

H11700

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. H11700

LOCALITY

State Alaska

General Locality Chatham Strait

Sublocality Kootznahoo Inlet

2007

CHIEF OF PARTY

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

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DATE

NOAA FORM 77-28 (11-72)		U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION		REGISTER NO. H11700
HYDROGRAPHIC TITLE SHEET				
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 <u>Alaska</u>				
General Locality <u>Chatham Strait</u>				
Sublocality <u>Kootznahoo Inlet</u>				
Scale <u>1:10,000</u>		Date of Survey <u>August 21, 2007 -September 15, 2007</u>		
Instructions Dated <u>6/15/2006</u>		Project No. <u>OPR-O322-KR-07</u>		
Vessel <u>R/V Davidson (1066485), R/V R2 (623241), R/V D2 (647782), Shoreline Skiff (WN6739NW)</u>				
Chief of Party <u>DEAN MOYLES</u>				
Surveyed by <u>ORTHMANN, REYNOLDS, GILL, MOUNT, STOCK, FARLEY,</u> <u>BRIGGS, POECKERT, ET AL</u>				
Soundings taken by echo sounder <u>RESON 8101 (R2 & D2 - HULL MOUNT), RESON 8111 (DAVIDSON -</u> <u>HULL MOUNT) and RESON 8125 (SKIFF - POLE MOUNT)</u>				
Graphic record scaled by <u>N/A</u>				
Graphic record checked by <u>N/A</u>				
Evaluation by <u>A. Raymond</u>		Automated plot by <u>N/A</u>		
Verification by <u>A. Raymond, K. Reser</u>				
Soundings in <u>Fathoms and Feet</u> at <u>MLLW</u>				
REMARKS: <u>Time in UTC. UTM Projection Zone 8</u>				
<u>Revisions and annotations appearing as endnotes were</u>				
<u>generated during office processing.</u>				
<u>As a result, page numbering may be interrupted or non-sequential</u>				
<u>All separates are filed with the hydrographic data.</u>				



A - Area Surveyed

H11700 (Sheet F) is bound by the coordinates listed below, which encompass Kootznahoo Inlet.

Hydrographic data collection began on August 21, 2007 and ended on September 15, 2007.

Table 1 – H11700 Sheet Limits¹

Sheet Limits H11700 Sheet F Scale 1:10,000		
Point #	Positions on NAD83	
	Degrees Latitude (N)	Degrees Longitude (W)
1	57-33-32.21 N	134-28-56.50 W
2	57-27-39.73 N	134-28-56.50 W
3	57-26-57.23 N	134-28-56.50 W
4	57-26-57.22 N	134-36-04.93 W
5	57-33-32.20 N	134-36-04.93 W

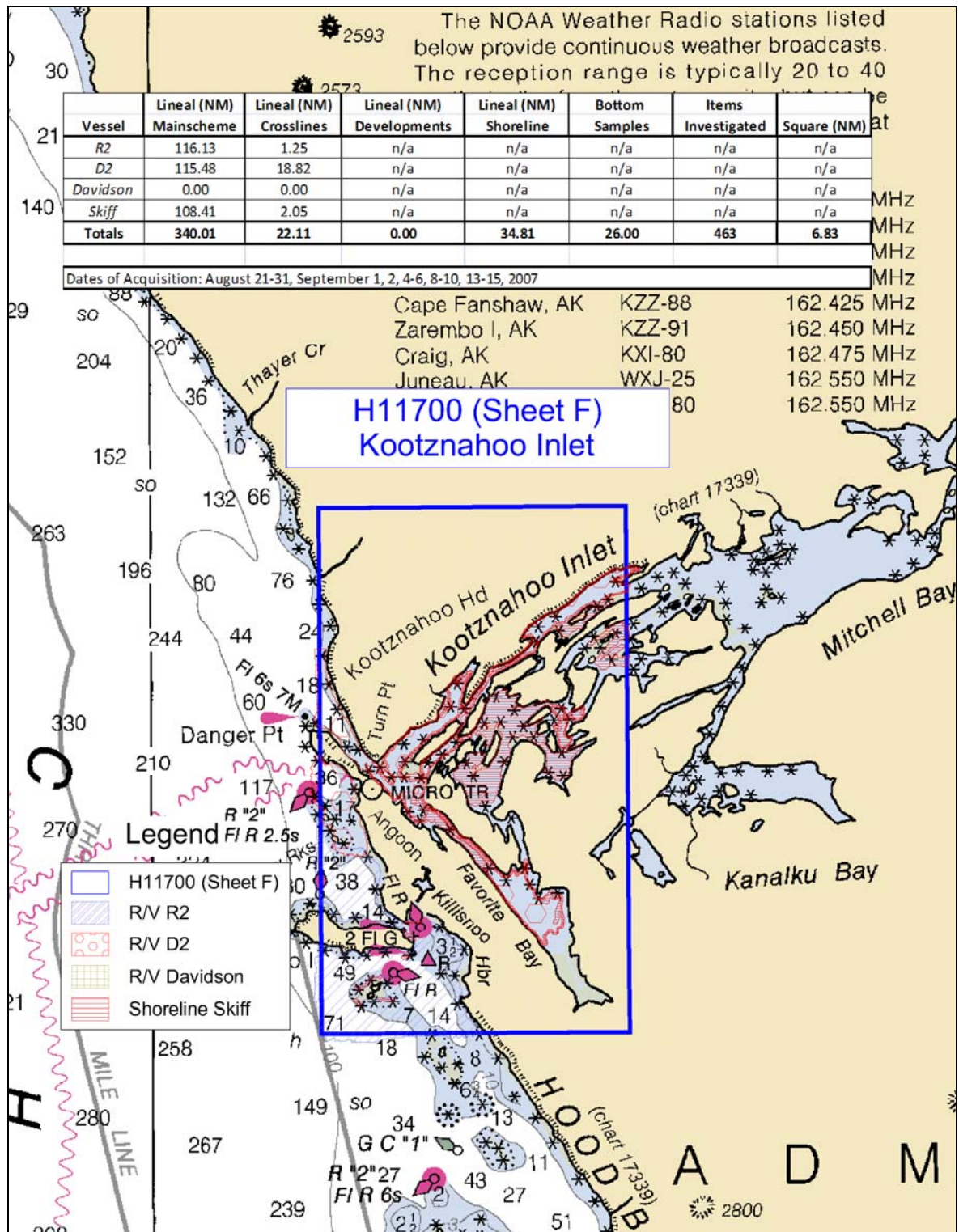


Figure 1 H11700 Area Surveyed



B – Data Acquisition & Processing

Refer to the OPR-O322-KR-07 Data Acquisition and Processing Report² 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

R/V R2, R/V D2, and the Shoreline Skiff acquired all soundings for H11700. R/Vs R2 & D2, 29 feet in length with a draft of 5.7 feet, were equipped with a 240 kHz Reson 8101 with option 033 (pseudo Side Scan) for multibeam data acquisition. The Shoreline Skiff, 24 feet in length with a draft of 1.42 feet, was equipped with a 455 kHz Reson 8125 with option 033 (pseudo Side Scan) for multibeam data acquisition. All vessels were 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 (v7.0.413.9).

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-O322-KR-07 Data Acquisition & Processing Report for a complete listing of equipment and vessel descriptions.

Quality Control

Crosslines

Crosslines were planned and well distributed throughout the survey to ensure adequate quality control. Total crossline length surveyed was 22.11 nautical miles or 6.5 percent of the total main scheme line length, exceeding the 5 percent planned. 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. However, beams that fall below the 95 percent confidence level in the QC report are associated with areas and conditions illustrated below. It should be noted that these locations are in agreement with the surrounding adjacent lines and are considered well within the required specifications.³

The majority of beams that fall below the 95 percent confidence level are located in areas having extremely steep slopes and/or rocks. Figures 2 and 3 below provide examples.

