

H11743

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. H11743

LOCALITY

State Alaska

General Locality Northeastern Prince William Sound

Sublocality Offshore - Southwest Knowles Head

2008

CHIEF OF PARTY

..... Commander Douglas D. Baird, NOAA

LIBRARY & ARCHIVES

DATE

HYDROGRAPHIC TITLE SHEET

H11743

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 Northeastern Prince William Sound

Sublocality Offshore - Southwest Knowles Head

Scale 1:20,000

Date of Survey September 6, 2008 -October 3, 2008

Instructions Dated 7/30/2008

Project No. OPR-P132-FA-08

Vessel NOAA Ship FAIRWEATHER

Chief of Party CDR Douglas D. Baird, NOAA Ship FAIRWEATHER

Surveyed by FAIRWEATHER Personnel

Soundings taken by echo sounder RESON 8111, RESON 8160, Reson 8101

Graphic record scaled by N/A

Graphic record checked by N/A

Evaluation by T. Wozumi

Automated plot by N/A

Verification by T. Wozumi, M. Herzog

Soundings in Fathoms and Feet

at

MLLW

REMARKS: Time in UTC. UTM Projection Zone 6

Revisions and annotations appearing as endnotes were

generated during office processing.

As a result, page numbering may be interrupted or non-sequential

All separates are filed with the hydrographic data.

Descriptive Report to Accompany Hydrographic Survey H11743

Project OPR-P132-FA

Prince William Sound, Alaska

Scale 1:20,000

September-October 2008

NOAA Ship *Fairweather*

Chief of Party: Commander Douglas D. Baird, NOAA

A. AREA SURVEYED

The survey area was located in Northeastern Prince William Sound, within the sub-locality of Offshore-Southwest Knowles Head. This survey corresponds to Sheet C in the sheet layout provided with the Project Instructions, as shown in Figure 1 below.

Data acquisition was conducted from September 6 to October 3, 2008 (DN 250 to DN 277).

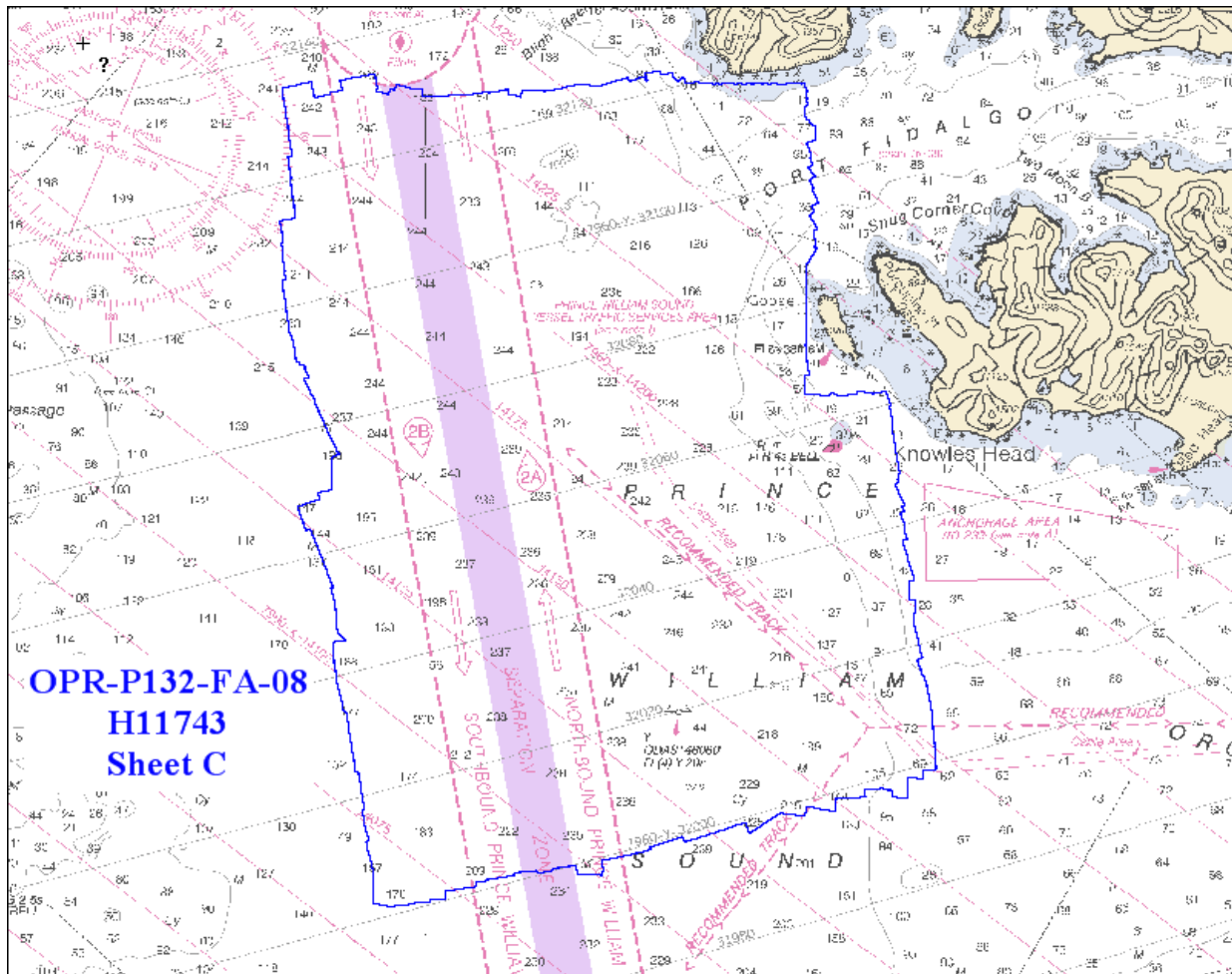


Figure 1: H11743 Survey Outline

One-hundred percent multibeam echosounder (MBES) coverage was obtained in the survey area. ¹ Additional coverage was obtained in order to determine least depths over features or shoals.

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
<u>670.99</u>	Multibeam MS mileage
	524.69 FAIRWEATHER S-220
	125.08 Launch 1010
	21.22 Launch 1018
0	SideScan MS
<u>670.99</u>	Total MS
CROSSLINE - Mileage	
0	Single Beam XL
<u>55.33</u>	Multibeam XL
	50.86 FAIRWEATHER S-220
	4.47 Launch 1010
	0.00 Launch 1018
<u>55.33</u>	Total XL
OTHER	
	0 Developments/AWOIS - Mileage
	0 Shoreline/Nearshore Investigation - Mileage
	0 Total # of Investigated Items
	9 Total Bottom Samples
<u>224.1</u>	Total SNM
<u>9/6,9/8,9/9,9/11,9/12,9/15,9/16,9/19-9/22,10/2 and 10/3 2008</u>	Specific Dates of Acquisition
<u>250,252,253,255,256,259,260,263-266,276 and 277</u>	Specific Dn#s of Acquisition

Table 1: H11743 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* 2008 Data Acquisition and Processing Report (DAPR), submitted under separate cover.² Items specific to this survey and any deviations from the aforementioned report are discussed in the following sections. This hydrographic survey was completed as specified by Hydrographic Survey Project Instructions OPR-P132-FA-08, dated July 8, 2008.

B1. Equipment and Vessels

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

	FAIRWEATHER	Launch 1010	Launch 1018
Hull Registration Number	S220 1010		1018
Builder	Aerojet-General Shipyard	The Boat Yard, Inc.	The Boat Yard, Inc.
Length Overall	231 feet	28' 10"	28' 10"
Beam	42 feet	10' 8"	10' 8"
Draft, Maximum	15' 6"	4' 0" DWL	4' 0" DWL
Cruising Speed	12.5 knots	24 knots	24 knots
Max Survey Speed	10 knots	10 knots	10 knots
Primary Echosounder	RESON 8111 & RESON 8160	RESON 8101	RESON 8101
Sound Velocity Equipment	SBE 19plus & 45, MVP 200	SBE 19plus	SBE19plus
Attitude & Positioning Equipment	POS/MV V4	POS/MV V4	POS/MV V4
Type of operations	MBES MBES		MBES

Table 2: Vessel Inventory

On Dn 275, RESON Transceiver Processing Units (TPUs) were switched between Launches 1010 and 1018 to troubleshoot the cause of intermittent outages that corrupted data for short durations, about two seconds or so on average. The TPU switch did not fix the problem because it was caused by a bad signal and control cable. Once the cable was replaced and the problem cleared, the TPUs were left in place: 1018 has TPU Serial 34497 and 1010 has TPU Serial 35737. This is a change from the *Fairweather* 2008 Data Acquisition and Processing Report, submitted under separate cover.³

B2. Quality Control

Crosslines

Multibeam crosslines for this survey totaled 55.33 linear nautical miles (lnm), comprising 8.25% of the 670.99 lnm of total MBES hydrography. Both main scheme and crossline mileage are summarized in Table 1 above. The median vertical difference between the mainscheme and crossline surfaces was found to be 0.227m.⁴ The histogram and crossline comparison statistics are shown below in Figure 2.

