

H11569

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. H11569

LOCALITY

State ALASKA

General Locality Ernest Sound and Eastern Passage

Sublocality Point Warde to Frosty Bay

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 HYDROGRAPHIC TITLE SHEET	REGISTRY No H11569
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>Ernest Sound and Eastern Passage</u> Sub-Locality <u>Point Warde to Frosty Bay</u> Scale <u>1:10,000</u> Date of Survey <u>April 13 to April 28, 2007</u> Instructions dated <u>3/13/2007</u> Project No. <u>OPR-O119-FA</u> Vessel <u>FAIRWEATHER S-220, Launch 1010, MonArk 1706</u> Chief of party <u>CDR Andrew L. Beaver, NOAA</u> Surveyed by <u>CST Grant Froelich, LT Jennifer Dowling (FOO), LTjg Guinevere Lewis</u> Soundings by echo sounder, hand lead, pole <u>Reson 8160, Reson 8111, Reson 8101ER</u> Graphic record scaled by <u>N/A</u> Graphic record checked by <u>N/A</u> Automated Plot <u>N/A</u> Verification by <u>S. Woldskehl, M. Herzog</u> Soundings in <u>Fathoms and Feet</u> at <u>MLLW</u>		
REMARKS: <u>All times are UTC.</u> <u>The purpose of this survey was to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.</u> <u>Revisions and annotations appearing as endnotes were 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>		

Descriptive Report to Accompany Hydrographic Survey H11569

Project OPR-O119-FA-07
Ernest Sound and Eastern Passage, Alaska
Scale 1:10,000
April, 2007

NOAA Ship FAIRWEATHER
Chief of Party: Commander Andrew L. Beaver, NOAA

A. AREA SURVEYED

The survey area was located in Ernest Sound and Eastern Passage, within the sub-locality of Point Warde to Frosty Bay. This survey corresponds to Sheet H 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 $56^{\circ}03'00''\text{N}$, $132^{\circ}06'00''\text{W}$ and the Northeast corner at $56^{\circ}11'00''\text{N}$, $131^{\circ}55'00''\text{W}$.

Data acquisition was conducted from April 13 to April 28, 2007 (DN 103 to DN 118).

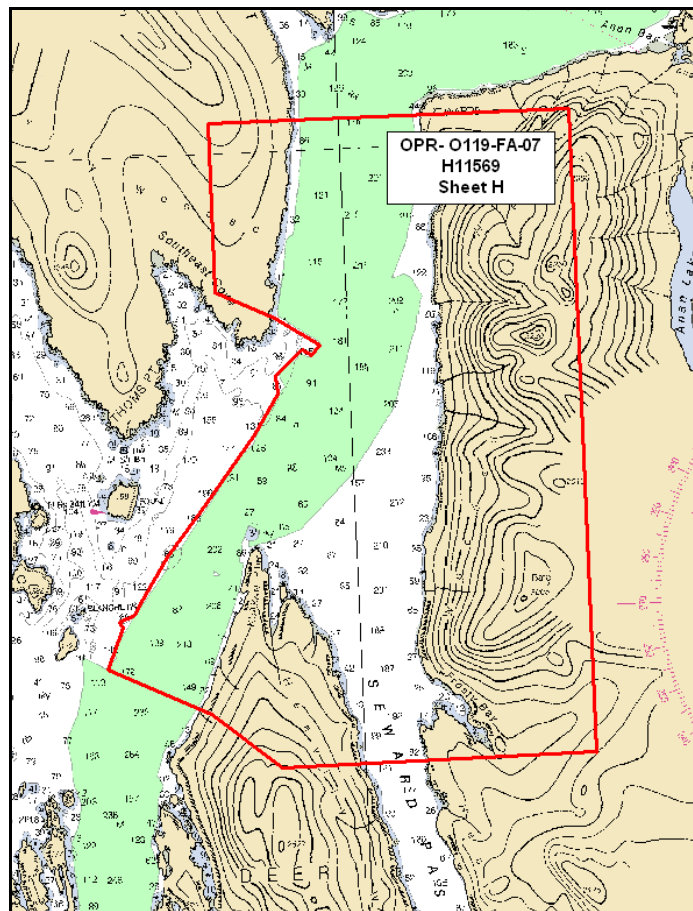


Figure 1: H11569

One hundred percent multibeam echosounder (MBES) coverage was obtained in the survey area offshore of the 8-meter depth curve.¹ When conditions allowed, multibeam echosounder (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 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.

Shoreline data were acquired for H11569. These data were 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 cover.² 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 during this survey are listed below in Table 1.

	FAIRWEATHER	Jensen Launch 1010	MonArk
Hull Registration Number	S220	1010	1706
Builder	Aerojet-General Shipyard.	The Boat Yard, Inc.	MonArk
Length Overall	231 feet	28' 10"	17'
Beam	42 feet	10' 8"	7'2"
Draft, Maximum	15' 6"	4' 0" DWL	1' 3"
Cruising Speed	12.5 knots	24 knots	20 knots
Max Survey Speed	10 knots	10 knots	
Primary Echosounder	RESON 8111 & RESON 8160	RESON 8101	
Sound Velocity Equipment	SBE 19plus & 45, MVP 200	SBE19plus	
Attitude & Positioning Equipment	POS/MV V4	POS/MV V4	
Type of operations	MBES, Bottom Samples	MBES, 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 H11569 were manually examined by the Hydrographer in CARIS subset mode. The internal consistency and integrity of data collected for survey H11569 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 13.08 linear nautical miles (lnm), comprising 13.34 % of the 98.01 lnm of total MBES hydrography. Both main scheme and crossline mileage are summarized in Table 2.

