

H12178

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. H12178

### LOCALITY

State Alaska

General Locality Behm Canal, AK

Sublocality Felice Strait

**2010**

### CHIEF OF PARTY

**Captain David O. Neander, NOAA**

### LIBRARY & ARCHIVES

DATE .....

<p style="text-align: center;">U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION</p> <p style="text-align: center;"><b>HYDROGRAPHIC TITLE SHEET</b></p>	<p>REGISTRY No</p> <p style="text-align: center;"><b>H12178</b></p>
<p><b>INSTRUCTIONS</b> – The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.</p>	<p>FIELD No: <b>N/A</b></p>
<p>State <u>Alaska</u></p> <p>General Locality <u>Behm Canal</u></p> <p>Sub-Locality <u>Felice Strait</u></p> <p>Scale <u>1:20,000</u> Date of Survey <u>04/13/2010 to 05/24/2010</u></p> <p>Instructions dated <u>2/16/2010</u> Project No. <u>OPR-O193-FA-10</u></p> <p>Vessel <u>NOAA Ship Fairweather (S220), Lauches 2805, 2806, 2807 and 2808, Skiff 1905 and Amber 2302</u></p> <hr/> <p>Chief of party <u>CAPT David O. Neander, NOAA</u></p> <p>Surveyed by <u>FAIRWEATHER Personnel</u></p> <p>Soundings by <u>Reson 8101, 8125 and 8111</u></p> <p>SAR by <u>Adam Argento</u> Compilation by <u>Fernando Ortiz</u></p> <p>Soundings compiled in <u>Fathoms</u></p>	
<p><b>REMARKS:</b> <u>All times are UTC. UTM Projection 9N</u></p> <p><u>The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. Revisions and end notes in red were generated during office processing.</u></p> <p><u>Page numbering may be interrupted or non sequential.</u></p> <hr/> <p><u>All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via <a href="http://www.ngdc.noaa.gov/">http://www.ngdc.noaa.gov/</a>.</u></p>	

# Descriptive Report to Accompany Hydrographic Survey H12178

Project OPR-O193-FA-10

Felice Strait, Alaska

Scale 1:20,000

April and May 2010

NOAA Ship *Fairweather*

Chief of Party: Captain David O. Neander, NOAA

## A. AREA SURVEYED

The survey area is located in Behm Canal, within the sub-locality of Felice Strait. This survey corresponds to Sheet 6 in the sheet layout provided with the Project Instructions, as shown in Figure 1 below.

Data acquisition was conducted from April 13 to May 24, 2010 (DN 103 to DN 139).

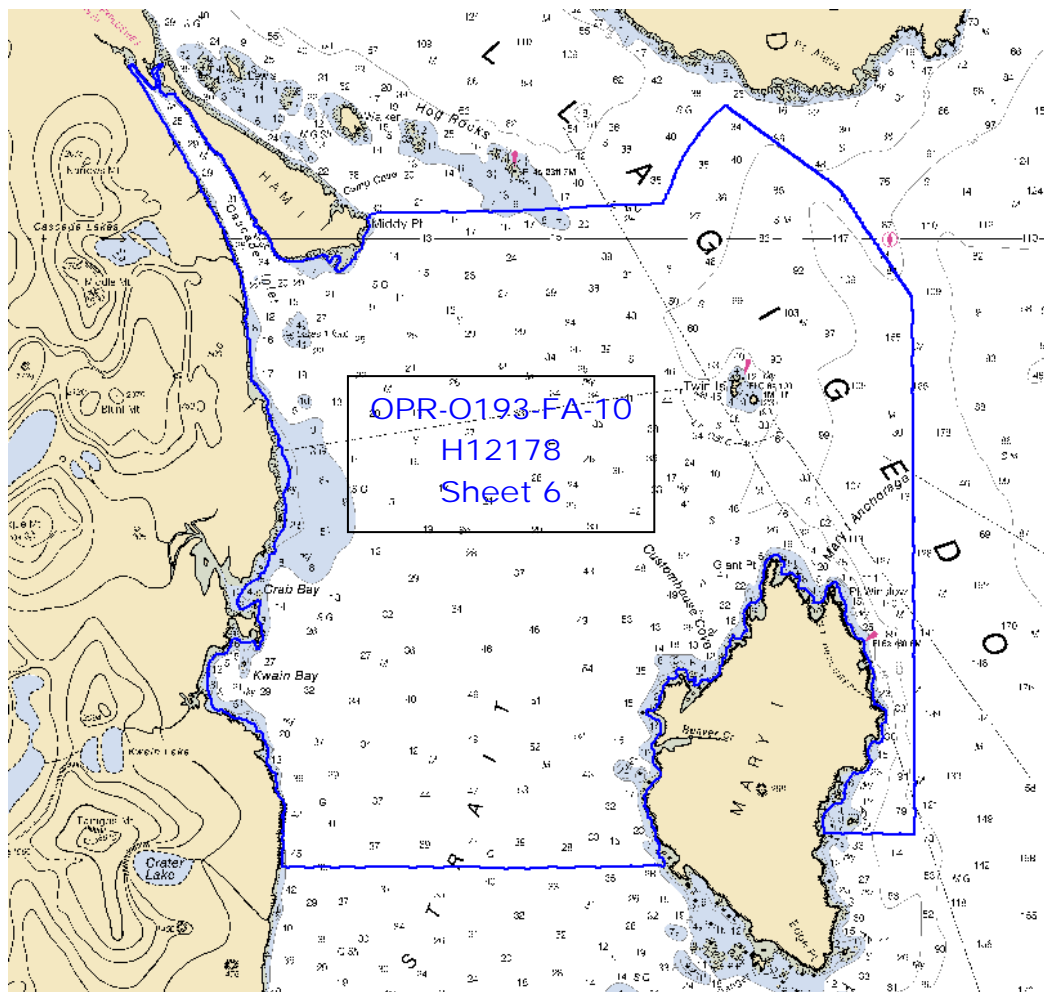


Figure 1: H12178 Survey Outline

Complete multibeam echosounder (MBES) coverage was obtained in the survey area to the Navigable Area Limit Line (NALL). Data were acquired as close to shore as safely possible, to the Mean High Water Buffer, or to the 4-meter curve. Additional coverage was obtained in order to determine least depths over features or navigationally significant shoal areas.<sup>1</sup>

Limited shoreline verification for H12178 was conducted as per section 3.5.5.3 of the Field Procedures Manual April 2010 (FPM). Shoreline features were given S-57 attribution and included for submission in Notebook .hob files.

Mainscheme and crossline mileage for MBES and shoreline acquisition were calculated and are displayed in Table 1 below.

