H11900

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-10-11-08

Registry No. H11900

LOCALITY

State Alaska

General Locality Pavlof Island

Sublocality Volcano Bay

2008

CHIEF OF PARTY
Commander Donald W. Haines, NOAA

LIBRARY & ARCHIVES

DATE

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H11900

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-10-11-08**

State Alaska

General Locality Pavlof Island

Sub-Locality Volcano Bay

Scale 1:10,000 **Date of Survey** 6/25/2008 - 8/8/2008

Instructions dated 6/4/2008 **Project No.** OPR-P184-RA-08

Vessel RA6 (1025_Reson8101), RA3 (1021), RA1 (1101), RA2 (1103), RA$ (2801), RA5 (2502), RA9 (915 Ceeducer)

Chief of party Commander Donald W. Haines, NOAA

Surveyed by RAINIER Personnel

Soundings by Reson SeaBat 8101, Tilted Reson 8125, Knudsen 320M, Reson SeaBat 7125, Ceeducer

SAR by Tyanne Faulkes Compilation by Peter Holmberg

Soundings compiled in Fathoms

REMARKS: All times are UTC. UTM Projection (zones #3 & #4)

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

Descriptive Report to Accompany Hydrographic Survey H11900

Project OPR-P184-RA-08
Pavlof Islands
Volcano Bay, Alaska
Scale 1:10,000
June – August, 2008
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 Letter Instructions OPR-P184-RA-08 dated June 4, 2008 and all other applicable direction[1], with the exception of deviations noted in this report. The survey area is Volcano Bay of Pavlof Islands, Alaska. This survey corresponds to sheet H11900 in the sheet layout provided with the Letter Instructions. OPR-P184-RA-08 responds to a request from Ocean Coast Survey to provide contemporary surveys to update National Ocean Service (NOS) nautical charts and reduce the critical survey area backlog. Many charted features in the project area originate from observations made prior to 1930. The Southwestern Alaska Pilots have indicated that this area is seeing increase freighter and passenger traffic.

Complete multibeam echosounder (MBES) coverage was achieved in the survey area in waters 8 meters and deeper, except as noted in this report. Survey coverage does not extend everywhere to the 4 meter curve. Coverage extends to within 4.5 meters of depth, with few areas reaching 5 meters of depth. 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 reference in Table 1.

Shoreline Verification was performed for the survey area in conjunction with lidar coverage.

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

Data Acquisition Type	Hull Number with Mileage (nm)							Total
	951	1101	1103	1015	1021	2801	2802	
VBES (mainscheme)	-	-	-	-	-	-	-	-
MBES (mainscheme)	-	-	-	39.79	97.64	70.29	109.44	317.16
Crosslines	-	-	-	-	-	16.62	1.7	18.32
Developments	-	-	0.64	-	-	-	-	0.64
Shoreline	-	11.85	10.00	-	-	-	-	21.85
Bottom Samples	8	-	-	-	-	-	-	8
Total Number of Items Investigated	-	-	-	-	-	-	-	0
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	-	11.61

Table 1. Statistics for survey H11900.

Data acquisition was conducted from June 25 to August 8, 2008 (DN177 to DN221).

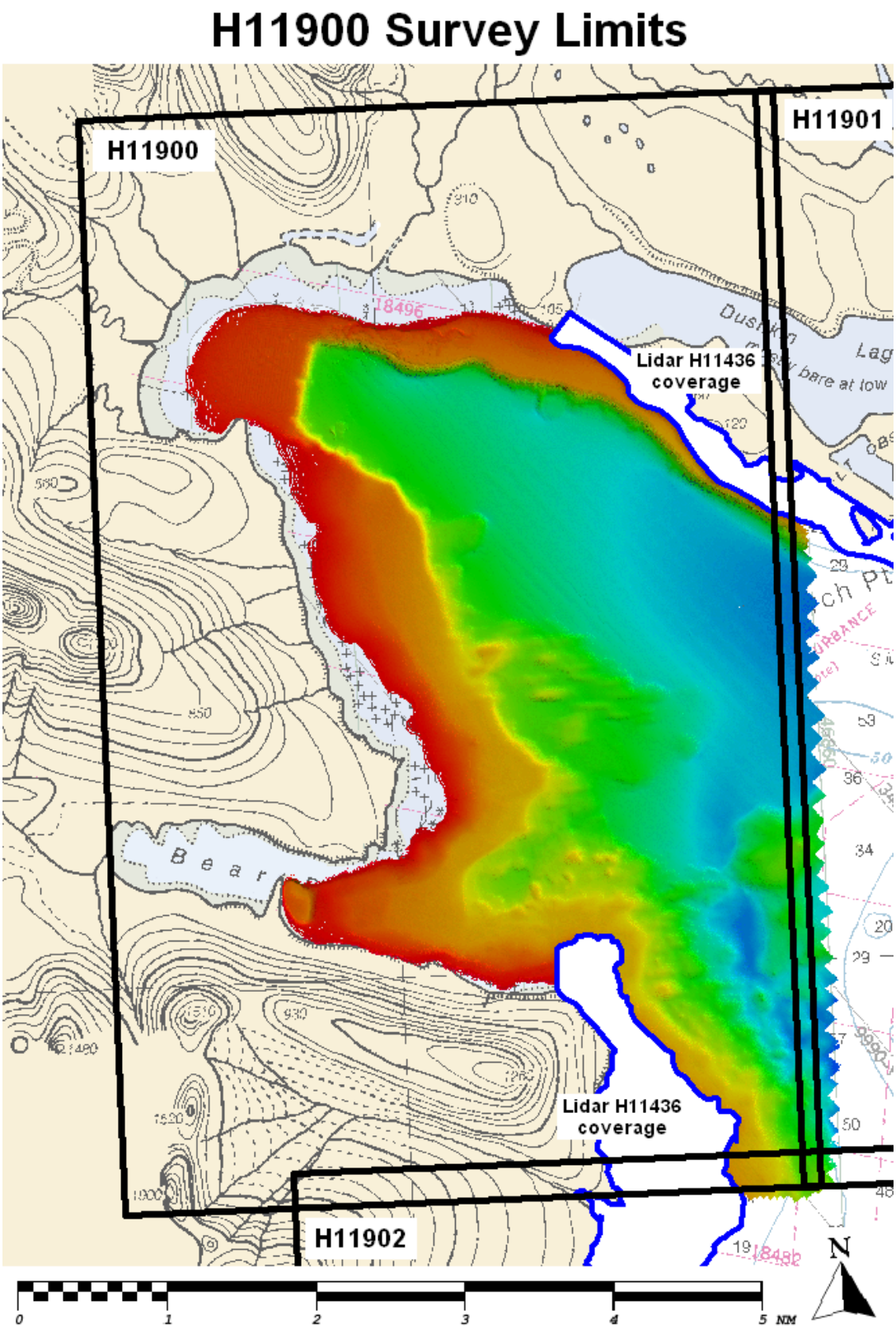


Figure 1. H11900 Survey Limits and mainscheme bathymetry junction with H11901 and H11902 Survey Limits and Lidar coverage (Chart 16549).

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-P184-RA-08 Data Acquisition and Processing Report* (DAPR), submitted under separate cover[1]. 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 (see Table 2).

Hull Number	Name	Acquisition Type
1101	RA-1	Vertical Beam Echosounder
1103	RA-2	Tilted Multibeam Echosounder
1021	RA-3	Multibeam Echosounder
2801	RA-4	Multibeam Echosounder
2802	RA-5	Multibeam Echosounder
1015	RA-6	Multibeam Echosounder
951	RA-9	Bottom Samples

Table 2. Data Acquisition Vessels for H11900.

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

No unusual vessel configurations were used for data acquisition

B2. Quality Control

Crosslines

Multibeam Echosounder (MBES) crosslines totaled 18.32 nautical miles, comprising 5.78% of main scheme MBES hydrography. The mainscheme nadir bathymetry was manually compared to the XL nadir beams in CARIS subset mode and agreed well with typical differences of 0.2 meters, with the largest difference 0.4 meters. All differences are within IHO S-44 standards.[2]

Due to excessive sound velocity error of crossline bathymetry, crosslines were omitted from the submitted BASE surface. However, crossline raw data and HDCS data are included for PHB review.

Junctions

The following contemporary surveys junction with H11901 and H11902 (See Figure 1):

Registry #	Scale	Date	Junction side
H11901	1:10,000	2008	East
H11902	1:10,000	2008	South

CARIS Field Sheets and CUBE surfaces for H11900 were created in conjunction with H11901 and H11902 bathymetry. CUBE surfaces were compared and agreement was excellent with only one discernable offset in the common area.

