

H11571

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. H11571

LOCALITY

State ALASKA

General Locality Ernest Sound and Eastern Passage

Sublocality Eaton Point to Western Deer Island

2007

CHIEF OF PARTY

Andrew L. Beaver CDR, NOAA

LIBRARY & ARCHIVES

DATE _____

NOAA FORM 77-28
(11-72)

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

REGISTRY No

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 _____

General Locality _____

Sub-Locality _____

Scale _____ Date of Survey _____

Instructions dated _____ Project No. _____

Vessel _____

Chief of party _____

Surveyed by _____

Soundings by echo sounder, hand lead, pole _____

Graphic record scaled by _____

Graphic record checked by _____ Automated Plot _____

Verification by _____

Soundings in fathoms feet at MLW MLLW _____

REMARKS: _____

Descriptive Report to Accompany Hydrographic Survey H11571

Project OPR-O119-FA-07
Ernest Sound and Eastern Passage, Alaska

Scale 1:10,000

April-May 2007

NOAA Ship FAIRWEATHER

Chief of Party: Commander Andrew L. Beaver, NOAA

A. AREA SURVEYED

The survey area is located in Ernest Sound and Eastern Passage, within the sub-locality of Eaton Point to Western Deer Island. This survey corresponds to Sheet K in the sheet layout provided with the Letter Instructions, as shown in *Figure 1* below. The survey area is bounded on the Southwest corner at 55°55'00"N, 132°10'00"W and the Northeast corner at 56°07'00"N, 132°00'00"W.

Data acquisition was conducted from April 15 to May 16, 2007 (DN 105 to DN 136).

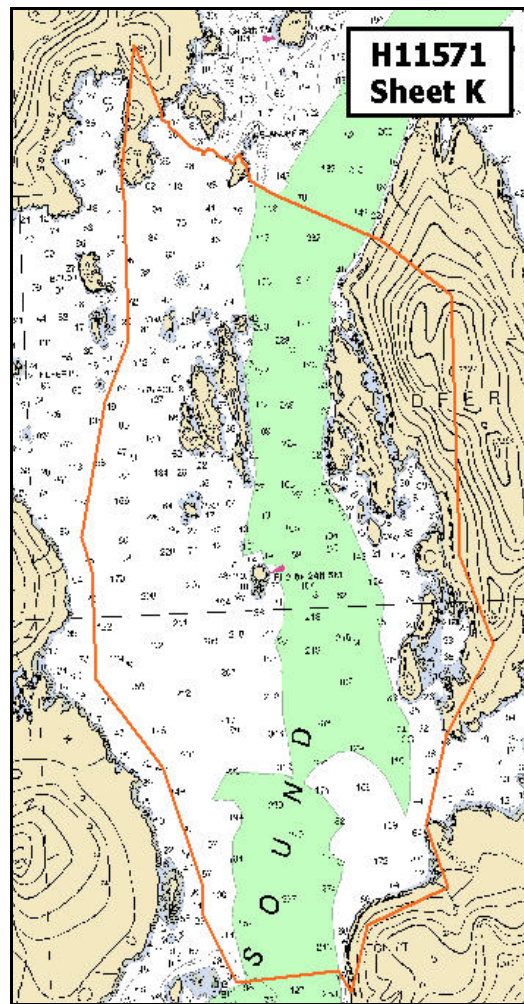


Figure 1: H11571

One hundred percent multi beam echo sounder (MBES) coverage was obtained in the survey area offshore of the 8-meter depth curve and the Navigable Area Limit Line (NALL) which is defined as the furthest offshore of either the 4-meter depth contour or a distance of 64 meters (0.8 mm at the scale of the largest scale chart) from the Mean High Water line.¹ When conditions allowed, multi beam echo sounder (MBES) data was acquired parallel to contours and at a line spacing of no less than 25 meters at depths between four and eight meters. Additional coverage was obtained when determining least depths over features or shoals offshore of the NALL. Due consideration was given to the safety of operations and areas deemed unsafe to survey were avoided by order of the Chief of Party.

Shoreline data were acquired for H11571. These data are attributed as S-57 objects for submittal.

B. DATA ACQUISITION AND PROCESSING

A complete description of data acquisition/processing systems and survey vessels along with quality control procedures and data processing methods are included and described in the *OPR-O119-FA-07 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover² Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections. This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-O119-FA, dated March 13, 2007.

B1. Equipment and Vessels

Equipment and vessels used for data acquisition and survey operations of this survey are listed in *Table 1*.

	FAIRWEATHER	Jensen Launch 1010	Jensen Launch 1018	MonArk	Ambar 700
Hull Registration Number	S220	1010	1018	1706	2302
Builder	Aerojet-General Shipyard	The Boat Yard, Inc.	The Boat Yard, Inc.	MonArk	Marine Silverships, Inc
Length Overall	231 feet	28' 10"	28' 10"	17'	23'
Beam	42 feet	10' 8"	10' 8"	7'2"	9' 4"
Draft, Maximum	15' 6"	4' 0" DWL	4' 0" DWL	1' 3"	1' 4"
Cruising Speed	13.5 knots	24 knots	24 knots	20 knots	22 knots
Max Survey Speed	10 knots	10 knots	10 knots		
Primary Echosounder	RESON 8160	RESON 8101	RESON 8101		
Sound Velocity Equipment	SBE 19plus & 45, MVP 200	SBE 19plus	SBE19plus		
Attitude & Positioning Equipment	POS/MV V4	POS/MV V4	POS/MV V4		
Type of operations	MBES	MBES	MBES & Bottom Samples	Shoreline	Shoreline

Table 1: Vessel Inventory

No vessel configurations used during data acquisition deviated from the *OPR-O119-FA-07 Data Acquisition and Processing Report (DAPR)*.

B2. Quality Control

Internal consistency and integrity of data among acquisition platforms collected for survey H11571 were manually examined by the Hydrographer in CARIS subset mode. The internal consistency and integrity of data collected for survey H11571 were found to be good as the data agreed within day-to-day, vessel-to-vessel and line-to-line.

Crosslines

Shallow water multibeam crosslines for this survey totaled 19.4 linear nautical miles (lnm), comprising 9.56% of the 202.9 lnm of total MBES hydrography. Both main scheme and cross-line mileage are summarized in *Table 2*.

MAIN SCHEME - Mileage	
Single Beam MS	0
Multibeam MS mileage	183.51434
SideScan MS	0
Total MS	183.51434
CROSSLINE - Mileage	
Single Beam XL	0
Multibeam XL	19.3981122
Total XL	19.3981122
OTHER	
Developments/AWOIS - Mileage	0
Shoreline/Nearshore Investigation - Mileage	40.7
Total # of Investigated Items	0
Total Bottom Samples	8
Total SNM	32.88
Specific Dates of Acquisition	4/15,4/16,4/17,4/27,4/28,4/29,5/1,5/3,5/11,5/13,5/16
Specific Dn#s of Acquisition	Dn105,106,107,117,118,119,121,123,131,133,136

Table 2: H11571 Survey Statistics

The Hydrographer has determined through manual examination of the data that the crossline agreement with mainscheme data meet the vertical accuracy requirements as stated in the *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM)*.

Junctions

OPR-O119-FA-07 JUNCTIONS³

Survey H11571 junctions with H11570, H11569, H11572, and H11573, which are Sheets J, H, L, and M respectively, of this project. The area of overlap between surveys are shown in *Table 3*. Data were reviewed in CARIS Subset Editor and depths were found to be consistent between the two surveys, meeting the requirements as stated in the *HSSDM*.

OPR-0327-RA-01 JUNCTION⁴

Survey H11571 junctions with survey H11052; sheet P of project OPR-0327-RA-01. As HDCS data were not available for survey H11052, sounding data from survey H11052 were imported into MapInfo and compared with the sounding data exported from CARIS BASE surfaces for survey H11571. The depths were found to be consistent between the two surveys, meeting the requirements as stated in the *HSSDM*.

H#	H11569	H11570	H11572	H11573	H11052
Project	OPR-O119-FA-06	OPR-O119-FA-06	OPR-O119-FA-06	OPR-O119-FA-06	OPR-0327-RA-01
Sheet	Sheet H	Sheet J	Sheet L	Sheet M	Sheet P
Overlap with H11571	500m	300m	250m	400m	200m

Table 3: Junction Surveys with H11571

The sheet limits and area of overlap for Sheets H, J, K, L, M, and P are shown in *Figure 2*.

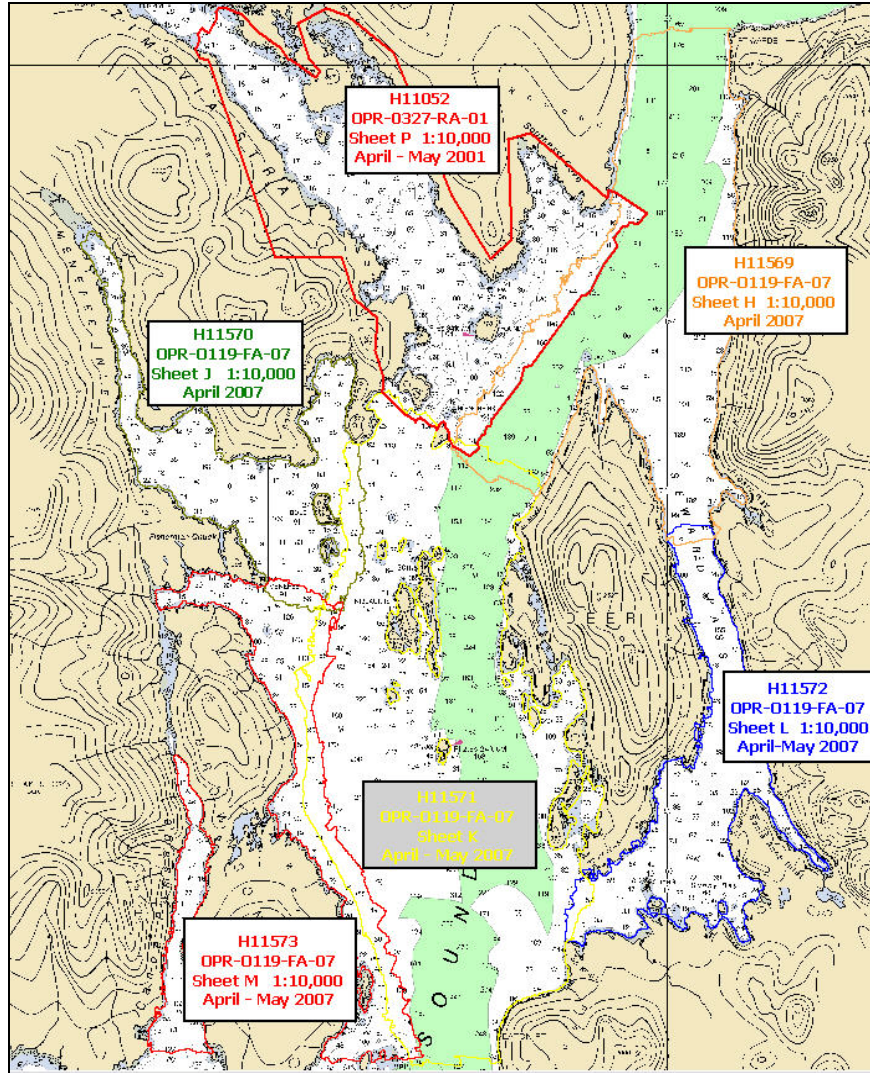


Figure 2: Surveys that junction with H11571

Quality Control Checks

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

Data Quality Factors

COVERAGE ASSESSMENT:

Coverage Assessment followed procedures as outlined in the DAPR.