MAIN SCHEME - Mileage	
0	Single Beam MS
572.41	Multibeam MS mileage
0.00	FAIRWEATHER S-220
177.74	Launch 2805
183.47	Launch 2806
47.40	Launch 2807
163.44	Launch 2808
0	Side Scan MS
572.41	Total MS
CROSSLINE - Mileage	
0	Single Beam XL
29.81	Multibeam XL
0.00	FAIRWEATHER S-220
1.68	Launch 2805
24.93	Launch 2806
0.00	Launch 2807
3.20	Launch 2808
29.81	Total XL
OTHER	
0	Developments/AVOIS - Mileage
19.94	Shoreline/Nearshore Investigation - Mileage
12	Total # of Investigated Items
20	Total Bottom Samples
51.72	Total \$NM
<div style="display: flex; justify-content: space-between;"> <span>4/13/10-4/16/10, 4/19/10-4/21/10, 5/4/10, 5/19/10</span> <span>Specific Dates of Acquisition</span> </div> <div style="border-top: 1px solid black; margin-top: 5px;"> <span>103, 104, 105, 106, 109, 110, 111, 118, 124, 139</span> </div>	

**Table 1: H12178 Survey Statistics**

## 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 *NOAA Ship Fairweather 2010 Data Acquisition and Processing Report (DAPR)*, submitted under separate cover. 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 Project Instructions OPR-O193-FA-10, dated February 16, 2010, and Change 1, dated April 23, 2010.

In addition to the original H12178 sheet limits, *Fairweather* surveyed Carpenter Inlet in the northwest corner of the sheet. Carpenter Inlet was found to be navigationally significant after *Fairweather* crew observed multiple fishing boats utilizing the inlet to reach Revillagigedo Channel within the first few days of data acquisition. After discussing this with HSD, the H12178 survey limits were revised and issued with Project Instructions OPR-O193-FA-10 Change 1, dated April 23, 2010.

### B.1 Equipment and Vessels

Equipment and vessels used for data acquisition and survey operations during this survey are listed below in Table 2.

	Launch 2805	Launch 2806	Launch 2807	Launch 2808	Skiff 1905	Ambar 2302
<b>Hull Registration Number</b>	2805	2806	2807	2808	1905	2302
<b>Builder</b>	All American	All American	All American	All American	SeaArk	Marine Silverships, Inc
<b>Length Overall</b>	28' 10"	28' 10"	28' 10"	28' 10"	19'	23'
<b>Beam</b>	10' 8"	10' 8"	10' 8"	10' 8"	8'	9' 4"
<b>Draft, Maximum</b>	4' 0" DWL	4' 0" DWL	4' 0" DWL	4' 0" DWL	1' 3"	1' 4"
<b>Cruising Speed</b>	28 knots	28 knots	28 knots	28 knots	20 knots	22 knots
<b>Max Survey Speed</b>	8 knots	8 knots	8 knots	8 knots		
<b>Primary Echo-sounder(s)</b>	RESON 7125	RESON 7125	RESON 7125	RESON 7125		
<b>Sound Velocity Equipment</b>	SBE 19plus	SBE19plus	SBE19plus	SBE19plus		
<b>Attitude &amp; Positioning Equipment</b>	POS/MV V4	POS/MV V4	POS/MV V4	POS/MV V4		
<b>Type of operation</b>	MBES	MBES	MBES	MBES	Shoreline, Shore Station	Shoreline, Shore Station

**Table 2: Vessel Inventory**

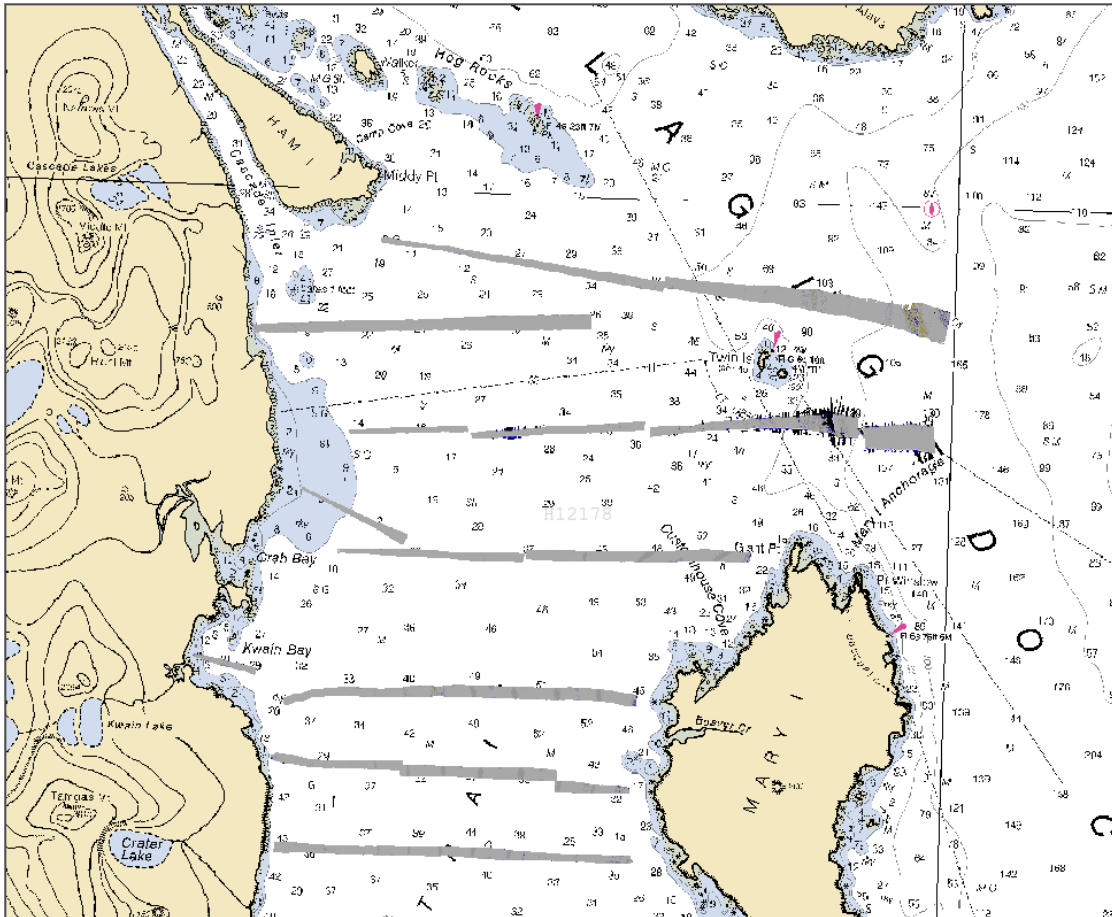
No vessel configurations used during data acquisition deviated from the DAPR.

## B.2 Quality Control

### B.2.1 Crosslines

Multibeam crosslines for this survey totaled 30 linear nautical miles (LNM), comprising 5% of the 572 LNM of mainscheme MBES hydrography. Both main scheme and crossline mileage are summarized in Table 1 above.

Surface differencing in CARIS BathyDataBASE was used to assess crossline agreement with main scheme lines. Figure 2 depicts a difference surface between a 16-meter surface made with main scheme lines only and a 16 meter surface made with crosslines only. This difference surface is submitted digitally in the Separates I folder. Crosslines agree with main scheme lines within the total allowable vertical and horizontal uncertainty in their common areas.<sup>2</sup> Some areas of crosslines were affected by features, downslope angles, and roll. These discrepancies were investigated using subset editor. The cooler colors in figure 2 indicate that crosslines over features and slopes are deeper than mainscheme data. Roll issues are discussed in section B.2.4: ROLL.



