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. **H11824**

Registry No.

LOCALITY

State **Alaska**

General Locality **Ernest Sound**

Sublocality **Vicinity of Vixen Inlet**

2009

CHIEF OF PARTY

CAPT Douglas Baird

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DATE

NOAA FORM 77-28
(11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTRY No

H11824

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: Alaska

General Locality: Ernest Sound

Sub-Locality: Vicinity of Vixen Inlet

Scale: 1:20,000 Date of Survey: May 2009

Instructions dated: 12 May 2009 Project No.: OPR-O119-FA-09

Vessel: NOAA Ship FAIRWEATHER

Chief of party: CAPT Douglas Baird

Surveyed by: CST Lynn Morgan, LT Matthew Ringel, ST Tami Beduhn

Soundings by echo sounder, hand lead, pole: MBES

Graphic record scaled by: N/A

Graphic record checked by: N/A Automated Plot: N/A

Verification by: *Atlantic Hydrographic Branch*

Soundings in fathoms feet at MLW MLLW: Meters at Mean Lower Low Water

REMARKS: All times are UTC. The purpose of this survey was to provide contemporary surveys to update National Ocean Service (NOS) nautical charts.

Red, bold, italic remarks made during office processing

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537

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Descriptive Report to Accompany Hydrographic Survey H11824

Project OPR-O119-FA-09
Ernest Sound & Eastern Passage, AK
Scale 1:20,000
May 2009
NOAA Ship *Fairweather*
Chief of Party: Captain Douglas D. Baird, Jr., NOAA

A. AREA SURVEYED

The survey area was located in Ernest Sound within the sub-locality of the Vicinity of Vixen Inlet. This survey corresponds to Sheet Q in the sheet layout provided with the Project Instructions, as shown in Figure 1 below.

Data acquisition was conducted from May 6 to May 28, 2009 (DN 126 to DN 149).

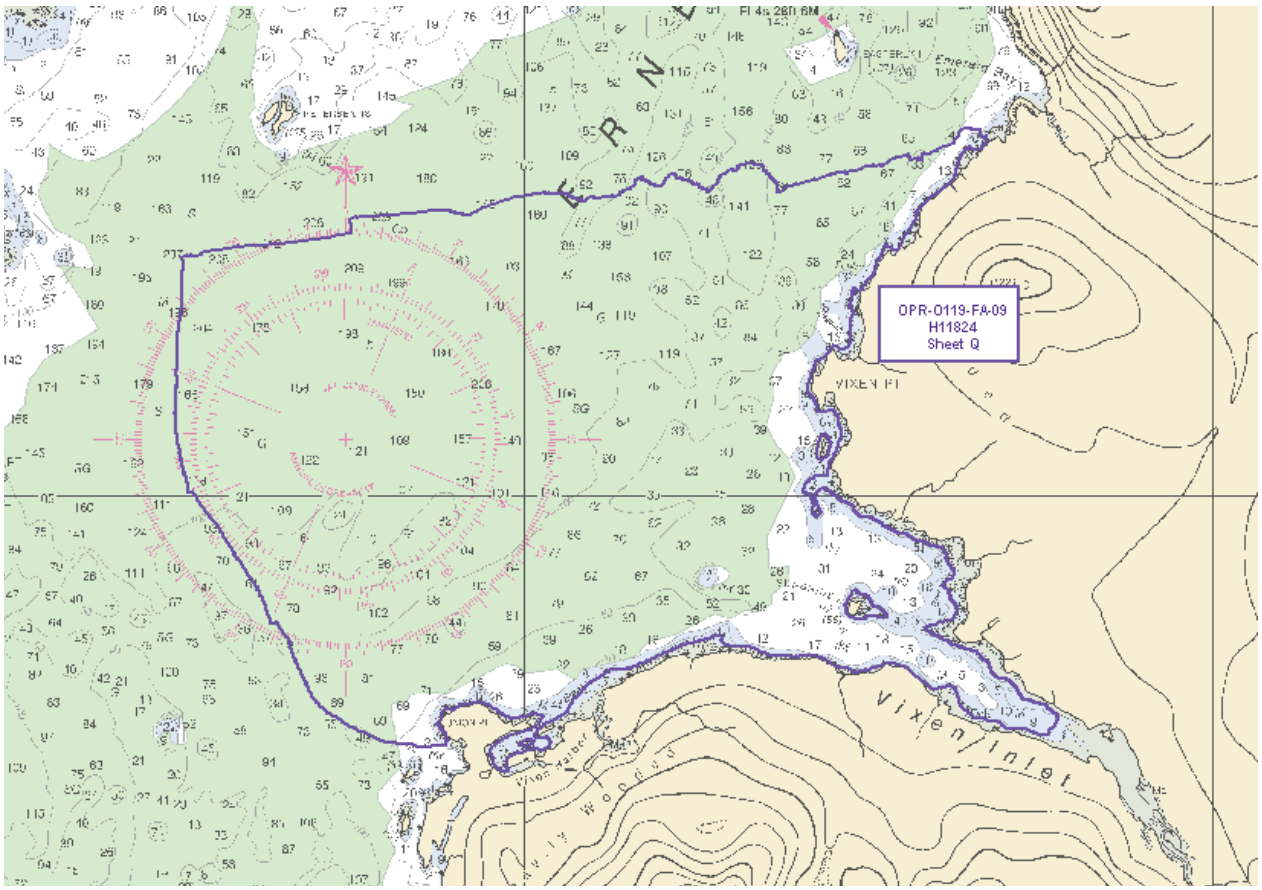

Figure 1: H11824 Survey Outline

One-hundred percent multibeam echosounder (MBES) coverage was obtained in the survey area to at least the 8-meter curve in the survey area. Data were acquired as close to shore as safely possible. Additional coverage was obtained in order to determine least depths over features or shoals.

Normally, limited shoreline verification would be conducted seaward of the Navigable Area Limit Line (NALL), as per section 3.5.5.3 of the Field Procedures Manual April 2009 (FPM). However, due to the lack of a shoreline window, about 70% of the near-shore main scheme bathymetric data for H11824 were acquired by half-stepping shoreward. Shoreline features were given S-57 attribution and included for submission in Notebook .hob files.

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

MAIN SCHEME - Mileage		
	0	**Single Beam MS**
	289.99	**Multibeam MS mileage**
	72.59	FAIRWEATHER S-220
	125.24	Launch 1010
	92.16	Launch 1018
	0	**SideScan MS**
	289.99	**Total MS**
CROSSLINE - Mileage		
	0	**Single Beam XL**
	28.99	**Multibeam XL**
	11.62	FAIRWEATHER S-220
	9.22	Launch 1010
	8.15	Launch 1018
	28.99	**Total XL**
OTHER		
	0	**Developments/AWOIS - Mileage**
	15.37	**Shoreline/Nearshore Investigation - Mileage**
	43	**Total # of Investigated Items**
	18	**Total Bottom Samples**
	22.26	**Total SNM**
5/6/09-5/9/09, 5/14/09, 5/20/09-5/28/09		**Specific Dates of Acquisition**
126, 127, 128, 129, 134, 140, 141, 142, 143, 144, 145, 146, 147, 148		**Specific Dn#s of Acquisition**

Table 1: H11824 Survey Statistics

B. DATA ACQUISTION 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* 2009 *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-O119-FA-09*, dated March 16, 2009 and change 1* dated May 12, 2009.

Submitted with H-Cell deliverable **Submitted with original field records

B1. Equipment and Vessels

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

	FAIRWEATHER	Launch 1010	Launch 1018	Skiff 1706	Ambar 2302
Hull Registration Number	S220	1010	1018	1706	2302
Builder	Aerojet-General Shipyard	The Boat Yard, Inc.	The Boat Yard, Inc.	MonArk	Marine Silverships, Inc
Length Overall	231 feet	28’ 10”	28’ 10”	17’	23’
Beam	42 feet	10’ 8”	10’ 8”	7’	9’ 4”
Draft, Maximum	15’ 6”	4’ 0” DWL	4’ 0” DWL	1’ 3”	1’ 4”
Cruising Speed	12.5 knots	24 knots	24 knots	20 knots	22 knots
Max Survey Speed	6 knots	6 knots	6 knots		
Primary Echosounder	RESON 8111 & RESON 8160	RESON 8101	RESON 8101 & RESON 8125		
Sound Velocity Equipment	SBE 19plus, MVP 200, SVP70	SBE 19plus	SBE19plus & Odom Digibar Pro		
Attitude & Positioning Equipment	POS/MV V4	POS/MV V4	POS/MV V4		
Type of operations	MBES	MBES	MBES	Shoreline, Shore Stations	Shoreline, Shore Stations

Table 2: Vessel Inventory

All vessel configurations used during data acquisition complied with the DAPR. *

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B2. Quality Control

Crosslines

Multibeam crosslines for this survey totaled 28.99 linear nautical miles (lnm), comprising 9.1% of the 289.99 lnm of total MBES hydrography, therefore meeting the 4% requirement stated in the NOS Hydrographic Surveys

Specifications and Deliverables dated April 2009. Both main scheme and crossline mileage are summarized in Table 1 above.

Surface differencing in Fledermaus was used to assess crossline agreement with main scheme. A 16-meter resolution surface of the crosslines filtered to 45° off nadir was compared to a 16-meter resolution surface of the main scheme lines. Figure 2 below shows a standard deviation of 1.904 meters and an average difference of 0.050 meters between the differenced surfaces. Figure 3 includes a visual of the differences spatially. Ninety-five percent of all data measured a vertical difference between -2.97 meters and 2.96 meters.

As seen in Figure 3, there is some disagreement between main scheme and crosslines in the central north and northwest corner of the survey. The colors from the surface differencing tiff display white as agreement, cool colors as crosslines shoaler than main scheme, and warmer colors as crosslines deeper than main scheme.

