
**HYDROGRAPHIC SHEET:** H11679

**LOCALITY:** Necker Bay, Approaches to Sitka, AK  
**TIME PERIOD:** April 18 - July 22, 2007

**TIDE STATION USED:** 945-1600 Sitka, AK  
Lat. 57° 03.1'N Long. 135° 20.4' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.791 meters

**TIDE STATION USED:** 945-1376 Dorothy Cove, AK  
Lat. 56° 43.3' N Long. 135° 4.5' W  
**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.699 meters

**REMARKS: RECOMMENDED ZONING**

Please use the TCARI grid "O112RA2007-TCARI-F.tc" as the final grid for project OPR-O112-RA-2007, H11679, during the time period between April 18 - July 22, 2007.

**Refer to attachments for zoning information.**

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

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

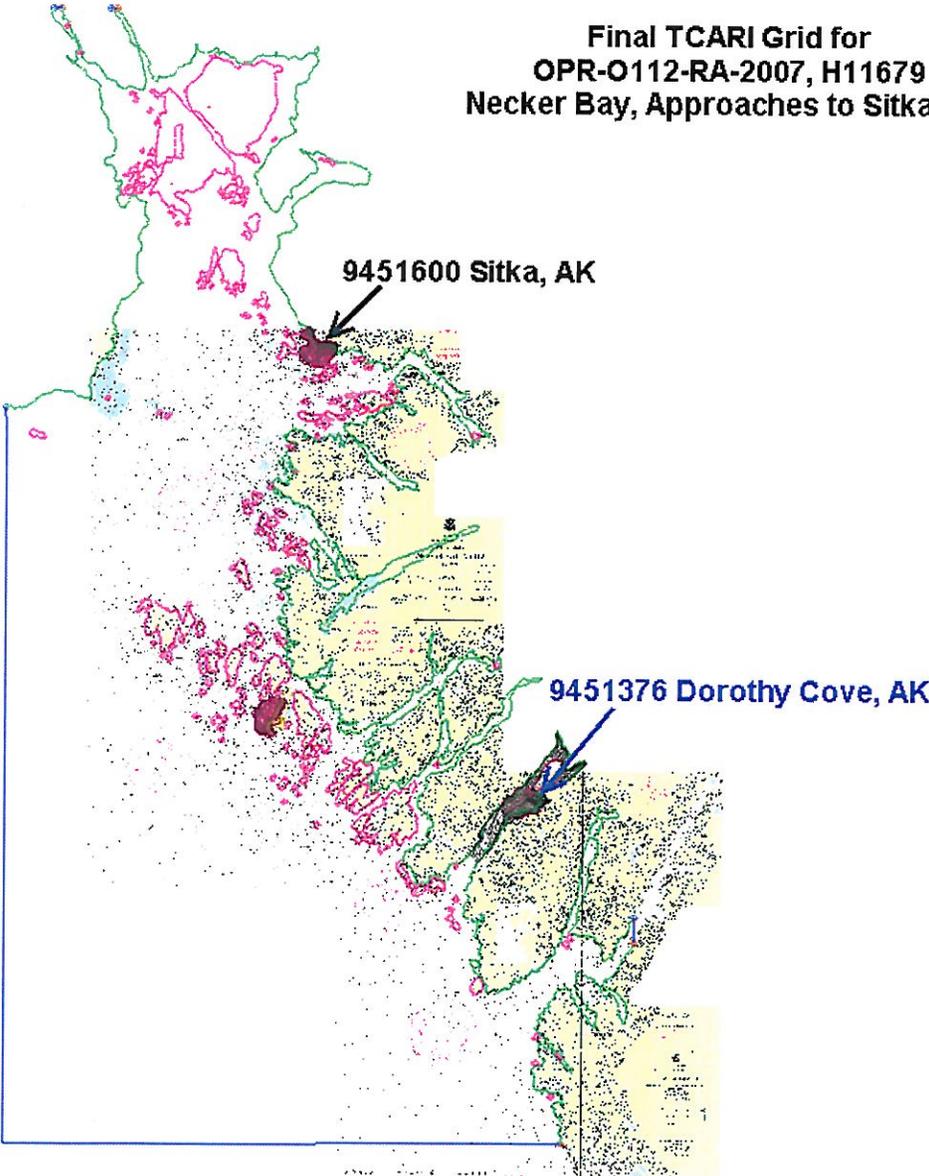
**Peter J. Stone**

Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, c=US, o=CO-OPS,  
ou=NOAA/NOS, email=peter.stone@noaa.gov  
Date: 2007.09.28 13:07:03 -04'00'

CHIEF, PRODUCTS AND SERVICES DIVISION



**Final TCARI Grid for  
OPR-O112-RA-2007, H11679  
Necker Bay, Approaches to Sitka, AK**



**H11679 HCell Report**  
Tyanne Faulkes, ERT Associate  
Pacific Hydrographic Branch

**Introduction**

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC's and RNC's in the region: NOAA RNC, 17328 (1:40,000) and corresponding NOAA ENC, US5AK35M. (See section 4. Meta Areas.)

HCell compilation of survey H11679 utilized Office of Coast Survey DRAFT HCell Specifications Version 4.0. For additional information on the standards and protocols used for HCell Compilation, see the DRAFT A/PHB HCell Reference Guide, version 4.0, 26 March, 2010.

**1. Compilation Scale**

Depths and features for HCell H11679 were compiled to the largest scale chart in the region, 17328, 1:40,000. (See section 4. Meta Areas.)

**2. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 10-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. The resultant sounding layer contains 7,039 depths ranging from 0 to 243.230 meters.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-4.7	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 and imported into a new layer created to accommodate chart density depths. Manual selection was used to accomplish a density and distribution that closely represents the seafloor morphology.

**3. Depth Contours**

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

Chart Contour Intervals in Fathoms from Chart 18474	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 H11679_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	18.5166	10.125	10

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, DEPRE, 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.

Some modifications made to GC shoreline MLLW contours, to bring the GC shoreline into agreement with H11679 hydrography, necessitated inclusion of several “0” DEPCNT features in the HCell. These 0 value contours have been generalized per the chart above. See 9.2 *Conflicts between Shoreline and Hydrography*.