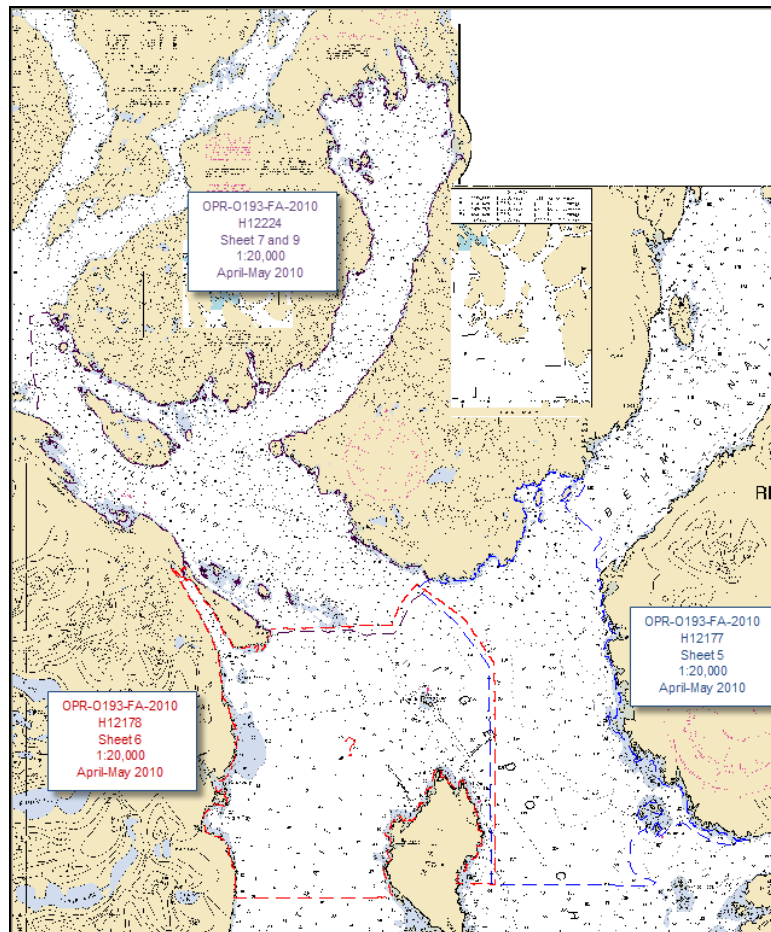
**Figure 2: Crossline and Main scheme Differences (White indicates agreement, warm colors indicate XLs are shallower than mainscheme and cool colors indicate XLs are deeper.)**

**B.2.2 Junctions**

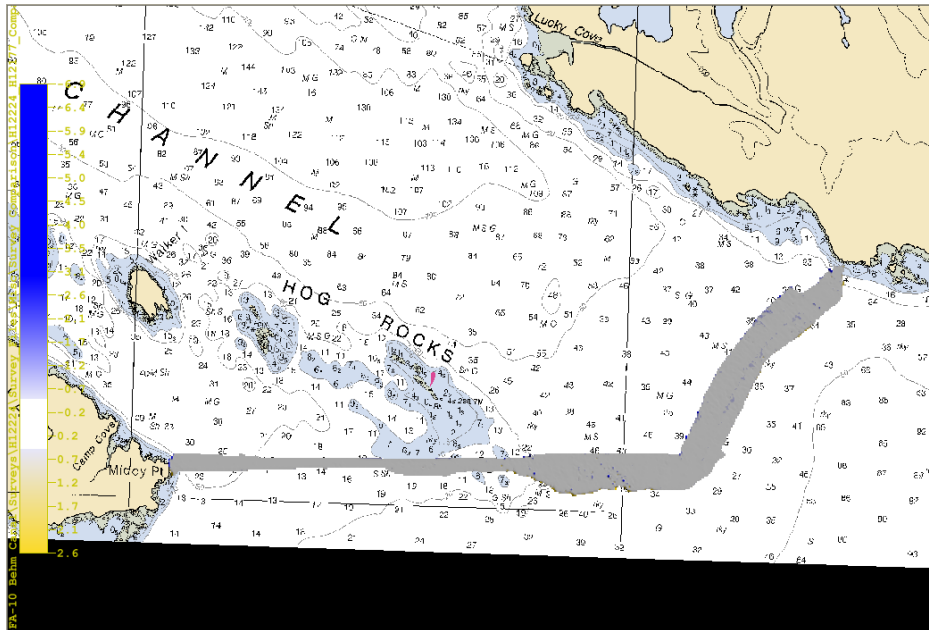
Survey H12178 junctions with H12177 and H12224, which are Sheets 5 and 7 of the same project, respectively.<sup>3</sup> The junctioning surveys are 1:20,000 survey scale. The area of overlap between the sheets was reviewed in CARIS Subset Editor for consistency and data were found to be in agreement within the IHO tolerance in their common areas. Additionally, surface differencing was utilized in CARIS BathyDataBASE to assess agreement between the aforementioned surveys. The sheet limits and area of overlap for Sheets 5, 6, 7 and 9 are shown in Figure 3. Figure 4 depicts a difference surface between the 16-meter combined surfaces of H12224 and H12178. Figure 5 depicts a difference surface between the 16-meter combined surfaces of H12178 and H12177. The blue colors in figure 5 indicate that H12178 has shoaler depths than H12177 due to the comparison between the 7125 data from launch 2807 and 8160 data from S220 on sheet H12177.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H12224	1:20,000	4/21/10-5/22/10	Revillagigedo Channel
H12177	1:20,000	5/5/10-5/23/10	Boca de Quadra to Alava Bay

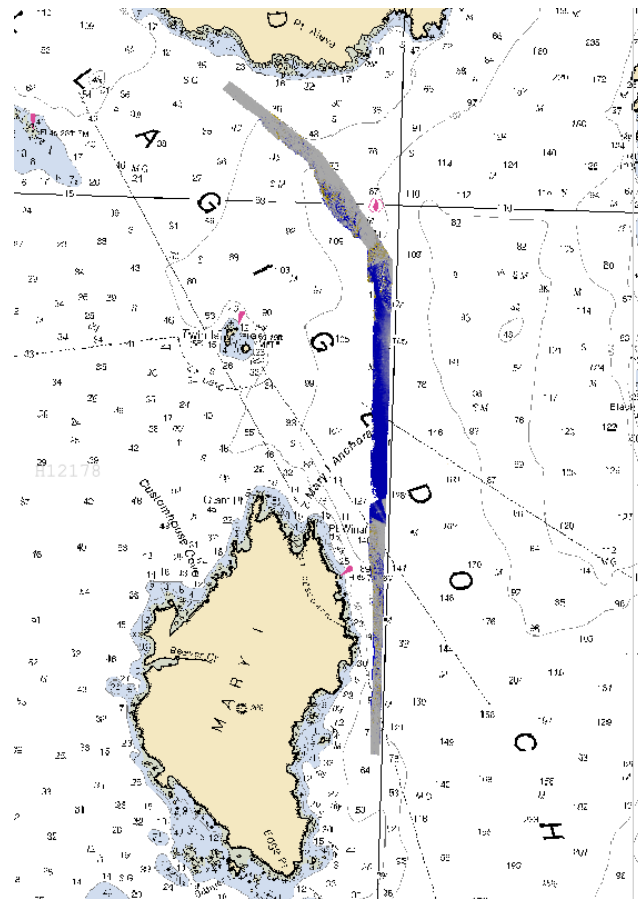
**Table 3: Junction Surveys**



**Figure 3: Junction Between H12178 and H12224 and H12177**



**Figure 4: Survey Junction Differences (Gray indicates agreement, Blue indicates H12178 is shallower than Junctions and Yellow colors indicate Junctions are deeper.)**



**Figure 5: Survey Junction Differences (Gray indicates agreement, Blue indicates H12178 is shallower than Junctions and Yellow colors indicate Junctions are deeper.)**



### B.2.3 Quality Control Checks

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

### B.2.4 Data Quality Factors

#### COVERAGE ASSESSMENT

Complete multibeam coverage was obtained within the limits of H12178 with the exception of some small holidays. For holidays larger than three surface grid nodes, the corresponding multibeam backscatter side scan was examined and no navigationally significant items were found. The least depths of all navigationally significant features are represented by H12178.<sup>4</sup>

#### DENSITY

Density requirements for H12178 were achieved with at least 98% of finalized surface nodes containing five or more soundings<sup>5</sup> (see Appendix V).

