

H11573

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. H11573

### LOCALITY

State ALASKA

General Locality Ernest Sound and Eastern Passage

Sublocality Eastern Brownson Island and Canoe Passage

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: \_\_\_\_\_

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**Descriptive Report to Accompany Hydrographic Survey H11573**

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

Scale 1:10,000

April, 2007

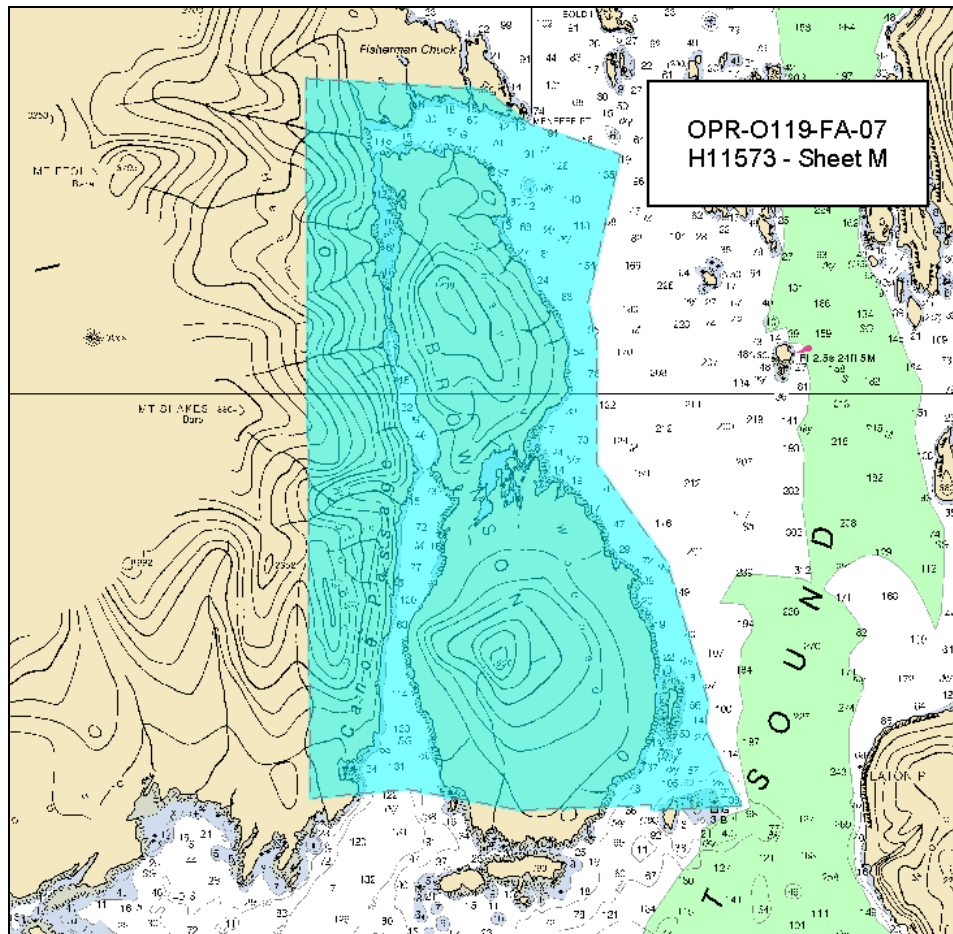
**NOAA Ship FAIRWEATHER**

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 eastern Brownson Island and Canoe Passage. This survey corresponds to Sheet M 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°14'00"W and the Northeast corner at 56°04'00"N, 132°06'00"W.

Data acquisition was conducted from April 29 to May 14, 2007 (DN 119 to DN 134).



*Figure 1: H11573 survey limits*

One hundred percent multibeam echosounder (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.<sup>1</sup> 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 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 H11573. 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.<sup>2</sup> 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	Jensen Launch 1018	MonArk	Ambar 700
<b>Hull Registration Number</b>	S220	1010	1018	1706	2302
<b>Builder</b>	Aerojet-General Shipyard.	The Boat Yard, Inc.	The Boat Yard, Inc.	MonArk	Marine Silverships, Inc
<b>Length Overall</b>	231 feet	28' 10"	28' 10"	17'	23'
<b>Beam</b>	42 feet	10' 8"	10' 8"	7'2"	9' 4"
<b>Draft, Maximum</b>	15' 6"	4' 0" DWL	4' 0" DWL	1' 3"	1' 4"
<b>Cruising Speed</b>	12.5 knots	24 knots	24 knots	20 knots	22 knots
<b>Max Survey Speed</b>	10 knots	10 knots	10 knots		
<b>Primary Echosounder</b>	RESON 8111 & RESON 8160	RESON 8101	RESON 8101		
<b>Sound Velocity Equipment</b>	SBE 19plus & 45, MVP 200	SBE 19plus	SBE19plus		
<b>Attitude &amp; Positioning Equipment</b>	POS/MV V4	POS/MV V4	POS/MV V4		
<b>Type of operations</b>	MBES, Bottom Samples	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 collected for survey H11573 were manually examined by the Hydrographer in CARIS subset mode. The internal consistency and integrity of data collected for survey H11573 were found to be acceptable as per the requirements laid forth in the Letter Instructions and in accordance with procedures set forth in the *Field Procedures Manual, dated March 2007 (FPM)* and the *NOS Hydrographic Surveys Specifications and Deliverables (HSSD)*, dated April 2007. Minor sound-velocity correction and roll errors were observed in areas of H11573 and are discussed further in the Data Quality Factors section of this report.

## Crosslines

Shallow water multibeam crosslines for this survey totaled 5.41 linear nautical miles (lnm), comprising 6.45% of the 80.76 lnm of total MBES hydrography. Both main scheme and crossline mileage are summarized in Table 2.

<b>MAIN SCHEME - Mileage</b>	
Single Beam MS	<u>0</u>
Multibeam MS mileage	<u>80.764247</u>
SideScan MS	<u>0</u>
Total MS	<u>80.764247</u>
<b>CROSSLINE - Mileage</b>	
Single Beam XL	<u>0</u>
Multibeam XL	<u>5.4084353</u>
Total XL	<u>5.4084353</u>
<b>OTHER</b>	
Developments/AWOIS - Mileage	<u>3.1085581</u>
Shoreline/Nearshore Investigation - Mileage	<u>25.5</u>
Total # of Investigated Items	<u>25</u>
Total Bottom Samples	<u>12</u>
Total SNM	<u>6.73</u>
Specific Dates of Acquisition	<u>May 3, 12, 14 and 15</u>
Specific Dn#s of Acquisition	<u>Dn 123, 132, 134, and 135</u>

*Table 2: H11573 Survey Statistics*

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 *NOS Hydrographic Surveys Specifications and Deliverables Manual (HSSD)*, dated April 2007.