Survey H11901 line 304_2130 showed a discernable offset of 0.6 meters at the appropriate CUBE depth resolution (see figure 2). This offset was a result of the poor sound velocity affecting the outer beams from line 304_2130.[3]

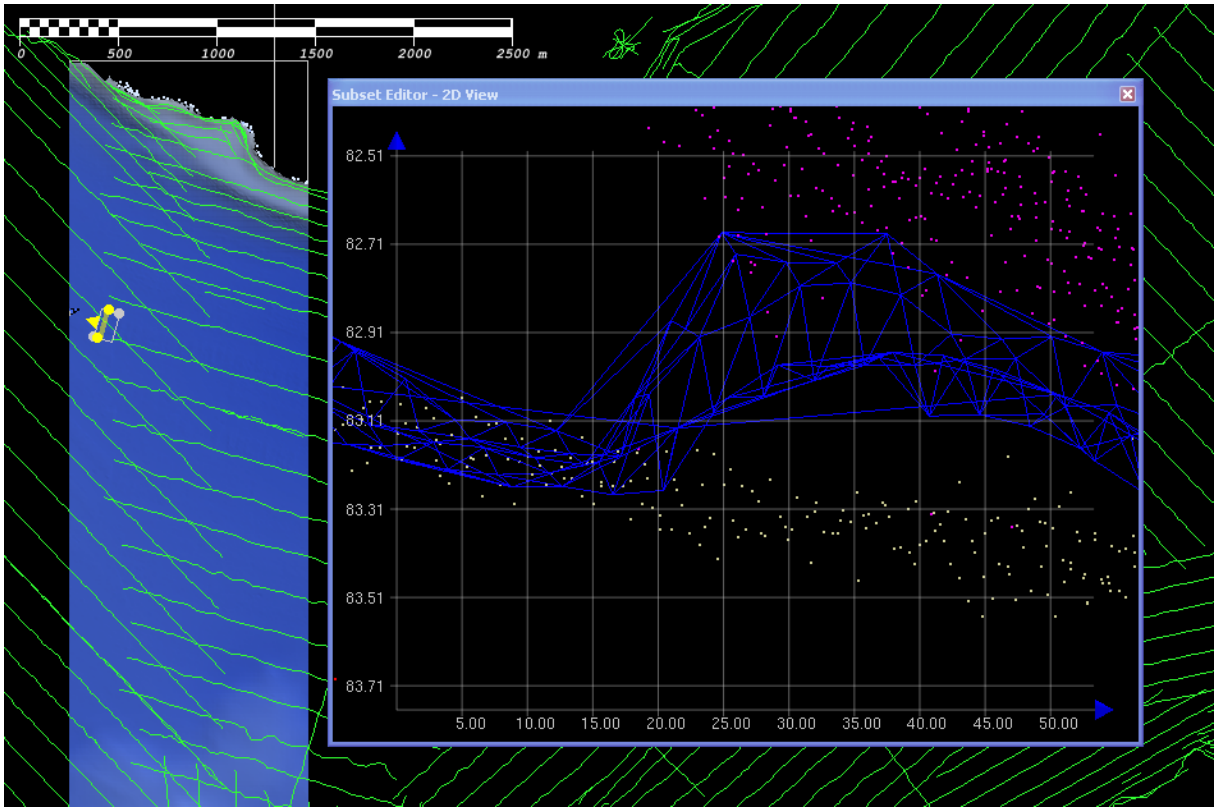


Figure 2. CUBE surface error from poor sound velocity of Survey H11901 line 304_2130.

Data Quality Factors

Sound Speed Artifacts

Due to stream runoff 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 velocity correctors. After correction for sound velocity in HDCS, some lines still exhibited characteristic "frowns" indicative of inaccurate sound velocity corrections. Despite the best efforts of the Hydrographer to conduct sufficient sound velocity casts distributed both spatially and temporally, and to correct for sound velocity errors in post processing, sound velocity errors were still noticeable in several regions, with the most pronounced region at the north end of Volcano Bay (see Figure 3). To compensate, the Hydrographer, where possible, rejected soundings obviously in error on the outer beams.

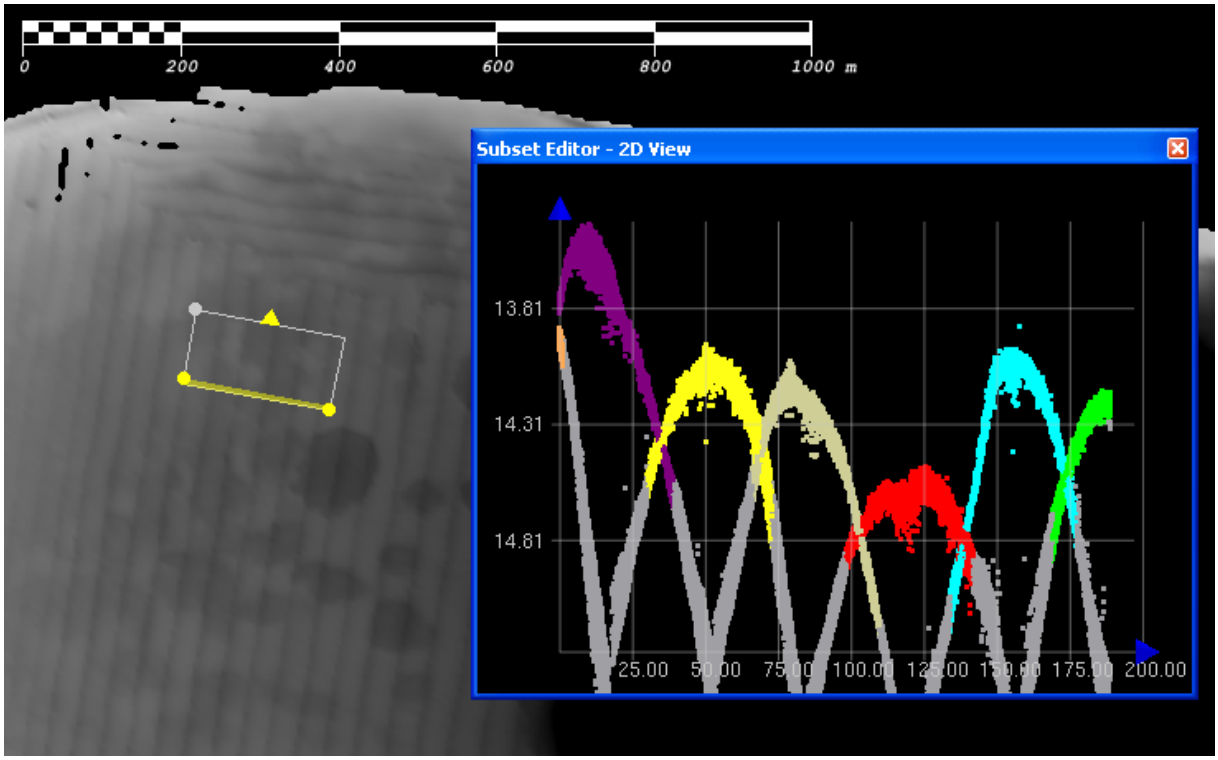


Figure 3. Poor sound velocity resulted in "frowns" in many lines in the northern region of Volcano Bay .

Sound Speed Error, Line 302_1732

A holiday pick up line resulted in poor bathymetry exceeding IHO S-44 depth accuracy standards. On DN218, launch 1021 (RA-3), acquired data to cover an existing holiday (line 302_1732). However, the sound velocity error from the holiday pick up line exhibited a 'smile' characteristic, which contrasted with the 'frowns' of the original surveyed area's sound velocity error. The result is a 'step' of over 1 meter in the CUBE surface at a depth of 61 meters, exceeding IHO standards for depth accuracy (see Figure 4).

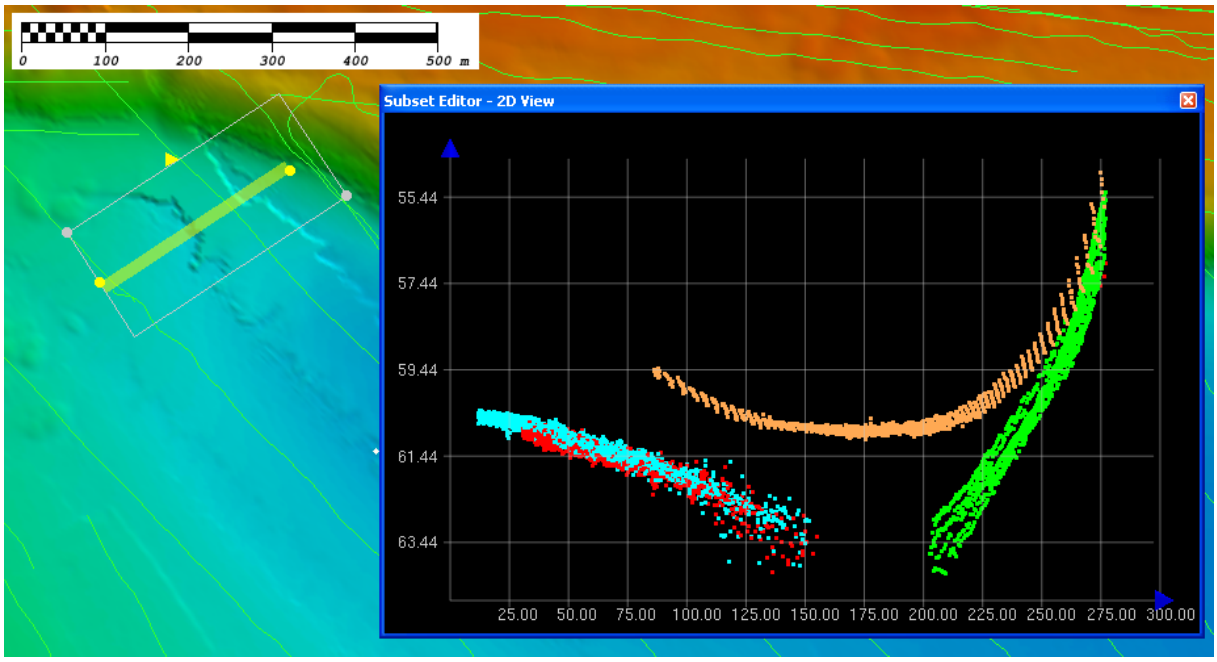


Figure 4. The holiday pick up line (orange) exhibits a 'smile' type sound velocity error, which contrasts with the 'frown' type sound velocity error found in the original bathymetry (adjacent lines). The resulting CUBE surface exceeds IHO depth accuracy standards.

Sound Speed Cast Issue, DN191, 21:45

On July 9, (DN191) the cast aboard Launch 2801 (RA-5) taken at 21:45 UTC time produced curious sound velocity readings near the surface. When applied, these surface readings produced "smiles" to the bathymetry (see Figure 6), which resulted in data exceeding IHO S-44 depth accuracy limits.

It is the hydrographer's opinion that when the cast soaked for two minutes to acclimate the salinity cell to the ambient surface water temperature, that it was soaked too close to the surface and may have been in the path of the engine cooling water exhaust. The result likely biased the salinity cell and resulted in errant readings of the first few meters of descent of the cast.