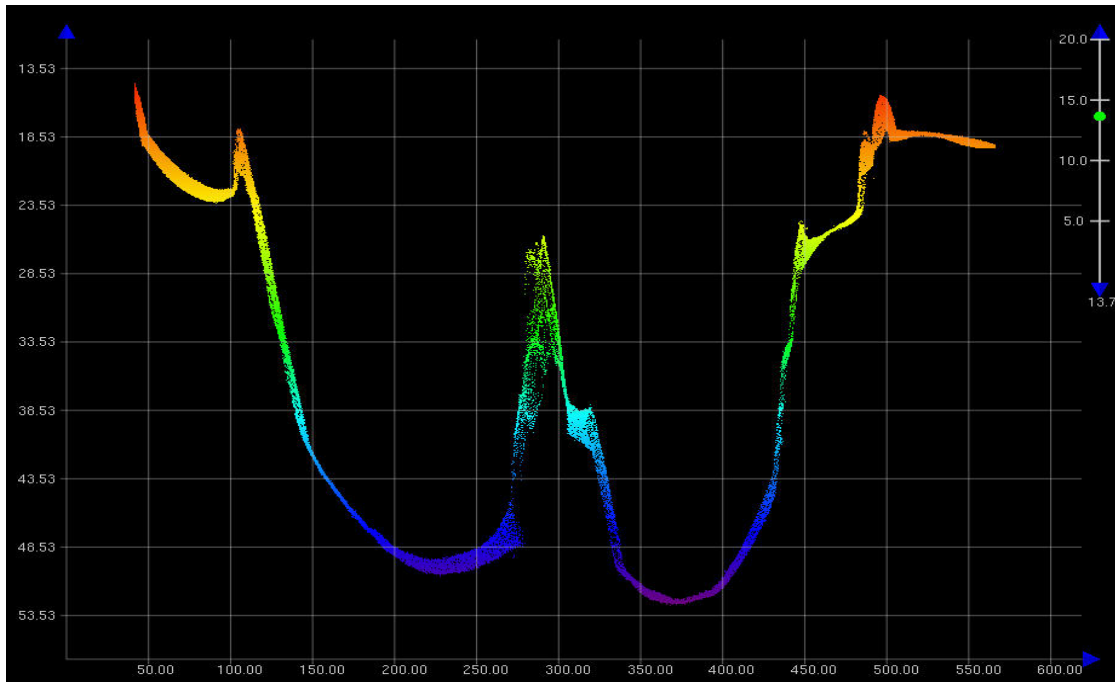


Figure 2 Profile of 2F04-TIE01

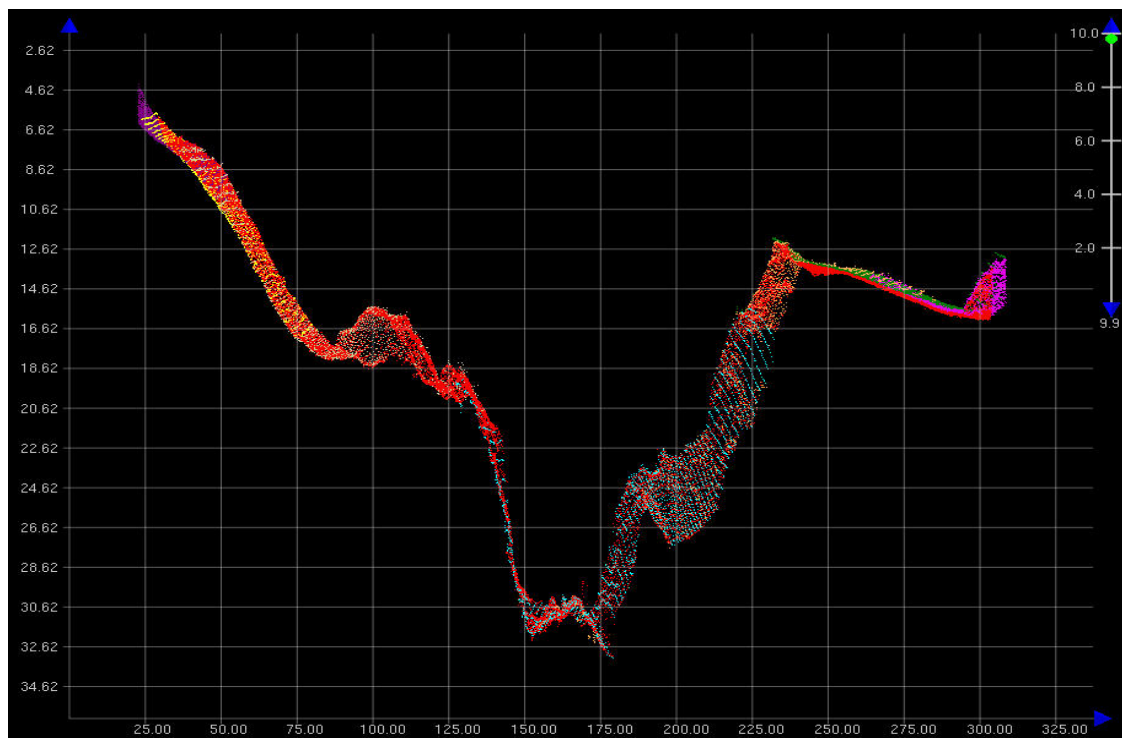


Figure 3 Profile of 1F02-TIE02A



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 $d = \text{depth}$.

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 H11700 had an uncertainty of about 0.10 to 0.50 meters. An exception to this is found in the nearshore areas in water depths of 1 to 2 meters where the uncertainty values ranged from 1.5 meters and higher. This was due to sparse data density of the outer beams, and from having no overlap. No uncertainty values were greater than the IHO level Order 1.⁴

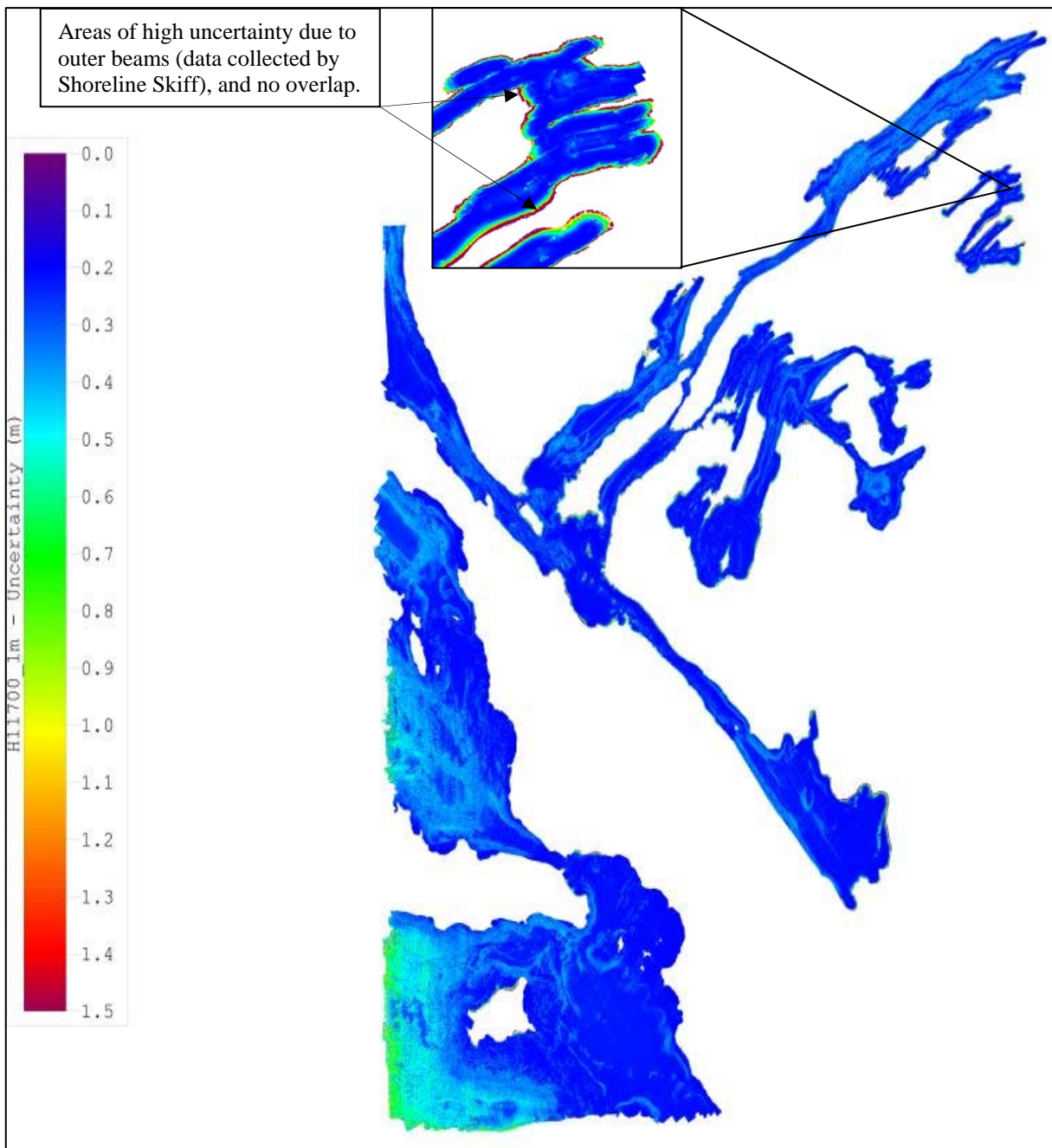


Figure 4 H11700 Uncertainty DTM

Survey Junctions

H11700 (Sheet F) junctions with:

Registry #	Scale	Date	Junction Side
H11701	1:10,000	2007	East
H11702	1:10,000	2007	South
H11698	1:20,000	2007	West

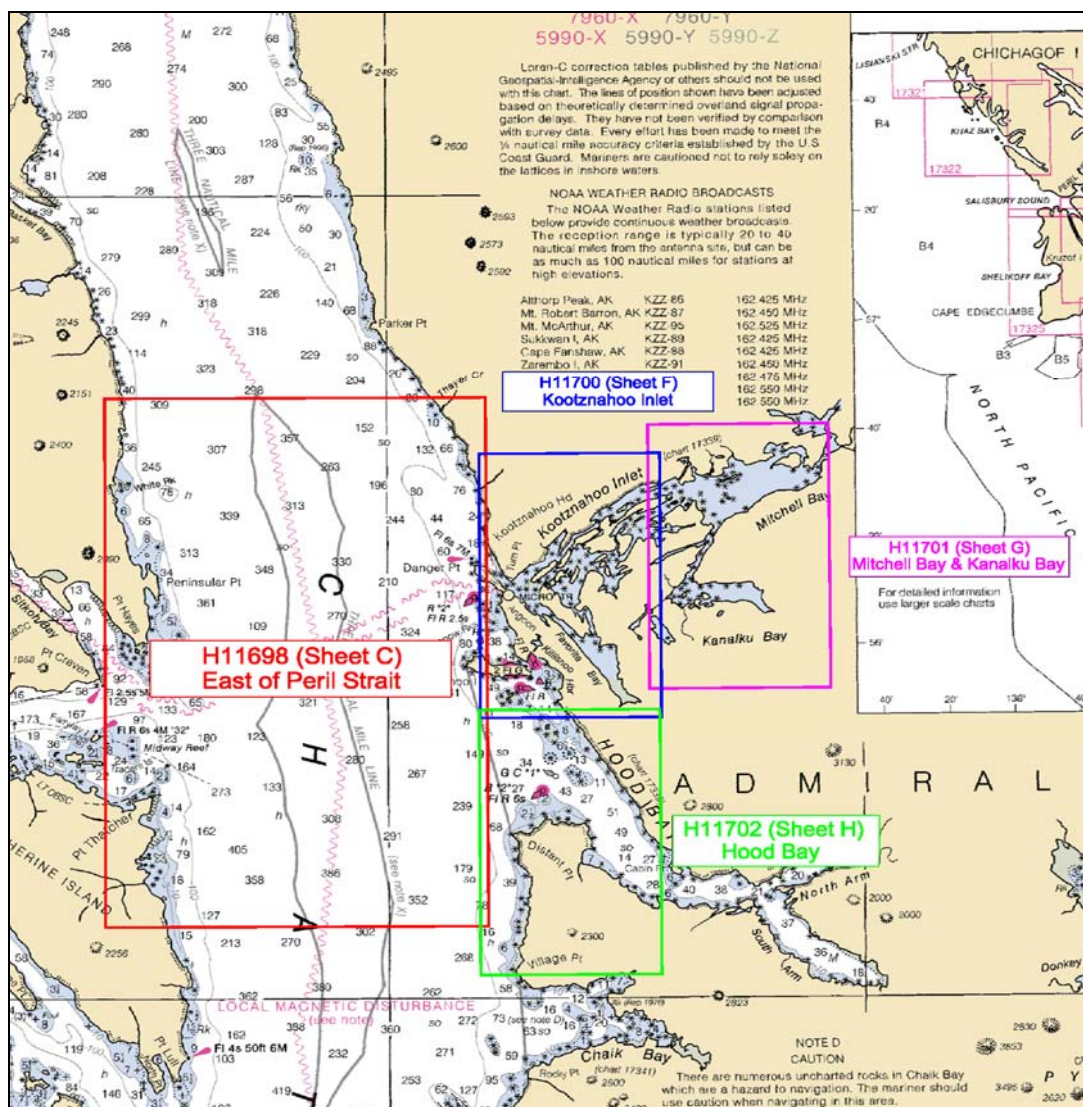


Figure 5 H11700 Survey Junctions

The surveys are in agreement along their common borders. The agreement was noted in the field using the CARIS CUBE surfaces during subset cleaning. The conformity is also apparent in the final combined BASE surfaces.⁵



Quality Control Checks

During the hydrographic survey OPR-O322-KR-07 the survey vessels conducted a number of confidence checks. These 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 the Reson 8125 (Shoreline Skiff), and 8101 (R2 & D2) 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 (April 2007) were achieved. These include, but were 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.

Data Quality

In general, the multibeam data quality for H11700 was excellent. One notable problem follows:

- During routine processing, tidal offsets were noticed throughout the survey area. This was due to water flow constrictions in and around the bays in the area. This problem was resolved by re-running that portion of the survey area at high tide, rather than low tide. In addition to tide gauge information, GPS heights from the GPS buoy and survey vessel were examined and used to derive final tide zoning and to provide a better understanding of the tides within these areas. No uncertainty values were greater than the IHO level Order 1.⁶ Refer to Appendix I in the “OPR-O322-KR-07 Horizontal & Vertical Control Report” for additional information.⁷



Corrections to Echo Soundings

Refer to the OPR-O322-KR-07 Data Acquisition and Processing Report for a detailed description of all corrections to echo soundings. No deviations from the report occurred.

Data Processing

Refer to the OPR-O322-KR-07 Data Acquisition and Processing Report for a detailed description of the processing flow.

The final Bathymetric with Associated Statistical Error (BASE) surface for H11700 is called H11700 and it contains six different BASE surfaces of different resolutions. To ensure sufficient overlap between these surfaces the follow parameters were used⁸:

Depth Threshold: 0 to 16 meters, resolution = 1m, Name in BASE Surface H11700_1m
Depth Threshold: 10 to 45 meters, resolution = 2m, Name in BASE Surface H11700_2m
Depth Threshold: 40 to 60 meters, resolution = 4m, Name in BASE Surface H11700_4m
Depth Threshold: 50 to 150 meters, resolution = 5m, Name in BASE Surface H11700_5m
Depth Threshold: 130 to 500 meters, resolution = 10m, Name in BASE Surface H11700_10m
Depth Threshold: 400 to Max depth, resolution = 15m, Name in BASE Surface H11700_15m

The final S57 file for this project is called "H11700_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.⁹

C – Horizontal & Vertical Control

Refer to the OPR-O322-KR-07 Horizontal and Vertical Control Report for a detailed description of the horizontal and vertical control used. No deviations from the report occurred. A summary of the project's horizontal and vertical control follows.

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 (PPK) routine.

It was necessary to acquire dual frequency GPS data at known locations on the ground so that a PPK solution could be used for final positioning. Sub-contractor John Oswald and Associates LLC (JOA) established two local control points: station "Angoon A" and station "Angoon B" in Angoon, AK. Refer to Appendix II in the "OPR-O322-KR-07 Horizontal & Vertical Control Report" for additional information.