Similar to surveys H11570 and H11572, H11571 has numerous areas of extremely steep underwater cliffs. Frequently dropping over 100 meters in an almost vertical line, the cliffs made it extremely difficult to display full multibeam coverage at all relevant depth resolution levels in CARIS HIPS. At the FAIRWEATHER filtered resolution levels (see Table 4), noticeable apparent data gaps (<3 nodes across) were present in the data (see Figure 3). However, when a blanket coarse resolution such as the 20m or

35m resolution is displayed, the gaps are not present (see *Figure 4*). The example in figures 3 and 4 is centered at position 56° 01.25'N, 132° 03.6'W in the East fieldsheet.⁵

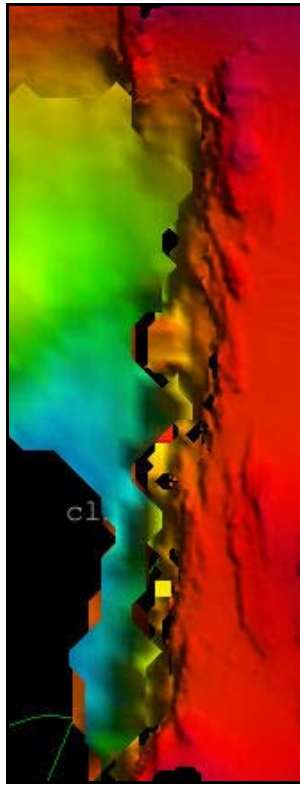


Figure 3: Cliff shown at FAIRWEATHER depth range resolutions

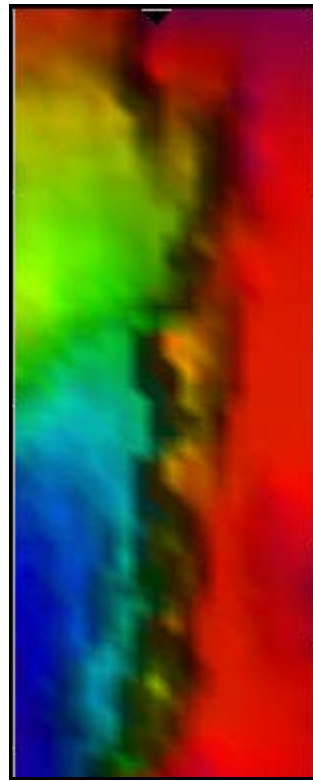


Figure 4: Cliff shown at 10m resolution

Another cliff similar to the example above is centered at the following position in H11571: 56° 04.70'N, 132° 05.98'W

DESIGNATED SOUNDINGS:

Designation of soundings followed procedures as outlined in the DAPR.

TRUEHEAVE:

TrueHeave data could not be applied to MBES data to 1018 line 2117 on May 13, 2007 (DN 133), because it was not logged. MBES data quality from that day does not appear to have been affected by the lack of TrueHeave due to the negligible swell in the protected waters of Ernest Sound.⁶

POS M/V:

The POS M/V attitude data on launch 1018 was logged at 1 Hz as opposed to the usual 25 Hz during acquisition on H11571. As a result, roll and pitch artifacts appeared in some of the shallower areas in H11571. (See *Figure 5*) An email on this issue is located in the correspondence folder in Appendix V. The CUBE surfaces in the affected areas were inspected using CARIS subset mode, and the internal consistency and integrity of affected data were found to be within IHO standards.⁷

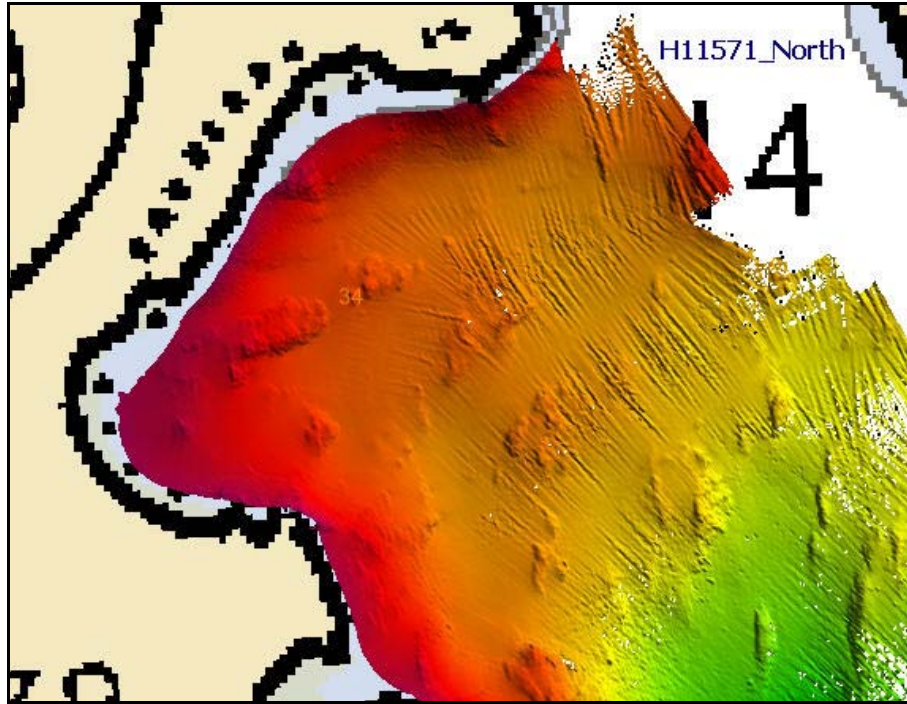


Figure 5: Roll and pitch artifacts from POS M/V in H11571_North fieldsheet

Accuracy Standards

All data meet the data accuracy specifications as stated in the *HSSDM*.⁸

B3. Corrections to Echo Soundings

Data reduction procedures for survey H11571 conform to those detailed in the DAPR.

B4. Data Processing

Data processing procedures for survey H11571 conform to those detailed in the DAPR, with the exceptions discussed below.

There are eight total fieldsheets fulfilling the various resolution requirements for survey H11571. Fieldsheet H11571 is the largest, encompassing the entire survey area to the ten-, twenty-, and thirty-five-meter resolutions. Seven additional fieldsheets (H11571_North, H11571_Niblack, H11571_West, H11571_East, H11571_Southeast, H11571_South, and H11571_Southwest) cover the areas of the survey near coastline or shoals. These fieldsheets include surfaces of five- and two-meter resolution. In addition, the East and Southeast fieldsheets had one-meter surfaces generated. The fieldsheet areas of coverage are displayed in *Figure 6*.



Figure 6: H11571 Fieldsheets

A detailed listing of the surface resolutions used for each depth range are given in *Table 4*.

FAIRWEATHER			
Depth Ranges		Resolutions	
Lo (m)	Hi (m)	Overlap (m)	Res. (m)
0	40		1 and 2
30	70	10	5
50	120	20	10
100	200	20	20
180	350+	20	35

Table 4: H11571 Surface Resolutions by Depth Range

C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H11571 can be found in the *OPR-O119-FA-07 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections came from the U.S. Coast Guard beacons at Annette Island (323 kHz) and Gustavus (288 kHz).

Vertical Control

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) primary tide station at Ketchikan (945-0460) served as control for datum determination and as the primary source for water level reducers for survey H11571 during acquisition.

FAIRWEATHER personnel installed one Sutron 8210 “bubbler” tide gauge at the tertiary station listed below. The gauge was installed in order to provide information to the Center for Operational Oceanographic Products and Services (CO-OPS N/OPS1) for the determination of time and height correctors, in accordance with the Project Instructions.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Thoms Point	945-0970	Tertiary 30 Day	April 12, 2007	May 22, 2007

Table 5: Tide Gauge Information

Refer to the *OPR-O119-FA-07 Horizontal and Vertical Control Report* for further information about the tertiary tide station.

A request for delivery of final approved water level data (smooth tides) for survey H11571 was forwarded to N/OPS1 on May 22, 2007 in accordance with the *Field Procedures Manual*, dated March 2007 (FPM). A copy of the request is included in Appendix V.⁹

FAIRWEATHER received the Tide Note for Hydrographic Survey H11571 on July 5, 2007. The Tide Note for Hydrographic Survey H11571 states that preliminary zoning is accepted as the final zoning correctors. Final approved water level data were received by FAIRWEATHER on July 10, 2007. The Tide Note for Hydrographic Survey H11571 and ancillary correspondence are included in Appendix V.

As per the Letter Instructions, all data were reduced to MLLW using the final approved water levels (smooth tides) from tertiary station Thoms Point (945-0970) by applying tide file 9450970.tid and time and height correctors through the zone corrector O119FA2007CORF.zdf, on July 10, 2007.¹⁰ It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Chart comparison procedures were followed as outlined in the DAPR.

Survey H11571 was compared with charts 17385 (16th Ed.; September, 2006, 1:80,000), and 17360 (35th Ed.; June, 2008, 1:217,828). Chart 17385 was been updated with the Notice to Mariners through September 9, 2009 and chart 17360 has been updated with the Notice to Mariners though June 14, 2008. There were no new changes within the survey area.

Chart 17385

Since the best scale chart represented in H11571 is Chart 17385, a 1:80,000 scale chart, there are numerous small shoal areas not adequately represented on the chart.¹¹ An example of this is an unrepresented 12 ½ fathom shoal in the northwest Niblack Islands (See *Figure 7*). Also of note is a charted 82 fathom sounding in the southern portion of H11571. Adjacent to the charted sounding is a shoal that is 30 fathoms closer to the surface (See *Figure 8*).