However, readings were recorded in the .5nv file as the cast traveled upwards to the surface. It was possible to re-establish readings from the 1.03 – 1.87 meter range, the same readings that were missing as the cast descended (see Figure 5).

The hydrographer edited the .svp file, removing the errant values believed to be skewed by the exhaust wash, and replacing the values from the 1.03 – 1.87 depth range. The result removed the "smiles" and produced more accurate bathymetry based on more accurate readings (see figure 6).[4]

Section 2008-191 21:45	
55:13:23	-161:59:26
0.88	1464.68
0.99	1465.57
2.90	1480.28
3.98	1480.16
5.02	1479.01
6.15	1478.22
7.00	1478.10
7.54	1478.18

Section 2008-191 21:45	
55:13:23	-161:59:26
1.03	1477.85
1.44	1479.31
1.87	1479.31
2.90	1480.28
3.98	1480.16
5.02	1479.01
6.15	1478.22
7.00	1478.10
7.54	1478.18

Figure 5. Surface and sound velocity readings of cast 21:45, day 191 from Launch 2801. Left is the original values of the .svp file; at depths 0.88 and 0.99 it is believed exhaust wash skewed the results. These values were removed. At right are the ascending values taken from the .5nv file to fill the 1.03 – 1.87 gap in data. These values were added.

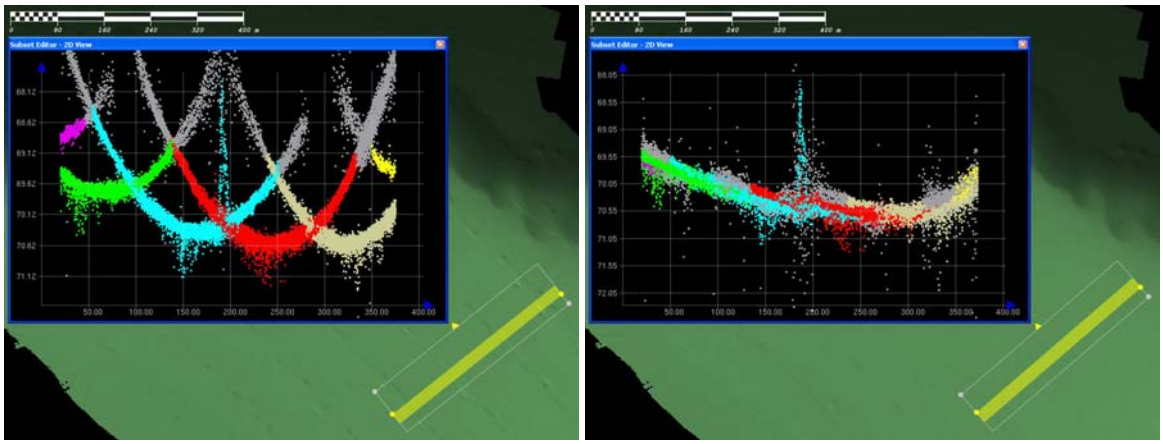


Figure 6. Applying the original .svp file produced egregious 'smiles' that exceeded IHO S-44 depth accuracy limits (left). Re-applying the 'fixed' cast (right), produced results within IHO S-44 standards.

Holidays

Lidar Junction Holiday

Holidays resulted from the delivery of conflicting lidar junction lines. Data planning and analysis were conducted using the Junction survey MapInfo table and not the lidar extent table delivered to the field. The discrepancy was not noted until after the field unit had left the area. (see Figure 7).[5]

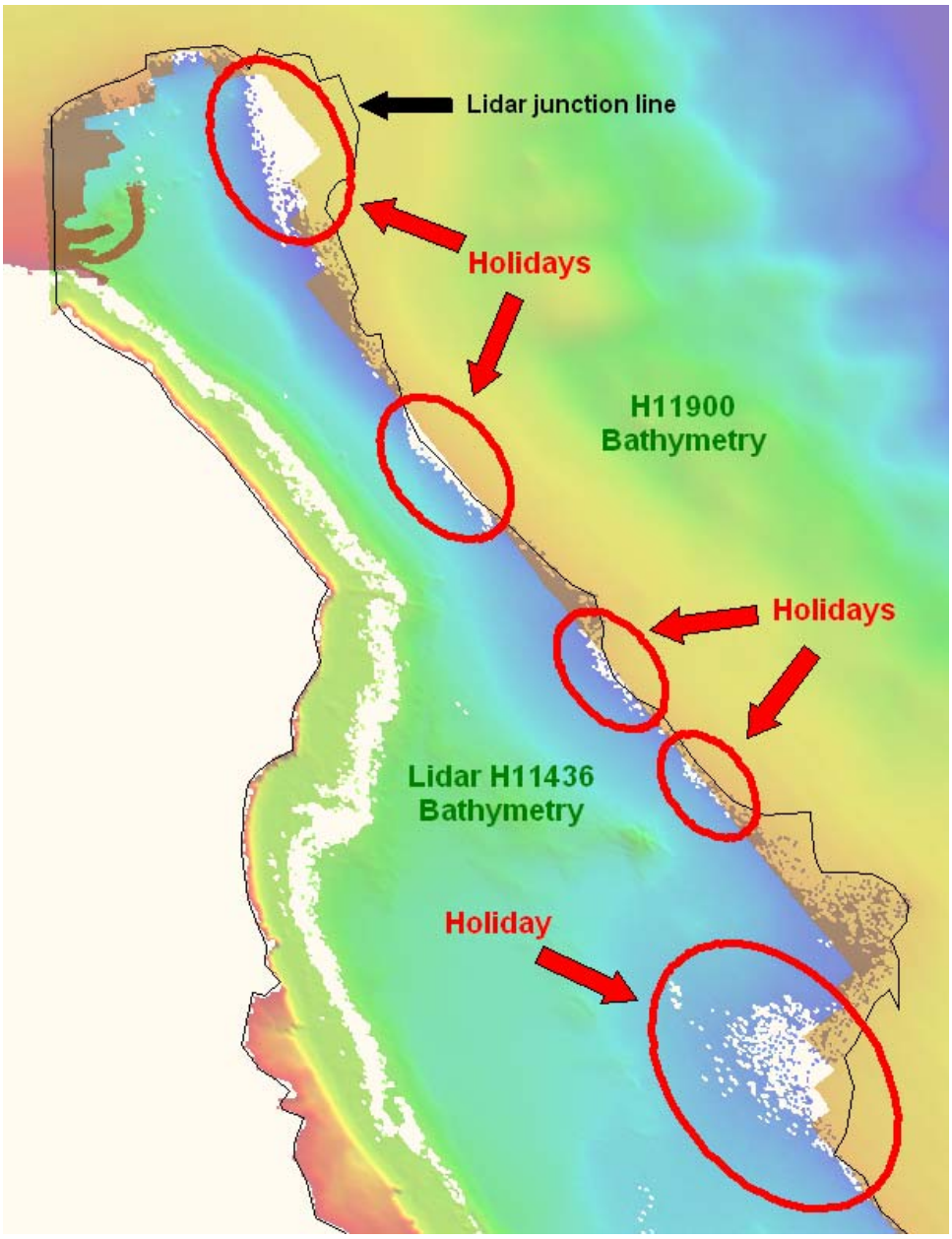


Figure 7. As a result of the discrepancy between the provided Lidar junction line and the actual Lidar bathymetry, holidays persisted due to the presumption of accuracy of the Lidar junction line.

Holidays Resulting From Deleted Outer Beams Due To Poor Sound Velocity

Several insignificant holidays exist seaward of the 8 meter curve in the north western area of Volcano Bay (see Figure 8). The gaps in data were a result of cleaning poor sound velocity from outer beams in the area. The outer beam data was examined prior to cleaning and no features were found. The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.[6]