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 set up via Com 2 to accept USCG differential corrections, which were output from a CSI MBX-3S Coast Guard beacon receiver. Note: since the pseudo range corrections received by the POS/MV are based on the NAD83 position of the reference station antenna, all DGPS-based final positions are NAD83. However, final positions were determined by a post-processed kinematic (PPK) solution using POSpac 4.3 processing software, which output a final solution in NAD83. (Refer to the “2007-NOAAProcessingProcedures” document for PPK processing procedure).

Table 2 - DGPS Stations

Station	ID	Latitude	Longitude	Freq.	Tx. Rate
Biorka, AK USCG	890	56°51'18" N	135°32'05"W	305	100BPS
Level Island, AK USCG	891	56°28'03" N	133°04'32" W	295	100BPS

Vertical Control

All sounding data were initially reduced to mean lower low water (MLLW) using unverified tidal data from three tide stations located in Warm Spring Bay, False Bay, and Mitchell Bay, AK. Sub-contractor John Oswald & Associates LLC (JOA) operated the gauges and e-mailed the data to the R/V Davidson at the end of every Julian day.

Table 3 - Tide Gauges

Gauge	Model	Gauge Type	Location	Latitude	Longitude	Operational
9451625	H350XL/355	Digital Bubbler	Warm Spring Bay, AK	57°05'18"N	134°49'30" W	April-September
9452328	H350XL/355	Digital Bubbler	False Bay, AK	57°40'00"N	134°56'06" W	April-September
9451953	H350XL/355	Digital Bubbler	Mitchell Bay, AK	57°32'24"N	134°25'30" W	August-September

TIDES

All sounding data were reduced to MLLW initially using unverified tidal data from the three tide stations located in Warm Spring Bay, False Bay, and Mitchell Bay, AK. 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 R/V Davidson at the end of every Julian Day. A cumulative file for the gauges was updated each day by appending the new data. Refer to the OPR-O322-KR-07 Horizontal and Vertical Control Report for additional tidal information and station descriptions.

The tidal zoning was modified by JOA, providing a more elaborate zoning scheme from those zones issued in the Statement of Work. For additional information, refer to JOA's Final Technical Report.

November 5, 2007, JOA issued verified tidal data and final zoning for H11696, H11697, H11698, H11699, H11702, H11703, H11704, H11705, H11706, H11707, & H11708 of OPR-O322-KR-07. On January 2, 2008, JOA issued verified tidal data and final zoning for H11700 & H11701 of OPR-O322-KR-07. All sounding data were then re-merged using CARIS HIPS and SIPS tide routine. Verified tidal data were used for all final Navigation BASE surfaces and S57 Feature files.¹⁰

D – Results and Recommendations

Chart Comparison

H11700 survey was compared with charts:

Chart No.	Scale	Edition	Edition Date
17339	30,000	11th	Mar. 1998
17320	217,828	17th	Nov. 2005

Note: Electronic chart (US3AK3BM).

Comparison of Soundings

In general, the soundings from chart 17339 coincide with the soundings from H11700 to within 1 to 5 fathoms; areas that do vary to any degree are as follows¹¹:

- Item # 1: Hydrographic survey H11700 revealed a depth of 13 fathoms in the vicinity of a 19 fathom sounding on chart 17339 located at 57°28'43" N, 134°34'53" W. This area was surveyed with 100% multibeam coverage. The shoaling is centered in the area depicted below.
- Item # 2: Hydrographic survey H11700 revealed a depth of 7 fathoms in the vicinity of a 2 ¼ fathom sounding on chart 17339 located at 57°28'16" N, 134°34'02" W. This area was surveyed with 100% multibeam coverage.
- Item # 3: Hydrographic survey H11700 revealed a depth of 7 fathoms in the vicinity of a 13 fathom sounding on chart 17339 located at 57°27'59" N, 134°33'28" W. This area was surveyed with 100% multibeam coverage. The shoaling is centered in the area depicted below.
- Item # 4: Hydrographic survey H11700 revealed a depth of 11 fathoms in the vicinity of a 4 fathom sounding on chart 17339 located at 57°27'57" N, 134°33'38" W. This area was surveyed with 100% multibeam coverage.
- Item # 5: Hydrographic survey H11700 revealed a depth of 20 fathoms in the vicinity of a 3 ½ fathom sounding on chart 17339 located at 57°27'57" N, 134°34'29" W. This area was surveyed with 100% multibeam coverage.
- Item # 6: Hydrographic survey H11700 revealed a depth of 21 fathoms in the vicinity of a 10 ½ fathom sounding on chart 17339 located at 57°27'54" N, 134°34'45" W. This area was surveyed with 100% multibeam coverage.
- Item # 7: Hydrographic survey H11700 revealed a depth of 2.7 fathoms in the vicinity



of a 9 fathom sounding on chart 17339 located at 57°27'36" N, 134°34'59" W. This area was surveyed with 100% multibeam coverage. The shoaling is centered in the area depicted below.

- Item # 8: Hydrographic survey H11700 revealed a depth of 19 fathoms in the vicinity of a 11 fathom sounding on chart 17339 located at 57°27'43" N, 134°34'15" W. This area was surveyed with 100% multibeam coverage.
- Item # 9: Hydrographic survey H11700 revealed a depth of 2.7 fathoms in the vicinity of a 8 fathom sounding on chart 17339 located at 57°28'13" N, 134°30'36" W. This area was surveyed with 100% multibeam coverage. The shoaling is centered in the area depicted below.

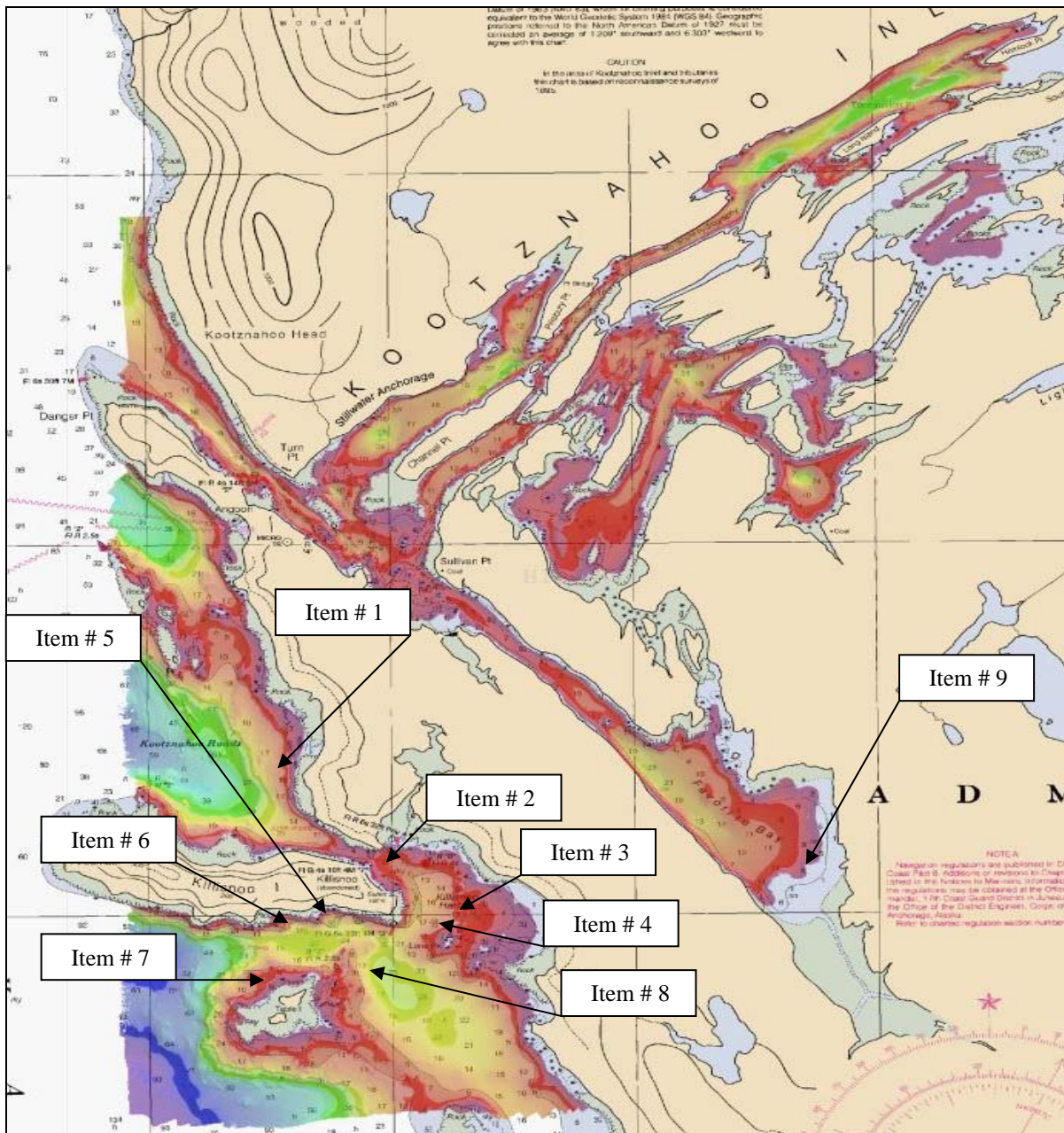


Figure 6 H11700 Chart Comparison (Chart 17339)