MAIN SCHEME - Mileage	
Single Beam MS	0
Multibeam MS mileage	98.01606371
SideScan MS	0
Total MS	98.01606371
CROSSLINE - Mileage	
Single Beam XL	0
Multibeam XL	13.07710961
Total XL	13.07710961
OTHER	
Developments/AWOIS - Mileage	0
Shoreline/Nearshore Investigation - Mileage	16.955
Total # of Investigated Items	5
Total Bottom Samples	5
Total SNM	14.12
Specific Dates of Acquisition	April 13 - April 28, 2007
Specific Dn#s of Acquisition	DN 103- DN 118

Table 2. H11569 Mainscheme and Crossline Statistics Summary.

The Hydrographer has determined, through manual examination of the data, that the crossline agreement with main scheme data meet the vertical accuracy requirements as stated in the March, 2007 *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSDM)*.

Junctions**SAME PROJECT JUNCTIONS:**³

Survey H11569 junctions with H11571 and H11572, which are Sheet K and L, respectively of the same project. The area of overlap between the sheets was approximately 500 meters wide. 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*. The sheet limits and area of overlap for Sheets K and L are shown in Figure 2.

OTHER PROJECT JUNCTIONS:⁴

Survey H11569 junctions with survey H11052; sheet P of project OPR-0327-RA-01, and with survey H11507; sheet E of project OPR-O119-FA-05. The area of overlap between sheets H11569 and H11507 was approximately 500 meters. Data for H11507 was reviewed in CARIS Subset Editor and depths were found to be consistent between the two surveys, meeting the requirements as stated in the *HSSDM*. The overlap between sheets H11569 and H11052 was approximately 600 meters. Due to the fact that HDCS data was not available for survey H11052, sounding data from survey H11052 was imported into MapInfo and compared with the sounding data exported from CARIS BASE surfaces for survey H11569. The depths were found to be consistent between the two surveys, meeting the requirements as stated in the *HSSDM*. The sheet limits and area of overlap for Sheets P and E are shown in Figure 2.

The area of overlap for H11507, H11052, H11571 and H11572 is shown in Figure 2.

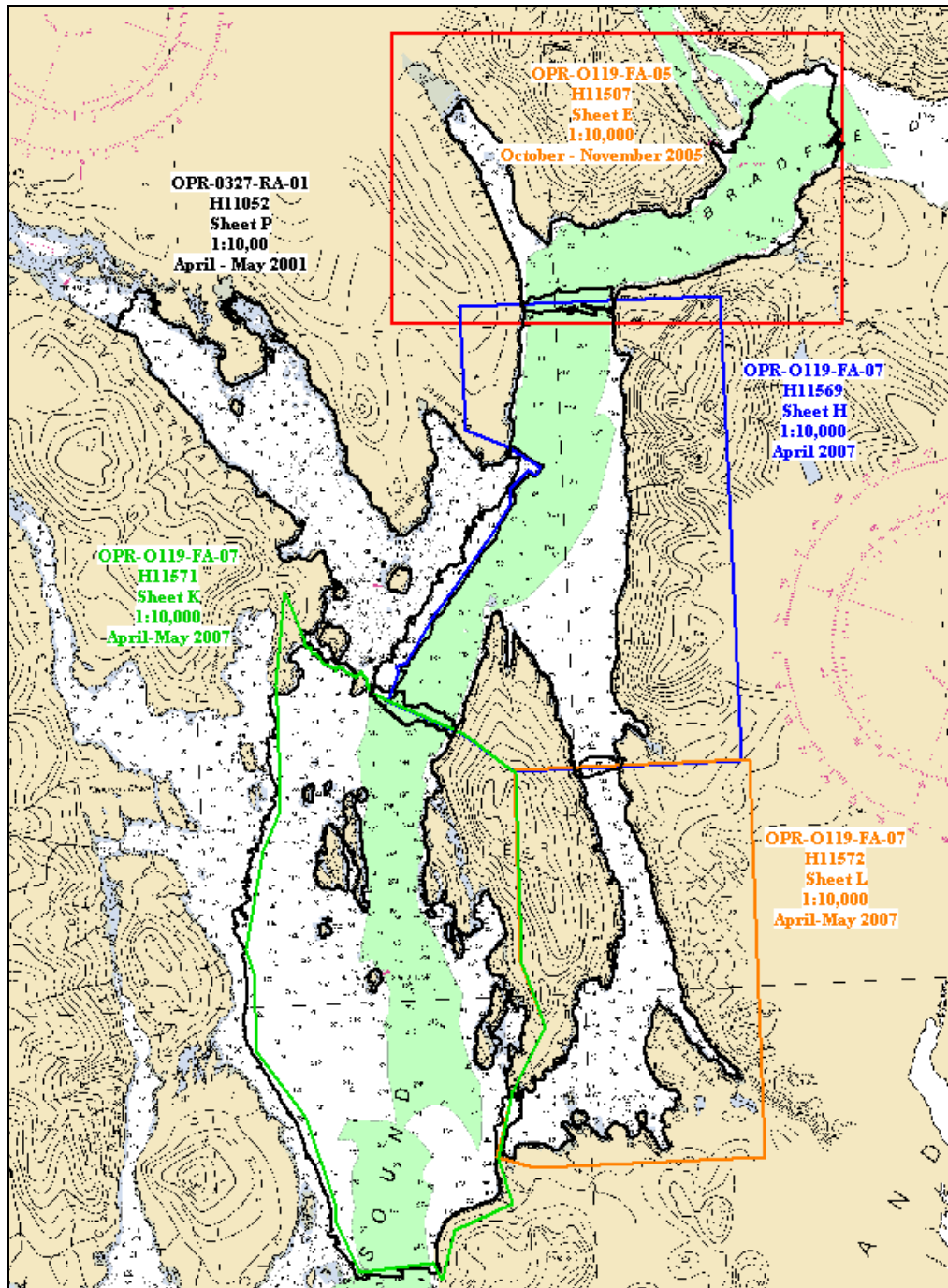


Figure 2: Junctions between H11569 and H11507, H11052, H11571, H11572

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.

