

H11518

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. ....

Registry No. .... H11518

### LOCALITY

State ..... Alaska

General Locality ..... Southwestern Alaskan Peninsula

Sublocality ..... Coal Cape

**2006**

### CHIEF OF PARTY

..... Dean Moyles, Fugro Pelagos, Inc.

### LIBRARY & ARCHIVES

DATE .....

**HYDROGRAPHIC TITLE SHEET**

H11518

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.

State Alaska

General Locality Southwestern Alaskan Peninsula

Sublocality Coal Cape

Scale 1:10,000

Date of Survey June 3, 2006 -June 16, 2006

Instructions Dated 2/3/2006

Project No. OPR-P182-KR-06

Vessel R/V QUICKSILVER (947419) & R/V OCEAN PIONEER (557401)

Chief of Party DEAN MOYLES

Surveyed by MOYLES, ORTHMANN, REYNOLDS, GILL, MOUNT, STOCK, FARLEY, ET AL

Soundings taken by echo sounder RESON 8101 (Hull Mounted) & 8111 (Hull Mounted)

Graphic record scaled by FUGRO PELAGOS, INC. PERSONNEL

Graphic record checked by FUGRO PELAGOS, INC. PERSONNEL

Evaluation by B. Johnston

Automated plot by N/A

Verification by B. Johnston, K. Reser

Soundings in Fathoms and Feet

at

MLLW

REMARKS: Time in UTC. UTM Projection Zone 4

Revisions and annotations appearing as endnotes were

generated during office processing.

As a result, page numbering may be interrupted or non-sequential

All separates are filed with the hydrographic data.



**A – Area Surveyed**

H11518 (Sheet B) is bound by the coordinates listed below, which encompasses Coal Cape.

Hydrographic data collection began on June 3, 2006 and ended on June 16, 2006.

**Table 1 – H11518 Sheet Limits**

<b>Sheet Limits</b> Task Order #1 H11518 Sheet B Scale 1:10,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	55°55'40.36" N	159°00'56.37" W
2	55°55'40.36" N	159°07'19.53" W
3	55°49'33.09" N	159°07'19.53" W
4	55°49'33.09" N	159°00'56.37" W

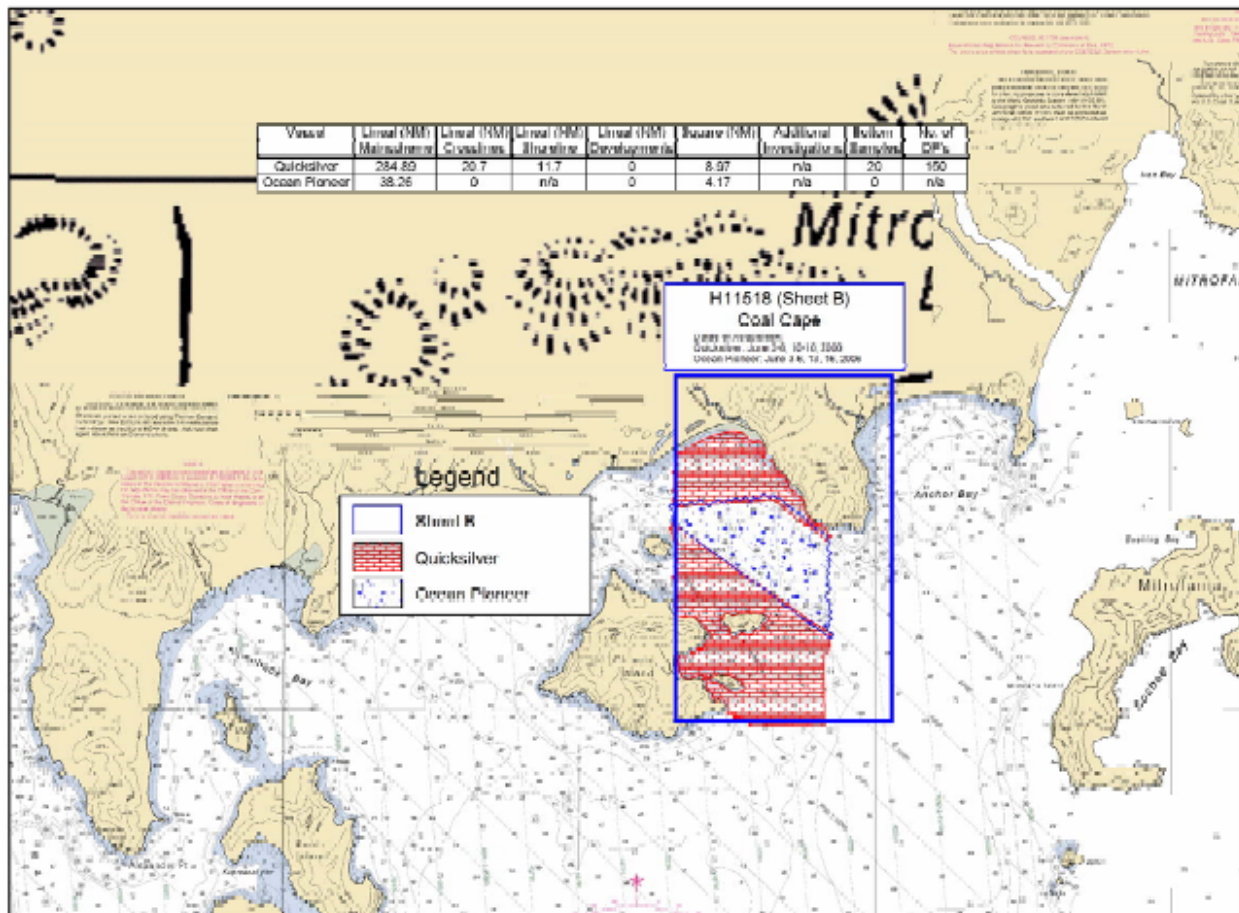


Figure 1: H11518 Area Surveyed



## **B – Data Acquisition and Processing**

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report<sup>1</sup> for a detailed description of all equipment, survey vessels, processing procedures and quality control features. Items specific to this survey and any deviations from the Data Acquisition and Processing Report are discussed in the following sections

### Equipment & Vessels

The R/V Quicksilver acquired all near-shore sounding data for H11518. The Quicksilver, which is 32 feet in length with a draft of 3 feet, was equipped with a Reson 8108 with option 033 (pseudo Side Scan) for multibeam data acquisition. The vessel was also equipped with two AML sound velocity and pressure sensors (SV&P) for sound velocity profiles. Vessel attitude and position were measured using an Applanix Position and Orientation System for Marine Vessel (POS MV 320 V4) with XTF files logged in Triton ISIS V 7.0.413.9.

