H12370

NOAA Form 76-35A

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Ocean Survey

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12370

LOCALITY

State:	Alaska
General Locality:	Chatham Strait
Sub-locality:	Vicinity of Patterson Bay and Deep Cove

2011

CHIEF OF PARTY
CAPT David O. Neander, NOAA

LIBRARY & ARCHIVES

Date:

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H12370**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State:	**Alaska**
General Locality:	**Chatham Strait**
Sub-Locality:	**Vicinity of Patterson Bay and Deep Cove**
Scale:	**10000**
Dates of Survey:	**09/25/2011 to 10/05/2011**
Instructions Dated:	**08/19/2011**
Project Number:	**OPR-O322-FA-11**
Field Unit:	**NOAA Ship *Fairweather***
Chief of Party:	**CAPT David O. Neander, NOAA**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**Meters at Mean Lower Low Water**
HCell Compilation Units:	***Fathoms at Mean Lower Low Water***

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and end notes (in red) were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC) and can be retrieved via http://www.ngdc.noaa.gov/.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey H12370

Project: OPR-O322-FA-11

Locality: Chatham Strait

Sublocality: Vicinity of Patterson Bay and Deep Cove

Scale: 1:10000

September 2011 - October 2011

NOAA Ship *Fairweather*

Chief of Party: CAPT David O. Neander, NOAA

A. Area Surveyed

The survey area is located in Chatham Strait, AK, within the sub-locality of vicinity of Patterson Bay and Deep Cove.

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
56.63116 N 134.61769 W	56.4651 N 134.76274 W

Table 1: Survey Limits

Survey Limits were acquired in accordance with the requirements in the Project Instructions and the HSSD.

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products. The project will cover emerging critical and category one areas as identified in the 2010 NOAA Hydrographic Survey Priorities (NHSP).

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

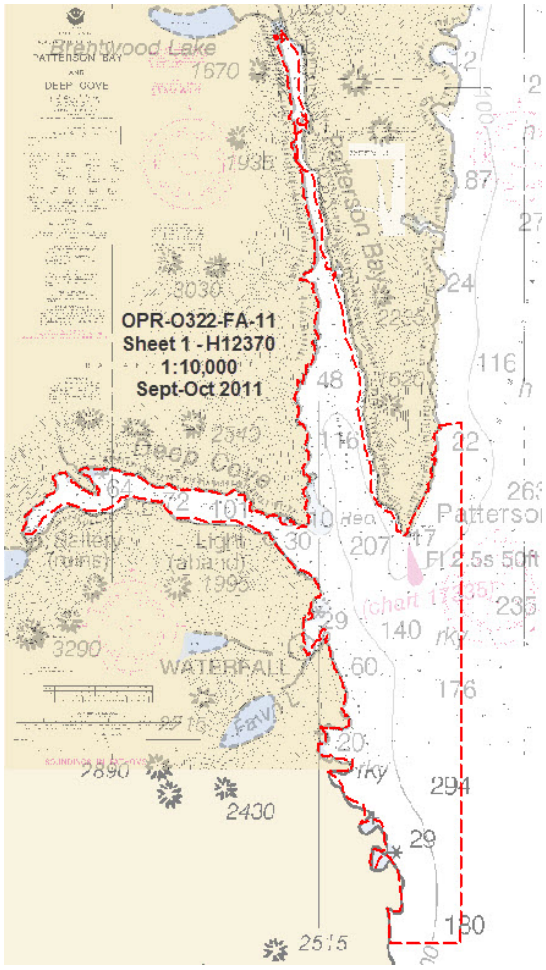


Figure 1: H12370 Survey Outline

Survey Coverage was in accordance with the requirements in the Project Instructions and the HSSD.

A.5 Survey Statistics

The following table lists the mainscheme and crossline acquisition mileage for this survey:

	HULL ID	*2806*	*S220*	*2805*	*Total*
LNM	**SBES Mainscheme**	0.00	0.00	0.00	0.00
	MBES Mainscheme	67.69	52.15	43.10	162.94
	Lidar Mainscheme	0.00	0.00	0.00	0.00
	SSS Mainscheme	0.00	0.00	0.00	0.00
	SBES/MBES Combo Mainscheme	0.00	0.00	0.00	0.00
	SBES/SSS Combo Mainscheme	0.00	0.00	0.00	0.00
	MBES/SSS Combo Mainscheme	0.00	0.00	0.00	0.00
	SBES/MBES Combo Crosslines	0.00	0.00	7.71	7.71
	Lidar Crosslines	0.00	0.00	0.00	0.00
Number of Bottom Samples					3
Number of DPs					0
Number of Items Items Investigated by Dive Ops					0
Total Number of SNM					10.21

Table 2: Hydrographic Survey Statistics

The following table lists the specific dates of data acquisition for this survey:

Survey Dates
09/25/2011
09/26/2011
09/27/2011
09/28/2011
10/05/2011

Table 3: Dates of Hydrography

A.6 Shoreline

The shoreline investigation was conducted by survey launches during multibeam acquisition. All features discovered or deemed in need of updating, are included in the final feature file.

A.7 Bottom Samples

Three bottom samples were acquired on sheet H12370. Eleven bottom sample locations were assigned in the Project Reference File. Two of the three sites correspond with sites identified by the supplied bottom sample Project Reference File. The remaining site was selected based on the suitability as a potential anchorage location.

All 3 bottom samples are included in the HCell.

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Refer to the Data Acquisition and Processing Report (DAPR) for a complete description of data acquisition and processing systems, survey vessels, quality control procedures and data processing methods. Additional information to supplement sounding and survey data, and any deviations from the DAPR are discussed in the following sections.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	***2805***	***2806***	***S220***
LOA	8.64 meters	8.64 meters	70.4 meters
Draft	1.12 meters	1.12 meters	4.7 meters

Table 4: Vessels Used

B.1.2 Equipment

The following major systems were used for data acquisition during this survey:

Manufacturer	Model	Type
RESON	SVP71	Sound Speed System
Sea Bird	SBE 19plus	Sound Speed System
RESON	SVP70	Sound Speed System
Brooke Ocean	MVP 200	Sound Speed System
Applanix	POS/MV V4	Positioning System
Applanix	POS/MV V4	Vessel Attitude System
RESON	7125	MBES
RESON	8160	MBES
RESON	7111	MBES

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines were collected, processed and compared in accordance with section 5.2.4.3 of the HSSD. Surface differencing in CARIS HIPS and SIPS was used to assess crossline agreement with main scheme lines. Percentage of crosslines collected to main scheme lines is 4.7% Differences in crosslines to main scheme lines are believed to be caused by sound velocity and changes in slope. Generally, the greatest differences in depth were found in areas where the change of slope is more abrupt. See figure 2 for an illustration of surface difference along slopes between the depths of 50 and 300 meters. Figure 3 is a statistical representation of the crossline differences.

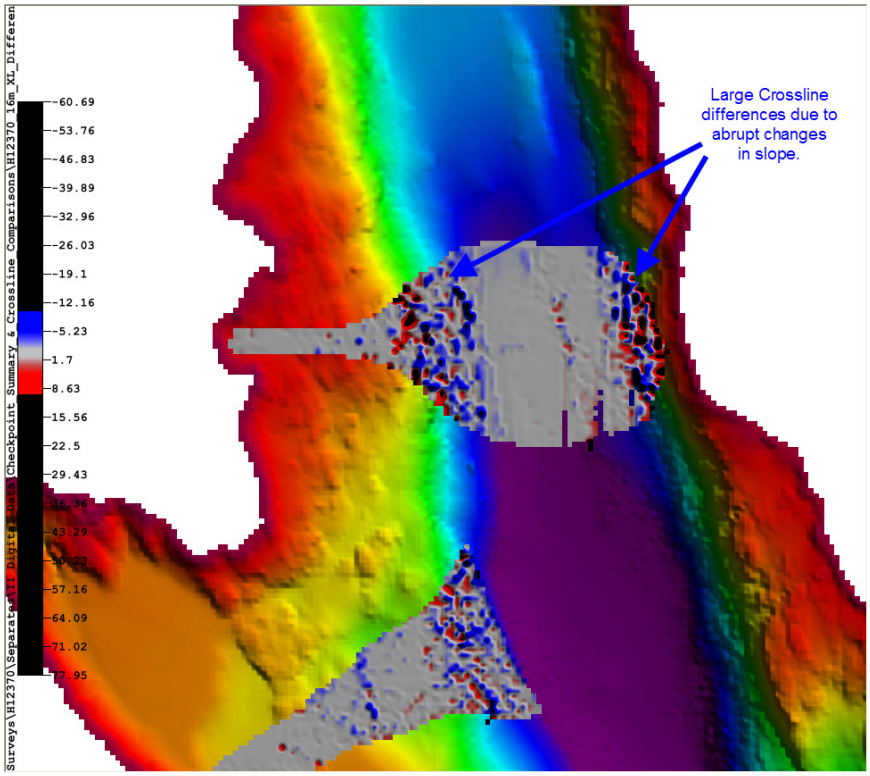


Figure 2: Graphical representation of differences between crossline and mainscheme surfaces.