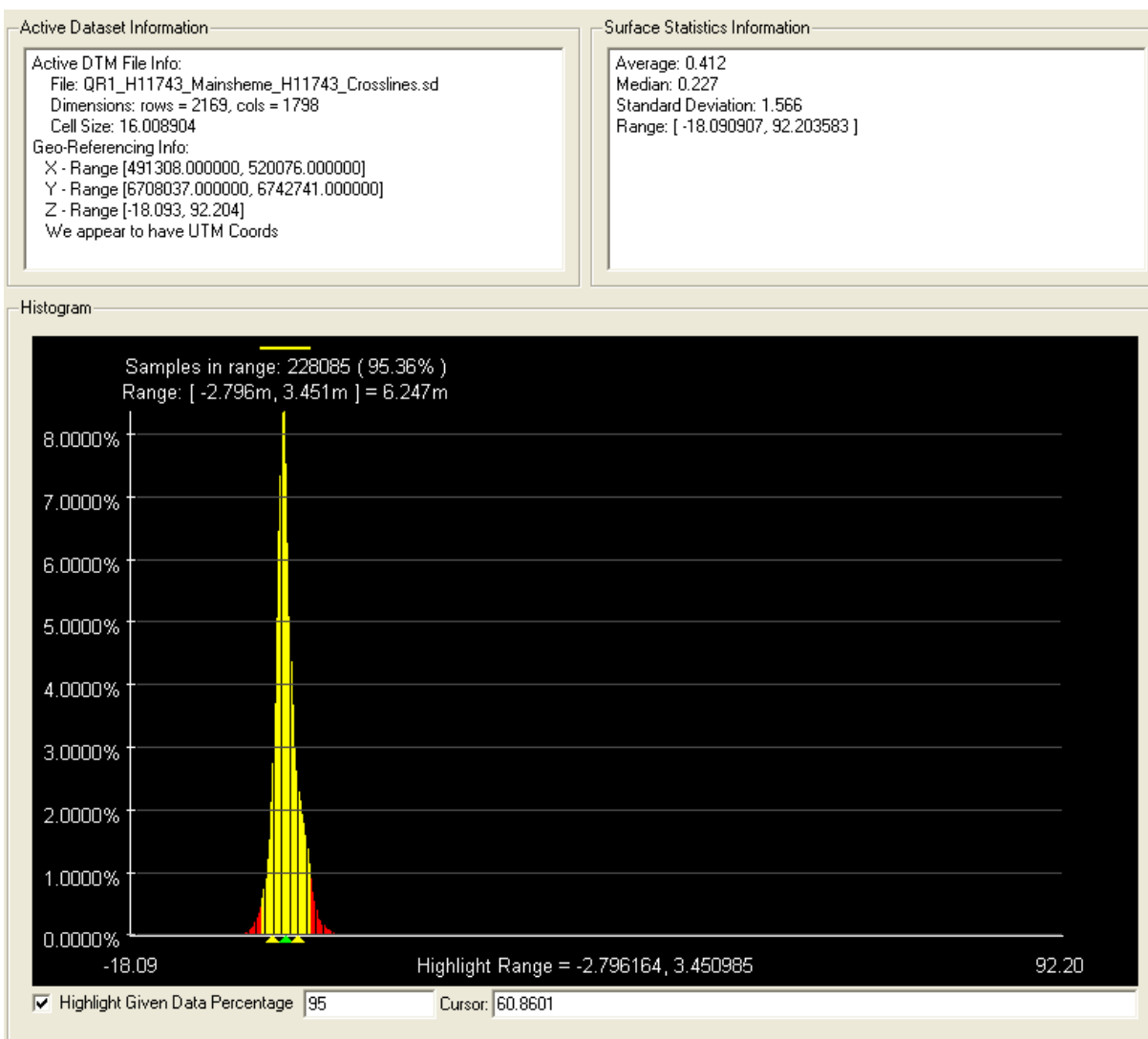


Figure 2: Histogram and Crossline Comparison Statistics

Crosslines were filtered to 45° from nadir on both port and starboard in all but the following case. Soundings from Launch 1010 on Dn264 with line 264-XL1 were examined for quality and reaccepted after standard crossline filtering to fill an area of inadequate data density. The region affected was in the NE region of the survey at a depth range of 80-100m. See Figure 3 below.

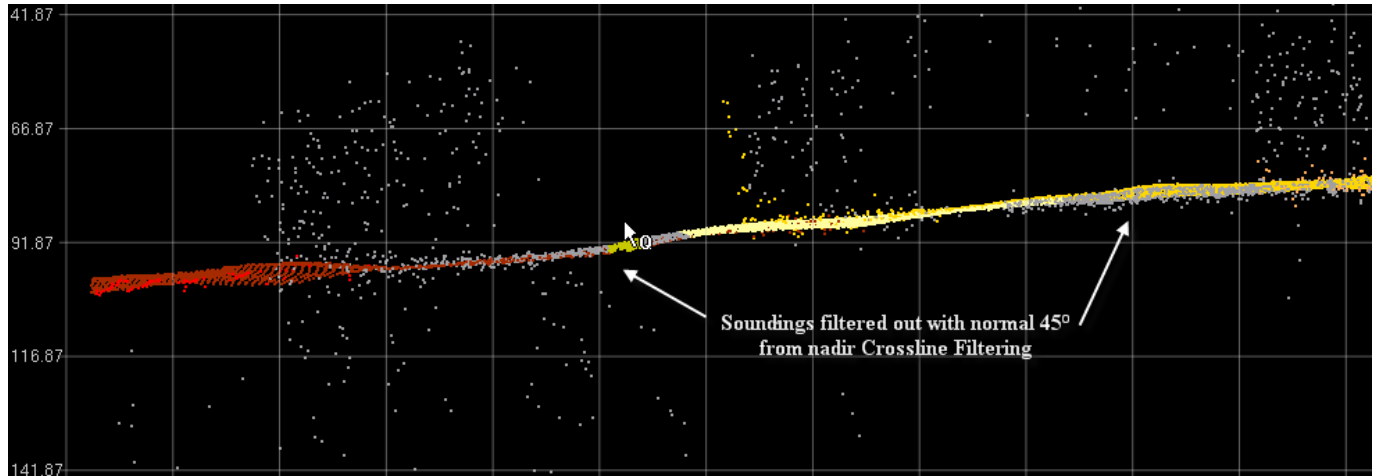


Figure 3: Good data reaccepted from Launch 1010 Dn264 line 246-XL1 previously filtered out with Crossline Filtering.

Junctions⁵

Survey H11743 junctions with H11752, which is Sheet D of the same project. The area of overlap between the sheets was reviewed in CARIS Subset Editor for consistency and data were found to be in good general agreement within one to two meters in most areas. In water over 400m differences of up to 8m were found. Survey H11752 used hull-mounted Reson 8160 MBES and 8111 MBES systems with Triton ISIS software. The sheet limits and area of overlap for Sheets C and D are shown in Figure 5.

Junction Survey	Survey Scale	Date of Survey	Survey Location
H11752	1:20,000	September-October 2008	Northwest Bear Cape
H10849 1:40,000		September-October 1998	7NM E of Naked Island
H10571 1:20,000		September-October 1994	5NM SW of Glacier Island
H11491	1:10,000	August-October 2005	Entrance to Valdez Arm
H11490	1:10,000	September-October 2005	Bligh Island to Busby Island
H11366	1:10,000	August 2004	Bligh Reef
H11492	1:10,000	September 2005- September 2006	Boulder Bay
H11742	1:10,000	August 2007-October 2007	W Port Fidalgo
H11637	1:20,000	November 2007	Orca Bay

Table 3: Junction Surveys

Survey H11743 junctions with H10849, which is Sheet W of project OPR-P139-RA from 1998. The area of overlap between the sheets was reviewed by comparing soundings in CARIS for consistency and data were found to be in good general agreement within one to three meters in most areas. There are some

small areas of overlap with up to an 8m difference in over 300m of water. Data for H10849 was collected using IDSS data acquisition system that consisted of Digital Equipment Corporations' VAX Station 4000-90 computer system interfaced with a SeaBeam Hydrochart II MBES. The sheet limits and area of overlap for H11743 and H10849 are shown in Figure 4.