The R/V Ocean Pioneer acquired all off-shore sounding data for H11518. The Ocean Pioneer, which is 205 feet in length with a draft of 17 feet, was equipped with a Reson 8111 with option 033 (pseudo Side Scan) for multibeam data acquisition. The vessel was also equipped with two AML sound velocity and pressure sensors (SV&P) for sound velocity profiles. Vessel attitude and position were measured using an Applanix Position and Orientation System for Marine Vessel (POS MV 320 V4) with XTF files logged in Triton ISIS V 7.0.413.9.

A 25 ft skiff, referred to as the DP Skiff, was used to perform item investigations and shoreline verification. The skiff was equipped with a CSI GBX-PRO DGPS receiver, WinFrog v3.6.0 data acquisition system (operated on a Dell laptop), laser range finder and a Sony digital camera. NOAA nautical charts & LIDAR Smooth Sheets were displayed as a layer in WinFrog for reference. All soundings on submerged features were collected by the Quicksilver. The DP Skiff was utilized to mark locations of exposed rocks. A West Marine Single Beam Echosounder was used to aid the hydrographer on the skiff in locating the shoalest point of targets near the surf zone or areas of limited visibility.

Heights were taken on features awash or above the water level by visual estimation, using simultaneous comparison to a known reference (the vessel's bow).

Refer to OPR-P182-KR-06 Data Acquisition and Processing Report for a complete listing of equipment and vessel descriptions.

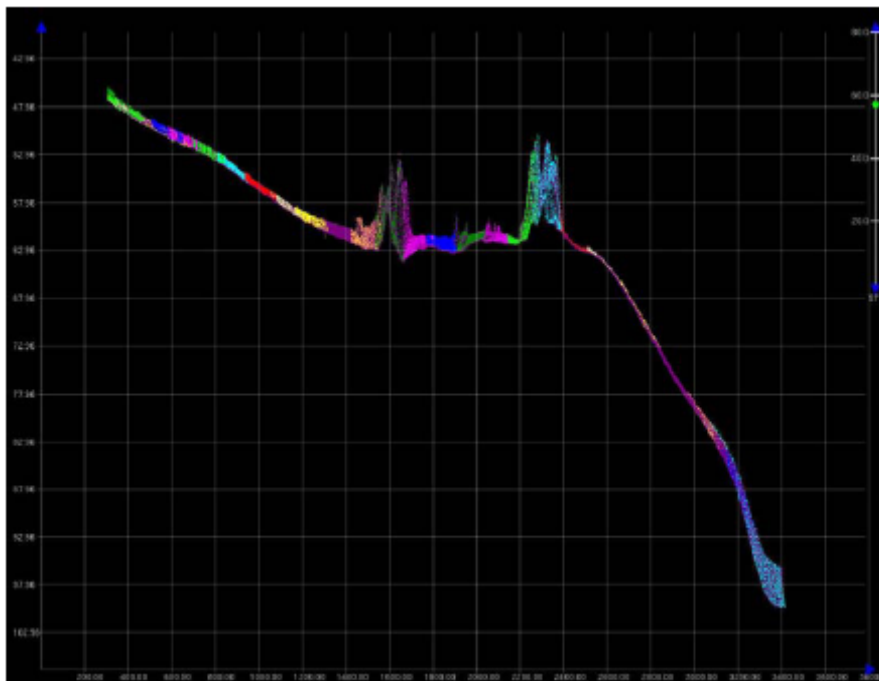
## Quality Control

### Crosslines

Quality control crosslines were planned to total at least five percent of the main scheme line length. Total crossline length surveyed was 20.7 nautical miles or 6.4 percent of the total main scheme nautical miles. Conducted crosslines were well distributed throughout the sheet to ensure adequate crossline quality control. Each crossline was compared to all main scheme lines it intersected, using the CARIS HIPS QC report routine.

The majority of QC Reports fall well within the required accuracy specifications.<sup>2</sup> However, beams that fall below the 95 percent confidence level in the QC Report are associated with specific areas and conditions illustrated below. It should be noted that data at these locations are in agreement with the surrounding offset lines and are considered well within the required specifications.<sup>3</sup>

The majority of beams that fell outside of the 95 percent confidence level were located in areas having extreme steep slopes and/or rocks. The figure below shows an example of this.



**Figure 2: Profile of 1B042-TIE01**

Note: The QC reports were generated based on the given accuracy specification of:

$$\pm \sqrt{[a^2 + (b * d)^2]}$$

where, a = 0.5, b = 0.013 and d = depth.

However, since a variance of a difference, rather than a variance from a mean is being used, the a and b values were defined in the user defined option within the CARIS HIPS QC Report routine:

$$a = 0.5 * \sqrt{2} = 0.707$$
$$b = 0.013 * \sqrt{2} = 0.018$$

#### Uncertainty Values (CARIS BASE Surface)

The majority of H11518 had uncertainty values of about 0.30 meters, but for areas having extremely steep slopes or deemed to be rocky, values ranged from 0.40 to 0.65 meters. The effects of speed sound error are very apparent in the graphic below and the uncertainty values on average were around 0.65m. No uncertainty values were greater than the IHO level Order 1.<sup>4</sup>