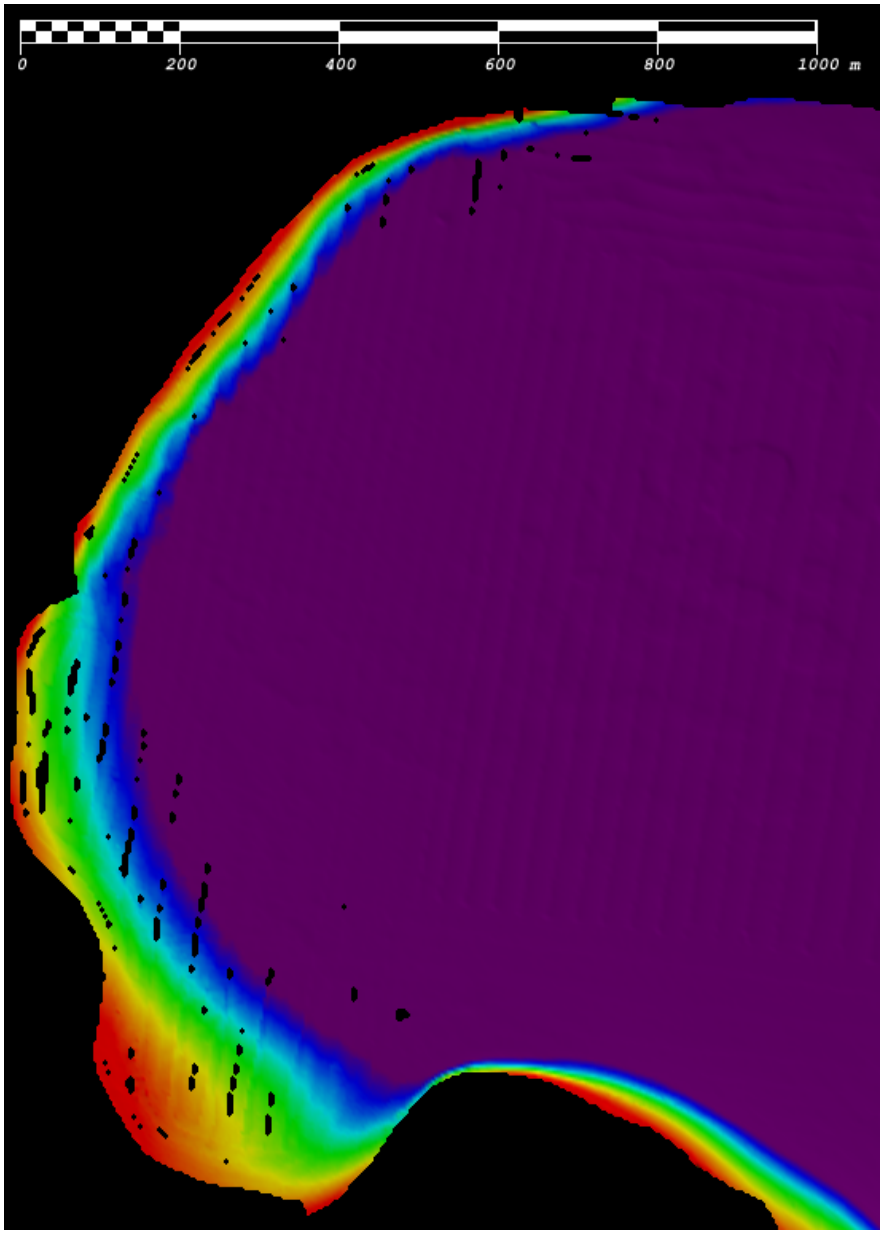


Figure 8. Holidays are within the color purple. All other gaps in data are within the 8 meter curve and 25 meter line spacing.

Holiday Due To Removal Of Crossline Data

A holiday, at the north end of Volcano Bay in 68 meters of depth, was created due to the removal of crossline data (see Figure 9). All crosslines were removed from inclusion for the creation of CUBE surfaces for H11900. The majority of all crossline outer beam data exhibited poor sound velocity that, when applied to the creation of CUBE surfaces, yielded results exceeding IHO S-44 depth accuracy limits. The outer beam data of the crossline was examined prior to cleaning and no features were found.[7]

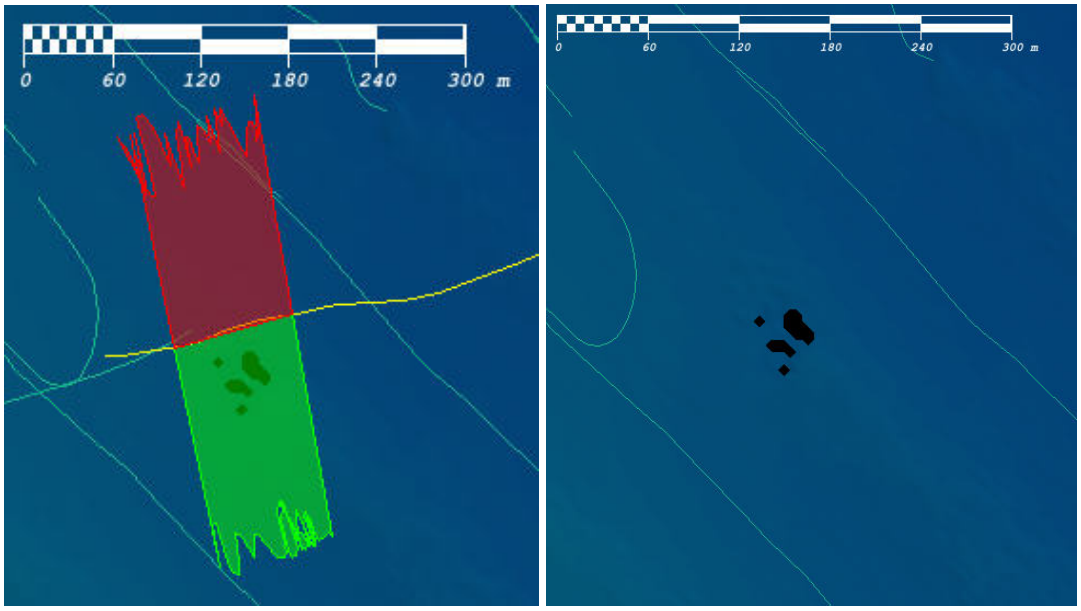


Figure 9. Left, crossline data fills a holiday that (right) exists because crossline data was not included in the creation of the CUBE surface.

DN177 1101 Data Removal

Due to sound velocity error exceeding IHO standards, DN177 of launch 1101 (RA-1) tilted multibeam data was removed from the survey and deleted from the HDCS data. The removal did not cause any holidays because of abundant multibeam coverage from other vessels over the same area.

B3. Data Reduction

Data reduction procedures for survey H11900 conform to those detailed in the *OPR-P184-RA-08 DAPR.*

B4. Data Representation

Many BASE surfaces were used in processing H11826. The submission Field Sheet and BASE Surface structure are shown in Figures 11 and 12 (see Table 3). 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.

Depth Range (m)	Resolution (m)	Cube Parameters
0-21.5	1	Shallow
18.5-52	2	Deep
46-115	4	Deep

Table 3. Depth range, BASE surface, and CUBE parameters for sheet H11900.

All field sheets were created with the all eastings and northings a multiple of 16m. For additional information on an individual field sheet's extents, see the associated .fsh file in the digital data.

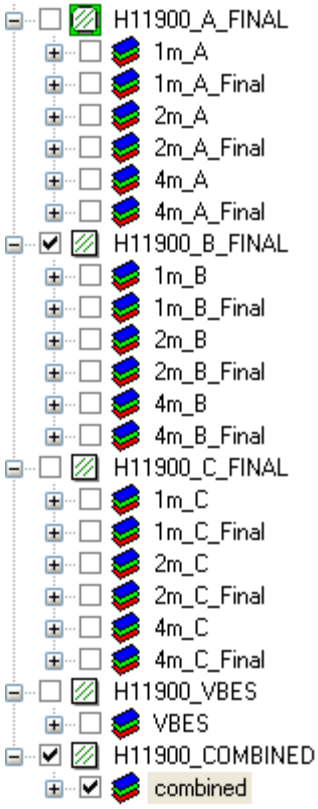


Figure 10: Field sheets and BASE surfaces submitted with H11900.

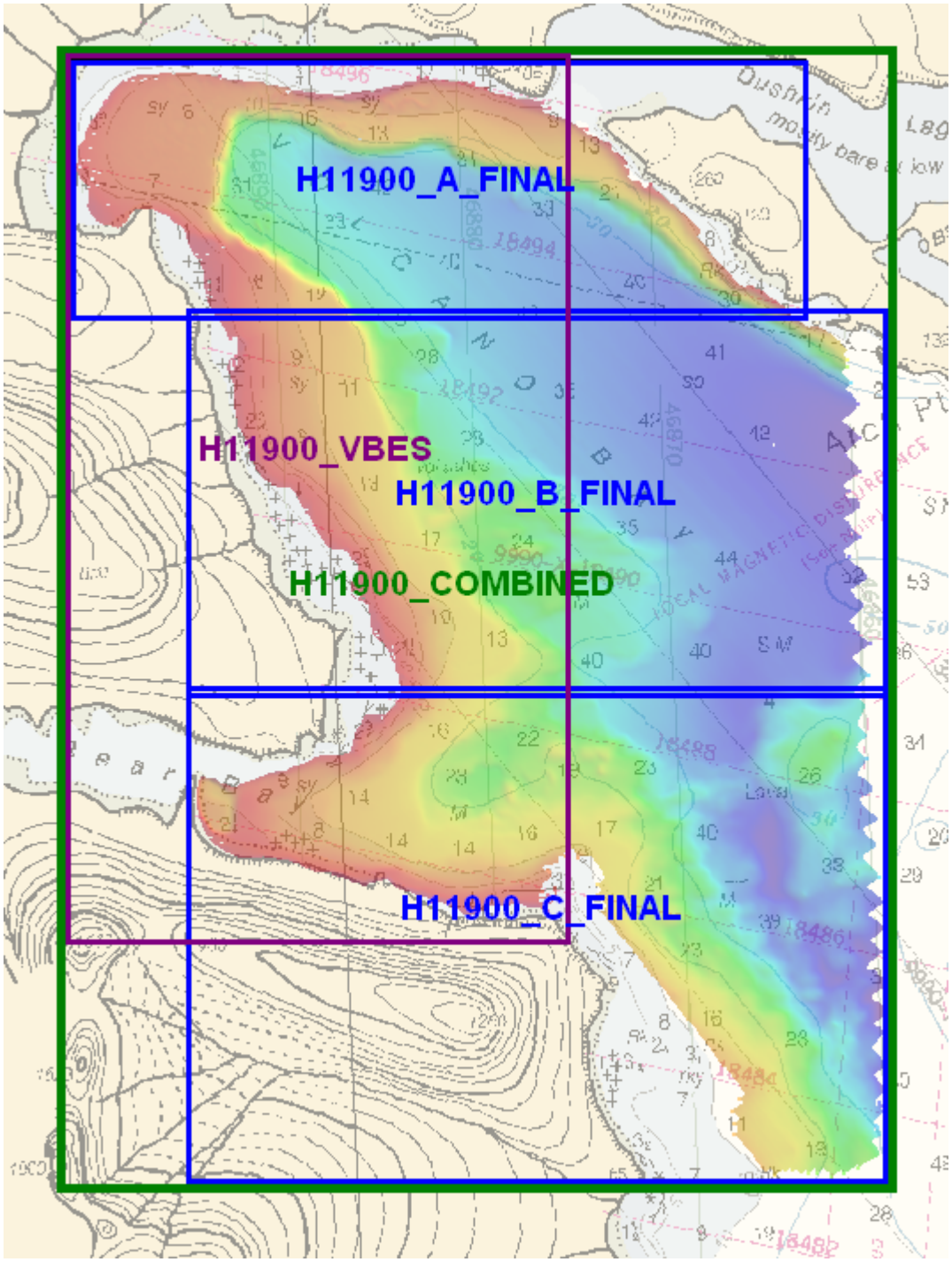


Figure 11: Layout of field sheet and BASE surfaces for H11900, overlaid on NOAA Chart 16549.