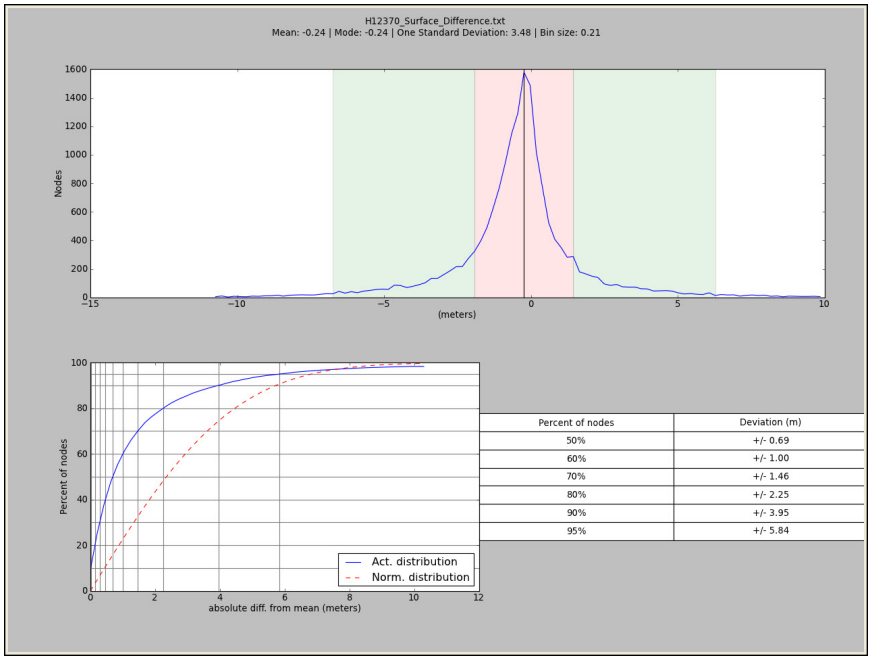


Figure 3: Statistical representation of differences between crossline and mainscheme surfaces.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.01	0.1

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S220	0.5	0.5	0.5
2806	2	n/a	0.5
2805	2	n/a	0.5

Table 7: Survey Specific Sound Speed TPU Values

Tide TPU values are in meters. Sound speed TPU values are in meters/second

B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12373	1:10000	2011	NOAA Ship FAIRWEATHER	E
H12371	1:10000	2011	NOAA Ship FAIRWEATHER	S

Table 8: Junctioning Surveys

H12373

The areas of overlap between the sheets are reviewed in CARIS Subset Editor for sounding consistency to assess surface agreement. The junction agreement is generally within the total allowable vertical uncertainty in their common areas and depths for all surfaces. Data overlap between all surveys was achieved for all junctions; see figure 4 for areas of overlap.

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between H12370_16m_combined surface and H12373_32m_combined surface. Differences in junctions are believed to be caused by sound velocity and change in slope. See figure 5 for statistical information.

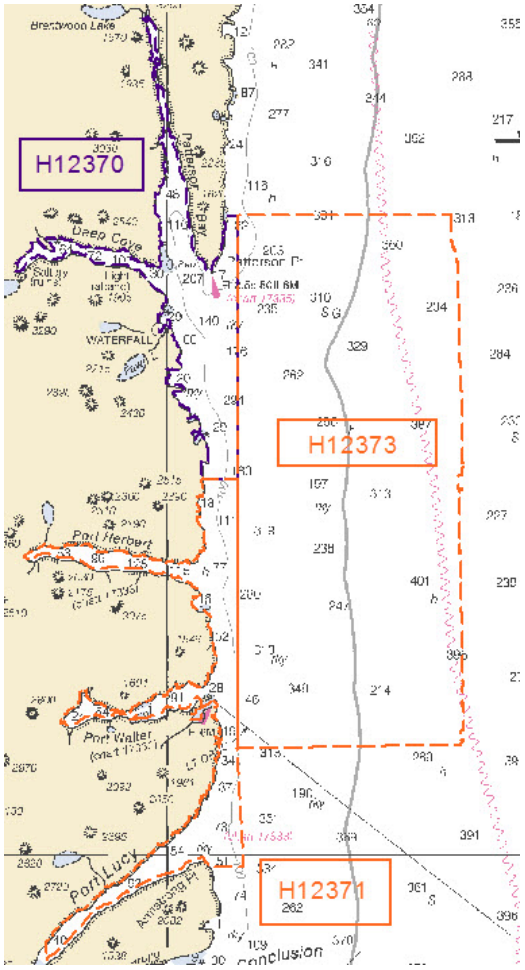
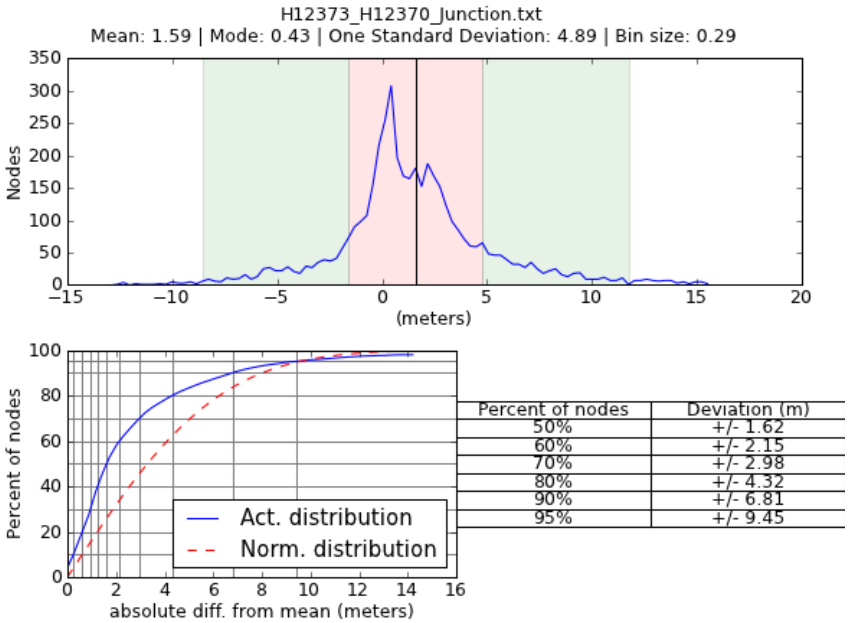


Figure 4: Junctions between H12371 and H12373



Percent of nodes	Deviation (m)
50%	+/- 1.62
60%	+/- 2.15
70%	+/- 2.98
80%	+/- 4.32
90%	+/- 6.81
95%	+/- 9.45

Figure 5: Statistical information for junction comparison between H12370 and H12373.

Due to the steep topography and possible sound speed refraction, differences in the junction area are to be expected. The data is adequate for charting.

H12371

Surface differencing in CARIS HIPS and SIPS was used to assess junction agreement between H12370_16m_combined surface and H12371_16m_combined surface. Difference in junctions are believed to be caused by change in slope. See figure 6 for statistical information.

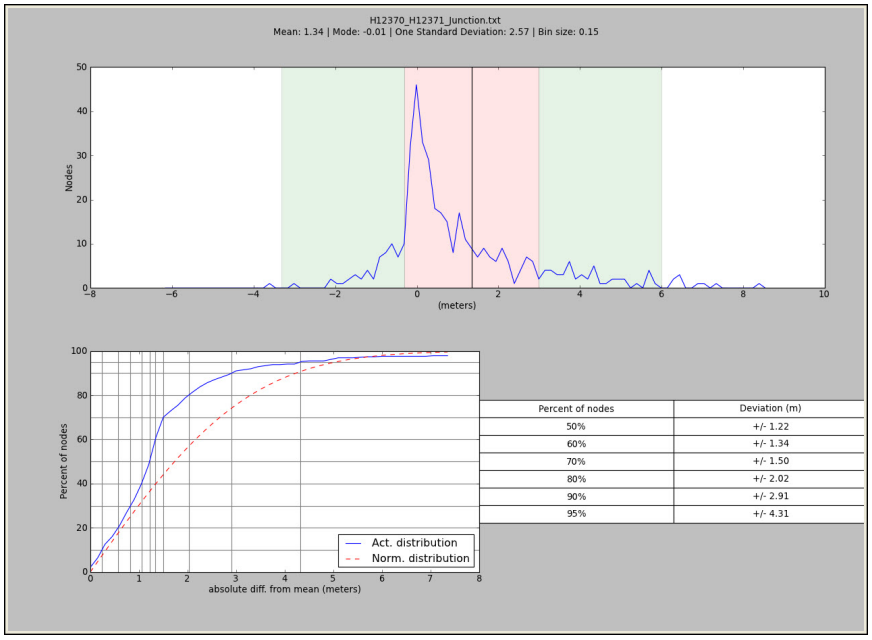


Figure 6: Statistical information for junction comparison between sheet H12370 and H12371.

Due to the steep topography, differences in the junction area are to be expected. The data is adequate for charting.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

B.2.5.1 Positioning and Vessel Attitude Systems

Due to the general topography of the area (steep mountains), the positioning and vessel attitude systems occasionally output low quality data as a result of poor satellite constellations. The application of SBETs improved this issue so that all data are within Total Horizontal Uncertainty standards. There are a few

instances throughout the survey area, most notably in Patterson Bay (Figure 7), where there are still horizontal offsets. Figure 8 is an example of a line logged with a low satellite count and a high PDOP value.