Figure 7: Uncharted shoal in NW Niblack Islands

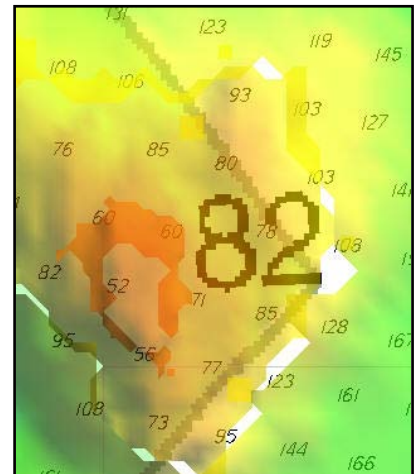


Figure 8: Uncharted shoal near charted (#17385) 82fm sounding

A 13 fathom sounding in the East fieldsheet is disproved directly by no areas deeper than 10 ½ fathoms in the vicinity. (See Figure 9).



Figure 9: Disproved charted (#17385) 13fm sounding

The rest of the depths on chart 17385 generally agree with the depths from survey H11571.

Chart 17360

Depths from survey H11571 generally agreed with depths on chart 17360 with the exception being the charted (#17385) 82 fathom sounding aforementioned in the Chart 17385 comparison paragraph above.¹² Some of the shoaler depths represented on the chart near the shoreline appear to have been removed for cartographic representation.

Chart Comparison Recommendations

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the *HSSDM*. **The surveyed soundings are adequate to supersede prior surveys in their common areas.**¹³ Based on the application of verified water level data (smooth tides) by FAIRWEATHER, final chart comparisons are not required by the Pacific Hydrographic Branch.

Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of H11571.¹⁴

Dangers to Navigation

Seven dangers to navigation were found and reported to the Mapping and Charting Division for final submission to the Seventeenth Coast Guard District on May 10 and May 23, 2007. A copy of the preliminary Danger to Navigation Reports are included in Appendix I.¹⁵

D.2 Additional Results

Shoreline Verification and Processing

FAIRWEATHER personnel conducted limited shoreline verification at times near predicted low water, in accordance with the Standing Project Instructions and HTD-2007-7. A composite source file from HSD's Operations Branch was provided with the project instructions. A sole shoreline source was included in the composite source file: Geographic Cell (GC) Shoreline compiled by the Remote Sensing Division (RSD) from photogrammetric surveys.¹⁶ Navigationally significant charted (17385) features located within the survey limits were also digitized into the composite source layer. All shoreline features from the composite source seaward of the Navigable Area Limit Line (NALL) were verified or disproved during shoreline operations.

Detached positions (DPs) and generic positions (GPs) acquired during shoreline verification were recorded in Trimble TerraSync 2.4.1 and on paper DP forms. Scanned copies of the DP forms are included in the digital Separates folder and hard copies can be found with the *Separates to be Included with Survey Data*.¹⁷ In addition, annotations describing shoreline were recorded on hard copy plots (boat sheets) of the digital shoreline.

DPs and GPs were inserted into Pydro where they were tide corrected, S57 attributed and resolved according to Pydro flagging logic. A survey feature report for shoreline items was generated and included as H11571_Features_Report.pdf in Appendix II. The report includes all significant shoreline items requiring specific attention that were flagged Report in Pydro. Investigation or survey methods for these items were included under the Remarks tab and, when appropriate, recommendations to the cartographer were included in the Recommendations tab.¹⁸

Shoreline deliverable .HOB files were compiled in Caris Notebook 3.0. Edits to existing source shoreline features were made in the H11571_Composite_Source.hob file, with GC and charted features modified or deleted as necessary. Field notes accompanying verified source features were entered in the remarks

attribute field. GPs and DPs were imported into Notebook from Pydro; these features are included in the H11571_Updates and/or H11571_Disprovals .HOB files.

If a source feature was edited in Notebook, the SORIND and SORDAT attribute fields were modified to reflect the survey number (US,US,graph,H11571) and final survey date. Unmodified source shoreline features were left with their original SORIND and SORDAT values. The SORIND/SORDAT information for shoreline features included in the final Notebook .HOB files is included in *Table 6*.

Shoreline Source	SORIND	SORDAT
RSD	US,US,graph,GC10548	19980515
RNC	US,US,graph,Chart17360	20060301
RNC	US,US,graph,Chart17385	20050601
Survey	US,US,graph,H11571	20070516

Table 6: SORIND/SORDAT Shoreline Features

For a more detailed description of shoreline verification and processing refer to the DAPR.

Shoreline Recommendations

The Hydrographer recommends that the shoreline depicted in the CARIS Notebook files and final sounding files supersede and complement shoreline information compiled on the NOAA charts.

Prior Survey Comparison

H11571 was compared with the prior survey, H04271, dated May-October 1922. Because of the differences in tidal datum, survey methods, and technology, the surveys only agreed to a small degree. Since H04271 was a lead-line survey with only partial bottom coverage, small rocks and pinnacles were not always discovered. Good examples of this limited discovery are the dangers to navigation (DTOns) discovered while surveying H11571. *Figure 10* highlights an area of comparison in the center of the Niblack Islands.

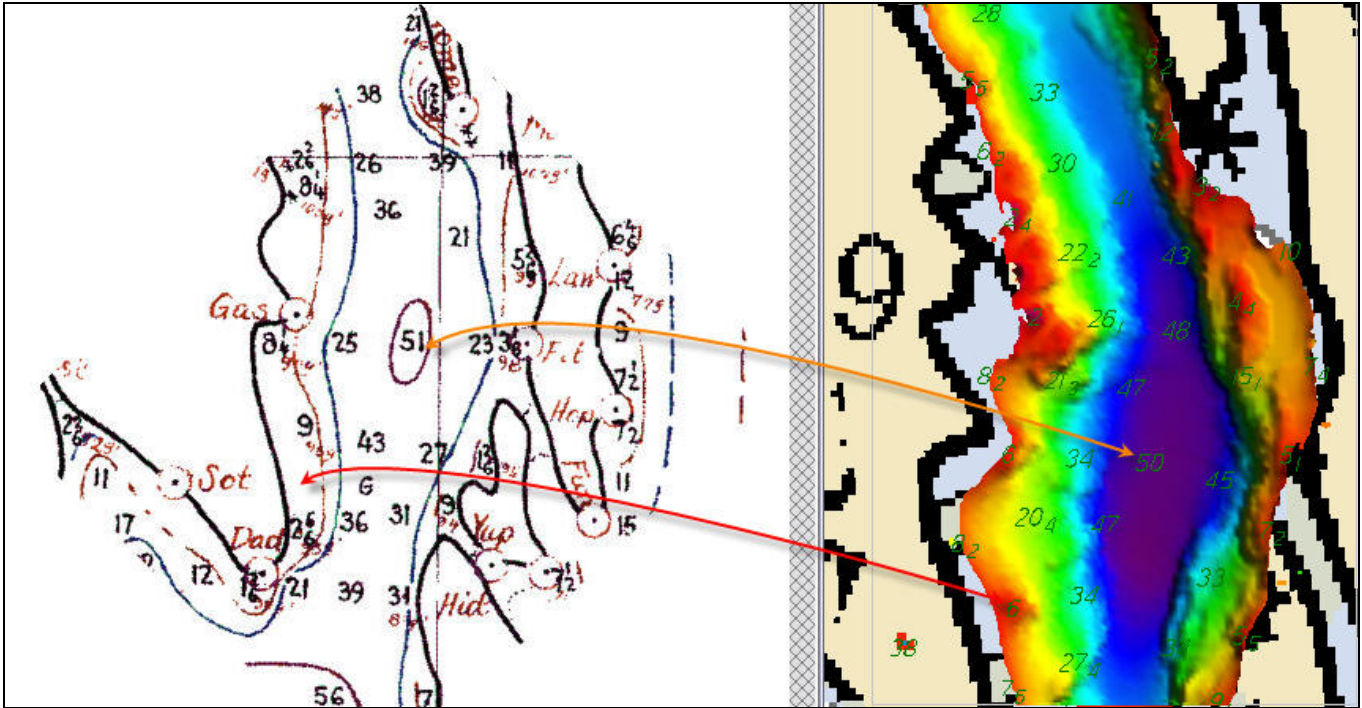


Figure 10: H11571 & H04271 Survey Comparison (Soundings in Fathoms)

Aids to Navigation

Survey H11571 included one (1) aid to navigation (ATON), South Niblack Islands Light (Light List # 22540). A detached position was taken for check purposes only. The ATON was found to serve its intended purpose.¹⁹

Bottom Samples

Bottom samples were collected on May 15, 2007 (DN 135) and are included as seabed classifications along with the other S57 features in the Pydro Preliminary Smooth Sheet. The bottom sample positions were also imported to the Notebook H11571_Updates.hob file.²⁰

Miscellaneous

In the center of the Niblack Islands, a significant sea shelf was discovered with MBES. The shelf retrogrades toward shore as it descends over 30 meters, which created a shadow, preventing an accurate bottom representation (See Figure 11). Because of dynamic features such as this in Ernest Sound, it is difficult to get the various resolution surfaces (when filtered by depth) to exhibit overlap. Any apparent holidays, however, were not true; full multibeam coverage was acquired.²¹ CUBE accurately represents the depths in the areas with these sea cliffs.