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-P184-RA-08 did not require static GPS observations or other horizontal control work, and all tide corrections were generated from CO-OPS maintained tide stations. Thus, no Horizontal and Vertical Control Report will be submitted.

Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). The northwestern extent of survey H11900 fell within UTM zone 3, and as such, data was converted and processed with UTM zone 3. Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacon utilized for this survey is given in Table 4.

Location	Frequency	Operator	Distance	Priority
Cold Bay	289 kHz	USCG	23.5nm	Primary

Table 4: Differential Corrector Sources for H11901.

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 Sand Point, AK (945-9450) served as control for datum determination and as the primary source for water level reducers for survey H11900.

No subordinate water level stations were required.

All data were reduced to MLLW using final approved water levels from station King Cove, AK (945-9881) using the tide file 9459881.tid and final time and height correctors using the zone corrector file P184RA2008CORP.zdf

The request for Final Approved Water Levels for H11900 was submitted to CO-OPS on August 13, 2008 and the Final Tide Note was received on August 20, 2008. This documentation is included in Appendix IV.[8]

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

Survey H11900 was compared with the following chart:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
16549	1:80,000	15th Ed, July 2003	05/13/2008

Table 5: Charts compared with H11900

The five rocks near the west entrance of Dushkin Lagoon were not visually seen during shoreline verification. The rocks were shoreward of the inshore limit as per project instructions, therefore neither VBES or MBES techniques were feasible (see Figure 12). Because they could not be disproven, they were retained in the field verified layer.[9]

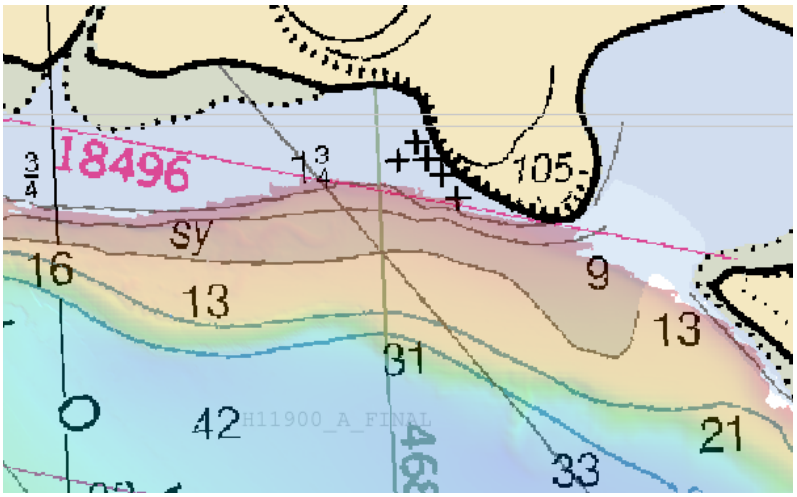


Figure 12: The five rocks near the western entrance of Dushkin Lagoon were not seen during shoreline verification.

Numerous rocks charted near the western edge of Volcano Bay were actually not rocks at all; they were within the limits of a ledge. The ledge feature was created from observations in the field, and included in the H11900_field_verified.hob file.[10] (see Figure 13 and Figure 14). Some of the rocks fell between bathymetry and the ledge; those rocks were included in the field verified layer because they could not be disproven.[11]

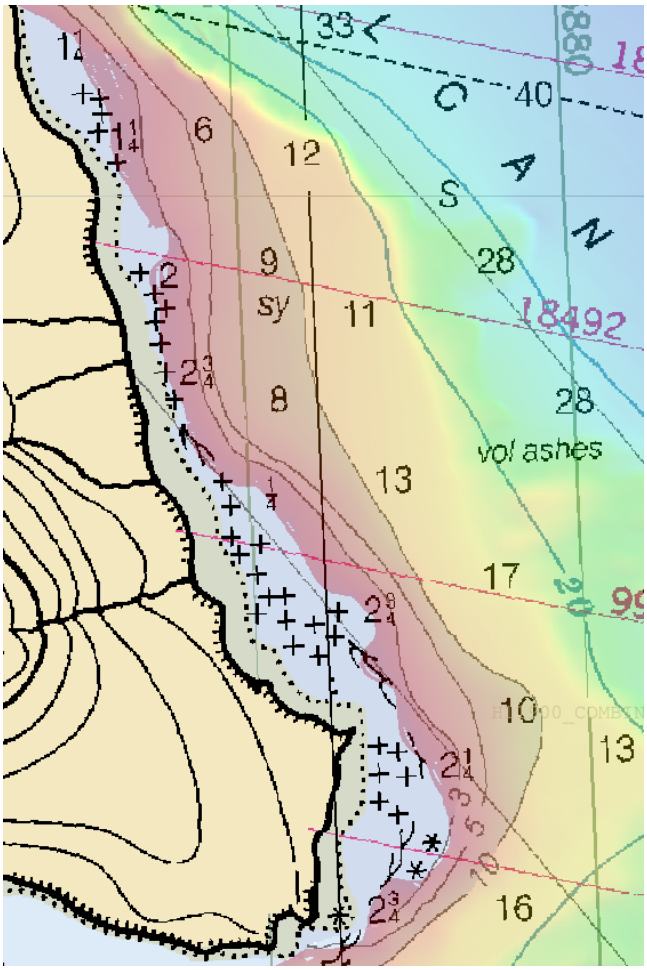


Figure 13: Numerous rocks on the western edge of Volcano bay fell within the limits of a ledge.

Figure 14: Three views of the ledge feature along the western edge of Volcano Bay, extending from (top) near the entrance of Bear Bay to (middle) the western shore of Volcano Bay, to (bottom) the northwest end of Volcano Bay.

The shoreline charted at the south western entrance to Volcano Bay is not accurate (see Figure 15). Bathymetry from survey H11900 pushes shoreward beyond the charted zero meter curve, as well as, in three instances, beyond Mean High Water.[12]

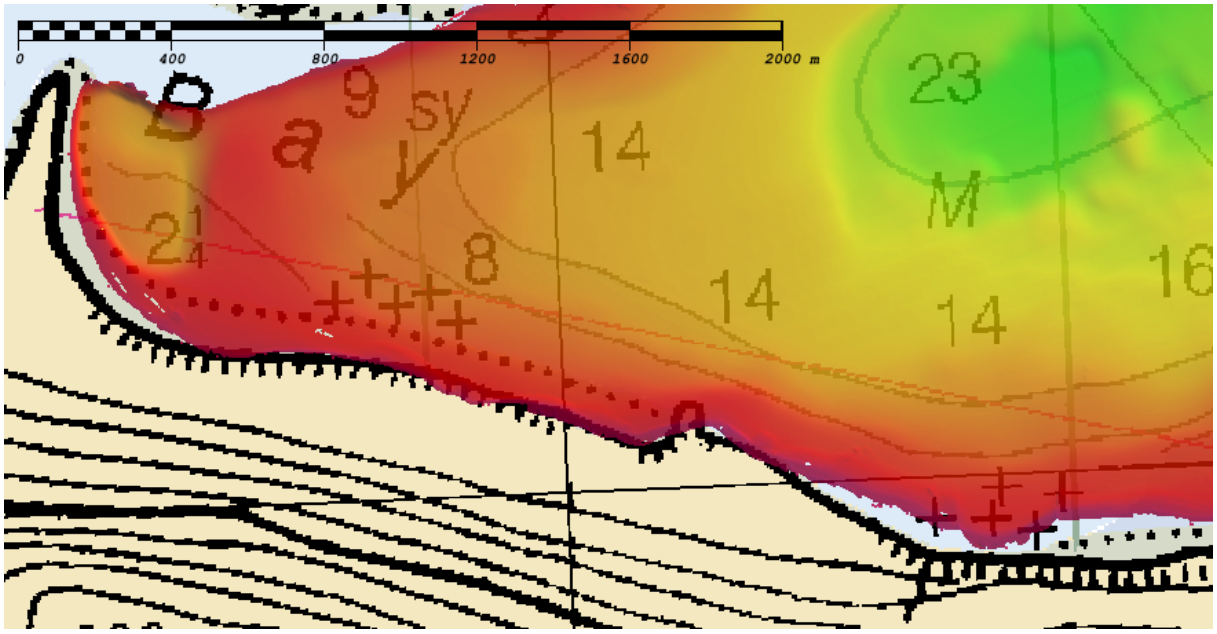


Figure 15: Layout of field sheet and BASE surfaces for H11900, overlaid on NOAA Chart 16549.

Southeast of the entrance to Dushkin Lagoon, near the far northeast limit of survey H11900, two charted (16549) islets were not detected; the hydrographer recommends deleting them from the chart (see figure 16). The composite source layer shows land areas inshore of the islets. Recommend charting land areas as per lidar data.[13]

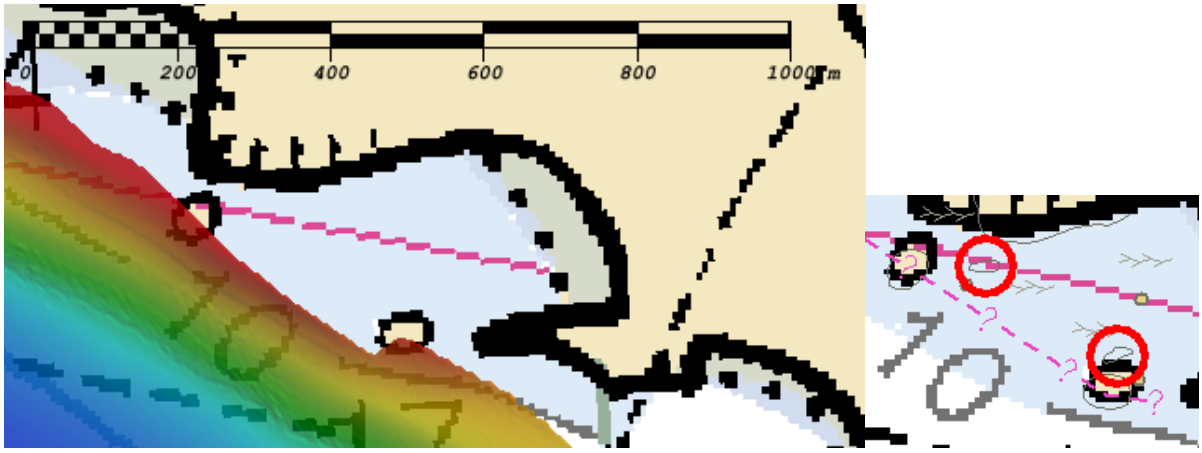


Figure 16: Two islets were not detected (left); the hydrographer recommends deleting and replacing the islet with the Lidar sourced land areas (right, circled red) shown in the composite source.