#### TRUEHEAVE

TrueHeave data could not be applied to MBES data for all lines from launch 2807 run on April 19, 2010 (DN 109), due to a corrupt file. MBES data were investigated in CARIS Subset mode and data quality from that day was not affected by the lack of TrueHeave.<sup>6</sup>

To enable the application of TrueHeave, some POS/MV TrueHeave files were “fixed” using the *fixTrueHeave.exe* utility from CARIS. Fixed files were assigned an additional \*.fixed suffix. This was performed for launch 2805 data from DN 105 and DN 110 and launch 2806 data from DN 104.

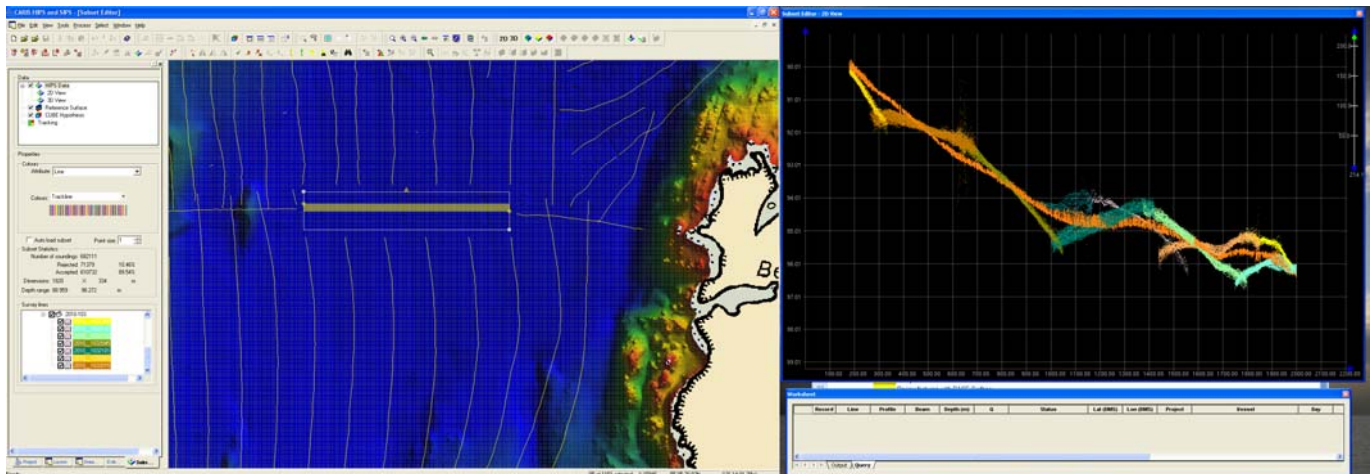
#### SOUND VELOCITY

On DN 110, evening processors applied the sound speed profile files nearest in distance in time within two hours to the 200 kHz lines acquired by launch 2806 instead of nearest in distance within time three hours as stated in the acquisition log. This did not appear to adversely affect the data.

Also on DN 110, launch 2807 was unable to retrieve a complete download for sound velocity cast 2010\_111\_005257. Velocipy would not parse this cast, no max depth was recorded, and it was not listed in the concatenated file. This also did not appear to adversely affect the data.<sup>7</sup>

#### ROLL

A systematic roll bias is present in the 200 kHz lines from launch 2805. The roll bias was examined in CARIS subset editor and the vertical misalignments are within the total allowable vertical uncertainty.<sup>8</sup> Due to the a mechanical problem with launch 2805’s davit, a new roll calibration test could not be performed to remeasure the 200 kHz roll bias for subsequent correction. An example of the most egregious roll artifact from launch 2805 and agreement with a crossline from launch 2806 is illustrated in Figure 6 below.



**Figure 6: Crossline Agreement Between Launch 2805 Mainscheme Data (upside down “V”s) and Launch 2806 crossline (orange) within TVU**

### DESIGNATED SOUNDINGS

Designation of soundings followed procedures as outlined in section 5.1.1.3 of the NOS Hydrographic Surveys Specifications and Deliverables (HSSD) dated April 2010.

Survey H12178 requires three designated soundings to accurately represent the seafloor. A 50-centimeter resolution surface was created around Mary Island and on the east side of Annette Island nearshore in lieu of excessive designated soundings.<sup>9</sup>

### B.2.5 Accuracy Standards

All data meet the data accuracy specifications as stated in the HSSD.<sup>10</sup> Based on a review of the IHO Order one and two layers in CARIS HIPS and SIPS, the total propagated uncertainty of the finalized surface nodes are within the total allowable vertical and horizontal uncertainty specifications for their associated depth.<sup>11</sup>

### B.3 Corrections to Echo Soundings

Data reduction procedures for survey H12178 conform to those detailed in the DAPR.

### B.4 Data Processing

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as final tide and sound velocity application is noted in the H12178\_Data\_Log spreadsheet. All datalogs are submitted digitally in the Separates I folder.

Finalized surfaces were combined at 8-meter and 16-meter resolutions for cleaning and review. By combining these resolutions, additional fliers were identified and cleaned out that the Hydrographer would not have been able to detect without the combined surfaces.

Data processing procedures for survey H12178 conform to those detailed in the DAPR. Data were processed initially using CARIS HIPS & SIPS v7.0, Service Pack 1, and Hotfix 4, Notebook v3.1 Hotfix 2, and BathyDatabase v2.3 in conjunction with version 2 of the NOAA object catalog support files. During the course of survey H12178, processing computer systems were updated to CARIS HIPS & SIPS v7.0, Service Pack 1, and Hotfix 5 and CARIS HIPS & SIPS v7.0, Service Pack 2, and Hotfix 3. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE (Combined Uncertainty and Bathymetry Estimator) Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

**TPU VALUES:**

The survey specific parameters used to compute TPU in CARIS for H12178 are listed in Table 4.