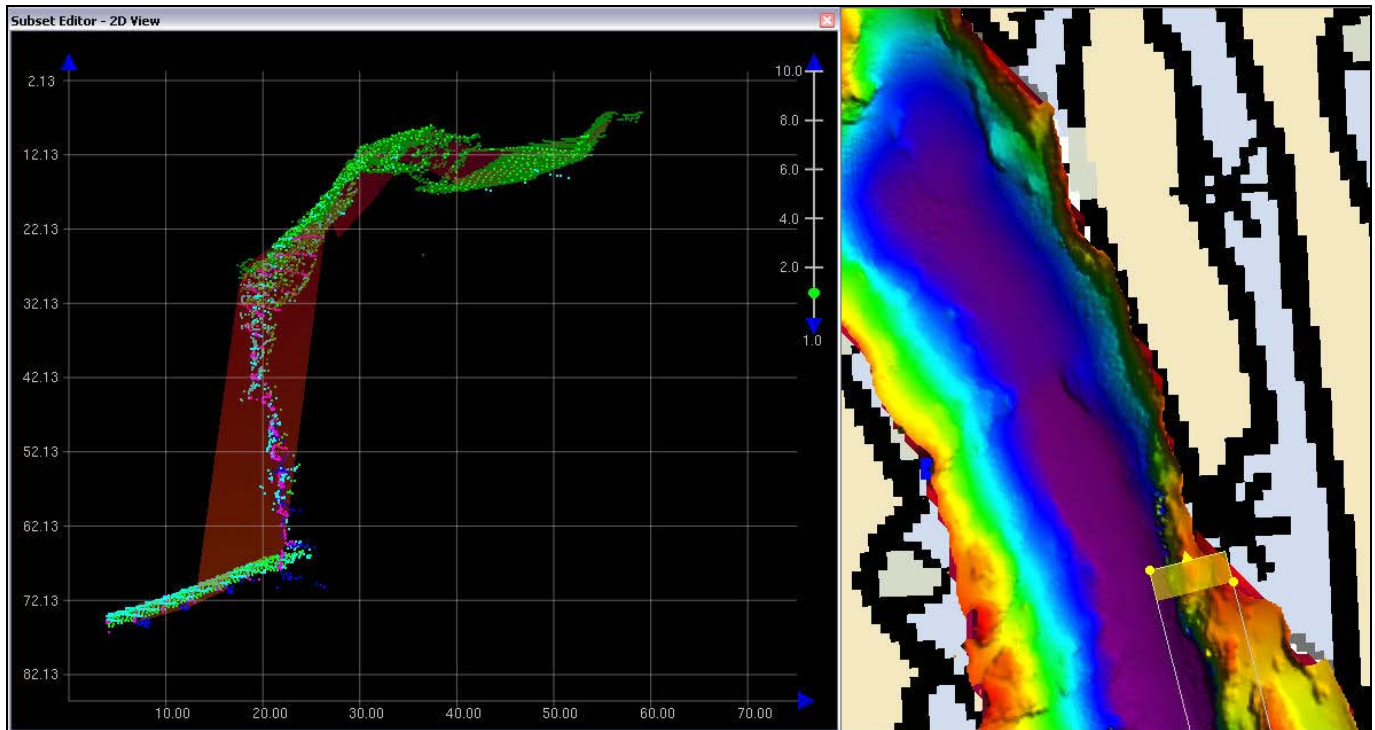


Figure 11: Sea Shelf in Central Niblack Islands

E. Supplemental Reports

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Hydrographic Systems Readiness Review Memo 2007	April 23, 2007	N/CS34
OPR-O119-FA-07 Data Acquisition and Processing Report	July 7, 2007	N/CS34
OPR-O119-FA-07 Horizontal & Vertical Control Report	May 30, 2007	N/CS34, N/OPS1
OPR-O119-FA-07 Tides and Water Levels Package	May 30, 2007	N/OPS1
OPR-O119-FA-07 Coast Pilot Report	July 7, 2007	N/CS26



UNITED STATES DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration
NOAA Marine and Aviation Operations
NOAA Ship FAIRWEATHER S-220
1010 Stedman Street
Ketchikan, AK 99901

August 24, 2007

MEMORANDUM FOR: CDR Dave Neander, NOAA
Chief, Pacific Hydrographic Branch

FROM: CDR Andrew L. Beaver, NOAA
Commanding Officer

Andrew L. Beaver
I am approving this
document
2007.08.25 08:13:55 -
08'00'

TITLE: Approval of Hydrographic Survey H11571,
OPR-O119-FA

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H11571 in accordance with the Hydrographic Manual, Fourth Edition; Hydrographic Survey Guidelines; Field Procedures Manual, Mar 2007; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for April 2007. Additional guidance was provided by applicable Hydrographic Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. All data and reports are respectfully submitted to N/CS34, Pacific Hydrographic Branch.

I acknowledge that all of the information contained in this report is complete and accurate to the best of my knowledge.

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

I am the author of this document
2007.08.27 10:08:51 -08'00'

For ENS Matthew Glazewski
Survey Manager

I have reviewed this document
2007.08.25 08:16:06 -08'00'

LT Jennifer N. Dowling
Field Operations Officer

Grant Froelich
I have reviewed this document
2007.08.25 23:09:42 Z

CST Grant D. Froelich
Chief Survey Technician

Attachment



¹ Concur.

² DAPR is filed with the project records.

³ Concur with all concurrent project junction evaluations.

⁴ Concur with junction evaluation.

⁵ During office evaluation of the survey, the fieldsheets were reconfigured with different grid resolutions and greater overlapping depth threshold that closed the gaps between finalized surfaces on steep slopes. See Survey Acceptance Review checklist and memo filed with the hydrographic records.

⁶ Concur.

⁷ The Survey Acceptance Review states that not all data were within IHO Order 1 tolerance. Because the area was small with depths greater than 50m, the recommendation is to accept and chart the survey data. See Survey Acceptance Review checklist and memo filed with the hydrographic records.

⁸ Concur with including the exception listed in endnote 7 above.

⁹ The approved Water Level Request is filed with the hydrographic records.

¹⁰ Concur.

¹¹ Concur. Supersede charted depth with soundings depicted in HCell H11571.

¹² Concur.

¹³ Supersede charted depth with soundings depicted in HCell H11571. Because of 100% multibeam coverage on this survey, it is recommended that the remaining green tint wire drag area and the “unsurveyed” areas should be removed from the chart and superseded with depths from HCell H11571.

¹⁴ Concur.

¹⁵ All submitted Dangers to Navigation were applied to the chart.

¹⁶ The GC shoreline differs from the raster charts because when the GC was applied to the raster, an approximate southeastern shift of 0.33 mm occurred. This error was reproduced on the ENC.

¹⁷ DP forms are filed with the Hydrographic record.

¹⁸ Final version of the feature deliverables were submitted with the Notebook .hob shoreline files, thus the Survey Features Report was not included in this report.

¹⁹ Concur.

²⁰ Seven bottom samples were collected during H11571 and all 7 are included in the HCell. An additional 17 bottom samples were imported from the ENC to be retained.

²¹ Concur.



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 5, 2007

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O119-FA-2007
HYDROGRAPHIC SHEET: H11569

LOCALITY: Point Warde to Frosty Bay, AK
TIME PERIOD: April 13 - April 28, 2007

TIDE STATION USED: 945-0970 Thoms Point, AK
Lat. 56° 07.1'N Long. 132° 04.7' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.670 meters

TIDE STATION USED: 945-0460 Ketchikan, AK
Lat. 55° 19.9' N Long. 131° 37.6' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 4.433 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: SA117 & SA117A

Refer to attachments for zoning information.

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

Note 2: Use tide data from the appropriate station with applicable zoning correctors for each zone according to the order in which they are listed in the Tidezone corrector file (*.ZDF). For example, tide station one (TS1) would be the first choice for an applicable zone followed by TS2, etc. when data are not available.

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/
NOS, email=peter.stone@noaa.gov, c=US
Date: 2009.10.14 07:01:26 -04'00'

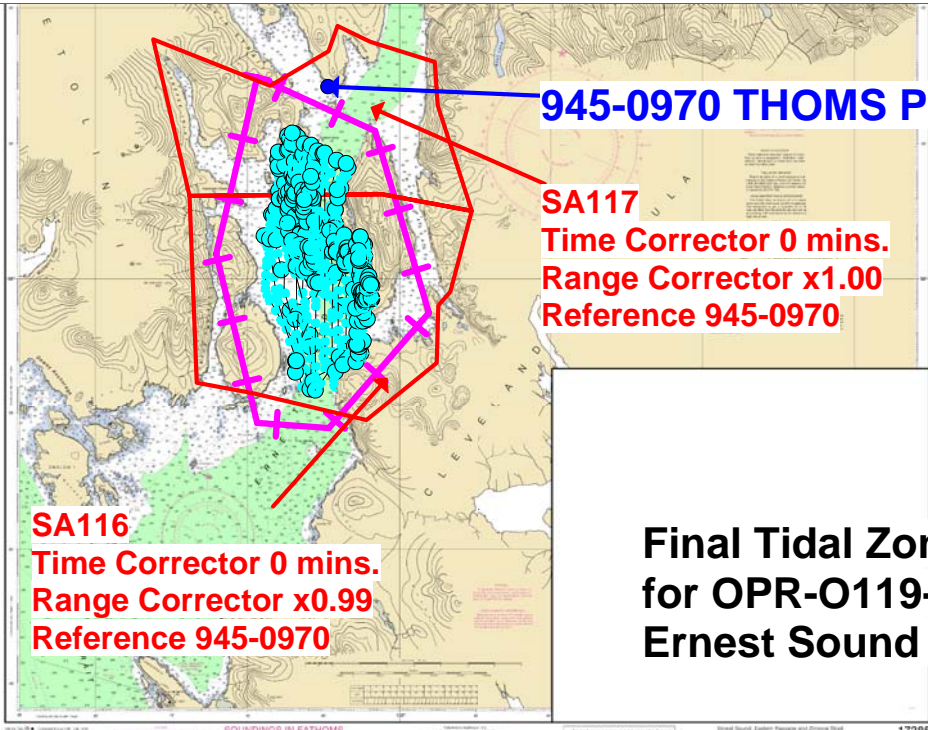
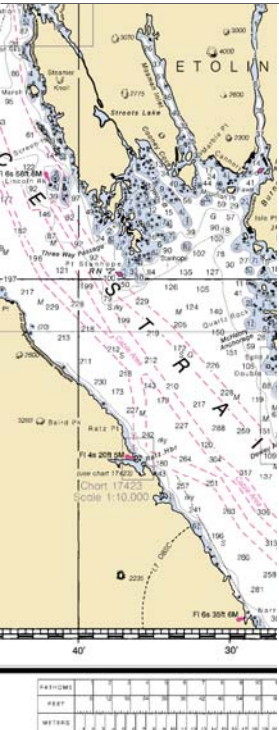
CHIEF, PRODUCTS AND SERVICES DIVISION