Located near the southern entrance to Bear Bay, five charted rocks exhibited differences between chart, multibeam bathymetry and field verification.[14]

There were two charted rocks disproved in multibeam bathymetry near the southern entrance of Bear Bay (see figure 18). These rocks were removed to the deleted source layer.[15]

One charted rock near the southern entrance of Bear Bay was revealed to not be a rock at all; it is really a defining boundary to a rocky surface (see figure 19).

Two charted rocks were not disproven in multibeam bathymetry nor by shoreline verification (see figure 20). Two large boulders were seen in the vicinity, but were too near to shore to be considered navigationally significant (see figure 21).[16]

In addition, a rocky feature one meter tall was identified near the five charted rocks discussed above (see figure 17). The feature is within a rocky area on a slope. A rocky area, encompassing this feature, was added to the field verified layer.[17]

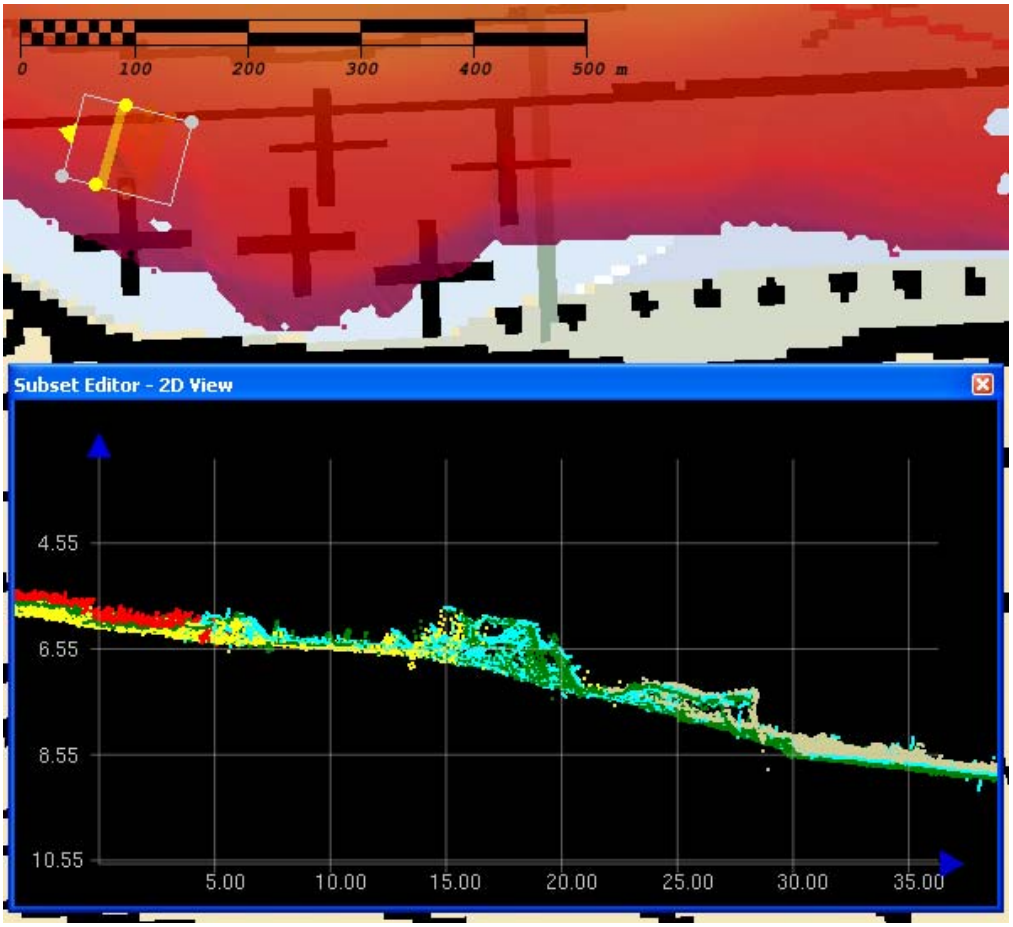


Figure 17:A pronounced rock, one meter in height, amongst a rocky area.

Figure 18: Two rocks (circled) were disproved by multibeam data.

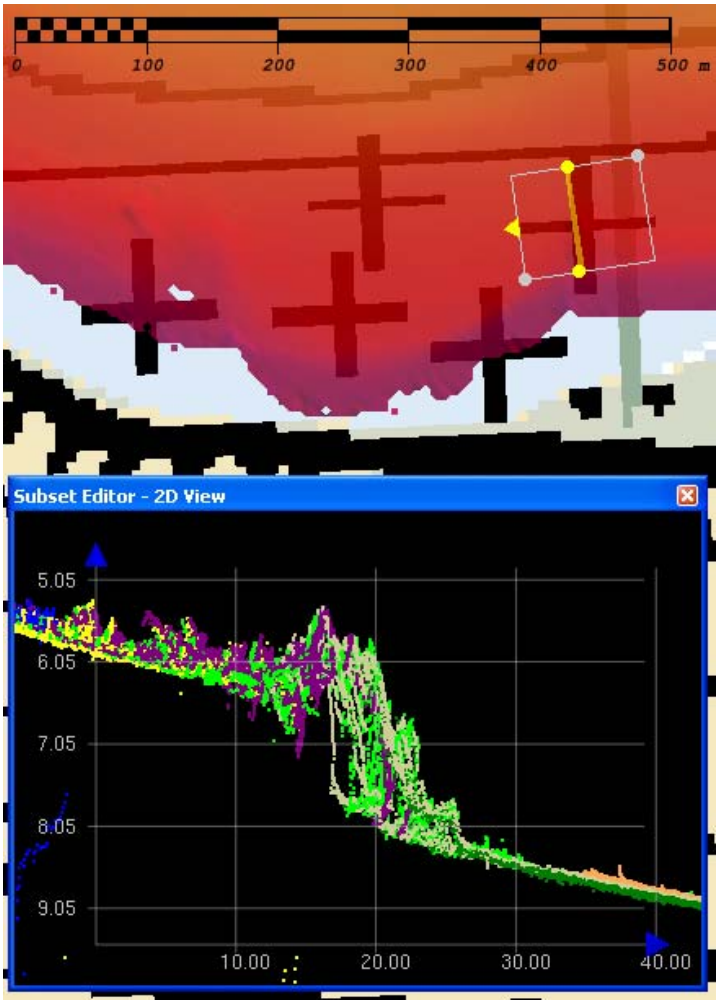


Figure 19: A charted rock (opened in subset editor) reveals that the charted rock is a defining boundary of a rocky surface.

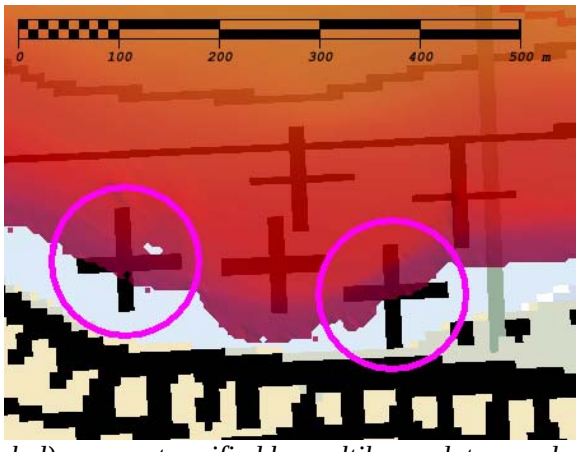


Figure 20: Two rocks (circled) were not verified by multibeam data nor during shoreline verification. Three rocks (not circled) were disproven by multibeam coverage.

Figure 21: Boulders seen during shoreline verification that may be the charted rocks noted in Figure 20.

Soundings from survey H11900 were generally within one to two fathoms of depths on chart 16549. In areas where the charted depth and soundings were greater than 2 fathoms, there was no noticeable trend in shoaling or deepening (see Figure 22). The entrance to Bear Bay exhibited the most pronounced differences, with variances of up to 9 fathoms (see Figure 23).