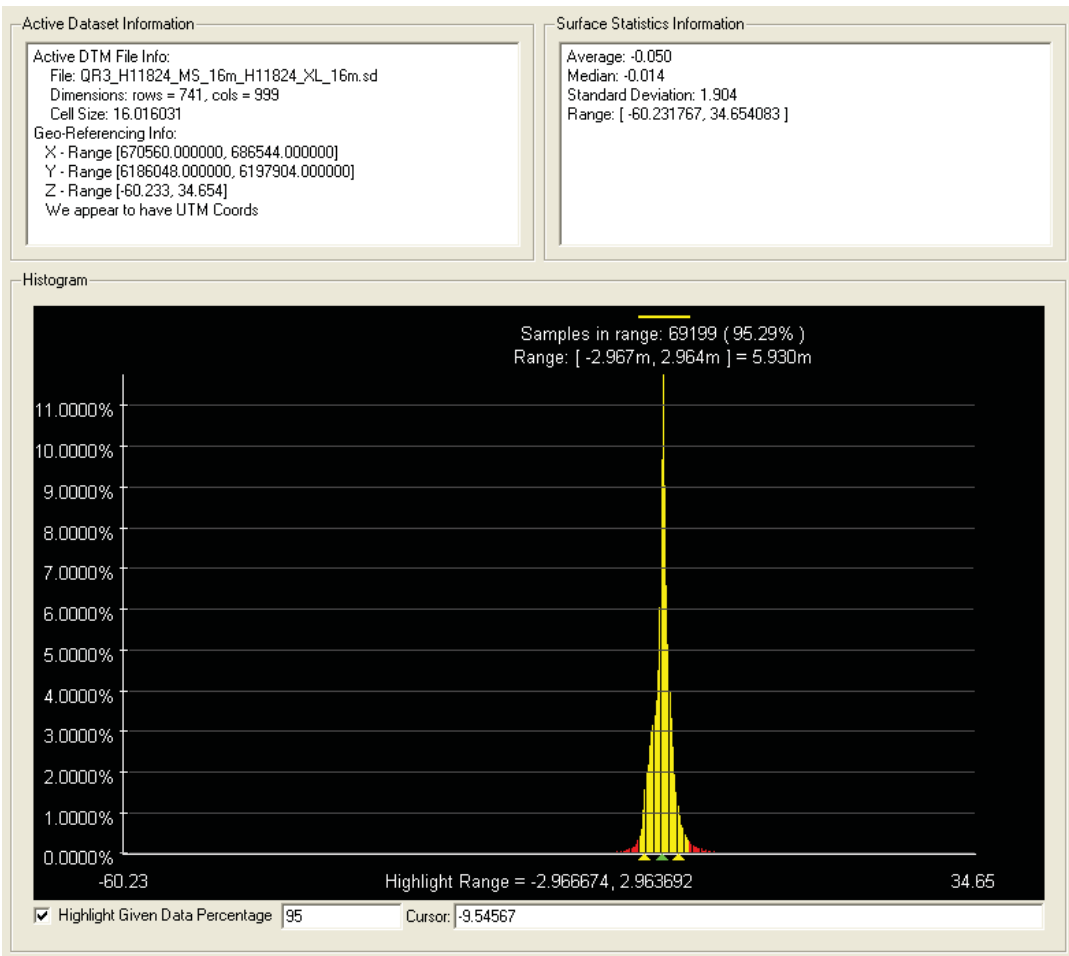


Figure 2: Crossline and main scheme differencing statistics

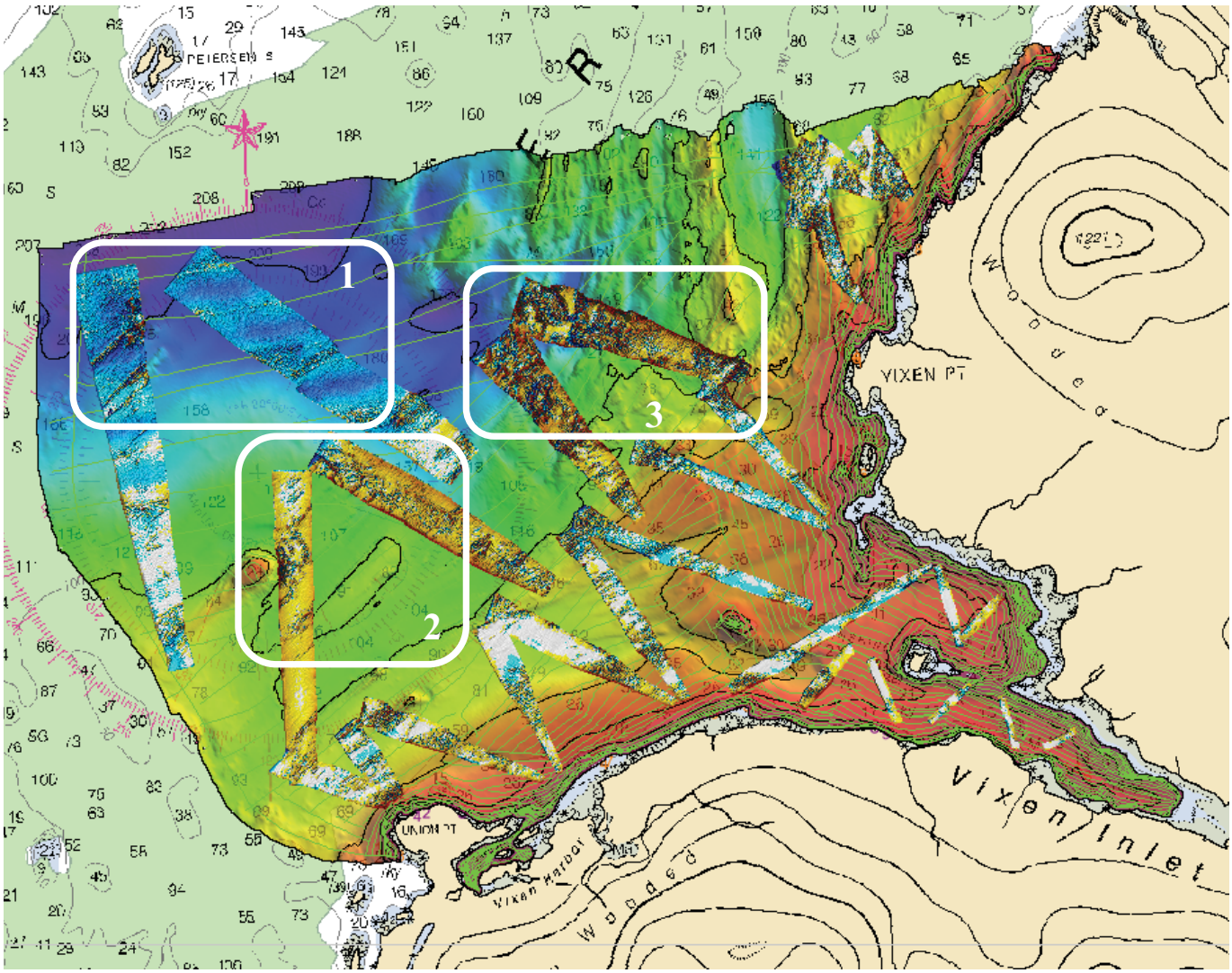


Figure 3: Crossline and main scheme differences (white indicates agreement, warm colors indicate a XLs shoaler than main scheme and cool colors indicate XLs are deeper).

The first and second areas of main scheme and crossline disagreement is due to an offset with the Reson 8160 as displayed below in Figures 4 and 5. The Reson 8160 soundings tend to be between 0.64 meters and 1.64 meters deeper than the Reson 8111 survey wide, but are still within IHO Order 2 specifications for 100 – 400 meters as stated in 5.1.1.1 of the NOS Hydrographic Surveys Specifications and Deliverables 2009.

The third area of disagreement is the same as area two in that Reson 8160 crosslines are slightly deeper than Reson 8111 main scheme, yet it has the added complication of having been acquired across steeper and varying slopes.

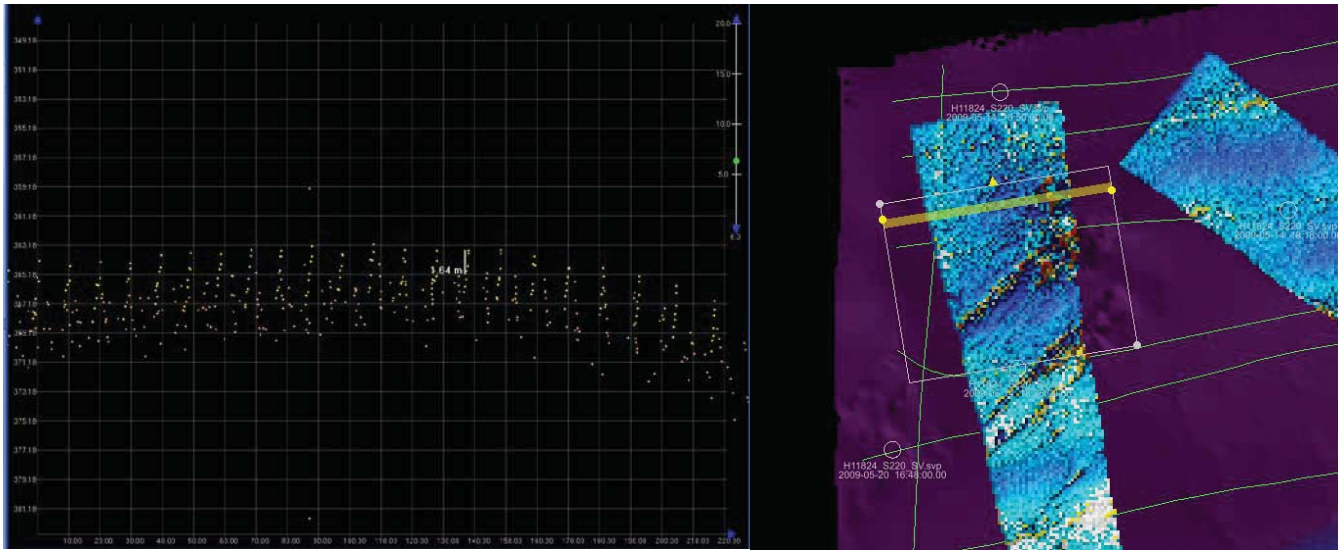


Figure 4: Subset Editor shows the Reson 8111 crossline approximately 1.64m shoaler than the 8160 main scheme in 360 meters of water.

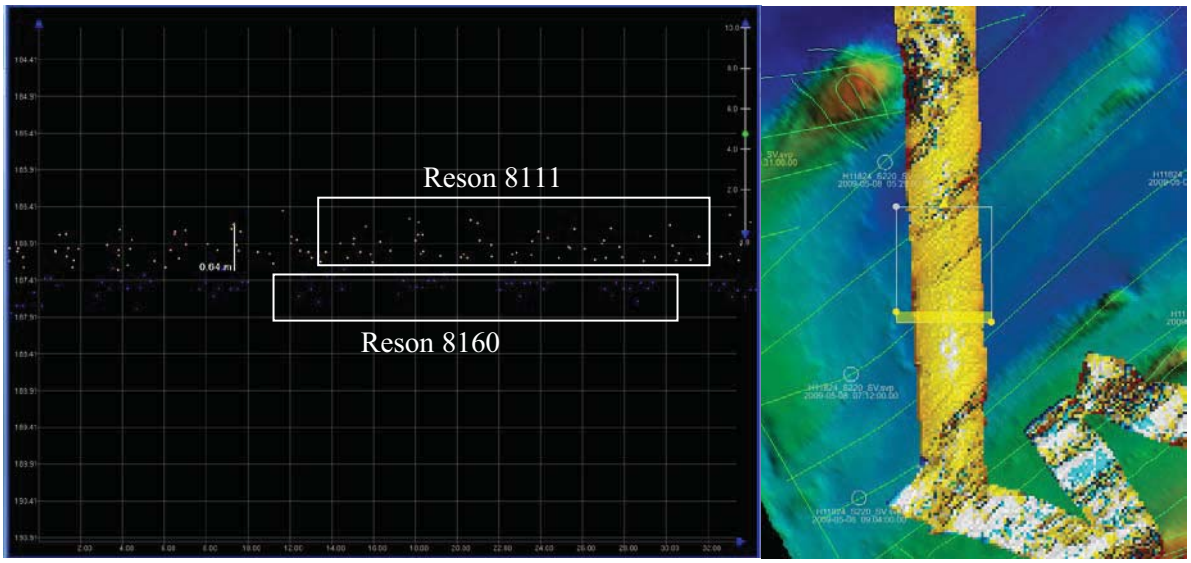


Figure 5: Subset Editor shows the Reson 8160 crossline approximately 0.64m deeper than the 8111 main scheme in 180 meters of water.

Junctions

Survey H11824 junctions with H11823 and H11825, which are Sheets P and R of the same project. This survey also junctions with H11822 from 2008. The area of overlap between the sheets was reviewed in Caris Subset Editor for consistency and data were found to be in general agreement within one meter. The sheet limits and area of overlap for Sheets H11822, H11823, H11824, and H11825 are shown in Figure 6.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H11822	1:10,000	Oct-Nov 2008	Ernest Sound- Southern Canoe Passage to Emerald Bay
H11823	1:10,000	May 2009	Ernest Sound- Stone Island to Onslow Point
H11825	1:20,000	May 2009	Ernest Sound- Vicinity of Union Bay

Table 3: Junction Surveys

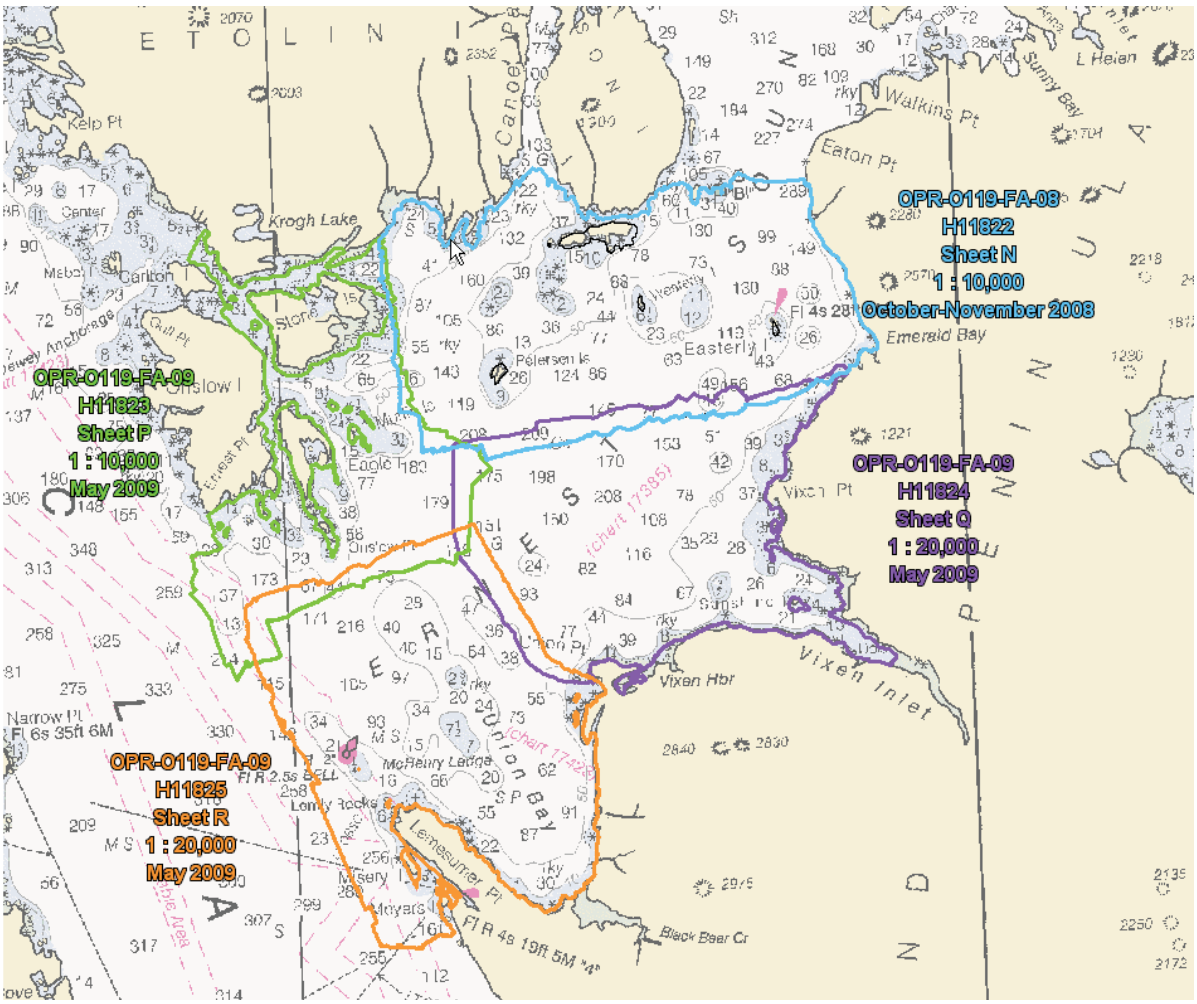


Figure 6: Junction Between H11822, H11823, H11824, and H11825

Survey H11822

Sounding agreement between H11822 and H11824 data was compared using surface differencing in Fledermaus. The junction area ranges in depth from 15 to 400 meters and surface statistics indicate that for the junction area the average deviation in sounding values was 0.705 meters, with a median difference of 0.683 meters. Visual review by the hydrographer confirms that overall agreement between surveys is within one meter.

Survey H11823

Sounding agreement between H11823 and H11824 data was compared using surface differencing in Fledermaus. This junction area ranges in depths from 240 to 400 meters, and surface statistics indicate that for the junction area the average difference in sounding values is 1.090 meters, with a median difference of 0.870 meters. Visual review by the hydrographer confirms that overall agreement between surveys is within one meter.

Survey H11825

Sounding agreement between H11825 and H11824 data was compared using surface differencing in Fledermaus. This junction ranges in depths from 10 to 250 meters, and surface statistics indicate that for the junction area the average deviation in sounding values is 0.688 meters, with a median difference of 0.554 meters. Visual review by the hydrographer confirms that overall agreement between surveys is within one meter.

