H12080

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. RA-40-03-09

Registry No. H12080

LOCALITY

State Alaska

General Locality Pavlof Islands

Sublocality Vicinity of Poperechnoi Island

2009

CHIEF OF PARTY

Captain Donald W. Haines, NOAA

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DATE

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

REGISTRY No

HYDROGRAPHIC TITLE SHEET

H12080

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-40-03-09

State: **Alaska**

General Locality: **Pavlof Islands**

Sub-Locality: **Vicinity of Poperechnoi**

Scale: **1:40,000** Date of Survey: **June 17, 2009 - July 31, 2009**

Instructions dated: **5/4/2009** Project No.: **OPR-P184-RA-09**

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

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

Surveyed by: **RAINIER Personnel**

Soundings by: **Reson SeaBat 7125, Tilted Reson SeaBat 8125, Knudsen 320M**

SAR by: **Fernando Ortiz** Compilation by: **Katie Reser**

Soundings compiled in: **Fathoms**

REMARKS: **All times are UTC. UTM Zone 4N.**

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.

Revisions and end notes in red were generated during office processing.

Page numbering may be interrupted or non sequential.

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

Descriptive Report to Accompany Hydrographic Survey H12080

Project OPR-P184-RA-09
Pavlof Islands, Alaska
Vicinity of Poperechnoi Island
Scale 1:40,000
June – July, 2009
NOAA Ship *Rainier* (s221)
Chief of Party: Captain Donald W. Haines, NOAA

A. AREA SURVEYED

This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-P184-RA-09 dated May 4, 2009 and all other applicable direction[1], with the exception of deviations noted in this report. The survey area is Pavlof Islands, Vicinity of Poperechnoi Island, Alaska. This survey corresponds to sheet "E" in the sheet layout provided with the Project Instructions. Currently, charts in the project area either originate from observations made prior to 1930's or are uncharted. OPR-P184-RA-09 responds to a request from the Southwestern Alaska Pilots who 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. In depths less than 8 meters additional MBES or vertical beam echosounder (VBES) coverage was acquired to identify least depths over significant features or shoals, as appropriate for this survey. Additional multibeam and vertical beam coverage was achieved in water depths between 8 m and 4 m that meet or exceed the project instruction requirements. Total mileage acquired by each vessel and system is reference in Table 1.

Data Acquisition Type	Hull Number with Mileage (lnm)							Total
	S221	1101	1103	2801	2802	2803	2804	
VBES (main scheme)	-	-	5.22	-	-	-	-	5.22
MBES (main scheme)	-	34.71	-	95.23	77.13	114.63	191.53	513.23
Crosslines	-	-	1.35	-	6.74	-	13.3	21.39
Developments	-	-	0.28	-	-	-	-	0.28
Shoreline	-	-	24.79	-	-	-	-	24.79
Bottom Samples	9	-	-	-	-	-	-	9
Total Area Surveyed (sq. nm)	-	-	-	-	-	-	-	22.93

Table 1: Statistics for survey H12080

Limited Shoreline Verification was performed for the survey area seaward of the Navigable Area Limit Line (NALL) for H12080, as per section 3.5.5 of the Field Procedures Manual April 2009 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook HOB files.

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

Data acquisition was conducted from June 17 to July 31, 2009 (DN 168 to 212).

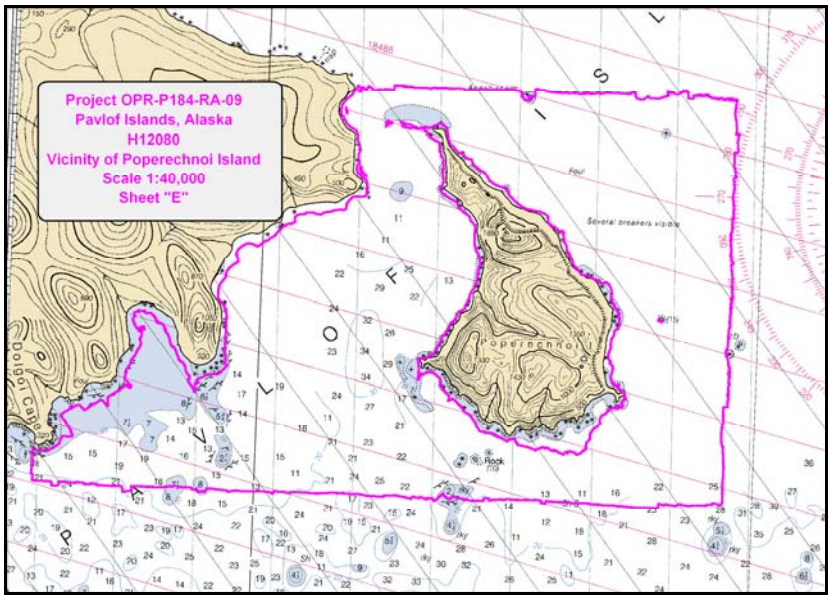


Figure 1: H12080 Survey Outline

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

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

B.1. Equipment and Vessels

Data for this survey were acquired by the following vessels:

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

Table 2: Data acquisition vessels and systems for H12080

Sound speed profiles were measured in accordance with the Specifications and Deliverables using SEACAT SBE-19 and 19+ profilers, as well as the Brooke Ocean Technology Moving Vessel Profiler.

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

As described in the DAPR, on 7/15/09 (DN196) the orientation of the Reson 8125 transducer was changed from a tilted position to that of a more standard flat position. This "standard" orientation of the transducer enabled offshore SWMB data collection using the Reson 8125 system on DN211 (July 30, 2009). All other data acquired for H12080 with the Reson 8125 system on previous days (DN168-191) was an along-shore buffer with the transducer in a tilted configuration.

A complete description of survey vessels, hardware, and software systems is included in the *OPR-P184-RA-09 DAPR.*

B.2. Quality Control

B.2.a. Crosslines

Vertical Beam Echo Sounder (VBES) crosslines totaled 1.35 nautical miles and Multibeam Echosounder (MBES) crosslines totaled 20.04 nautical miles. The sum of all cross lines totaled 4.3% of mainscheme hydrography.[1] Cross-line and Main Scheme bathymetry were manually compared in CARIS HIPS Subset Mode. VBES crosslines showed excellent agreement with MBES mainscheme, with differences no greater than 0.2 meters observed.[2] The nadir beams of MBES crosslines also showed excellent agreement with the mainscheme lines, with average differences between 0 and 0.15 meters observed.[3] In rarer cases, differences up to 0.5 meters were observed on the slopes to deep water and differences of 0.2 meters in relatively flat areas in 50-70 meter deep water.[4]

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

B.2.b. Final Uncertainty

Uncertainty values of submitted, finalized grids are calculated in CARIS using the "Greater of the Two" of total propagated uncertainty and standard deviation (scaled to 95%). An "IHOness" attribute layer was created for H12080's finalized combined surface in CARIS HIPS for analysis (figure 2). Throughout the majority of the survey area, uncertainty values for H12080 fall below the IHO levels as described in the NOS Specifications and Deliverables.[5] The major exceptions to these results occurred along the very near shore areas and around offshore features when using the tilted Reson 8125 sonar configuration; refer to

OPR-P184-RA-09 DAPR for specifics. Additional IHO problems can be seen as parallel tracks in deeper water where the outer beams of SV "smiles" pushed the up the uncertainty values but had little if any effect on the BASE surface.

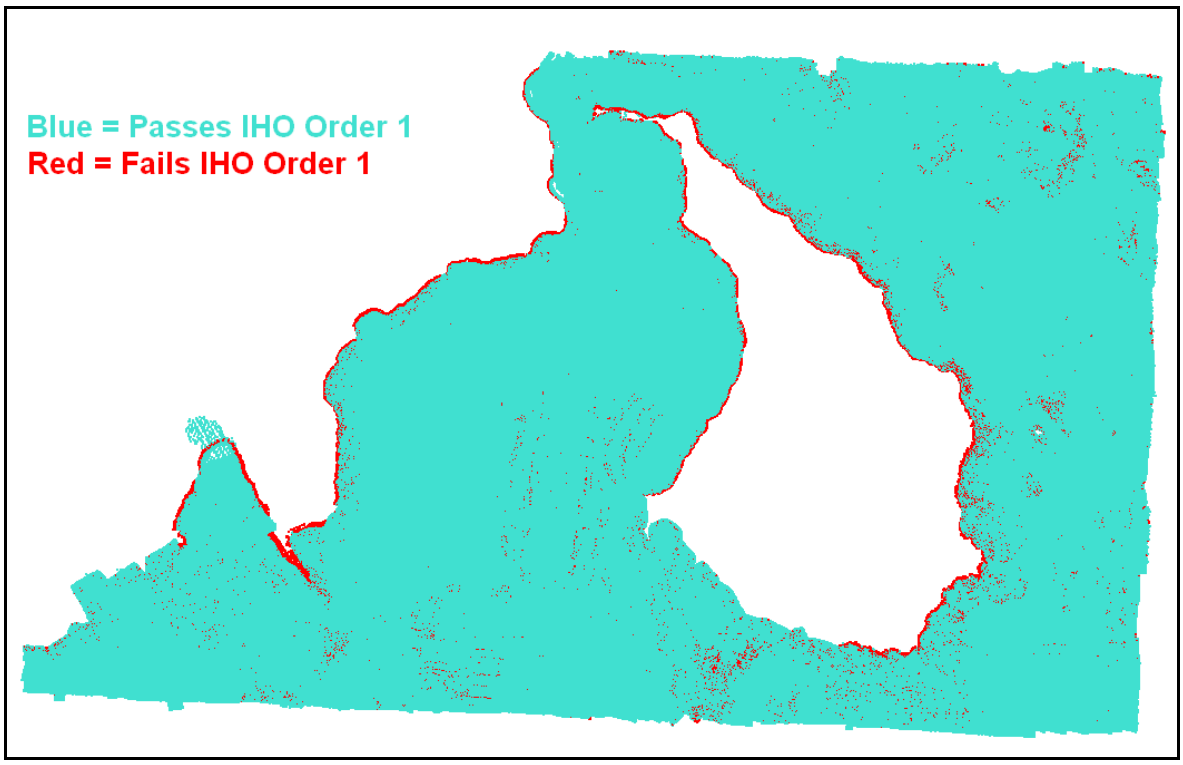


Figure 2: H12080 IHO order 1 compliance for depth uncertainty

B.2.c. Junctions

Survey H12080 junctions with H12079, which is Sheet D of the same project, and H12081, which is Sheet F of the same project (table 3).[6] The sheet limits and area of overlap for Sheets D and F are shown in Figure 3.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H12079	1:40,000	2009	North
H12081	1:40,000	2009	East

Table 3: Junction Surveys

Survey H12079 was completed concurrently with survey H12080 during project OPR-P184-RA-09. Soundings from H12080 were compared with sounding data from survey H12079 using the 2-D subset editor in CARIS HIPS. In general the area of overlap between H12080 and H12079 showed excellent agreement, with no discernable offset throughout most of the junction area.[7] One minor exception is the 5-20 meter deep waters on the slope just east of Dolgoi Island where H12079 was found to be up to 0.15 meters shoaler than H12080.[8] Additionally, in the 50-80 meter deep waters found in the eastern third of the junction, H12079 was found to be between 0.05 to 0.15 meters deeper than H12080.[9]

Survey H12081 was completed concurrently with survey H12080 during project OPR-P184-RA-09. Soundings from H12080 were compared with sounding data from survey H12081 using the 2-D subset editor in CARIS HIPS. The area of overlap between H12080 and H12081 showed excellent agreement, with no discernable offset throughout most of the junction area.[10] Agreement was particularly good in the shoaler areas with a hard, rocky bottom. The largest differences observed, up to 0.3 meters, were observed in deeper waters with depths between 50-80m on slopes where the point cloud tended to spread out and the launches were operating in low frequency mode.[11]

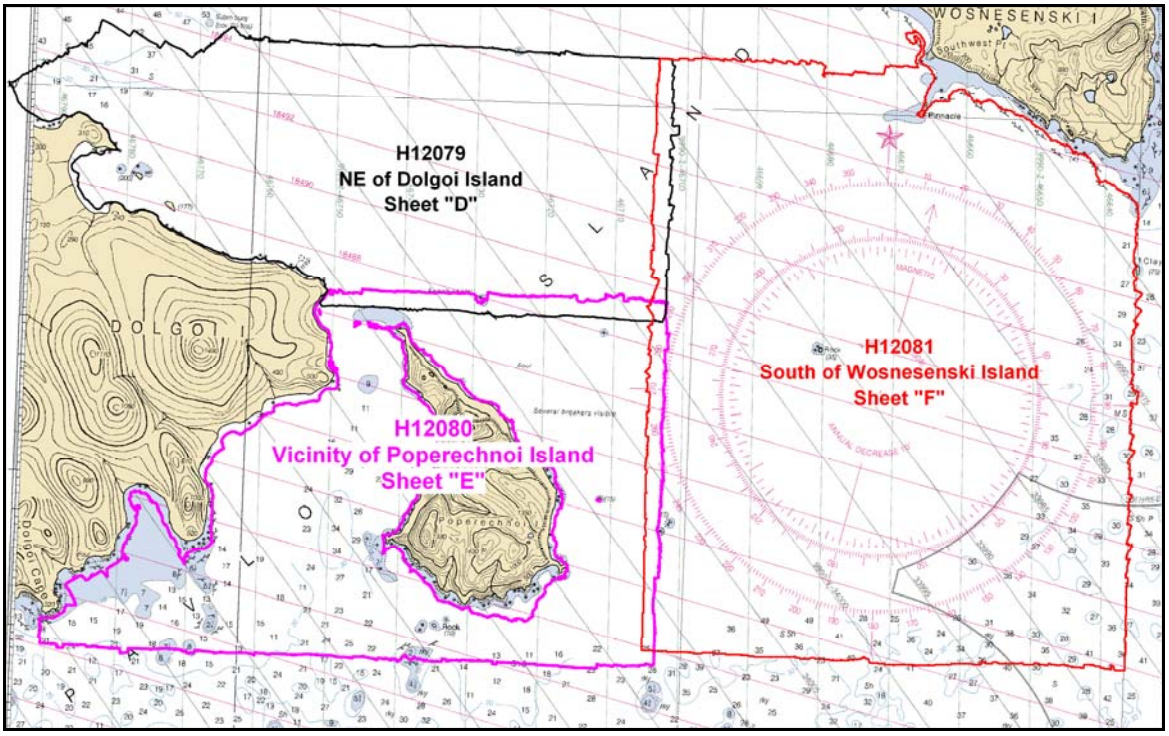


Figure 3: Contemporary surveys that junction with H12080

B.2.d. Quality Control Checks

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

B.2.e. Data Quality Factors

True Heave

Ninety-three (93) lines of multibeam data failed to load true heave. Almost all of these lines, ninety-one (91) in total, were from launch 2803 (RA-3) on DN177 and DN 211. For both of these days, the lines which failed to load true heave fell within ½ -day time blocks. Apparently the problem affecting the lines in these two time blocks was not universal since a few of the lines collected at these times did properly apply true heave. The two additional lines which failed to load true heave, launch 2801 on DN211 and launch 2802 on DN180, were the lone lines for that particular launch-day.