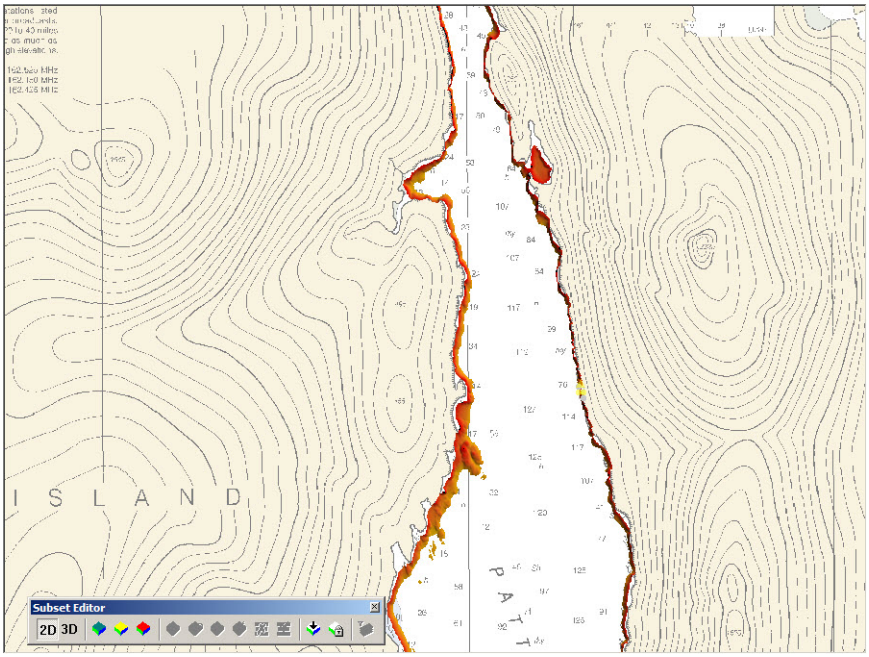


Figure 7: Overview of Patterson Bay where positioning issues are most prevalent.

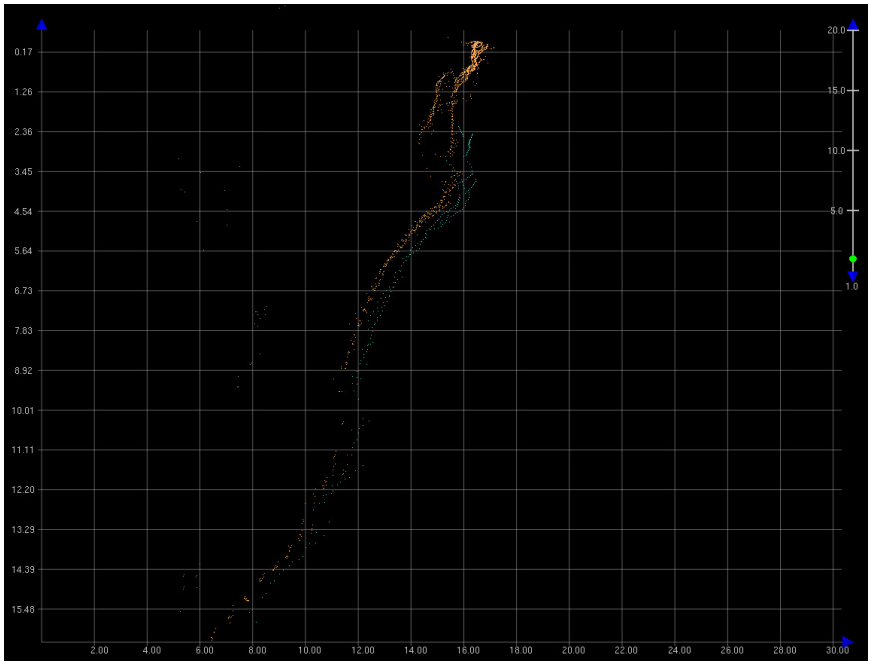


Figure 8: Poor positioning in Patterson Bay due to low satellites resulting from the topography of the survey area.

The data is adequate for charting despite the horizontal offsets.

B.2.6 Factors Affecting Soundings

B.2.6.1 Factors Affecting Soundings

There were no factors affecting soundings on sheet H12370.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Sound speed measurements were conducted and applied as discussed in the Corrections to Echo Soundings section of the DAPR.

B.2.8 Coverage Equipment and Methods

All Equipment and survey methods were used as detailed in the DAPR.

B.2.9 Surface Tearing due to Overhanging Ledges

Overhanging ledges are present on both the east and west sides of Patterson Bay. Near these ledges, the 1m finalized surface will honor the shoalest soundings, but will then tear to soundings representing the ledges that are deeper and more nearshore than the shoal soundings. No soundings were deleted to prevent the surface from tearing. Figures 9, 10, 11 are examples of this issue on the east side of Patterson Bay.

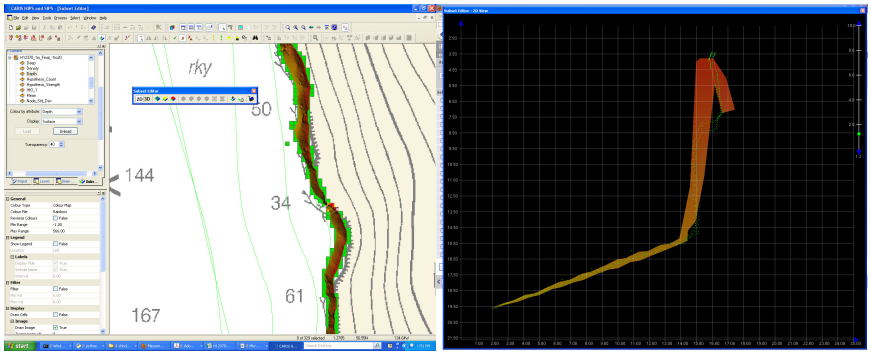


Figure 9: Surface tearing example on east side of Patterson Bay

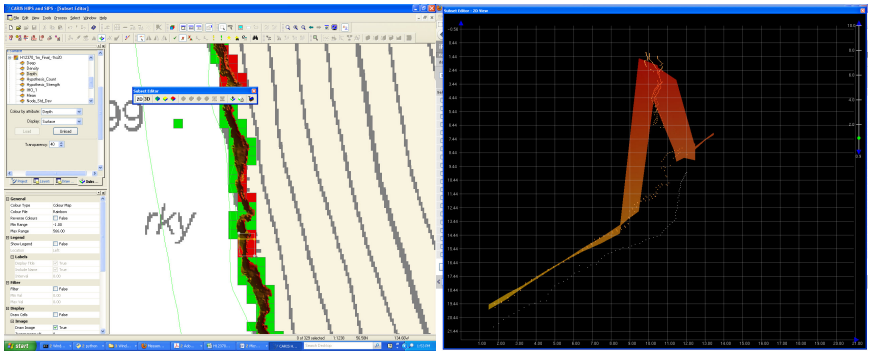


Figure 10: Surface tearing example on east side of Patterson Bay

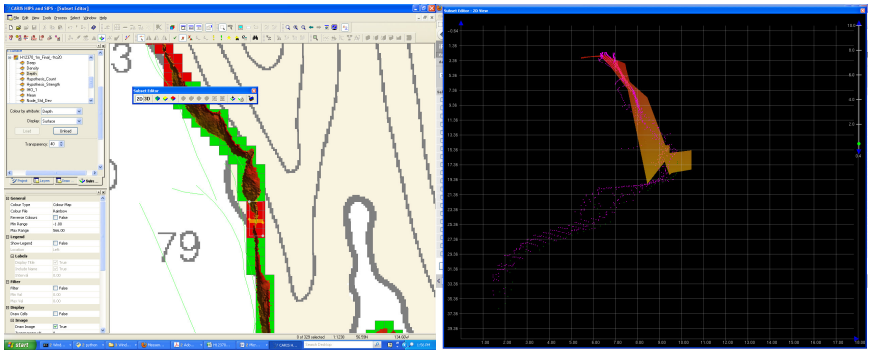


Figure 11: Surface tearing example on east side of Patterson Bay

Surface tearing is a result of limitations in gridding algorithms for bathymetric data and has no effect on the integrity of the underlying data itself. The data is adequate for charting.

B.2.10 IHO Uncertainty

The data meet the accuracy specifications as stated in the NOS Hydrographic Surveys Specifications and Deliverables (HSSD) dated April 2011, see Standards Compliance Review in Appendix V.

Due to the steep topography, differences in the junction area are to be expected. The data is adequate for charting.

B.2.11 Density

Density requirements for the 1m, 2m, 4m, 8m, and 16m finalized surfaces were achieved with at least 99.21% of finalized surface nodes containing five or more soundings. See Standards Compliance Review in Appendix V.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

Do not concur. The field has used a questionable method to correct soundings by manually rejecting large portions of data on the eastern border of the survey for a clean edge look. Although there was a non-standard method of rejecting data on the eastern edge of the survey, the data meets specifications and coverage requirements. The data is adequate for charting.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was logged as 7k files and 81X files submitted to NGDC for file backup and to the Pacific Hydrographic Branch for processing.

This data will be archived at NGDC, but branches are not currently processing delivered backscatter.