Quality Control Checks

MBES quality control checks were conducted as discussed in the quality control section B of the DAPR*.
Submitted with H-Cell deliverable

DENSITY ANALYSIS

A Python script was written aboard *Fairweather* by ST Weston Renoud to compute the percentage of nodes populated with at least five soundings from the finalized BASE surfaces to determine if data density requirements are met. All surfaces meet the density requirement. Table 4 shows the statistical results of this analysis. In addition, the raw output from the Python script is found in Appendix 5*.
Submitted with H-Cell deliverable

Finalized Surface Resolution	Depth Range	Percentage of nodes with five or more soundings
1m	0 - 23	95.5%
2m	18 - 40	98.3%
4m	30 - 80	98.4%
8m	65 - 160	98.7%
16m	135 Plus	97.8%

Table 4: Five Soundings Per Node Density Analysis

COVERAGE ASSESSMENT

Coverage and holiday assessment was performed through the use of interpolated surfaces. Interpolation was useful in the low density areas created between Reson 8125 lines seen in Figures 7 and 8 from insufficient overlap. The following surfaces were interpolated to help assess holidays.

Fieldsheet Name	Surface Name	Depth Ranges (m)	Resolution (m)
H11824	H11824_8m_Final_65to160	65 - 160	8
H11824_SE	H11824_SE_1m_Final_0to23	0 - 23	1
H11824_SE	H11824_SE_2m_Final_18to40	18 - 40	2
H11824_NE	H11824_NE_1m_Final_0to23	0 - 23	1

Table 5: Surfaces Interpolated for Holiday Assessment

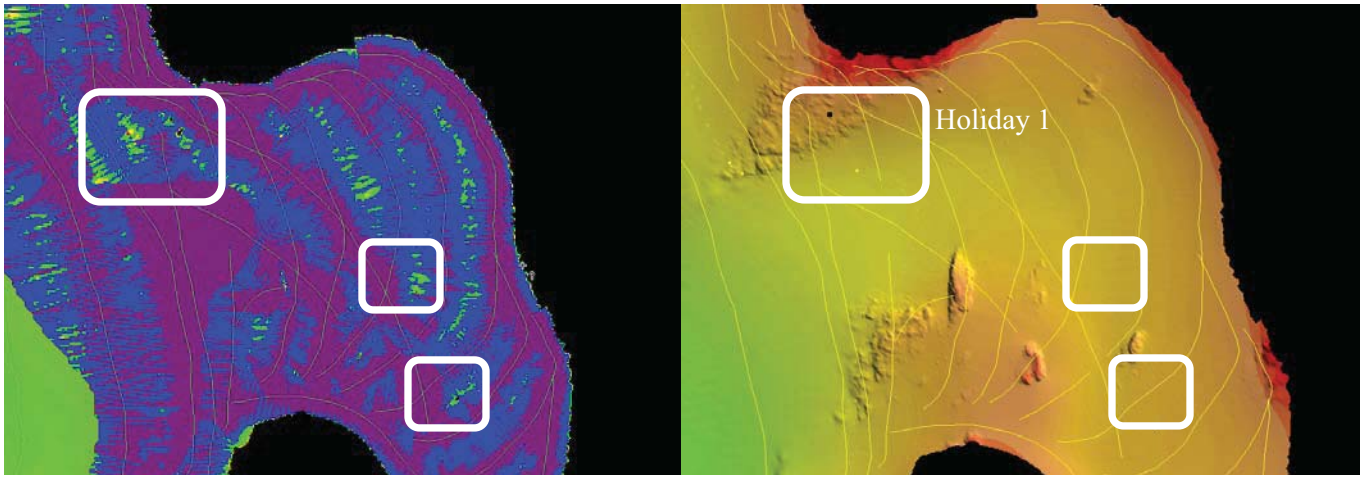


Figure 7: Finalized 1m and 2m low density areas vs. interpolated 1m and 2m surfaces for holiday assessment.

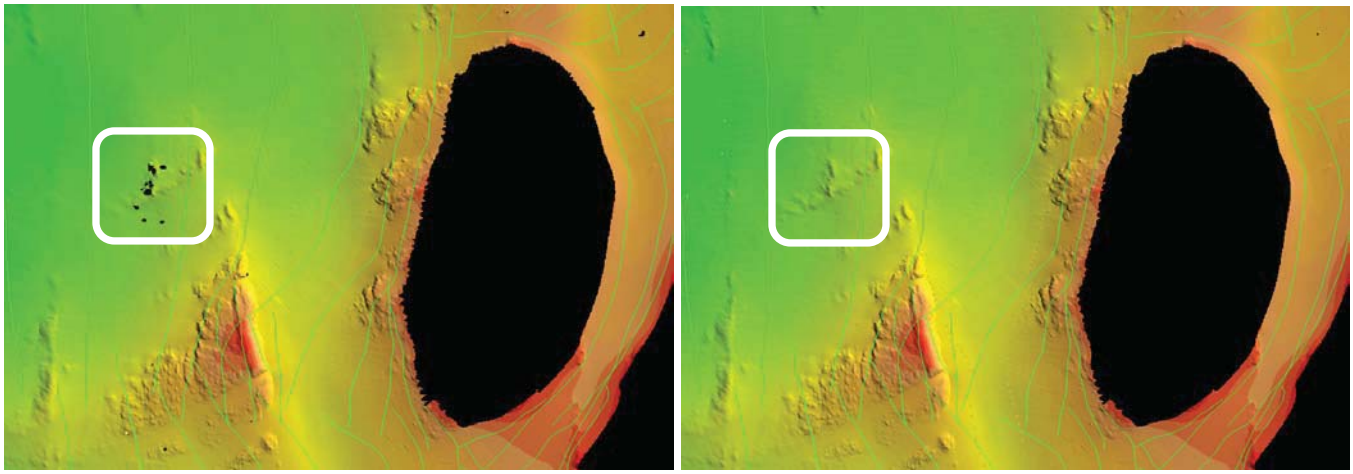


Figure 8: Possible data gaps between 1m and 2m finalized surfaces resolved with interpolation.

The pseudo side scan data was examined in Caris HIPS in areas where surface coverage gaps are larger than three nodes across and no navigationally significant items were found. All least depths were represented by the surface. The four holidays found in the coverage are listed below in Table 6.

Latitude	Longitude	Backscatter Reviewed	Least Depth Captured
55-50-39.57N	132-05-44.92W	2009Q_1461926 and 2009Q_1462035	Yes
55-51-29.99N	132-05-15.93W	no SS available	Yes
55-51-54.80N	132-04-55.72W	2009Q_1442241	Yes
55-52-11.91N	132-04-25.68W	2009Q_1442211	Yes

Table 6: Holiday Listing

TRUEHEAVE:

POSPac TrueHeave data were applied to all MBES data for survey H11824.

To enable the application of TrueHeave data some POSPac files were "fixed" using the *fixTrueHeave.exe* utility from Caris. Fixed files were assigned an additional *.fixed suffix. This "fix" was utilized for data acquired using Launch 1010 on the following days: DN 142, DN 143, and DN 146.

SOUND VELOCITY

A real-time surface sound speed data input for the Reson 8160 on DN 140 was not available. A surface sound speed value of 1483 meters per second was used real-time for the sonar to use in its beam-forming process, and the acquired processed data were found to be in general agreement with surrounding data acquired using other sonar systems. Remaining sound velocity artifacts have been evaluated by the Hydrographer and are within specifications in their respective depth ranges.

Sound Velocity artifacts are present in the data acquired in the vicinity of Vixen Inlet. The lines acquired with Launch 1010 on DN 141 and DN 142 inside Vixen Inlet were filtered 65/65 port/starboard using a Caris HIPS swath filter. The filtering reduced much of the outer beam effect on the one-meter resolution surface and remaining surface offsets are now within specification. Some of the filtered data were re-accepted to fill any holidays created in lower density areas.

DESIGNATED SOUNDINGS

Designation of soundings followed procedures as outlined in section 5.1.1.3 of the NOS Hydrographic Surveys Specifications and Deliverables (HSSDM) dated April 2009.
Thirteen soundings were designated in H11824 so that the CUBE (Combined Uncertainty and Bathymetry Estimator) surface would honor the shoal points of features. Additionally, four soundings in the Caris HIPS critical sounding layer were flagged as "outstanding" to signify features which were imported into Caris Notebook to assist with shoreline feature positioning. ***Concur with clarification. There are 7 designated soundings and 5 outstanding soundings submitted.***

ACCURACY STANDARDS

Survey H11824 exceeds the data accuracy specifications as stated in the HSSDM. Figure 9 shows the IHO coverage map. Ninety-nine percent of the bathymetric data meets IHO Orders 1 and 2 for the corresponding depth ranges. In the Fledermaus histograms below (Figures 10 and 11) values greater than zero meet or exceed the specification.

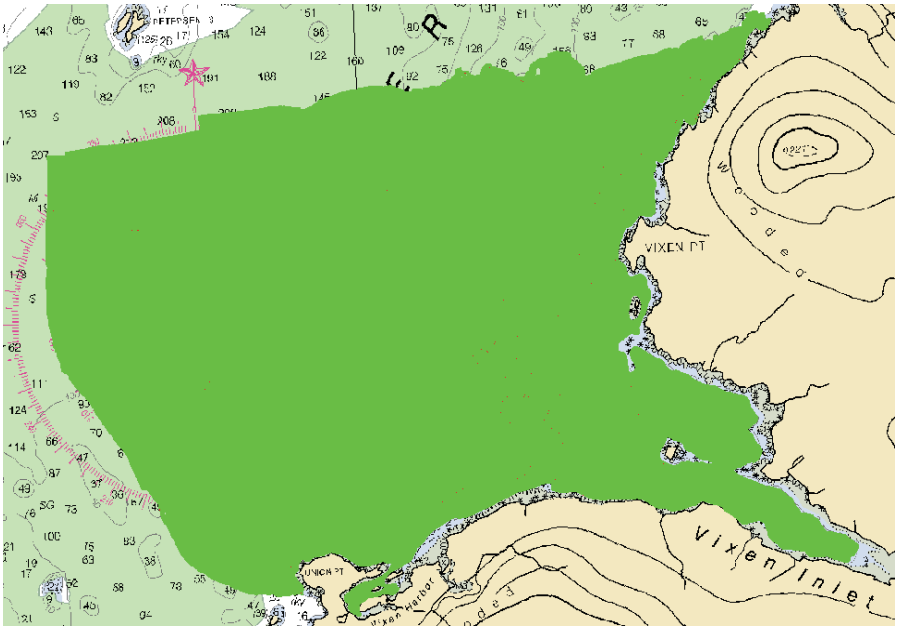


Figure 9: IHO Orders 1 & 2 Pass (green) or Fail (red)

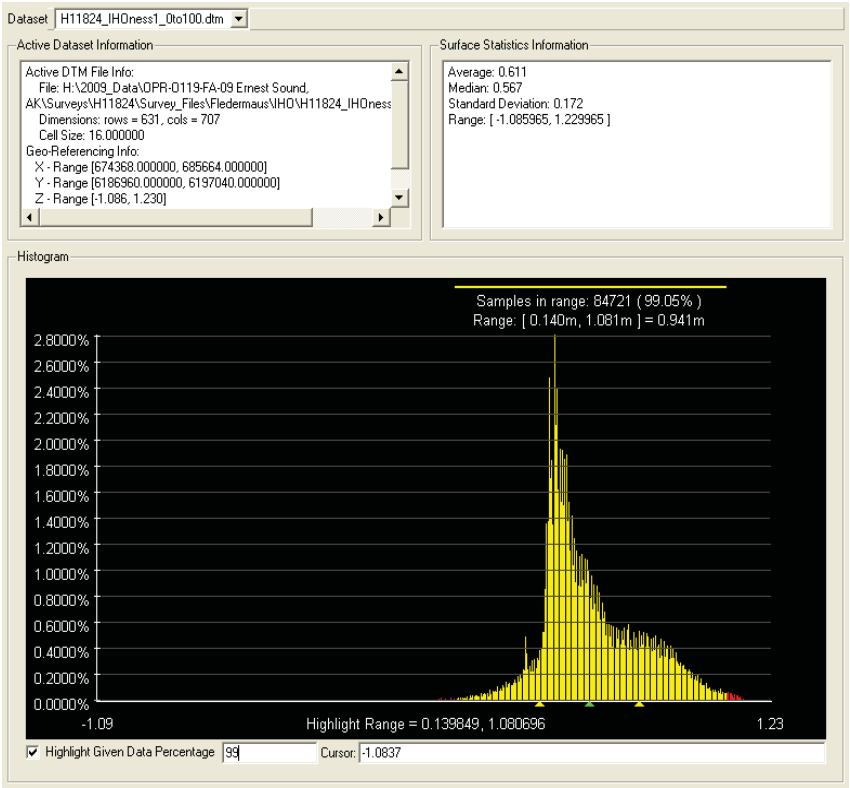


Figure 10: IHO Order 1 Histogram- Values above zero indicate IHO specifications were met or exceeded.