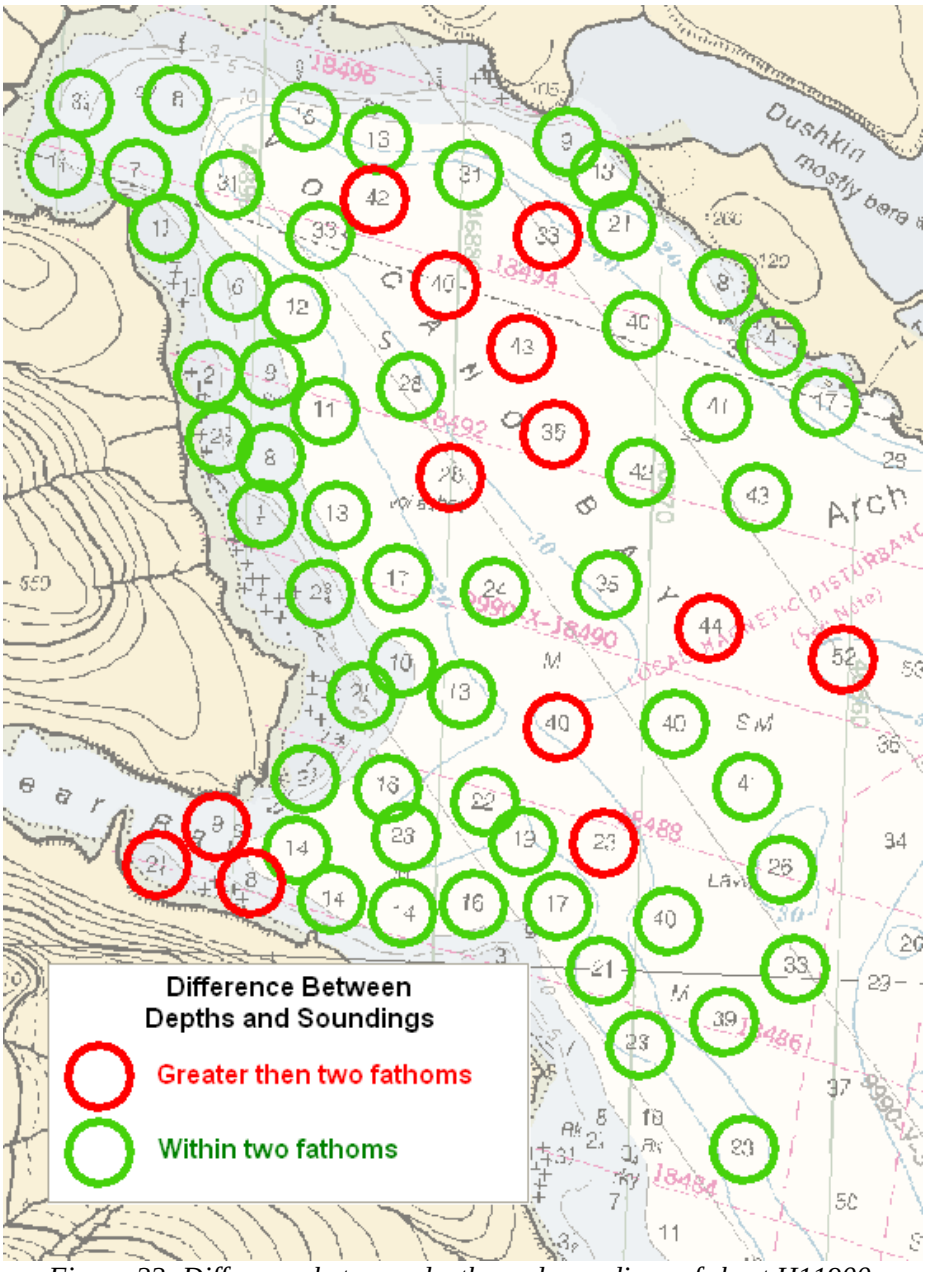


Figure 22: Difference between depths and soundings of sheet H11900.

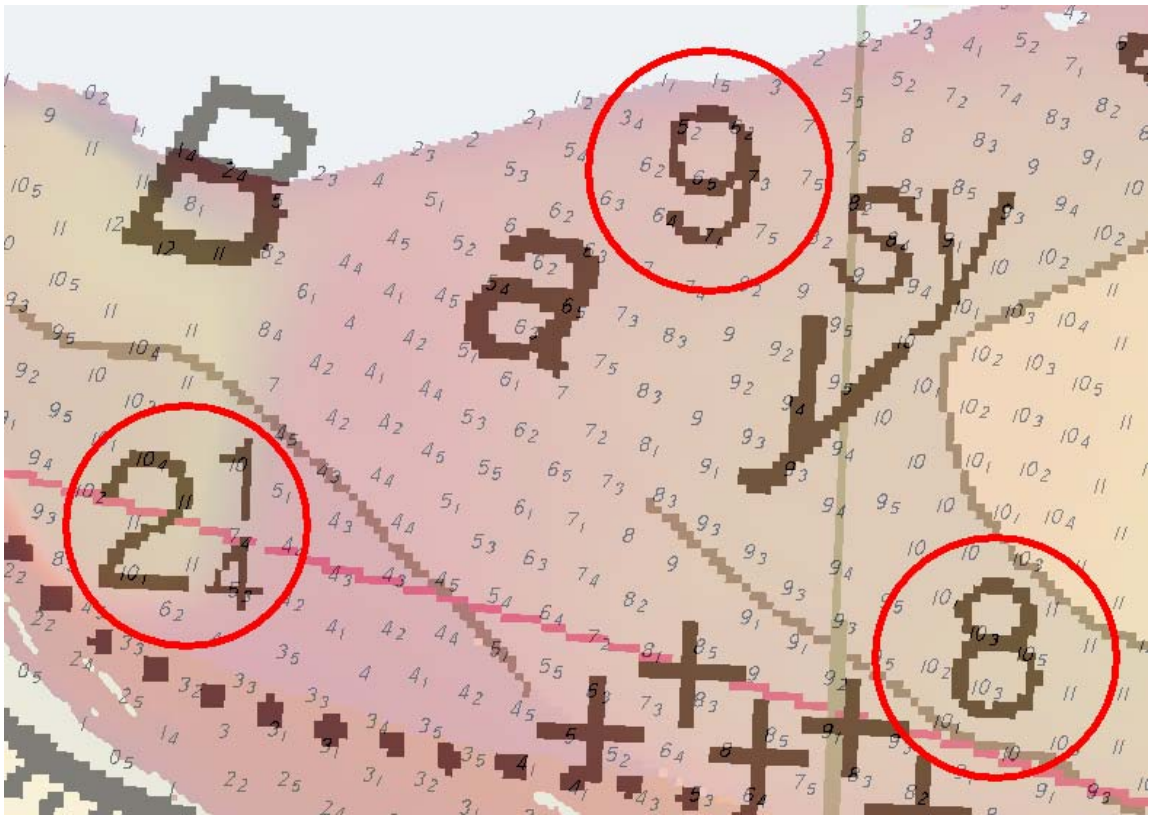


Figure 23: The entrance to Bear Bay exhibits noticeable difference between charted depths and soundings. The 2 ¼ depth (left) is nearly 9 fathoms shoaler then MBES bathymetry.

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

D.1.b. Dangers to Navigation

No dangers to navigation (DTONs) were found in survey H11900.

D.1.c. Other Features

Automated Wreck and Obstruction Information System (AWOIS) Investigations

One AWOIS Maritime Boundary Claim item (53,670) is located within the survey limits of H11900. During shoreline investigation the maritime boundary could not be safely seen or approached due to rocks in the area.[19]

Additional Items

No additional charted items were investigated and no other features were located on survey H11900.

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 .HOB files containing features from LIDAR survey H11436 selected for further investigation. These features were provided as H11436_LI_Investigations.hob.

In addition, a composite source file was provided using data from the latest ENCs as well as prior survey features. Photogrammetric survey project GC10645 has been adequately applied to ENCs used in the composite source file. This source shoreline was used for orientation purposes in Hypack and Notebook and on printed boat sheets utilized for investigation of the LIDAR items discussed above.

Shoreline Verification

Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables and FPM sections 6.1 and 6.2.

All shoreline data is submitted in Caris Notebook .hob files. The session H11900_NTBK contains the following:

HOB File	Purpose and Contents
H11900_original_comp_source.hob	Original source data (0_1P184R.000) clipped to H11900 with all lidar investigation items added.
H11900_field_verified.hob	Field verified source features and shoreline, including edits and updates and DPs taken on bottom samples, new features or to update source features are also included in this HOB file.
H11900_deleted.hob	Items removed from the original comp source.

Table 6. List and Description of Notebook HOB files.

Traditional "limited shoreline verification" was not required for some of this survey, since a portion of the nearshore area was covered by junction LIDAR survey H11436. The following field procedures were followed:

- The H11436 LIDAR item assigned for further investigation was addressed by visual technique as appropriate and feasible, near predicted low water. Note that this feature is located in an area unsafe to approach and/or is considered insignificant to navigation, and was not further investigated.

All shoreline data is submitted in Caris Notebook .hob files.

Source Shoreline Changes and New Features

No new features were found during this survey; all shoreline modifications are discussed above in the chart comparison section.

Recommendations

The Hydrographer recommends that the shoreline as depicted in the Notebook .HOB files supersede and complement shoreline information compiled on the CFF and charts as described above.[20]

D.2.c. Aids to Navigation

There are no Aids to Navigation within the limits of H11900.