B.5 Data Processing

B.5.1 Software Updates

The following software updates occurred after the submission of the DAPR:

Manufacturer	Name	Version	Service Pack	Hotfix	Installation Date	Use
Caris	HIPS/SIPS	7.1	0	3	10/24/2011	Processing
Caris	HIPS/SIPS	7.1	0	2	08/08/2011	Processing
Caris	Notebook	3.1	0	3	10/13/2011	Processing
Caris	Bathy DataBASE	3.2	1	0	10/13/2011	Processing
NOAA	Pydro	11.9-11 (r3603-3670)	1	0	12/02/2011	Processing
Applanix	PosPAC	5.4	1	0	10/13/2011	Processing

Table 9: Software Updates

The following Feature Object Catalog was used: Object Catalogue 5

B.5.2 Surfaces

The following CARIS surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12370_1m	CUBE	1 meters	-	NOAA_1m	Complete MBES
H12370_2m	CUBE	2 meters	-	NOAA_2m	Complete MBES
H12370_4m	CUBE	4 meters	-	NOAA_4m	Complete MBES
H12370_8m	CUBE	8 meters	-	NOAA_8m	Complete MBES
H12370_16m	CUBE	16 meters	-	NOAA_16m	Complete MBES
H12370_1m_Final_-1to20	CUBE	1 meters	-1 meters - 20 meters	NOAA_1m	Complete MBES
H12370_2m_Final_16to40	CUBE	2 meters	16 meters - 40 meters	NOAA_2m	Complete MBES
H12370_4m_Final_32to80	CUBE	4 meters	32 meters - 80 meters	NOAA_4m	Complete MBES
H12370_8m_Final_64to160	CUBE	8 meters	64 meters - 160 meters	NOAA_8m	Complete MBES
H12370_16m_Final_128to600	CUBE	16 meters	128 meters - 600 meters	NOAA_16m	Complete MBES
H12370_16m_Combined	CUBE	16 meters	-	NOAA_16m	Complete MBES

Table 10: CARIS Surfaces

All field sheet extents were adjusted using the Base 16 Calculator tool to ensure coincident nodes among all bathymetric surfaces regardless of the field sheet in which they are contained given the standard surface resolutions of one, two, four, eight, and sixteen meters. The NOAA CUBE parameters mandated in HSSD were used for the creation of all CUBE BASE surfaces in Survey H12370.

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

The 1m surface was finalized so the depth range was -1 meter to 20 meters. The minimum depth of -1 meter was used to assure soundings on the top of a -0.2 meter rock were included in the finalized surface.

As there was significant downsloping encountered in the near shore areas, the use of conventional surface ranges was found to create holes in the boundaries between the surfaces. The solution decided upon was to double the depth overlap between the surfaces. For example, where originally the 2-meter surface would have a range of 18-40 meters and the 4-meter surface a range of 36-80 meters, the new surfaces would be 16-40 meters and 32-80 meters respectively. This solved the main display issues, but some gaps remained in those areas where sheer cliffs were encountered, as shown in figure 12.

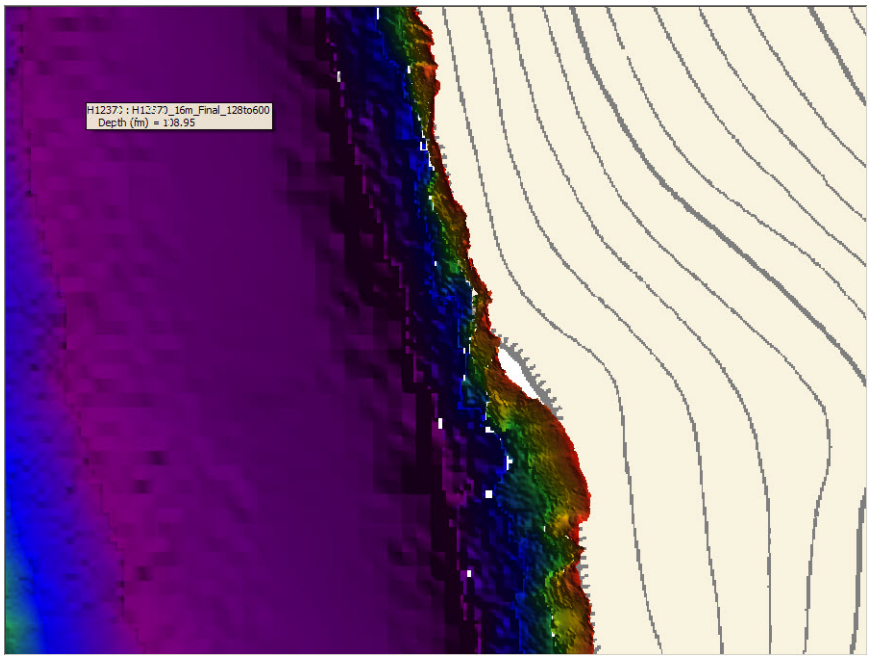


Figure 12: H12370 Patterson Bay Resolution Issue

A 16-meter combined surface, H12370_16m_Combined.csar, was used as the basis for compilation.

B.5.3 Data Logs

Data acquisition and processing notes are included in the acquisition and processing logs, and additional processing such as sound velocity application is noted in the H12370 Data Log spreadhseet. All data logs are submitted digitally in the Separates I folder.

B.5.4 Critical Soundings

Designation of soundings followed procedures as outlined in section of 5.2.1.2 of the HSSD.

Survey H12370 requires 4 designated soundings and 0 outstanding soundings. Two soundings were designated as Dangers to Navigation. Two designated soundings are required to accurately represent the seafloor.

B.5.5 TrueHeave

To enable the application of TrueHeave some POS/MV files were "fixed" using the fixTrueHeave.exe utility from CARIS. Fixed files were assigned an additional *.fixed suffix. This was performed for the following vessels and days: Launch 2805 days 269 and 270; Launch 2806 days 268, 269, and 270.

The data that the fixTrueHeave utility was applied to is adequate for charting.

B.5.6 Data Processing Deviations

All Reson 8160 data were filtered to 55 degrees off nadir on both port and starboard to remove poor quality data. No Reson 7111 data were filtered.

After the data was filtered, the remaining data is adequate for charting.

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

C.1 Vertical Control

The vertical datum for this project is Mean lower low water.

Standard Vertical Control Methods Used:

Discrete Zoning

The following National Water Level Observation Network (NWLON) stations served as datum control for this survey:

Station Name	Station ID
Port Alexander	9451054

Table 11: NWLON Tide Stations

File Name	Status
9451054.tid	Verified Observed

Table 12: Water Level Files (.tid)

File Name	Status
O322FA2011CORP.zdf	Final

Table 13: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 10/11/2011. The final tide note was received on 10/24/2011.

Preliminary zoning is accepted as the final zoning for project OPR-O322-FA-2011.

See attached Tide Note dated October 24, 2011.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD83).

The following PPK methods were used for horizontal control:

Single Base

Vessel kinematic data were post-processed using Applanix POSPac processing software and SingleBase Post Processed Kinematic methods described in the DAPR. Smooth Best Estimate of Trajectory (SBET) and associated error (RMS) data were applied to all MBES data in CARIS HIPS.

For further details regarding the processing and quality control checks performed see the H12370 POSPAC Processing Logs spreadhseet located in the SBET folder with the GNSS data. See also the OPR-O322-FA-11 Horizontal and Vertical Control report, submitted under separate cover.

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
PAT	TT9786

Table 14: User Installed Base Stations

The following DGPS Stations were used for horizontal control:

DGPS Stations
Annette Island, AK - 323 kHz (100 BPS)
Gustavus, AK - 288 kHz (100 BPS)
Level Island, AK - 295 kHz (100 BPS)

Table 15: USCG DGPS Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 WAAS Correctors

On DN 269, Launch 2805 acquired data with WAAS correctors enabled instead of DGPS. This option was disabled after DN 269 and subsequent days were all run with DGPS correctors.

D. Results and Recommendations

D.1 Chart Comparison

D.1.1 Raster Charts

The following are the largest scale raster charts, which cover the survey area:

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
17320	1:217828	18	03/2008	10/23/2007	11/03/2007
17335	1:20000	7	10/2004	09/14/2004	10/02/2004

Table 16: Largest Scale Raster Charts

17320

Sounding agreement between surveyed soundings on sheet H12370 varied from 1 to 196 fathoms with chart 17320. The greatest difference of 196 fathoms was found at the charted 22-fathom sounding northeast of Patterson Point, where the surveyed soundings ranged from 116 to 218 fathoms (Figure 13).

North of the entrance to Port Herbert, a 29-fathom charted sounding was surveyed with MBES from 64 to 213 fathoms (Figure 14).

Contours generated in CARIS HIPS generally approximated the charted 10-fathom and 100-fathom contours. Exceptions to this include the 10-fathom contour north of the entrance to Deep Cove and the 100-fathom contour northeast of Patterson Point (Figure 15).

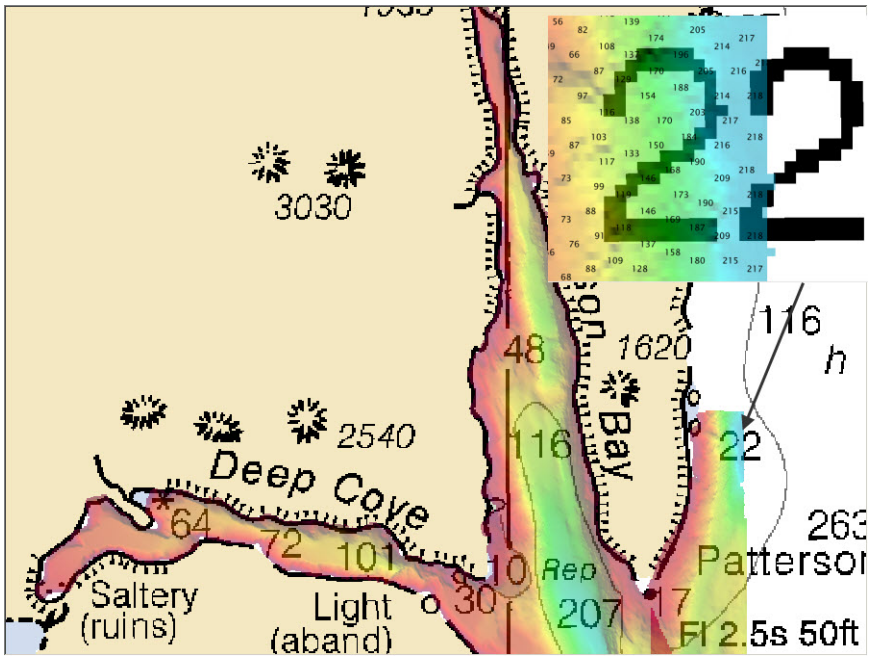


Figure 13: Chart 17320 sounding difference between surveyed soundings in the northern portion of sheet H12370.