When the fix true heave utility is unable to correct the condition, the affected lines have only real-time heave correctors applied. See the acquisition log for specifics. All lines were examined and no significant heave artifacts are present in the data.[12]

The following HSX lines were converted in CARIS HIPS without applying true heave:

Vessel	Year-Day	Line
2801_Reson7125_HF_512	2009-211	000-0000
2802_Reson7125_HF_512	2009-180	000-1704
2803_Reson7125_HF_512	2009-177	000_1655
2803_Reson7125_HF_512	2009-177	000_1700
2803_Reson7125_HF_512	2009-177	000_1704
2803_Reson7125_HF_512	2009-177	000_1709
2803_Reson7125_HF_512	2009-177	000_1712
2803_Reson7125_HF_512	2009-177	000_1713
2803_Reson7125_HF_512	2009-177	000_1716
2803_Reson7125_HF_512	2009-177	000_1720
2803_Reson7125_HF_512	2009-177	000_1721
2803_Reson7125_HF_512	2009-177	000_1726
2803_Reson7125_HF_512	2009-177	000_1727
2803_Reson7125_HF_512	2009-177	000_1729
2803_Reson7125_HF_512	2009-177	000_1733
2803_Reson7125_HF_512	2009-177	000_1736
2803_Reson7125_HF_512	2009-177	000_1738
2803_Reson7125_HF_512	2009-177	000_1743
2803_Reson7125_HF_512	2009-177	000_1745
2803_Reson7125_HF_512	2009-177	000_1751
2803_Reson7125_HF_512	2009-177	000_1758
2803_Reson7125_HF_512	2009-177	000_1801
2803_Reson7125_HF_512	2009-177	000_1804
2803_Reson7125_HF_512	2009-177	000_1811
2803_Reson7125_HF_512	2009-177	000_1820
2803_Reson7125_HF_512	2009-177	000_1823
2803_Reson7125_HF_512	2009-177	000_1828
2803_Reson7125_HF_512	2009-177	000_1831
2803_Reson7125_HF_512	2009-177	000_1834
2803_Reson7125_HF_512	2009-177	000_1836
2803_Reson7125_HF_512	2009-177	000_1841
2803_Reson7125_HF_512	2009-177	000_1843
2803_Reson7125_HF_512	2009-177	000_1844
2803_Reson7125_HF_512	2009-177	000_1845
2803_Reson7125_HF_512	2009-177	000_1848
2803_Reson7125_HF_512	2009-177	000_1850
2803_Reson7125_HF_512	2009-177	000_1852
2803_Reson7125_HF_512	2009-177	000_1854
2803_Reson7125_HF_512	2009-177	000_1919
2803_Reson7125_HF_512	2009-177	000_1926
2803_Reson7125_HF_512	2009-211	022_2254
2803_Reson7125_HF_512	2009-211	023_2256
2803_Reson7125_HF_512	2009-211	024_2257

Vessel	Year-Day	Line
2803_Reson7125_HF_512	2009-211	025_2258
2803_Reson7125_HF_512	2009-211	026_2301
2803_Reson7125_HF_512	2009-211	027_2302
2803_Reson7125_HF_512	2009-211	028_2305
2803_Reson7125_HF_512	2009-211	029_2307
2803_Reson7125_HF_512	2009-211	030_2310
2803_Reson7125_HF_512	2009-211	031_2312
2803_Reson7125_HF_512	2009-211	032_2313
2803_Reson7125_HF_512	2009-211	033_2316
2803_Reson7125_HF_512	2009-211	034_2319
2803_Reson7125_HF_512	2009-211	035_2320
2803_Reson7125_HF_512	2009-211	036_2324
2803_Reson7125_HF_512	2009-211	037_2328
2803_Reson7125_HF_512	2009-211	038_2330
2803_Reson7125_HF_512	2009-211	038A2330
2803_Reson7125_HF_512	2009-211	039_2330
2803_Reson7125_HF_512	2009-211	040_2332
2803_Reson7125_HF_512	2009-211	041_2337
2803_Reson7125_HF_512	2009-211	042_2339
2803_Reson7125_HF_512	2009-211	043_2341
2803_Reson7125_HF_512	2009-211	044_2342
2803_Reson7125_HF_512	2009-211	045_2343
2803_Reson7125_HF_512	2009-211	046_2344
2803_Reson7125_HF_512	2009-211	047_2345
2803_Reson7125_HF_512	2009-211	048_2346
2803_Reson7125_HF_512	2009-211	049_2348
2803_Reson7125_HF_512	2009-211	050_2351
2803_Reson7125_HF_512	2009-211	051_2353
2803_Reson7125_HF_512	2009-211	052_2358
2803_Reson7125_HF_512	2009-211	053_0000
2803_Reson7125_HF_512	2009-211	054_0001
2803_Reson7125_HF_512	2009-211	055_0002
2803_Reson7125_HF_512	2009-211	056_0003
2803_Reson7125_HF_512	2009-211	057_0006
2803_Reson7125_HF_512	2009-211	058_0007
2803_Reson7125_HF_512	2009-211	059_0009
2803_Reson7125_HF_512	2009-211	060_0010
2803_Reson7125_HF_512	2009-211	061_0014
2803_Reson7125_HF_512	2009-211	062_0018
2803_Reson7125_HF_512	2009-211	063_0021
2803_Reson7125_HF_512	2009-211	064_0021
2803_Reson7125_HF_512	2009-211	065_0023
2803_Reson7125_HF_512	2009-211	066_0026
2803_Reson7125_HF_512	2009-211	067_0030
2803_Reson7125_HF_512	2009-211	068_0031
2803_Reson7125_HF_512	2009-211	069_0033
2803_Reson7125_HF_512	2009-211	070_0035
2803_Reson7125_HF_512	2009-211	071_0037
2803_Reson7125_HF_512	2009-211	072_0039
2803_Reson7125_HF_512	2009-211	073_0040

Sound Speed Artifacts

Despite the best efforts of the Hydrographer to conduct sufficient sound velocity casts distributed both spatially and temporally, instances of sound velocity errors occurred. After correction for sound velocity in HDCS, some lines still exhibited the characteristic "smiles" indicative of inaccurate sound speed corrections. These sound speed errors were particularly noticeable in the shallow region just south of the unnamed spit extending west from the northern tip of Poperechnoi Island. To address these sound velocity issues, the Hydrographer rejected outer beam soundings obviously in error (figure 4) in an attempt to produce CUBE surfaces that best represent the seafloor.[13] This technique eliminated many, but not all sound velocity related artifacts.

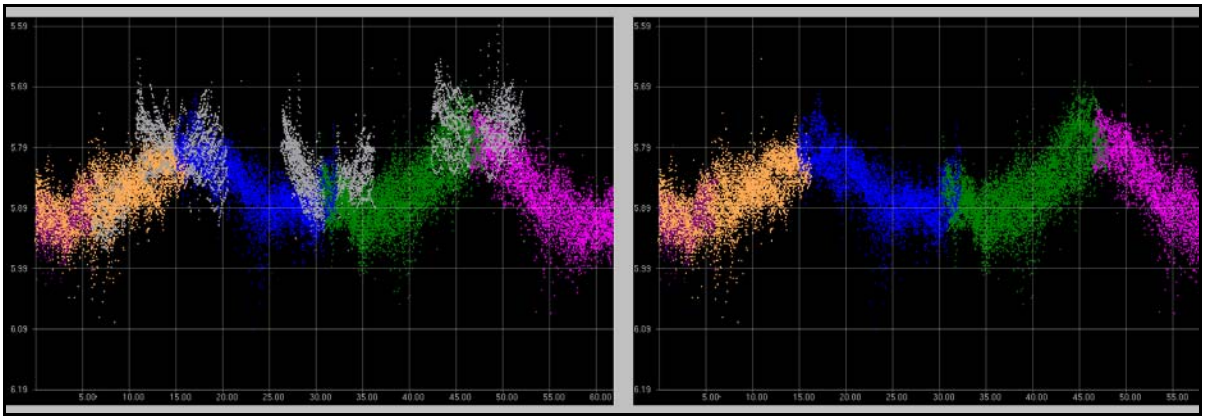


Figure 4: Before (left) and after (right) rejection of the outer beams of a sound velocity "smile" (Please note; vertical exaggeration is approximately 6.5 to 1)

Malfunctioning Surface Sound Velocimeter

Data acquired with the tilted Reson 8125 multibeam sonar installed on *Rainier* launch 1101 (RA-1) displayed numerous momentary sound velocity 'blowouts' (figure 5) where the vessel's Digibar surface sound velocimeter was not reading the proper surface sound velocity. This problem was corrected later in the field season when the faulty Digibar was replaced (refer to *OPR-P184-RA-09 DAPR*).

Since the Reson 8125 requires correct, real-time surface sound velocity input for beam forming purposes it was not possible to apply corrections during post processing. To compensate, the Hydrographer rejected soundings obviously in error from the outer beams.[14] Unfortunately this rejected data resulted in characteristic gaps perpendicular to the shore in the shoreline buffer lines. The corresponding multibeam backscatter side scan was examined and no navigationally significant items were found.[15] Mainscheme data acquired on DN196 also exhibits the same problem.

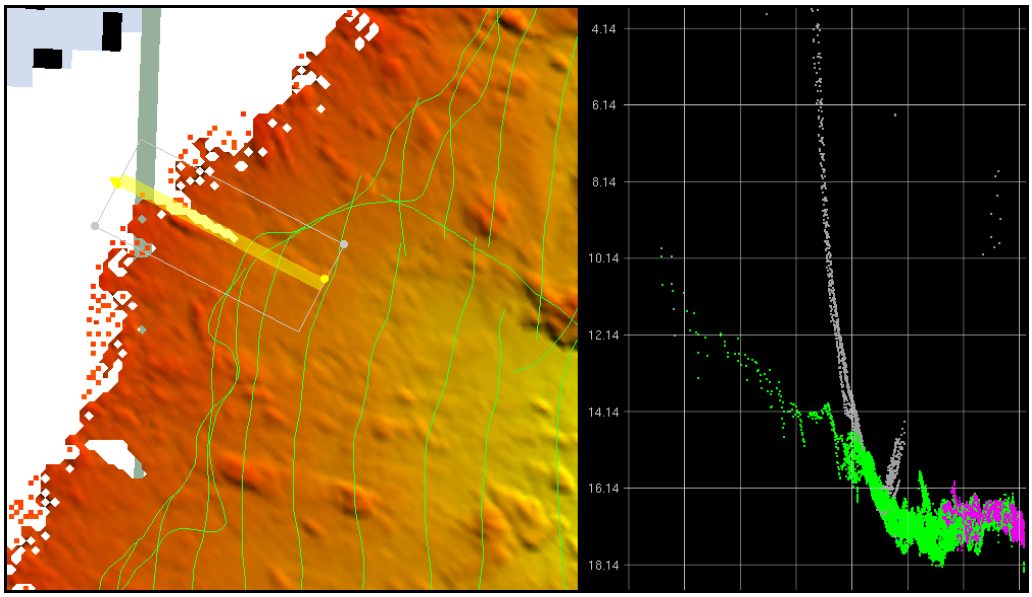


Figure 5: An example of a Reson 8125 Digibar "blowout" The characteristic gap can be seen perpendicular to the shore in the surface to the left while the grey colored rejected pings of the blowout are evident in the 2-D view to the right

Mid Water Column Acoustic Scatter due to Kelp

Bull kelp was present throughout the survey area in waters shoaler than 15m deep and having a rocky bottom. This kelp is evident in both the pseudo side scan and sounding data (figure 6). When necessary to assure the fidelity of the BASE surface, the Hydrographer rejected soundings which were obviously kelp.[16]

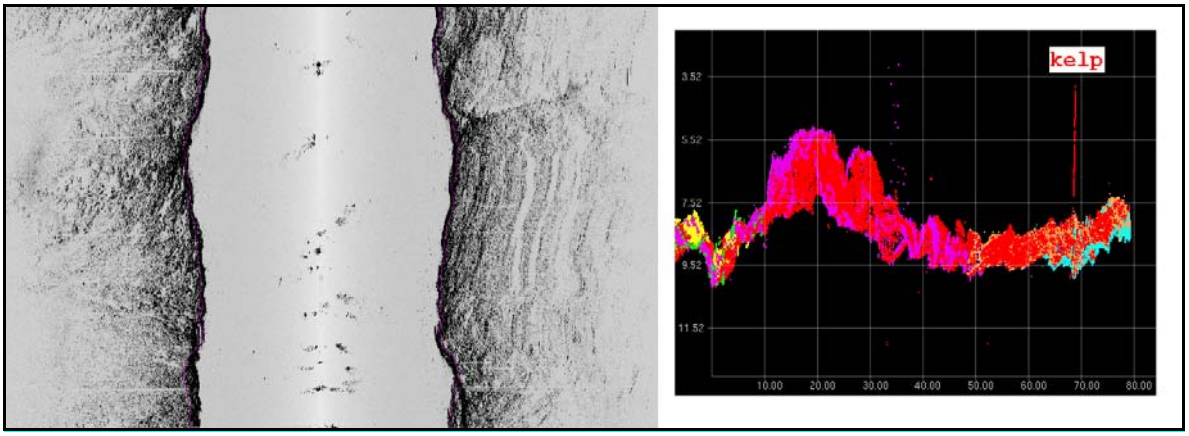


Figure 6: Bull kelp as evident in both SIPS side scan data as well as HIPS subset editor

B.2.f. Object Detection and Coverage Assessment

Kelp

The inshore limit of shallow water multibeam (SWMB) coverage throughout the entire survey area was limited due to kelp. Extensive beds of kelp along the exposed south shore of Poperechnoi Island and the southeast shore of Dolgoi Island limited SWMB coverage to the 10-15 meter curve. The Hydrographer recommends these areas be charted as foul with kelp as noted in the final features file.[17]

Holidays

Holidays are present as stripes parallel to shore between 55° 07' 14.74" N, 161° 38' 24.83" W and 55° 06' 25.24" N, 161° 37' 56.9" W (figure 7). Two of these holidays are inshore of the 8m depth curve but the gap is greater than 25 meters. A third holiday extents into waters greater than 8m of depth. Since the inner line of tilted 8125 data was acquired at a high stage, the kelp was standing upright supported by the high water. When the offshore lines were run at a lower stage of tide the kelp, no longer supported by a full column of water, was allowed to lie on the surface. This resulted in a thick bed of surface kelp which preventing junction with the inshore data. [18]

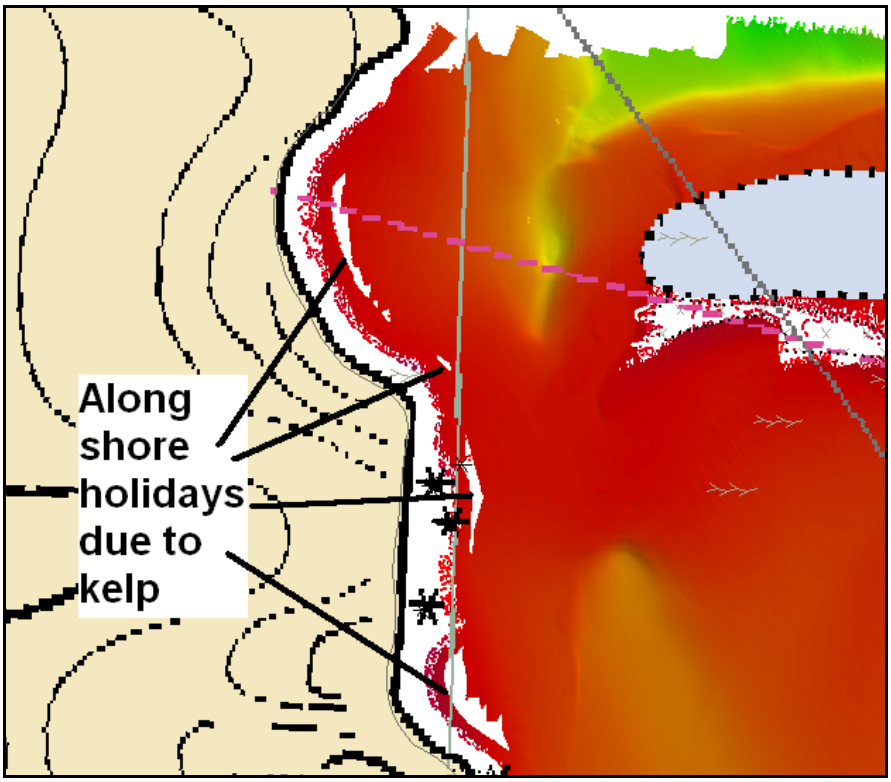


Figure 7: Holidays along shore due to kelp

Numerous holidays are present in the vicinity of 55° 06' 53.14" N, 161° 36' 03.43" W due to faulty SV on RA-1 (figure 8). As previously discussed, the Reson 8125 multibeam sonar installed on *Rainier* launch 1101 (RA-1) displayed numerous momentary sound velocity 'blowouts' due to a failing Digibar surface sound velocimeter. The rejection of these blowouts in CARIS resulted in holidays. The corresponding multibeam backscatter side scan was examined and no navigationally significant items were found.[19]

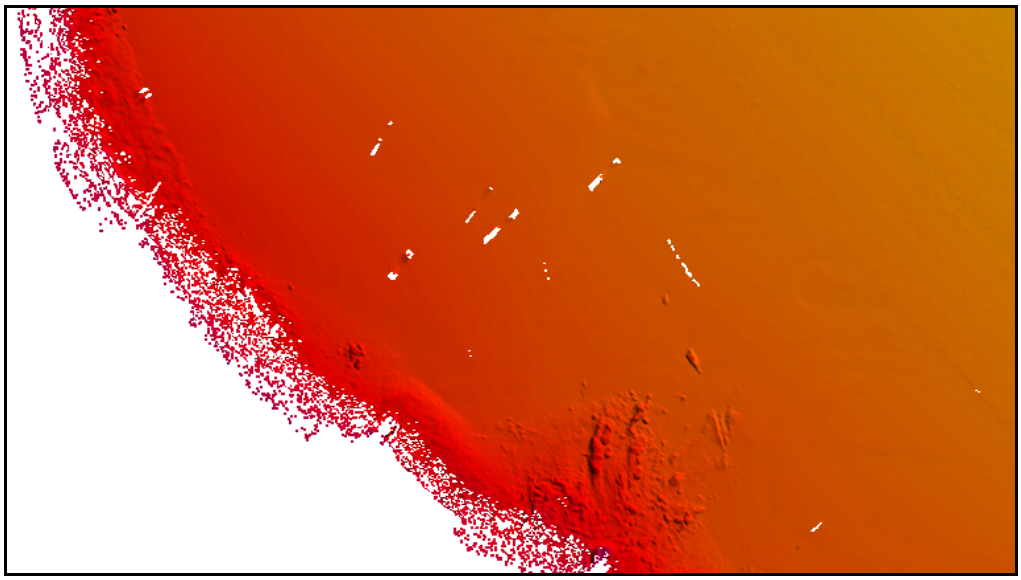


Figure 8: Holidays due to a failing surface sound velocimeter on RA-1

Numerous holidays are present in the vicinity of 55° 06' 57.78" N, 161° 31' 39.2" W (figure 9). Due to the extremely rocky and irregular seafloor in this area, numerous holidays due to acoustic shadowing and the lack of returns from away-sloping features resulted in many holidays. Examination by the hydrographer indicates that least depths on all of the features in this area were ensonified.[20]