Figure 3 shows two different representations of the shoreline along Seward Passage towards Frosty Bay: one displaying the various resolution surfaces at their appropriate depths (2m between 0-40m, 5m between 30-70m, 10m between 50-120m, 20m between 100-200m, and 35m between 180-450m), and one displaying the shoreline using BASE surfaces without range filtering. Due to the steep nature of the bathymetry in Ernest Sound, it is difficult to get the various resolution surfaces (when filtered by depth) to exhibit overlap. Twenty meters of overlap was used between both the 5 and 10m surfaces as well as the 10 and 20m surfaces and, as shown in Figure 3 and Figure 4, there still appear to be gaps along edges of the shoreline. This phenomenon is only exhibited on the edges of shoals and shoreline with sharp changes in elevation. According to Section 5.1.2.1 of the HSSDM, a gap is only considered a holiday if it measures larger than 3 nodes across. Each of these gaps were measured and found to be smaller than the requisite 3 nodes; therefore complete multibeam coverage has been demonstrated.⁵

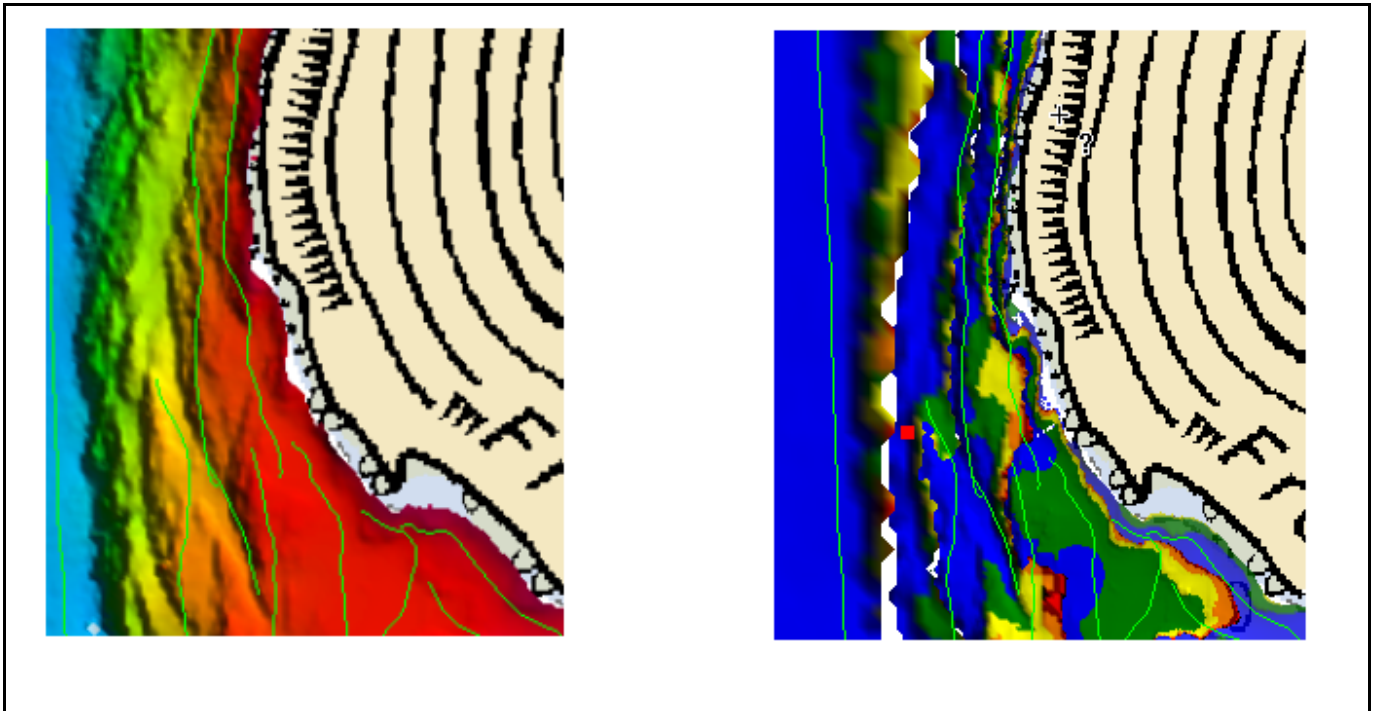


Figure 3: Two representations of the steep and deep shoreline along the approach to Frosty Bay: one figure showing the appropriately range filtered 2m, 5m, 10m, 20, and 35 m surfaces (right), and one displaying the shoreline without range filtering applied. Due to the steep and deep nature of the seafloor, gaps appear in the multi-resolution surface, even with sufficient data to accurately depict the shoreline.