Survey H11743 junctions with H10571, which is Sheet U of project OPR-P125-RA from 1994. The area of overlap between the sheets was reviewed by viewing soundings in CARIS for consistency and data were found to be in good general agreement within one meter. Data for H10571 was collected using a Raytheon DSF-6000N dual frequency (100 kHz, 24 kHz), paper trace echo sounder. The sheet limits and area of overlap for H11743 and H10571 are shown in Figure 4.

Survey H11743 junctions with H11491, which is Sheet H of project OPR-P132-RA-05. The area of overlap between the sheets was reviewed in CARIS Subset Editor for consistency and data were found to be in good general agreement within one to three meters in most areas. There are some small areas of overlap with up to a 4m difference in over 400m of water. The sheet limits and area of overlap for H11743 and H11491 are shown in Figure 4.

Survey H11743 junctions with H11366, which is Sheet D of project OPR-P132-RA-04. The area of overlap between the sheets was reviewed in CARIS Subset Editor for consistency and data were found to be in good general agreement within one to three meters. The sheet limits and area of overlap for H11743 and H11366 are shown in Figure 4.

Survey H11743 junctions with H11490, which is Sheet E of project OPR-P132-RA-05. The area of overlap between the sheets was reviewed by comparing soundings in CARIS for consistency and data were found to be in good general agreement within one meter in all areas. The sheet limits and area of overlap for H11743 and H11490 are shown in Figure 4.

Survey H11743 junctions with H11492, which is Sheet L of project OPR-P132-RA-05. The area of overlap between the sheets was reviewed by comparing soundings in CARIS for consistency and data were found to be in good general agreement within one to three meters in most areas. The sheet limits and area of overlap for H11743 and H11492 are shown in Figure 4.

Survey H11743 junctions with H11742, which is Sheet B of project OPR-P132-FA-07. The area of overlap between the sheets was reviewed by comparing soundings in CARIS for consistency and data were found to be in good general agreement within one to three meters in most areas. The sheet limits and area of overlap for H11743 and H11742 are shown in Figure 4.

Survey H11743 junctions with H11637, which is Sheet K of project OPR-P132-FA-07. The area of overlap between the sheets was reviewed by comparing soundings in CARIS for consistency and data were found to be in good general agreement within one to two meters in most areas. H11637 used hull-mounted Reson 8160 MBES and 8111 MBES systems with Triton ISIS software. The sheet limits and area of overlap for H11743 and H11637 are shown in Figure 4.

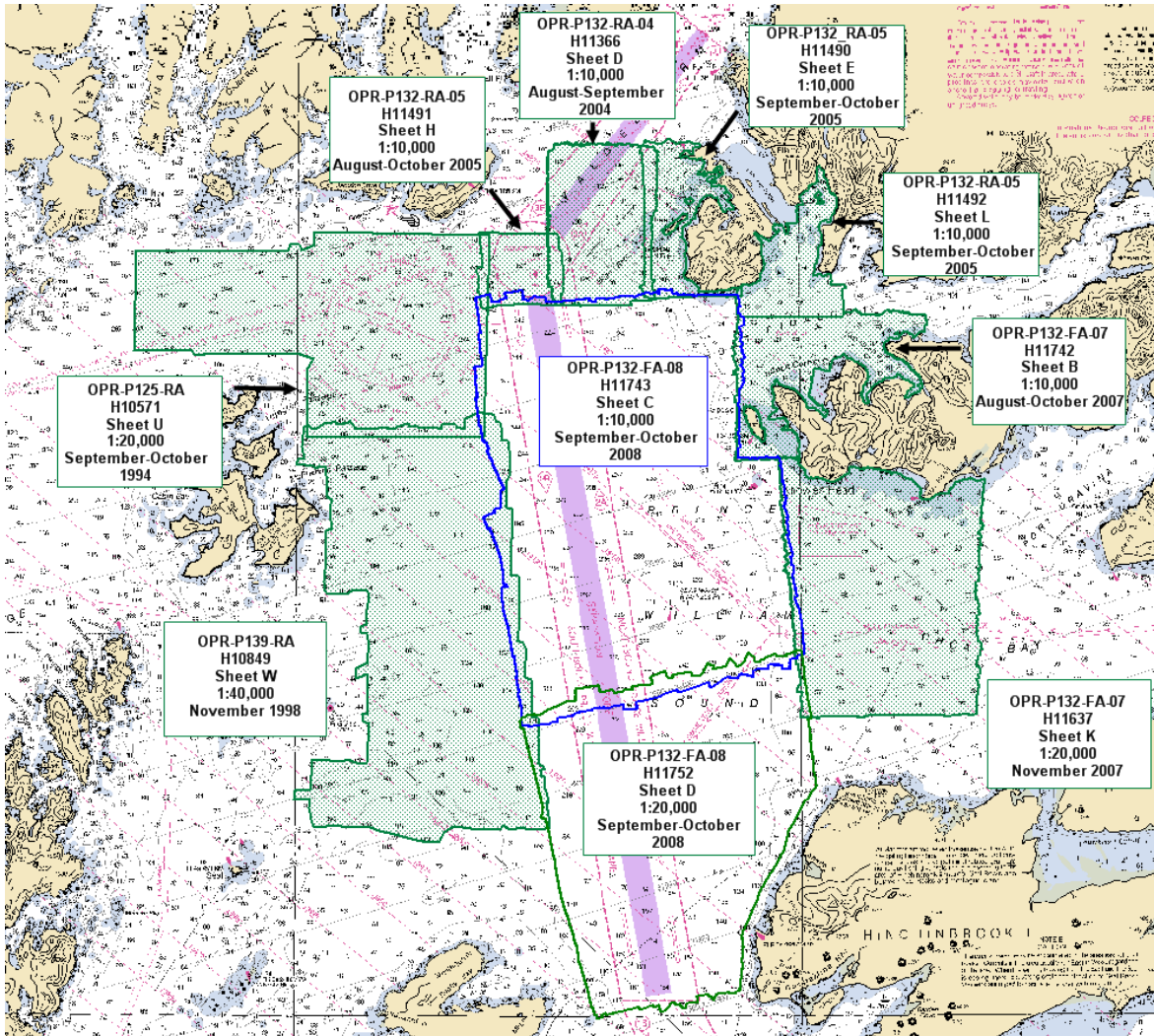


Figure 4: Junction between H11743, H11752, H10849, H10571, H11491, H11366, H11490, H11492, H11742 and H11637

Quality Control Checks

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

Data Quality Factors

TRUEHEAVE:

CARIS was unable to apply TrueHeave files for Launch 1010 Dn255 and Dn264, S220 8111 Dn260 and S220 8160 Dn264. The fixtrueheave application was run on the days listed above and failed for the following lines: Launch 1010 Dn264 line 265-0005; S220 8111 Dn260 lines 260-0638, 206-0702, 260-0707, 260-0713, 260-0721, 260-0731, 260-0757, 260-0833, 260-0857, 260-0923, 260-0949, 260-1018, 260-1044, 260-1112; and S220 8160 Dn264 line 265-0010.

On October 9, 2008 a new fixtrueave application was applied to the above line's associated True Heave files but did not fix the problem. Data quality does not seem to be affected by the absence of applied true heave in the deep waters of the Prince William Sound survey area.⁶

SOUND VELOCITY:

Survey H11743 has some sound velocity (SV) errors at depths over 400m that do not meet the SV allowable error as specified by section 5.1.3.5 of the NOS Hydrographic Survey Specifications and Deliverables Manual (HSSDM), but do meet International Hydrographic Organization (IHO) order 2 standards.⁷ At depths over 220m SV casts were made using the Brooke Ocean Moving Vessel Profiler (MVP), and were not of adequate depths to create an accurate SV profile. The lack of a full water column SV profile is a likely cause of SV error. Figures 5 and 6 below illustrate a SV error at 435m in the SW region of Survey H11743. For this depth the allowable error would be $0.3\text{m} + 0.5\%$ of 435m, which comes to 2.475m. The actual error is 2.86m, which is 0.385m over the allowable SV error. The allowable IHO Order 2 error is 10.055m and the actual error is 7.195m below this.