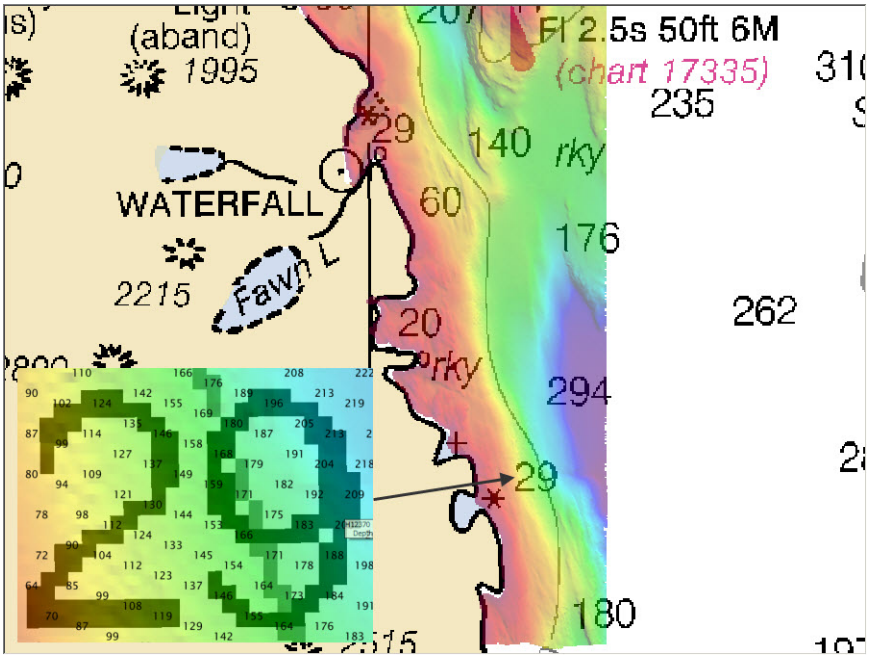


Figure 14: Chart 17320 sounding difference between surveyed soundings in the southern portion of sheet H12370.

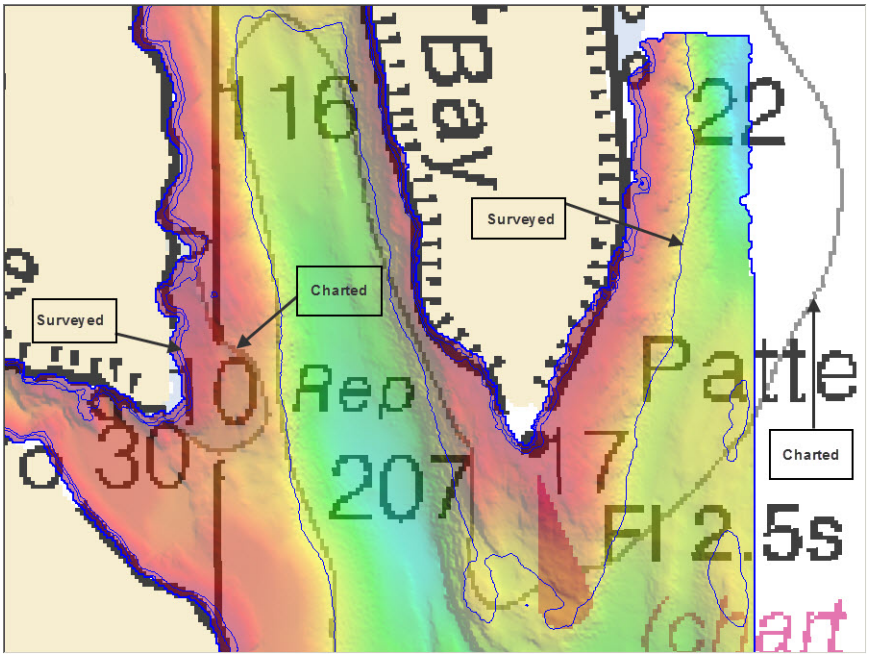


Figure 15: Chart 17320 contour differences between generated contours on sheet H12370.

Update charted depths and contours based on new survey data.

17335

Sounding agreement between surveyed soundings on sheet H12370 varied from 1 to 68 fathoms. The greatest difference of 68 fathoms was found at the charted 35-fathom sounding northeast of Patterson Point, where the surveyed sounding is 103 fathoms (Figure 16).

In northern Patterson Bay, a charted 14-fathom sounding was surveyed with MBES at 6 fathoms (Figure 16).

In the central Patterson Bay, a charted 12-fathom sounding was surveyed with MBES at 2 fathoms (Figure 16).

North of the entrance to Deep Cove, a charted reported 10-fathom sounding was surveyed with MBES at 40 fathoms (Figure 16).

In the entrance to Deep Cove, a charted 31-fathom sounding was surveyed with MBES at 15 fathoms (Figure 17).

East of Mist Cove, a charted 39-fathom sounding was surveyed with MBES at 87 fathoms (Figure 17).

Mist Cove has multiple charted soundings that vary between the surveyed soundings by 5 to 10 fathoms (Figure 17).

Contours generated in CARIS HIPS closely approximated the charted 5-fathom and 10-fathom contours except in a few areas in Patterson Bay where no 10-fathom contour was charted (Figure 18).

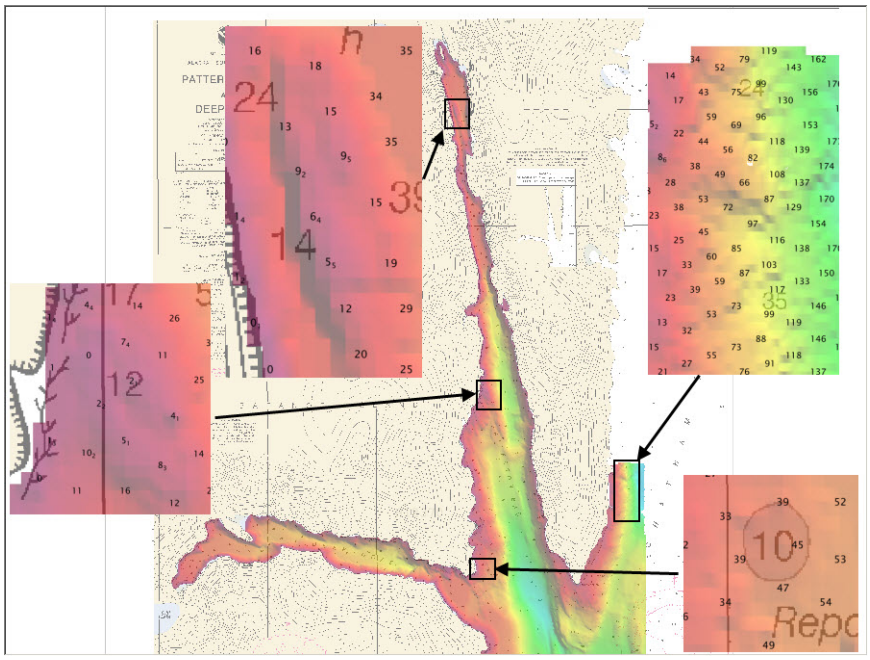


Figure 16: Chart 17335 sounding difference between surveyed soundings on the southern portion of sheet H12370.

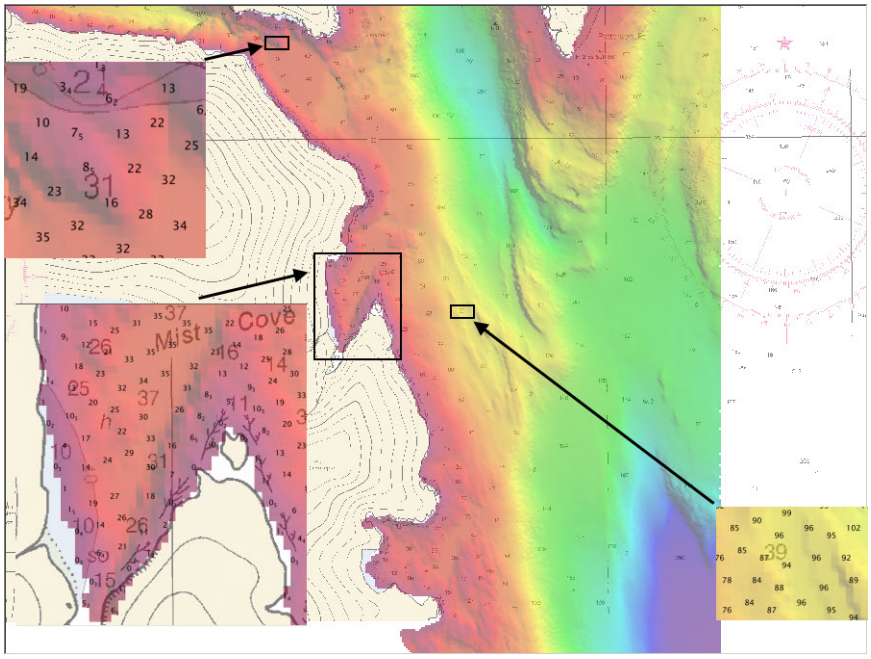


Figure 17: Chart 17335 sounding difference between surveyed soundings on the northern portion of sheet H12370.