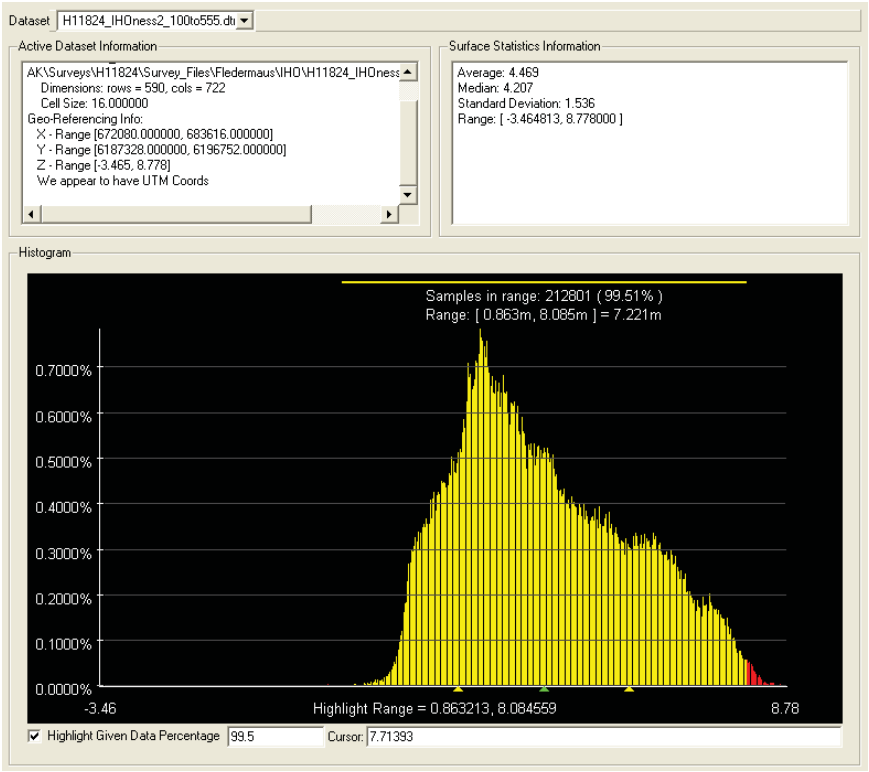


Figure 11: IHO Order 2 Histogram- Values above zero indicate IHO specifications were met or exceeded.

B3. Data Processing

Initial data acquisition and processing notes are included in the acquisition and processing logs. Additional processing such as the application of final, approved water levels and sound velocity is most accurately tracked in the survey-wide query in the Reviewer_Qry tab of the H11824_Data_Log_v9 spreadsheet**. All of the logs are included with the digital Separates I*.
Submitted with H-Cell deliverable **Submitted with original field records

Data processing procedures for survey H11824 conform to those detailed in the DAPR*.
Submitted with H-Cell deliverable

Data were processed using Caris HIPS & SIPS v6.1, Service Pack 2, and Hotfix 8. Additional processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any deviations from the processing procedures outlined in the DAPR* are discussed below in Tables 4 & 5.
Submitted with H-Cell deliverable

Data Quality Factors Affecting Data Processing Procedures
In the following cases alternative data processing techniques that deviate from those described in the DAPR* were used in order to address data quality issues: ***Submitted with H-Cell deliverable***

- The north and southwest edges of the survey were filtered to 60degrees to remove the low sounding density areas outside the sheet limits for surface density analysis.

- An exception was made to the standard line filtering procedure outlined in the DAPR* for the S220 line 2009XL1282346. The line was collected for a holiday line, but mistakenly named, converted, and filtered 45/45 like a crossline. The line was not analyzed in final processing and survey review as a crossline but was instead included in the survey as a main scheme line. Surface density was adequate around the line so there was no need to undo the filter. ***Submitted with H-Cell deliverable***

- As stated in the Sound Velocity section, the data from Launch 1010 on DN 141 and DN 142 (the part inside Vixen Inlet) were filtered 65/65, port/starboard to help correct sound velocity artifacts visible in the Caris HIPS CUBE BASE surface.

- Initial directed editing and cleaning for H11824 was informed by the finalized surfaces. The finalized surfaces were then combined at both the eight and 16-meter resolutions for final editing, analysis, and field review. Combining at finer resolutions was necessary because additional noise appeared that the hydrographer was unable to detect otherwise.

- There are still unresolved vertical offsets for the Reson 8125 system of approximately 0.3m. An example of the offset can be seen below in Figure 12.

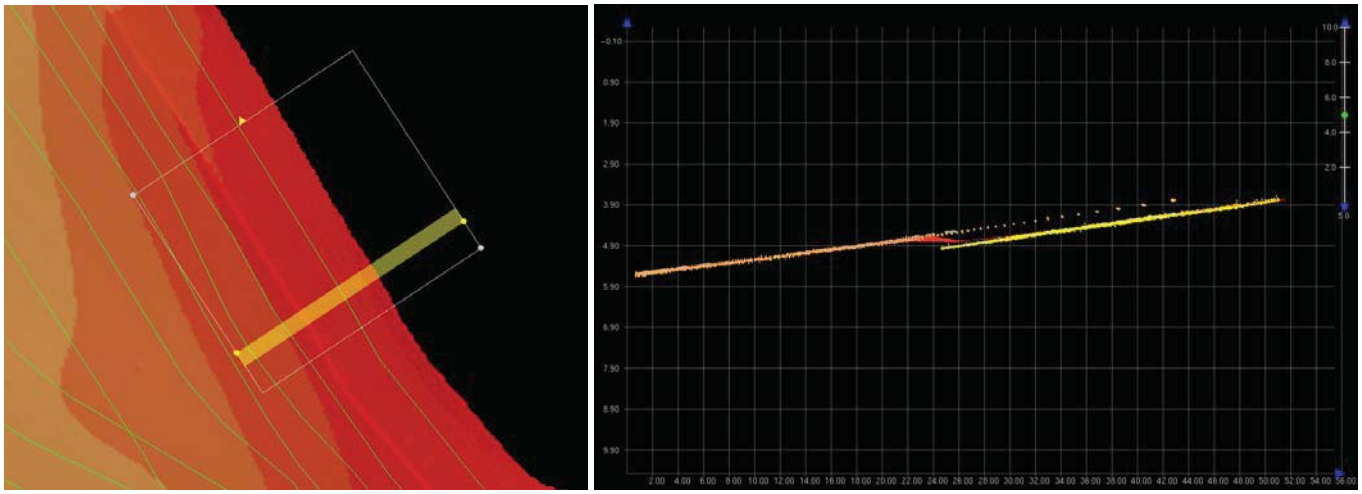


Figure 12: Vertical offset of Reson 8125 data (yellow).

- There is a low density area at nadir seen below in Figure 13. The area was evaluated by the hydrographer and deemed not to be a holiday. The low density area occurred because the Reson 8101 was not tuned correctly.

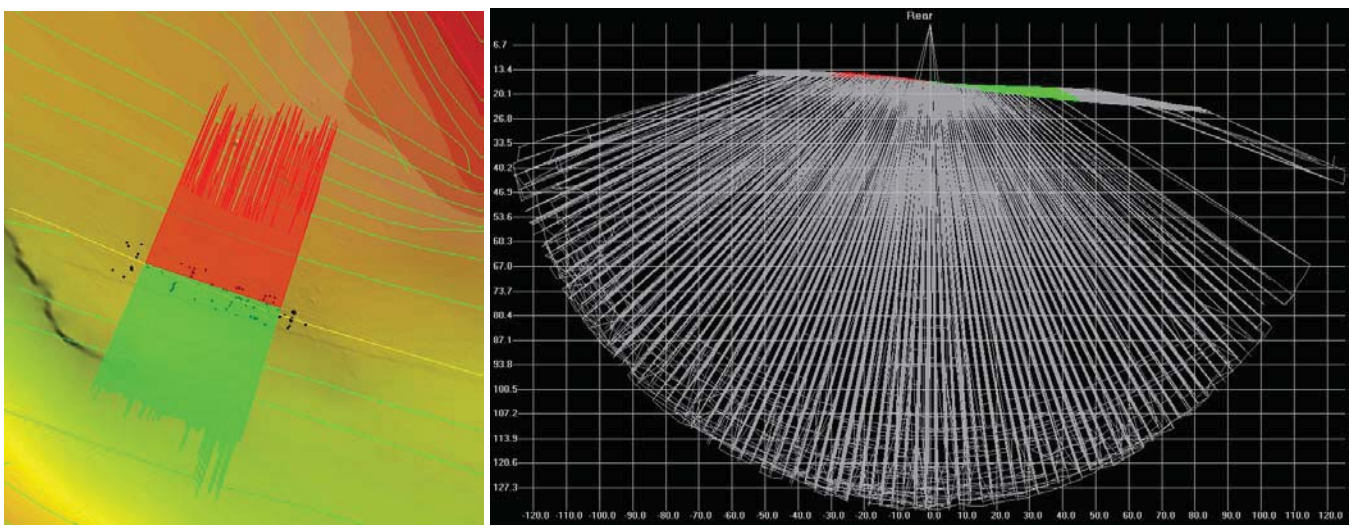


Figure 13: Insufficient tuning of the Reson 8101 on a soft bottom.

TPE Values

The survey specific parameters used to compute TPE in Caris for H11824 are listed in Table 7.

Tide values:	Measured	0 m	Zoning	0.07 m
Reson 8101 Sound Speed Values:	Measured	1.00 m/s	Surface	1.00 m/s
Reson 8125 Sound Speed Values:	Measured	1.00 m/s	Surface	0.50 m/s
Reson 8111 & 8160 Sound Speed Values:	Measured	0.50 m/s	Surface	0.50 m/s

Table 7: Survey Specific CarisTPE Parameters

CUBE Surfaces

The Caris HIPS CUBE BASE surfaces created and the associated resolutions are listed below in Table 5. Four fieldsheets were used to cover the survey area. Fieldsheet H11824_QC is the only fieldsheet to cover the entire survey area. Due to the density of the data, only 8-meter and 16-meter surfaces could be regularly created in the H11824_QC fieldsheet. The other three fieldsheets H11824_SW, H11824_SE, and H11824_NE are smaller and near the shoreline for the 1-meter, 2-meter, and 4-meter resolution ranges. The five depth ranges were based on the density to support the individual grid sizes, as well as the amount of overlap between surfaces to ensure coverage in areas of steep slope.

The CUBE parameters utilized for creating CUBE BASE surfaces are included in Table 8. The CUBE parameters .xml file is included with digital data in the vessel configuration folder.

Fieldsheet Name	Surface Name	Depth Ranges (m)	Resolution (m)	CUBE Parameters
H11824_QC	H11824_8m	All	8	NOAA_8m
	H11824_16m	All	16	NOAA_16m
	H11824_8m_Final_65to160	65-160	8	
	H11824_16m_Final_135to999	135 Plus	16	
H11824_SW	H11824_SW_1m	All	1	NOAA_1m
	H11824_SW_2m	All	2	NOAA_2m
	H11824_SW_4m	All	4	NOAA_4m
	H11824_SW_1m_Final_0to23	0-23	1	
	H11824_SW_2m_Final_18to40	18-40	2	
	H11824_SW_4m_Final_30to80	30-80	4	
H11824_SE	H11824_SE_1m	All	1	NOAA_1m
	H11824_SE_2m	All	2	NOAA_2m
	H11824_SE_4m	All	4	NOAA_4m
	H11824_SE_1m_Final_0to23	0-23	1	
	H11824_SE_2m_Final_18to40	18-40	2	
	H11824_SE_4m_Final_30to80	30-80	4	
H11824_NE	H11824_NE_1m	All	1	NOAA_1m
	H11824_NE_2m	All	2	NOAA_2m
	H11824_NE_4m	All	4	NOAA_4m
	H11824_NE_1m_Final_0to23	0-23	1	
	H11824_NE_2m_Final_18to40	18-40	2	
	H11824_NE_4m_Final_30to80	30-80	4	

Table 8: Depth Ranges, Resolutions, and CUBE Parameters

C. HORIZONTAL AND VERTICAL CONTROL

A complete description of horizontal and vertical control for survey H11824 can be found in the *OPR-O119-FA-09 Horizontal and Vertical Control Report**, submitted under separate cover. A summary of horizontal and vertical control for this survey follows. ***Submitted with H-Cell deliverable***

C1. Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential Global Positioning System (DGPS) was the major method of positioning. Differential corrections from the U.S. Coast

Guard beacon at Annette Island (323 kHz) were used primarily. Level Island (295 kHz) differential correctors were utilized during acquisition of Reson 8111 and Reson 8160 data on S220 for DN 140. For further detail see the Acquisition and Processing logs* for the particular day located in Separates I*. ***Submitted with H-Cell deliverable***

Single-base post-processed kinematic (PPK) GPS data were used for positioning data acquired on Launch 1018 for DN 146 due to positioning errors visible in the bathymetric surfaces. For Quality control checks and more information on the base stations established, see the Horizontal and Vertical Control Report* for OPR-O119-FA-09. The remaining offset in the Reson 8125 data is discussed in the Data Processing section of this report. ***Submitted with H-Cell deliverable***

C2. 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 primary source for water level correctors for survey H11824. ***Submitted with original field records***

NOAA Ship *Fairweather* personnel installed two Sutron 8210 "bubbler" tide gauges at the tertiary stations listed below in Table 9. Gauge #10 (S/N 010799) was the gauge used for Magnetic Point. 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. Gauge 12 (S/N 23513) was installed in Vixen Harbor as a temporary gauge. This gauge was installed to assist computation of tide zones in the high-current and restricted waters inside the harbor.

Station Name	Station Number	Type of Gauge	Date of Installation	Date of Removal
Magnetic Point	945-0753	Tertiary 30 Day	April 30, 2009	June 2, 2009
Vixen Harbor	945-0761	Temporary	May 26, 2009	June 2, 2009

Table 9: Tide Gauge Information

Refer to the *OPR-O119-FA-9 Horizontal and Vertical Control Report** for further information about the tide stations. ***Submitted with H-Cell deliverable***

A request for delivery of final approved (smooth) water levels for survey H11824 was forwarded to N/OPS1 on June 1st, 2009 in accordance with the Field Procedures Manual (FPM), dated April 2009. A copy of the request is included in Appendix ***I***V.

All data were reduced to MLLW using final, approved water levels and from station Ketchikan, AK, by applying tide file 9450460.tid and time and height correctors through the Final Zoning corrector file H11824CORF.zdf. It will not be necessary for the Atlantic 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 HSSDM, utilizing Pydro and Mapinfo software programs.

Survey H11824 was compared with the following charts listed in Table 10.