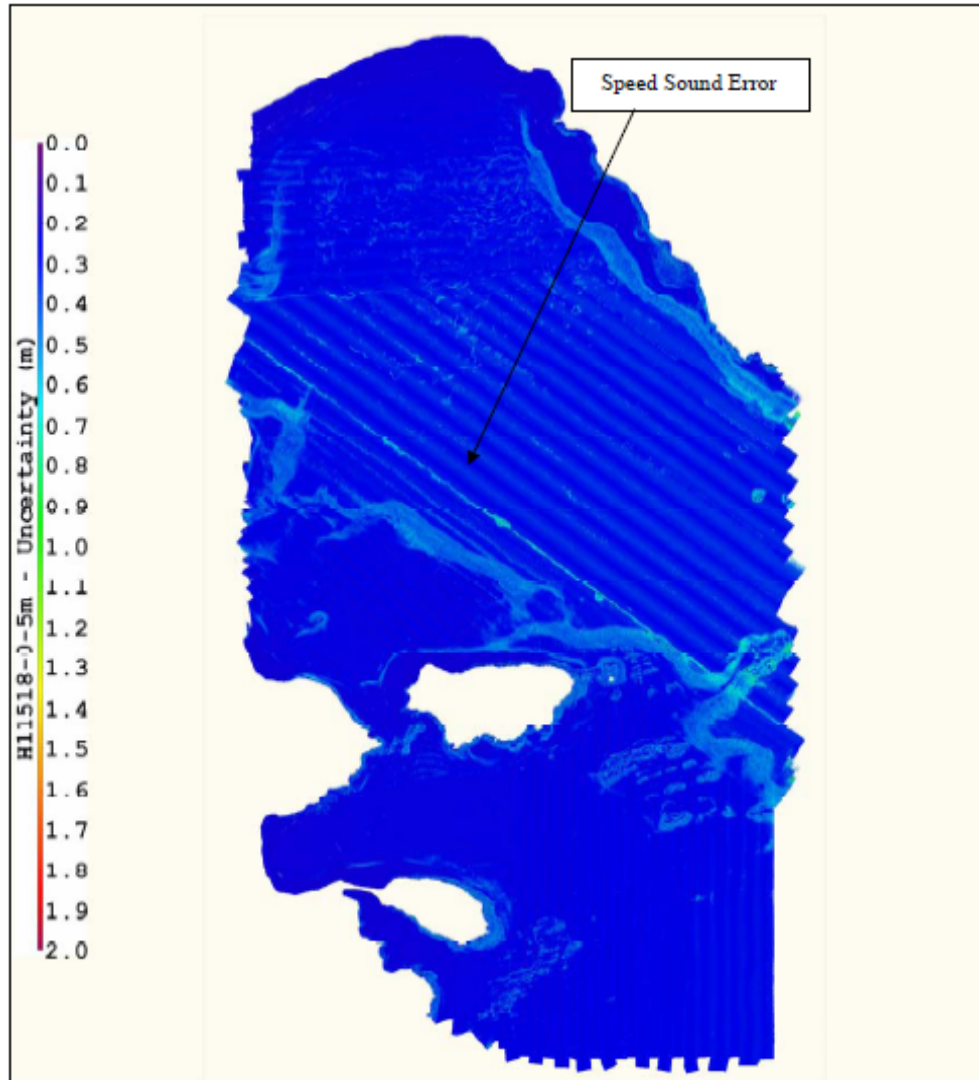


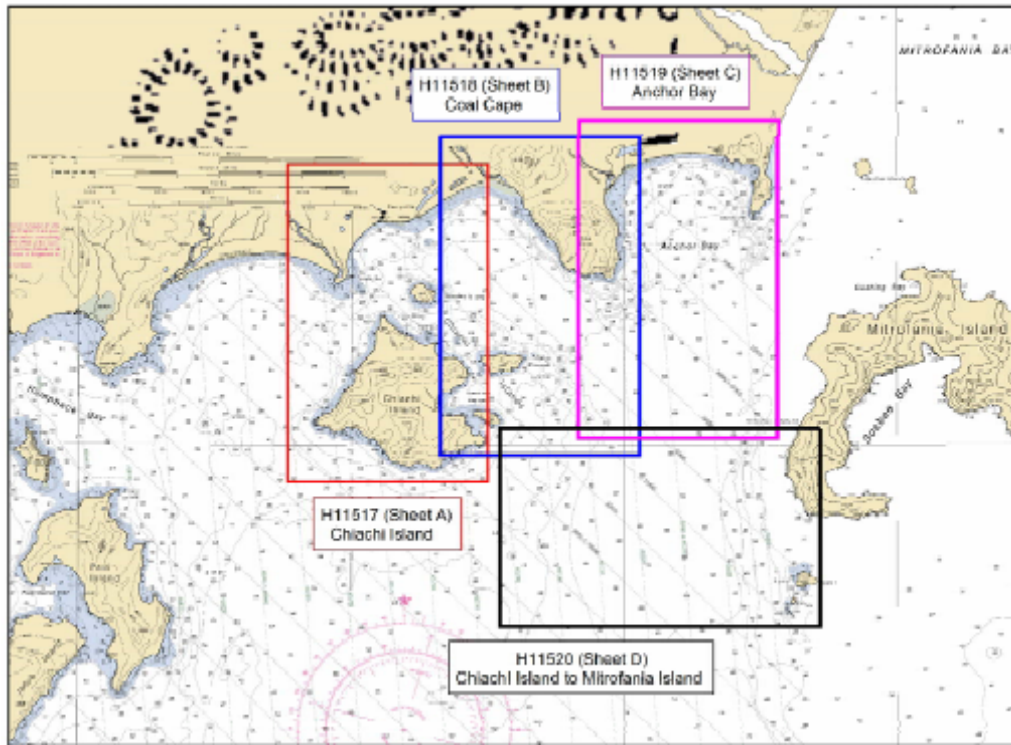
Figure 3: Uncertainty DTM

Survey Junctions

H11518 (Sheet B) junctions with<sup>5</sup>:

Registry #	Scale	Date	Junction Side
H11517	1:10,000	2006	West
H11519	1:10,000	2006	East
H11520	1:10,000	2006	South





**Figure 4: H11518 Survey Junctions**

The surveys are in agreement along their common borders. The agreement was noted in the field using the CUBE surfaces during subset cleaning. The conformity is also apparent in the Final Combined BASE Surfaces.<sup>6</sup>

### Quality Control Checks

During the hydrographic survey OPR-P182-KR-06 the R/Vs Quicksilver and Ocean Pioneer conducted a number of confidence checks. This usually consisted of the vessels running two lines in the opposite direction over a reference surface (normally the patch test site). The data sets collected with Reson 8101 and 8111 systems that were installed on the Quicksilver and Ocean Pioneer respectively, compared within 5 to 10 centimeters.

Positioning system confidence checks were conducted on a daily basis using the POS MV controller software. The controller software had numerous real time displays that were monitored throughout the survey to ensure the positional accuracies specified in the NOS Hydrographic Surveys Specifications and Deliverables (version June 2006) were achieved. These include, but are not limited to the following: GPS Status, Position Accuracy, Receiver Status (which included HDOP) and Satellite Status. During periods of high HDOP and/or low number of available satellites survey operations were stopped.

### Data Quality

In general, the multibeam data quality for H11518 was excellent. One notable problem follows:

- During data acquisition and routine processing, a general downward and/or upward cupping was noticed in the across track sounding profiles for certain areas. This is possibly due to a high volume of thermal layering and strong under currents in the water column. This problem was addressed by conducting SVP casts more frequently and reducing the line spacing interval. Even though this SVP error is noticeable on the Uncertainty surface, the data are well within the required specifications.<sup>7</sup>

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report for a detailed description of the survey equipment and methodology used over the course of this survey.

### Corrections to Echo Soundings

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report for a detailed description of all corrections to echo soundings and lead line measurements. No deviations from the report occurred.<sup>8</sup>

### Data Processing

Refer to the OPR-P182-KR-06 Data Acquisition and Processing Report for a detailed description of the processing flow.