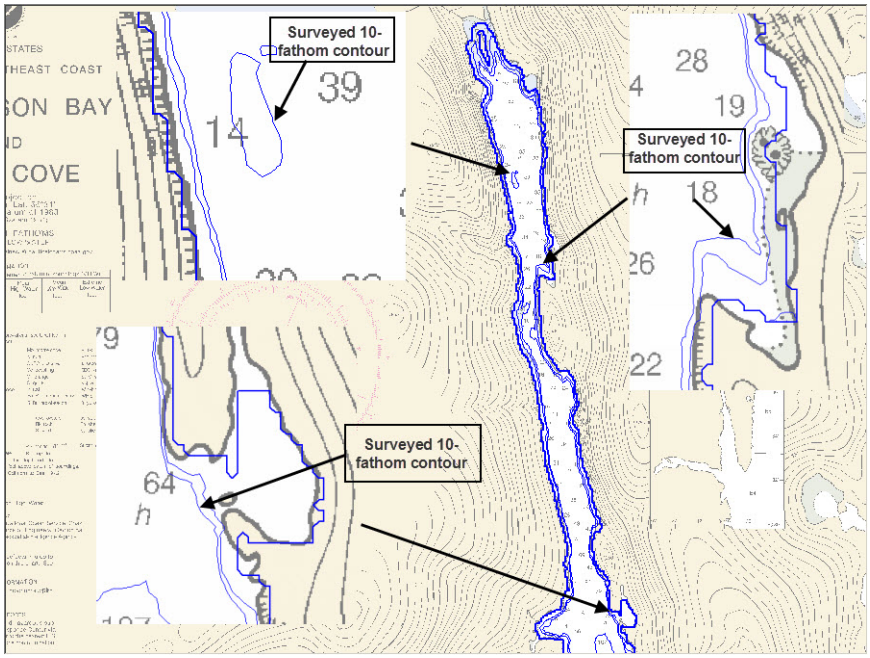


Figure 18: Chart 17335 contour differences between generated contours on sheet H12370.

Update charted depths and contours based on new survey data.

D.1.2 Electronic Navigational Charts

The following are the largest scale ENCs, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US3AK4PM	1:217828	9	03/21/2011	03/21/2011	NO
US5AK2XE	1:20000	1	08/02/2011	08/02/2011	YES

Table 17: Largest Scale ENCs

US3AK4PM

ENC US3AK4PM depths match RNC 17320 and 17335 therefore all RNC comparisons stated in D.1.1 apply to US3AK4PM.

Update charted depths and contours based on new survey data.

US5AK2XE

ENC US5AK2XE depths match RNC 17335 therefore all RNC comparisons stated in D.1.1 apply to US5AK2XE.

Update charted depths and contours based on new survey data.

D.1.3 AWOIS Items

There were no AWOIS items located within the limits of H12370.

D.1.4 Charted Features

All charted features which were investigated are included in the survey's Final Feature File.

A large section of chart 17335 is covered with a green-tint, wire drag area that was not specifically addressed by the field. Due to full multibeam coverage in the area, it is recommended that the green-tint be removed in the common area and chart updated with the new survey depths.There is a 10-fathom sounding on chart 17335 at 56-32-30.836N, 134-39-56.698W that was reported in 1948. The sounding was disproved with full multibeam coverage and it is recommended that the chart be updated with the new survey depths.Within the green-tint area, there is a 149-fathom sounding on chart 17335 at 56-32-29.937N, 134-38-53.899W, indicating that no bottom was detected at that depth. Due to full multibeam coverage, it is recommended that the sounding be removed and the chart updated with the new survey depths.

D.1.5 Uncharted Features

There were no uncharted features in this survey.

D.1.6 Dangers to Navigation

Two dangers to navigation were found within the limits of H12370, and were reported to the Marine Chart Division on November 9, 2011. One Danger to Navigation Report is included in Appendix I of this report.

The 2 reported DTONs have been applied to the charts and are included in the HCell. See attached DTON Report.

D.1.7 Shoal and Hazardous Features

There were no shoals or hazardous features in this survey.

D.1.8 Channels

There were no channels in this survey.

D.2 Additional Results

D.2.1 Shoreline

Fairweather personnel investigated significant features while conducting survey operations for survey H12370. Annotations, information, and diagrams collected on boat sheets during field operations are scanned and included in the digital Separates I folder. Shoreline verification procedures for survey H12370 conform to those detailed in the DAPR.

Features from the current editions of charts 17320 and 17335 that were not depicted by the source shoreline data were digitized in CARIS Notebook with S-57 attribution into the H12370_Final_Feature_File.hob file, to be displayed for field verification.

During composition of the original feature file, there was an error where small and large scale shoreline and feature data were not deconflicted. All chart 17320 shoreline and feature data were flagged in the final feature file as update with their original source date and source indication as well as a recommendation to disregard shoreline and feature data sourced from chart 17320. The exception for this is where the small scale chart is the only chart available.

The Composite Source File contained some features that were duplicated, but at least one of the duplicates was addressed in the Final Feature File.

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.

Some shoreline features were revised or omitted in the HCell to accommodate chart scale.

D.2.2 Prior Surveys

Prior survey comparisons were not conducted by the field.

D.2.3 Aids to Navigation

Survey H12370 included one aid to navigation (ATON). The ATON was found to serve its intended purpose.

D.2.4 Overhead Features

No overhead features in the survey area.

D.2.5 Submarine Features

No submarine features in the survey area.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals in the survey area.

D.2.7 Platforms

No platforms in the survey area.

D.2.8 Significant Features

No significant features in the survey area.

D.2.9 Construction and Dredging

No planned construction or dredging in the survey area.

E. Approval Sheet

As Chief of Party, Field operations for this hydrographic survey were conducted under my direct supervision, with frequent personal checks of progress and adequacy. I have reviewed the attached survey data and reports.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to the Processing Branch.

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, Standing and Letter Instructions, and all HSD Technical Directives. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Report Name	Report Date Sent
Hydrographic Systems Readiness Review	2011-08-26
Data Acquisition and Processing Report	2011-12-22
Horizontal and Vertical Control Report for OPR-O322-FA-11	2011-12-22
Coast Pilot Report	2011-12-06

Approver Name	Approver Title	Approval Date	Signature
CAPT David O. Neander, NOAA	Chief of Party	12/19/2011	2011.12.21 14:21:30 -08'00'
ENS Scott E. Broo	Sheet Manager	12/19/2011	Daniel Smith 2011.12.21 22:30:05 Z
ENS Daniel D. Smith	Assistant Sheet Manager	12/19/2011	Daniel Smith 2011.12.21 22:30:45 Z
CST Weston J. Renoud	Chief Survey Technician	12/19/2011	David Moehl 2011.12.21 14:34:38 -08'00'
LT Caryn M. Zacharias, NOAA	Field Operations Officer	12/19/2011	Caryn M. Zacharias 2011.12.22 09:22:08 -08'00'

F. Table of Acronyms

Acronym	Definition
AFF	Assigned Features File
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continually Operating Reference Staiton
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Discrete Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERZT	Ellipsoidally Referenced Zoned Tides
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSDM	Hydrographic Survey Specifications and Deliverables Manual

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	Local Notice to Mariners
LNM	Linear Nautical Miles
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NAIP	National Agriculture and Imagery Program
NALL	Navigable Area Limit Line
NM	Notice to Mariners
NMEA	National Marine Electronics Association
NOAA	National Oceanic and Atmospheric Administration
NOS	National Ocean Service
NRT	Navigation Response Team
NSD	Navigation Services Division
OCS	Office of Coast Survey
OMAO	Office of Marine and Aviation Operations (NOAA)
OPS	Operations Branch
MBES	Multibeam Echosounder
NWLON	National Water Level Observation Network
PDBS	Phase Differencing Bathymetric Sonar
PHB	Pacific Hydrographic Branch
POS/MV	Position and Orientation System for Marine Vessels
PPK	Post Processed Kinematic
PPP	Precise Point Positioning
PPS	Pulse per second

Acronym	Definition
PRF	Project Reference File
PS	Physical Scientist
PST	Physical Science Technician
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Porpagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Exectutive Officer
ZDA	Global Positiong System timing message
ZDF	Zone Definition File

H12370 Danger to Navigation Report

Registry Number: H12370
State: Alaska
Locality: Chatham Strait
Sub-locality: Vicinity of Patterson Bay and Deep Cove
Project Number: OPR-O322-FA-11
Survey Dates: September 25, 2011 - October 5, 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
17335	7th	10/01/2004	1:20,000 (17335_1)	[L]NTM: ?
17320	18th	03/01/2008	1:217,828 (17320_1)	[L]NTM: ?
16016	21st	10/01/2007	1:969,756 (16016_1)	[L]NTM: ?
531	24th	07/01/2007	1:2,100,000 (531_1)	[L]NTM: ?
500	8th	06/01/2003	1:3,500,000 (500_1)	[L]NTM: ?
530	32nd	06/01/2007	1:4,860,700 (530_1)	[L]NTM: ?
50	6th	06/01/2003	1:10,000,000 (50_1)	[L]NTM: ?