<b>Tide values:</b>	Measured	0.01 m	Zoning	0.01m
<b>Sound Speed Values:</b>	Measured	1.00 m/s	Surface	0.50 m/s

**Table 4: Survey Specific CARIS TPE Parameters**

**CUBE SURFACES:**

The CARIS HIPS BASE (Bathymetry Associated with Statistical Error) surfaces delivered with H12178 and their associated resolutions are listed in Table 5. All field sheet extents were adjusted using the *Base 16 Calculator* tool to ensure coincident nodes among all bathymetric surfaces regardless of the field sheet in which they are contained given the standard surface resolutions of one, two, four, eight, and sixteen meters. A 50-centimeter surface was created around Mary Island and the east side of Annette Island to reduce the number of necessary designated soundings. The NOAA CUBE parameters mandated in the HSSD were used for the creation of all CUBE BASE surfaces in Survey H12178.<sup>12</sup>

The surfaces have been reviewed where noisy data, or ‘fliers’ are incorporated into the gridded solution causing the surface to be shallower or deeper than the true seafloor. Where these spurious soundings cause the gridded surface to be shallower or deeper than the reliably measured seabed by greater than the maximum allowable TVU at that depth, the noisy data have been rejected and the surface recomputed.

<b>Fieldsheet Name</b>	<b>Surface Name</b>	<b>Depth Ranges (m)</b>	<b>Resolution (m)</b>
H12178	H12178_1m		1
	H12178_2m		2
	H12178_4m		4
	H12178_8m		8
	H12178_16m		16
	H12178_1m_Final_0to22	0-22	1
	H12178_2m_Final_0to44	20-44	2
	H12178_4m_Final_40to88	40-88	4
	H12178_8m_Final_80to176	80-176	8
	H12178_16m_Final_160+	160+	16
	H12178_Combined_16m	All	16

H12178_A	H12178_A_50cm		0.5
	H12178_A_50cm_Final_0to20	0-20	0.5
H12178_B	H12178_B_50cm		0.5
	H12178_B_50cm_Final_0to20	0-20	0.5

**Table 5: Depth Ranges, Resolutions, and CUBE Parameters**

### C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H12178 can be found in the *OPR-O193-FA-10 Horizontal and Vertical Control Report*, submitted under separate cover. A summary of horizontal and vertical control for this survey follows.

#### C.1 Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential correctors from the U.S. Coast Guard beacon at Annette Island (323 kHz) were used during real-time acquisition and were the sole method of positioning of detached positions (DP) and bottom samples as there is currently no functionality for applying SBET files to these types of data.

The Post Processing Kinematic method (PPK) is the primary method of horizontal positioning of MBES soundings on H12178. Correctors from a GPS base station established on horizontal control mark SOUTH TWIN RESET on South Twin Island were used for post processing all vessel-day POSMV files. Single Best Estimate of Trajectory(SBET) files were applied to all MBES data in CARIS HIPS. SBETs were not applied to launch 2807 data on DN 109 because POSMV data were not logged that day. The SBET files also were not applied to two very short lines 2010F\_1042155 and 2010F\_1042209 acquired on launch 2806 on DN109 due to a Reson system failure and reboot during acquisition. These lines were retained for holiday coverage. A text record of the CARIS Output window after the SBET and SMRMSG files were applied in CARIS is included in the Global Navigation Satellite System (GNSS) data folder.

For further detail regarding the processing and quality control checks performed see the H12178\_POSPAC\_Processing\_Log.xls spreadsheet located in the SBET folder with the GNSS Data. See also the *OPR-O193-FA-10 Horizontal and Vertical Control Report*, submitted under separate cover.

#### C.2 Vertical Control

The vertical datum for this project is Mean Lower Low Water (MLLW) as specified in the Project Instructions. The operating National Water Level Observation Network (NWLON) primary tide station at Ketchikan, AK (945-0460) served as control for datum determination and as the preliminary source for water level correctors for survey H12178.

*Fairweather* personnel installed a tide gauge at the tertiary station listed below in Table 6. 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	Gauge #	S/N
Custom House Cove	945-0296	Tertiary 30 Day	April 12, 2010	May 23, 2010	14	2444 4 Paros

**Table 6: Tide Gauge Information**

Refer to the *OPR-O193-FA-10 Horizontal and Vertical Control Report* for further information about the tide station.

A request for delivery of final approved tides for survey H12178 was forwarded to N/OPS1 on May 28, 2010 in accordance with the FPM. A copy of the submitted request package is included in Appendix IV.<sup>13</sup>

As per the Project Instructions and final tide note, all data were reduced to MLLW using final, approved water levels from the Custom House Cove station (945-0296) by applying tide file 9450296.tid and time and height correctors through the zone corrector file H12178CORF.zdf. **It will not be necessary for the 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 section 4.5 of the FPM and section 8.1.3-D.1 of the HSSD, utilizing CARIS HIPS and SIPS 7.0 software program.

Survey H12178 was compared with the following charts listed in Table 7.<sup>14</sup> There were no new changes within the survey area.

NOAA Chart Number	Chart Scale	Edition Number	Edition Date	Updated with Notice to Mariners through
17434	1:80,000	13 <sup>th</sup> Ed.	July 1, 2007	January 30, 2010 (5/10)

**Table 7 : NOAA Charts compared with Survey H12178**

#### D.1.1 Chart 17434

Depths from survey H12178 generally agreed within one to two fathoms with depths on chart 17434.<sup>15</sup>

#### D.1.2 Chart Comparison Recommendations

The Hydrographer has determined that bottom coverage requirements have been met and data accuracy meets requirements specified by the HSSD. **All soundings from H12178 are adequate to supersede prior surveys in their common areas.**<sup>16</sup>

## **D.2 Automated Wreck and Obstruction Information System (AWOIS) Investigations**

There was one AWOIS item located within the limits of H12178. The AWOIS item number 53903 consisted of two unknown submerged obstructions located at the mouth of Cascade Inlet. These items were disproved by 200% MBES coverage within their search radii. It is recommended that the two submerged obstructions from AWOIS item 53903 be removed from the chart.<sup>17</sup> All AWOIS items were addressed and are included in the H12178\_Final\_Feature\_File and included in the H12178\_AWOIS\_Report included in Appendix II.<sup>18</sup>

## **D.3 Dangers to Navigation**

There were no dangers to navigation found within the survey limits.<sup>19</sup>

## **D.4 Additional Results**

### **D.4.1 Shoreline/Feature Verification**

*Fairweather* personnel conducted limited shoreline verification and reconnaissance at times near predicted negative tides within the survey limits on April 28, 2010 (DN 118) and May 4, 2010 (DN124). Annotations, information, and diagrams collected on DP forms and boat sheets during field operations are scanned and included in the digital Separates I folder. Shoreline verification procedures for survey H12178 conform to those detailed in the DAPR, with the exceptions as discussed below.

Five ledges and one reef from the current editions of charts 17434 that were not depicted by the source shoreline data were digitized in CARIS Notebook with S-57 attribution into the H12178\_Feature\_File.hob file, to be displayed for field verification.<sup>20</sup>

Within the survey area, several charted ledges, MLLW and MHW lines are in conflict with the contemporary hydrographic data. In accordance with agreements reached with the Hydrographic Branches, these ledge area features were not further processed by field personnel.<sup>21</sup>

### **D.4.2 Shoreline/Feature Data Processing**

Source features collected or edited by the field have source indication (SORIND) and source date (SORDAT) attribute fields populated to reflect the survey number (US,US,graph H12178) and final survey date 20100524. Unmodified source shoreline features were left with their original SORIND and SORDAT values.