The final BASE surface for H11518 is called H11518-Final and it contains four different BASE surfaces of different resolutions.<sup>9</sup> To ensure sufficient overlap between these surfaces the following parameters were used:

- Depth Threshold: 0 to 20 meters resolution=0.5m, Name in BASE Surface H11518-0-5m
- Depth Threshold: 15 to 35 meters resolution=1m, Name in BASE Surface H11518-1m
- Depth Threshold: 30 to 65 meters resolution=2m, Name in BASE Surface H11518-2m
- Depth Threshold: 55 to Max depth resolution=5m, Name in BASE Surface H11518-5m

The final S57 file for this project is called “H11518\_S57\_Features.000”. This file contains all shoreline and bottom sample feature data for this project in S57 format as required in the Specifications and Deliverables.<sup>10</sup>



## C – Vertical & Horizontal Control

Refer to the OPR-P182-KR-06 Horizontal and Vertical Control Report<sup>11</sup> for a detailed description of the horizontal and vertical control used on this survey. A summary of the project’s horizontal and vertical control follows. No deviations from the report occurred.

### Horizontal Control

The horizontal control datum for this survey was the North American Datum of 1983 (NAD83). All raw positions were originally collected in WGS84 and transformed to NAD83 during the post-processed kinematic GPS (KGPS) routine.

It was necessary to acquire dual frequency GPS data at a known location/s on the ground so that a KGPS solution could be used for final positioning. JOA established two local control points: station “SITE 1” was located on the USCGS station MIT (UW0401) and station “SITE 2”, was located on a piece of pipe off of “SITE 1”. Refer to the Appendix II of the Vertical & Horizontal Control Report for results and procedures.

Vessel position was determined in real time using a Trimble Zephyr L1/L2 GPS antenna, which was connected to a Trimble BD950 L1/L2 GPS card residing in the POS MV. The POS MV was setup via the Com 2 to accept USCG differential corrections, which were output from a CSI MBX-3S Coast Guard beacon receiver. Note: since the pseudorange corrections received by the POS MV are based on the NAD 83 position of the reference station antenna position, all positions were NAD 83. However, final positions were determined using a post-processed KGPS solution using the POSpac 4.3 processing software (Refer to the “2006-NOAAProcessingProcedures” document for KGPS processing procedure).

**Table 2 – DGPS Stations**

Station	ID	Latitude	Longitude	Freq.	Tx. Rate	Rx. No.	Wt.
Cold Bay, USCG	296	55°05'30"N	162°31'54" W	289	100BPS	1	1
Kodiak, USCG	295	57°37'06"N	152°11'36"W	313	100BPS	2	1

Positioning system confidence checks were conducted on a daily basis using the POS MV controller software. The controller software has numerous real time displays that were monitored throughout the survey to ensure the positional accuracies specified in the NOS Hydrographic Surveys Specifications and Deliverables (version June 2006) were achieved. These include, but are not limited to the following: GPS Status, Position accuracy, Receiver Status (which included HDOP) and Satellite Status. During periods of high HDOP and/or low number of available satellites survey operations were suspended.

Vertical Control

All sounding data were initially reduced to mean lower low water (MLLW) using unverified tidal data from one tide station located on Mitrofanía Island, AK. A sub-contractor, John Oswald & Associates LLC (JOA), operated the gauge.

**Table 3 – Tide Gauges**

Gauge	Model	Gauge Type	Location	Latitude	Longitude	Operational
9459016	H350/355	Digital Bubbler	Mitrofanía Island, AK	55°53'22"N	158°49'11" W	May-July

**Table 4 – Final Tide Zones**

Zone	Primary			
	Site	Number	Time	Range Ratio
JOA001	Mitrofanía Island, AK	9459016	0	1.00
JOA002	Mitrofanía Island, AK	9459016	-6	1.00
JOA003	Mitrofanía Island, AK	9459016	-6	1.07
JOA004	Mitrofanía Island, AK	9459016	-12	1.00
JOA005	Mitrofanía Island, AK	9459016	-12	1.07
JOA006	Mitrofanía Island, AK	9459016	-12	1.14

Tidal data for a twenty-four hour period, UTC (Alaska Daylight Time to UTC was +8 hours), was assembled by JOA and e-mailed to the Ocean Pioneer at the end of every Julian Day. A cumulative file for the gauge was updated each day by appending the new data.

On September 9, 2006, JOA issued verified tidal data and final zoning for OPR-P182-KR-06. The tidal zoning was modified by JOA, providing a simpler zoning scheme from those issued in the Statement of Work (for additional information, refer to JOA's Final Technical Report). From September 20, 2006 to September 22, 2006 all sounding data were re-merged using CARIS HIPS and SIPS tide routine. Verified tidal data were used for the final Navigation Base Surfaces and S57 Feature files.<sup>12</sup> Refer to the Vertical and Horizontal Control Report for additional tidal information and station descriptions.

## D – Results and Recommendations

### Chart Comparison

H11518 survey was compared with charts<sup>13</sup>:

Chart Number	Scale	Edition	Edition Date as of Feb. 2006
OPR-P182-KR-06			
16006	1:1,534,076	33 <sup>rd</sup>	Dec. 2000
16011	1:1,023,188	36 <sup>th</sup>	Aug. 2004
16013	1:969,761	29 <sup>th</sup>	Nov. 2003
16556	80,000	4 <sup>th</sup>	Nov. 2002
16561 <sup>14</sup>	80,000	2 <sup>nd</sup>	Mar. 2005

### Comparison of Soundings

The soundings from chart 16556 coincide with the soundings from H11518 to within 1 to 3 fathoms; areas that do vary to any degree are as follows:

1. Hydrographic survey H11518 revealed a depth of 44 fathoms, located at 55°52'40.35" N, 159°05'22.05" W, which is in the vicinity of a 53 fathom sounding on chart 16556. This area was surveyed with 100% multibeam coverage.<sup>15</sup>
2. Hydrographic survey H11518 revealed a depth of 51 fathoms, located at 55°52'49.68" N, 159°01'52.49" W, which is in the vicinity of a 58 fathom sounding on chart 16556. This area was surveyed with 100% multibeam coverage.<sup>16</sup>
3. Hydrographic survey H11518 revealed a depth of 25 fathoms, located at 55°51'01.36" N, 159°02'46.85" W, which is in the vicinity of a 39 fathom sounding on chart 16556. This area was surveyed with 100% multibeam coverage.<sup>17</sup>
4. Hydrographic survey H11518 revealed a depth of 26 fathoms, located at 55°50'13.30" N, 159°03'58.60" W, which is in the vicinity of a 32 fathom sounding on chart 16556. This area was surveyed with 100% multibeam coverage.<sup>18</sup>