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

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal	4.15 m	56° 34' 19.6" N	134° 39' 57.6" W	---
1.2	Rock	-0.21 m	56° 34' 20.4" N	134° 40' 00.9" W	---

1 - Dangers To Navigation

1.1) 225/119

DANGER TO NAVIGATION

Survey Summary

Survey Position:	56° 34' 19.6" N, 134° 39' 57.6" W
Least Depth:	4.15 m (= 13.63 ft = 2.271 fm = 2 fm 1.63 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.048 m ; **TVU (TPEv)** ±0.313 m
Timestamp:	2011-269.21:55:02.444 (09/26/2011)
Survey Line:	h12370 / fa_2806_200khz_rsn7125_256bms_2011 / 2011-269 / 2011m_2692154
Profile/Beam:	225/119
Charts Affected:	17335_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Rock is shoaler than surrounding soundings. Predicted zone tides applied.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12370/fa_2806_200khz_rsn7125_256bms_2011/2011-269/2011m_2692154	225/119	0.00	000.0	Primary

Hydrographer Recommendations

Chart sounding. Remove existing 12 fm sounding at same location.

Cartographically-Rounded Depth (Affected Charts):

2 ¼fm (17335_1, 17320_1, 16016_1, 530_1)

2fm 1ft (531_1)

4.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 1:depth known
	SORDAT - 20111005
	SORIND - US,US,graph,H12370

TECSOU - 3:found by multi-beam

Feature Images

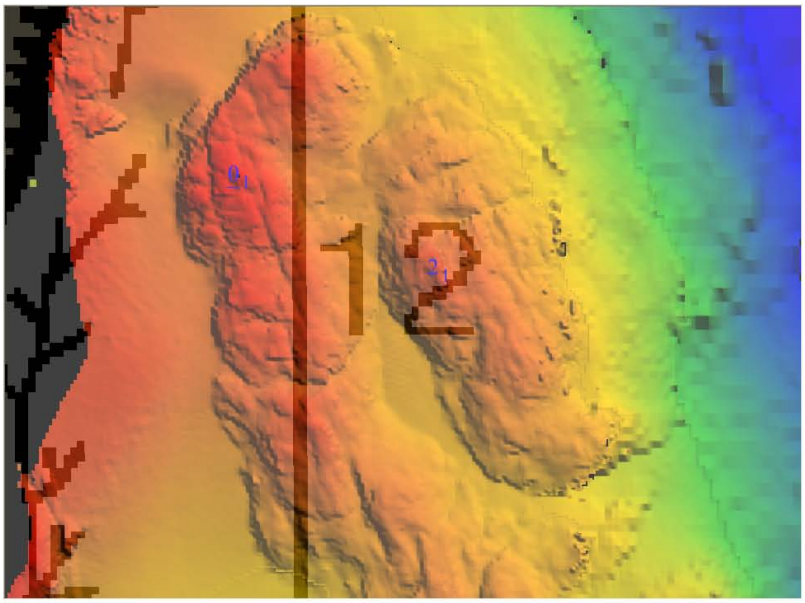


Figure 1.1.1

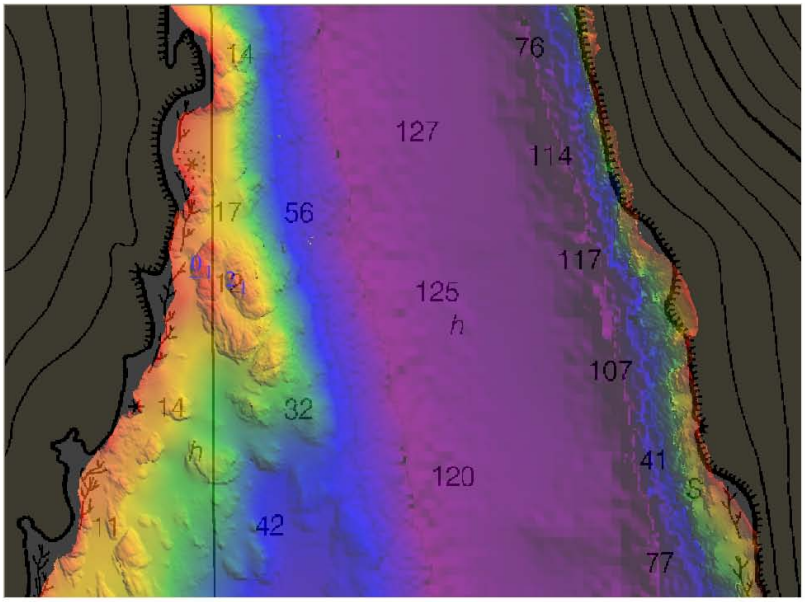


Figure 1.1.2

1.2) 223/23

DANGER TO NAVIGATION

Survey Summary

Survey Position:	56° 34' 20.4" N, 134° 40' 00.9" W
Least Depth:	-0.21 m (= -0.68 ft = -0.113 fm = 0 fm 5.32 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.052 m ; **TVU (TPEv)** ±0.312 m
Timestamp:	2011-269.22:02:59.713 (09/26/2011)
Survey Line:	h12370 / fa_2806_200khz_rsn7125_256bms_2011 / 2011-269 / 2011m_2692202
Profile/Beam:	223/23
Charts Affected:	17335_1, 17320_1, 16016_1, 531_1, 500_1, 530_1, 50_1

Remarks:

New feature. Rock was observed with full multibeam coverage at high tide. Predicted zone tides are applied.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12370/fa_2806_200khz_rsn7125_256bms_2011/2011-269/2011m_2692202	223/23	0.00	000.0	Primary

Hydrographer Recommendations

Chart new rock.

Cartographically-Rounded Depth (Affected Charts):

0fm (17335_1, 17320_1, 16016_1, 530_1)

0fm 0ft (531_1)

-.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20111005
	SORIND - US,US,graph,H12370

TECSOU - 3:found by multi-beam

VALSOU - -0.206 m

WATLEV - 4:covers and uncovers

Feature Images

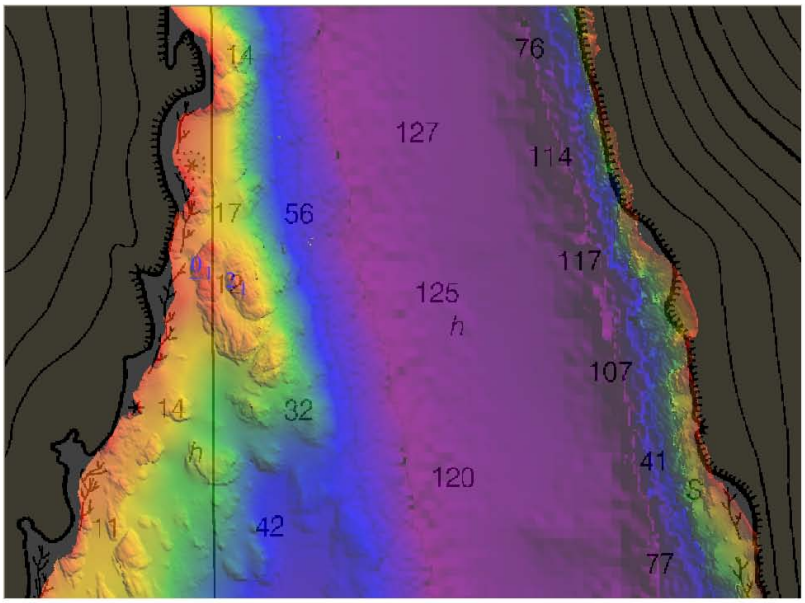


Figure 1.2.1

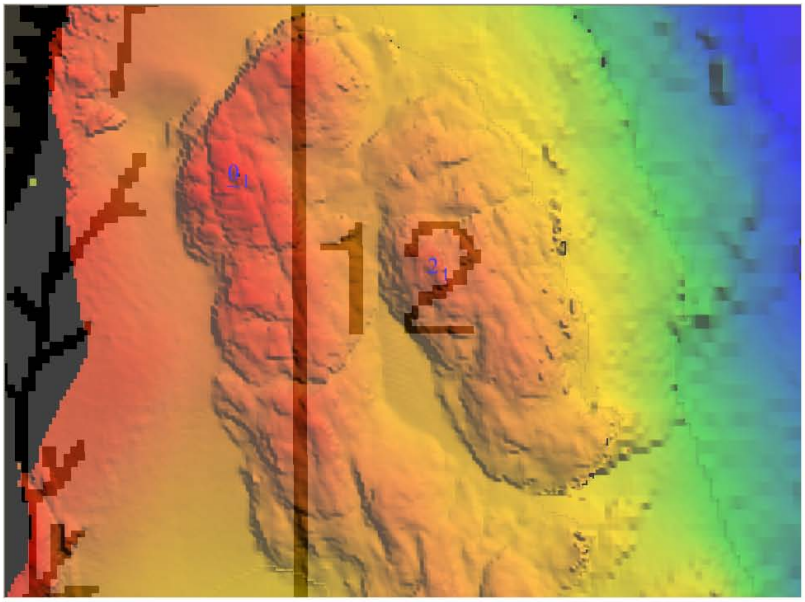


Figure 1.2.2

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 24, 2011

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-O322-FA-2011
HYDROGRAPHIC SHEET: H12370

LOCALITY: Vicinity of Patterson Bay / Deep Cove, Chatham Strait, AK
TIME PERIOD: September 25 - October 05, 2011

TIDE STATION USED: 945-1054 Port Alexander, AK
Lat. 56° 14.8'N Long. 134° 38.8' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 3.077 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-O322-FA-2011, H12370, during the time period between September 25 and October 05, 2011.