It should also be noted the soundings from H11700 coincide with the soundings from chart 17320 to within 1 to 5 fathoms and with the electronic chart US3AK3BM to within 5 to 15 meters.¹²



Automated Wreck and Observation Information System

There were no AWOIS items assigned to H11700.¹³

Charted Features¹⁴

All charted features residing on charts incorporated within H11700 (see Listing of Charts above) were investigated and are as follows:

- Isolated 4 fathom shoal located at 57°27'57" N and 134°33'38" W; survey lines were conducted to provide 200% coverage over the area. The multibeam data was reviewed in CARIS HIPS and the shoal was not located. H11700 survey did reveal a shoal with a least depth of 7.7m (4.2 fathoms) located approximately 250 meters to the NE. It is noted as Item # 4 above in Figure 6 H11700 Chart Comparison (Chart 17339). It is recommended that the 4 fathom shoal be removed from the charts and the charts updated to reflect the submitted H11700 CARIS BASE Surface.¹⁵

Dangers to Navigation

Eight Dangers to Navigation were located during the survey of H11700. The Dangers to Navigation were reported on September 12, 2007 (See Appendix I for submitted reports).¹⁶

Bottom Samples

The R/Vs R2 and D2 were 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 (v3.7.0). Sediment retrieved from the sampler was analyzed and then encoded with the appropriate S57 attributes. Positions and descriptions of all samples are found in the H11700_S57_Features file.¹⁷

Aids to Navigation

Throughout survey operations the position and description of all charted Aids to Navigation were recorded and logged as specified in the Statement of Work. Positions and descriptions were recorded and logged using WinFrog (v3.7.0). All Aids to Navigation surveyed in H11700 were compared to current charts and Light List VI to ensure they are correct and undamaged as per the April 2007 Specifications and Deliverables. Deviations are as follows¹⁸:



- Light: Fl R 4s 14 ft 5M was investigated by DP JD254_019_D2; it does adequately serve the intended purpose for which it was established, but is slightly out of position. The light is charted at 57°30'18" N, 134°34' 59" W on chart 17339 and Light List, but is actually located to the SW on rock at 57°30'17.25" N, 134°34'59.68"W.
- Buoy/Light: R"6" Fl R 4s was investigated by DP JD240_067; it does adequately serve the intended purpose for which it was established, but is slightly out of position. The Aid is charted at 57°28'16.55" N, 134°33'43.14" W on chart 17339. It should be charted to reflect the Light List position at 57°28'17" N, 134°33'49" W.
- Marker: R "4" was investigated by DP JD254_013_D2; it does adequately serve the intended purpose for which it was established, but is slightly out of position. The Aid is charted on electronic chart US3AK3BM at 57°27'53.34" N, 134°33'36.75" W, but should be changed to reflect its position on chart 17339 at 57°27'53.04" N, 134°33'32.83" W.
- Marker: R "4" was investigated by DP JD254_025_D2; it does adequately serve the intended purpose for which it was established, but is slightly out of position. The Marker is charted at 57°30'02.20" N, 134°34'36.26" W on chart 17339 and Light List, but is actually located to the southeast at RSD obstruction position 57°30'00.96" N, 134°34'36.26" W.

Shoreline Verification Results

Remote Sensing Division (RSD) provided the shoreline detail (AK0401B) for this survey. Since the RSD shoreline was the official shoreline source provided by NOAA, primary focus was given to its verification during this survey. However, charted features were investigated if practical as were any significant new features observed during the course of shoreline verification. Significant features were deemed to be those potentially dangerous to navigation and / or seaward of the 4m contour.

Visual inspection during shoreline verification determined the RSD shoreline to be very accurate. RSD foul areas and ledges commonly needed some adjustment but the MHW line and point features provided by RSD were particularly good. Any discrepancies are detailed below.

Fugro Pelagos' LIDAR system was used to collect data in this sheet as well. The LIDAR sounding data was used strictly to provide reconnaissance data to assist vessel operations in the field. Geo-referenced photo-mosaics provided by LIDAR were also utilized as a layer during S-57 attribution to help delineate shoreline features (such as kelp area extents). The matchup between the LIDAR photo-mosaic, RSD source shoreline, and vessel multibeam data was excellent. Note that no heights / depths in the S-57 feature file were LIDAR-derived.

The Hydrographer recommends that the RSD MHW from (AK0401B) supersede previously charted shoreline where any discrepancies occur unless noted below.¹⁹



The following tables itemize any errors or discrepancies found in the RSD source and charted shoreline. Note that RSD and charted features that were found to be positioned accurately are not itemized here and not included in the S57 feature file. New features (features not in the RSD source/chart but found during field investigation) do appear in the S57 feature file, but are not itemized here.²⁰

RSD Source (AK0401B) Changes, Discrepancies, and Comments				
RSD Feature	RSD Position	Remarks	Actions Taken in S57 Feature File / Recommendations	Applicable DP form(s)
Foul	57 31 44.76 N 134 29 16.86 W	RSD foul area is actually a ledge	Defined using MBES and LIDAR photo-mosaic. Chart as depicted in S57 file.	N / A
Rock	57 30 27.66 N 134 33 21.80 W	RSD rock not found, full MBES coverage.	Do not chart.	N / A
Rock	57 30 29.87 N 134 33 23.98 W	RSD rock not found, full MBES coverage.	Do not chart.	JD254_178
Rock	57 30 18.20 N 134 34 12.07 W	RSD rock not found, full MBES coverage.	Do not chart.	N / A
Piers – Floating and Fixed	57 29 38.20 N 134 33 54.42 W	RSD piers good. Angoon small boat harbor.	Chart.	JD254_044_D2 JD254_046_D2
Pier – Floating	57 29 39.88 N 134 34 00.19 W	RSD pier good. Angoon fuel dock.	Chart.	JD254_042_D2
Pier – Floating and Fixed	57 29 48.01 N 134 34 07.05 W	RSD pier good. Angoon float plane dock.	Chart.	JD254_035_D2
Pier – Fixed	57 29 52.63 N 134 34 21.80 W	RSD pier good. Lodge boat dock (private).	Chart.	N / A
Obstruction	57 30 00.96 N 134 34 36.26 W	RSD Obstruction is the actual position of the nearby charted Aid to Navigation.	Chart Aid to Navigation at this point.	JD254_026 JD254_025
Foul	57 30 18.75 N 134 34 58.08 W	RSD foul area does not extend out in to channel.	Do not chart. Chart the obstruction area depicted in the S57 file instead.	N / A
Rock	57 30 18.60 N 134 34 59.99 W	RSD rock not found, full MBES coverage.	Do not chart.	JD254_020_D2
Rock	57 30 37.15 N 134 34 29.81 W	RSD rock not found, full MBES coverage.	Do not chart.	JD254_244_D2
Foul	57 31 23.88 N 134 32 48.82 W	RSD foul extends further seaward.	Chart as depicted in S57 file.	JD254_221_D2 JD254_220_D2 JD254_214_D2