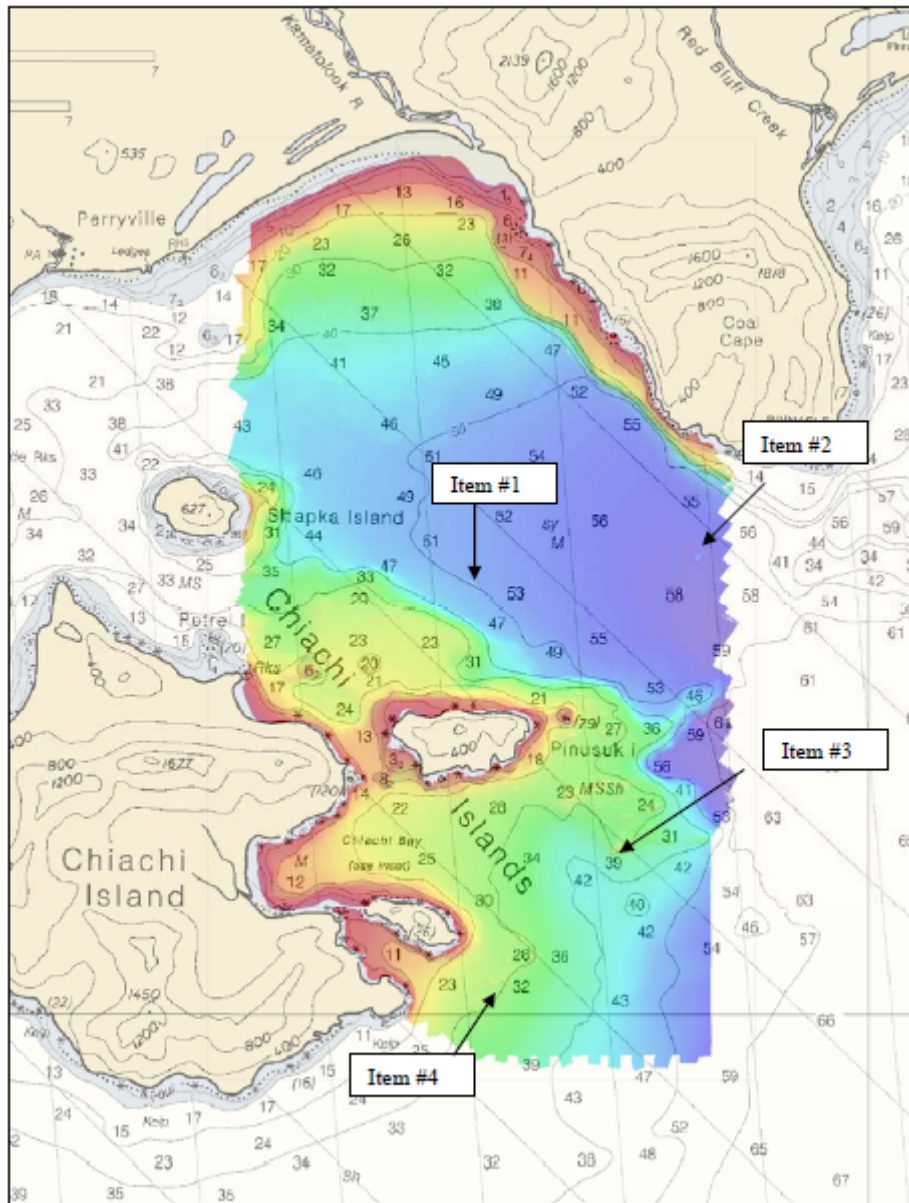


Figure 5: H11518 Chart Comparison

Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11518.<sup>19</sup>





### Charted Features

There were no charted features labeled PA, ED, PD, or Rep within the limits of H11518.<sup>20</sup>

### Dangers to Navigation

Two dangers to navigation were located during the hydrographic survey of H11518 and were reported on June 29, 2006.<sup>21</sup>

### Additional Results

#### Additional Item Investigations

None were assigned for this sheet.<sup>22</sup>

### LIDAR Investigations

Two items listed in the Descriptive Report for H11266 (Tenix LADS Sheet AX Mitrofanina) as recommended for additional investigation were located within the bounds of this survey. They were investigated during shoreline verification and the results are shown below.

- LIDAR Shoal No. AX2 (LIDAR position 55° 53' 34.9740" N, 159° 02' 00.4215" W), reported as "Possible drying rock in kelp" was confirmed by this survey. Rock was also in the RSD data as feature 41519. Appears in S57 Feature File as rock at the RSD position (55° 53' 34.980" N, 159° 02' 01.04" W).<sup>23</sup> See DP form JD153\_63.
- LIDAR Shoal No. AX7 (LIDAR position 55° 53' 33.2530", 159° 01' 47.6251" W), reported as "Possible drying rock in kelp", was confirmed by this survey. Shown in S57 Feature File as an islet at the LIDAR position.<sup>24</sup> See DP form JD153\_62.

### RSD Shoreline Verification Results

Remote Sensing Division (RSD) provided the shoreline detail (GC10571) for this sheet. Since the RSD shoreline was the official shoreline source provided by NOAA, primary focus was given to its verification during this survey. However, significant previously charted features were also investigated as were any significant new features found during the course of shoreline verification. Significant features were deemed to be those dangerous to navigation and / or seaward of the 4m contour.

Visual inspection during shoreline verification deemed the RSD shoreline very accurate in general. The mean high water (MHW) line and point features (rocks, islets) provided in the RSD source were particularly good.

The Hydrographer recommends that the RSD MHW from GC10571 shown in the S57 Feature File supersede previously charted shoreline as well as H11266 where any discrepancies occur.<sup>25</sup>

The MHW line from the RSD data is replicated in the S57 Feature File without modification Likewise, rocks and islets originating from the RSD data appear in their RSD position. Most RSD foul areas required modification.<sup>26</sup>

The following table summarizes the results of the RSD shoreline investigation, and how the data has been modified in the S57 Feature File.

<b>Changes from RSD Source Data in S57 Feature File</b>				
<b>RSD Feature</b>	<b>RSD Position</b>	<b>Remarks</b>	<b>Actions Taken In S57 Feature File</b>	<b>Applicable DPs</b>
MHW Line	55 53 44.340 N 159 02 16.840 W	MB Coverage encroached on MHW line west side of island.	Adjusted approx. 20m of MHW 10m E.	N/A
Foul	55 54 53.393 N 159 03 43.68 W	RSD reported three distinct foul areas. This survey confirmed the foul areas but observed they were connected, continuous, and extended further seaward. Numerous rock and kelp features along entire coast.	Foul areas connected and extended. Used MB coverage, DPs, and RSD foul to delineate.	JD153_83 JD153_87
Foul	55 54 37.125 N 159 03 20.493 W			
Foul	55 54 01.402 N 159 02 24.665 W			
Rock (Covers / Uncovers)	55 50 07.332 N 159 04 59.670 W	RSD rock was not found. Full MB coverage found no indication of a rock that covers/uncovers; least depth in area approximately 9m.	Not shown in S-57 File.  Do not chart.	JD154_81
MHW Line	55 50 13.772 N 159 05 17.031 W	MB Coverage encroached on MHW line north side of the point.	Adjusted approx. 40m of MHW line 10m S.	N/A
Foul	55 50 24.151 N 159 05 42.73 W	RSD Foul area confirmed but extends further south.	Foul area extended south using DPs for extents.	JD154_71 JD154_73
Foul	55 50 33.875 N 159 05 47.794 W	RSD reported three distinct foul areas. This survey confirmed the foul areas but observed they were connected, continuous, and extended further seaward and along the coast. Numerous rock and kelp features along entire coast.	Foul areas connected and extended. Used MB coverage, DPs, and RSD foul to delineate.	JD154_54A JD154_55A JD154_57A JD154_59A JD154_97 JD154_91 JD154_90 JD154_88 JD154_84
Foul	55 50 40.204 N 159 05 26.801 W			
Foul	55 50 38.510 N 159 04 47.293 W			