## Junctions

Survey H11573 junctions with H11570 and H11571, which are Sheets J and K, respectively of the same project. The area of overlap between survey H11573 and H11570 was approximately 300 meters wide. Likewise the area of overlap between H11573 and H11571 was approximately 400 meters wide. Data were reviewed in CARIS Subset Editor and depths were found to be consistent between each survey, meeting the requirements as stated in the *HSSD*.<sup>3</sup> The sheet limits and area of overlap for Sheets J, K and M are shown in Figure 2.

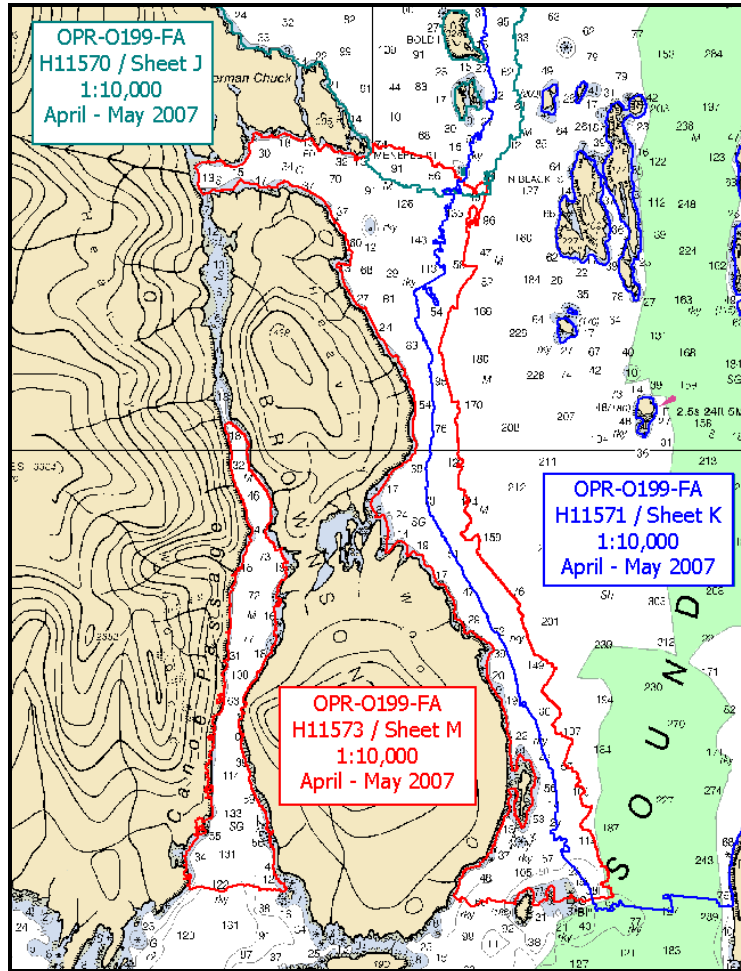


Figure 2: Junctions between H11570, H11571 and H11573

## Quality Control Checks

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

## Data Quality Factors

### COVERAGE ASSESSMENT:

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. To this extent, and as per the correspondence titled *Holey Field Sheets.txt* in Section IV. Supplemental Survey Records and Correspondence of the H11573

Descriptive Report Appendices, base surface depth displays deviated from the DAPR. Base surface depth displays were chosen that would both show a considerable amount more data, as well as, be reasonable resolution for data management.<sup>4</sup> Some small display faults still exist in H11573; however they are less than 3 nodes. Base surface depth display ranges are listed below in Table 3.

Depth Ranges (m)	Resolution (m)	Surface Name	Fieldsheet Name
0 to 60	2	H11573_0to60_North_2m	H11573_North_2m
		H11573_0to60_Central_2m	H11573_Central_2m
		H11573_0to60_Southwest_2m	H11573_Southwest_2m
		H11573_0to60_Southeast_2m	H11573_Southeast_2m
20-70	5	H11573_20to70_5m	H11573
40-130	10	H11573_40to130_10m	
80-200	20	H11573_80to200_20m	
130-350	35	H11573_130to350_35m	

**Table 3: Depth Ranges and Resolutions**

At position 56°02'24.9.0"N, 132°12'43.7"W, a holiday of 30m x 30m exists. This is greater than 3 nodes of the 2m surface. Corresponding backscatter data has been reviewed and the Hydrographer believes the least depth for the area has been acquired.<sup>5</sup>

At position 56°02'33.3.0"N, 132°12'02.1"W, a holiday of 28m x 16m exists. This is greater than 3 nodes of the 5m surface. Corresponding backscatter data has been reviewed and the Hydrographer believes the least depth for the area has been acquired.<sup>6</sup>

At position 56°01'43.9.0"N, 132°10'22.2"W, a holiday of 28m x 5m exists. This is greater than 3 nodes of the 2m surface. Corresponding backscatter data has been reviewed and the Hydrographer believes the least depth for the area has been acquired.<sup>7</sup>

Again, due to the steep nature of the bathymetry in survey H11573, multibeam data was acquired inshore of the NALL in most areas. While this provides more data about the area, it is also prone to holidays. Multiple small holidays exist inshore of the NALL in survey H11573.<sup>8</sup>

Due to time constraints the holidays in survey H11573 were not able to be addressed.

The remainder of survey H11573 meets the coverage requirements stated in the Letter Instructions.<sup>9</sup>

#### DESIGNATED SOUNDINGS:

Designation of soundings followed procedures as outlined in the DAPR.