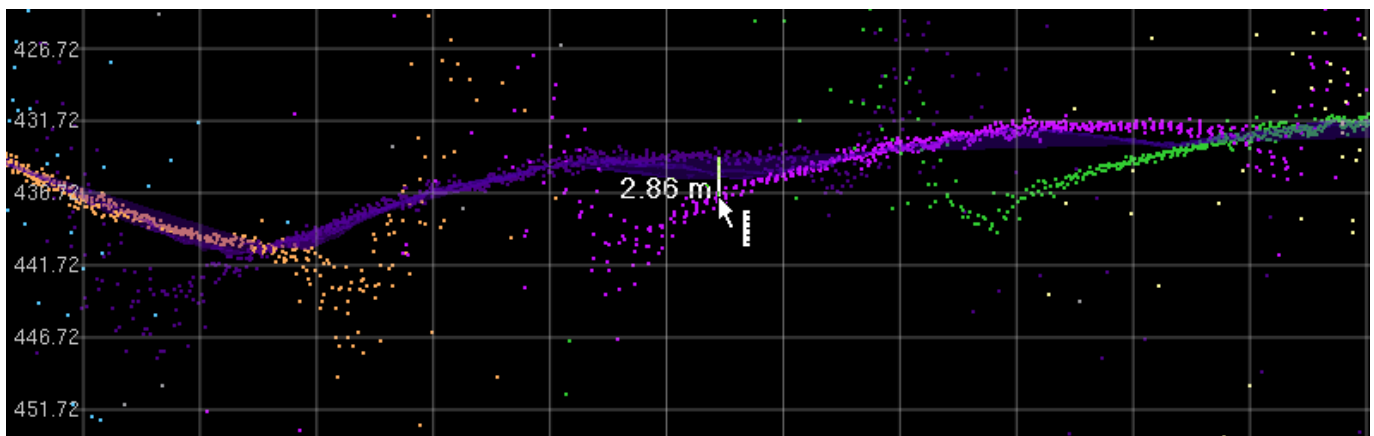


Figure 5: Sound Velocity Error in 435m of water in SW region of Survey H11743.

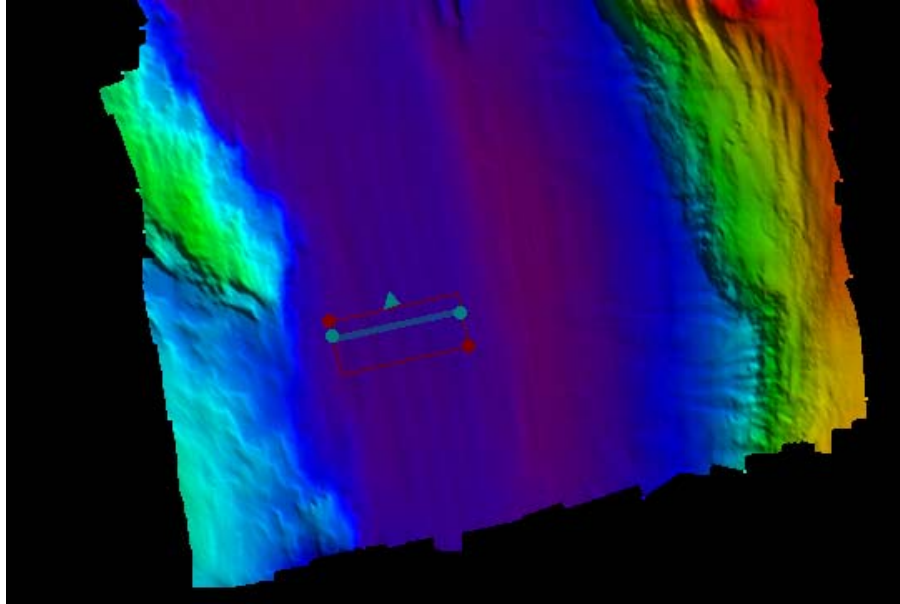


Figure 6: Overview of region with SV error for Survey H11743 as detailed in Figure 5.

UNCLASSIFIED DISCREPANCY

In the western region of Survey H11743 an inconsistency of data was investigated and found to meet IHO order 2 standards. Initially, the inconsistency looked like a sound velocity error, but up on further investigation it appears to be a unique problem in this survey. The problem seems to revolve around line 263-2027 from S220 8160 on Dn263, which runs from the northern to the southern extent of the survey. Figure 7 below illustrated the regions examined in depth.

The two lines flanking line 263-2027 from 60° 40' 12" N and 147° 1' 48" W to the southern end of the sheet each show an offset with line 263-2027. Figure 8 shows what initially looked like a roll bias error between line 263-2027 and 253-0708 from S220 8160 Dn253. A systematic roll bias error was investigated and ruled out as the error was isolated to these lines. An offset of 11.4m was found between the two lines on either side of line 263-2027, and is shown in Figure 9. From 60.67N and 147.03 W to the northern end of the sheet line 263-2027 continues to be offset from its neighboring lines.

Tides, vessel speed, roll bias and other possible systematic errors were investigated but no attributable error could be found. The data does meet IHO order 2 for depths exceeding 100m and was found to be acceptable to replace previous charted data.⁸

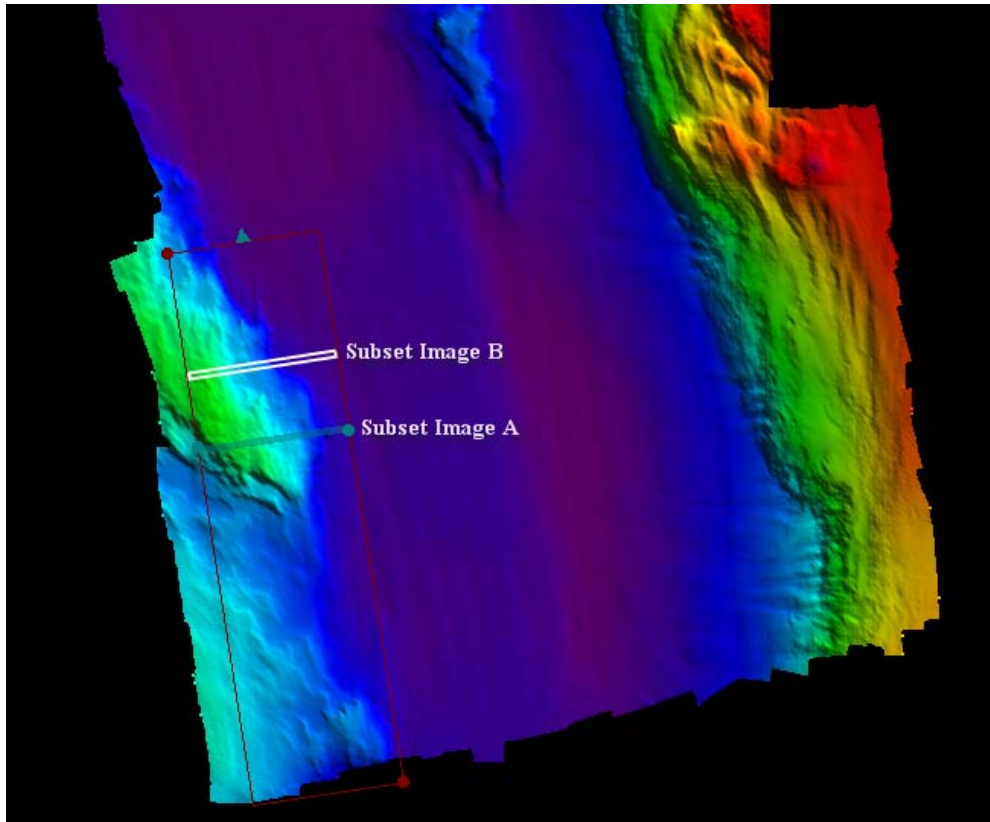


Figure 7: Overview of region detailed in Figures 8 and 9 below.