### **D.4.3 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 Composite Source File and charts.<sup>22</sup>

#### D.4.4 Aids to Navigation

Survey H12178 included two (2) aids to navigation (ATONs). Both of the ATONs were found to serve their intended purposes.<sup>23</sup>

The Twin Island Light ATON was positioned as assigned by the Project Instructions. The position is listed in the Survey Feature Report included in Appendix II. The Mary Island Light was not positioned during the course of this survey. An ATON Report was submitted to [aton.report@noaa.gov](mailto:aton.report@noaa.gov) for all assigned ATONs within the survey area of OPR-O193-FA-10. See the *OPR-O193-FA-10 Horizontal and Vertical Control Report* regarding further information on positioned ATONs.

#### D.4.5 Overhead Features

There are no overhead features within the limits of survey H12178.<sup>24</sup>

#### D.4.6 Submarine Cables and Pipelines

There are no submarine cables or pipelines charted within the limits of H12178, and none were detected by the survey.<sup>25</sup>

#### D.4.7 Ferry Routes

There are no ferry routes charted within the limits of survey H12178, and none were observed to be operating in the area.<sup>26</sup>

#### D.4.8 Bottom Samples

Twenty bottom samples were collected on April 28, 2010 (DN 118) and May 4, 2010 (DN 124) and are included as seabed classifications along with the other S-57 features in the Notebook H12178\_Final\_Feature\_File.hob file.<sup>27</sup>

### D.5 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 2010	April 9, 2010	N/CS34
Data Acquisition and Processing Report 2010	August 9, 2010	N/CS34
Horizontal and Vertical Control Report for OPR-O193-FA-10	July 26, 2010	N/CS34
Tides and Water Levels Package for OPR-O193-FA-10	May 25, 2010	N/OPS1
ATON Report for OPR-O193-FA-10	September 5, 2010	N/CS2



**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

October 15, 2010

MEMORANDUM FOR:

Gary Nelson  
Chief, Pacific Hydrographic Branch

FROM:

CAPT David O. Neander, NOAA  
Commanding Officer

David O. Neander  
2010.10.14  
19:44:21 -08'00'

TITLE:

Approval of Hydrographic Survey H12178,  
OPR-O193-FA-10

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H12178 in accordance with the Hydrographic Manual, Fourth Edition; Field Procedures Manual, April 2009; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for April 2009. 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:

ENS Leigh Hedgepeth  
2010.10.14 18:46:26 Z

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ENS Leigh Hedgepeth  
Survey Manager

Digitally signed by Briana Welton  
DN: cn=Briana Welton, o=NOAA Ship  
Fairweather, ou=NOAA,  
email=briana.welton@noaa.gov, c=US  
Date: 2010.10.14 23:49:55 Z

---

LT Briana Welton  
Field Operations Officer

Digitally signed by Lynnette  
V. Morgan  
Date: 2010.10.15 02:02:18 Z

---

CST Lynnette V. Morgan  
Chief Survey Technician

Attachment





### **Revisions and corrections performed during office processing and certification**

<sup>1</sup> Concur.

<sup>2</sup> Concur.

<sup>3</sup> H12178 junctions with surveys H12177 and H12224. A common junction will be made during compilation of those surveys.

<sup>4</sup> Concur. Holidays were examined in Caris HIPS and SIPS 7.0 and there were no navigationally significant features were found. Chart as depicted in the HCell.

<sup>5</sup> Concur.

<sup>6</sup> Concur. Data is adequate and within specifications despite the lack of True Heave. It is recommended that the data from H12178 supersede charted data within the common area.

<sup>7</sup> Concur. Data is adequate and within specifications despite Sound velocity corrections and the profile selection method. It is recommended that the data from H12178 supersede charted data within the common area.

<sup>8</sup> Concur. Data is adequate and within specifications despite the roll errors. It is recommended that the data from H12178 supersede charted data within the common area.

<sup>9</sup> Concur with clarification. Designated soundings were used as appropriate to the scale of the chart.

<sup>10</sup> Concur.

<sup>11</sup> Concur.

<sup>12</sup> A 16 meter combined surface was created during the Survey Acceptance Review and was used for the cartographic compilation of this survey.

<sup>13</sup> Tide note is appended to this report.

<sup>14</sup> Concur with clarifications. During office processing and certification the following chart was also used:

Chart	Scale	Edition	Edition Date	Date Local Notice to Mariners Applied Through
17428	1:40,000	10 <sup>th</sup>	April 1 <sup>st</sup> , 2007	04/16/2011

<sup>15</sup> Concur.

<sup>16</sup> Concur.

<sup>17</sup> Concur with the hydrographers recommendations to remove AWOIS Item #53903 . The AWOIS item was disproved with 100% multibeam. A bluenote was added to the HCell.

<sup>18</sup> AWOIS report is attached to this report.

<sup>19</sup> Concur.

<sup>20</sup> Concur. Chart features as depicted in the HCell.

<sup>21</sup> Concur.

<sup>22</sup> Concur with clarification. The submitted hob files were used in the compilation of HCell H12178. During compilation, some modifications were made to accommodate chart scale. Chart features as depicted in the HCell.

<sup>23</sup> Concur. Chart ATONs as per latest ATONIS information.

<sup>24</sup> Concur.

<sup>25</sup> Concur.

<sup>26</sup> Concur.

<sup>27</sup> Concur with clarification. 19 bottom samples from the field are included in the HCell to be charted. One bottom sample from the field was removed because it was inside a rocky seabed area and 32 bottom samples were imported from the chart to the HCell to be retained.

# H12178 AWOIS Report

**Registry Number:** H12178  
**State:** Alaska  
**Locality:** Behm Canal, AK  
**Sub-locality:** Felice Strait  
**Project Number:** OPR-O193-FA-10  
**Survey Date:**

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17434	13th	07/01/2005	1:80,000 (17434_1)	USCG LNM: 04/21/2009 (11/03/2009) CHS NTM: 11/19/1993 (09/25/2009) NGA NTM: 10/04/2003 (11/14/2009)
17420	28th	03/01/2007	1:229,376 (17420_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
501	12th	11/01/2002	1:3,500,000 (501_1)	[L]NTM: ?
530	32nd	06/01/2007	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

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	AWOIS	[no data]	[no data]	[no data]	---

**1 - DR\_AWOIS**

## 1.1) AWOIS #53903 - OBSTRUCTION

### No Primary Survey Feature for this AWOIS Item

**Search Position:** 55° 09' 36.0" N, 131° 21' 28.5" W  
**Historical Depth:** [None]  
**Search Radius:** 200  
**Search Technique:** SWMB  
**Technique Notes:** [None]

#### History Notes:

UNKNOWN--TWO UNKNOWN SUBM OBSTRUCTIONS LOCATED AT THE MOUTH OF CASCADE INLET AT SCALED (NAD83) POSITIONS LAT 55/09/37.31N LONG 131/21/32.19W LAT 55/09/34.38N LONG 131/21/24.42W. OBSTRUCTIONS FIRST APPEARED ON CHART IN APPROX 1990. (LAH 01/11/2010)

### Survey Summary

**Charts Affected:** 17434\_1, 17420\_1, 16016\_1, 531\_1, 501\_1, 530\_1, 50\_1

#### Remarks:

AWOIS 53903 - Charted obstruction point disproved, entire search radius covered with complete MBES (200%).