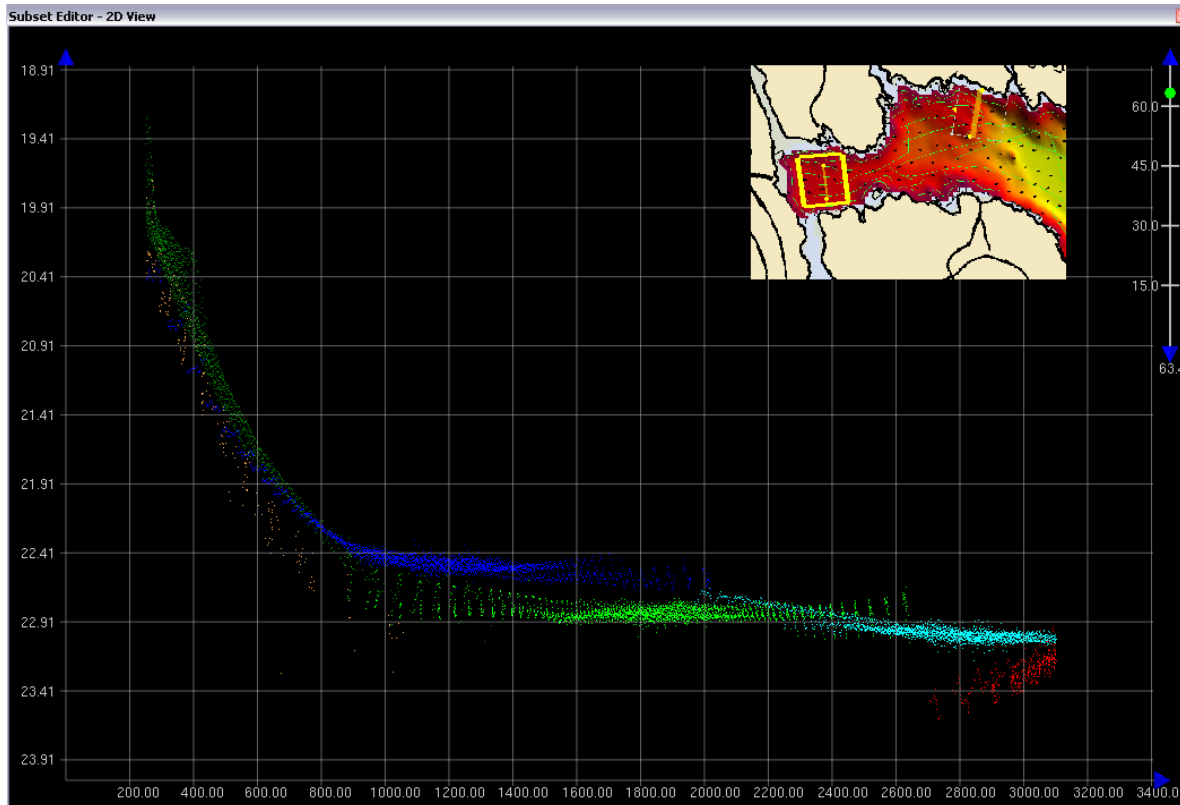
## Accuracy Standards

### 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 H11573. Due to extraordinarily calm conditions on acquisition days in shallow areas, few artifacts were seen in H11573 data. Roll and pitch artifacts appeared at position 56°02'40''N 132°10'06.5''W in H11573. An email on this issue is located in the correspondence folder in Appendix IV. 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.<sup>10</sup>

### TIDES:

At position 56°02'30''N 132°12'30''W, the termination of a small inlet north of Brownson Island meets the northern opening of Canoe Passage. Approximately 0.5 nm from the opening of Canoe Passage, the inlet narrows. This narrowing is significant enough to restrict water movement and tidal flow. The Hydrographer believes this geographic feature to be the cause for significant (1.0m in 20m water depth) vertical offset in the data gathered by launch 1018 on DN 134. An example of this offset can be seen in *Figure 4*. Data gathered east of the narrow portion of the inlet shows no signs of the offset and all other possibilities, including the POS M/V issue discussed above, have been explored. *Figure 5* shows data from the east side of the inlet. Attitude data for the area was reviewed in CARIS Attitude Editor and showed no signs of marked incongruity. Furthering the idea that this issue did not propagate from the slow logging POS M/V, the data has a horizontal offset and heave is logged at 200 Hz by True Heave. True Heave data supersedes POS M/V Real Time Heave data and thus obscures any potential error from the POS M/V. Vertical control data for this project are discussed further in the Vertical Control section of this report.



*Figure 4: Vertical offset in 1018 data from west of inlet.*



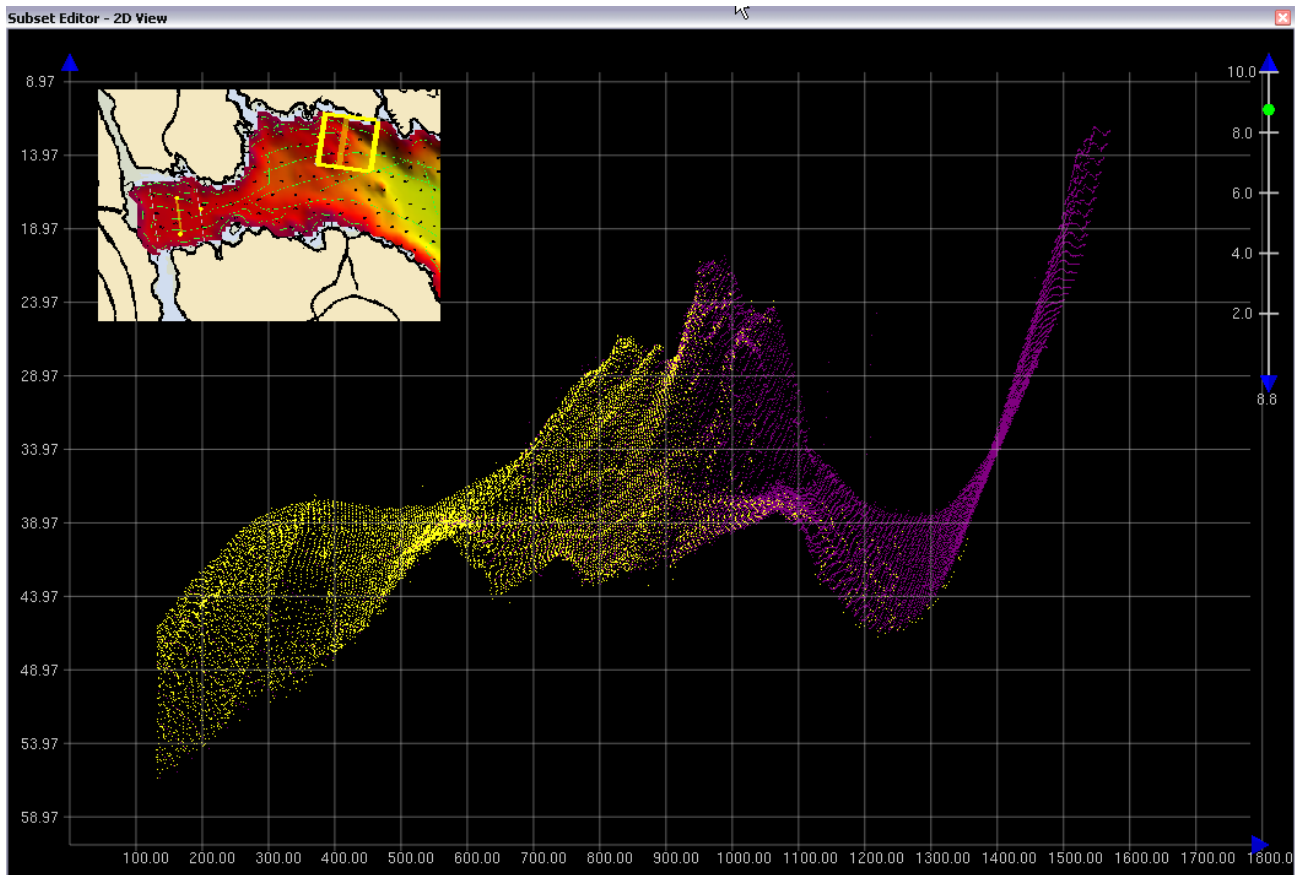


Figure 5: 1018 / 1010 junction data from east of inlet shows no offset. (1018 in purple, 1010 in yellow)

Though nominal roll errors were observed in isolated areas of survey H11573 the regions were closely examined in CARIS subset editor and all data were found to meet the data accuracy specifications as stated in the HSSDM. This error could be associated with the POS M/V issue discussed above.