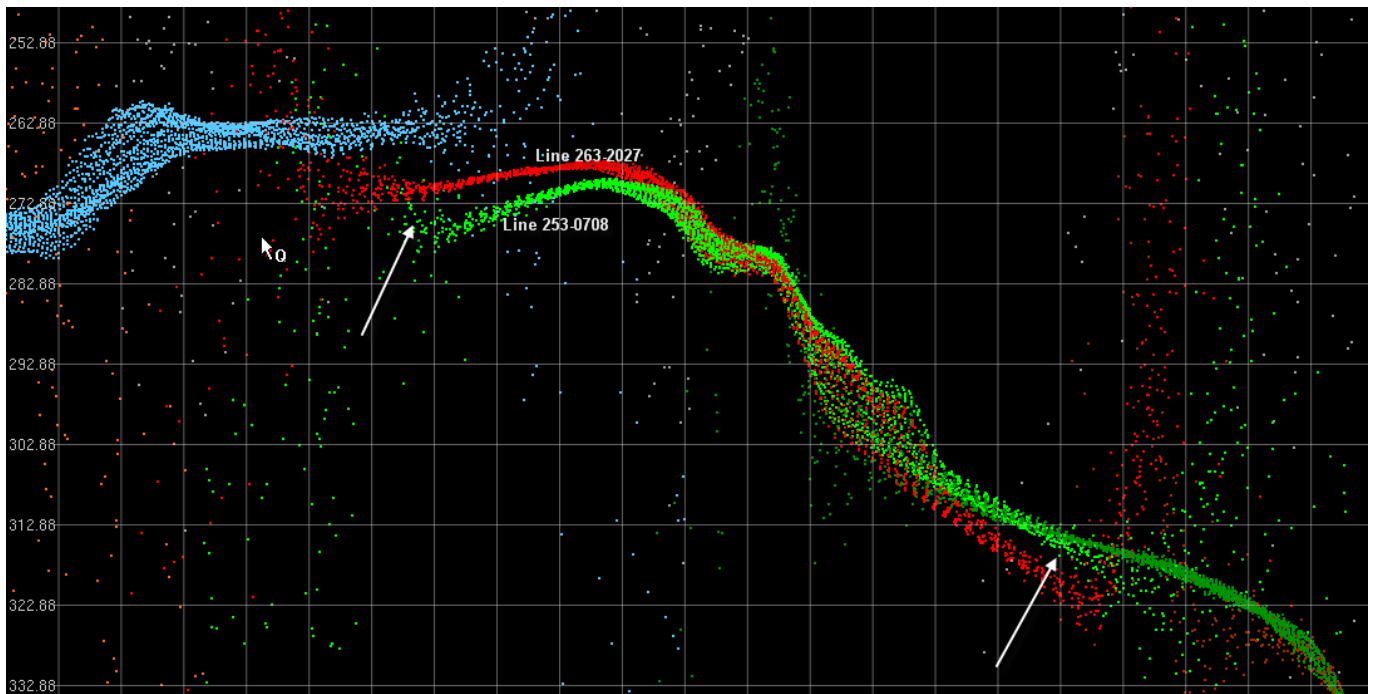


Figure 8: Subset Image A showing discrepancy between lines 263-2027 and 253-0708 in Survey H11743.

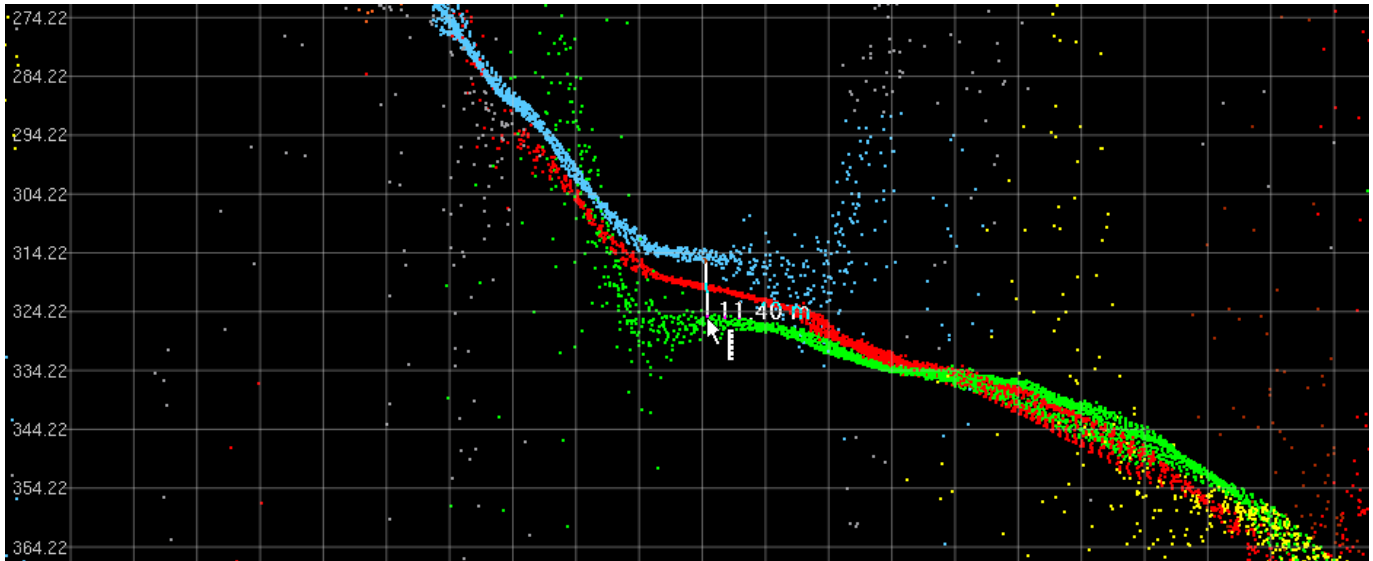


Figure 9: Subset Image B showing large discrepancy found between lines on the western of Survey H11743

DESIGNATED SOUNDINGS

Designation of soundings followed procedures as outlined in section 5.1.1.3 of the HSSDM dated April 2008.

Thirty designated soundings were made to accurately represent the bottom in rocky seabed areas.

Accuracy Standards

In Fledermaus a surface representing each IHO order 1 and 2 were created to analyze the IHO budget at nodes. The HSSDM, April 2008 section 5.1.1.1 states that the total sounding error must be within the 95% confidence level for each specific IHO order. Fledermaus DMagic Surface Statistics illustrates the sounding's IHO uncertainty budgets in Figures 10 and 11 below.