### Feature Correlation

Address	Feature	Range	Azimuth	Status
H12178_AWOIS	AWOIS # 53903	0.00	000.0	Primary

### Hydrographer Recommendations

Remove feature from chart and chart surveyed soundings in area.

### S-57 Data

[None]

### Feature Images

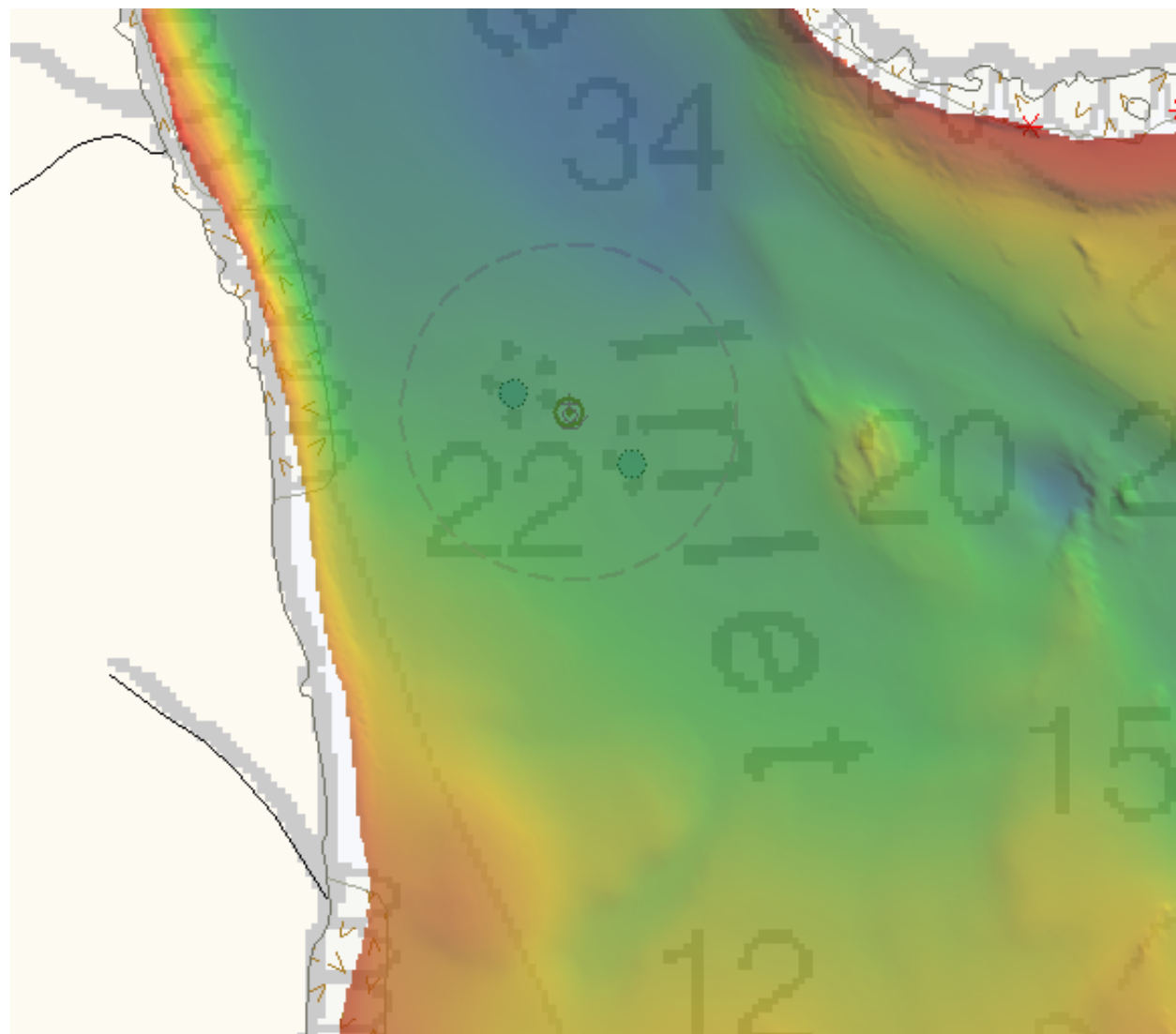


Figure 1.1.1



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** July 22, 2010

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-O193-FA-2010  
**HYDROGRAPHIC SHEET:** H12178

**LOCALITY:** Felice Strait, Behm Canal, AK  
**TIME PERIOD:** April 13 - May 19, 2010

**TIDE STATION USED:** 945-0296 Custom House Cove, AK  
Lat. 55° 5.77'N Long. 131° 13.33' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 4.369 meters

**REMARKS: RECOMMENDED ZONING**  
Use zone(s) identified as: SA67A, SA73, and SA75

**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).

**Peter J. Stone**

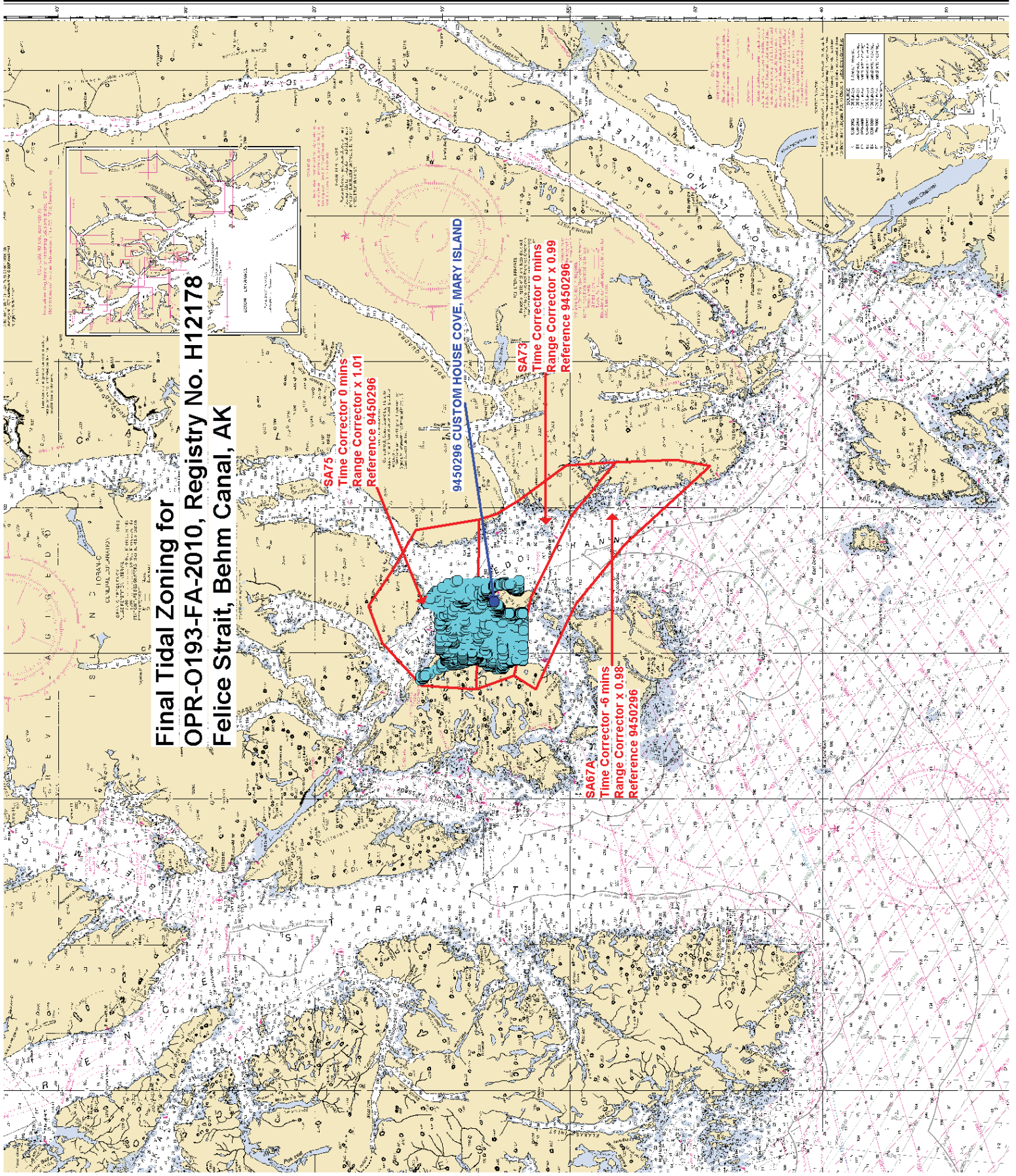
Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=NOAA/NOS/CO-OPS,  
ou=Oceanographic Division,  
email=peter.stone@noaa.gov, c=US  
Date: 2010.07.23 15:15:26 -04'00'