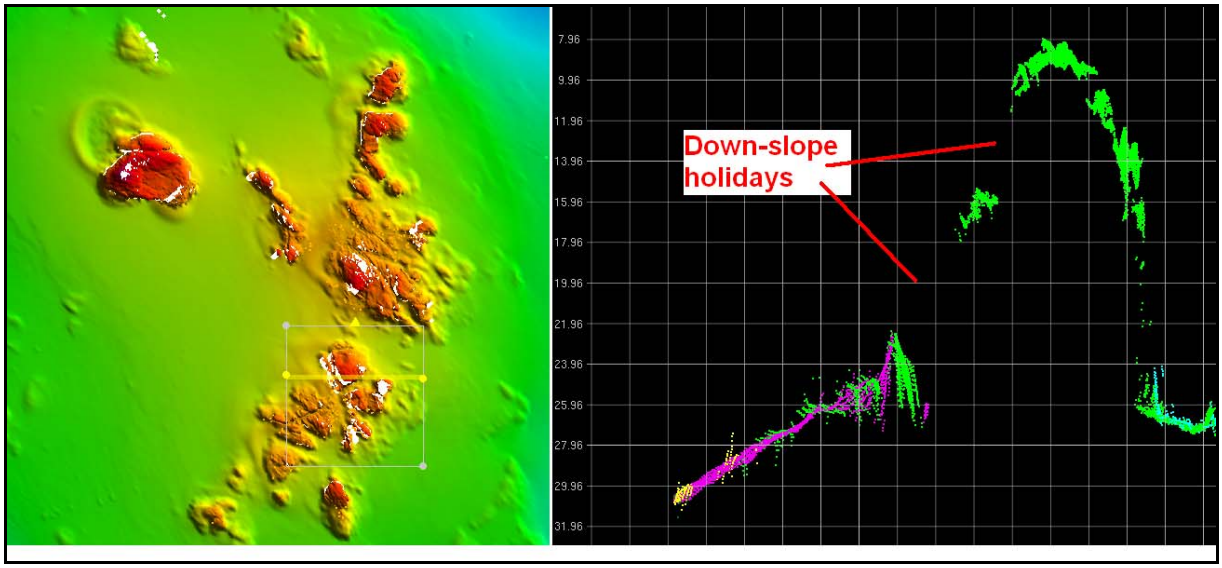


Figure 9: Down slope holidays in an area of extreme topography

The following is a list of additional individual holidays present on H12080:

- 55° 03' 59.58" N, 161° 42' 33.41" W due to along shore kelp
- 55° 04' 32.89" N, 161° 40' 35.75" W due to acoustic shadowing of a rock
- 55° 03' 11.63" N, 161° 43' 52.42" W due to acoustic shadowing of a rock
- 55° 03' 31.95" N, 161° 43' 11.61" W due to a data gap

Data Density

Data density for survey H12080 met the 5 sounding per node density requirement with 97.32% of nodes having greater than 5 contributing soundings.[21] The analysis was performed using ASCII files derived from H12080 final combined surfaces, one surface for each individual resolution used on the sheet. A Python script written by *Fairweather's* Weston Renoud was run on each of these ASCII files and the results tallied (table 4). The total nodes and nodes with at least five soundings were summed up for the three resolutions used for H12080 and the final percent of "passing" nodes was calculated for the whole sheet. Areas having problems meeting the 5 sounding per node density requirement include the narrow strip along shore and along the offshore edges of the sheet (figure 10).

surface res	total nodes	# of nodes with 5 sndgs	% pass
1m	20251267	19621648	96.89
2m	3104508	3077761	99.14
4m	1247440	1243725	99.70
total	24603215	23943134	97.32

Table 4: BASE surface nodes with at least 5 soundings

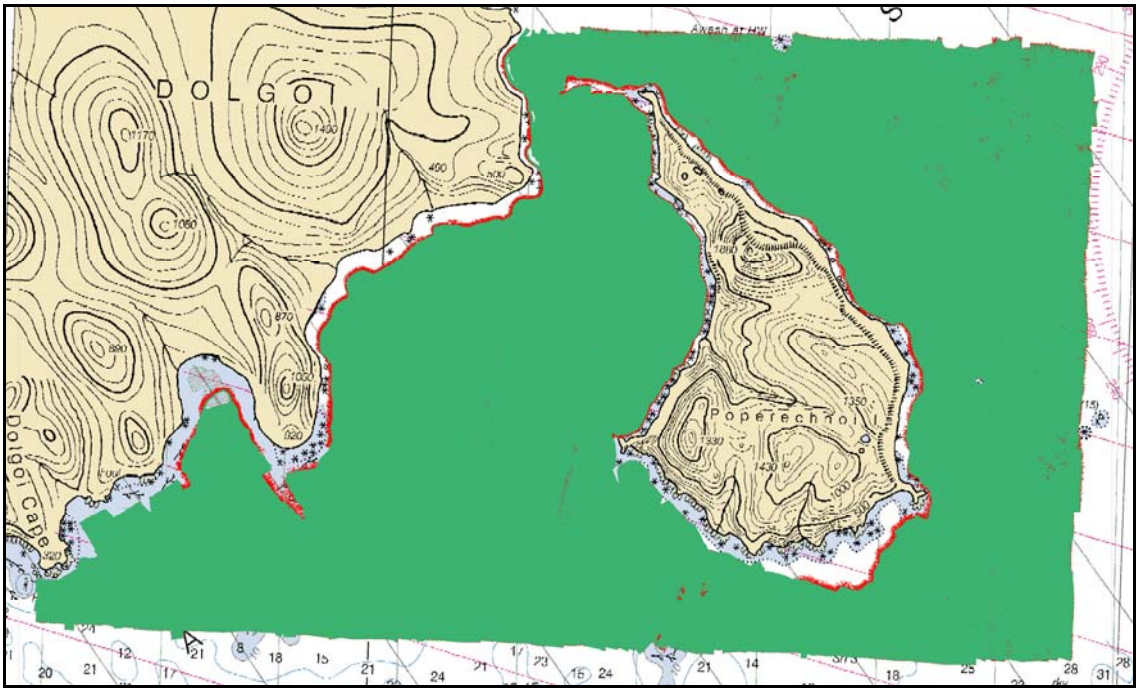


Figure 10: Density coverage for H12080, red indicates nodes with less than 5 pings per grid node; green indicates 5 pings or more per grid node

B.2.g. Unusual Conditions

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

B.3. Corrections to Echo soundings

Data reduction procedures for survey H12080 conform to those detailed in the *OPR-P184-RA-09 DAPR.*

B.4. Data Processing

Data processing procedures for survey H12080 conform to those detailed in the DAPR. Data were processed using CARIS HIPS and SIPS v6.1, Service Pack 2 and Hotfix 8. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

TPU VALUES:
The survey specific parameters used to compute TPU in CARIS for H12080 are listed in Table 5.

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

Table 5: Survey specific CARIS TPU parameters

Many BASE surfaces were used in processing H12080. Final BASE surface resolutions and depth ranges were set according to Table 6 below, with field sheets smaller than 25 million nodes. CUBE surfaces were processed with a parameter set corresponding to each resolution as per HTD 2009-2. The CUBE parameter XML file is included with the data deliverables. The submission Field Sheet and BASE Surface structure are shown in figures 11, 12, and 13.

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

Table 6: Depth range and surface resolutions for H12080

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

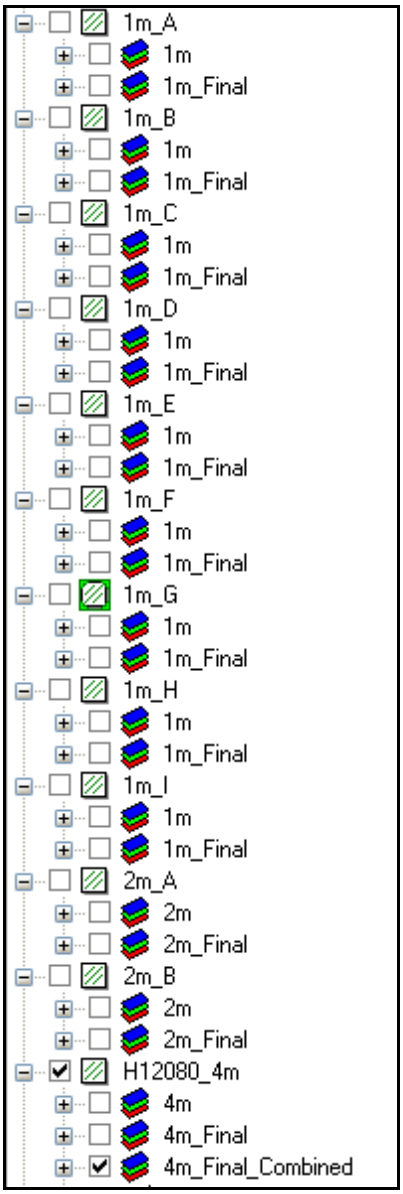


Figure 11: Field sheets and BASE surfaces submitted with H12080

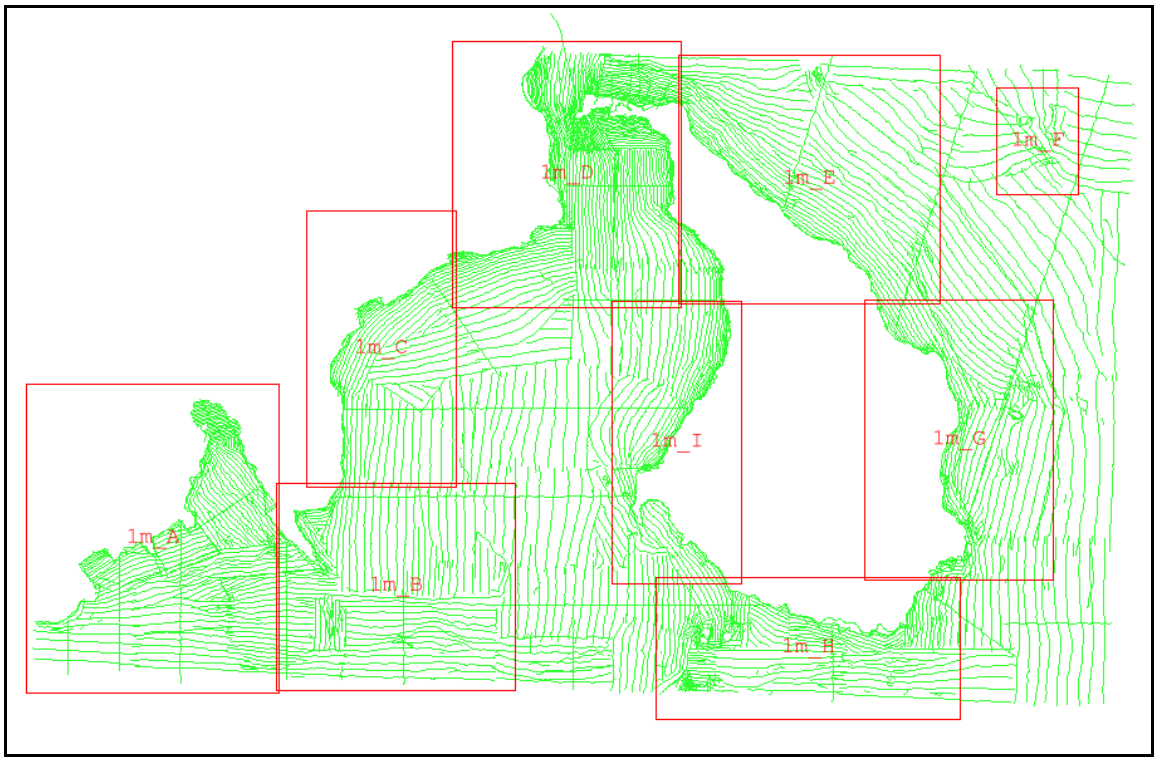


Figure 12: H12080 1m field sheet layout

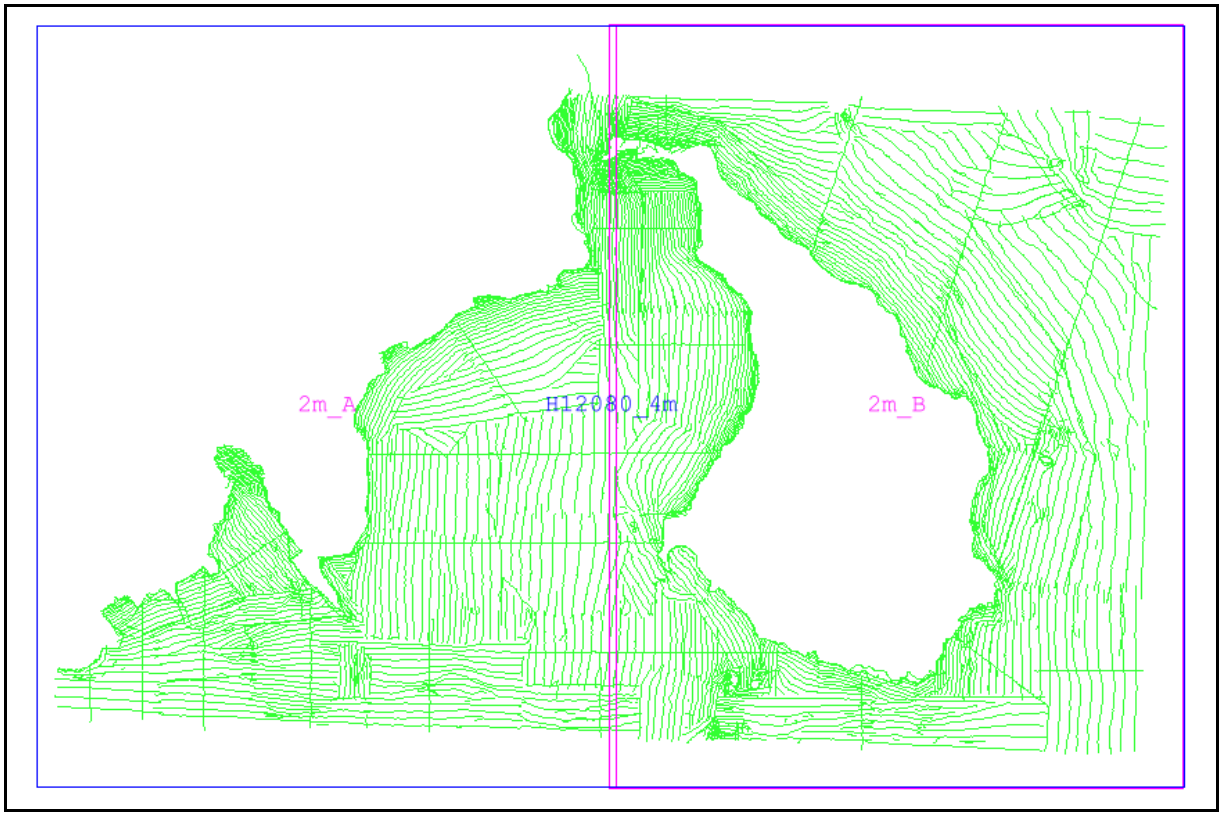


Figure 13: H12080 2m and 4m field sheet layout

C. VERTICAL AND HORIZONTAL CONTROL

Project OPR-P184-RA-09 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.

C.1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. The differential corrector beacons utilized for this survey are given in Table 7.

Location	Frequency	Operator	Priority
Cold Bay	289 kHz	USCG	Primary

Table 7: Differential Corrector Sources for H12080

C.2. Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Sand Point, AK (945-9450) served as control for datum determination and as the primary source for water level reducers for survey H12080.

No tertiary gauges were required.