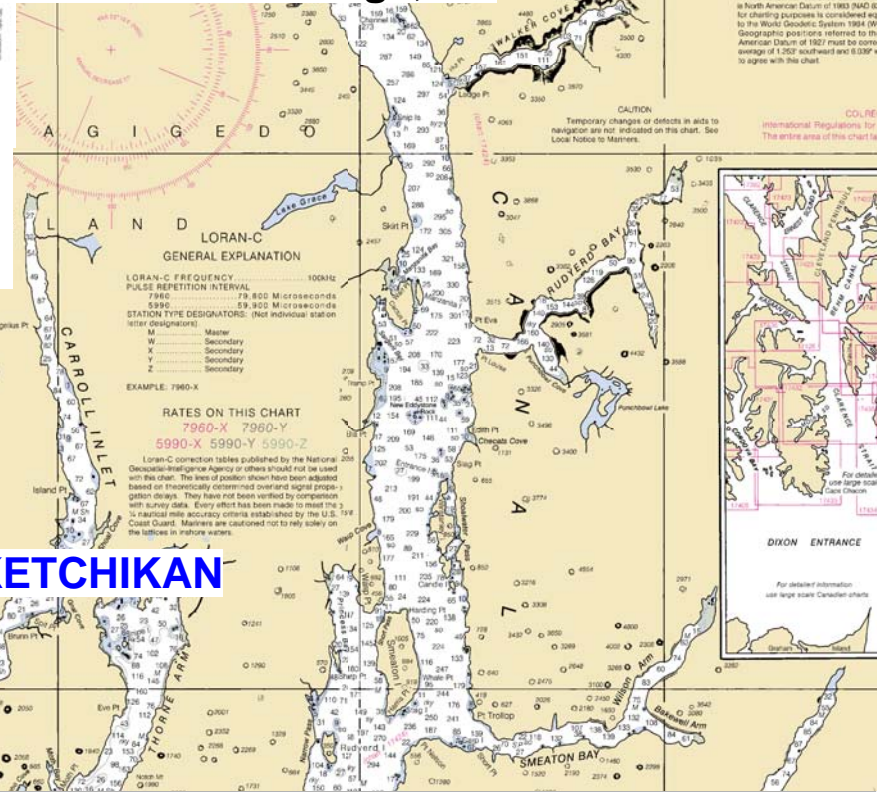
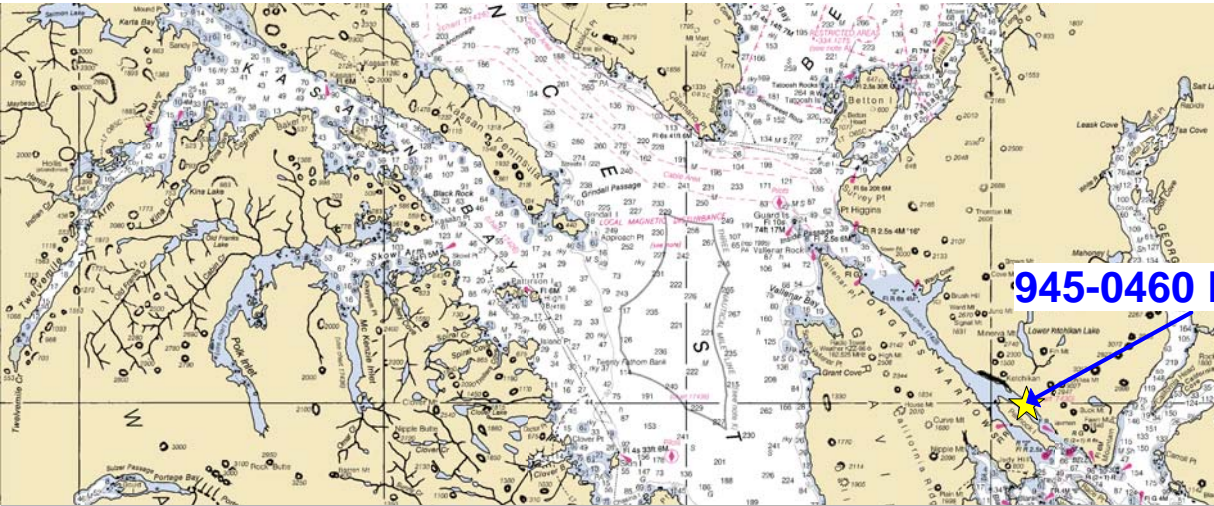
Final tide zone node point locations for OPR-O119-FA-2007, H11571

Format: Tide Station (in recommended order of use)
 Average Time Correction (in minutes)
 Range Correction
 Longitude in decimal degrees (negative value denotes Longitude West),
 Latitude in decimal degrees

	Tide Station Order	AVG Time Correction	Range Correction
Zone SA116	945-0970	0	x0.99
	945-0460	0	x1.05
-131.957153 55.983659			
-131.943951 55.991965			
-131.920439 56.04175			
-132.018721 56.052018			
-132.230563 56.05108			
-132.222667 55.935868			
-132.161117 55.929514			
-132.036082 55.912845			
-131.958945 55.948125			
-131.957153 55.983659			
Zone SA117	945-0970	0	x1.00
	945-0460	+6	x1.06
-131.920439 56.04175			
-131.957818 56.106856			
-131.961061 56.133332			
-132.031824 56.14577			
-132.067839 56.155399			
-132.07769 56.139917			
-132.141902 56.118694			
-132.270577 56.147212			
-132.230563 56.05108			
-132.018721 56.052018			
-131.920439 56.04175			



Final Tidal Zoning for OPR-O119-FA-2007, H11571 Ernest Sound and Eastern Passage, AK



H11571 Danger to Navigation Report

Registry Number: H11571
State: Alaska
Locality: Ernest Sound Eastern Passage
Sub-locality: Eaton Point to Western Deer Island
Project Number: OPR-O119-FA-07
Survey Date: [None]

Charts Affected

Number	Version	Date	Scale
17422	9th Ed.	02/01/2006	1:79334
17385	16th Ed.	09/01/2006	1:80000
17360	34th Ed.	03/01/2006	1:217828
17420	27th Ed.	11/01/2005	1:229376
16016	20th Ed.	11/01/2003	1:969756
531	23rd Ed.	01/01/2006	1:2100000
530	31st Ed.	06/01/2005	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	4.75 m	056° 00' 41.202" N	132° 05' 51.768" W	---
1.2	Rock	2.63 m	055° 59' 14.610" N	132° 01' 47.523" W	---
1.3	Rock	3.03 m	055° 59' 10.613" N	132° 02' 12.132" W	---
1.4	Rock	2.68 m	055° 59' 11.721" N	132° 02' 22.252" W	---
1.5	Rock	2.96 m	056° 03' 04.796" N	132° 06' 57.108" W	---

1 - Danger To Navigation

1.1) 441/5**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 056° 00' 41.202" N, 132° 05' 51.768" W
Least Depth: 4.75 m
Timestamp: 2007-107.17:01:13.184 (04/17/2007)
Survey Line: h11571 / fa_1010_reson8101 / 2007-107 / 107-1659
Profile/Beam: 441/5
Charts Affected: 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

10 fathom charted sounding (#17385) surveyed as 4.75m using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1010_reson8101/2007-107/107-1659	441/5	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and replacing 10fm sounding with 2.6fm sounding.

Cartographically-Rounded Depth (Affected Charts):

2 ½fm (17385_1, 17360_1, 17420_1, 16016_1, 530_1)

2fm 3ft (531_1)

4.7m (50_1)

Feature Images

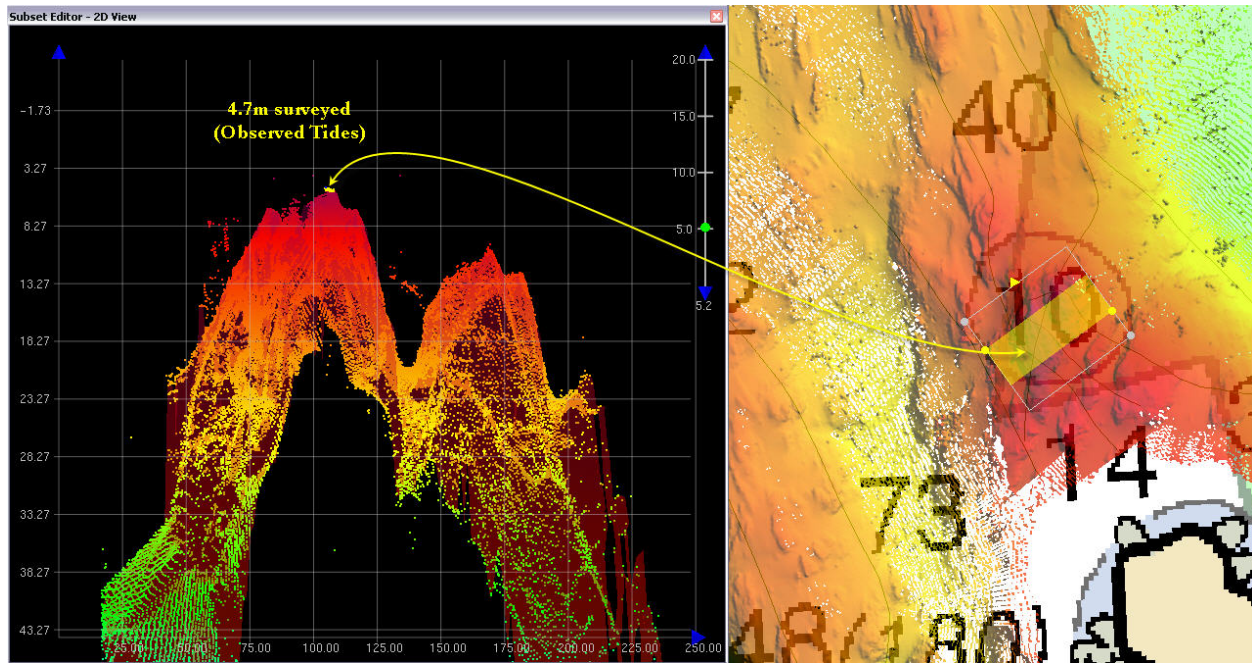


Figure 1.1.1

1.2) 2156/85**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 055° 59' 14.610" N, 132° 01' 47.523" W
Least Depth: 2.63 m
Timestamp: 2007-121.20:57:05.079 (05/01/2007)
Survey Line: h11571 / fa_1010_reson8101 / 2007-121 / 121-2046
Profile/Beam: 2156/85
Charts Affected: 17422_1, 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

7 fathom charted sounding (#17385) surveyed as 2.63m using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1010_reson8101/2007-121/121-2046	2156/85	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and replacing 7fm sounding with 1.4fm sounding.