All data meet the data accuracy specifications as stated in the *HSSDM*.<sup>11</sup>

### **B3. Corrections to Echo Soundings**

Data reduction procedures for survey H11573 conform to those detailed in the DAPR.

### **B4. Data Processing**

Data processing procedures for survey H11573 conform to those detailed in the DAPR.

There are five total fieldsheets fulfilling the various resolution requirements for survey H11573. Fieldsheet H11573 is the largest, encompassing the entire survey area to the five-, ten-, twenty-, and thirty-five-meter resolutions. Four additional fieldsheets (H11573\_North, H11573\_Central, H11573\_Southeast, and H11573\_Southwest) cover the areas of the survey near coastline or shoals. These fieldsheets include surfaces of two meter resolution. The fieldsheet areas of coverage are displayed in *Figure 6*.

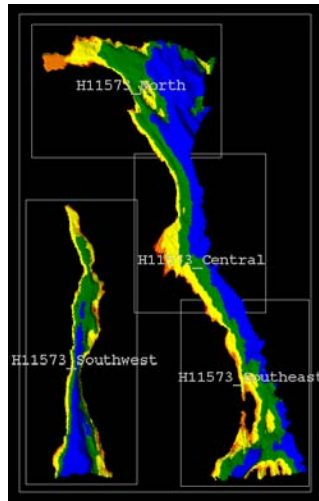


Figure 6: Fieldsheet areas of coverage

### C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H11573 can be found in the *OPR-O119-FA-07 Horizontal and Vertical Control Report*, submitted under separate cover.<sup>12</sup> 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 H11573 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 3: Tide Gauge Information

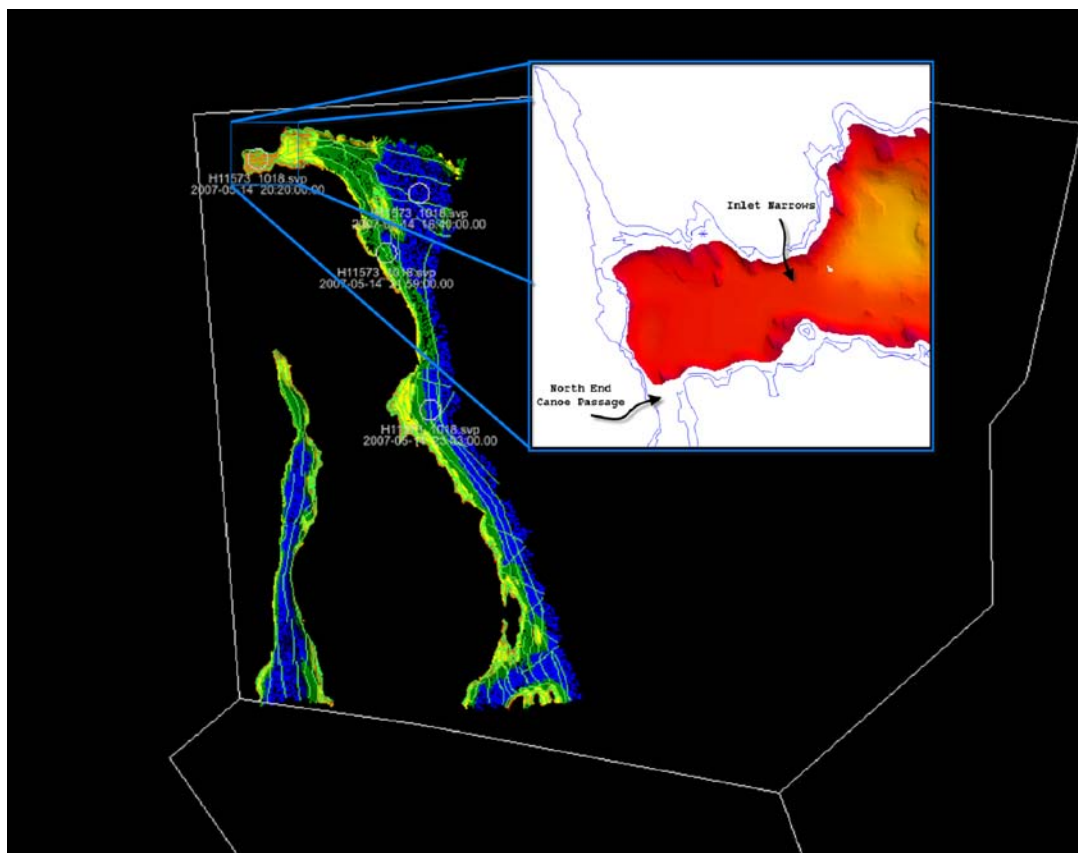
Refer to the *OPR-O119-FA-07 Horizontal and Vertical Control Report* for further information about the tertiary tide station.

A request for delivery of final approved water level data for survey H11573 was forwarded to N/OPS1 on May 26, 2007 in accordance with the *Field Procedures Manual*, dated March 2007 (*FPM*). A copy of the request is included in Appendix V.<sup>13</sup>

FAIRWEATHER received the Tide Note for Hydrographic Survey H11573 on July 6, 2007. The Tide Note for Hydrographic Survey H11573 states that new zoning as depicted in the final tide note and H11573CORF.zdf should be used as final zoning. Final approved water level data were received by the FAIRWEATHER on July 6, 2007 for tertiary tide station Thoms Point (945-0970). The Tide Note for Hydrographic Survey H11573 and ancillary correspondence are included in Appendix V.<sup>14</sup>

As per the Letter Instructions, all data were reduced to MLLW using the final approved water levels from the Thoms Point gauge (945-0970) by applying tide file 9450970.tid and time and height correctors through the zone corrector file H11573CORF.zdf.<sup>15</sup> It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels to the survey data during final processing.

As discussed in the Accuracy Standards section of this report, an area in the northeast section of survey H11573 experienced significant tidal offset due to local geography. The primary zone corrector for the area does not account for this feature and thus the phenomenon was not accounted for in data processing. Refer to *Figure 7* for further details regarding this area.