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels from the Sand Point, AK station (954-9450) by applying tide file 9459450.tid and time and height correctors through the zone corrector file P184RA2009CORP.zdf. **It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during final processing.**

The request for Final Approved Water Levels for H12080 was submitted to CO-OPS on August 13, 2009 in accordance with the Field Procedures Manual (FPM), dated April 2009. The Final Tide Note was received on September 11, 2009.[22] This documentation is included in Appendix IV.

D. RESULTS AND RECOMMENDATIONS

D.1. Chart Comparison

D.1.a. Survey Agreement with Chart

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

Survey H12080 was compared with the following charts:

Chart	Scale	Edition and Date	Local Notice to Mariners Applied Through
16549	1:80,000	15th Ed, Jul 2003	10/24/2009
16551	1:80,000	10th Ed; Apr 2008	10/24/2009

Table 8: Charts compared with H12080

The majority of H12080 was previously unsurveyed and devoid of charted depths except along the southern edges of the sheet. Some additional scattered depths are present in the channel between Dolgoi and Poperechnoi Islands where apparently some recon lines were run. In spite of the fact that charts 16549 and 16551 are the same scale and share the same depths in their common area, there is a slight discrepancy with the positions of a portion of these depths. Some of the depths line up perfectly while others show offsets up to 70 meters in no consistent direction. Contour lines exhibit the same problem and some are even shaped differently (figure 14).[23]

Despite the scarcity of soundings on both charts 16549 and 16551, charted contours do a good job of following the surveyed depths of H12080. Most charted depths are within 1 fathom of survey soundings with two exceptions:

- H12080 found a 5.7 fathom sounding on a charted 8 fathom depth in the vicinity of 55° 03' 43.27" N 161° 41' 27.65" W. A 2.7 fathom depth was also found approximately 90 meters to the north and reported as a DTON.[24]
- H12080 found a rock awash on an offshore charted 2 fathom depth in the vicinity of 55° 02' 49.12" N 161° 36' 04.83" W.[25]

In both of these cases H12080 found depths shoaler than charted. These discrepancies between the charted depths and survey soundings can be attributed to the improved horizontal positioning and increased bottom coverage modern survey methods. H12080 also often found significantly shoaler points between charted depths which can also be attributed to complete multibeam coverage.[26]

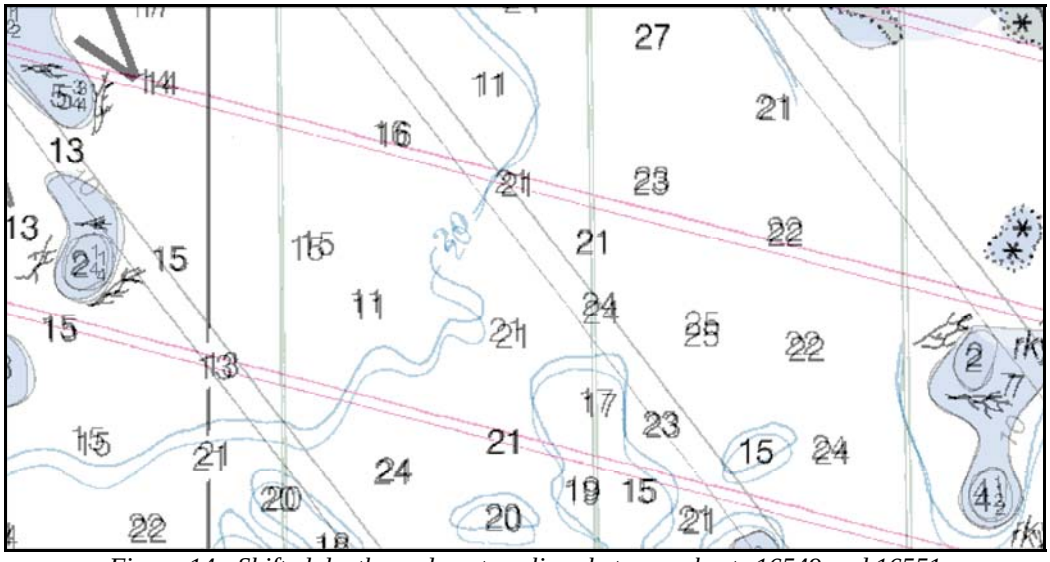


Figure 14: Shifted depths and contour lines between charts 16549 and 16551

Discrepancies between the charted shoreline of 16549 and 16551 were noted as indicated in figure 15. The shoreline depicted on chart 16551 agrees reasonably well with the composite source shoreline as provided with the project; however a significant offset is apparent between composite source and the shoreline of chart 16549. A more detailed high water line and additional rocks and ledges are also found on chart 16551 when compared to chart 16549. Even though both charts are of the same scale, the shoreline of chart 16551 appears to have been compiled at a higher resolution than that of chart 16549. The charted 16551 shoreline agrees much more closely with shoreline observed in the field in the near shore areas of Poperechnoi and Dolgoi Islands than that of chart 16549. However, for some of the small islands offshore of Poperechnoi Island, H12080 bathymetry better matches the positions found on chart 16549.[27]

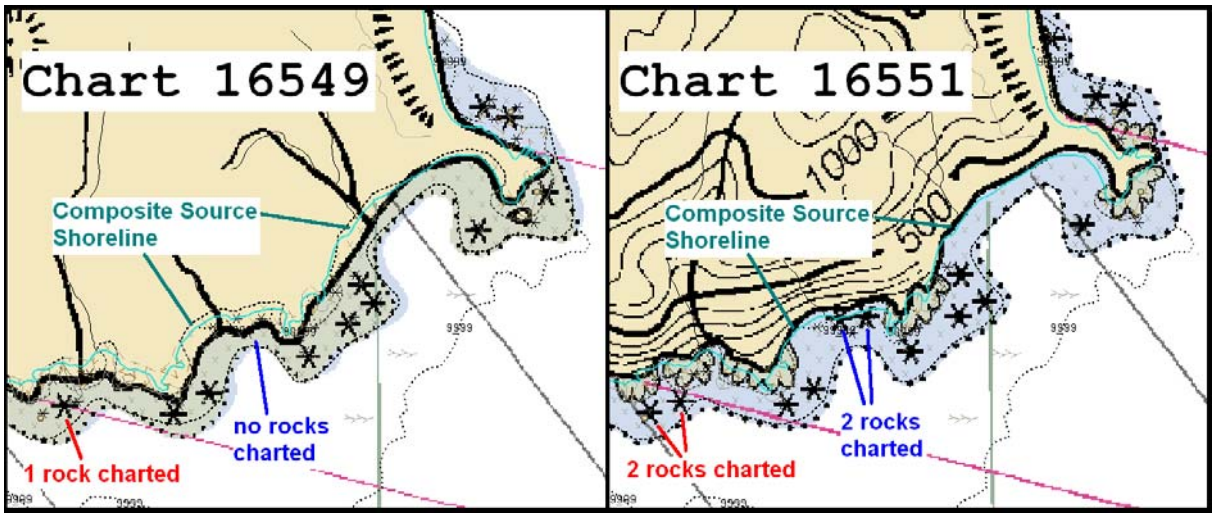


Figure 15: Shoreline discrepancies between charts 16549 and 16551

The dotted danger line on chart 16549 is depicted incorrectly. The placement of the danger line buffering the near shore rocks surrounding Poperechnoi Island is correct, except as modified in the field, but the area between danger line and mean high water (MHW) is tinted green, instead of blue. The contrast between charts 16549 and 16551 is shown below in Figure 16. The Hydrographer recommends adjusting the tint inshore of the charted danger lines on chart 16549 to blue.[28]

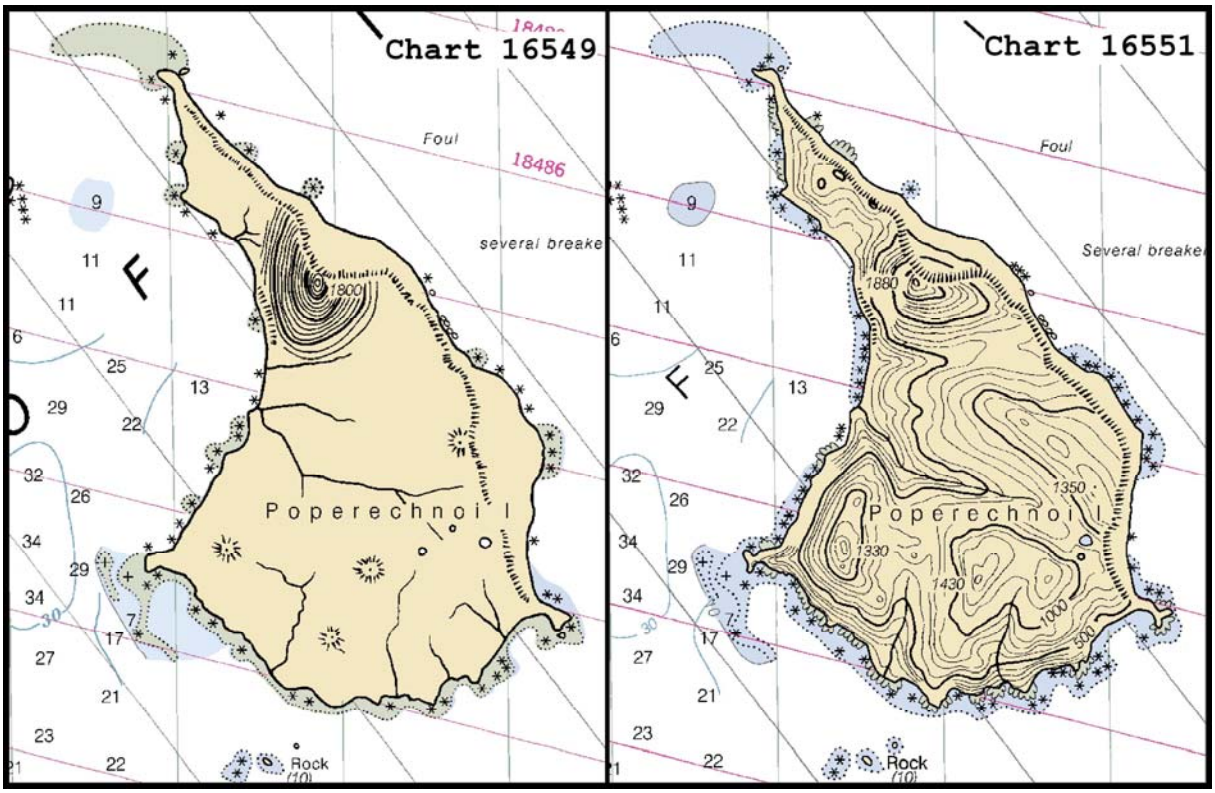


Figure 16: The charted danger line enclosing the near shore rocks surrounding Poperechnoi Island is incorrectly charted with a green tint on chart 16549 (left) as opposed to the correct blue tint used on chart 16551 (right)

Northeast of Poperechnoi Island approximately 1.5 km offshore, both charts 16549 and 16551 have notes of "Foul" and "several breakers visible" (figure 16). Soundings in the vicinity of the "Foul" ranged between 22-27 fathoms in what appears to be a gently sloping seafloor with no evidence of either bottom features or kelp. The "several breakers visible" note is in the vicinity of two offshore features with least depths of 3fm 4ft, but no breakers were observed in the field. The Hydrographer recommends that both of these notes be removed from the affected charts.[29]

The Hydrographer recommends that survey soundings supersede all prior survey and charted depths in the common area.[30]

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

No AWOIS items were located within the survey limits of H12080.[31]

D.1.c. Other Investigated Features

Additional Items

No additional charted items were investigated and no other features were located on survey H12080.

D.1.d. Dangers to Navigation

Twelve (12) Dangers to Navigation (DTONs) were found on survey H12080, and reported to the Marine Chart Division via email on February 9, 2009.[32] The original DTON submission package is included in Appendix I.[33]

D.2. Additional Results

D.2.a. Shoreline Verification

Shoreline Source
Limited shoreline verification was accomplished using the composite source file (CSF) provided with the project instructions. The CSF has been created using the latest ENCs, most recent aerial photogrammetry, and prior hydrographic surveys. Prior survey features within the CSF are for reference. This composite source was printed on paper "boat sheets" and displayed in CARIS Notebook and/or Hypack for field verification.

Shoreline Verification
Limited shoreline verification was conducted near predicted low water in accordance with the Specifications and Deliverables section 8.2 and the Field Procedures Manual section 3.5 and 4.4. Detached positions (DPs) acquired during shoreline verification were recorded and S-57 attributed in CARIS Notebook. These indicate revisions to features, and features not found in the provided CSF. In addition, annotations describing shoreline were recorded on the hard copy plots of the CSF as described above.

All shoreline data is submitted in CARIS Notebook HOB files. The session H12080_Notebook.wrk contains the following:

HOB File	Purpose and Contents
H12080_Composite_Source.hob	The original source data as provided for project OPR-P184-RA-09 and filtered to the limits of survey H12080.
H12080_Reference.hob	Survey sheet limits.
H12080_Final_Features.hob	The composite source data modified by the field to best represent the shoreline at survey scale. This includes the addition of new features and modification of source features. This file retains all features neither verified nor disproved by this survey
H12080_Disprovals.hob	The composite source items that were deleted or modified in position or geographic type.

Table 9: List and Description of Notebook HOB files

Source Shoreline Changes and New Features
Significant kelp growth was present on the south side of Poperechnoii Island that prevented near-shore acquisition. A buffer was established outside the area foul with kelp. This buffer is

depicted in the H12080_Final_Features.hob file. The Hydrographer recommends charting these foul kelp areas as defined in the H12080_Final_Features.hob file.[34]

Charts 16549 and 16551 both depict danger lines enclosing the near shore rocks surrounding Poperechnoi Island attributed as obstruction lines in the original composite source HOB file. These danger lines were modified in the field using both new features found during shoreline verification and kelp limits defined with a VBES buffer line and SWMB coverage.[35]

Recommendations
The Hydrographer recommends that the shoreline as depicted in the Notebook HOB files supersede and complement shoreline information compiled on the composite source file and charts as described above.[36]

D.2.b. Prior Survey Comparison

Prior survey comparison was not performed.

D.2.c. Aids to Navigation

There are no Aids to Navigation located within the survey limits of H12080.[37]

D.2.d. Overhead Features

There are no overhead features located within the survey limits of H12080.[38]

D.2.e. Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the survey limits of H12080, and none were detected by the survey.[39]

D.2.f. Ferry Routes

There are no ferry routes charted within the limits of survey H12080, and none were observed to be operating in the area.[40]

D.2.g. Bottom Samples

Nine (9) bottom samples were acquired in the northern half of survey area H12080.[41]
These samples were all collected over previously uncharted areas. All bottom samples have been included in the H12080_Final_Features.hob file in the CARIS Notebook session.

D.2.h. Other Findings

There were no other findings for survey H12080.