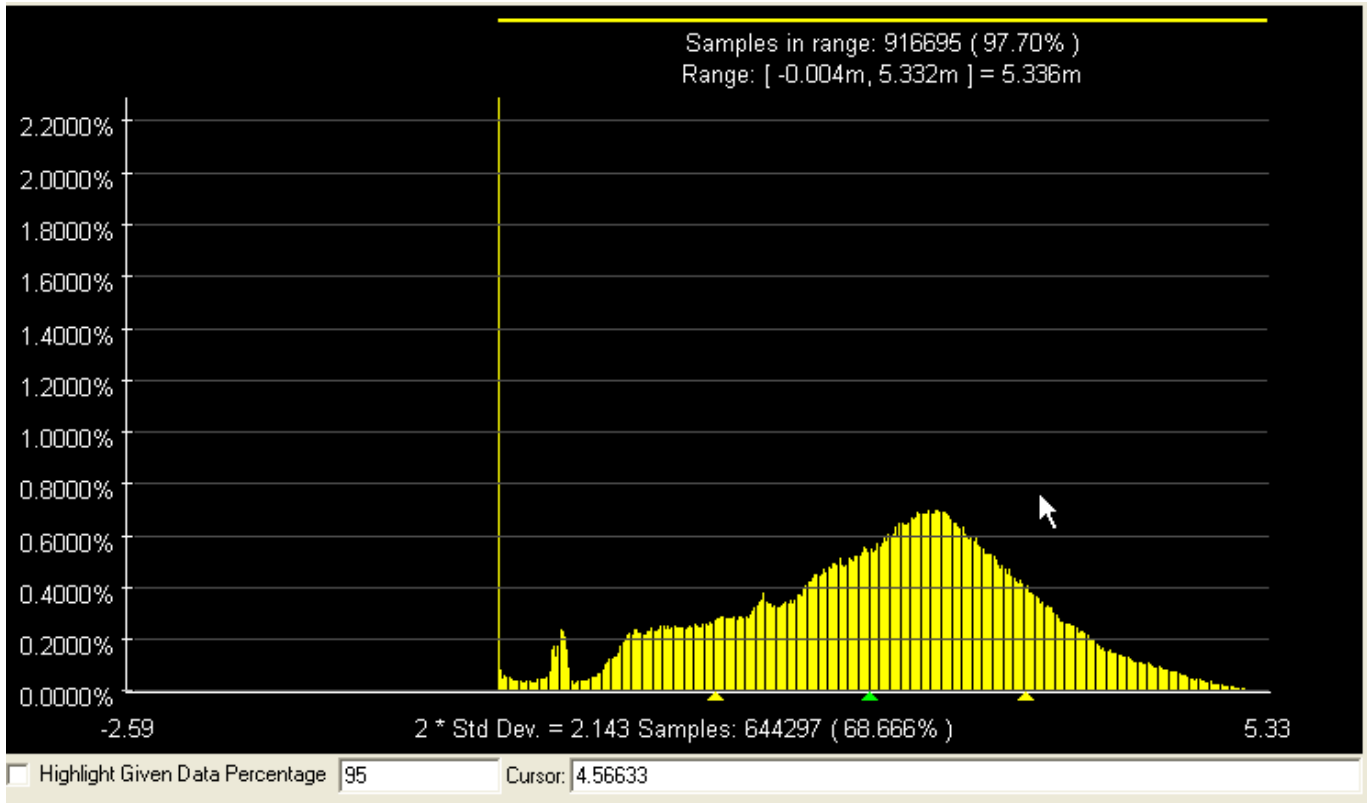


Figure 10: IHO Order 1 Surface Statistics

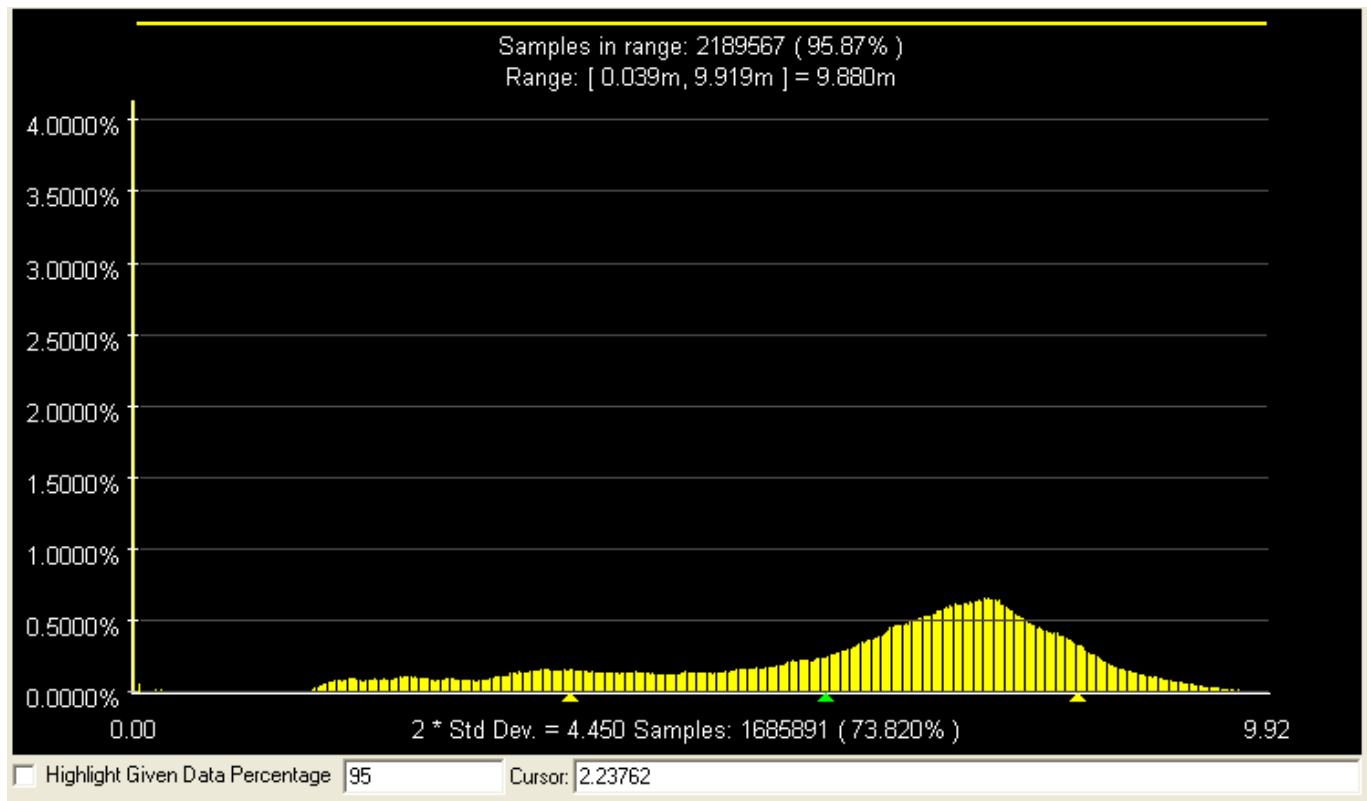


Figure 11: IHO Order 2 Surface Statistics

Survey H11743 had SV errors that did not meet the SV allowable error as specified by section 5.1.3.5 of HSSDM, but did meet IHO order 2 standards.⁹ This is discussed in detail in Section B2: Quality Control within the Sound Velocity paragraph.

B3. Corrections to Echo Soundings

Data reduction procedures for survey H11743 conform to those detailed in the DAPR.

B4. Data Processing

Initial data acquisition and processing notes are included the acquisition and processing logs, additional processing such as final tides and sound velocity applied is most accurately tracked in the survey wide query in the MBES QC Review tab of the H11743_Data_Log. All of the logs are included with the digital Separates I.

Data processing procedures for survey H11743 conform to those detailed in the DAPR. Further processing details regarding Total Propagated Uncertainty (TPU/TPE) and CUBE Surfaces and Parameters utilized, along with any the deviations from the processing procedures outlined in the DAPR are discussed below.

Data processing was completed using CARIS HIPS/SIPS Service Pack 2 with Hotfix 4. Data was combined at 16m resolution and cleaned and reviewed to that level. As of March 2009, the current technology implemented in CARIS HIPS/SIPS, any combining at finer resolutions than this may produce additional noise. The hydrographer would not have been able to detect said noise in combined surfaces with finer resolutions with the current processing methods.

TPE VALUES:

The survey specific parameters used to compute TPE in CARIS for H11743 are listed in Table 4.

Tide values:	Measured	0.02 m	Zoning	0.16 m
Sound Speed Values:	Measured	0.50 m/s	Surface	0.50 m/s

Table 4: Survey Specific CARIS TPE Parameters

CUBE SURFACES:

The CARIS HIPS CUBE (Combined Uncertainty and Bathymetry Estimator) BASE (Bathymetry Associated with Statistical Error) surfaces created and the associated resolutions are listed below in Table 5.¹⁰

Fieldsheet Name	Surface Name	Depth Ranges (m)	Resolution (m)
H11743	H11743_2m	All	2
H11743	4m	All	4
	H11743_8m	All	8
H11743	16m	All	16
H11743	2m 0to20 Final	0-20	2
	H11743 4m 15to40 Final	15-40	4
	H11743 8m 35to80 Final	35-80	8
H11743	16m 70to600 Final	70-600	16

Table 5: Depth Ranges and Resolutions

CUBE PARAMETERS:

The CUBE parameters utilized for creating CUBE surfaces are included in Table 6. The CUBE parameters .xml file is included with digital data in the vessel configuration folder.

Surface Resolutions	CUBE Parameters				
Grid Resolution	Profile Name	EOV	CDS	CDM	HES
2m 2m	etergrid	2.0	1.0	1.41	2.95
4m 4m	etergrid	2.0	1.0	2.83	2.95
8m 8m	etergrid	2.0	1.0	5.65	2.95
16m 16m	etergrid	4.0	10.0	11.31	2.95

Table 6: CUBE parameters used during this survey

C. HORIZONTAL AND VERTICAL CONTROL

A report of horizontal and vertical control was not required or submitted for *OPR-P132-FA-08*.¹¹ A summary of horizontal and vertical control for this survey follows.

Horizontal Control

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential Global Positioning System (DGPS) was the sole method of positioning. Differential corrections from the U.S. Coast Guard beacon at Cape Hinchinbrook (292 kHz) was used primarily.

Vertical Control

The vertical datum for this project is Mean Lower Low Water (MLLW) as specified in the Letter Instructions. The operating National Water Level Observation Network (NWLON) primary tide station at

Valdez, AK (945-4240) served as control for datum determination and as the primary source for water level correctors for survey H11743.

A request for delivery of final approved (smooth) tides for survey H11743 was forwarded to N/OPS1 on October 7, 2008 in accordance with the Field Procedures Manual (FPM), dated May, 2008. A copy of the request is included in Appendix IV.¹²

As per the Project Instructions, all data were reduced to MLLW using the final approved water levels (smooth tides) from the Valdez, AK station (954-4240) by applying tide file 9454240.tid and time and height correctors through the zone corrector file P132FA2008CORF.zdf.¹³ **It will not be necessary for the Pacific Hydrographic Branch to reapply the final approved water levels (smooth tides) to the survey data during final processing.**¹⁴

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 CARIS HIPS software program.

Survey H11743 was compared with the following charts listed in Table 7. There were no new changes within the survey area.