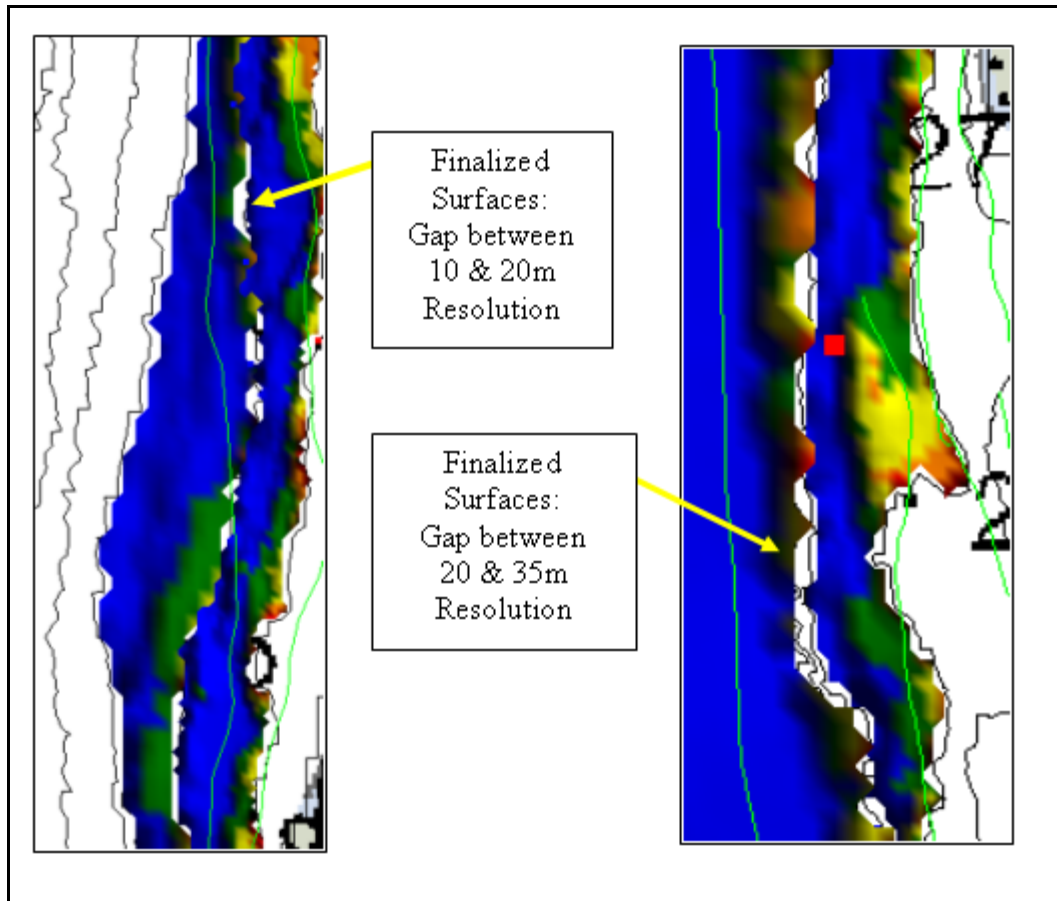


Figure 4: A closer look at the gaps which exist in the finalized range filtered surfaces. (Right) Represents the gaps that appear between the 10m and 20m finalized surfaces. (Left) Represents the gaps that appear between the 20m and 35m finalized surfaces

DESIGNATED SOUNDINGS:

There were no designated soundings for survey H11569.

Accuracy Standards

All data meet the data accuracy specifications as stated in the *HSSDM*.⁶

B3. Corrections to Echo Soundings

Data reduction procedures for survey H11569 conform to those detailed in the DAPR, with the exceptions discussed below.

SOUND VELOCITY:

The majority of the MBES data collected for survey H11569 from the launch 1010 used a sound velocity profile selection method of casts taken previous in time; however, on April 27 (Dn 117), Launch 1010

was focused on acquiring crosslines. For that day, the sound velocity was corrected using the cast nearest in distance within a time of two hours. All sound velocity profile selection methods have been documented in the Acquisition and Processing Logs.

B4. Data Processing

Data processing procedures for survey H11569 conform to those detailed in the DAPR, with the exceptions discussed below.

There are three total fieldsheets fulfilling the various resolution requirements for survey H11569. Fieldsheet H11569 is the largest, encompassing the entire survey area to the five-, ten-, twenty-, and thirty-five-meter resolutions. Two additional fieldsheets (H11569_North and H11569_South) split the survey into South and North quadrants and include surfaces of two meter resolution. The fieldsheet areas of coverage are displayed in *Figure 5*.

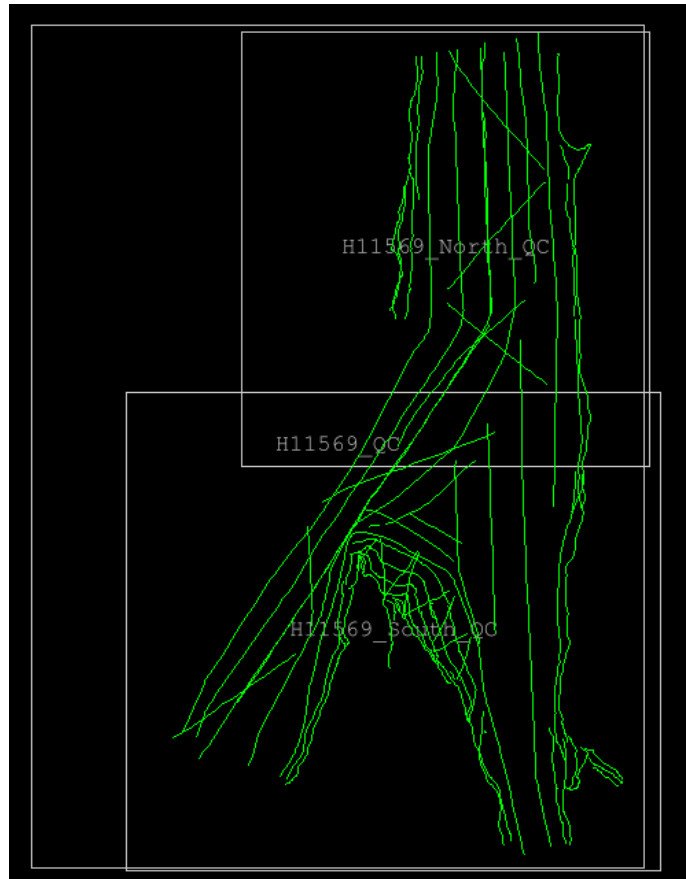


Figure 5: Fieldsheet Coverage for fieldsheets H11569, H11569_North, H11569_South

A detailed listing of the surface resolutions used for each depth range are given in Table 3. The low-end thresholds (e.g. 30m at 5m resolution) were chosen to satisfy the object detection requirements stated in section 5.1.1.2 of the HSSDM. The high-end thresholds (e.g. 70m at 5m resolution) were chosen to avoid unnecessary cleaning of the data while still maintaining as high a resolution surface for a given depth as practical.⁷