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (17422_1, 17385_1, 17360_1, 17420_1, 16016_1, 530_1)

1fm 2ft (531_1)

2.6m (50_1)

Feature Images

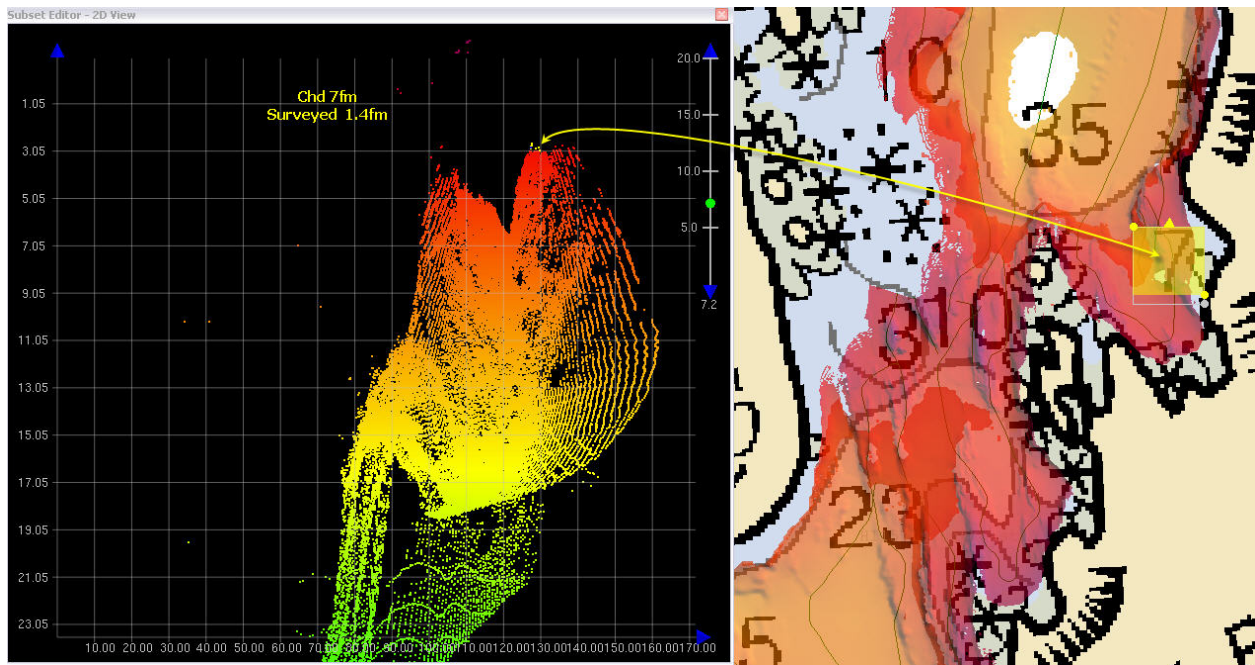


Figure 1.2.1

1.3) 411/13**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 055° 59' 10.613" N, 132° 02' 12.132" W
Least Depth: 3.03 m
Timestamp: 2007-121.21:28:16.470 (05/01/2007)
Survey Line: h11571 / fa_1010_reson8101 / 2007-121 / 121-2127
Profile/Beam: 411/13
Charts Affected: 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

10 fathom charted sounding (#17385) surveyed as 3.03m using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1010_reson8101/2007-121/121-2127	411/13	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and replacing 10fm sounding with 1.66fm sounding.

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (17385_1, 17360_1, 17420_1, 16016_1, 530_1)

1fm 4ft (531_1)

3.0m (50_1)

Feature Images

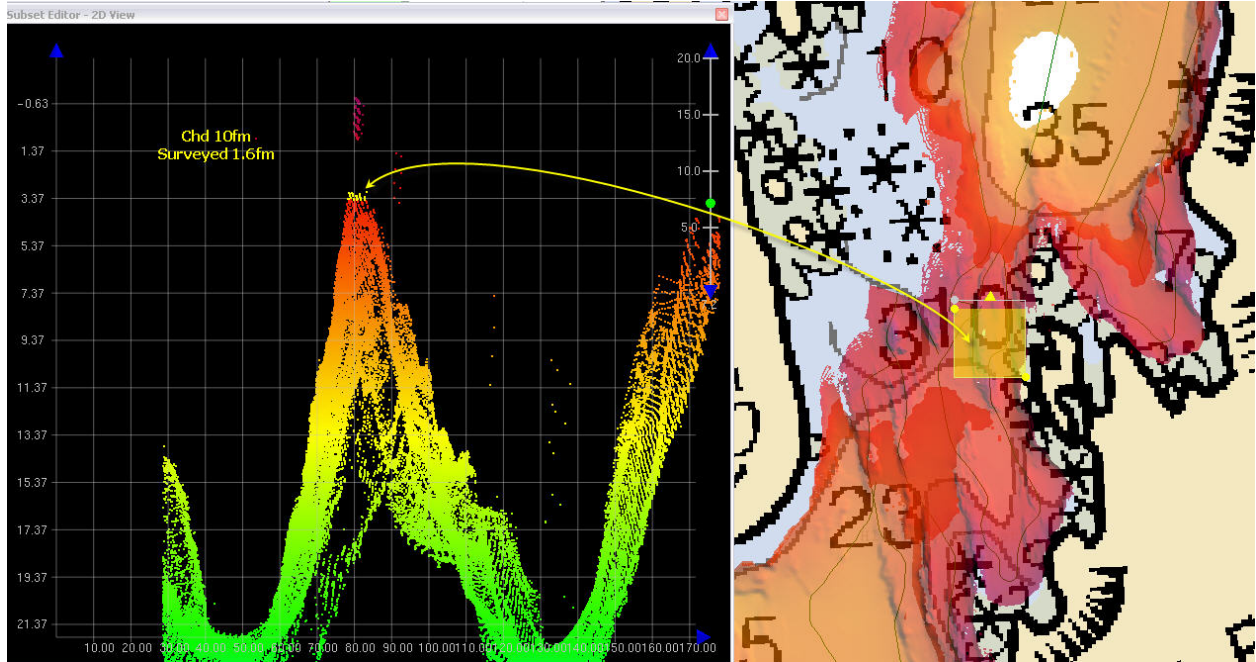


Figure 1.3.1

1.4) 328/8**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 055° 59' 11.721" N, 132° 02' 22.252" W
Least Depth: 2.68 m
Timestamp: 2007-121.21:31:28.570 (05/01/2007)
Survey Line: h11571 / fa_1010_reson8101 / 2007-121 / 121-2130
Profile/Beam: 328/8
Charts Affected: 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

3 fathom charted sounding (#17385) surveyed as 2.68m using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1010_reson8101/2007-121/121-2130	328/8	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and replacing 3fm sounding with 1.46fm sounding.

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (17385_1, 17360_1, 17420_1, 16016_1, 530_1)

1fm 3ft (531_1)

2.7m (50_1)

Feature Images

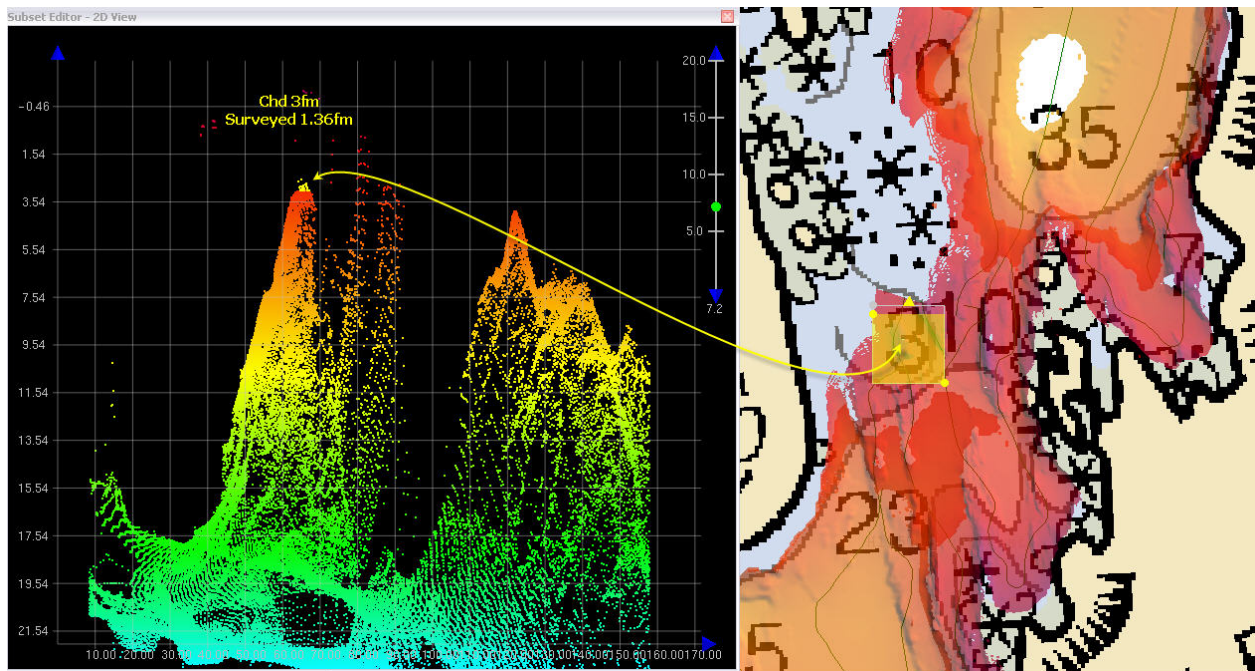


Figure 1.4.1

1.5) 628/99**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 056° 03' 04.796" N, 132° 06' 57.108" W
Least Depth: 2.96 m
Timestamp: 2007-117.22:25:54.359 (04/27/2007)
Survey Line: h11571 / fa_1018_reson8101 / 2007-117 / 117-2220
Profile/Beam: 628/99
Charts Affected: 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

Near a 28 fathom charted sounding (#17385) surveyed a 4.75m sounding using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1018_reson8101/2007-117/117-2220	628/99	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and adding a 1.6fm sounding at position: 56.05133226° N , 132.11586343° W.