RSD Source (AK0401B) Changes, Discrepancies, and Comments				
RSD Feature	RSD Position	Remarks	Actions Taken in S57 Feature File / Recommendations	Applicable DP form(s)
Pier – Floating	57 30 05.54 N 134 35 18.96 W	RSD pier good. However, it is actually fixed and non-floating.	Chart.	JD240_099
Rocks (2)	57 29 13.88 N 134 35 04.77 W 57 29 15.30 N 134 35 04.35 W	RSD rocks not found at these position w/ full MBES coverage though kelp is evident in photo-mosaic.	Do not chart; chart the nearby multibeam rocks instead.	N / A
Pier – Fixed	57 28 10.04 N 134 34 05.41 W	RSD pier good. Small boat dock for lodge at Killisnoo.	Chart	JD240_006
Pier – Fixed and Building	57 28 20.33 N 134 34 04.82 W	RSD pier and building good. Angoon Ferry Terminal.	Chart	JD240_070

Charted Feature Changes, Discrepancies, and Comments				
Chart No. and Feature	Charted Position	Remarks	Recommendations	Applicable DP form(s)
17339 Ledge	57 32 36.47 N 134 29 05.68 W	Charted ledge off point not that extensive, actually reef and smaller ledge.	Chart ledge / reef as depicted in S57 file.	JD254_033
17339 Ledge	57 32 24.21 N 134 29 16.86 W	Charted ledge not that extensive.	Chart ledge as depicted in S57 file.	N / A
17339 Ledge	57 32 03.29 N 134 30 14.05 W	Charted ledges inaccurate; redefined around Long Island.	Chart ledge as depicted in S57 file.	JD254_019
17339 Ledge	57 31 47.90 N 134 29 36.88 W	Charted ledge very inaccurate; redefined using MBES and LIDAR photo-mosaic as complex series of reefs and ledges.	Chart ledges / reefs depicted in the S57 file.	JD255_073



Charted Feature Changes, Discrepancies, and Comments				
Chart No. and Feature	Charted Position	Remarks	Recommendations	Applicable DP form(s)
17339 Ledge	57 31 41.56 N 134 29 05.62 W	Charted ledge inaccurate; redefined using MBES and LIDAR photo-mosaic as a reef and ledge	Chart ledge / reef as depicted in S57 file.	JD255_106
17339 Ledge	57 30 34.87 N 134 30 29.70 W	Charted ledge not that extensive in this area; redefined using MBES and LIDAR photo-mosaic.	Chart ledge this area as depicted in S57 file.	JD245_143
17339 Danger Line	57 30 16.02 N 134 30 43.95 W	No hazard; full MBES coverage.	Remove.	N / A
17339 Rock	57 30 12.68 N 134 33 00.49 W	Charted rock not found. Skiff did not observe it and nothing evident in LIDAR photo-mosaic.	Remove.	JD245_027
17339 Rock	57 30 26.30 N 134 32 16.61 W	Charted rock actually a ledge.	Remove and chart as ledge as depicted in S57 file.	JD245_015
17339 Rocks (3)	57 30 27.12 N 134 32 28.24 W 57 30 29.87 N 134 32 22.78 W 57 30 27.28 N 134 32 21.81 W	Charted rocks are actually ledges.	Remove and chart as ledges as depicted in S57 file.	JD245_016
17339 Rocks (3)	57 30 39.50 N 134 32 13.33 W 57 30 36.65 N 134 32 12.76 W 57 30 35.71 N 134 32 13.17 W	Charted rocks are actually ledges.	Remove and chart as ledges as depicted in S57 file.	JD245_123



Charted Feature Changes, Discrepancies, and Comments				
Chart No. and Feature	Charted Position	Remarks	Recommendations	Applicable DP form(s)
17339 Reef	57 30 46.59 N 134 32 09.98 W	Charted ledge off islet inaccurate – actually smaller ledge with two reefs. Redefined using MBES and LIDAR photo-mosaic.	Chart ledges / reefs depicted in the S57 file.	N / A
17339 Ledge	57 30 42.52 N 134 32 30.04 W	Charted ledge very inaccurate; redefined using MBES and LIDAR photo-mosaic as complex series of reefs and ledges.	Chart ledges / reefs depicted in the S57 file.	N / A
17339 Ledge	57 30 42.46 N 134 32 18.87 W	Ledge not that extensive; adjusted using MBES.	Chart north end of ledge as depicted in the S57 file.	N / A
17339 Ledge	57 30 41.41 N 134 32 45.41 W	Ledge not that extensive; adjusted using MBES.	Chart ledge as depicted in S57 file.	N / A
17339 Ledge	57 30 14.78 N 134 34 05.24 W	Large ledge not an accurate depiction of area. Actually a collection of ledges, reefs, kelp areas, and obstruction/foul areas. Used MBES, and LIDAR photo-mosaic to define.	Remove the single ledge and chart area as depicted in the S57 file.	N / A
17339 Ledge	57 28 04.85 N 134 31 00.31 W	Ledge does not exist.	Remove.	JD254_085_D2
17339 Ledge	57 29 13.60 N 134 32 39.23 W	Ledge does not exist.	Remove.	JD254_076_D2
17339 Wreck	57 29 30.55 N 134 33 29.44 W	Wreck exists; actually a group of wrecks evident in LIDAR photo-mosaic.	Chart. Depicted in S57 file as a wreck area.	N / A




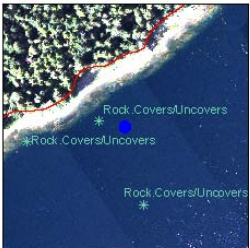
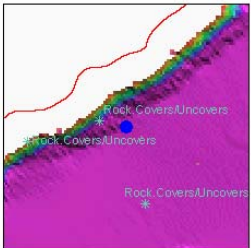
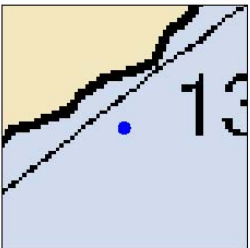
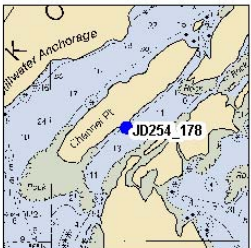
Charted Feature Changes, Discrepancies, and Comments				
Chart No. and Feature	Charted Position	Remarks	Recommendations	Applicable DP form(s)
17339 Rock	57 29 50.66 N 134 33 56.73 W	Rock in incorrect position.	Move to 57 29 51.43 N 134 33 55.01. Depicted in S57 file at this (correct) position.	N / A
17339 Rock	57 29 51.73 N 134 33 55.03 W	Rock in incorrect position.	Move to 57 29 52.54 N 134 33 54.66 W. Depicted in S57 file at this (correct) position.	N / A
17339 Rocks (2)	57 29 45.07 N 134 33 42.00 W 57 29 46.24 N 134 33 40.77 W	Rocks not found, full MBES coverage.	Remove.	JD254_056_D2
17339 Rock	57 29 43.69 N 134 33 35.36 W	Rock is actually two discrete rocks.	Chart as two rocks as depicted in S57 file.	N / A
17339 Ledge	57 30 41.87 N 134 36 11.01 W	Ledge this area does not extend as far seaward as shown on chart.	Chart ledges as depicted in S57 file this area.	N / A
17339 Ledge	Extents: 57 31 35.20 N 134 35 55.47 W 57 30 28.28 N 134 35 00.20 W	Ledge this area does not extend as far seaward as shown on chart.	Chart ledges as depicted in S57 file.	JD256_009
17339 Rock	57 30 33.47 N 134 34 22.11 W	Charted rock not found, full MBES coverage. Nothing nearby in LIDAR photo-mosaic.	Remove.	N / A
17339 Ledge	57 30 04.23 N 134 35 20.61 W	Ledge inaccurate as charted. Refined using MBES and photo-mosaic.	Chart ledge as depicted in S57 file	N / A
17339 Rocks (2)	57 29 15.52 N 134 35 06.19 W 57 29 12.46 N 134 35 06.24 W	Rocks not found; full MBES coverage.	Remove and chart the nearby multibeam rocks instead.	N / A
17339 Ledge	57 29 37.17 N 134 36 08.06 W	Reefs do not connect, evident from full MBES coverage.	Break at this point.	N / A