*Figure 7: Tide Zoning and Inlet Geography*

## D. RESULTS AND RECOMMENDATIONS

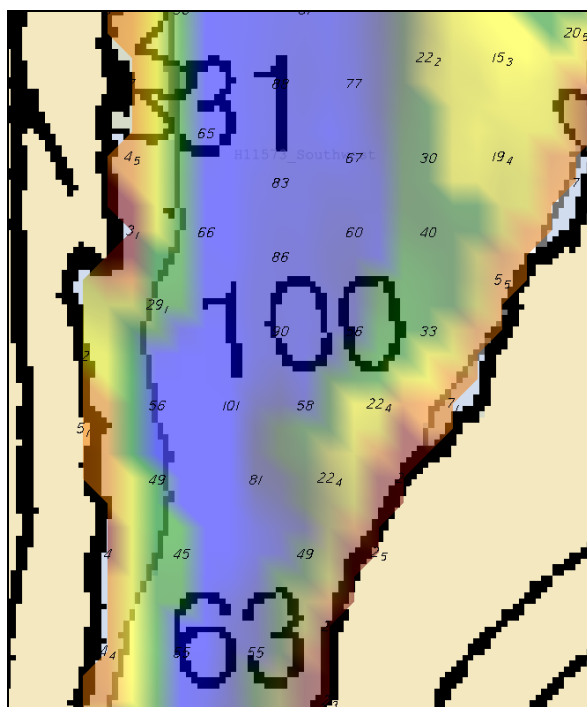
### D1. Chart Comparison

Chart comparison procedures were followed as outlined in the FPM.

Survey H11573 was compared with charts 17385 (16<sup>th</sup> Ed, Sep. 2006, Scale 1:80,000), and 17360 (34<sup>th</sup> Ed, Mar. 2006, Scale 1:217,828). All charts have been updated with the Notice to Mariners through March 10, 2007 and the most recent Notice to Mariners from June 9, 2007 was consulted. There were no new changes within the survey area.

#### Chart 17385

Due to the proximity of survey H11573 to shore, chart 17385 is not capable of displaying accurate soundings to the 1:80,000 scale. The Hydrographer recommends that soundings from H11573 supersede all soundings on chart 17385.<sup>16</sup> For an example of this discrepancy, see *Figure 8* below.



*Figure 8: Canoe Passage Bathymetry Comparison with Chart 17385*

#### Chart 17360

Due to the proximity of survey H11573 to shore, chart 17360 is not capable of displaying accurate soundings to the 1:217,828 scale. The Hydrographer recommends that soundings from H11573 supersede all soundings on chart 17360.<sup>17</sup> For an example of this discrepancy, see *Figure 9* below.

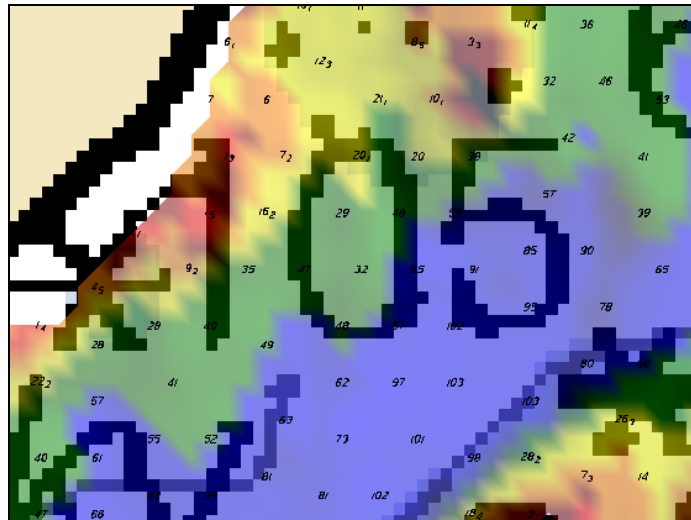


Figure 9: H11573 Bathymetry Comparison with Chart 17360

## 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.**<sup>18</sup>

## Automated Wreck and Obstruction Information System (AWOIS) Investigations

There was one AWOIS item located within the limits of H11573. The AWOIS item is addressed in the H11573\_Features\_Report.pdf in Appendix II.<sup>19</sup>

## Dangers to Navigation

One danger to navigation was found and reported to the Mapping and Charting Division for final submission to the Seventeenth Coast Guard District on May 24, 2007. A copy of the preliminary Danger to Navigation Report is included in Appendix I.<sup>20</sup>

## D2. 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. 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.<sup>21</sup>

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.<sup>22</sup> 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 H11573\_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.<sup>23</sup>

Shoreline deliverable .HOB files were compiled in Caris Notebook 3.0. Edits to existing source shoreline features were made in the H11573\_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 H11573\_Pydro\_Updates .HOB files.

Approved water levels were applied to tide correct all the DP features included in the Pydro PSS. In Notebook, tide-corrected depths acquired to verify source features were transferred from the H11573\_Pydro\_Updates \$CSYMB feature to the source rock or feature that is being verified in the H11573\_Composite\_Source.hob file.

If a source feature was edited in Notebook, the SORIND and SORDAT attribute fields were modified to reflect the survey number (US,US,graph,H11573) 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 4.

<b>Shoreline Source</b>	<b>SORIND</b>	<b>SORDAT</b>
<b>RSD</b>	<b>US,US,graph,GC10493</b>	<b>19970810</b>
<b>RSD</b>	<b>US,US,graph,GC10493</b>	<b>19980500</b>
<b>RSD</b>	<b>US,US,graph,GC10549</b>	<b>19970814</b>
<b>RSD</b>	<b>US,US,graph,GC10549</b>	<b>19980530</b>
<b>Survey</b>	<b>US,US,graph,H11573</b>	<b>20070516</b>

*Table 4: 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.

### **Aids to Navigation**

There were no Aids to Navigation found within the survey limits.<sup>24</sup>

## Bottom Samples

Bottom samples were collected on May 12 and 16, 2007 (DN132 and DN135) 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 H11573\_Pydro\_Updates.hob file.<sup>25</sup>

## 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 23, 2007

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

FROM: CDR Andrew L. Beaver, NOAA  
Commanding Officer

Andrew L. Beaver  
I am approving this  
document  
2007.08.23 16:49:16 -08'00'

TITLE: Approval of Hydrographic Survey H11573,  
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 H11573 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:

---

LTjg Allison R. Martin  
Survey Manager

I am approving this document  
2007.08.24 10:47:53 -08'00'

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LT Jennifer Dowling  
Field Operations Officer

Grant Froelich  
I am approving this document  
2007.08.23 23:12:46 Z

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CST Grant Froelich  
Chief Survey Technician

Attachment





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<sup>1</sup> Concur

<sup>2</sup> DAPR is filed with the project reports.

<sup>3</sup> Do not concur. Some differences between surveys exist on the order of approximately 2 fathoms (4 meters) in some areas. It is recommended that the shoalest soundings from each of the junctions are applied to the chart.

<sup>4</sup> 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.

<sup>5</sup> Concur.

<sup>6</sup> Concur.

<sup>7</sup> Concur.