E. APPROVAL

As Chief of Party, field operations for hydrographic survey H12080 were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports. The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual (April 2009 edition), Field Procedures Manual (April 2009 edition), Standing and Project Instructions, and all HSD Technical Directives issued through July 2009. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

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

Title	Date Sent	Office
Hydrographic Systems Readiness Review Package	*Under separate cover*	N/CS34
Data Acquisition and Processing Report for OPR-P184-RA-09	January 12, 2010	N/CS34
Coast Pilot Report for OPR- P184-RA-09	*To be submitted*	N/CS26
Tides and Water Levels Package for OPR-P184-RA-09	July 31, 2009	N/OPS1

Approved and Forwarded:

Donald W. Haines, CAPT/NOAA
I am approving this document
2010.03.03 14:40:26 -08'00'

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

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

Survey Sheet Manager:

James B Jacobson
I am signing this document for Shawn Gendron
2010.03.03 16:41:40 Z

Shawn Gendron
Senior Survey Technician, NOAA Ship *Rainier*

Chief Survey Technician:

James B Jacobson
I am the author of this document
2010.03.03 16:40:00 Z

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

Field Operations Officer:

Brent Pounds
I have reviewed this document
2010.03.03 10:03:57 -09'00'

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

Revisions and Corrections Compiled During Office Processing and Certification

[1] Although the crossline to mainscheme percentage didn't meet the 5% requirement as stated in the Hydrographic Survey Specifications and Deliverables, the crosslines run during the survey were sufficient for quality control purposes.
[2] Concur.
[3] Concur.
[4] Concur.
[5] Concur.
[6] H12080 also junctions with H11903 from OPR-P184-RA-08. A common junction was made with H11903 and H12079 which have already been compiled. A junction with H12081 will be made when that survey is compiled.
[7] Concur.
[8] Concur. Larger differences between two datasets are expected in sloping areas and difference in this case has been deemed acceptable.
[9] Given the depth of water in the area, the discrepancy in the junction area is acceptable.
[10] Concur.
[11] Given the depth of water in the area, the discrepancy in the junction area is acceptable.
[12] Concur. The data is adequate to supersede charted data in the common area.
[13] After rejecting the outer beams on data exhibiting sound speed errors, the remaining data is adequate to supersede charted data in the common area.
[14] After rejecting the outer beams on data exhibiting sound speed errors, the remaining data is adequate to supersede charted data in the common area.
[15] Concur.
[16] After rejecting the bad data due to kelp, the remaining data is adequate to supersede charted data in the common area.
[17] Concur with clarification. Chart foul areas as depicted in the HCell.
[18] The holiday was examined and no navigationally significant features were discovered based on the data surrounding the holiday. The larger holidays have been preserved in the HCell. Depths and kelp features should be charted as depicted in the HCell.
[19] Concur. Chart depths as depicted in the HCell.
[20] Concur. Chart depths and features as depicted in the HCell.
[21] Concur.
[22] See attached Tide Note dated September 4, 2009.
[23] For both 16549 and 16551, update contours based on new survey data and depths as depicted in the HCell.
[24] The 2.7 fathom rock has been applied to the charts and is included in the HCell.
[25] The rock awash is included in the HCell.
[26] Concur. Chart depths as depicted in the HCell.
[27] Update depths and features as depicted in the HCell. Update charted coastline based on the latest available GC shoreline.
[28] Concur with clarification. Recommend that chart 16549 be updated based the appearance of 16551 and update foul areas as depicted in the HCell. Update charted coastline based on the latest available GC shoreline.
[29] Concur with clarification. The offshore 'Foul' notation has been blue noted to be removed. The 'several breakers visible' notation has been blue noted to be retained because given the surrounding features, it is possible that at certain tide ranges, water may break over those features.
[30] Concur.
[31] Concur.
[32] All twelve DTONs have been applied to the chart and all are included in the HCell. It is recommended that the 3fm 1ft DTON reported at 55-06-52.330N, 161-37-36.182W be charted as a sounding and not a rock because there is not a sharp contrast in depths between this DTON and the surrounding depths to indicate that it is a distinct rock.
[33] See attached DTON report.

[34] Chart foul areas as depicted in the HCell.
[35] Chart foul areas as depicted in the HCell.
[36] Concur with clarification. The submitted hob files were used in the compilation of HCell H12080. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.
[37] Concur.
[38] Concur.
[39] Concur.
[40] Concur.
[41] Seven bottom samples collected during H12080 are included in the HCell. Two bottom samples were excluded because they fell within rocky seabed areas that were delineated during compilation.

H12080 DTON Repot

Registry Number: H12080

State: Alaska

Locality: Pavlof Islands

Sub-locality: Vicinity of Poperechnoi Island

Project Number: OPR-P184-RA-09

Survey Dates: 06/25/2009 - 07/31/2009

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16551	10th	04/01/2008	1:80,000 (16551_1)	NGA NTM: None (04/11/2009) USCG LNM: None (04/07/2009) CHS NTM: None (03/27/2009)
16549	15th	07/01/2003	1:80,000 (16549_1)	[L]NTM: ?
16540	12th	01/01/2005	1:300,000 (16540_1)	[L]NTM: ?
16011	37th	11/01/2007	1:1,023,188 (16011_1)	[L]NTM: ?
16006	35th	04/01/2008	1:1,534,076 (16006_1)	[L]NTM: ?
513	7th	06/01/2004	1:3,500,000 (513_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	11.27 m	55° 04' 31.0" N	161° 31' 56.5" W	---
1.2	Rock	7.10 m	55° 05' 04.0" N	161° 31' 52.5" W	---
1.3	Rock	4.88 m	55° 03' 46.8" N	161° 41' 28.8" W	---
1.4	Rock	4.82 m	55° 03' 45.8" N	161° 42' 00.9" W	---
1.5	Rock	5.85 m	55° 06' 52.3" N	161° 37' 36.3" W	---
1.6	Rock	9.06 m	55° 03' 34.3" N	161° 32' 50.9" W	---
1.7	Rock	6.91 m	55° 06' 05.5" N	161° 33' 10.8" W	---

1.8	Rock	6.79 m	55° 05' 49.7" N	161° 33' 12.9" W	---
1.9	Rock	13.15 m	55° 03' 38.3" N	161° 38' 27.3" W	---
1.10	Rock	15.78 m	55° 03' 31.5" N	161° 39' 25.3" W	---
1.11	Rock	5.50 m	55° 02' 59.9" N	161° 35' 53.1" W	---
1.12	Rock	10.74 m	55° 03' 04.8" N	161° 34' 12.5" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 184/6 from h12080 / 2801_reson7125_hf_512 / 2009-212 / 908_2135

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 04' 31.0" N, 161° 31' 56.5" W

Least Depth: 11.27 m (= 36.97 ft = 6.161 fm = 6 fm 0.97 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.971 m ; **TVU (TPEv)** ±0.284 m

Timestamp: 2009-212.21:35:52.116 (07/31/2009)

Survey Line: h12080 / 2801_reson7125_hf_512 / 2009-212 / 908_2135

Profile/Beam: 184/6

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2801_reson7125_hf_512/2009-212/908_2135	184/6	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

6fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

11.3m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 11.267 m

WATLEV - 3:always under water/submerged

Feature Images

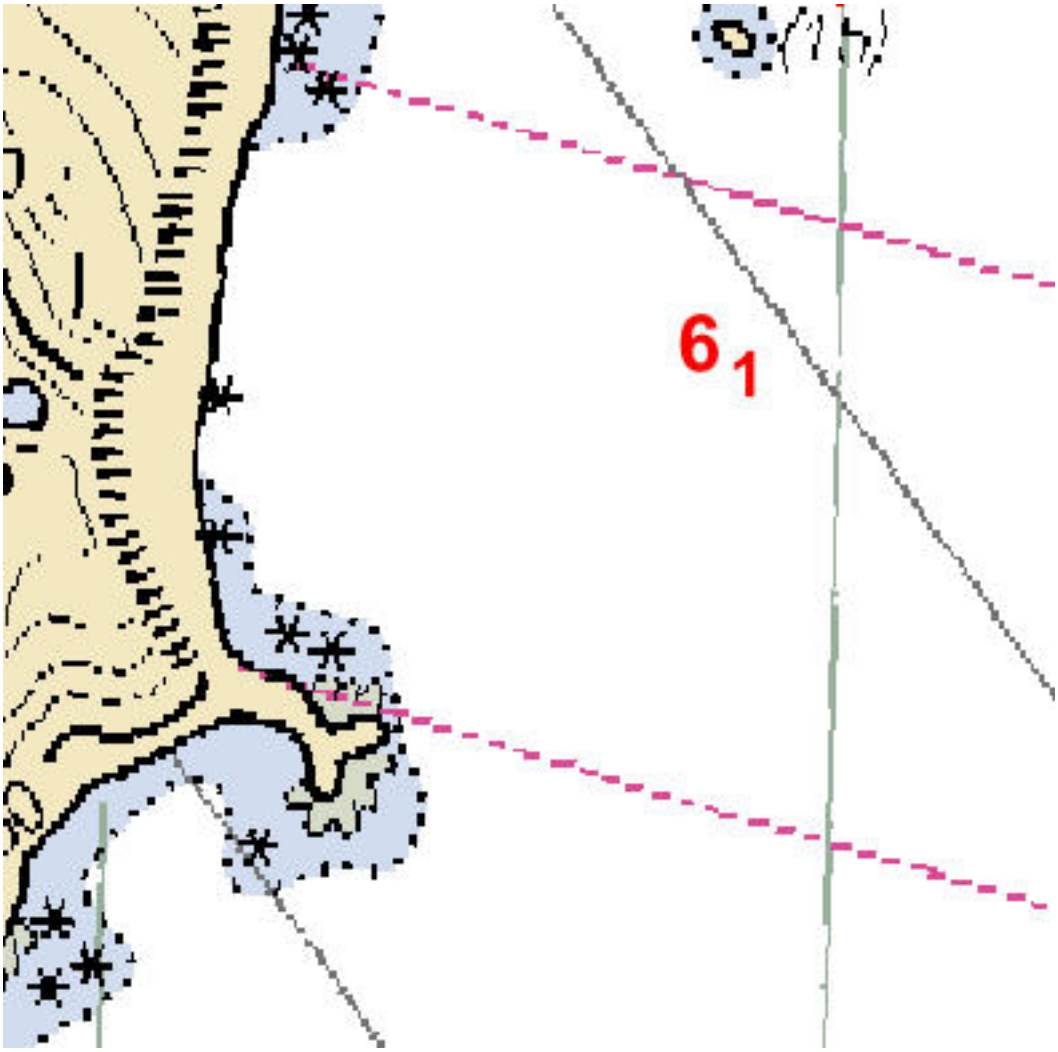


Figure 1.1.1

1.2) Profile/Beam - 344/125 from h12080 / 2801_reson7125_hf_512 / 2009-212 / 908_2313

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 05' 04.0" N, 161° 31' 52.5" W

Least Depth: 7.10 m (= 23.30 ft = 3.883 fm = 3 fm 5.30 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.266 m

Timestamp: 2009-212.23:14:35.288 (07/31/2009)

Survey Line: h12080 / 2801_reson7125_hf_512 / 2009-212 / 908_2313

Profile/Beam: 344/125

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2801_reson7125_hf_512/2009-212/908_2313	344/125	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

3 ¾fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

7.1m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 7.102 m

WATLEV - 3:always under water/submerged

Feature Images

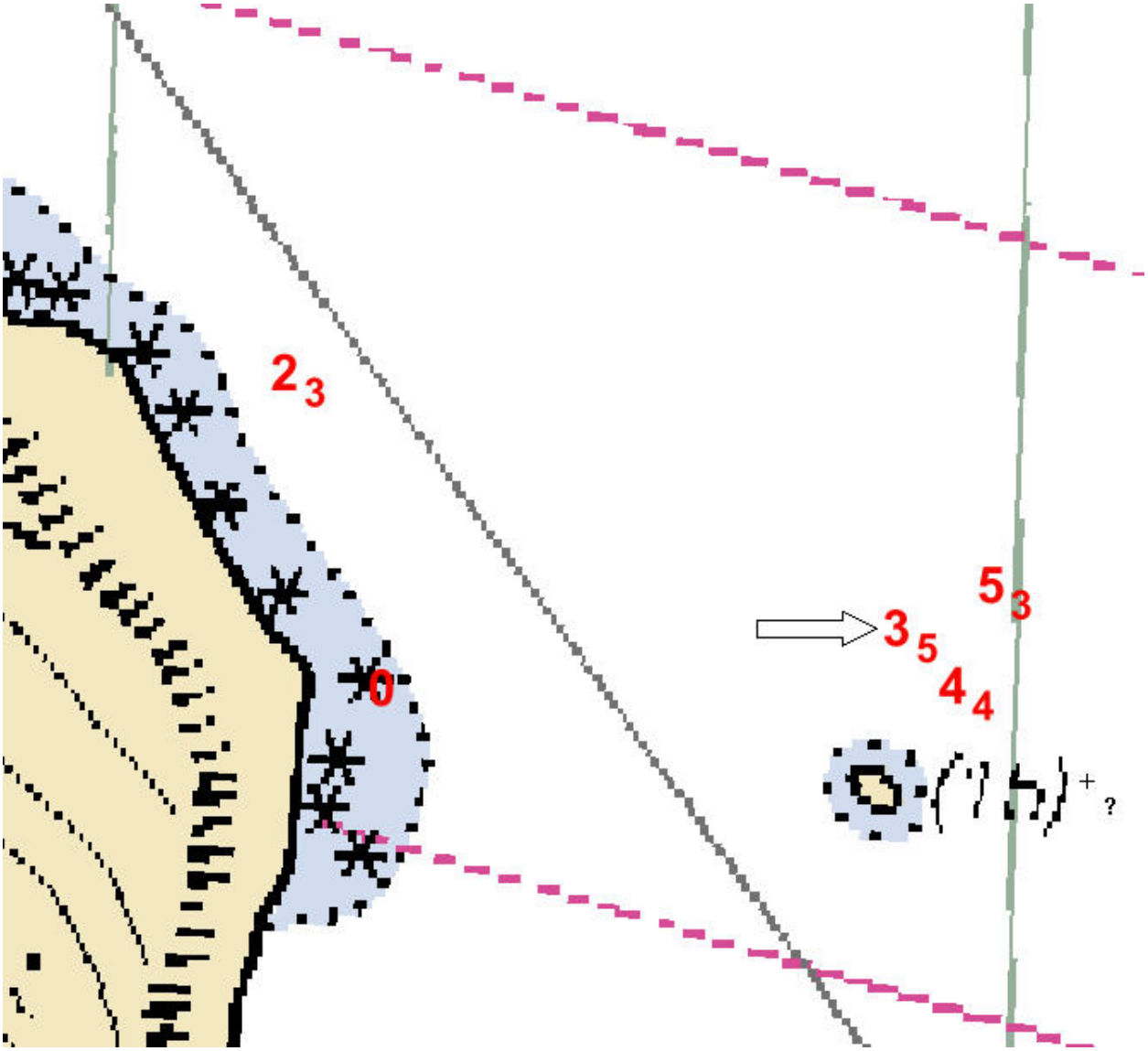


Figure 1.2.1

1.3) Profile/Beam - 179/355 from h12080 / 2802_reson7125_hf_512 / 2009-177 / 000_2241

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 03' 46.8" N, 161° 41' 28.8" W

Least Depth: 4.88 m (= 16.00 ft = 2.666 fm = 2 fm 4.00 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.264 m

Timestamp: 2009-177.22:41:58.816 (06/26/2009)

Survey Line: h12080 / 2802_reson7125_hf_512 / 2009-177 / 000_2241

Profile/Beam: 179/355

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2802_reson7125_hf_512/2009-177/000_2241	179/355	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

2 ½fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

4.9m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 4.876 m

WATLEV - 3:always under water/submerged

Feature Images

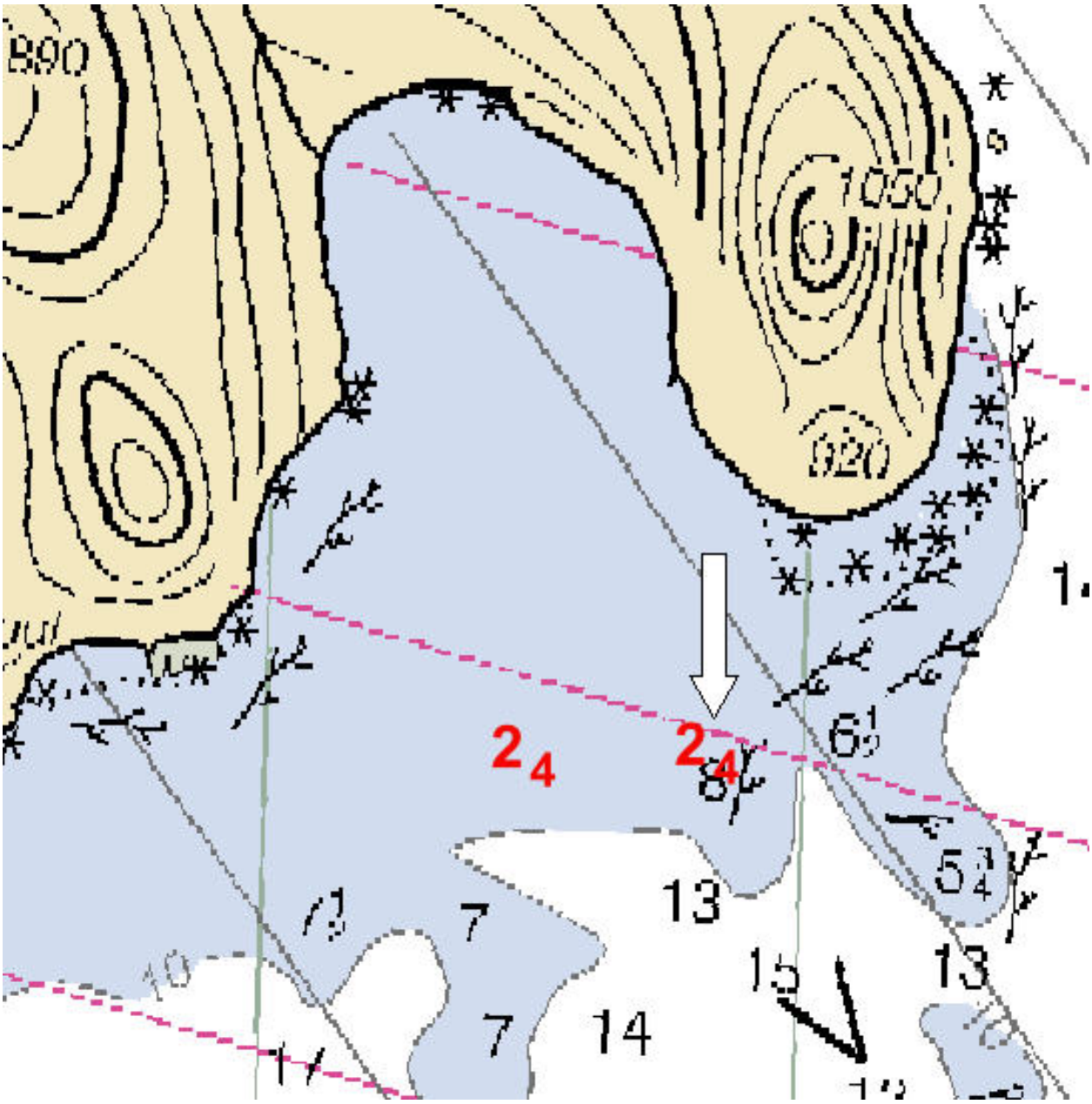


Figure 1.3.1

1.4) Profile/Beam - 437/57 from h12080 / 2802_reson7125_hf_512 / 2009-177 / 000a0009