NOAA Chart Number	Chart Scale	Edition Number	Edition Date	Updated with Notice to Mariners through
17385	1:80,000	16th ed	September, 2006	04/18/2009
17420	1:229,376	28th ed	March, 2007	04/18/2009
17423	1:40,000	14th ed	March, 2006	04/18/2009

Table 10: NOAA Charts compared with Survey H11824

Chart 17385

Soundings from survey H11824 generally agree within one to two fathoms of charted depths on chart 17385 with the following exceptions:

- 208 fm charted sounding surveyed 10-15 fathoms shoaler (Figure 14) ***Concur***
- 32 fm charted sounding surveyed at 26 fm (Figure 15) ***Concur.***
- ¾ fm shoal extent portrayed inaccurately. Chart at surveyed extents. (Figure 16) ***Concur with clarification. Submitted UWTROC at location Latitude 55-49.23.29N and Longitude 132-07-14.63W portrays more accurately the shoal within the area.***

Figure 14: Sounding Plot at charted 208 fm sounding

Figure 15: Sounding Plot and Subset around charted 32 fm

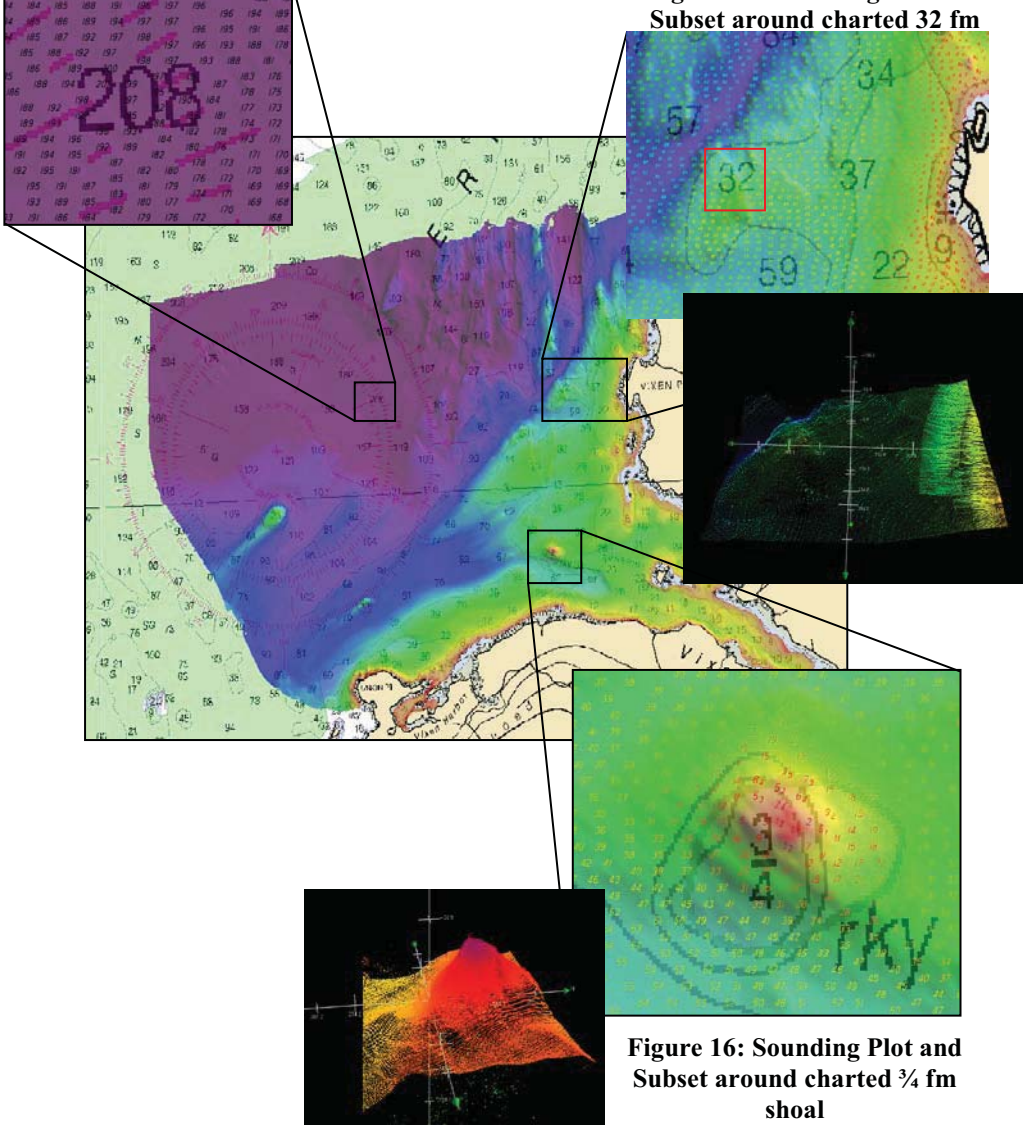


Figure 16: Sounding Plot and Subset around charted ¾ fm shoal

Chart 17420

Depths from survey H11824 generally agree within one to two fathoms with depths on chart 17420 with the following exceptions:

- 208 fm charted sounding surveyed from 170 – 201 fathoms (Figure 17) ***Concur***
- 26 fm charted sounding surveyed at 20 fm (Figure 18) ***Concur***

Figure 17: Sounding Plot of 208 charted sounding

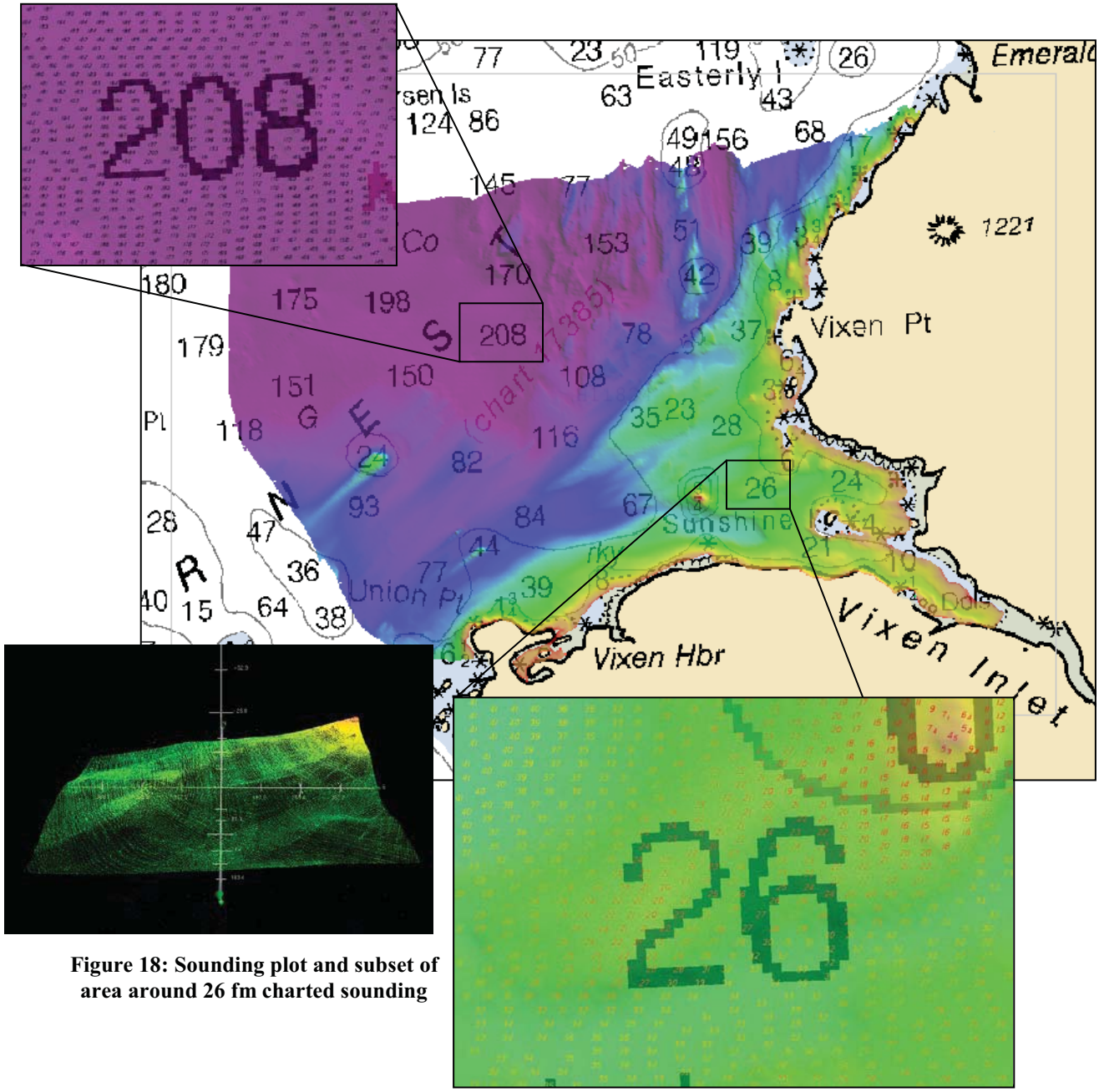


Figure 18: Sounding plot and subset of area around 26 fm charted sounding

Chart 17423

Depths from survey H11824 generally agree within one to two fathoms with depths on chart 17423 with the following exceptions:

- 15 fm to 1 ¾ fm shoal mis-charted. Chart surveyed soundings (Figure 19) ***Concur***

Chart 17423 does not accurately represent Vixen Harbor at the charted scale. It is the recommendation of the Hydrographer that an inset be made on the published chart for Vixen Harbor due to the harbor's narrow, shoal entrance and the harbor's verified use by fishing vessels. Figure 20 depicts how the charted depths do not represent the surveyed area. ***Do not concur. Due to the extremely shoal depths in Vixen Harbor's entrance, the office does not recommend an inset be made due to concern for mariner's safety.***

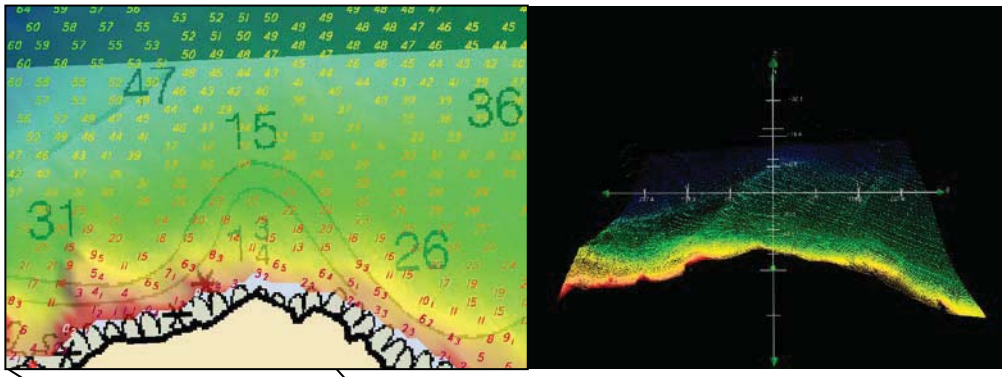


Figure 19: Sounding Plot and Subset around 1 ¾ to 15 fm shoal

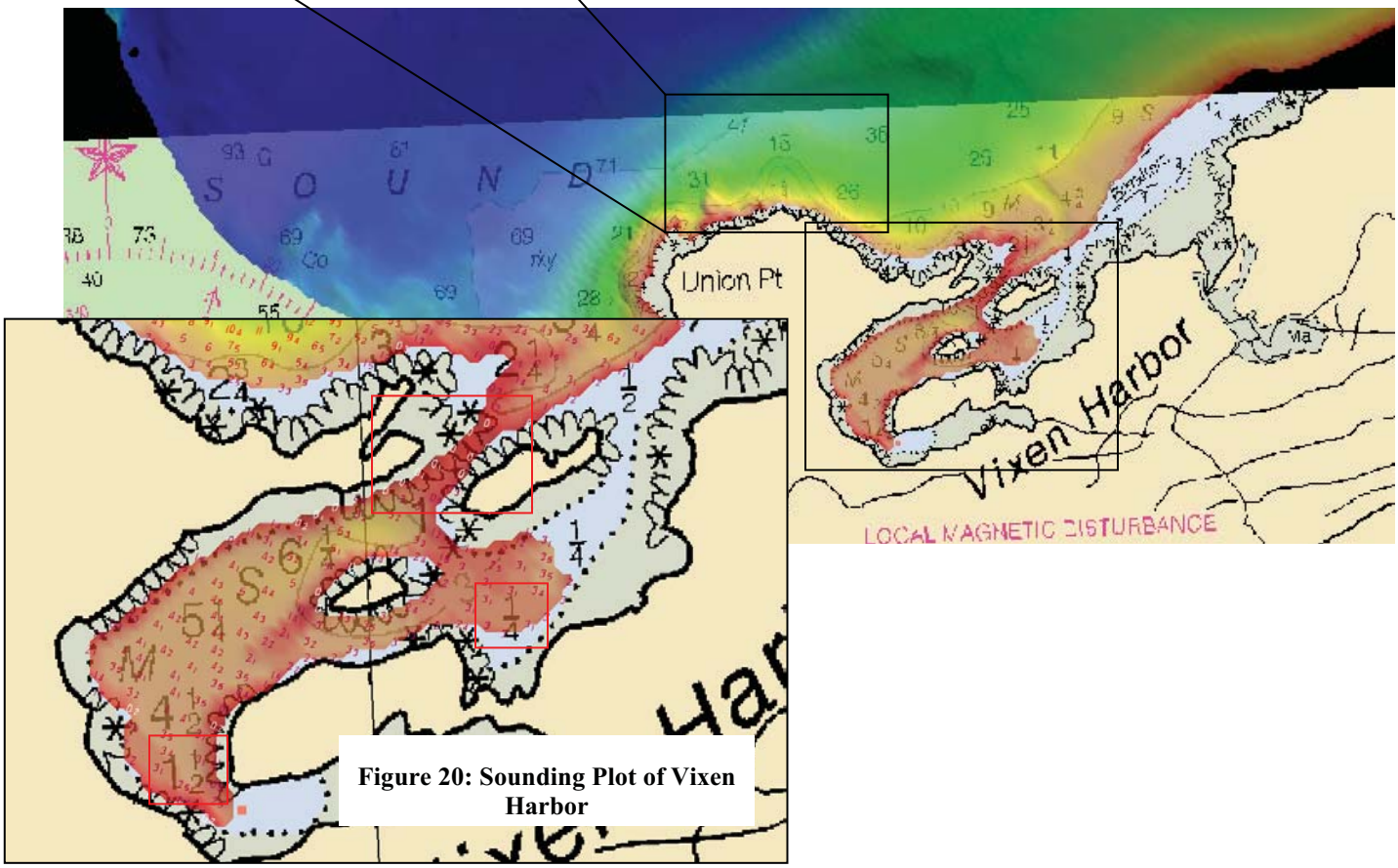


Figure 20: Sounding Plot of Vixen Harbor

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. ***Concur***

Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of H11824. ***Concur***

Dangers to Navigation

There were no dangers to navigation found within the survey limits of H11824. ***Concur***