NOAA Chart Number	Chart Scale	Edition Number	Edition Date	Updated with Notice to Mariners through
16700	1:200,000	30 th Ed.	December, 2007	December 22, 2007(22/07)
16708	1:79,291	26 th Ed.	November, 2008	November 15, 2008 (15/08)
16709	1:80,000	26 th Ed.	April, 2005	August 23, 2008 (23/08)

Table 7: NOAA Charts compared with Survey H11742¹⁵

Chart 16700

Depths from survey H11743 generally agreed within one to three fathoms with depths on chart 16700.¹⁶

Chart 16708

Depths from survey H11743 generally agreed within one to three fathoms with depths on chart 16708.¹⁷

Chart 16709

Depths from survey H11743 generally agreed within one to three fathoms with depths on chart 16709.¹⁸ In depths over 175 fathoms there were differences of up to 6 fathoms. There is one sounding that exceeds general agreement.

A charted sounding of 192 fm where the MBES sounding layer indicates a shoalest depth of 201 fm was found at 60.69N and 146.82W and is illustrated in Figure 12.¹⁹

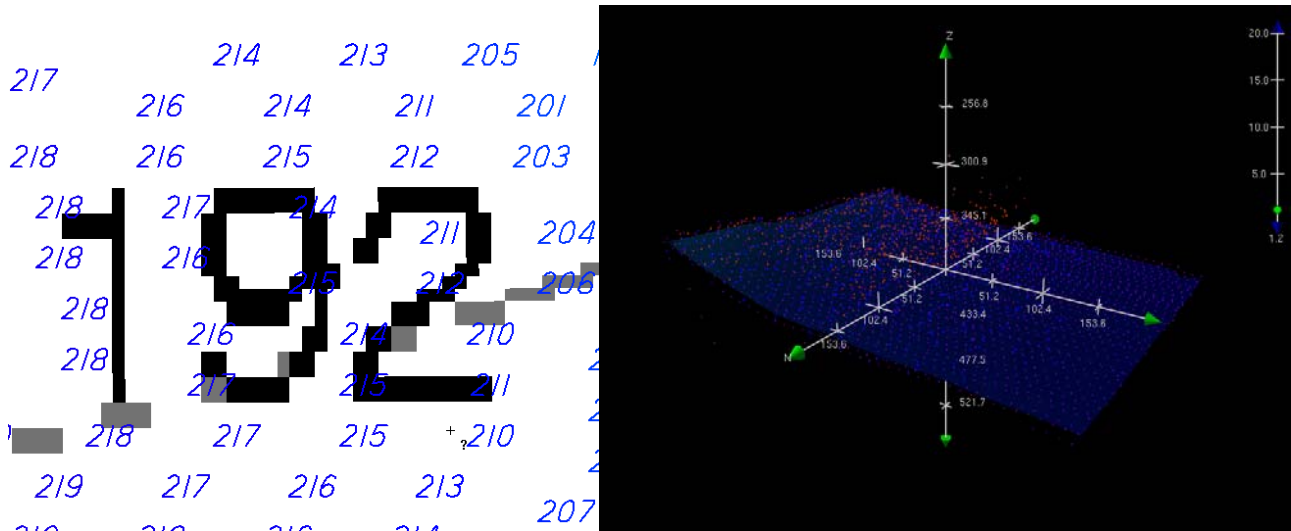


Figure 12: Surveyed least depth of 201fm on charted 192 sounding and complete coverage for charted sounding.

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.**²⁰

Automated Wreck and Obstruction Information System (AWOIS) Investigations

There were no AWOIS items located within the limits of H11743.²¹

Dangers to Navigation

There were no dangers to navigation found within the survey limits.²²

D.2 Additional Results

Shoreline Verification

There was no shoreline verification requested for this survey.²³

Aids to Navigation

There were no aids to navigation within the survey limits.²⁴

Bottom Samples

Bottom samples were collected on September 15, 2008 (DN265), September 16, 2008 (DN266), and October 2, 2008 (DN276) and are included as seabed classifications along with the other S57 features in the Pydro Preliminary Smooth Sheet. The bottom sample positions were also imported into the Notebook H11743_Field_Verified.hob file.²⁵

E. Supplemental Reports

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

<u>Title</u>	<u>Date Sent</u>	<u>Office</u>
Hydrographic Systems Certification Report 2008	May 14, 2008	N/CS34
Data Acquisition and Processing Report 2008	November 14, 2008	N/CS34
Coast Pilot Report for OPR-P132-FA-08	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

March 10, 2009

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

FROM: CDR Douglas D. Baird, NOAA
Commanding Officer

Doug Baird
2009.03.25 13:41:49
-07'00'

TITLE: Approval of Hydrographic Survey H11743,
OPR-P132-FA-08

As Chief of Party, I have ensured that standard field surveying and processing procedures were adhered to during acquisition and processing of hydrographic survey H11743 in accordance with the Hydrographic Manual, Fourth Edition; Field Procedures Manual, May 2008; and the NOS Hydrographic Surveys Specifications and Deliverables, as updated for April 2008. 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:

Digitally signed by
Megan A. Bucher
Date: 2009.03.10
17:28:06 Z

ST Megan Bucher
Survey Manager

Digitally signed by Matthew
Ringel
Date: 2009.03.24 15:58:48
-07'00'

LT Matthew Ringel
Field Operations Officer

Digitally signed by Lynnette Morgan
DN: cn=Lynnette Morgan, c=US, o=NOAA,
ou=NOAA Ship Fairweather, email=lynnette.
v.morgan@noaa.gov
Date: 2009.03.10 22:53:50 Z

CST Lynnette V. Morgan
Chief Survey Technician

Attachment



Revisions Compiled During Office Processing and Certification

¹ Concur.

² DAPR is filed with the project records.

³ Concur.

⁴ Concur.

⁵ Concur with all junction evaluations.

⁶ Concur.

⁷ Concur. The data is adequate to supersede charted data in the common area despite the apparent sound speed errors.

⁸ Concur.

⁹ Concur with clarification. IHO Order 2 specifications were deemed acceptable given the sound speed errors were in depths greater than 100m.

¹⁰ The gridding resolution was revised by PHB. See Survey Acceptance Review checklist and memo filed with hydrographic records.

¹¹ Concur.

¹² The tide note is appended to this report.

¹³ The Approved Water level Request is filed with the hydrographic records.

¹⁴ Concur. Final approved water levels have been applied to all data.

¹⁵ Chart 16708 includes a 1:40,000 inset not mentioned here that covers a 270 x 75m area encompassing 8 charted soundings overlapping with H11743.

¹⁶ Concur.

¹⁷ Concur.

¹⁸ Concur.

¹⁹ Concur. Supersede charted depth with soundings depicted in HCell H11743.

²⁰ Concur.

²¹ Concur.

²² Concur.

²³ Concur.

²⁴ Concur.

²⁵ Nine bottom samples were collected during H11743 and all nine are included in the HCell. An additional fifteen bottom samples were imported from the ENC's to be retained.



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 27, 2008

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P132-FA-2008
HYDROGRAPHIC SHEET: H11743

LOCALITY: Offshore-SW Knowles Head, Prince William Sound, AK
TIME PERIOD: September 6 - October 3, 2008

TIDE STATION USED: 945-4240 Valdez, AK
Lat. 61° 07.4'N Long. 146° 21.8' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.417 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-P132-FA-2008, H11743, during the time period between September 6 - October 3, 2008.

Please use the zoning file "P132FA2008CORP" submitted with the project instructions for H11743. Zones PWS64, PWS65 & PWS71 are the applicable zones for H11743.