D.2.d. Overhead Features

There are no overhead features within the limits of survey H11900.[21]

D.2.e. Submarine Cables and Pipelines

A charted (16549) cable area extends through the southwest area of H11900, however no evidence of submerged cables was apparent in the data, recommend retaining as charted.[22]

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H11900, and none were observed to be operating in the area.[23]

D.2.g. Bottom Samples

Eight (8) bottom samples were collected for survey H11900 and are included in the H11900_field_verified.hob file.[24]

D.2.h. Other Findings

A magnetic disturbance was observed in the vicinity of Arch Point near Volcano Bay. Although differences of up to 5 degrees from the predicted variation were noted, precise magnetic measurements were not conducted around Arch Point. The hydrographer recommends retaining the local magnetic disturbance and associated note as charted.[25]

E. APPROVAL

As Chief of Party, field operations for hydrographic survey H11900 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2008 edition), Field Procedures Manual (May 2008 edition), Standing and Letter Instructions, and all HSD Technical Directives issued through August 2008. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

Title	Date Sent	Office
Data Acquisition and Processing Report for OPR-O-RA-08	Nov. 26, 2008	N/CS34
Coast Pilot Report for OPR- P184-RA-08	TBD	N/CS26

Approved and Forwarded:

CAPT Donald W. Haines, NOAA
2009.02.09 09:10:14 -08'00'

Captain Donald W. Haines, NOAA
Commanding Officer

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

Survey Sheet Manager:

Ian Colvert
I am the author of this document
2009.02.04 10:22:05 -08'00'

Ian Colvert
Survey Technician, NOAA Ship *Rainier*

Chief Survey Technician:

James B Jacobson
I have reviewed this document
2009.02.04 10:24:35 -08'00'

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

Field Operations Officer:

I have reviewed this document
2009.02.06 12:07:32 -08'00'

Lieutenant Charles Yoos, NOAA
Field Operations Officer

Revisions and Corrections During Office Processing and Certification

[1] DAPR filed with project records.
[2] Concur.
[3] Only data from H11900 was compiled in this region of overlap between H11900 and H11901.
[4] Despite minor deviations from data meeting IHO specifications all data are deemed acceptable and should be used to supersede prior charted data.
[5] Given the nature of the sloping and non-rocky seafloor and examining the outer beams of the backscatter from the multibeam it was not necessary to represent these holidays in the H11900_CS.000.
[6] Concur with clarification, small holidays not represented in H11900_CS.000.
[7] Holiday not represented in H11900_CS.000.
[8] Tide note appended to this report.
[9] Concur, blue notes have been added to H11900_CS.000 recommending these rocks be retained as charted.
[10] Ledge is included in H11900_CS.000.
[11] The rocks have been blue noted to be retained.
[12] Several blue notes have been created advising that intertidal zones be modified.
[13] Concur with clarification; updated GC shoreline was applied to the new edition of the chart. Islands are correctly charted on the new 16th edition of the chart.
[14] The rocks disproved by multibeam have been flagged for removal via bluenotes.
[15] The rocks disproved by multibeam have been flagged for removal via bluenotes.
[16] Rocks flagged to be retained via bluenotes.
[17] Rocky seabed areas delineated by the field were determined to be to inappropriately small for the scale of chart 16549, regardless all shoal depths have been selected for charting, and some portrayed as rocks.
[18] Concur.
[19] Retain status and record of AWOIS item 53670.
[20] Concur with clarification. The aforementioned data was used in the compilation of H11900_CS.000 and some modifications were made to adequately update chart 16549. Chart features as delivered in H11900_CS.000.
[21] Concur.
[22] Concur.
[23] Concur.
[24] All eight bottom samples are included in H11900_CS.
[25] Concur.

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 15, 2008

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P184-RA-2008
HYDROGRAPHIC SHEET: H11900

LOCALITY: Volcano Bay, Pavlof Islands, AK
TIME PERIOD: June 25 - August 8, 2008

TIDE STATION USED: 945-9881 King Cove, AK
Lat. 55° 03.6'N Long. 162° 19.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.876 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-P184-RA-2008, H11900, during the time period between June 25 and August 8, 2008.

Please use the zoning file "P184RA2008CORP" submitted with the project instructions for Pavlof Islands, AK. Zones SWA218 & SWA205 are the applicable zones for H11900.

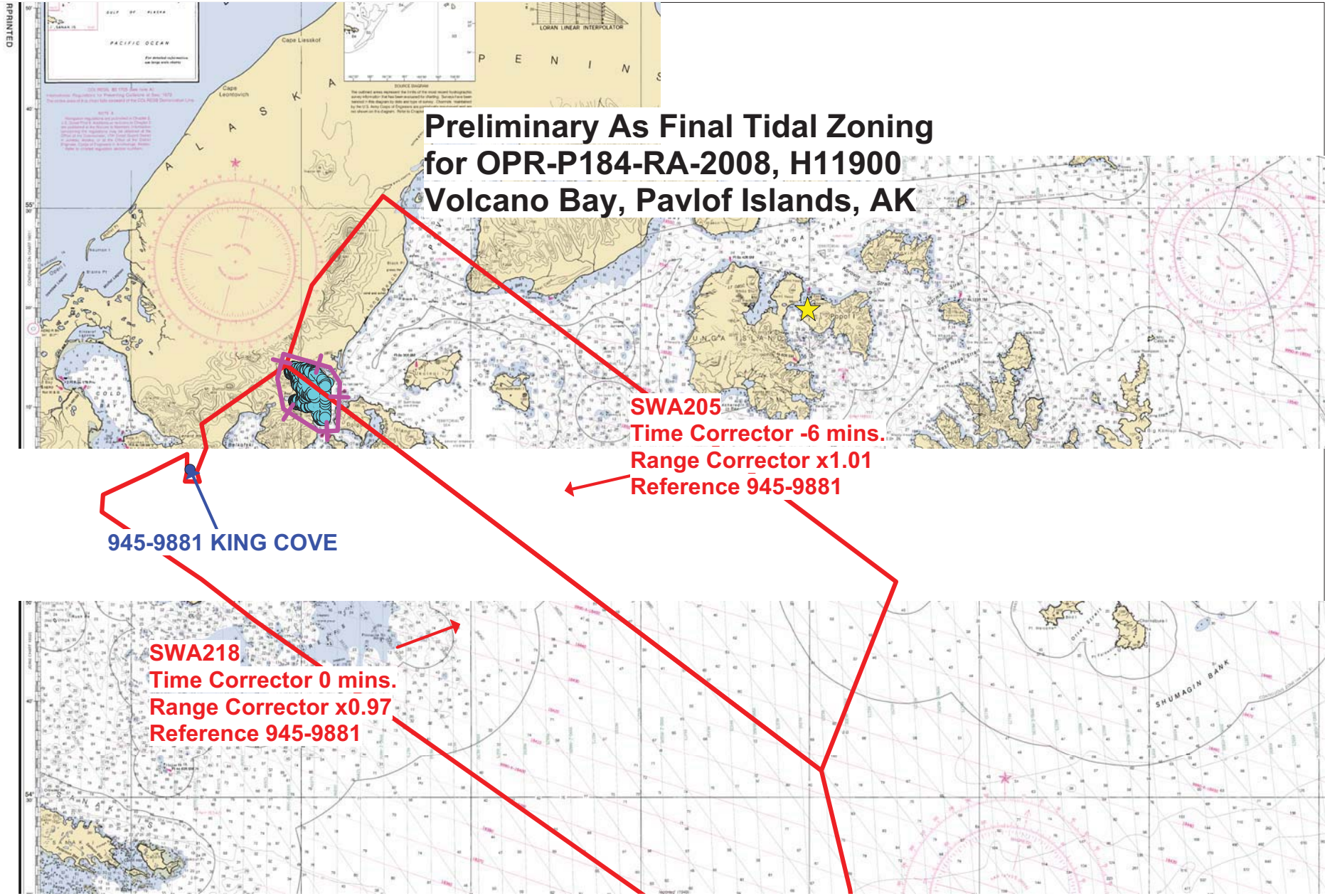
Refer to attachments for zoning information.

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

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2008.06.30 15:49:33 -04'00'

CHIEF, PRODUCT AND SERVICES DIVISION


Preliminary As Final Tidal Zoning
for OPR-P184-RA-2008, H11900
Volcano Bay, Pavlof Islands, AK
SWA205
Time Corrector -6 mins.
Range Corrector x1.01
Reference 945-9881
945-9881 KING COVE
SWA218
Time Corrector 0 mins.
Range Corrector x0.97
Reference 945-9881

H11900 HCell Report

Peter Holmberg, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H11900 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 H11900 were compiled to the largest scale raster chart shown below:

Chart	Scale	Edition	Edition Date	NTM Date
16549	1:80,000	16th	03/01/2010	05/01/2010

The following ENCs were also used during compilation:

Chart	Scale
US4AK55M	1:80,000

3. Soundings

In CARIS BASE Editor a survey-scale sounding (SOUNDG) feature object layer was built from a 4-meter Combined Surface from multibeam and singlebeam data from H11900 and a 3-meter Surface from lidar data from H11436. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	100	5

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

4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the *_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 16549	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 H11900_SS.000
0	0.000	0.000	0.000	0
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.517	10.125	10
20	36.576	37.9476	20.750	20
30	54.864	56.236	30.750	30

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 H11900:

M_QUAL

The Meta area object was constructed on the basis of the limits of the hydrography. H11900 contains three separate M_QUAL objects. One large area depicting data sourced from H11900 and two smaller areas depicting data sourced from lidar survey H11436, see figure 1 from H11900 Descriptive Report.

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-Notes to the MCD chart Compiler
DEPCNT	Zero contour
M_QUAL	Data quality Meta object
SBDARE	bottom samples and ledge
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features
WEDKLP	New and retained kelp areas

The *_SS HCell contains the following Objects:

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

8. Spatial Framework

8.1 Coordinate System

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

8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

9. Data Processing Notes

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

10. QA/QC and ENC Validation Checks

H11900 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

H11900_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:80,000
H11900 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000
H11900 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H11900 _outline.gml	Survey outline
H11900 _outline.xsd	Survey outline

11.2 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, 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:

Peter Holmberg
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6843
Peter.Holmberg@noaa.gov

APPROVAL SHEET
H11900

Initial Approvals:

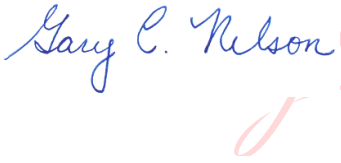
The survey evaluation and verification has been conducted according to branch processing procedures and the HCell compiled per the latest OCS HCell Specifications.

Digitally signed by Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2010.06.14 11:09:32 -07'00'

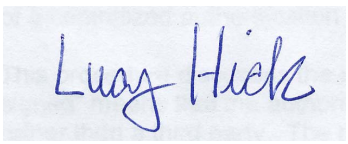
The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or disproval of charted data within the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

Digitally signed by Kurt Brown
Date: 2010.06.14 11:18:30 -07'00'

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.



Gary C. Nelson
2010.06.14
11:16:12 -07'00'



Lucy Hick
AWOIS & SURF Check Complete
2010.06.17 16:56:17 -04'00'