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 03' 45.8" N, 161° 42' 00.9" W

Least Depth: 4.82 m (= 15.80 ft = 2.633 fm = 2 fm 3.80 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.267 m

Timestamp: 2009-178.00:10:38.459 (06/27/2009)

Survey Line: h12080 / 2802_reson7125_hf_512 / 2009-177 / 000a0009

Profile/Beam: 437/57

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2802_reson7125_hf_512/2009-177/000a0009	437/57	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

2 ½fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

4.8m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 4.815 m

WATLEV - 3:always under water/submerged

Feature Images

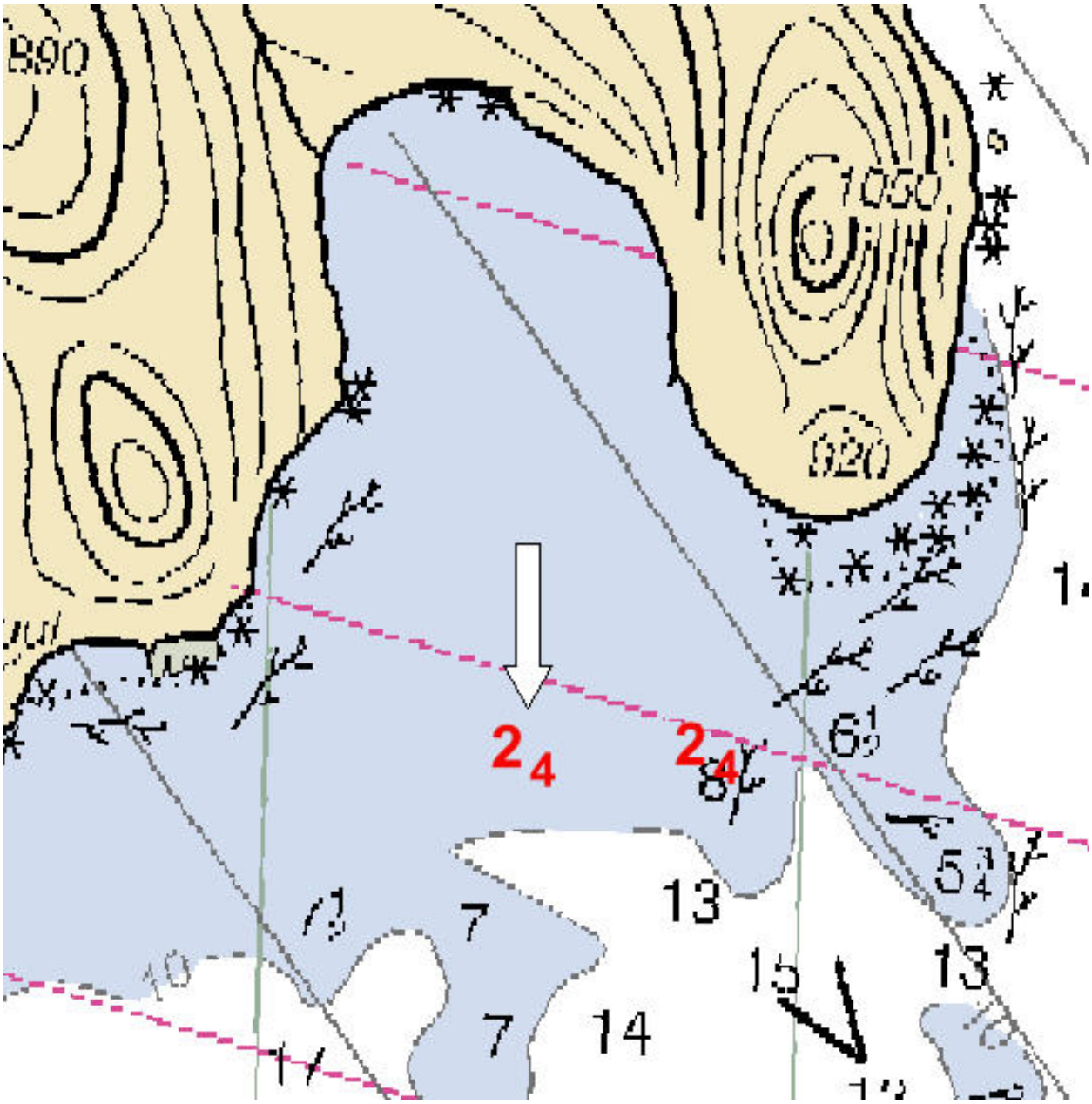


Figure 1.4.1

1.5) Profile/Beam - 1127/85 from h12080 / 2802_reson7125_hf_512 / 2009-179 / 000_2330

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 06' 52.3" N, 161° 37' 36.3" W

Least Depth: 5.85 m (= 19.20 ft = 3.200 fm = 3 fm 1.20 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.266 m

Timestamp: 2009-179.23:31:42.464 (06/28/2009)

Survey Line: h12080 / 2802_reson7125_hf_512 / 2009-179 / 000_2330

Profile/Beam: 1127/85

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2802_reson7125_hf_512/2009-179/000_2330	1127/85	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

3 ¼fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

5.9m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 5.852 m

WATLEV - 3:always under water/submerged

Feature Images

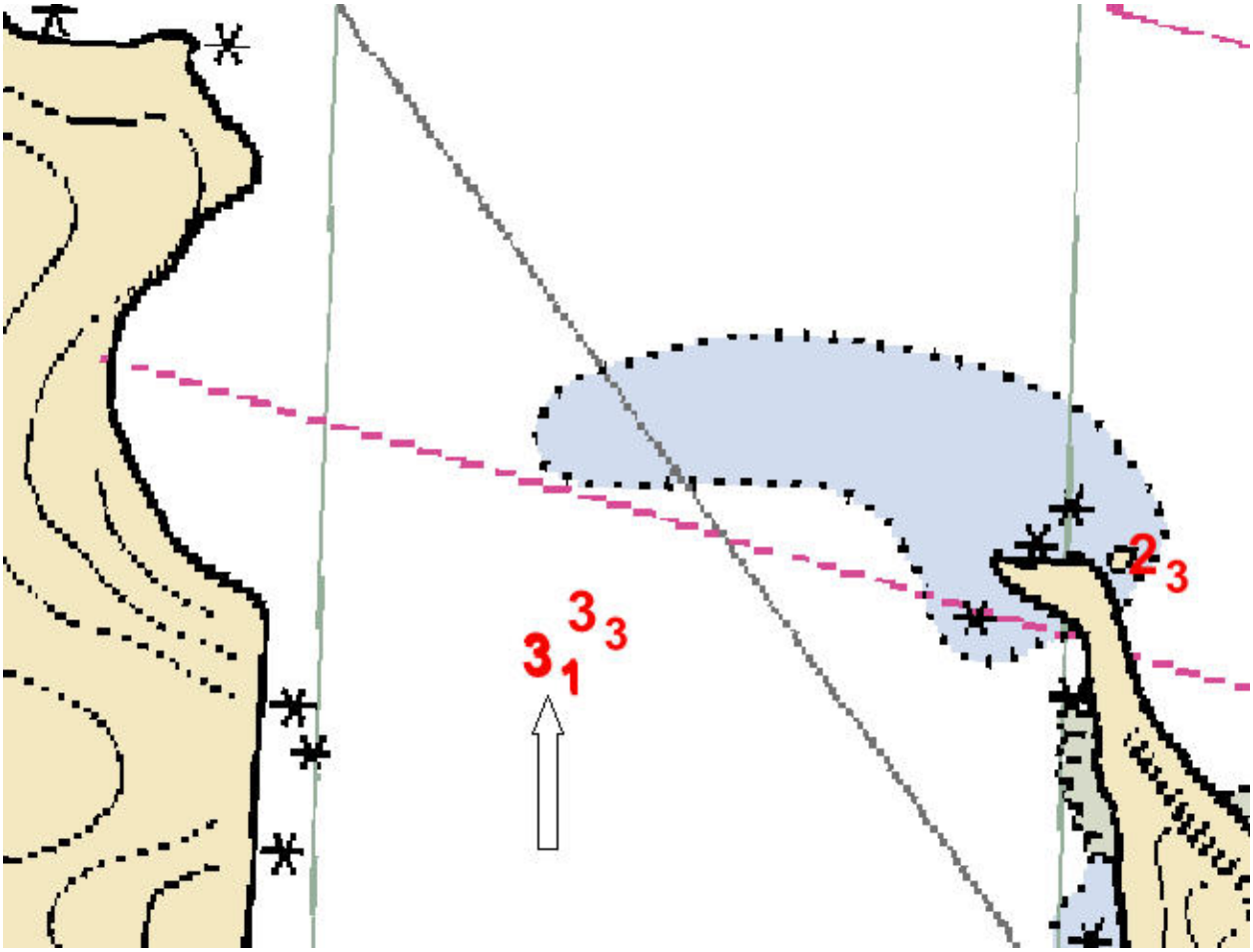


Figure 1.5.1

1.6) Profile/Beam - 325/145 from h12080 / 2803_reson7125_hf_512 / 2009-211 / 013_2206

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 03' 34.3" N, 161° 32' 50.9" W

Least Depth: 9.06 m (= 29.74 ft = 4.956 fm = 4 fm 5.74 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.266 m

Timestamp: 2009-211.22:07:16.694 (07/30/2009)

Survey Line: h12080 / 2803_reson7125_hf_512 / 2009-211 / 013_2206

Profile/Beam: 325/145

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2803_reson7125_hf_512/2009-211/013_2206	325/145	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

5fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

9.1m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 9.064 m

WATLEV - 3:always under water/submerged

Feature Images

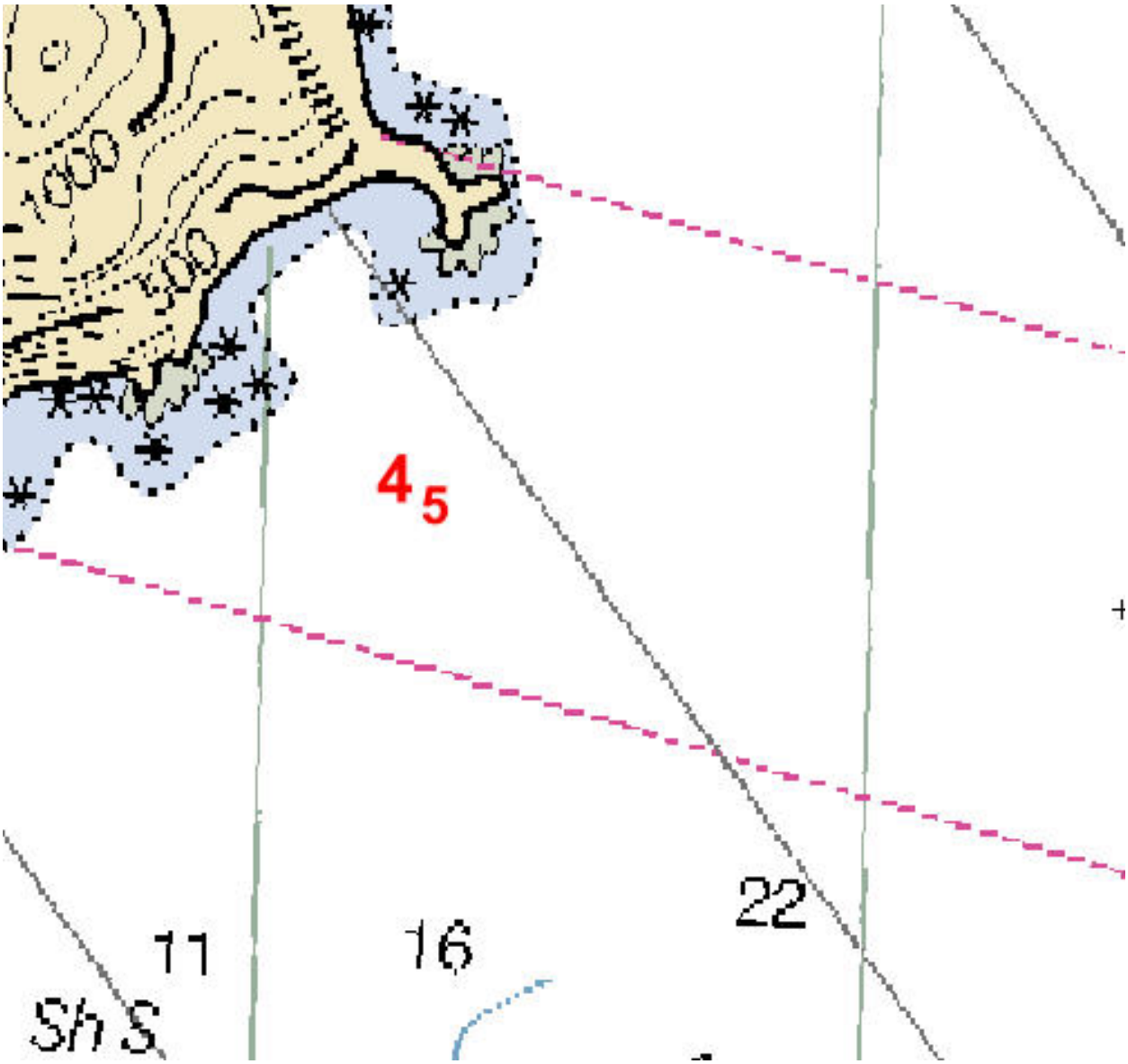


Figure 1.6.1

1.7) Profile/Beam - 419/475 from h12080 / 2803_reson7125_hf_512 / 2009-212 / 311_2125

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 06' 05.5" N, 161° 33' 10.8" W

Least Depth: 6.91 m (= 22.66 ft = 3.777 fm = 3 fm 4.66 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.270 m

Timestamp: 2009-212.21:26:28.438 (07/31/2009)

Survey Line: h12080 / 2803_reson7125_hf_512 / 2009-212 / 311_2125

Profile/Beam: 419/475

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2803_reson7125_hf_512/2009-212/311_2125	419/475	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