D.2 Additional Results

Shoreline Source

A composite source file (CSF) in .000 format from HSD's Operations Branch was provided with the Project Instructions**. Shoreline sources that were included in the composite source file included charted features from charts 17423 and 17385, see Table 8. The original file was imported into Caris Notebook , converted to a .hob file, clipped to the sheet limits, and named H11824_Original_Composite_Source.hob** to be included with the deliverables. This file was copied and named H11824_Feature_File.hob** to be utilized during field verification. Additionally, features from the current editions of charts 17423 and 17385 that were not depicted by the source shoreline data were digitized in Caris Notebook with S-57 attribution into the H11824_Feature_File.hob file, to be displayed for field verification. ****Submitted with original field records***

Shoreline Verification

Due to lack of a low water shoreline window in the beginning of the project, near shore MBES hydrographic data was acquired prior to conducting shoreline verification for two-thirds of the survey. Extra caution was taken by the launches "half stepping" into shore for near shore polygons. Half stepping is done by driving along the edge of your real time coverage, so as to never be in un-surveyed water. Boat crews surveyed as close to the four-meter and eight-meter curve as they deemed safe at times near predicted low water, in accordance with the Project Instructions** and section 3.5.5.3 of the FPM. When *Fairweather* personnel were able to conduct limited shoreline verification for the survey, polygons where created for areas where the Navigable Area Limit Line (NALL) or eight-meter curve hadn't been reached . During shoreline verification, detached positions (DPs) were acquired and edits to the daily field H11824_Feature_File_TRX_DnXXX.hob were recorded in Caris Notebook and on paper DP forms and boat sheets. Scanned copies of the DP forms and boat sheets with field annotations are included in the digital Separates I** folder. ****Submitted with original field records***

Chart 17385 (1: 80,000) was the largest scale charts for the survey area. A Mean High Water (MHW) Buffer line, offset 64 meters (0.8 mm at scale of 1:80,000) respectively from the composite source MHW, was used during shoreline verification to determine the NALL. The NALL was determined in the field as the farthest off-shore of either the MHW buffer listed above, the 4-meter depth contour, or the inshore limit of safe navigation. All shoreline features provided in the composite source file seaward of the Navigable Area Limit Line (NALL) were verified or disproved during shoreline operations. Features off-shore of the NALL and not addressed or features of an ambiguous nature were flagged with a marker note for further clarification.

Shoreline Data Processing

Acquired and edited positions during shoreline verification operations were processed in Caris Notebook. Features that required tide correction were processed using the Load Tide function in Caris Notebook. Approved water levels were applied to tide corrected features where appropriate.

Numerous extents of sections of the shoreline (ledges) are in conflict with hydrography, see Figure 21 for an example. After discussion with representatives from the Pacific and Atlantic Hydrographic Branches, it has been decided to leave the ledge area features intact for processing branch personnel to manage. In many cases the Prior Survey Features (psf) more accurately represent the ledge than what is currently charted. The psf have been extracted from the Final Feature File and will be submitted with the other deliverables as a separate file H11824_Prior_Survey_Features.hob** to help aid the branch in partially disproving the charted ledge**.**
Submitted with original field records

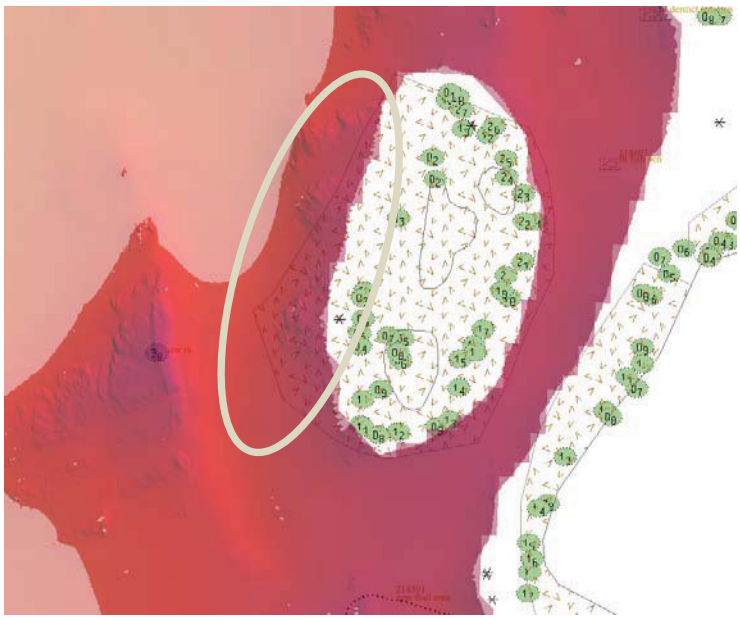


Figure 21: Example of MBES coverage over charted ledge to the extent of prior survey features

New features and features requiring revision were given S57 attribution. As outlined in section 4.4.10 of the FPM, features were delineated, attributed and placed on either the survey edited H11824_Final_Feature_File.hob * * (compiled from the field daily files) or H11824_Disprovals.hob**. A tabulated listing of all investigated features is included in Appendix 2*. ***Submitted with H-Cell deliverable **Submitted with original field records***

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,survy,H11824) and final survey date 20090528. 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 11.

Shoreline Source	SORIND	SORDAT
Chart	US,US,graph,chart 17423	20060300
Chart	US,US,graph,chart 17385	20050200
Survey	US,US,survy,H11824	20090528

Table 11: SORIND/SORDAT Shoreline Final Feature File Features

Shoreline Source	SORIND	SORDAT
Prior Survey	US,US,graph,survey H09191	19710000
Prior Survey	US,US,graph,survey H09287	19720000
Prior Survey	US,US,graph,survey H09288	19720000

Table 12: SORIND/SORDAT Prior Survey Features Removed from Final Feature File

Source Shoreline Changes, New Features and Charted Features

In accordance with section 4.4.10 of the FPM, field notes made by the Hydrographer were provided in the Remarks field for features and when appropriate and recommendations to the cartographer were included in the Recommendations field.

Items disproved by the Hydrographer and deemed to not be included in the H11824_Final_Feature_File .hob* file were moved to the H11824_Disprovals .hob* file. Photos of several shoreline features are included within the Notebook Files folder. Photo file names were labeled with the Unique ID number found in the H11824_Final_Feature_File.hob* file. ***Submitted with original field records***

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 CSF and charts.
Concur with clarification. Each shoreline ledge feature will be addressed in H11823 H-Cell.

Aids to Navigation

There were no aids to navigation within the survey limits. ***Concur***

Bottom Samples

Bottom Samples were collected in depths shoaler than 100 meters May 25th – 27th, 2009 (DN 145 to DN 147) and are included as seabed classifications along with the other S57 features in the Notebook H11824_Final_Feature_File.hob file*. ***Submitted with original field records***

Additional Recommendations

It is the recommendation of the Hydrographer that an inset be made on the published chart for Vixen Harbor due to the harbor's narrow, shoal entrance and the harbor's verified use by fishing vessels. Vixen Harbor being well sheltered also makes it a prime small boat anchorage. ***Do not concur. Due to the extremely shoal depths and obvious danger in Vixen Harbor's entrance, the office does not recommend an inset be made due to concern for mariner's safety.***

E. Supplemental Reports

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

Title	Date Sent	Office
Hydrographic Systems Readiness Review 2009	May 15, 2009	N/CS33
Data Acquisition and Processing Report 2009	TBD	N/CS33
Horizontal and Vertical Control Report for OPR-O119-FA-09	TBD	N/CS33
Tides and Water Levels Package for OPR-O119-FA-09	June 23, 2009	N/OPS1
Coast Pilot Report for OPR-O119-FA-09	TBD	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 19, 2009

MEMORANDUM FOR: LCDR Richard Brennan, NOAA
Chief, Atlantic Hydrographic Branch

FROM: CAPT Douglas D. Baird, NOAA
Commanding Officer

Doug Baird
2009.08.31 13:22:59
-08'00'

TITLE: Approval of Hydrographic Survey H11824,
OPR-O119-FA-09

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H11824 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/CS33, Atlantic 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:

Tami
Beduhn

Digitally signed by Tami Beduhn
DN: cn=Tami Beduhn, c=US, o=NOAA,
ou=NOAA Ship Fairweather, email=tami.
beduhn@noaa.gov
Reason: I attest to the accuracy and integrity
of this document
Date: 2009.08.29 06:32:32 Z

ST Tami Beduhn
Survey Manager

Digitally signed by Matthew Ringel
Date: 2009.08.31 12:41:11 -08'00'

LT Matthew Ringel
Field Operations Officer

Attachment

Appendix I: DtoN Report

There are no DtoNs in survey H11824

Appendix II: Survey Feature Report

Charted Features

Chart Features

Type	Acronym	UserID	Latitude	Longitude	userid	VALSOU (meters)	Remarks	Office Notes
Point	MARCUL	114410	55-47-44.2655N	132-10-15.6470W	114410		8 pens extending to sl	*Concur*
								
Point	MARCUL	114406	55-50-32.9665N	132-05-26.3704W	114406		flt derilict fish pen	*Do not concur. Feature falls on 1:80,000 raster chart and will not be represented*
								
Point	MARCUL	114407	55-50-27.7354N	132-05-28.8526W	114407		floating fish pen	*Do not concur. Feature falls on 1:80,000 raster chart and will not be represented*
								
Line	OBSTRN						new foul area	*Concur chart obstruction area centered around 55-49-03.4532N, 132-04-56.6119W*
Line	OBSTRN						new foul area	*Concur chart obstruction area centered around 55-50-04.5748N, 132-05-46.9784W*
Line	OBSTRN						new foul area	*Concur chart obstruction area centered around 55-50-04.5748N, 132-05-46.9784W*
Line	OBSTRN	214501			214501		new foul area	*Concur chart obstruction area centered around 55-50-04.5748N, 132-05-46.9784W*

Line	OBSTRN	214502			214502		new foul area	*Concur chart obstruction area centered around 55-50-04.5748N, 132-05-46.9784W*
Area	SBDARE						new reef ext from psf (H09288)	*Concur with clarification. Extend ledge to encompass reef. Proposed reef is too small to display on the 1:80,000 raster chart.*
Area	SBDARE						new reef ext from psf(H09288)/chd rks	*Concur*
Area	SBDARE						new reef, ext from psf (H09288)	*Do not concur. No information to support new reef. Retain charted rock at this location. No cartographic action necessary.*
Line	SBDARE						chd (17385) rks ext/hps ldg	*Concur with clarification. Exisiting ledge is extended to field's recommendation. The H-Cell includes a SBDARE and DEPCNT to represent the ledge.*
Point	SBDARE	314702	55-47-54.6029N	132-10-25.6392W	314702		fne gy M	*Do not concur. Redunant seabed area, do not chart.*
Point	SBDARE	414509	55-49-34.1962N	132-05-33.3134W	414509		St	*Concur*
Point	SBDARE	414504	55-48-53.5608N	132-06-38.5188W	414504		med St	*Concur with clarification. Chart Stone*
Point	SBDARE	414510	55-49-48.4615N	132-06-16.8903W	414510		med St	*Concur with clarification. Chart Stone*
Point	SBDARE	414506	55-48-29.1614N	132-09-10.3905W	414506		med P brk Sh	*Concur with clarification. Chart pebbles, broken shells*
Point	SBDARE	414503	55-48-46.8410N	132-05-21.9558W	414503		stk fin Silt	*Concur with clarification. Chart sticky silt/ooze*
Point	SBDARE	414602	55-51-44.1590N	132-05-27.6348W	414602		Co	*Concur*
Point	SBDARE	414508	55-49-59.2000N	132-08-16.6080W	414508		St	*Concur*
Point	SBDARE	414603	55-50-58.5737N	132-06-07.7514W	414603		M med S med G brk Sh	*Concur with clarification. Chart mud, medium sand, medium gravel*
Point	SBDARE	414501	55-48-12.9146N	132-02-49.6527W	414501		stk fin M	*Concur with clarification. Chart sticky mud*
Point	SBDARE	414511	55-50-11.6794N	132-06-31.4152W	414511		crs S	*Concur*
Point	SBDARE	414512	55-50-34.3003N	132-05-58.7827W	414512		St	*Concur*
Point	SBDARE	414601	55-52-18.7032N	132-04-28.5908W	414601		St	*Concur*
Point	SBDARE	414513	55-49-20.4272N	132-04-34.4574W	414513		med S St brk Sh	*Concur*
Point	SBDARE	314701	55-47-58.8631N	132-10-13.0028W	314701		fne gy M	*Concur with clarification. Chart grey mud.*
Point	SBDARE	414505	55-49-15.0247N	132-07-05.5785W	414505		St	*Concur*
Point	SBDARE	414502	55-48-32.3788N	132-03-54.9679W	414502		med P	*Concur with clarification. Chart pebbles*
Point	SBDARE	414507	55-48-18.0090N	132-09-43.3824W	414507		stk fin S brk Sh	*Concur with clarification. Chart fine sand, broken shells*
Point	UWTROC	114402	55-50-02.2841N	132-05-57.6375W	114402	0.580	new rk	*Concur*
Point	UWTROC	114403	55-49-52.9241N	132-05-45.4834W	114403	-2.220	chd (17385) rk vfd, DP for ht	*Concur. Charted position verified, revise rock height*

Point	UWTROC	114405	55-50-08.7828N	132-05-45.7510W	114405	-1.070	psf (H09287) rk vfd, DP for ht	***Concur***

Point	UWTROC	114401	55-50-06.1350N	132-05-53.3017W	114401	1.340	new rk	***Concur***