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CHIEF, OCEANOGRAPHIC DIVISION



**Final Tidal Zoning for  
OPR-0193-FA-2010, Registry No. H12178  
Felice Strait, Behm Canal, AK**



**H12178 HCell Report**  
Fernando Ortiz, Physical Scientist  
Pacific Hydrographic Branch

**1. Specifications, Standards and Guidance Used in HCell Compilation**

HCell compilation of survey H12178 used:

Office of Coast Survey HCell Specifications: Version: 4.0, 2 June, 2010.  
HCell Reference Guide: Version 2.0, 2 June, 2010.

**2. Compilation Scale**

Depths and features for HCell H12178 were compiled to the largest scale raster charts shown below:

Chart	Scale	Edition	Edition Date	NTM Date
17428	1:40,000	10 <sup>th</sup>	04/01/2007	04/16/2011
17434	1:80,000	13 <sup>th</sup>	07/01/2005	03/26/2011

The following ENC's were also used during compilation:

Chart	Scale
US5AK47M	1:40,000
US4AK4SM	1:80,000
US4AK49M	1:80,000

**3. Soundings**

A survey-scale sounding (SOUNDG) feature object layer was built from the 16-meter Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at 1:10,000 for chart 17428 and 20,000 for 17434 chart at survey scale using a Radius Table file with values shown in the table, below.

Shoal Limit (m)	Deep Limit (m)	Radius (mm)
-5	10	2
10	20	3
20	50	3.5
50	500	4

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



#### 4. Depth Contours

Depth contours at the intervals on the largest scale chart are included in the \*\_SS HCell for MCD raster charting division to use for guidance in creating chart contours. The metric and fathom equivalent contour values are shown in the table below.

Chart Contour Intervals in Fathoms from Chart 17428 and 17434	Metric Equivalent to Chart Fathoms, Arithmetically Rounded	Metric Equivalent of Chart Fathoms, with NOAA Rounding Applied	Fathoms with NOAA Rounding Applied	Fathoms with NOAA Rounding Removed for Display on H12178_SS.000
0	0	0.2286	0.000	0
3	5.4864	5.715	3.125	3
5	9.144	9.3726	5.125	5
10	18.288	18.517	10.125	10
20	36.576	37.9476	20.750	20
50	91.44	92.812	50.750	50
100	182.88	184.252	100.750	100

With the exception of the zero contours included in the \*\_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography, as all other features in the \*\_CS file and soundings in the \*\_SS have been. This may result in conflicts between the \*\_SS file contours and HCell features at or near the survey limits. Conflicts with M\_QUAL, and SBDARE objects, and with DEPCNT objects representing MLLW, should be expected. HCell features should be honored over \*\_SS.000 file contours in all cases where conflicts are found.

#### 5. Meta Areas

The following Meta object areas are included in HCell H12178:

M\_QUAL  
M\_CSCL

The Meta area objects were constructed on the basis of the limits of the hydrography.

#### 6. Features

Features addressed by the field units are delivered to PHB where they are deconflicted against the hydrography and the largest scale chart. These features, as well as features to be retained from the chart and features digitized from the Base Surface, are included in the HCell. The geometry of these features may be modified to emulate chart scale per the HCell Reference Guide on compiling features to the chart scale HCell.

#### 7. Spatial Framework

##### 7.1 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.

## 7.2 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

See the HCell Reference Guide for details of conversion from metric to charting units, and application of NOAA rounding.

## 7.3 S-57 Object Classes

The CS HCell contains the following Object Classes:

\$CSYMB	Blue Notes (points) —Notes to the MCD chart Compiler
*DEPCNT	Modified surveyed MLLW
*LNDARE	Land area
*LNDELV	Land elevation
M_CSCL	Compilation scale of data
M_QUAL	Data quality Meta object
OBSTRN	Obstruction area objects
SBDARE	Bottom samples, reefs, ledges, and rocky seabed areas
SOUNDG	Soundings at chart scale density
*UWTROC	Rock features

\* The M\_QUAL is adequate for NDB product searches except for features in these object classes which reside outside the M\_QUAL limits.

The SS HCell contains the following Object Classes:

DEPCNT	Generalized contours at chart scale intervals (See table under section 4.)
SOUNDG	Soundings at the survey scale density (See table under section 3.)

## 8. Data Processing Notes

There were no significant deviations from the standards and protocols given in the HCell Specification and HCell Reference Guide.

## 9. QA/QC and ENC Validation Checks

H12178 was subjected to QA checks in S-57 Composer prior to exporting to the metric HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to 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.

## 10. Products

### 10.1 HSD, MCD and CGTP Deliverables

H12178_CS.000	Base Cell File, Chart Units, Soundings and features compiled to 1:40,000 and 1:80,000
H12178_SS.000	Base Cell File, Chart Units, Soundings and Contours compiled to 1:10,000 and 1:20,000
H12178_DR.pdf	Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items
H12178_outline.gml	Survey outline
H12178_outline.xsd	Survey outline

### 10.2 Software

CARIS HIPS Ver. 7.0	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.1	Creation of soundings and bathy-derived features, creation of the 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, SP 1	Validation of the base cell file.
Northport Systems, Inc., Fugawi View ENC Ver.1.0.0.3	Independent inspection of final HCells using a COTS viewer.

## **11. Contacts**

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

Fernando Ortiz  
Physical Scientist  
Pacific Hydrographic Branch  
Seattle, WA  
206-526-6859  
[Fernando.ortiz@noaa.gov](mailto:Fernando.ortiz@noaa.gov).

APPROVAL SHEET  
H12178

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

The survey and associated records have been inspected with regard to survey coverage, delineation of the depth curves, development of critical depths, S-57 classification and attribution of soundings and features, cartographic characterization, and verification or 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.