Foul	55 50 23.806 N 159 04 44.901 W	Foul area confirmed but found to extend further seaward.	Adjusted using MB coverage, DPs, and RSD foul.	JD154_101
Foul	55 51 10.091 N 159 06 11.937 W	Foul area confirmed, but area from 55 51 11.721 N, 159 06 07.604 W northeast along coast about 300m found to NOT be foul. Instead, ledges are present.	Adjusted using MB coverage, DPs, and RSD foul. Charted ledges using DPs.	JD154_65 JD154_66 JD154_62 JD154_58 JD154_56 JD154_44
Rock (Covers / Uncovers)	55 51 15.396 N 159 05 51.906 W	RSD rock was actually the seaward extent of a ledge from MHW.	Ledge drawn from MHW to position.	JD154_62
Rock (Bare Rock)	55 51 49.308 N 159 03 41.112 W	RSD rock was actually the seaward extent of a ledge from MHW.	Ledge drawn from MHW to position.	JD154_32
Foul	55 51 51.061 N 159 03 57.675 W	Foul area confirmed but found to extend further seaward and west along coast.	Adjusted using MB coverage, DPs, and RSD foul.	JD154_25 JD154_30 JD154_34
MHW	55 51 49.100 N 159 03 17.951 W	RSD MHW around small island was out of position by 17m.	Adjusted using MB coverage.	N/A

Changes to Charted Features and Removals

The following table lists changes and disprovals of existing charted shoreline data found during this survey.<sup>27</sup>

Previously Charted Feature Discrepancies				
Chart and Feature	Chart Position	Remarks	Recommendations	DP Form(s)
16556 ROCK	55 54 33.223 N 159 03 13.739 W	Not found—visual search entire area clear water, with partial MB coverage. Kelp noted and in foul area.	Remove.	JD153_75
16556 ROCK	55 54 39.129 N 159 03 24.76 W	Not found—visual search entire area clear water. Heavy kelp noted. In foul area.	Remove.	JD153_78
16556 ROCK	55 54 46.659 N 159 03 28.552 W	Not found—visual search entire area clear water, but rocks were noted about 25m NE. In foul area.	Remove.	JD153_79
16556 ROCK	55 55 02.821 N 159 03 46.928 W	Not found—visual search entire area clear water, with partial MB coverage. Edge of foul area.	Remove.	JD153_89
16556_2 ROCK (Ht. 8 ft.)	55 50 27.897 N 159 05 44.330 W	Located approximately 25m NW of charted position with a deeper least depth (55 50 28.456 N, 159 05 45.49 W,	Remove.	JD154_65A



		0.73m above MLLW)		
16556_2 ROCK	55 50 36.830 N 159 05 47.94 W	Not found—visual search entire area clear water. On edge of multibeam coverage. Edge of foul area.	Remove.	JD154_62A
16556_2 ROCK	55 50 39.633 N 159 05 56.038 W	Not found—visual search entire area clear water. In a foul area with extensive kelp; search could have been incomplete.	Retain as charted. Appears in S57 Feature File at charted position.	JD154_58A
16556_2 ROCK (Ht 7 ft.)	55 51 04.759 N 159 06 20.579 W	Not found. Area received full multibeam coverage.	Remove.	N/A
16556_2 LEDGE	55 51 28.021 N 159 05 42.286 W	Ledge not observed. Instead area is foul with many distinct rocks.	Remove ledge, chart foul.	JD154_55
16556_2 ROCK	55 51 33.735 N 159 05 40.754 W	Full multibeam coverage, no rock.	Remove.	N/A
16556_2 ROCK	55 51 43.486 N 159 05 55.718 W	Full multibeam coverage, no rock.	Remove.	N/A
16556_2 ROCK (Ht. 6')	55 51 49.676 N 159 06 14.142 W	Full multibeam coverage, no rock.	Remove	N/A
16556_2 (Ht 5')	55 51 54.510 N, 159 04 30.637 W	Full multibeam coverage, no rock.	Remove.	N/A
16556_2 (Ht 4')	55 51 54.538 N 159 04 16.600 W	Full multibeam coverage, no rock.	Remove.	

### Bottom Samples

On June 14 and 15, 2006 the R/V Quicksilver was fitted to obtain bottom samples as specified in the Statement of Work. The purpose of this was to characterize the bottom in charted anchorages and for general bottom classification.

Samples were taken with a Van Veen grab sampler and position was recorded with WinFrog V3.6. Sediment retrieved from the sampler were analyzed and then encoded with the appropriate S-57 attributes.<sup>28</sup> Positions and descriptions of all samples are found in Appendix V and in the H11518\_S57\_Features file.

### Aids to Navigation

There were no charted aids to navigation in the survey area. No uncharted aids to navigation were found in the survey area.<sup>29</sup>



### Shoreline Correlator Sheet

ArcMap v9.0 with the Shoreline Correlator add-on, written by the Fugro Pelagos Inc. GIS department, aided in the processing of the investigation results. The Correlator utilized the Winfrog Log files to create an individual DP form for all acquired DP's. The Correlator was mapped to the Log, Tide, Photos, NOAA Chart (largest scale available), LIDAR Data, Smooth Sheet Soundings and Multibeam Coverage to calculate and display the desired information for each DP. The DP forms and raw field records can be found on the Project DVD under Reports\Descriptive Reports\H11518 Shoreline.<sup>30</sup>



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**E – Approval Sheet**

**Approval Sheet**

For

**H11518**

Standard field surveying and processing procedures were followed in producing this survey in accordance with the following documents:

OPR-P182-KR-06 statement of work and hydrographic manual;  
Fugro Pelagos, Inc. Acquisition Procedures (2006- NOAAAcquisitionProcedures);  
Fugro Pelagos, Inc. Processing Procedures (2006-NOAAProcessingProcedures);  
Technical Report for Tides, 9459016 Mitrofanina Report Complete 2006

The data were reviewed daily during acquisition and processing.

This report has been reviewed and approved. All records are forwarded for final review and processing to the Chief, Pacific Hydrographic Branch.

Approved and forwarded,

A handwritten signature in cursive script, reading "Dean Moyles", written in black ink on a white background.