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (17385_1, 17360_1, 17420_1, 16016_1, 530_1)
 1fm 3ft (531_1)
 2.9m (50_1)

Feature Images

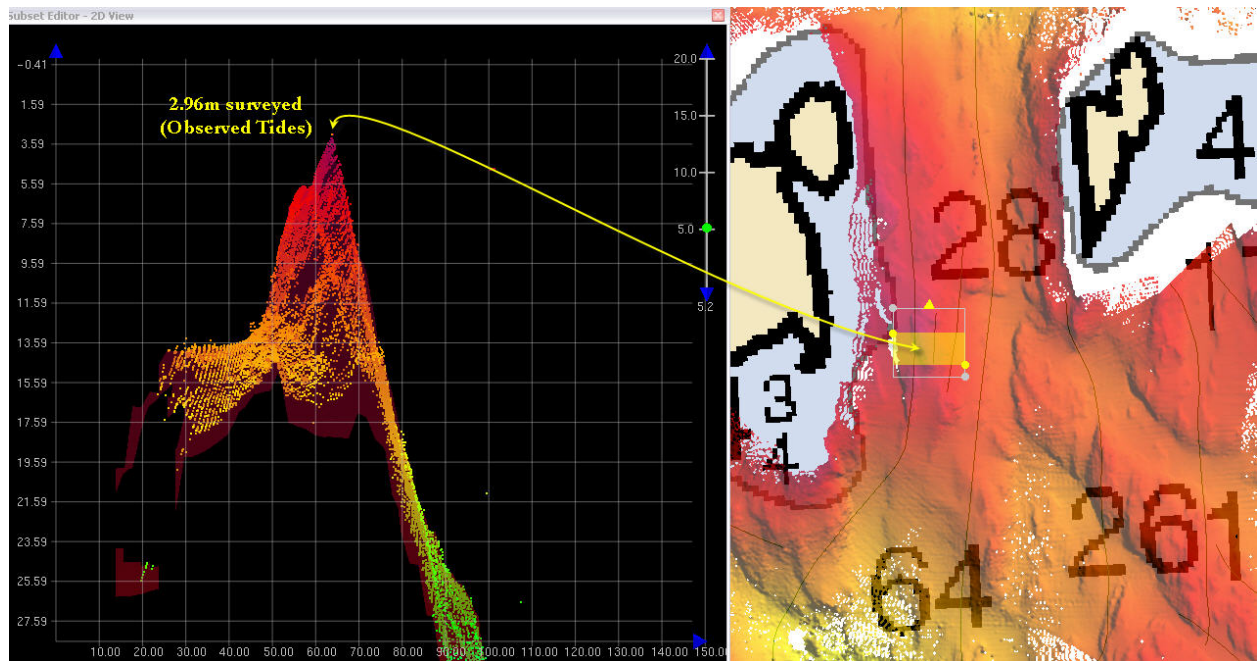


Figure 1.5.1

H11571 Danger to Navigation Report

Registry Number: H11571
State: Alaska
Locality: Ernest Sound Eastern Passage
Sub-locality: Eaton Point to Western Deer Island
Project Number: OPR-O119-FA-07
Survey Dates: April 15, 2007 - May 16, 2007

Charts Affected

Number	Version	Date	Scale
17385	16th Ed.	09/01/2006	1:80000
17360	34th Ed.	03/01/2006	1:217828
17420	27th Ed.	11/01/2005	1:229376
16016	20th Ed.	11/01/2003	1:969756
531	23rd Ed.	01/01/2006	1:2100000
530	31st Ed.	06/01/2005	1:4860700
50	6th Ed.	06/01/2003	1:10000000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Rock	5.10 m	056° 00' 54.179" N	132° 02' 45.776" W	---
1.2	Rock	2.52 m	056° 01' 06.274" N	132° 03' 27.651" W	---

1 - Danger To Navigation

1.1) 1840/53**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 056° 00' 54.179" N, 132° 02' 45.776" W
Least Depth: 5.10 m
Timestamp: 2007-131.21:34:11.040 (05/11/2007)
Survey Line: h11571 / fa_1010_reson8101 / 2007-131 / 131-2129
Profile/Beam: 1840/53
Charts Affected: 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

Near an 8 fathom charted sounding (#17385) surveyed a 5.1m sounding using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1010_reson8101/2007-131/131-2129	1840/53	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and adding a 2.8fm sounding at position: 56.01504982°N , 132.04604893°W.

Cartographically-Rounded Depth (Affected Charts):

2 ¾fm (17385_1, 17360_1, 17420_1, 16016_1, 530_1)

2fm 4ft (531_1)

5.1m (50_1)

Feature Images

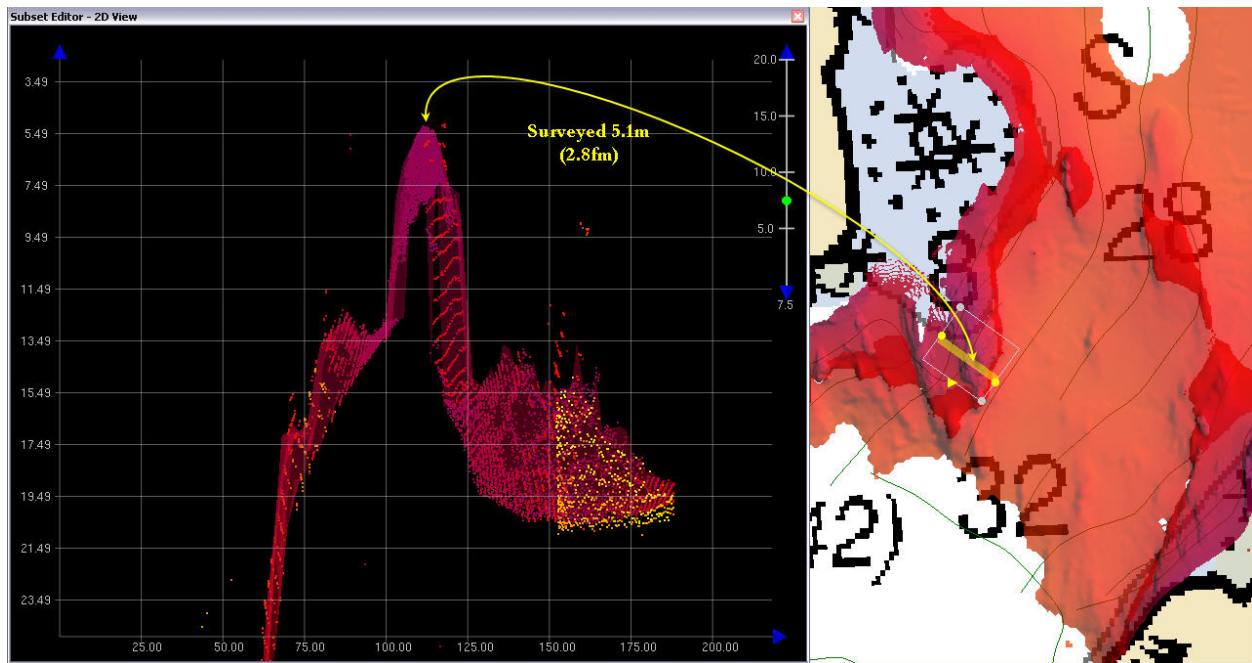


Figure 1.1.1

1.2) 1397/15**DANGER TO NAVIGATION****Survey Summary**

Survey Position: 056° 01' 06.274" N, 132° 03' 27.651" W
Least Depth: 2.52 m
Timestamp: 2007-131.21:04:26.617 (05/11/2007)
Survey Line: h11571 / fa_1018_reson8101 / 2007-131 / 131-2056
Profile/Beam: 1397/15
Charts Affected: 17385_1, 17360_1, 17420_1, 16016_1, 531_1, 530_1, 50_1

Remarks:

Near a 9 fathom charted sounding (#17385) surveyed a 2.5m sounding using preliminary unverified tidal reductions from Ketchikan, AK gauge.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h11571/fa_1018_reson8101/2007-131/131-2056	1397/15	0.00	000.0	Primary

Hydrographer Recommendations

Hydrographer recommends submittal to MCD as danger to navigation, and adding a 1.4fm sounding at position: 56.01840953°N, 132.05768089°W.

Cartographically-Rounded Depth (Affected Charts):

1 ¼fm (17385_1, 17360_1, 17420_1, 16016_1, 530_1)

1fm 2ft (531_1)

2.5m (50_1)

Feature Images

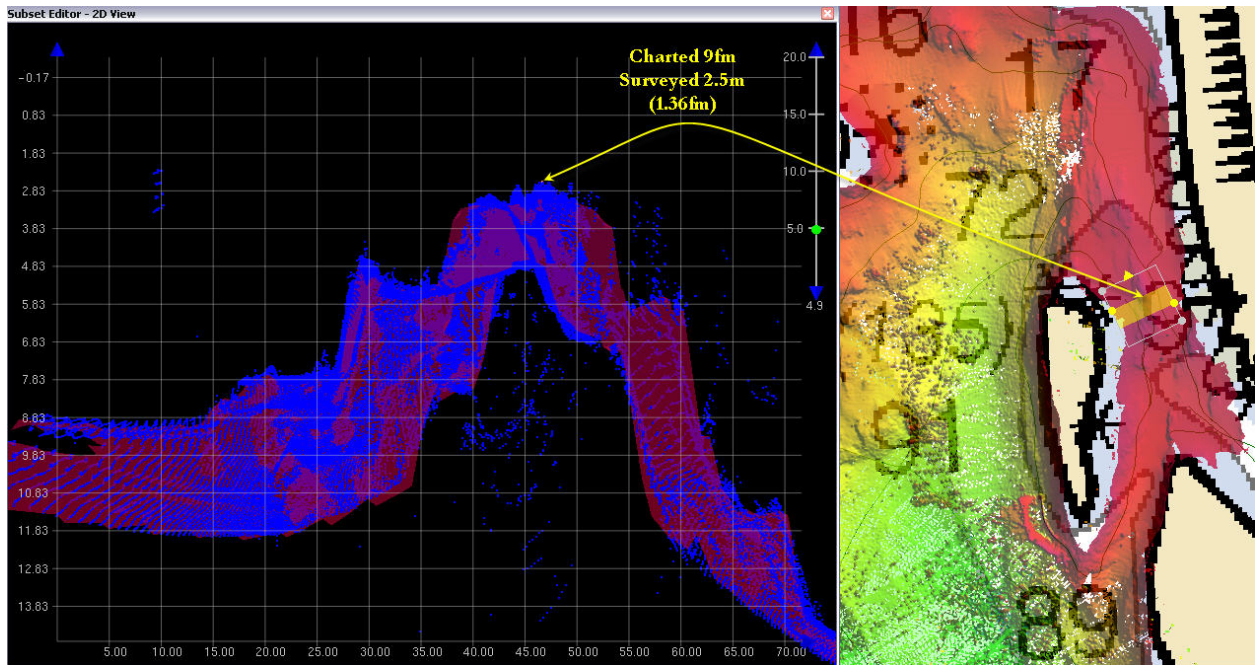


Figure 1.2.1

Subject:
Re: [Fwd: H11569 - GC not applied to ENC/chart]
From:
Andrew Kampia <Andrew.Kampia@noaa.gov>
Date:
Fri, 02 Oct 2009 17:21:06 -0400
To:
Gary Nelson <Gary.Nelson@noaa.gov>
CC:
Laurie Bennett <Laurie.Bennett@noaa.gov>

Gary,

Sorry for the delayed response. This was an unusual case.