Point	UWTROC		55-50-21.1402N	132-05-56.9666W		3.789	new rk	***Concur***
Point	UWTROC	214503	55-49-01.5712N	132-04-49.4618W	214503	-1.500	chd (17385) rk vfd	***Concur. Charted position verified, revise rock height.***
Point	UWTROC		55-49-23.2906N	132-07-14.6283W		1.942	new rk	***Concur***
Point	UWTROC		55-48-16.9707N	132-11-0.3996W		0.636	new pos chd (17385) rk	***Do not concur. Do not chart new rock as it is located on the charted ledge***
Point	UWTROC		55-49-28.2936N	132-03-59.7147W		2.278	new rk	***Concur with clarification. Delete charted rock. Add new rock at survey depth and location***
Point	UWTROC	114404	55-50-04.9128N	132-05-46.4926W	114404	-0.060	psf (09287) rk vfd, DP for ht	***Concur***

Point	UWTROC	114601	55-48-51.6240N	132-07-11.6434W	114601	-2.760	psf (H09288) rk HP/ext reef	***Concur***
Point	WRECKS	114408	55-48-00.1980N	132-10-20.2287W	114408	-4.850	wreck on bch	***Concur***

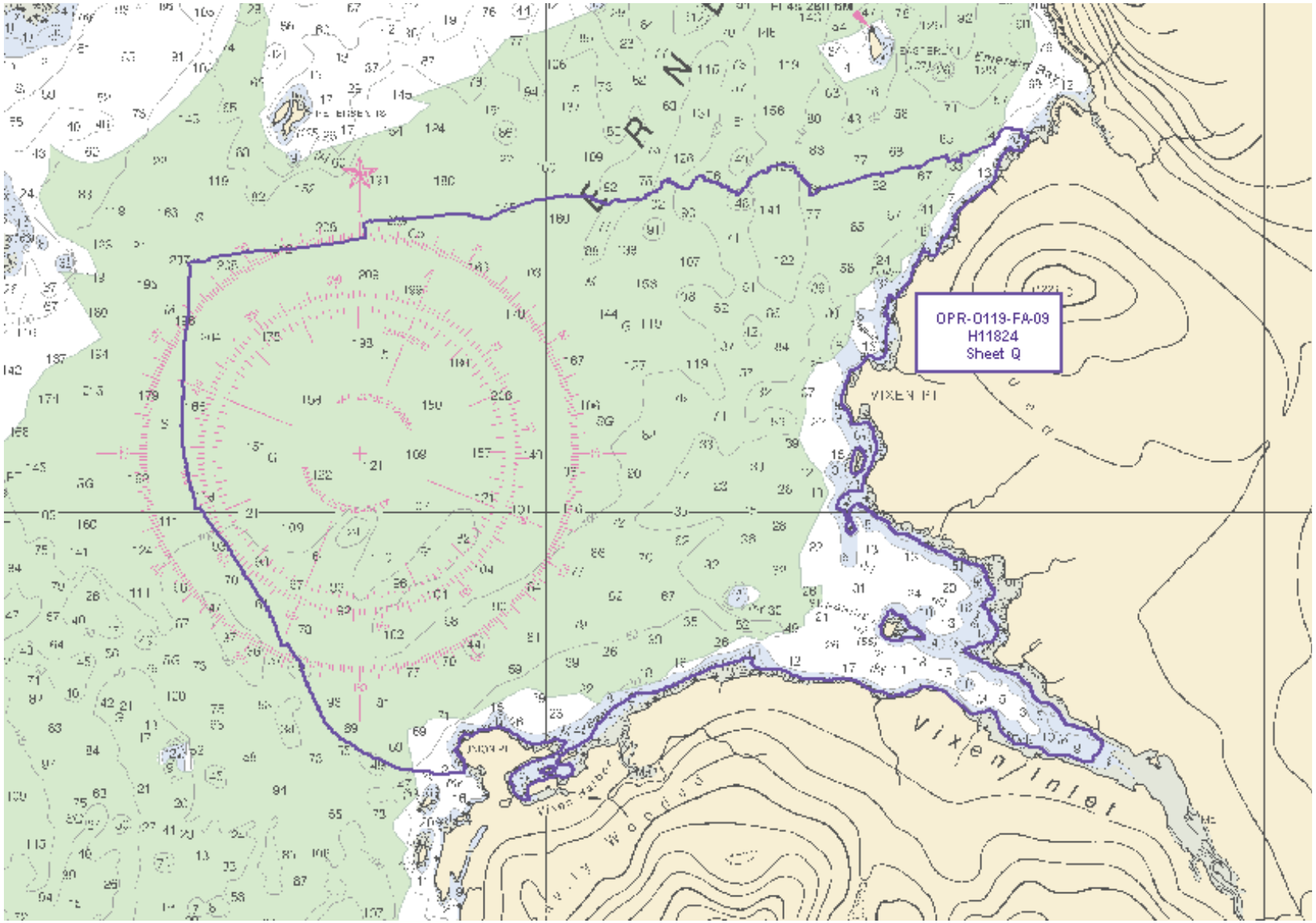
Disproved Features

Disproved Features

Type	Acronym	Latitude	Longitude	Remarks	Recommendations	Office Notes
Point	UWTROC	55-49-22.8N	132-07-15.0W	hp chd (17385) shl, secondary to MBES sdg ftr	use MBES sdg for depth and pos	*Concur. No cartographic action necessary.*
Point	UWTROC	55-49-27.1913N	132-03-59.8776W	chd(17385) rk pos dis by MBES	chart rk at suv location	*Concur*
Point	UWTROC	55-48-58.7516N	132-04-16.9657W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-48-54.0N	132-04-11.4W	chd(17385) rk dis by MBES	remove from chart	*Do not concur. Delete charted rock. Add submerged rock.*
Point	MORFAC	55-48-19.1783N	132-03-37.1446W	chd(17385)ftr dis by Shl vf and MBES	remove from chart	*Concur*
Point	MORFAC	55-48-16.6010N	132-03-32.5737W	chd(17385)ftr dis by Shl vf and MBES	remove from chart	*Concur*
Point	UWTROC	55-50-50.5828N	132-05-55.0725W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-51-16.6259N	132-05-18.4630W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-51-44.3081N	132-05-06.0067W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-51-20.4N	132-05-17.4W	chd(17385) rk dis by MBES	remove from chart	*Do not concur. Retain as charted*
Point	UWTROC	55-51-14.0328N	132-05-33.6226W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-51-36.9472N	132-05-17.2030W	chd(17385) rk dis by MBES	remove from chart	*Do not concur. Retain as charted*
Point	UWTROC	55-52-01.2N	132-04-48.6W	chd(17385) rk dis by MBES	remove from chart	*Do not concur. Retain as charted*
Point	UWTROC	55-52-03.5980N	132-04-39.5683W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-52-26.6488N	132-04-09.2325W	chd(17385) rk dis by MBES	remove from chart	*Concur*
Area	OBSTRN			area not foul	remove from chart	*Concur with clarification. Remove charted foul obstruction area. Add modified foul obstruction area--included in H-Cell.*
Point	UWTROC	55-48-0.8676N	132-09-50.3358W	chd(17423) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-48-19.8N	132-10-48.0W	chd(17385) rk dis by MBES	remove from chart	*Do not concur. Rock is not present on chart 17423_5. No cartographic action necessary*
Point	UWTROC	55-48-19.2103N	132-10-46.2585W	chdchd(17423) rk dis by MBES	remove from chart	*Concur*
Point	UWTROC	55-48-18.6N	132-10-52.2W	chd(17385) rk dis by MBES	remove from chart	*Do not concur. Rock is not present on chart 17423_5. No cartographic action necessary*
Point	UWTROC	55-48-16.8N	132-11-02.4W	chd(17385) rk pos dis by MBES	chart rk at suv location	*Do not concur. Rock is not present on chart 17423_5. No cartographic action necessary*
Point	OBSTRN	55-51-50.2650N	132-05-07.2483W	chd(17385) rk pos dis by MBES	chart rk at suv location	*Concur*
Point	UWTROC	55-52-06.6N	132-04-31.8W	chd(17385) rk pos dis by MBES	rk is ext ldg	*Do not concur. Retain as charted*

Appendix III: Final Progress Sketch and Survey Outline

Survey Outline



Appendix IV: Tides and Water Levels

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NOAA Ship FAIRWEATHER (MOP-FA)
1010 Stedman St
Ketchikan, AK 99901

May 29, 2009

MEMORANDUM FOR: Chief, Requirements and Development Division, N/OPS1

FROM: CDR Douglas D. Baird, NOAA Ship FAIRWEATHER (MOP-FA)

SUBJECT: Request for Approved Tides/Water Levels

Please provide the following data:

1. Tide Note
2. Final zoning in MapInfo and .MIX format
3. Six Minute Water Level data (Co-ops web site)

Transmit data to the following:

NOAA/NOS/Atlantic Hydrographic Branch
N/CS33, Building #2
439 West York Street
Norfolk, VA 23510
ATTN: Chief AHB

NOAA Ship FAIRWEATHER
1801 Fairview Avenue E
Seattle, WA 98102
ATTN: Chief Survey Technician

These data are required for the processing of the following hydrographic survey:

Project No.:	OPR-O119-FA-09
Registry No.:	H11824
State:	Alaska
Locality:	Ernest Sound & Eastern Passage
Sublocality:	Vicinity of Vixen Inlet

Attachments containing:

1) an Abstract of Times of Hydrography,
2) digital MID MIF files of the track lines from Pydro

cc: N/CS33

Year_DOY	Min Time	Max Time
2009_126	22:31:08	23:51:54
2009_127	00:06:56	23:59:57
2009_128	00:00:04	23:59:56
2009_129	00:00:04	22:03:55
2009_134	16:59:48	20:10:38
2009_140	16:47:15	19:59:58
2009_141	16:54:36	23:58:17
2009_142	00:00:01	19:22:21
2009_143	22:01:02	23:59:30
2009_144	00:02:52	23:59:10
2009_145	00:00:03	23:59:31
2009_146	00:00:02	23:59:58
2009_147	00:00:15	23:30:53
2009_148	00:12:03	23:58:58
2009_149	00:01:03	00:37:47

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : August 11, 2009

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O119-FA-2009
HYDROGRAPHIC SHEET: H11824

LOCALITY: Vicinity of Vixen Inlet, Ernest Sound & Eastern Psg, AK
TIME PERIOD: May 6 - 29, 2009

TIDE STATION USED: 945-0460 Ketchikan, AK
Lat.55° 19.91'N Long. 131° 37.57' 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: SA114 & SA115

Refer to attachments for zoning information.

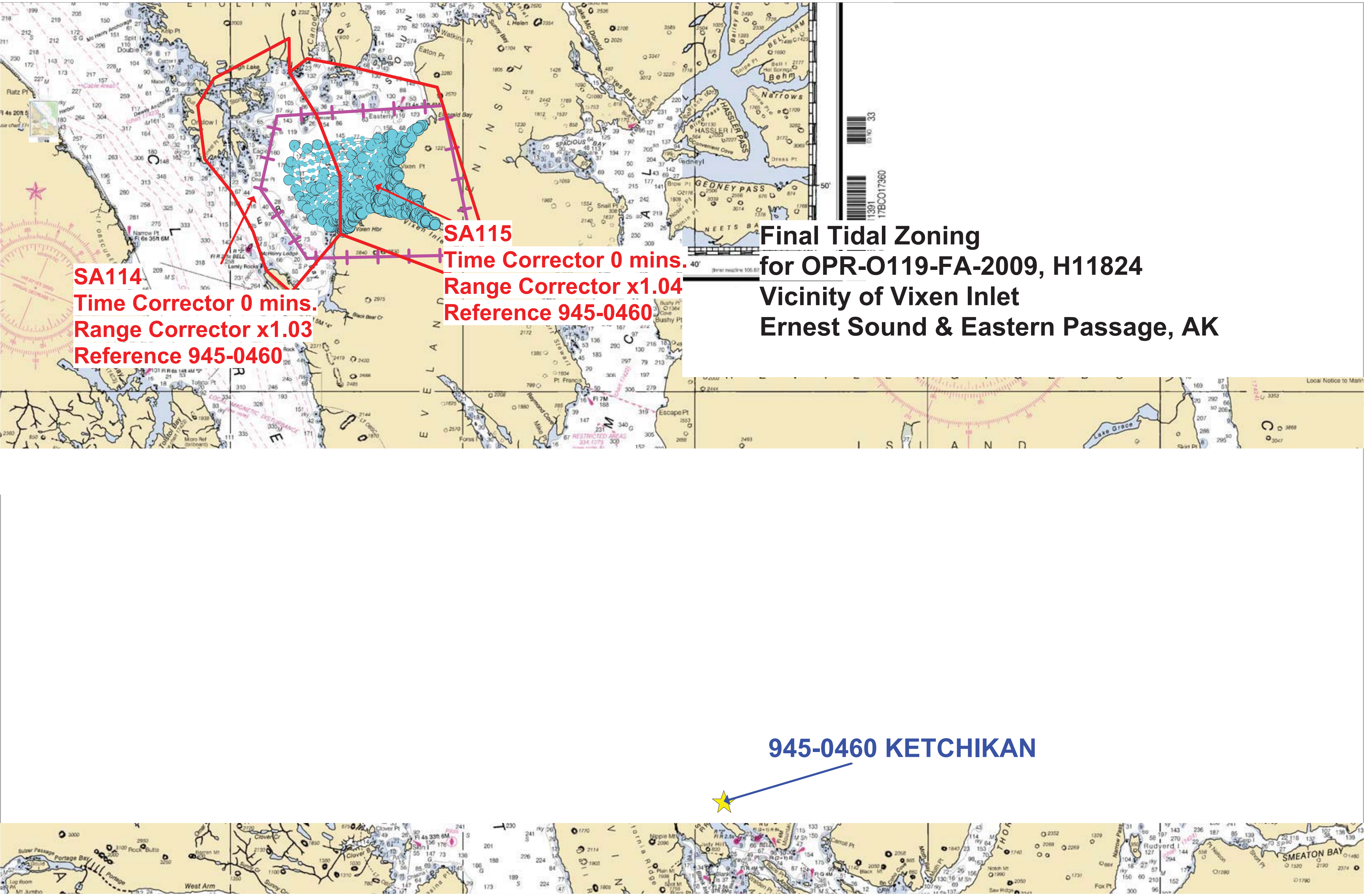
Note 1: Provided time series data are tabulated in metric units (meters), relative to MLLW and on Greenwich Mean Time on the 1983-2001 National Tidal Datum Epoch (NTDE).