Charted Feature Changes, Discrepancies, and Comments				
Chart No. and Feature	Charted Position	Remarks	Recommendations	Applicable DP form(s)
17339 Reef	57 31 00.98 N 134 31 31.16 W	Reef not as extensive as charted. Refined using MBES coverage and photo-mosaic.	Chart reef as depicted in S57 file.	N / A
17339 Ledge	57 31 17.60 N 134 32 21.74 W	Ledge not that extensive.	Chart as depicted in S57 file.	N / A
17339 Ledge	57 30 17.74 N 134 32 19.12 W	Ledge inaccurate. Redefined using MBES coverage and photo-mosaic.	Chart as depicted in S57 file.	N / A
17339 Ledge	57 28 32.97 N 134 35 52.72 W	Ledge doesn't extend this far seaward. Redefined this area using MBES coverage.	Chart as depicted in S57 file.	JD240_026
US3AK3BM (ENC) Rock	57 28 22.50 N 134 34 29.29 W	Rock does not exist, full MBES coverage.	Remove.	N / A
17339 Rock	57 28 12.11 N 134 34 04.56 W	Rock does not exist, full MBES coverage.	Remove.	N / A
17339 Subm ruin	57 28 08.11 N 134 33 59.87 W	Nothing observed in MBES coverage.	Remove.	N / A
17339 Rock	57 28 09.07 N 134 33 58.62 W	Rock does not exist, full MBES coverage.	Remove.	N / A
US3AK3BM (ENC) Rock	57 28 09.29 N 134 34 02.38 W	Rock does not exist, full MBES coverage.	Remove.	N / A
17339 Rock and shoal area	57 27 57.58 N 134 33 53.54 W	Rock does not exist. And shoal area extends out in to deep water; full MBES coverage.	Remove rock. Refine or remove the shoal line.	N / A
17339 Rock	57 27 59.31 N 134 34 33.73 W	Rock does not exist, full MBES coverage.	Remove.	N / A

Shoreline Correlator Sheet

ArcMap (v9.2) 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 DPs. The Correlator was mapped to the log file, tide file, photos, NOAA Chart (largest scale available), and CARIS BASE Surfaces to calculate and display the desired information for each DP. The DP forms²¹ and raw field records can be found on the Project USB Drive under; OPR-O322-KR-07\H11700\Final_Deliverables\Reports\Descriptive Report\H11700 Shoreline.

DP ITEM NUMBER : JD254_178		DP Form	
<p>Date: 11 September, 2007 Julian Day: 254 UTC Time: 18:39:14 Latitude: 57 30 29.70 N Longitude: 134 33 22.67 W Northing: 6374051.06 Easting: 526585.37 Raw (+Depth) or (-Height) (m): 19.30 Draft Corrector (m): N/A SV Corrector (m): N/A Tide Corrector (m): 2.19 Corrected to MLLW (m): 17.11 Corrected to MLLW (fathoms): 9.36 Corrected to MLLW (feet): 56.15 DP Comment: D2_F red 45650 & 45651 not found</p>	<p>Correlating DP Item Numbers: N/A N/A N/A N/A</p> <p>Correlating MB Least Depth: None</p>		
<p>Remarks/Recommendations: RSD rock not found, full MBES coverage. Photo of beach. Do not chart.</p>		<p>Chart: 17339_1 Topo: Carto Code: None</p>	
			
DPs, LIDAR Photo-mosaic, RSD AK0401B 200m x 200m	DPs, MBES Coverage, RSD AK0401B 200m x 200m	DP and Chart 200m x 200m	DP and Chart 2000m x 2000m



E – Approval Sheet

Approval Sheet

For

H11700

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

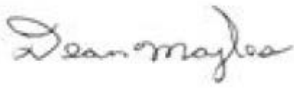
OPR-O322-KR-07 Statement of Work and 2007 Specifications & Deliverables;
Fugro Pelagos, Inc. Acquisition Procedures (2007- NOAAAcquisitionProcedures);
Fugro Pelagos, Inc. Processing Procedures (2007-NOAAProcessingProcedures);

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,

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

X 

Dean Moyles
ACSM Certified



Revisions Compiled During Office Processing and Certification

- ¹ Do not concur. The bounding box of the survey area has the following corners:
SW - 57-26-45.189N, 134-36-34.714W
NE - 57-32-55.610N, 134-28-16.214W
- ² Filed with project records.
- ³ Concur.
- ⁴ Concur.
- ⁵ Concur.
- ⁶ Concur.
- ⁷ Filed with project records.
- ⁸ Concur with clarification. New BASE surfaces were created at higher resolutions and new depth thresholds. See Survey Acceptance Review Checklist filed with hydrographic records.
- ⁹ Concur.
- ¹⁰ Concur.
- ¹¹ Concur with clarification. Compiler agrees with all items identified in the comparison with Chart 17339. Items 2 through 8 fall in the area covered by the inset and the discrepancies noted in the comparison with Chart 17339 also agree with the charted depths on the inset. Supersede charted data in the common area.
- ¹² Concur.
- ¹³ Concur.
- ¹⁴ There is a charted (17339) pipeline, position approximate, the center of which is located at 57-30-29.255N, 134-35-15.378W that was not addressed during the survey. The area was covered with 100% multibeam and the bathymetry of the area does not appear to be conducive to pipeline placement and there is no evidence of a pipeline or pipeline ruins in the data. Recommend removing the Pipeline PA from Chart 17339.
- ¹⁵ Concur.
- ¹⁶ Concur with clarification. One additional DTON was identified during the Survey Acceptance Review. All nine reported DTONs have been applied to the charts and all are included in HCell H11700.
- ¹⁷ Twenty-three bottom samples were collected during H11700 and 19 are included in the HCell. No charted bottom samples were retained.
- ¹⁸ Chart all ATONs according to the latest ATONIS information.
- ¹⁹ Concur.
- ²⁰ Concur with clarification. All items addressed in the tables have been reviewed during compilation and are either included in the HCell or have been blue noted to be removed or modified as appropriate.
- ²¹ Filed with hydrographic records.

Hydrographic Survey Registry Number: H11700

Survey Title: **State:** **ALASKA**
 Locality: **Chatham Strait**
 Sub-locality: **Kootznahoo Inlet**

Project Number: OPR-O322-KR-07

Survey Dates: May-June & August-September, 2007

Depths are reduced to Mean Lower Low Water using preliminary tides.

Positions are based on the NAD83 horizontal datum.

Charts Affected:

Chart No.	Scale	Edition	Edition Date
16016	969,756	20th	Nov. 2003
17320	217,828	17th	Nov. 2005
17339	30,000	11th	Mar. 1998

DANGER TO NAVIGATION:

Feature	Depth (fms ft)	Latitude	Longitude
Sounding	8 fms 1 ft	57-27-44.7N	134-35-00.8W
Sounding	5 fms 5 ft	57-27-48.6N	134-34-23.6W
Rock	2 fms 2 ft	57-27-06.1N	134-32-50.5W
Sounding	6 fms 0 ft	57-27-52.9N	134-33-41.9W
Sounding	4 fms 2 ft	57-28-02.0N	134-33-25.9W
Sounding	6 fms 4 ft	57-28-06.8N	134-33-30.2W
Sounding	5 fms 3 ft	57-28-43.8N	134-34-52.8W
Sounding	1 fms 5 ft	57-30-17.1N	134-34-38.8W

COMMENTS:

This is a contractor submitted DTON – no digital file is included.

Items 1,2 and 4 – 7 are on the inset for 17339.

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

H11700 Office Dton

Registry Number: H11700
State: Alaska
Locality: Chatham Strait
Sub-locality: Kootznahoo Inlet
Project Number: OPR-O322-KR-07
Survey Date:

Uncharted rock awash. Feature file reported hieght from levelling 0.1 fathoms.

Charts Affected

Number	Version	Date	Scale
17339	11th Ed.	03/07/1998	1:30000
17320	17th Ed.	11/01/2005	1:217828
16016	20th Ed.	11/01/2003	1:969756
531	23rd Ed.	01/01/2006	1:2100000
500	8th Ed.	06/01/2003	1:3500000
530	31st Ed.	06/01/2005	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
1.1	GP	-0.26 m	57° 30' 15.7" N	134° 34' 39.2" W

1 - Danger To Navigation

1.1) GP No. - Danger 2 from ChartGPs - ENC H11700_S57

DANGER TO NAVIGATION

Survey Summary

Survey Position: 57° 30' 15.7" N, 134° 34' 39.2" W
Least Depth: -0.26 m
Timestamp: [None]
GP Dataset: ChartGPs - ENC H11700_S57
GP No.: Danger 2
Charts Affected: 17339_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Uncharted rock awash within foul area. Feature file reported hieght from levelling 0.1 fathoms.