3 ¾fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

6.9m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 6.908 m

WATLEV - 3:always under water/submerged

Feature Images

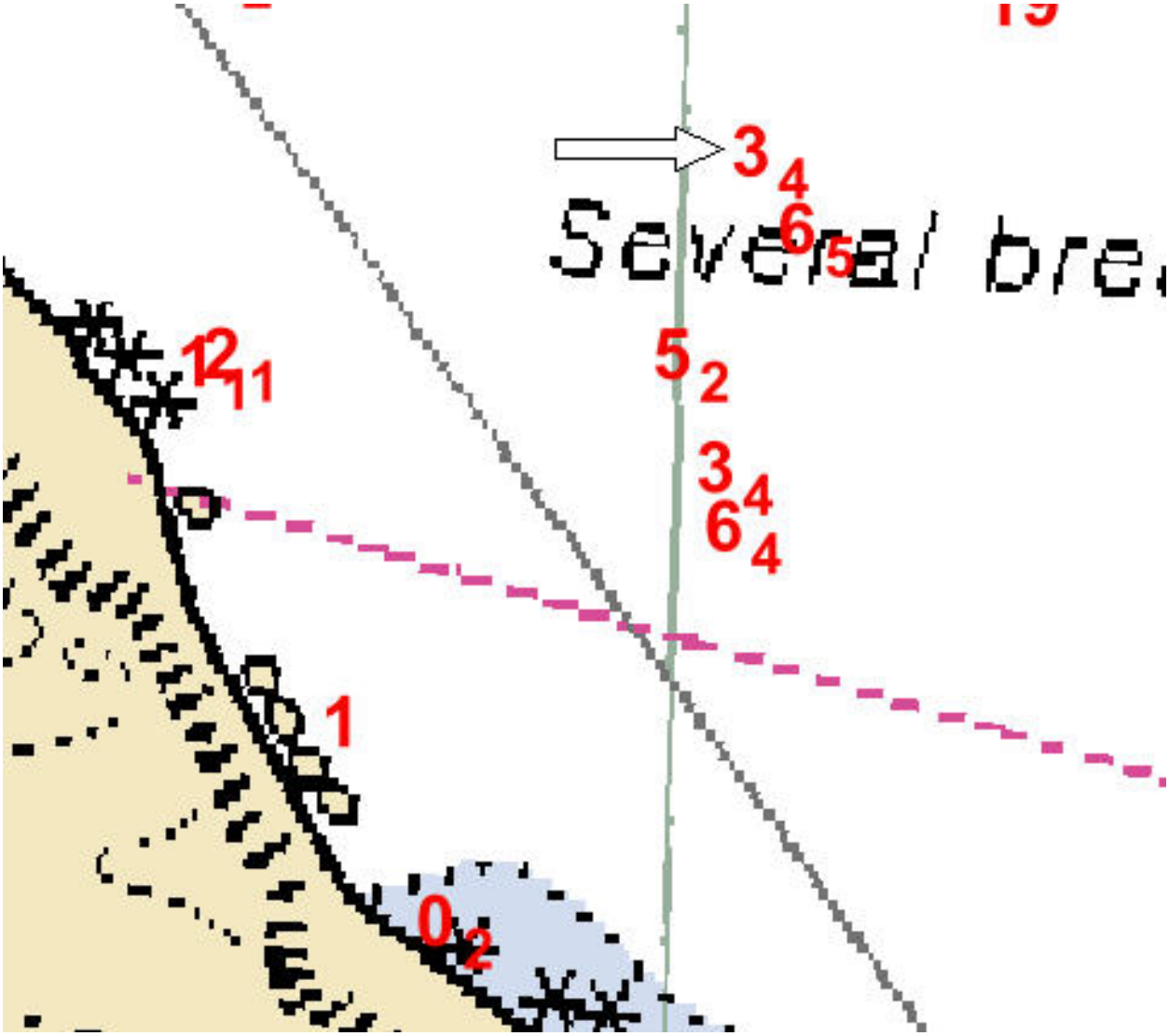


Figure 1.7.1

1.8) Profile/Beam - 1050/153 from h12080 / 2803_reson7125_hf_512 / 2009-212 / 315_2157

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 05' 49.7" N, 161° 33' 12.9" W

Least Depth: 6.79 m (= 22.29 ft = 3.715 fm = 3 fm 4.29 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.265 m

Timestamp: 2009-212.22:00:46.366 (07/31/2009)

Survey Line: h12080 / 2803_reson7125_hf_512 / 2009-212 / 315_2157

Profile/Beam: 1050/153

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2803_reson7125_hf_512/2009-212/315_2157	1050/153	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

3 ¾fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

6.8m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 6.794 m

WATLEV - 3:always under water/submerged

Feature Images

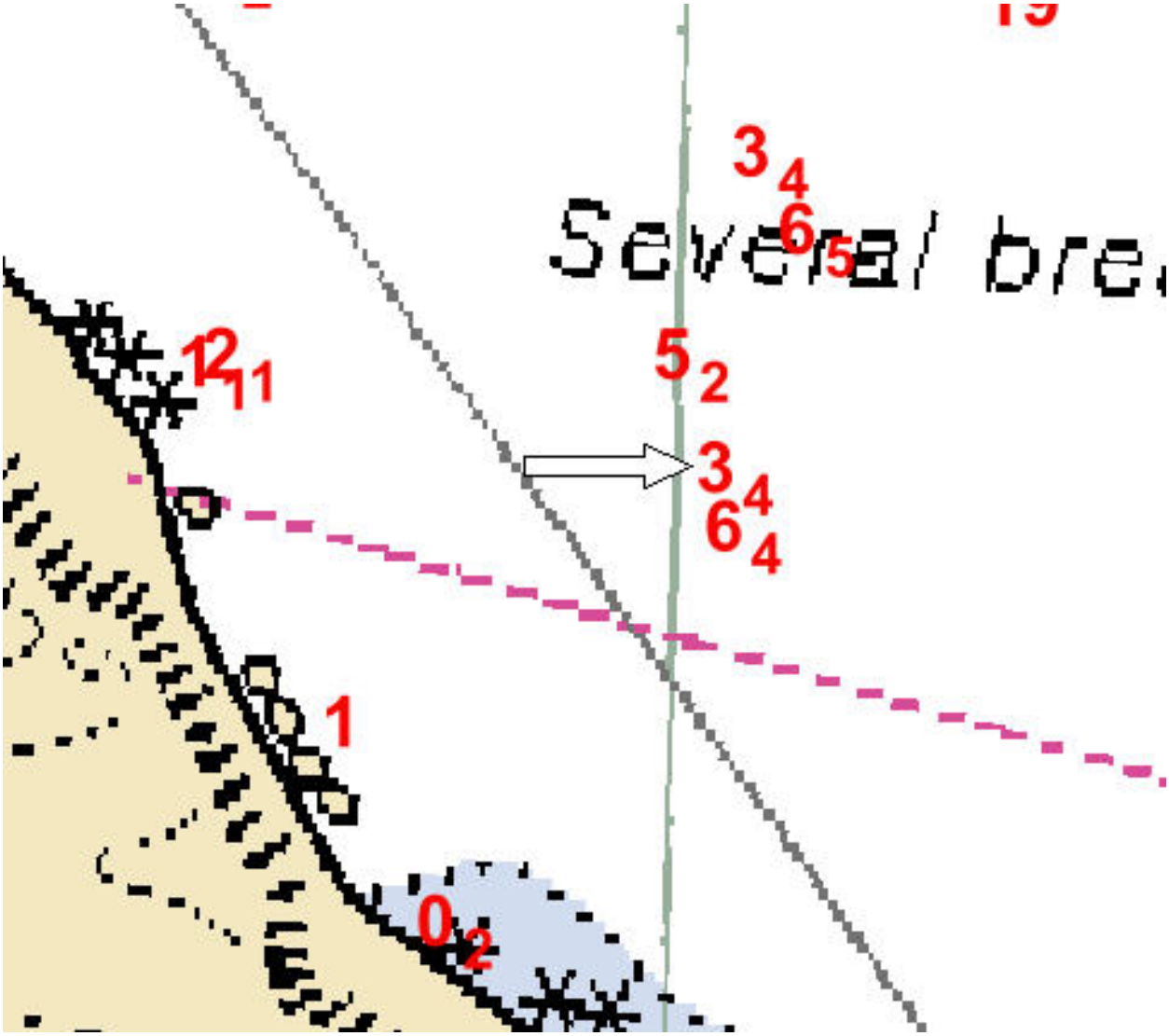


Figure 1.8.1

1.9) Profile/Beam - 463/41 from h12080 / 2804_reson7125_hf_512 / 2009-175 / 000_0059

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 03' 38.3" N, 161° 38' 27.3" W

Least Depth: 13.15 m (= 43.14 ft = 7.191 fm = 7 fm 1.14 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.982 m ; **TVU (TPEv)** ±0.303 m

Timestamp: 2009-176.01:01:23.965 (06/25/2009)

Survey Line: h12080 / 2804_reson7125_hf_512 / 2009-175 / 000_0059

Profile/Beam: 463/41

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2804_reson7125_hf_512/2009-175/000_0059	463/41	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

7 ¼fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

13.2m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 13.150 m

WATLEV - 3:always under water/submerged

Feature Images

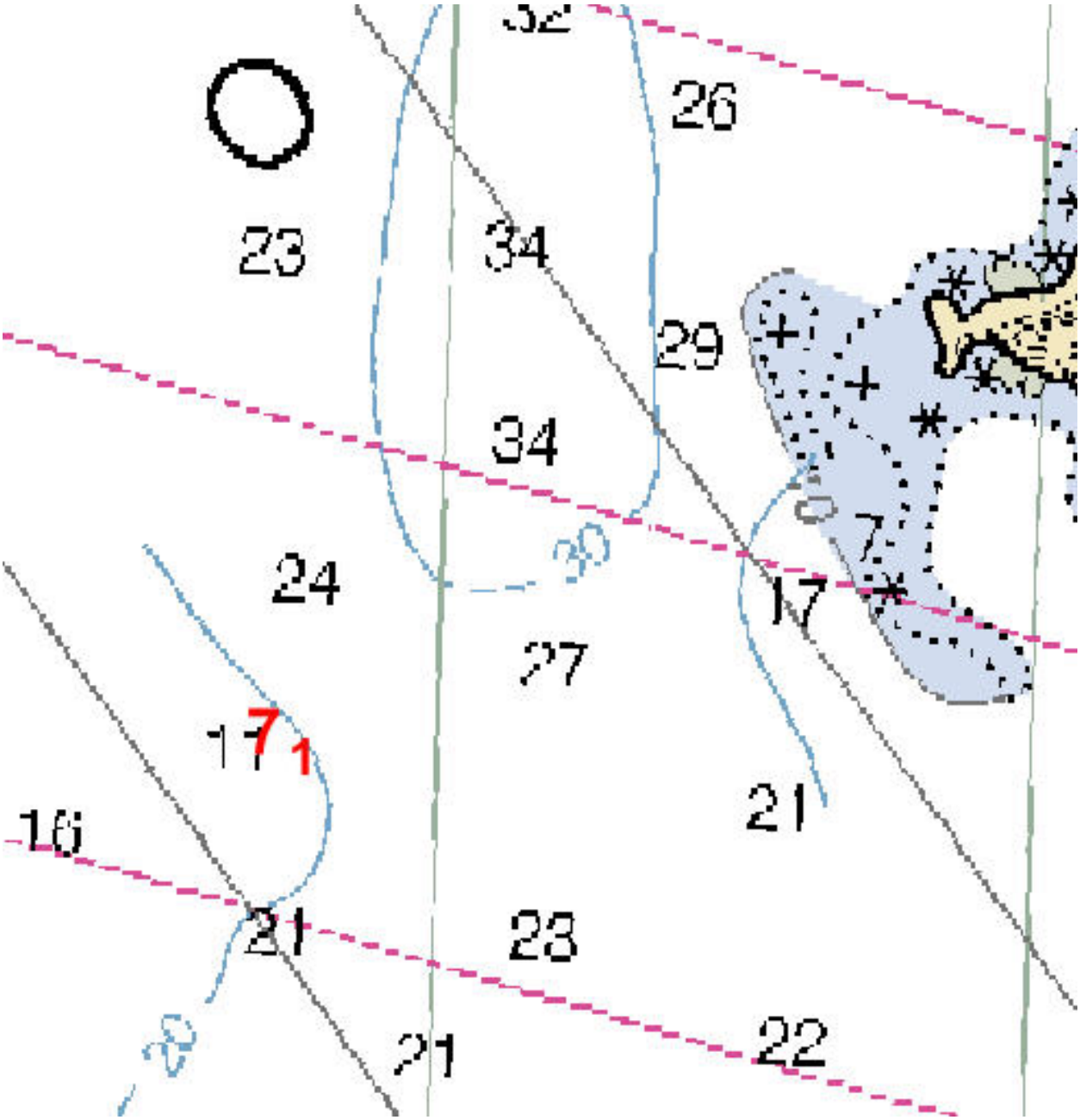


Figure 1.9.1

1.10) Profile/Beam - 2173/434 from h12080 / 2804_reson7125_hf_512 / 2009-176 / 000_1759

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 03' 31.5" N, 161° 39' 25.3" W

Least Depth: 15.78 m (= 51.77 ft = 8.628 fm = 8 fm 3.77 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.969 m ; **TVU (TPEv)** ±0.279 m

Timestamp: 2009-176.18:05:36.572 (06/25/2009)

Survey Line: h12080 / 2804_reson7125_hf_512 / 2009-176 / 000_1759

Profile/Beam: 2173/434

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2804_reson7125_hf_512/2009-176/000_1759	2173/434	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

8 ½fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

15.8m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 15.778 m

WATLEV - 3:always under water/submerged

Feature Images

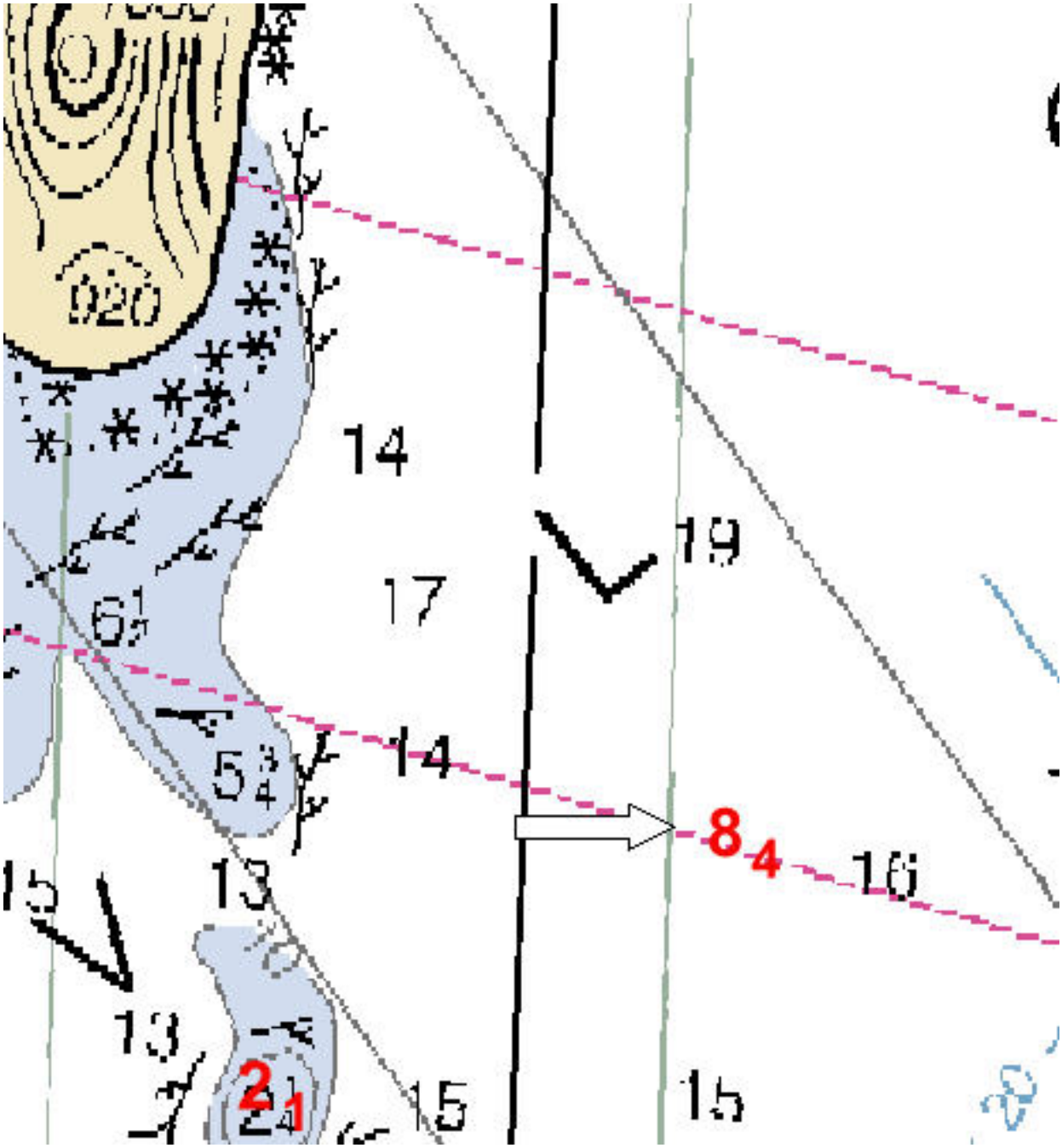


Figure 1.10.1

1.11) Profile/Beam - 284/482 from h12080 / 2804_reson7125_hf_512 / 2009-177 / 000_2348

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 02' 59.9" N, 161° 35' 53.1" W

Least Depth: 5.50 m (= 18.03 ft = 3.006 fm = 3 fm 0.03 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.268 m

Timestamp: 2009-177.23:48:40.147 (06/26/2009)

Survey Line: h12080 / 2804_reson7125_hf_512 / 2009-177 / 000_2348

Profile/Beam: 284/482

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2804_reson7125_hf_512/2009-177/000_2348	284/482	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

3fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

5.5m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 5.497 m

WATLEV - 3:always under water/submerged

Feature Images

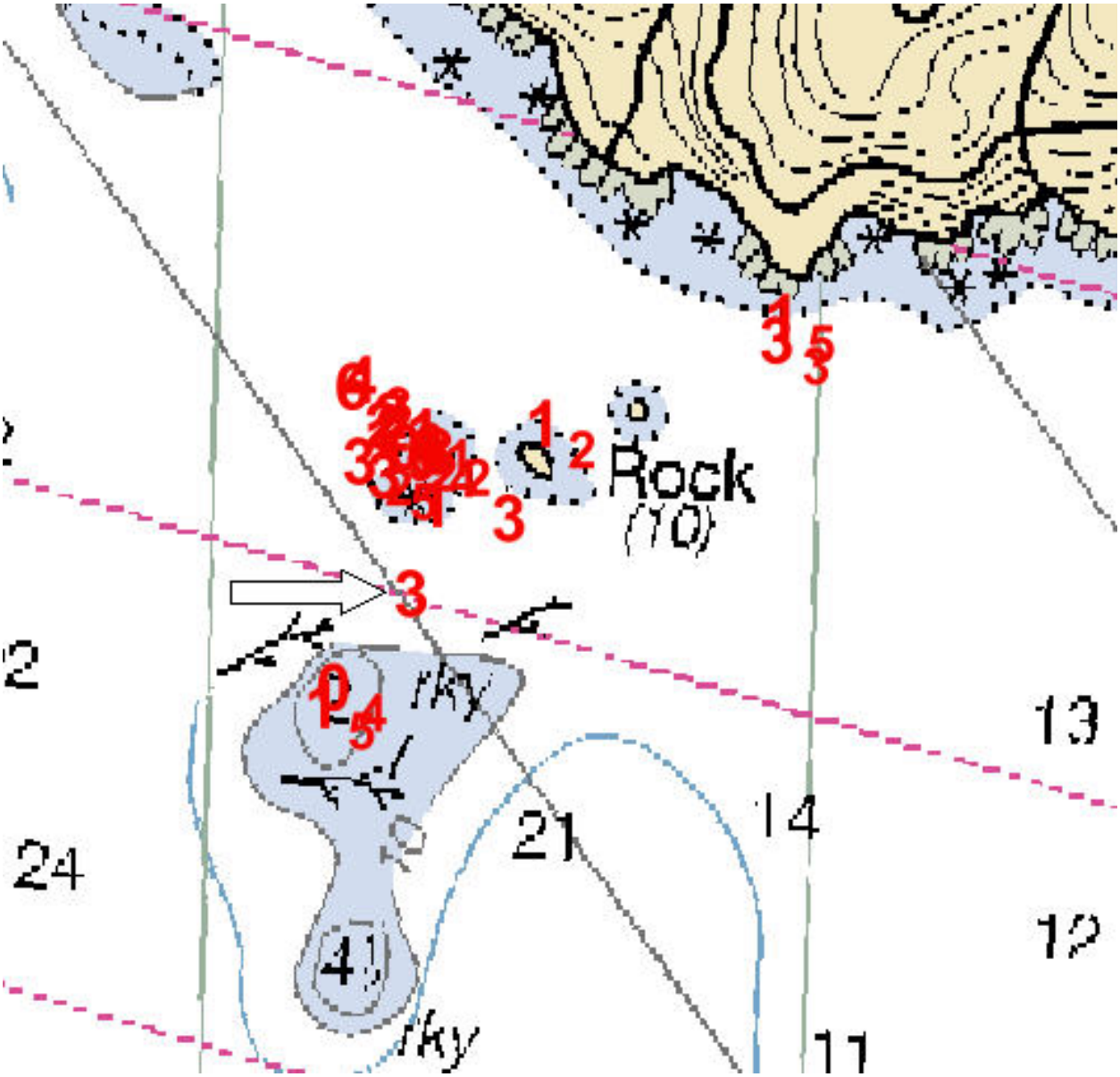


Figure 1.11.1

1.12) Profile/Beam - 123/186 from h12080 / 2804_reson7125_hf_512 / 2009-177 / 000a0006

DANGER TO NAVIGATION

Survey Summary

Survey Position: 55° 03' 04.8" N, 161° 34' 12.5" W

Least Depth: 10.74 m (= 35.25 ft = 5.875 fm = 5 fm 5.25 ft)

TPU (±1.96σ): **THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.266 m

Timestamp: 2009-178.00:07:10.198 (06/27/2009)

Survey Line: h12080 / 2804_reson7125_hf_512 / 2009-177 / 000a0006

Profile/Beam: 123/186

Charts Affected: 16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 500_1, 513_1, 530_1, 50_1

Remarks:

DTON

Dangerous submerged rock

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12080/2804_reson7125_hf_512/2009-177/000a0006	123/186	0.00	000.0	Primary

Hydrographer Recommendations

Chart with bathymetry from the current survey.

Cartographically-Rounded Depth (Affected Charts):

5 ¾fm (16549_1, 16551_1, 16540_1, 16011_1, 16006_1, 530_1)

10.7m (500_1, 513_1, 50_1)

S-57 Data

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

Attributes: SORDAT - 20090731

SORIND - US,US,nsurf,H12080

VALSOU - 10.744 m

WATLEV - 3:always under water/submerged

Feature Images

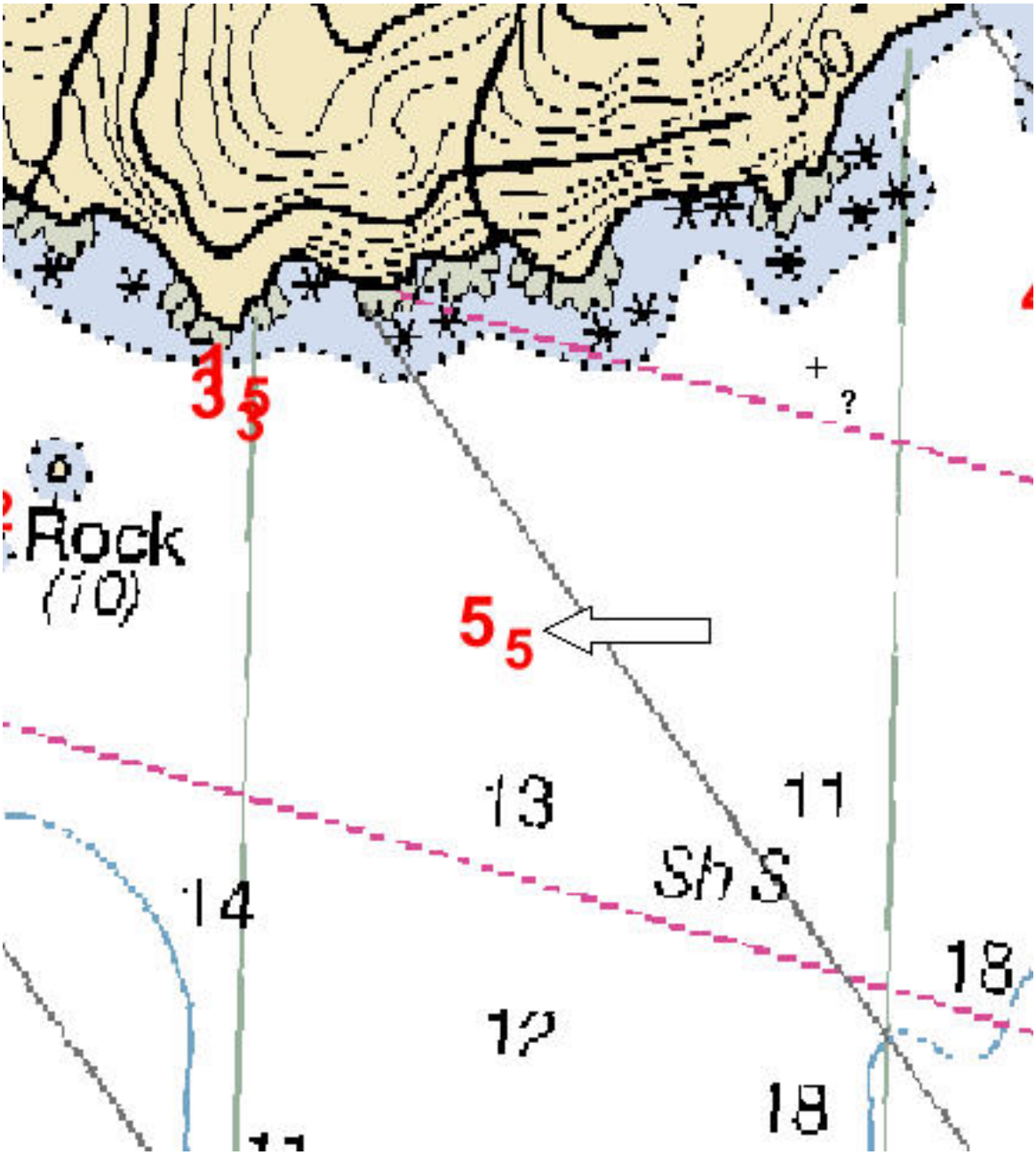


Figure 1.12.1

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : September 4, 2009

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P184-RA-2009
HYDROGRAPHIC SHEET: H12080

LOCALITY: Vicinity of Poperechnoi, AK
TIME PERIOD: June 17 - August 1, 2009

TIDE STATION USED: 945-9450 Sand Point, AK
Lat. 55° 19.9'N Long. 160° 30.3' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.988 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SWA205 & SWA218

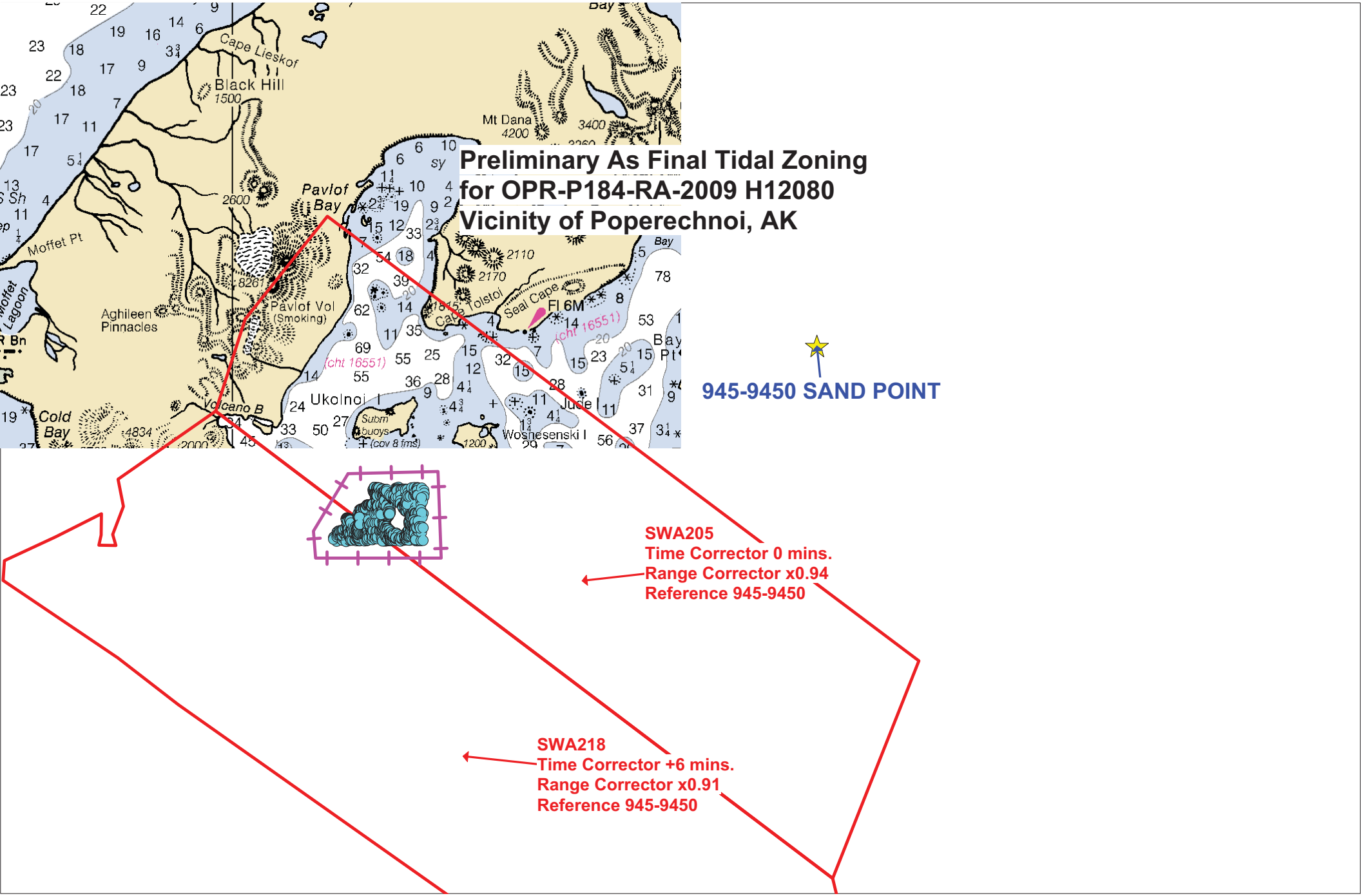
Refer to attachments for zoning information.

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

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2009.09.11 15:37:26 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION


Preliminary As Final Tidal Zoning
for OPR-P184-RA-2009 H12080
Vicinity of Poperechnoi, AK
945-9450 SAND POINT
SWA205
Time Corrector 0 mins.
Range Corrector x0.94
Reference 945-9450
SWA218
Time Corrector +6 mins.
Range Corrector x0.91
Reference 945-9450
Cape Lieskof
Black Hill
1500
Mt Dana
4200
3400
Pavlof Bay
Moffet Pt
2600
8267
Aghileen Pinnacles
Pavlof Vol (Smoking)
Volcano B
Cold Bay
4834
Ukolnoi I
Subm buoys
(cov 8 fms)
Tolstoi
Seal Cape
Fl 6M
(cht 16551)
Jude I
Woshesenski I
1200
2110
2170

H12080 HCell Report

Katie Reser, Physical Scientist
Pacific Hydrographic Branch

1. Specifications, Standards and Guidance Used in HCell Compilation

HCell compilation of survey H12080 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 H12080 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
16549	1:80,000	16th	03/01/2010	05/22/2010
16551	1:80,000	10th	04/01/2008	09/11/2010

The following ENCs were also used during compilation:

Chart	Scale
US4AK55M	1:80,000

3. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from a 4-meter multibeam combined surface in CARIS BASE Editor. A shoal-biased selection was made at 1:15,000 survey scale using a Radius Table file with values shown in the table, below.

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

In CARIS BASE Editor soundings were manually selected from the high density sounding 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	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 H12080_SS.000
0	0.0000	0.2286	0.125	0
3	5.4864	5.715	3.125	3
5	9.144	9.373	5.125	5
10	18.288	18.517	10.125	10
20	36.576	37.948	20.750	20
30	54.864	56.2356	30.750	30
40	73.152	74.5236	40.750	40

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

5. Meta Areas

The following Meta object areas are included in HCell H12080:

M_QUAL

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

6. Features

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

7. S-57 Objects and Attributes

The *_CS HCell contains the following Objects:

$CSYMB	Blue notes
COALNE	GC coastline
DEPCNT	Zero contours
M_QUAL	Data quality meta object
OBSTRN	Obstruction areas
SBDARE	Ledges, reefs, rocky seabed areas and bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rocks
WEDKLP	Kelp

The *_SS HCell contains the following Objects:

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

8. Spatial Framework

8.1 Coordinate System

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

8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

9. Data Processing Notes

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

10. QA/QC and ENC Validation Checks

H12080 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

H12080_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:80,000
H12080 _SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:15,000
H12080 _DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12080 _Outline.gml	Survey outline
H12080 _Outline.xsd	Survey outline

11.2 Software

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

12. Contacts

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

Katie Reser
Physical Scientist
Pacific Hydrographic Branch
Seattle, WA
206-526-6864
katie.reser@noaa.gov

APPROVAL SHEET
H12080

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

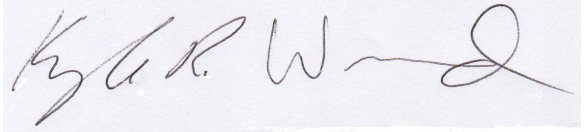
Katie Reser
2010.10.28
06:54:33 -07'00'

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 Pete Holmberg
DN: cn=Pete Holmberg, o=NOAA, ou=PHB, email=peter.holmberg@noaa.gov, c=US
Date: 2010.10.28 07:39:01 -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.

Digitally signed by Gary C. Nelson
DN: cn=Gary C. Nelson, o=NOAA, ou=Pacific Hydrographic Branch, email=gary.nelson@noaa.gov, c=US
Date: 2010.10.28 09:14:26 -07'00'



Kyle R. Ward
AWOIS and SURF check Complete
2010.12.03 15:00:03 -05'00'