Dean Moyles,  
Lead Hydrographer  
Fugro Pelagos, Inc. Survey Party



## **Revisions Compiled During Office Processing and Certification**

<sup>1</sup> Filed with project records.

<sup>2</sup> Concur.

<sup>3</sup> Concur.

<sup>4</sup> Concur.

<sup>5</sup> Concur with clarification. H11518 also junctions with LIDAR survey H11266 from OPR-P182-KR-04. A cursory inspection of the junction during compilation shows good agreement in the common area.

<sup>6</sup> Concur.

<sup>7</sup> Concur. These data are adequate to supersede charted data in the common area.

<sup>8</sup> Concur.

<sup>9</sup> Concur with clarification. The BASE surface used for compilation was a 5m combined surface named H11518\_5m\_comb.

<sup>10</sup> All surveyed features included in HCell H11518 have been de-conflicted and reduced to chart scale. All bottoms samples collected during survey H11518 are included in HCell H11518.

<sup>11</sup> Filed with project records.

<sup>12</sup> Concur. Final approved water levels have been applied to all data.

<sup>13</sup> Concur with clarification. Survey H11518 also falls on chart 16540, scale 1:300,000. A cursory comparison during compilation shows agreement within 1 to 3 fathoms with one exception. There is a surveyed 51 fathom sounding at 55-52-49.63N, 159-01-52.79W in the vicinity of a charted (16540) 58 fathom sounding. The surveyed 51 fathom sounding is included in HCell H11518.

<sup>14</sup> No part of survey H11518 falls on chart 16561.

<sup>15</sup> Concur. The 44 fathom sounding is included in HCell H11518.

<sup>16</sup> Concur. The 51 fathom sounding is included in HCell H11518.

<sup>17</sup> Concur. The 25 fathom sounding is included in HCell H11518.

<sup>18</sup> Concur. The 26 fathom sounding is included in HCell H11518.

<sup>19</sup> Concur.

<sup>20</sup> Concur.

<sup>21</sup> Concur. The first DTON was a reported 5fm 4ft rock located at 55-54-33.51N, 159-03-28.31W. The rock was not applied to the charts, but it is included as a submerged rock in HCell H11518. The second DTON was a reported 1fm 3ft rock located at 55-551-33.15N, 159-05-09.60W. The rock has been applied to the charts and is included as a submerged rock in HCell H11518.

<sup>22</sup> Concur.

<sup>23</sup> Concur. A field verified rock that covers and uncovers is located at this position in HCell H11518.

<sup>24</sup> Concur. A field verified islet with an elevation of 1m is located at the LIDAR position in HCell H11518.

<sup>25</sup> Concur.

<sup>26</sup> Concur. The modified foul areas are included in HCell H11518 and have the SORDAT and SORIND attributed for survey H11518.

<sup>27</sup> Concur with clarification. Compiler agrees with the field recommendations with the exception of the following: The first item is recommended to be retained because there is only partial multibeam coverage. The second and third items will be superseded by a field verified rock. The fourth item is recommended to be retained because there is only partial multibeam coverage. The ninth item is recommended to be retained because there isn't enough information to disprove.

<sup>28</sup> Thirty-three bottom samples were collected during H11518. Only twenty-three are included in the HCell because of redundancy after rocky seabed areas were delineated from the surface. Thirteen additional bottom samples were retained from Chart 16556.



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<sup>29</sup> Concur.

<sup>30</sup> Filed with hydrographic records.

**Hydrographic Survey Registry Number: H11518**

**Survey Title:**           **State:**       **ALASKA**  
**Locality:**   **Southwestern Alaska Peninsula**  
**Sub-locality:** **Coal Cape**

**Project Number:**   **OPR-P182-KR-06**

**Survey Dates:**     **June – July 2006**

Depths are reduced to Mean Lower Low Water using unverified observed tides.

Positions are based on the NAD83 horizontal datum.

**CHARTS AFFECTED:**

Chart Number	Scale	Edition	Edition Date as of Feb. 2006
OPR-P182-KR-06			
16006	1:1,534,076	33 <sup>rd</sup> Dec.	2000
16011	1:1,023,188	36 <sup>th</sup> Aug.	2004
16013	1:969,761	29 <sup>th</sup> Nov.	2003
16556	1:80,000	4th Nov.	2002
16561	1:80,000	2nd Mar.	2005

**DANGER TO NAVIGATION:**

<b>Feature</b>	<b>Depth(fms ft)</b>	<b>Latitude</b>	<b>Longitude</b>
Rock	5 fms 4 ft	55-54-33.51N	159-03-28.31W
Rock	1 fms 3 ft	55-51-33.15N	159-05-09.60W

**COMMENTS:**

Questions concerning this report should be directed to the Chief, Pacific Hydrographic Branch (N/CS34) at (206) 526-6835.

**H11518 HCell Report**  
Katie Reser, Physical Scientist  
Pacific Hydrographic Branch

**Introduction**

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC and RNCs in the region: NOAA ENC US4AK58M and NOAA RNC 16556.

HCell compilation of survey H11518 used Office of Coast Survey HCell Specifications Version 3.0 and HCell Reference Guide Version 1.0.

**1. Compilation Scale**

Depths for HCell H11518 were compiled to the largest scale chart in the region, 16556, 1:80,000 and inset 1:20,000. The density and distribution of soundings from H11518 were selected to emulate the distribution on chart 16556 and the inset. Non-bathymetric features have been generalized to chart and inset scale.

**2. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 5-meter combined surface, **H11518\_Combined\_5m**, in CARIS BASE Editor. A shoal-biased selection was made at 1:15,000 scale for the main chart area and 1:5,000 scale for the inset area using a Radius Table file with values shown in the table, below. The resultant sounding layer contains depths ranging from 0.5 to 114.3 meters.

Upper limit (m)	Lower limit (m)	Radius (mm)
0 10		3
10 20		4
20 50		4.5
50	150	5

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

**3. Depth Areas and Depth Contours**

**3.1 Depth Areas**

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize the hydrographic extents, which were then used to



create the single, all encompassing depth area (DEPARE). Two depth ranges, from 0 to 150 meters and from -2.000 to 0 meters, were used for depth area objects. Upon conversion to NOAA charting units, the depth ranges are 0 to 82.02 fathoms and -1.09 to 0 fathoms.

### 3.2 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 generalized metric and fathom equivalent contour values are shown in the table below.

Chart Contours in Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours NOAA Rounded	Actual Value of Chart Contours
0 0.00		0.2286	0.00
5 5.4864		5.715	3.125
10 18.288		18.5166	10.125
20 36.576		37.9476	20.750
50 91.44		92.8116	50.750

Contours delivered in the \*\_SS file 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 results in conflicts between the \*\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_COVR, M\_QUAL, DEPARE, COALNE and SBDARE objects, and with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over \*\_SS.000 file contours in all cases where conflicts are found.