Depth Ranges (m)		Resolution (m)
Low	High	
0	40	2
30	70	5
50	120	10
100	200	20
180	450	35

Table 3: Caris BASE Surface Depth Ranges and Resolutions

Survey H11569 has been examined for noise “pimples” in offshore areas (as described in HydroGeek Volume 3) via the creation of a combined surface; all such fliers have been removed.

C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H11569 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 H11569 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 4: Tide Gauge Information

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

All data were reduced to MLLW using observed water levels with preliminary zoning downloaded from

the CO-OPS website for station Ketchikan by applying tide file 9450460.tid and time and height correctors through the preliminary zone corrector file O119FA2007CORP.zdf.

Final approved water level data (smooth tides) were not applied by the FAIRWEATHER. The Pacific Hydrographic Branch will apply final approved water levels (smooth tides) to the survey data during final processing.⁸ A request for delivery of final approved water level data (smooth tides) for survey H11569 was forwarded to N/OPS1 on May 26, 2007 in accordance with the FPM. A copy of the request is included in Appendix IV.⁹

D. RESULTS AND RECOMMENDATIONS

D.1 Chart Comparison

Chart comparison procedures were followed as outlined in the FPM.

Survey H11569 was compared with charts 17385 (16th Ed.; September, 2006, 1:80,000), and 17360 (35th Ed.; June, 2008, 1:217,828). Chart 17385 has been updated with the Notice to Mariners through September 9, 2009 and chart 17360 has been updated with the Notice to Mariners through June 14, 2008. There were no new changes within the survey area.

Chart 17385

Depths from survey H11569 generally agreed within one to two fathoms with depths on chart 17385. Some of the shoaler depths represented on the chart near the shoreline appears to have been pulled off shore for cartographic representation, but remain accurate within the scale of the chart.¹⁰

Chart 17360

Depths from survey H11569 generally agreed within one to two fathoms with depths on chart 17360. Some of the shoaler depths represented on the chart near the shoreline appears to have been pulled off shore for cartographic representation, but remain accurate within the scale of the chart.¹¹

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.**¹² Final chart comparisons will be made at the Pacific Hydrographic Branch after the application of smooth tides.

Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of H11569.¹³

Dangers to Navigation

There were no dangers to navigation found within the survey limits.¹⁴

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 was 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.¹⁵ 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*.¹⁶ 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. It was not necessary to flag any of the new features 'report', therefore a survey feature report for shoreline items was not generated.

Shoreline deliverable .HOB files were compiled in Caris Notebook 3.0. Edits to existing source shoreline features were made in the H11569_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 H11569_Updates.hob.

Approved tides will be applied by the Pacific Hydrographic Branch to tide correct all the DP features included in the Pydro PSS. The H11569_Updates.HOB file will need to be updated to include any changes to depth values following application of smooth tides. In Notebook, tide-corrected depths acquired to verify source features must be transferred from the H11569_Updates \$CSYMB feature to the source rock or feature that is being verified in the H11569_Composite_Source.hob file.¹⁷

If a source feature was edited in Notebook, the SORIND and SORDAT attribute fields were modified to reflect the survey number (US,US,graph,H11569) 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 5.

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,H11569	20070428

Table 5. SORIND/SORDAT Shoreline Features

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

Source Shoreline Changes and New Features

A GC ledge located at 56°4'22.2" N, 132°00'27.0" W extended significantly seaward of the NALL. The seaward most extent of the ledge was positioned approximately 50 meters seaward of what was digitized in the GC shoreline. New extents for the ledge were acquired as DPs in the field and the ledge was modified in Caris Notebook.¹⁸

A GC ledge located at 56°5'21.6" N, 132°01'25.8" W extended significantly seaward of the NALL. The seaward most extent of the ledge was positioned approximately 100 meters seaward of what was digitized in the GC shoreline. New extents for the ledge were acquired as DPs in the field and the ledge was modified in Caris Notebook.¹⁹

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.²⁰

Aids to Navigation

There were no Aids to Navigation found within the survey limits.²¹

Bottom Samples

Bottom samples were collected on April 28, 2007 (DN 118) 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 H11569_Updates.hob file.²²

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

June 17, 2007

MEMORANDUM FOR: CDR Don Haines, NOAA
Chief, Pacific Hydrographic Branch

FROM: CDR Andrew L. Beaver, NOAA
Commanding Officer

Andrew L. Beaver
I am approving this
document
2007.07.10 11:26:26 -
08'00'

TITLE: Approval of Hydrographic Survey H11569,
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 H11569 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:

Date: 2007.07.07
17:16:16 Z

LTjg Guinevere Lewis
Survey Manager

I have reviewed this document
2007.07.07 08:55:58 -08'00'