#### 4. Meta Areas

The following Meta object areas are included in HCell H11679:

M\_QUAL

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

#### 5. Features

##### 5.1 Generalization of Features to Chart Scale

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

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

## 5.2 Compilation of Features to the HCell

Shoreline features for H11679 were delivered from the field in four different hob files defining new features, modification to GC or charted features, and disprovals. These were deconflicted against GC shoreline, the chart and hydrography during office processing.

The source of all features included in the H11679 HCell can be determined by the SORIND field.

## 5.2 Mean High Water Used for HCells

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

## 6. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

\$CSYMB	Blue Notes
COALNE	Coastline
M_QUAL	Data quality Meta object
OBSTRN	Obstruction area and point objects
SBDARE	Bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks

The \*\_SS HCell contains the following Objects:

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

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

## 7. Blue Notes

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

## 8. Spatial Framework

### 8.1 Coordinate System

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

## 8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

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

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

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

## 9. Data Processing Notes

### 9.1 Junction with H11679

Junctions are discussed in section B2 in the Descriptive Report.

## 10. QA/QC and ENC Validation Checks

H11679 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

H11679_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000
H11679_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H11679_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11679_outline.gml	Survey outline to populate SURDEX

### 11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.3	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.1	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.
Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

## 12. Contacts

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

Tyanne Faulkes  
ERT Associate  
Pacific Hydrographic Branch  
Seattle, WA  
206-526-6883  
[Tyanne.Faulkes@noaa.gov](mailto:Tyanne.Faulkes@noaa.gov)

APPROVAL SHEET  
H11679

Initial Approvals:

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

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

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