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - ENC H11700_S57	Danger 2	0.00	000.0	Primary

Hydrographer Recommendations

Cartographically-Rounded Depth (Affected Charts):

0fm (17339_1, 17320_1, 16016_1, 530_1)

0fm 1ft (531_1)

-.3m (500_1, 50_1)

S-57 Data

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

Attributes: QUASOU - 1:depth known
 SORDAT - 20070915
 SORIND - US,US,surve,H11700
 TECSOU - 12:found by levelling
 VALSOU - -0.260 m
 WATLEV - 5:awash

Feature Images

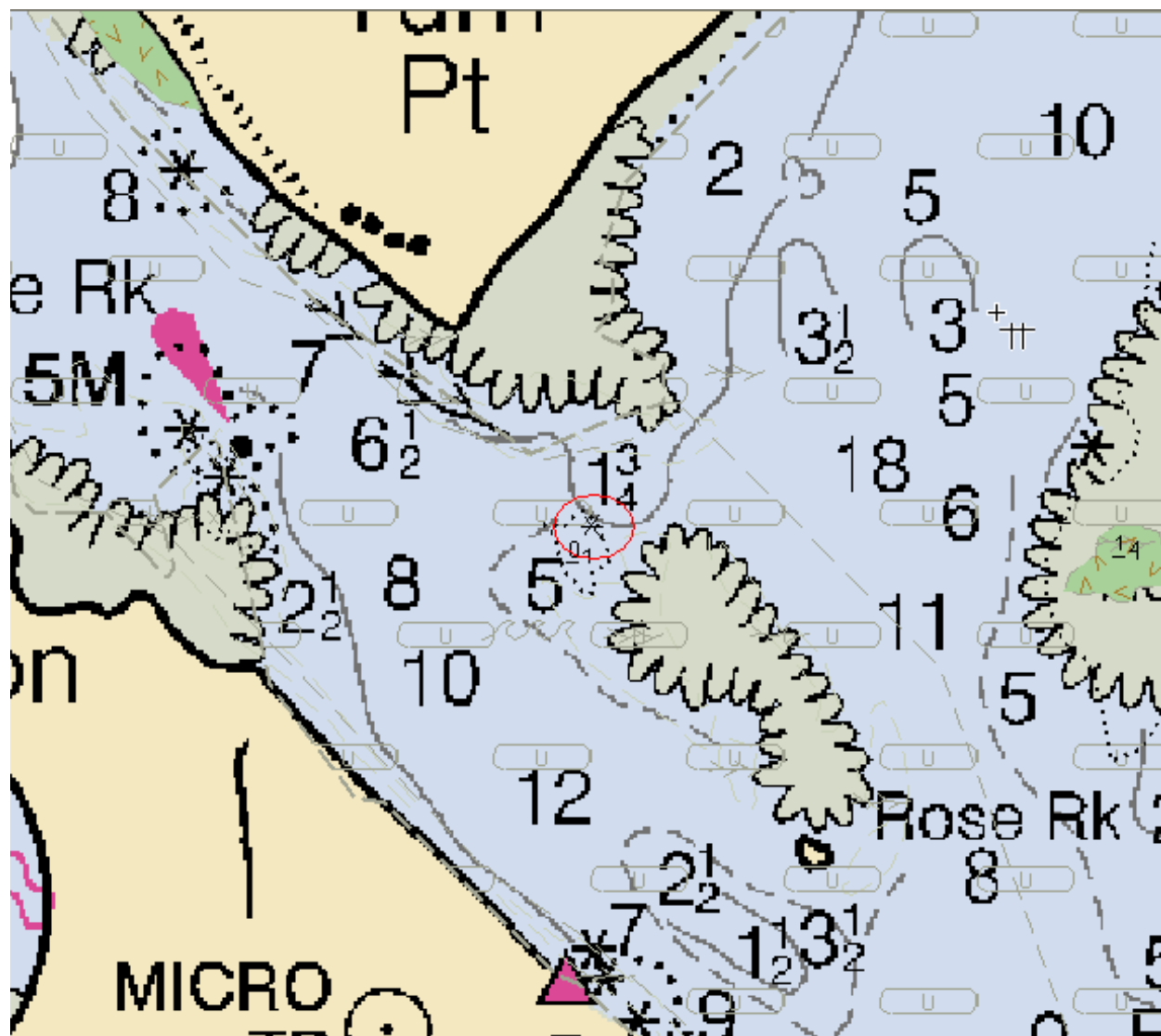


Figure 1.1.1

H11700 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's and RNC's in the region: NOAA ENC US3AK3BM and NOAA RNC's 17339 and 17320.

HCell compilation of survey H11700 used Office of Coast Survey HCell Specifications Version 3.0 and HCell Reference Guide Version 1.0.

1. Compilation Scale

Depths for HCell H11700 were compiled to the largest scale chart in the region, 17339, 1:30,000 and 17339 inset, 1:10,000. The density and distribution of soundings from H11700 were selected to emulate the distribution on chart and inset. Non-bathymetric features have been generalized to chart scale.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 5-meter combined surface, **H11700_Combined_5m**, in CARIS BASE Editor. A shoal-biased selection was made at 1:7,500 scale for the main chart area and 1:4,000 for the inset area using a Radius Table file with values shown in the table, below. The resultant sounding layer contains depths ranging from 0.0 to 208.5 meters.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	300	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 and inset 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 -2.3 to 0 meters and 0 to 300 meters, were used for the depth area objects. Upon conversion to NOAA charting units, the depth ranges are -1.26 to 0 fathoms and 0 to 164.04 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
3	5.4864	5.715	3.125
10	18.288	18.5166	10.125
50	91.44	92.8116	50.750
100	182.88	184.2516	100.75

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 and COALNE, should be expected. HCell features should be honored over *_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell 11700:

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 H11700 were delivered from the field in one S-57 file defining new features and modification to GC or charted features. The features included in the HCell were de-conflicted against GC shoreline, the chart and hydrography during office processing.

There were nine DTONs reported from survey H11700. All reported DTONs have been applied to the charts and all are included in HCell H11700.

There were no AWOIS items in the limits of H11700.

Twenty-three bottom samples were collected during H11700 and 19 are included in the HCell. No charted bottom samples were retained.

The source of all features included in the H11700 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 depth areas
DEPCNT	Zero-meter contour defining intertidal areas
COALNE	GC MHW line
LNDARE	GC Islets to be retained
UWTROC	Rock features
SLCONS	GC Pier to be retained with new information
OBSTRN	Foul areas
SBDARE	Bottom samples, reefs, ledges and rocky seabed areas
WATTUR	Areas with tide rips and overfalls
WEDKLP	Kelp features
WRECKS	New non-dangerous wreck
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
M_CSCL	Compilation Scale Meta object for the inset area
\$CSYMB	Blue notes

The *_SS HCell contains the following Objects:

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

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

H11700 junctions with surveys H11698, H11701 and H11702. H11698 has already been compiled, so the junction made during compilation addresses changes to be made to the data from that HCell for application to the charts. The junctions with H11701 and H11702 will be made when the surveys are compiled.

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 given a blue note with a recommendation to adjust the GC shoreline using the new survey data.

10. QA/QC and ENC Validation Checks

H11700 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

- H11700 Base Cell File, Chart Units, Soundings compiled to 1:30,000 and 1:10,000
- H11700 Base Cell File, Chart Units, Soundings compiled to 1:7,500 and 1:4,000
- H11700 Base Cell File, Metric Units, Features compiled to 1:10,000
- H11700 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11700 Survey Outline to populate SURDEX

11.2 File Naming Conventions

- | | |
|--|----------------------------|
| • Chart units base cell file, chart scale soundings | H11700_CS.000 |
| • Chart units base cell file, survey scale soundings | H11700_SS.000 |
| • Metric base cell file, survey scale features | H11700_Features.000 |
| • Descriptive Report package | H11700_DR.pdf |
| • Survey outline | H11700_Outline.gml & *.xsd |

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	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.

APPROVAL SHEET
H11700

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 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.

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.