LT Jennifer Dowling
Field Operations Officer

Grant Froelich
I have reviewed this document
2007.07.07 19:06:11 Z

CST Grant Froelich
Chief Survey Technician

Attachment



Revisions Compiled During office Processing and Certification

- ¹ Concur.
- ² DAPR is filed with the project records.
- ³ Concur with all concurrent project junction evaluations.
- ⁴ Concur with all junction evaluations.
- ⁵ During office evaluation of the survey, the fieldsheets were reconfigured with different grid resolutions and greater overlapping depth thresholds 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 gridding resolution was revised by PHB. See Survey Acceptance Review checklist and memo filed with the hydrographic records.
- ⁸ Concur. Final approved water levels have been applied to all data.
- ⁹ The Approved Water Level Request is filed with the hydrographic records.
- ¹⁰ Concur.
- ¹¹ Concur.
- ¹² Concur. Supersede charted depths with soundings depicted in HCell H11569. Because of 100% multibeam on this survey, it is recommended that the remaining green tint wire drag area and the “unsurveyed” areas should be removed from chart 17385 and superseded with depths from this survey.
- ¹³ Concur.
- ¹⁴ Concur.
- ¹⁵ The GC shoreline differs from the raster charts because when the GC was applied to the raster, an approximate southeastern shift of 0.33mm occurred. This error was reproduced on the ENC.
- ¹⁶ Concur. DP forms are filed with the Hydrographic records.
- ¹⁷ Concur. All features with height attributed have been updated with the application of final approved water levels and are included in the HCell.
- ¹⁸ Concur.
- ¹⁹ Concur.
- ²⁰ Concur.
- ²¹ Concur.
- ²² Concur. Five bottom samples were collected during H11743 and all five are included in the HCell. An additional single bottom sample was imported from the ENC to be retained.



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'

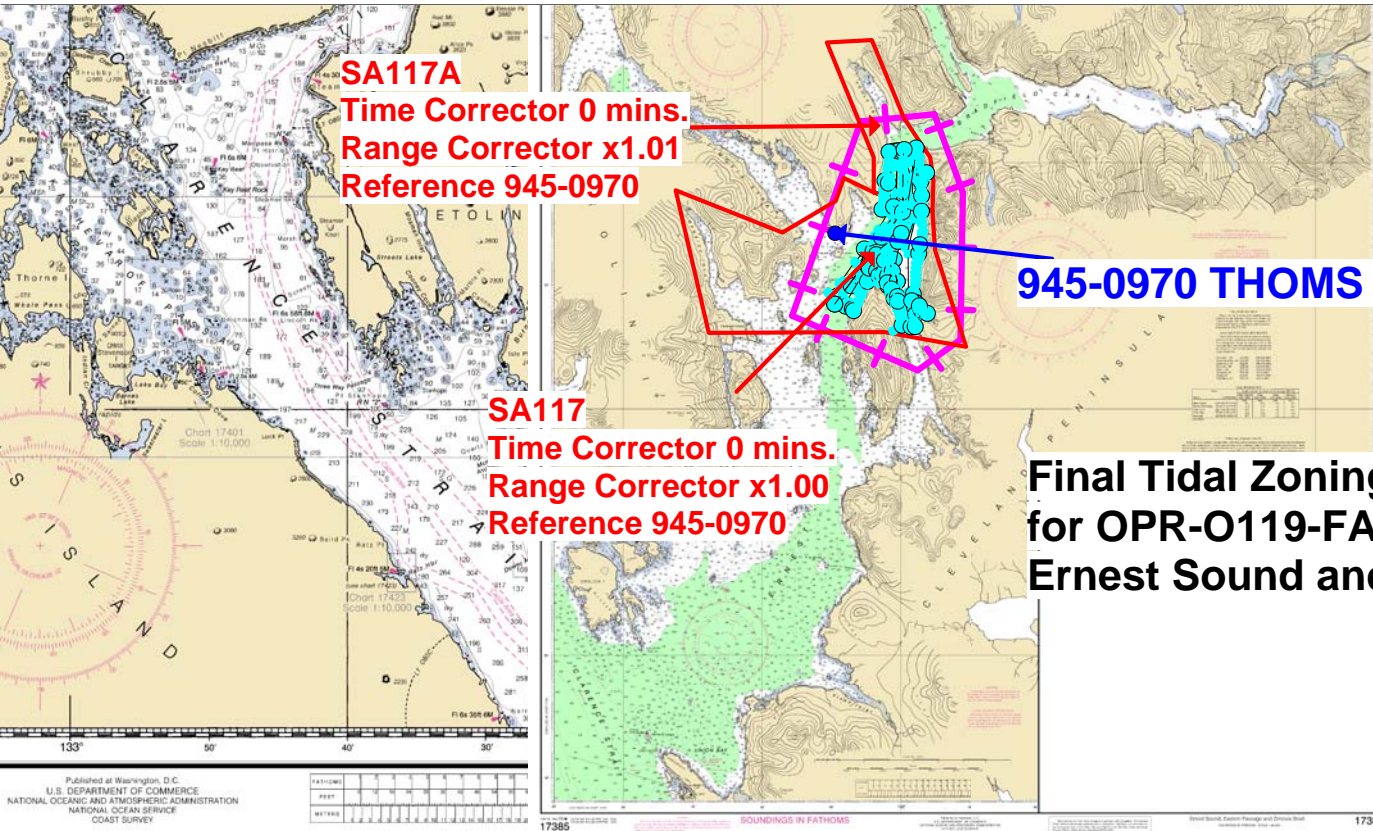
CHIEF, PRODUCTS AND SERVICES DIVISION



Final tide zone node point locations for OPR-O119-FA-2007, H11569

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 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			
-132.018601 56.05159			
-131.920439 56.04175			
Zone SA117A	945-0970	0	x1.01
	945-0460	+6	x1.07
-132.031824 56.14577			
-132.031824 56.169172			
-132.088262 56.246482			
-132.034031 56.248051			
-131.995131 56.195482			
-131.963681 56.169172			
-131.95975 56.153816			
-131.961061 56.133332			
-132.031824 56.14577			