Some modifications made to GC shoreline MLLW contours, to bring the GC shoreline into agreement with H11518 hydrography, necessitated inclusion of several DEPCNT features in the HCell. These 0 value contours have not been generalized. See 9.2 *Conflicts between Shoreline and Hydrography*.

### 4. Meta Areas

The following Meta object areas are included in HCell 11518:

M\_QUAL                      M\_CSCL  
M\_COVR

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

## 5. Features

Shoreline features for H11518 were delivered from the field one .000 file defining new features, modification to GC or charted features, and disprovals. These were deconflicted against GC shoreline, the chart and hydrography during office processing.

Features from junctioning LIDAR surveys H11266 were manually digitized from the smooth sheets and de-conflicted against the features submitted with H11518.

During office processing, eight submerged rocks were digitized from the high resolution BASE Surfaces.

There were two DTONs reported from survey H11518. The first DTON was a reported 5fm 4ft rock located at 55-54-33.51N, 159-03-28.31W. The rock was not applied to the charts, but it is included as a submerged rock in HCell H11518.

The second DTON was a reported 1fm 3ft rock located at 55-551-33.15N, 159-05-09.60W. The rock has been applied to the charts and is included as a submerged rock in HCell H11518.

The source of all features included in the H11518 HCell can be determined by the SORIND field.

## 6. S-57 Objects and Attributes

The \*\_CS HCell contains the following Objects:

SOUNDG	Chart scale soundings
DEPARE	All-encompassing depth area and intertidal areas
DEPCNT	Zero contour for ledges and intertidal areas
COALNE	GC and charted MHW line
LNDARE	Islet features
LNDELV	Height feature for islets
UWTROC	Rock features
OBSTRN	Foul areas
WEDKLP	Kelp features
SBDARE	Bottom samples and ledges
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
M_CSCL	Compilation scale Meta object
\$CSYMB	Blue notes

The \*\_SS HCell contains the following Objects:

DEPCNT	NOAA rounded contours at chart scale intervals
SOUNDG	Soundings at the survey scale density

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

## **7. Blue Notes**

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features with the Blue Note information located in the INFORM field. The NINFOM field is populated with the charting disposition

## **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, and therefore have lower precision. Units and precision are shown below.

BASE Editor and S-57 Composer Units:

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

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

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

- All depths deeper or equal to 11 fathoms display as whole fathoms.

- All depth units between 0 fathoms (MLLW) and 11 fathoms display as fathoms and whole feet.
- All depth units above MLLW (0 fathoms) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet above that.
- All height units (HUNI) which have been converted to charting units, and that are 2.0 feet above MHW and greater, are shown in feet.

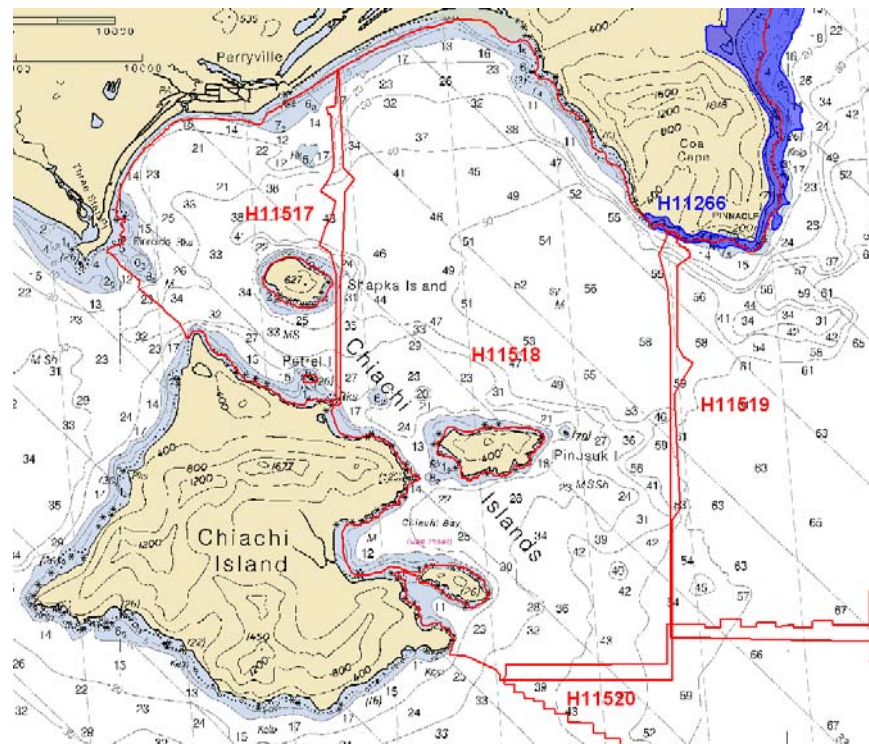
In an ENC viewer fathoms and feet depth units (DUNI) display in the format X.YZZZ, where X is fathoms, Y is feet, and ZZZ is decimals of the foot. In an ENC viewer, heights (HUNI) display as whole feet.

## 9. Data Processing Notes

### 9.1 Junctions

H11518 junctions with surveys H11519 and H11520, both of which have already been compiled. A common junction was made between the surveys. The junction with H11517 will be made when that survey is compiled.

H11518 also junctions with LIDAR survey H11266 (see figure 1). Given the extremely small area of the LIDAR junction, no soundings from LIDAR are included H11518 HCell.



**Figure 1. H11266 and H11518 survey coverage**

## 9.2 Conflicts between Shoreline and Hydrography

There are instances of GC shoreline in conflict with hydrography. These were examined using the highest resolution Surfaces. Conflicts were resolved making modifications to the GC shoreline.

## 10. QA/QC and ENC Validation Checks

H11518 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a 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 have been approved by MCD as inherent to and acceptable for HCells.

## 11. Products

### 11.1 HSD, MCD and CGTP Deliverables

- H11518 Base Cell File, Chart Units, Soundings compiled to 1:80,000 and 1:20,000
- H11518 Base Cell File, Chart Units, Soundings compiled to 1:15,000 and 1:5,000
- H11518 Base Cell File, Metric Units, Features compiled to 1:10,000
- H11518 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11518 Survey Outline to populate SURDEX

### 11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11518\_CS.000
- Chart units base cell file, survey scale soundings H11518\_SS.000
- Metric base cell file, survey scale features H11518\_Features.000
- Descriptive Report package H11518\_DR.pdf
- Survey outline H11518\_Outlin e.gml & \*.xsd

### 11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.1	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. 2.0	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.
Newport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

### 12. Contacts

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

Katie Reser, Physical Scientist, PHB, Seattle, WA; 206-526-6864;  
[Katie.Reser@noaa.gov](mailto:Katie.Reser@noaa.gov).

APPROVAL SHEET  
H11518

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

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

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