We looked at the GC application and realized that it was applied to the raster with a southeastern shift of about 0.33 mm. This error was reproduced on the ENC.

This is particularly annoying for the visible rocks. I'm sorry for the frustration this probably gives to your compilers.

I recommend you compile the hydro in it's exact geographic position with an understanding that the GC horizontal accuracy is correct, but our ENC/Raster may not be horizontally accurate. It would not help us to apply the GC shoreline in the HCell. If you need more help describing the error so you can make a note of it, I'm happy to discuss it.

Please let me know if you have any questions.

Thanks.

Gary Nelson wrote:
Andy,

I received this information yesterday. The compilers asked why the GC had not been applied. I thought you might be able to help us out. Since we have the information here, would it help if we applied the GC shoreline in the HCell or should we just make note of it.

Thanks,

Gary

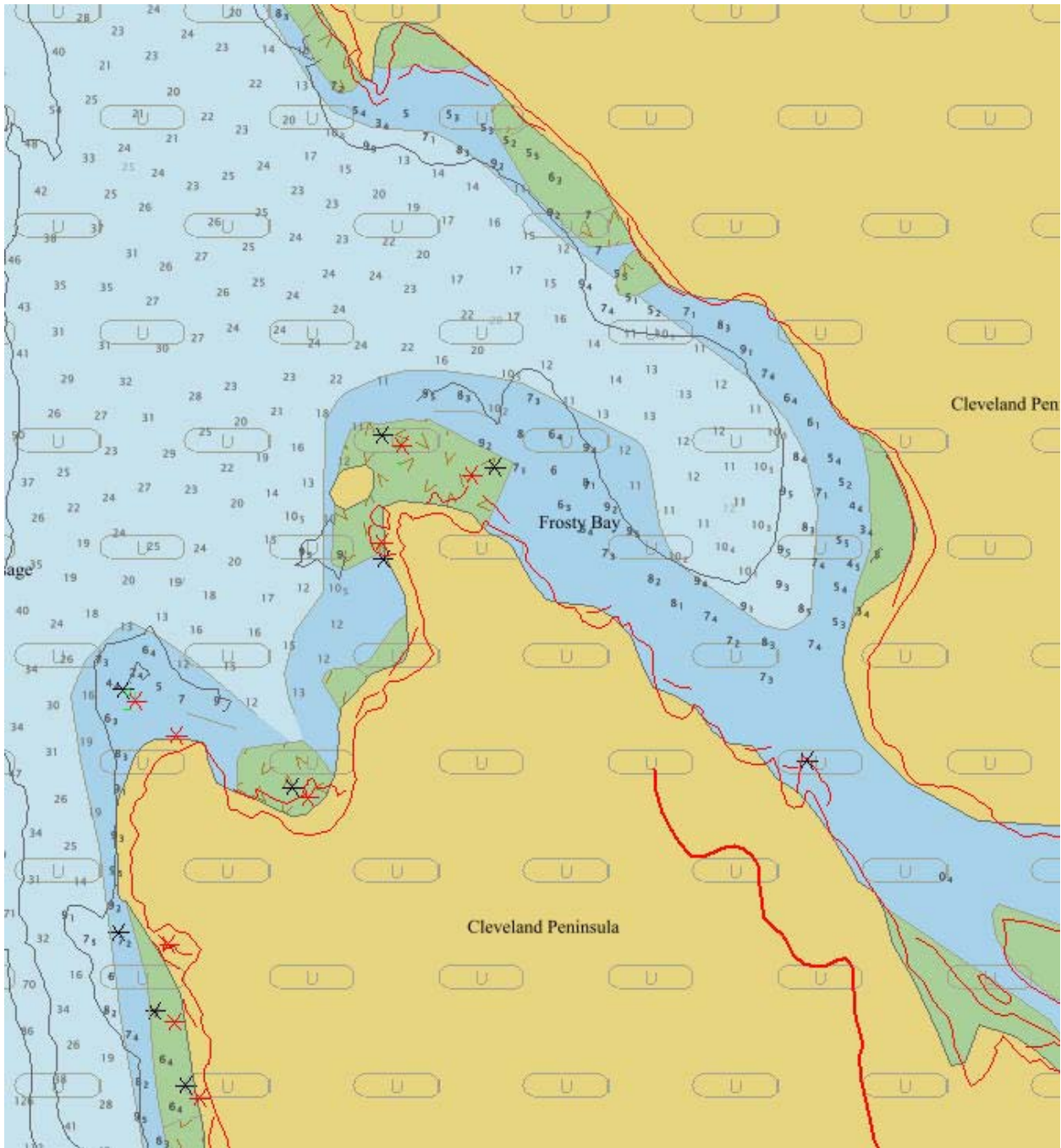
Subject:
H11569 - GC not applied to ENC/chart
From:
"martha.herzog" <martha.herzog@noaa.gov>
Date:
Tue, 29 Sep 2009 15:15:36 -0700
To:
Gary Nelson <Gary.Nelson@noaa.gov>
To:
Gary Nelson <Gary.Nelson@noaa.gov>

Hi Gary,

This is one of the areas in H11569 where the GC has not been applied to ENC US4AK3OM or chart 17385.

The GC (Composite Source) is in red. There are plenty of places where soundings/DEPARE overlap with ledges.

-martha



H11571 HCell Report
Martha Herzog, Cartographer
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 ENC and RNC in the region: NOAA ENC, US4AK3OM, and NOAA RNCs, 17385 and 17360.

HCell compilation of survey H11571 utilized Office of Coast Survey HCell Specifications Version 3.0, with approved modifications to better meet MCD needs.

1. Compilation Scale

Depths for HCell H11571 were compiled to the largest scale chart in the region, 17385, 1:80,000. Non-bathymetric features have not been generalized to chart scale; their position, characterization and density are as delivered from the field.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 10-meter Combined Surface, **H11571_Combined_10m**, in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 survey scale using a Radius Table file with values shown in the table, below.

Upper limit (m)	Lower limit (m)	Radius (mm)
0	10	3
10	20	4
20	50	4.5
50	200	5
200	500	6

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).

3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11571_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 Generalized	Actual Value of Chart Contours
0	0	0.2286	0
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 H11571_SS file have not been deconflicted against shoreline features, soundings and hydrography as all other features in the H11571_CS files and soundings in the H11571_SS have been. This may result in conflicts between the H11571_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 H11571_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell 11509:

M_QUAL
M_COVR

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

5. Features

5.1 Generalization of Features to Chart Scale

Features gathered by field units are delivered to PHB and applied to the preliminary HCell without reduction in number and character. This preliminary HCell is used to perform evaluation and verification of survey soundings and features; features are deconflicted against hydrography, and geometry is corrected as needed. Linear and area features are also digitized against the BASE surfaces, and features to be retained are imported from the chart. This features file is used as the basis for the final HCell compilation with features reduced to the largest scale RNC and ENC

Features generalization has been accomplished primarily through reduction in the number of features including in the HCell. Generalizing area features to point objects is entrusted to the RNC division. Where line and area objects are included in the HCell, complexity of the lines and edges comprising the features have been smoothed commensurate with chart scale.

5.2 Compilation of Features to the HCell

Shoreline features for H11571 were delivered from the field in 3 different hob files defining new or modified chart or GC features, disprovals, and the composite source with new or modified features. These were deconflicted against GC shoreline (as the ENC and chart did not display the GC shoreline correctly), the chart and hydrography during office processing.

During office processing, several submerged rocks and numerous rocky seabeds were digitized from the high resolution BASE Surfaces.

The source of all features included in the H11571 HCell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The H11571_CS HCell contains the following Objects:

\$CSYMB	Blue notes
COALNE	Modified GC coastline
DEPARE	The all-encompassing depth area
DEPCNT	Modified GC MLLW
LNDARE	Islet
LNDELV	Islet elevation
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
OBSTRN	Obstruction area object
SBDARE	Modified GC ledges and reefs, bottom samples, and rocky seabed areas
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features

The H11571_SS HCell contains the following Objects:

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

All S-57 Feature Objects in the H11571_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. By agreement with MCD, the NINFOM field is populated with an abbreviated version of the Blue Note (30 characters or less), describing the chart disposition, to be used by MCD in generating their Chart History spreadsheet.

8. Spatial Framework

8.1 Coordinate System

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

8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

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

- All depths deeper or equal to 11 fathoms display as whole fathoms.
- All depth units between 0 fathoms (MLLW) and 11 fathoms display as fathoms and whole feet.
- All depth units skyward of 0 fathoms (MLLW) to 2.0 feet above MHW display in feet for values that round to 5 feet or less, and in fathoms and feet skyward of that.
- All height units (HUNI) which have been converted to charting units, and that are 2.00 feet above MHW and greater, are shown in feet.

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

9. Data Processing Notes

9.1 Junctions

H11571 junctions with H11569. A common junction was made with this survey. H11571 junctions H11570 and H11572 both currently being compiled (November 2009). Common junction were made with these surveys. H11571 also junctions with H11052 (May 2001). All soundings from H11571 should supersede H11052 in common areas. A junction with H11573 will be made when that survey is compiled.

9.2 Conflicts between Shoreline and Hydrography

There are numerous instances of GC shoreline in conflict with hydrography. This is because when the GC was applied to the raster, an approximate southeastern shift of 0.33 mm occurred. This error was reproduced on the ENC. MCD should resolve this error.

10. QA/QC and ENC Validation Checks

H11571 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 are MCD approved as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11571 Base Cell File, Chart Units, Soundings compiled to 1:80,000
- H11571 Base Cell File, Chart Units, Soundings compiled to 1:10,000
- H11571 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11571 Survey outline to populate the SURDEX

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11571_CS.000
- Chart units base cell file, survey scale soundings H11571_SS.000
- Descriptive Report H11571_DR.pdf
- Survey outline H11571_Outline.gml and *.xsd

11.3 Software

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

12. Contacts

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

Martha Herzog, Physical Scientist, PHB, Seattle, WA; 206-526-6841; Martha.herzog@noaa.gov.

APPROVAL SHEET
H11571

Initial Approvals:

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