<sup>8</sup> The Survey Acceptance Review filed with the project records documents other holidays.

<sup>9</sup> Concur.

<sup>10</sup> Concur. All data were accepted.

<sup>11</sup> Do not concur. The paragraph above states that there are 1 meter tidal offsets in 20 meters depth which exceed HDSSM specifications. Because this area that exceeded specifications is small and does not pose a danger to navigation, the recommendation is to accept and chart the survey data.

<sup>12</sup> Horizontal and Vertical Control Report is filed with the hydrographic records.

<sup>13</sup> The approved Water Level Request is filed with the hydrographic records.

<sup>14</sup> Tide Note is attached to this report.

<sup>15</sup> Concur.

<sup>16</sup> Concur.

<sup>17</sup> Concur.

<sup>18</sup> Concur.

<sup>19</sup> AWOIS item has been applied to the chart and is addressed in the Survey Features Report filed with the hydrographic records.

<sup>20</sup> All submitted Dangers to Navigation were applied to the chart.

<sup>21</sup> Numerous charted ledges are in the survey area. Recommendations for ledge line adjustment, retention, or removal are conveyed via bluenotes in the HCell.

<sup>22</sup> DP forms are filed with the hydrographic record.

<sup>23</sup> Concur. The Survey Features Report contains a copy of the Danger to Navigation item and the surveyed AWOIS item. The DTON and AWOIS items are filed with the hydrographic records.

<sup>24</sup> Concur.

<sup>25</sup> Sixteen bottom samples were collected during H11573 and all 16 are included in the HCell. An additional eight bottom samples were 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'

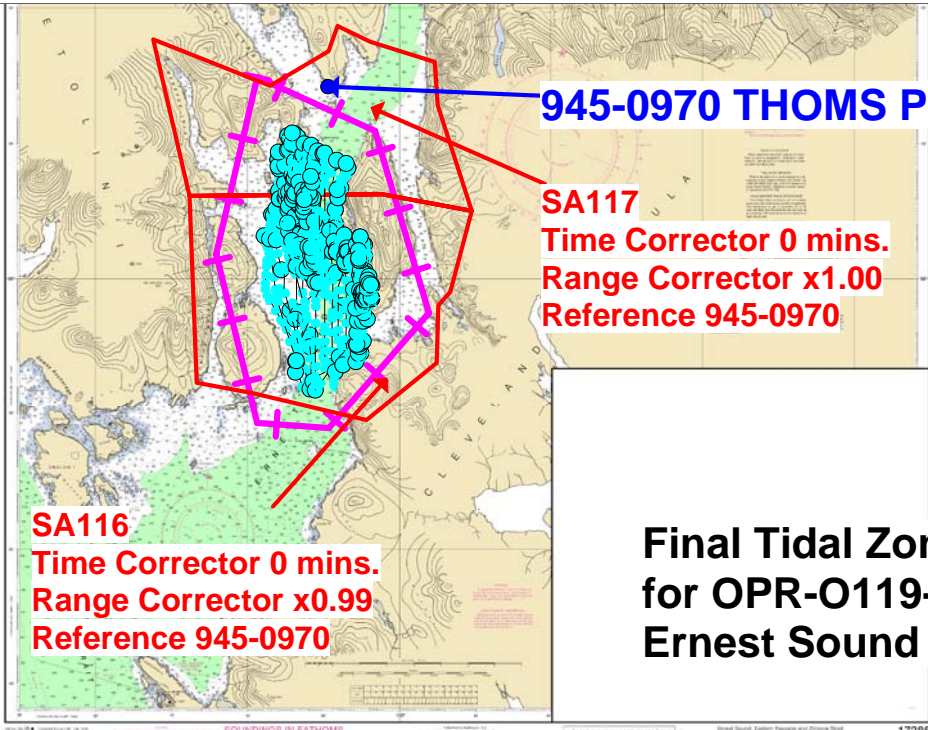
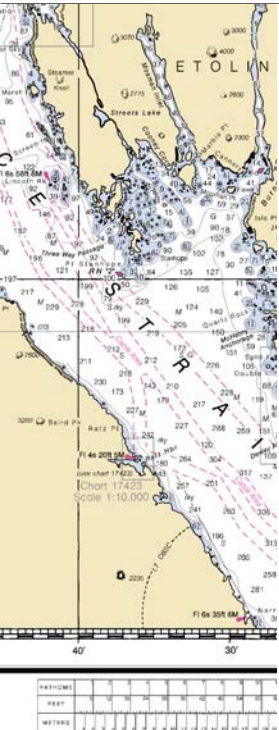
CHIEF, PRODUCTS AND SERVICES DIVISION



**Final tide zone node point locations for OPR-O119-FA-2007, 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 Order	Station	AVG Correction	Time	Range Correction
Zone SA116	945-0970			
	945-0460	0	x0.99	
		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			
	945-0460	0	x1.00	
		+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			