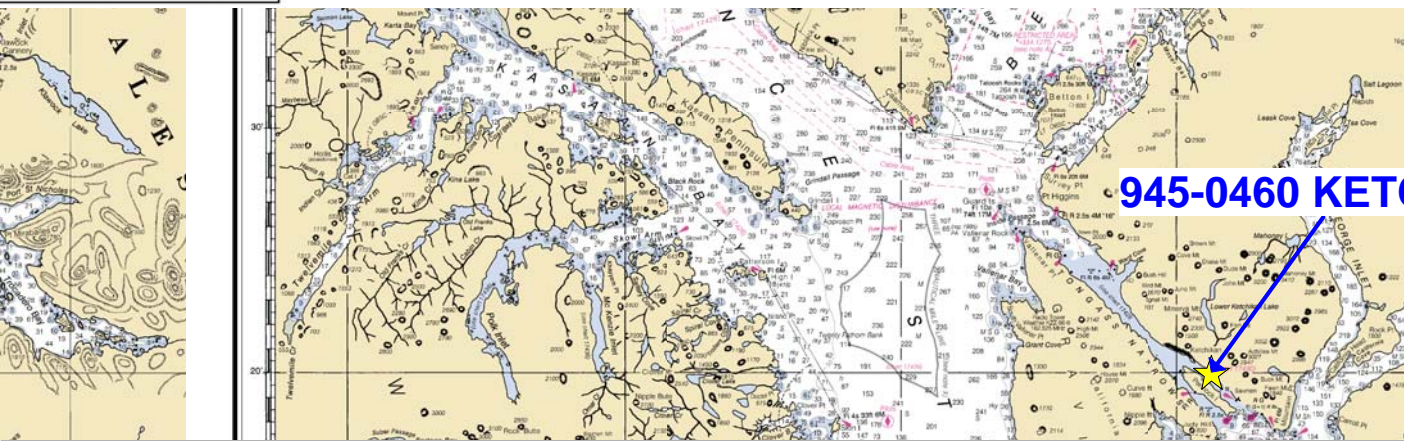
945-0970 THOMS POINT

**Final Tidal Zoning
 for OPR-O119-FA-2007, H11569
 Ernest Sound and Eastern Passage, AK**

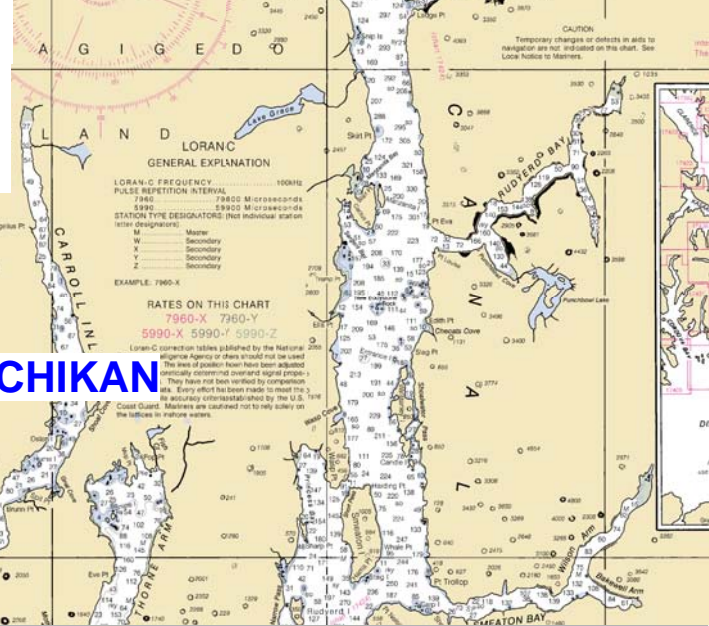


Electronic Navigation Certificate of Authenticity
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945-0460 KETCHIKAN