Peter J. Stone

Digitally signed by Peter J. Stone
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/NOS, email=peter.stone@noaa.gov, c=US
Date: 2009.08.12 08:09:15 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION

Final Tidal Zoning for OPR-O119-FA-2009, H11824 Vicinity of Vixen Inlet Ernest Sound & Eastern Passage, AK



Appendix V: Supplemental Survey Records and Correspondence

Python Script for Density Analysis

File: 16m_Final_135to999.txt
5 or more soundings 97.776880%
average node density 575.535051
standard deviation 2202.647080

File: 8m_Final_70to160.txt
5 or more soundings 98.664357%
average node density 29.546458
standard deviation 21.052526

File: 1m_SW_Final_0to23.txt
5 or more soundings 95.515458%
average node density 32.662312
standard deviation 28.234558

File: 4m_SW_Final_30to80.txt
5 or more soundings 99.072344%
average node density 28.572055
standard deviation 18.648436

File: 2m_SW_Final_18to40.txt
5 or more soundings 98.338228%
average node density 17.724083
standard deviation 12.296209

File: 1m_SE_Final_0to23.txt
5 or more soundings 95.458040%
average node density 24.284332
standard deviation 23.624567

File: 2m_SE_Final_18to40.txt
5 or more soundings 99.176189%
average node density 26.142328
standard deviation 21.094561

File: 4m_SE_Final_30to80.txt
5 or more soundings 99.370960%
average node density 30.355618
standard deviation 24.145859

File: 1m_NE_Final_0to23.txt
5 or more soundings 96.132004%
average node density 47.539023
standard deviation 51.285964

File: 2m_NE_Final_18to40.txt
5 or more soundings 98.653018%
average node density 26.506211
standard deviation 19.598753

File: 4m_NE_Final_30to80.txt
5 or more soundings 98.460888%
average node density 28.968519
standard deviation 25.380386

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or Evaluation Reports

AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H11824
PROJECT No.	OPR-O119-FA-09
FIELD UNIT	*FAIRWEATHER*
DATE OF SURVEY	05/06/2009-05/29/2009
LARGEST SCALE CHART	*17423_5, edition 14, 20060301, 1:40,000*
ADDITIONAL CHARTS	*17385_1, edition 17, 20091101, 1:80,000*
SOUNDING UNITS	Fathoms
COMPILER	Katrina Wyllie

Source Grids	**File Name** H:\Compilation\H11824_O119_FA\AHB_H11824\SAR Final Products\GRIDS
	H11824_SW_1m_Final_0to23.csar
	H11824_SW_2m_Final_18to40.csar
	H11824_SW_4m_Final_30to80.csar
	H11824_SE_1m_Final_0to23.csar
	H11824_SE_2m_Final_18to40.csar
	H11824_SE_4m_Final_30to80.csar
	H11824_NE_1m_Final_0to23.csar
	H11824_NE_2m_Final_18to40.csar
	H11824_NE_4m_Final_30to80.csar
	H11824_8m_Final_65to160.csar
	H11824_16m_Final_135to999.csar
Surfaces	**File Name** H:\Compilation\H11824_O119_FA\AHB_H11824\COMPILE\Working
Combined	**H11824_16m_Combined.csar**
Interpolated TIN	\Interpolated TIN**H11824_16m_Interp.csar**
Shifted Interpolated TIN	\Shifted Surface**H11824_InterpTIN_Shifted_GT10.csar**
Shifted Interpolated TIN	\Shifted Surface**H11824_InterpTIN_Shifted_LTE10.csar**
Final HOBs	**File Name** H:\Compilation\H11824_O119_FA\AHB_H11824\COMPILE\Final_Hobs
Survey Scale Soundings	H11824_SS_Soundings.hob
Chart Scale Soundings	H11824_CS_Soundings.hob
Contour Layer	H11824_Contours.hob
Feature Layer	H11824_Features.hob
Meta-Objects Layer	H11824_MetaObjects.hob
Blue Notes	H11824_BlueNotes.hob

Meta-Objects Attribution	
Acronym	**Value**
M_COVR	
CATCOV	Coverage available
SORDAT	20090528
SORIND	US,US,graph,H11824
M_QUAL	
CATZOC	Zone of confidence U (data not assessed)
INFORM	*Fairweather*

POSACC	10
SORDAT	20090528
SORIND	US,US,graph,H11824
SUREND	20090528
SURSTA	20090506
DEPARE	
DRVALV 1	0.001fm
DRVALV2	222.156fm
SORDAT	20090528
SORIND	US,US,graph,H11824
M_CSCL	
CSCALE	80,000
SORDAT	20090528
SORIND	US,US,graph,H11824

SPECIFICATIONS:

I. COMBINED SURFACE:
   a. Number of ESAR Final Grids: 11
   b. Resolution of Combined (m): 16

II. SURVEY SCALE SOUNDINGS (SS):
   a. Radius
   b. Shoal biased
   c. Use Single-Defined Radius (mm at Map Scale):
      i. H11824_40k_SS_SSR.txt
      ii. H11824_80k_SS_SSR.txt
   d. Queried Depth of All Soundings
      i. Minimum: 0.001fm
      ii. Maximum: 222.156fm

III. INTERPOLATED TIN SURFACE:
   a. Resolution (m): 16m
   b. Natural Neighbor
   c. Shifted value: -0.125m for ≤ 10 fathoms
      -1.372m for > 10 fathoms

IV. CONTOURS:
   a. Use a Depth List: H11824_Depth_curves_lessthanequalto10fm.txt
      H11824_Depth_curves_greaterthan10fm.txt
   b. Line Object: DEPCNT
   c. Value Attribute: VALDCO

V. CHART SURVEY SOUNDINGS (CS):
   a. Number of ENC CS Soundings: 203
   b. Radius
   c. Shoal biased
   d. Use Single-Defined Radius: m on the ground
      i. H11824_40k_CS_SSR.txt
      ii. H11824_80k_CS_SSR.txt
   e. Filter: Interpolated != 1
   f. Number Survey CS Soundings: 193

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT to ACCOMPANY
SURVEY H11824 (2009)

This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

B. DATA ACQUISITION AND PROCESSING

B.1 DATA PROCESSING

The following software was used to process data at the Atlantic Hydrographic Branch:

CARIS HIPS/SIPS version 6.1 SP2 HF 1-8
CARIS Bathy Manager version 2.3 HF 1-16
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3 SP3
CARIS S57 Composer version 2.0 HF 1-3

B.2. QUALITY CONTROL

B.2.1. H-Cell

The AHB source depth grid for the survey's nautical chart update product entailed the field's original 1, 2, 4, 8, and 16m grids, combined at 16 meter resolution. The survey scale selected soundings were created from the combined surface at 1mm radius at 1:40,000 and 1:80,000 for the respective chart scale areas. The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

A TIN (Triangulated Irregular Network) surface was created from the survey scale soundings from which an interpolated surface was generated for the purpose of generating depth curves. Depth curves were minimally manually edited and forwarded to MCD for reference only. The curves were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth curves are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Compile Log attached directly before this Evaluation Report. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), sounding selections (SOUNDG), features (OBSTRN, SBDARE, UWTROC,WRECKS, MARCUL), Meta objects (M_COVR, M_QUAL, M_CSCL), and cartographic Blue Notes ($CSYMB).

All of the components with the exception of the sounding selection and depth contours were inserted into one feature layer (including the Bluenotes, as dictated by Hydrographic Technical directive 2009-9 and HSD's H-Cell Specifications 2009). The SAHOB H-Cell layer was exported to S-57 format for H-Cell deliverable. H11824 H-

Cell chart scale soundings were selected based upon the scale of the applicable chart. The H-Cell's SS deliverable includes survey scale soundings selected and depth contours.

Both S-57 files were converted in CARIS HOM for output of H-Cell in chart units (fathoms). The final deliverables are two S-57 files; one that contains the chart scale soundings, all the features, meta objects, and blue notes (H11824_CS.000), and one that contains the sounding selections and depth contours (H11824_SS.000). Quality assurance checks were made utilizing CARIS S-57 Composer version 2.0 validation checks and dKart Inspector, version 5.0, tests.

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H11824 CARIS H-Cell final deliverables include the following products:

H11824_CS.000	1:40,000 Scale	H11824 H-Cell (Chart Scale)
H11824_SS.000	1:40,000 Scale	H11824 Selected Soundings (Survey Scale)

C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by the field unit with no additional correction required by Atlantic Hydrographic Branch. The field unit applied verified water levels in conjunction with the preliminary tidal zoning which was accepted and approved by N/OPSI CO-OPS as the final zoning for H11824. Sounding datum is Mean Lower Low Water (MLLW). Vertical datum is Mean High Water (MHW).

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 8N.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

17423_5 (14th Edition, 03/01/2006)
Corrected through NM 5/01/2010
Corrected through LNM 4/20/2010
Scale 1:40,000

17385_1 (17th Edition, 11/01/2009)
Corrected through NM 5/01/2010
Corrected through LNM 4/20/2010
Scale 1:80,000

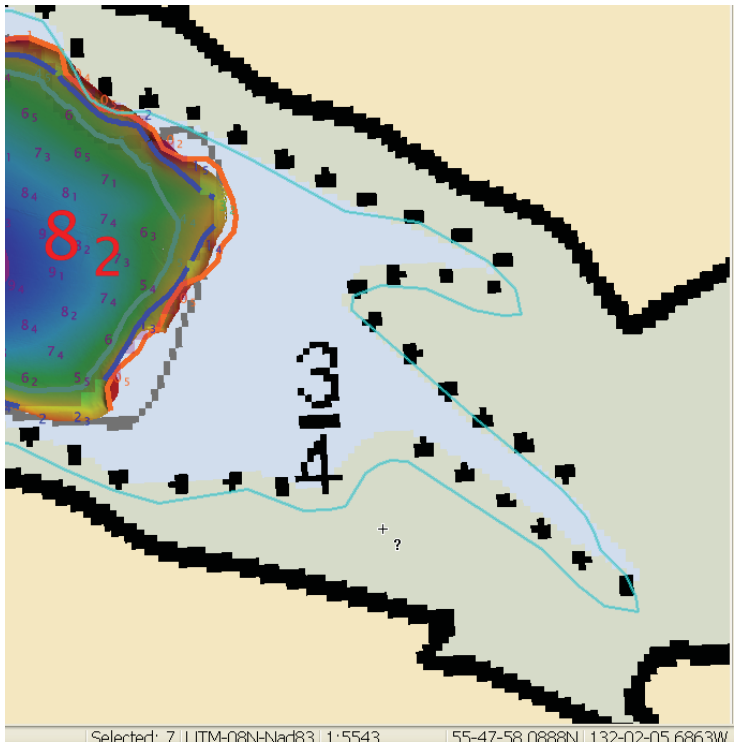
ENC Comparison **US4AK3OM**
Edition 12
Application Date 2009-03-31
Issue Date 2009-03-31
Chart 17385

D.1.1 Hydrography

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section "D" and in Appendix I and II of the Descriptive Report. The following exceptions are noted:

a. The bathymetry data of H11823 is adequate to supersede the charted wire drag green tint areas on raster chart 17385_1.

b. There are some places within the survey area where the Raster Chart 17385_1 is not in harmony with the ENC US4AK3OM. Recommend ensuring raster and ENC are in harmony. One example below shows the ENC intertidal area (0 fm depth contour) shown with the blue line on top of the raster chart's depiction of the intertidal area shown in the dotted black line. The two do not match throughout the survey.



c. There are several ledges throughout the survey that are partially or completely covered by bathymetry data. AHB recommends the ledges be revised to the extents of H11823 bathymetry data where possible. The new ledge extents are provided to MCD for reference even though MCD may find it impossible to revise a charted ledge do to the cartographic representation of the ledge on the 1:80,000 raster. In a few cases, the M_COVR object is modified in order to retain the ledge as charted. In accordance with MCD encoding instructions (stated below), the seabed areas and depth contours that correspond to the ledges share the same topology and are included in the H-Cell deliverable.

The Nautical Chart Manual Volume 3, 2007 Edition, Section I.5.2.7 (page 141) states:

Rocky areas of the foreshore and ledges that are charted with a symbolized wavy line (Chart 1, I-21) are collected as described in Sections 5.2 and 7.1 of S-57 Appendix B.1, Annex A. The line is to be digitized by connecting the outermost points of the symbolized line. The line shall be encoded as part of the Depth Contour (DEPCNT) with the attribute VALDCO = 0 as per Section 5.2. The line shall be used to bound a Seabed Area (SBDARE) area if it closes upon itself, or appears to close upon the shoreline as portrayed by Item J21 of U.S. Chart No.1. The line shall be encoded as a Seabed Area line SBDARE) only if it does not close upon itself or the shoreline. It shall be encoded with appropriate attribution as per S-57 Appendix B.1 Annex A, Section 7.1.

D.3. MISCELLANEOUS

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland. See Section D.1. of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey.

D.4. ADEQUACY OF SURVEY

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

APPROVAL SHEET
H11824

Initial Approvals:

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the Evaluation Report.

All final products have undergone a comprehensive reviews per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

Digitally signed by Katrina Wyllie
DN: cn=Katrina Wyllie, o=NOAA, ou=AHB, email=katrina.wyllie@noaa.gov, c=US
Date: 2010.05.27 14:25:27 -04'00'

Katrina Wyllie
Hydrographic Intern
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Richard T. Brennan
I am approving this document
2010.05.28 15:13:15 -04'00'

Approved: _____

Richard T. Brennan
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch

Paul Turner
AWOIS & SURF Check
2010.07.06 10:06:36 -04'00'