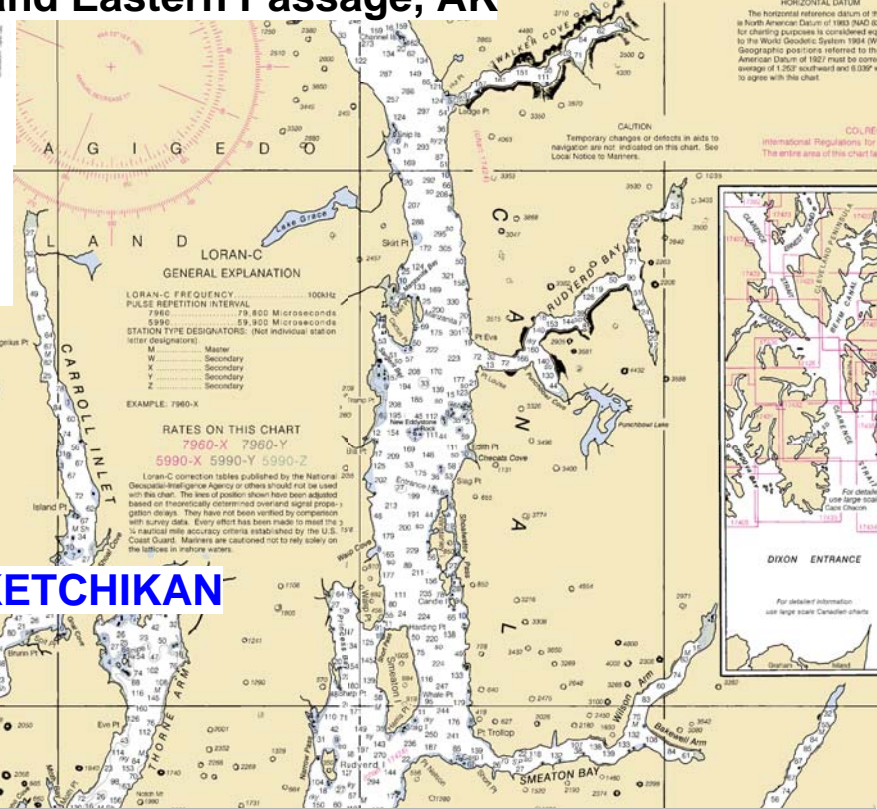


**945-0970 THOMS POINT**

**SA117**  
**Time Corrector 0 mins.**  
**Range Corrector x1.00**  
**Reference 945-0970**

**SA116**  
**Time Corrector 0 mins.**  
**Range Corrector x0.99**  
**Reference 945-0970**

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



**945-0460 KETCHIKAN**

# H11573 Danger to Navigation Report

**Registry Number:** H11573  
**State:** Alaska  
**Locality:** Ernest Sound and Eastern Passage  
**Sub-locality:** Eastern Brownson Island and Canoe Passage  
**Project Number:** OPR-O119-FA  
**Survey Dates:** April 29, 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
1.1	Sounding	2.33 m	055° 58' 37.889" N	132° 11' 39.823" W

## **1 - Danger To Navigation**

**1.1) 334/98****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 055° 58' 37.889" N, 132° 11' 39.823" W  
**Least Depth:** 2.33 m  
**Timestamp:** 2007-136.21:44:31.789 (05/16/2007)  
**Survey Line:** h11573 / fa\_1010\_reson8101 / 2007-136 / 136-2144  
**Profile/Beam:** 334/98  
**Charts Affected:** 17385\_1, 17360\_1, 17420\_1, 16016\_1, 531\_1, 530\_1, 50\_1

**Remarks:**

Completely developed a submerged rock between charted 72 and 16 fathom (chart 17385). Observed tidal data from Ketchikan, with preliminary zoning, shows a least depth of 2.33 meters.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
h11573/fa_1010_reson8101/2007-136/136-2144	334/98	0.00	000.0	Primary

**Hydrographer Recommendations**

The Hydrographer recommends adding the least depth to the chart.

**Cartographically-Rounded Depth (Affected Charts):**

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

1fm 1ft (531\_1)

2.3m (50\_1)