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
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NOS, email=peter.stone@noaa.gov, c=US
Date: 2008.10.28 07:10:01 -04'00'

CHIEF, OCEANOGRAPHIC DIVISION



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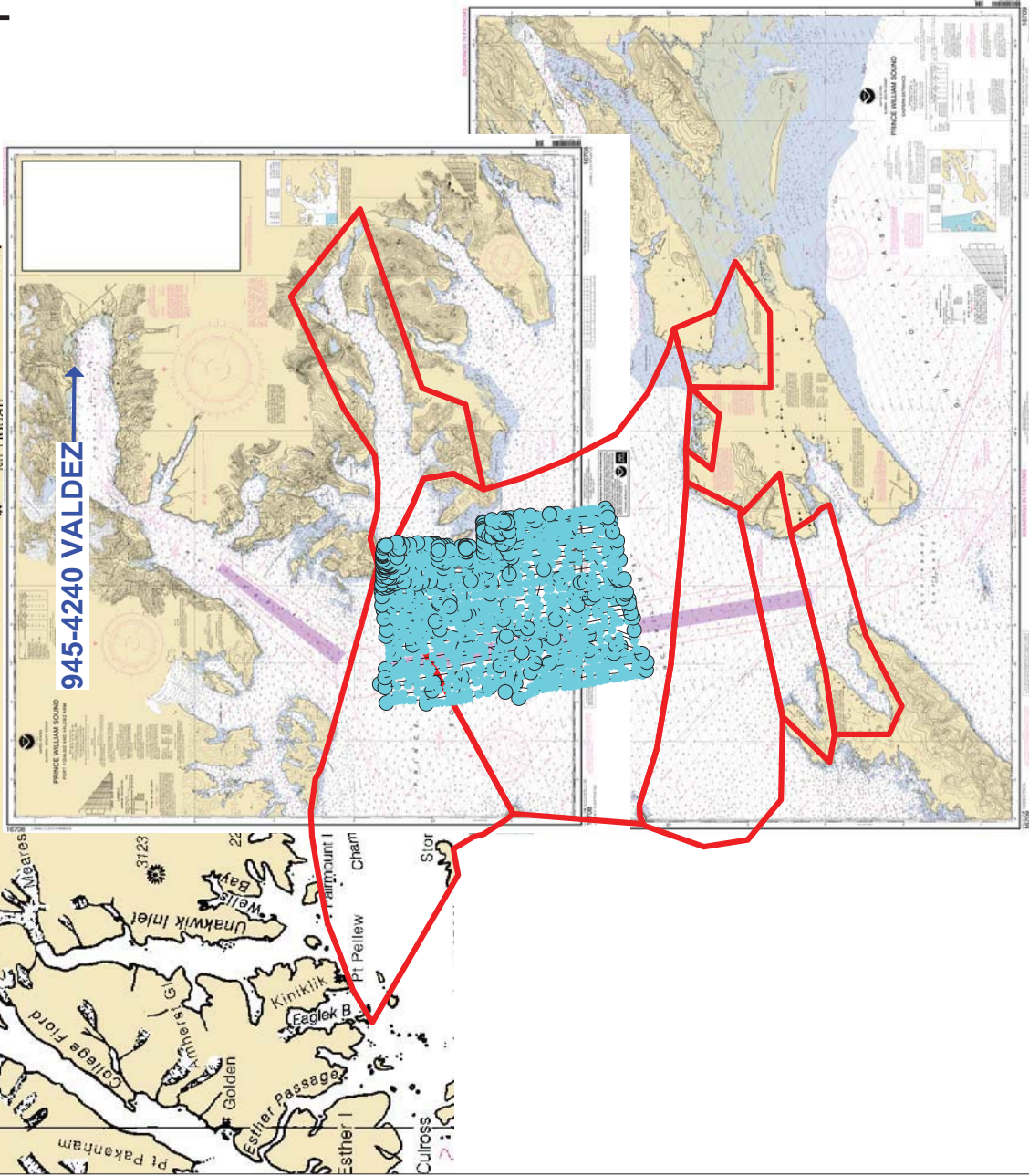
NOTE D

The Prince William Sound vessel traffic service is shown on charts 16700, 16708 and 18709.

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H11743 HCell Report
Martha Herzog, Physical Scientist
Pacific Hydrographic Branch

Introduction

The primary purpose of the HCell is to provide new survey information in International Hydrographic Organization (IHO) format S-57 to update the largest scale ENC's and RNC's in the region: NOAA ENC's, US3AK21M, US4AK24M, US4AK25M, and NOAA RNC's, 16708, 16709, 16700.

HCell compilation of survey H11743 utilized Office of Coast Survey HCell Specifications Version 3.1, with approved modifications to better align with PHB's HCell process and to meet MCD needs.

1. Compilation Scale

Depths for HCell H11743 were compiled to the largest scale charts in the region: 16708, 1:79,271; 16709, 1:80,000; and 16708 inset, 1:40,000.

2. Soundings

A survey-scale sounding (SOUNDG) feature object layer was built from the 16-meter Combined Surface **H11743_Office_Combined** in CARIS BASE Editor. A shoal-biased selection was made at 1:20,000 survey scale using a Radius Table file with values shown in the table, below.

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

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

3. Depth Areas and Depth Contours

3.1 Depth Areas

The extents of the highest resolution BASE Surface together with the extents of the soundings layer were used to digitize the hydrographic extents, which were then used to create the single, all encompassing depth area (DEPARE).

3.2 Depth Contours

Depth contours at the intervals on the largest scale chart are included in the H11743_SS.000 for MCD raster charting division to use for guidance in creating chart contours. The generalized metric and fathom equivalent contour values are shown in the table below.

Chart Contours in Fathoms	Metric Equivalent of Chart Contours	Metric Equivalent of Chart Contours Generalized	Actual Value of Chart Contours
0 0		0.2286	0
3 5.4864		5.715	3.125
5 9.144		9.3726	5.125
10 18.288		18.5166	10.125
50 91.44		92.8116	50.750
100 182.880		184.252	100.75

4. Meta Areas

The following Meta object areas are included in HCell H11743:

M_QUAL
M_COVR
M_CSCL

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

5. Features

5.1 Generalization of Features to Chart Scale

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

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

5.2 Compilation of Features to the HCell

Shoreline features for H11743 were delivered from the field in one hob file containing bottom samples. These were deconflicted against, the chart and hydrography during office processing. Additional bottom sample features were imported from ENC's US3AK21M, US4AK24M, and US4AK25M. The source of all features included in the H11743 HCell can be determined by the SORIND field.

6. S-57 Objects and Attributes

The H11743_HCell contains the following Objects:

\$CSYMB	Blue Notes
DEPARE	The all-encompassing depth area
M_COVR	Data coverage Meta object
M_QUAL	Data quality Meta object
M_CSCL	Delineation of compilation scale
SBDARE Bottom	samples
SOUNDG	Soundings at the chart scale density

The H11743_SS HCell contains the following Objects:

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

All S-57 Feature Objects in the H11743_HCell have been attributed as fully as possible based on information provided by the Hydrographer and in accordance with current guidance and the OCS HCell Specifications.

7. Blue Notes

Notes to the RNC and ENC chart compilers are included in the HCell as \$CSYMB features with the Blue Note information located in the INFORM field. By agreement with MCD, the NINFOM field is populated with an abbreviated version of the Blue Note (30 characters or less), describing the chart disposition, to be used by MCD in generating their Chart History spreadsheet.

8. Spatial Framework

8.1 Coordinate System

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

8.2 Horizontal and Vertical Units

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

Chart Unit Base Cell Units:

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

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

BASE Editor and S-57 Composer Units:

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

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

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

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

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

9. Data Processing Notes

9.1 Junction with H11743

H11743 junctions with H11752, which was compiled and submitted in August 2009. A common junction was made between the two surveys. H11743 also junctions with H10571 (1994), H10849 (1998), H11366 (2004), H11491 (2005), H11490 (2005), H11492 (2006), H11742 (2007), and H11637 (2007). All soundings from H11743

should supersede prior surveys H10571, H10849 and H11366 in common areas. Junctions with H11490, H11491, H11492, H11742 and H11637 will be made when those surveys are compiled.

10. QA/QC and ENC Validation Checks

H11743 was subjected to QA checks in S-57 Composer prior to exporting to the HCell base cell (000) file. The millimeter precision metric S-57 HCell was converted to a chart units and NOAA rounding applied. dKart Inspector was then used to further check the data set for conformity with the S-58 ver. 2 standard (formerly Appendix B.1 Annex C of the S-57 standard). All tests were run and warnings and errors investigated and corrected unless they are MCD approved as inherent to and acceptable for HCells.

11. Products

11.1 HSD, MCD and CGTP Deliverables

- H11743 Base Cell File, Chart Units, Soundings and features compiled to 1:79,271.
- H11743 Base Cell File, Chart Units, Soundings compiled to 1:20,000.
- H11743 Descriptive Report including end notes compiled during office processing and certification, the HCell Report, and supplemental items.
- H11743 Survey outline to populate the SURDEX.

11.2 File Naming Conventions

- Chart units base cell file, chart scale soundings H11743 _CS.000
- Chart units base cell file, survey scale sounding set H11743 _SS.000
- Descriptive Report package H11743 _DR.pdf
- Survey outline H11743_Outline.gml & *.xsd

11.3 Software

CARIS HIPS Ver. 6.1	Inspection of Combined BASE Surfaces
CARIS BASE Editor Ver. 2.2	Creation of soundings and bathy-derived features, creation of the depth area, meta area objects, and Blue Notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer Ver. 2.0	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS 4.4a	Setting the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM Ver. 3.3	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
HydroService AS, dKart Inspector Ver. 5.1	Validation of the base cell file.

12. Contacts

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

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martha.herzog@noaa.gov.

APPROVAL SHEET
H11743

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.