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

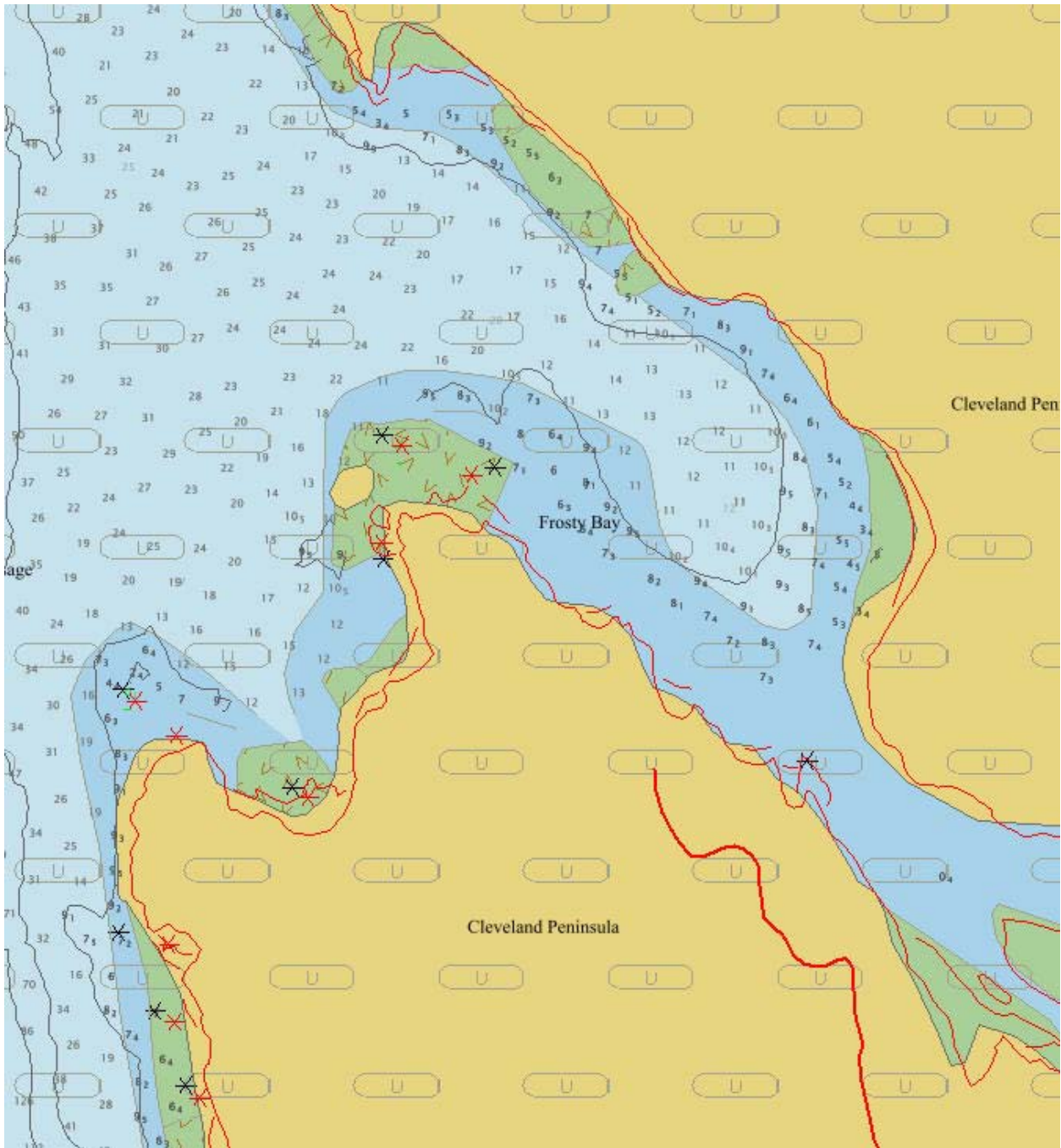
Subject:
H11569 - GC not applied to ENC/chart
From:
"martha.herzog" <martha.herzog@noaa.gov>
Date:
Tue, 29 Sep 2009 15:15:36 -0700
To:
Gary Nelson <Gary.Nelson@noaa.gov>
To:
Gary Nelson <Gary.Nelson@noaa.gov>

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



H11569 HCell Report
Martha Herzog, 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 ENC and RNC in the region: NOAA ENC, US4AK3OM, and NOAA RNCs, 17385 and 17360.

HCell compilation of survey H11569 utilized Office of Coast Survey HCell Specifications Version 3.1, with approved modifications to better align with PHB's HCell process and to meet MCD needs.

1. Compilation Scale

Depths for HCell H11569 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 15-meter combined surface **H11569_Comb_15m** 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 H11569_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 H11569_SS file have not been deconflicted against shoreline features, soundings and hydrography as all other features in the H11569_CS file and soundings in the H11569_SS have been. This results in conflicts between the H11569_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 H11569_SS.000 file contours in all cases where conflicts are found.

4. Meta Areas

The following Meta object areas are included in HCell H11569:

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 or 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.

Pending further guidance from MCD, features generalization has been accomplished primarily through reduction in the number of features included 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 H11569 were delivered from the field in three .hob files defining new features, modification to GC or charted 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.

The source of all features included in the H11569 HCell can be determined by the SORIND field.

5.2 Mean High Water Used for HCells

For the purposes of determining the height at which a rock becomes an islet, the CO-OPS “*Tide Note for Hydrographic Survey*”, “*Height of High Water Above the Plane of Reference*” is used.

For the purpose of compilation of intertidal depth areas, a MHW (-h) value is used for defining the DRVAL1 (Depth Range Value) attribute field for the DEPARE component of the feature, where DRVAL2 is always 0.0. The MHW value from US4AK3OM was used for H11569.

6. S-57 Objects and Attributes

The H11569_CS HCell contains the following Objects:

\$CSYMB	Blue Notes
DEPARE	The all-encompassing depth area
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
SBDARE	Modified GC ledges and reefs, bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features

The H11569_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 H11569_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

H11569 junctions with H11572, currently being compiled (October 2009) and with H11507. A common junction was also made between H11569 and these two prior surveys. H11569 also junctions with H11052. All soundings from H11569 should supersede tH11569 in common areas. A junction with H11571 will be made when this survey is compiled.

9.2 Conflicts between Shoreline and Hydrography

There are numerous instances of charted shoreline and ledges 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

H11569 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

- H11569 Base Cell File, Chart Units, Soundings and features compiled to 1:80,000.
- H11569 Base Cell File, Chart Units, Soundings compiled to 1:10,000.
- H11569 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items.
- H11569 Survey outline to populate the SURDEX.

11.2 File Naming Conventions

- | | |
|---|----------------------------|
| • Chart units base cell file, chart scale soundings | H11569_CS.000 |
| • Chart units base cell file, survey scale sounding set | H11569_SS.000 |
| • Descriptive Report package | H11569_DR.pdf |
| • Survey outline | H11569_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. 5.0	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:

Martha Herzog, Physical Scientist, PHB, Seattle, WA; 206-526-6730; Martha.herzog@noaa.gov.

APPROVAL SHEET
H11569

Initial Approvals:

The survey evaluation and verification has been conducted according to branch processing procedures and the H-Cell 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 disproof 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 H-Cell, 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.