### Feature Images

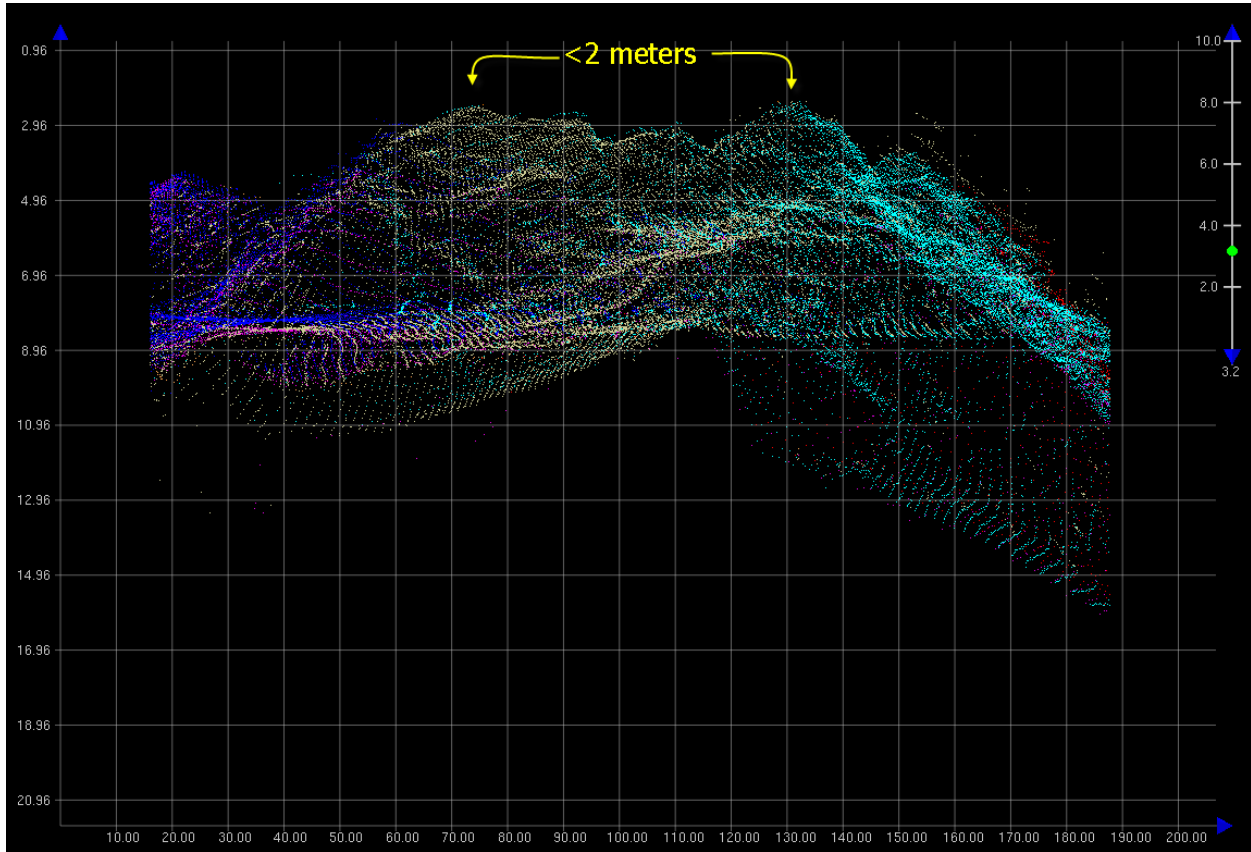


Figure 1.1.1



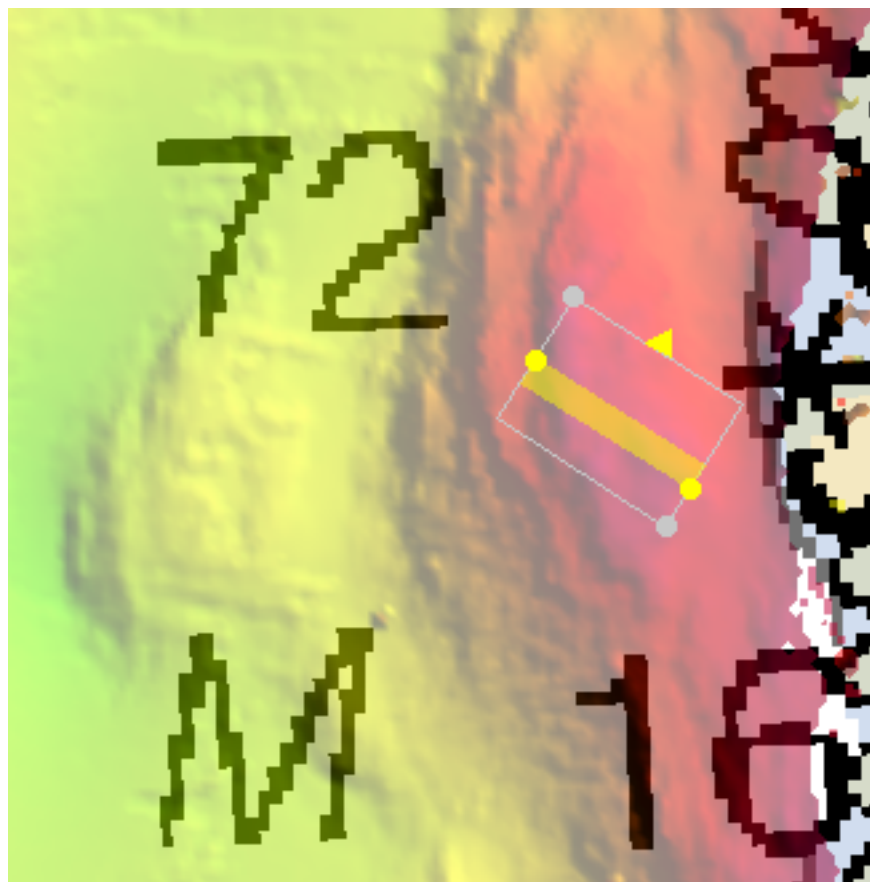


Figure 1.1.2

# H11573\_AWOIS

**Registry Number:** H11573  
**State:** Alaska  
**Locality:** Ernest Sound and Eastern Passage  
**Sub-locality:** Eastern Brownson Island and Canoe Passage  
**Project Number:** OPR-O119-FA  
**Survey Dates:** April 29, 2007 - May 16, 2007

AWOIS item.

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17385	16th	09/01/2006	1:80,000 (17385_1)	[L]NTM: ?
17360	34th	03/01/2006	1:217,828 (17360_1)	[L]NTM: ?
17420	27th	11/01/2005	1:229,376 (17420_1)	[L]NTM: ?
16016	20th	11/01/2003	1:969,756 (16016_1)	[L]NTM: ?
531	23rd	01/01/2006	1:2,100,000 (531_1)	[L]NTM: ?
530	31st	06/01/2005	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

## Features

Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude
500/12	AWOIS	1.50 m	56° 02' 01.6" N	132° 10' 01.9" W

## **1 - Item Data**

## 1.1) AWOIS #53309 - SOUNDING

### Primary Survey Feature is Profile/Beam - 500/12 from h11573 / fa\_1018\_reson8101 / 2007-134 / 134-1903

**Search Position:** 56° 02' 01.3" N, 132° 10' 01.4" W  
**Historical Depth:** 0.61 m  
**Search Radius:** 200  
**Search Technique:** MBES, VBES, S2, DI  
**Technique Notes:** [None]

#### History Notes:

H4271/1922 -- A SUBMERGED ROCK, HAVING LEAST DEPTH OF 2 FEET AT M.L.L.W. WAS FOUND .75 MILE DUE SOUTH FROM MENEFFEE POINT. (SCALED POSITION LAT. 56/02/01.3N LONG. 132/10/01.4W (NAD83)) ENTERED 11/05 BY JCA. ■■■WOIS item #53309 verified with 200% MBES. Multibeam data indicates the shoal may be deeper than charted.

### Survey Summary

**Survey Position:** 56° 02' 01.6" N, 132° 10' 01.9" W  
**Least Depth:** 1.50 m (= 4.90 ft = 0.817 fm = 0 fm 4.90 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh) [None] ; TVU (TPEv) [None]  
**Timestamp:** 2007-134.19:04:38.429 (05/14/2007)  
**Survey Line:** h11573 / fa\_1018\_reson8101 / 2007-134 / 134-1903  
**Profile/Beam:** 500/12  
**Charts Affected:** 17385\_1, 17360\_1, 17420\_1, 16016\_1, 531\_1, 530\_1, 50\_1

#### Remarks:

AWOIS item #53309 verified with 200% MBES. Multibeam data indicates the shoal may be deeper than charted.

### Hydrographer Recommendations

The hydrographer does not recommend any changes to charts #17360 and 17385.

#### Cartographically-Rounded Depth (Affected Charts):

0 ¾fm (17385\_1, 17360\_1, 17420\_1, 16016\_1, 530\_1)

0fm 5ft (531\_1)

1.5m (50\_1)

## S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** EXPSOU - 1:within the range of depth of the surrounding depth area  
OBJNAM - 53309  
QUASOU - 1:depth known  
RECDAT - 20070514  
SORIND - US,US,graph,H11573  
STATUS - 1:permanent  
TECSOU - 1:found by echo-sounder  
VERDAT - 12:Mean lower low water

## Office Notes

AWOIS is charted correctly.

**H11573 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 H11573 utilized Office of Coast Survey HCell Specifications Version 3.0, with approved modifications to better meet MCD needs.

**1. Compilation Scale**

Depths for HCell H11573 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 20-meter Combined Surface, **H11573\_Combined\_20m**, 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 H11573\_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 H11573\_SS file have not been deconflicted against shoreline features, soundings and hydrography as all other features in the H11573\_CS files and soundings in the H11573\_SS have been. This may result in conflicts between the H11573\_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 H11573\_SS.000 file contours in all cases where conflicts are found.

### 4. Meta Areas

The following Meta object areas are included in HCell 11573:

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 use 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 H11573 were delivered from the field in 2 different hob files; H11573\_Pydro\_Updates.hob defined new or modified chart or GC point features while H11573\_Composite Source.hob included features from the updates file and included modified line or area features. These were deconflicted against GC shoreline, the chart and hydrography during office processing.

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

The source of all features included in the H11573 HCell can be determined by the SORIND field.

## 6.S-57 Objects and Attributes

The H11573\_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, bottom samples
SOUNDG	Soundings at the chart scale density
UWTROC	Rock features

The H11573\_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 H11573\_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 above 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 above 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**

H11573 junctions with H11570 and H11571. Common junctions were made with these surveys. Common junction were made with these surveys

## **10. QA/QC and ENC Validation Checks**

H11573 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**

- H11573 Base Cell File, Chart Units, Soundings compiled to 1:80,000
- H11573 Base Cell File, Chart Units, Soundings compiled to 1:10,000
- H11573 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
- H11573 Survey outline to populate the SURDEX

### **11.2 File Naming Conventions**

- Chart units base cell file, chart scale soundings      H11573\_CS.000
- Chart units base cell file, survey scale soundings      H11573\_SS.000
- Descriptive Report      H11573\_DR.pdf
- Survey outline      H11573\_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](mailto:Martha.herzog@noaa.gov).

APPROVAL SHEET  
H11573

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 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 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.