Please use the zoning file "O322FA2011CORP" submitted with the project instructions for OPR-O322-FA-2011. Zones SA478, SA479, and SA479A are the applicable zones for Registry No. H12370.

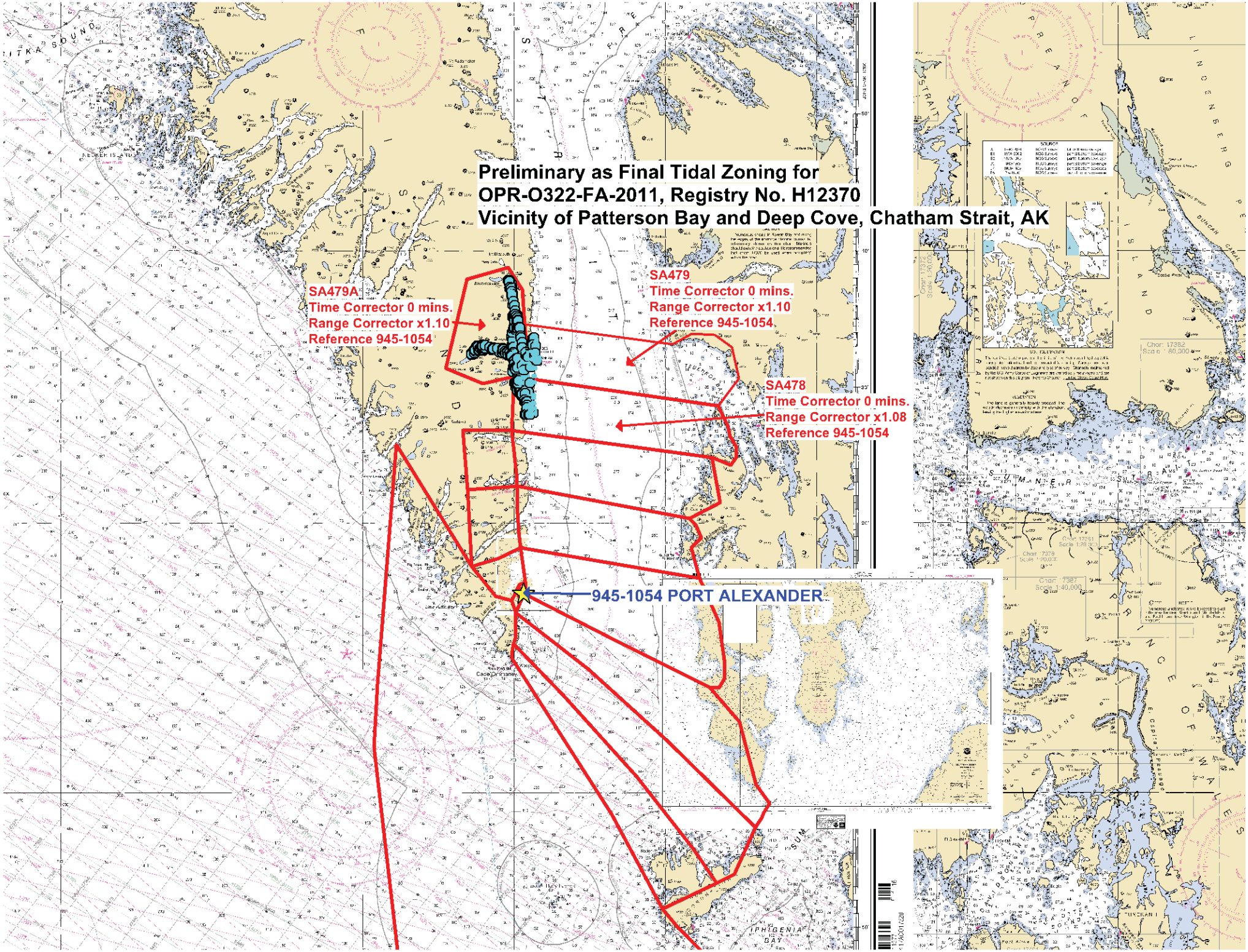
Refer to attachments for zoning information.

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).

Gerald Hovis

Digitally signed by Gerald Hovis
DN: cn=Gerald Hovis, o=Center for Operational Oceanographic Products and Services, ou=NOAA/NOS/CO-OPS/OD/PSB, email=gerald.hovis@noaa.gov, c=US
Date: 2011.10.26 12:52:59 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final Tidal Zoning for
OPR-O322-FA-2011, Registry No. H12370
Vicinity of Patterson Bay and Deep Cove, Chatham Strait, AK
SA479A
Time Corrector 0 mins.
Range Corrector x1.10
Reference 945-1054
SA479
Time Corrector 0 mins.
Range Corrector x1.10
Reference 945-1054
SA478
Time Corrector 0 mins.
Range Corrector x1.08
Reference 945-1054
945-1054 PORT ALEXANDER

PHB Compilation Log

General Survey Info

Survey Number	H12370	Field Unit	NOAA Ship Fairweather	State	AK	UTM Zone	8N
Project Number	OPR-O322-FA-11	Project Name (Locality)	Chatham Strait				
Start Date	09/25/2011	Sublocality	Vicinity of Patterson Bay and Deep Cove				
End Date	10/05/2011	Survey Scale	1:10,000	Compilation Scale	1:20,000		

Affected Raster Charts

Chart	KAPP	Scale	Edition	Date	NTM Date
17335	2665	1:20,000	8th	11/01/2011	02/25/2012
17320	2644	1:217,828	18th	03/01/2008	02/25/2012

Add Chart | Remove Chart

Affected Electronic Charts

ENC	Scale
US3AK4PM	1:217,828

Add ENC | Remove ENC

Spatial Reference

Horizontal Datum	WGS84
Coordinate System	LLDG
Sounding Datum	MLLW
Vertical Datum	MHW

Junction Surveys

Survey Number	Survey Date	Location Relative to Current Survey
H12371	10/07/2011	South
H12373	10/08/2011	East

Add Survey | Remove Survey

HCell Compiler	Katie Reser	QC Reviewer	Peter Holmberg	SAR Reviewer	Adam Argento

Source Surfaces

Resolution	File Name
16m	H12370_16m_Combined.csar

PHB Compilation Log

Processing Info

Add Surface | Remove Surface

Supporting Documents	
Name	Version
Specs and Deliverables	Aug 2011
HCell Specs	6.1

Add Doc | Remove Doc

Software Used		
Software	Version, HF	Used For
CARIS HIPS	7.1 HF3	SAR Review. Inspection of Combined BASE Surfaces.
Pydro	11.11	SAR Review. Generation of DTON and AWOIS Reports.
CARIS BASE Editor	3.2 SP1 HF2	Creation of soundings and bathy-derived features, meta area objects, and blue notes; Survey evaluation and verification; Initial HCell assembly.
CARIS S-57 Composer	2.2 SP1 HF3	Final compilation of the HCell, correct geometry and build topology, apply final attributes, export the HCell, and QA.
CARIS GIS	4.4a SP5 HF40	Set the sounding rounding variable for conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS HOM	3.3 SP3 HF8	Perform conversion of the metric HCell to NOAA charting units with NOAA rounding.
CARIS Plot Composer	5.1 SP1	Generate plots used for QC.
HydroService AS, dKart Inspector	6.0	Validation check of the HCell.

Product Info

Deliverables	
Chart Scale HCell	H12370_CS.000
Survey Scale HCell	H12370_SS.000
HCell Report for MCD	H12370_HR.pdf
Feature Listing	H12370_FL.txt
Descriptive Report	H12370_DR.pdf
Survey Outline	H12370_Outline.gml and .xsd

Horizontal and Vertical Units

During creation of the HCell 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.

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

PHB Compilation Log

Radius Setting

A survey-scale sounding (SOUNDG) feature object layer was built from the Combined Surface in CARIS BASE Editor. A shoal-biased selection was made at survey scale using a Radius Table file with values shown below.

Radius (mm)	Min. Depth (m)	Max Depth (m)
3	-5	10
4	10	20
4.5	20	50
5	50	500

Contours

Depth contours at the intervals on the largest scale chart are included in the SS HCell for MCD raster charting division to use for guidance in creating chart contours. With the exception of the zero contours included in the *_CS file, contours have not been deconflicted against shoreline features, soundings and hydrography.

Charted Contours	Metric Equivalent	Metric- NOAA Rounded	Chart Contours - NOAA Rounded
0 fm	0.0000	0.2286	0.125 fm
5 fm	9.144	9.3726	5.125 fm
10 fm	18.288	18.5166	10.125 fm
100 fm	182.88	184.2516	100.750 fm

Add Contour | Remove Contour

Additional Info

Contact Information

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

HCell Compiler: Katie Reser

Phone Number: (206) 526-6864

Email: Katie.Reser@noaa.gov

Compilation Comments

APPROVAL SHEET
H12370

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

Katie Reser
2012.05.15
10:43:50 -07'00'

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 disproval 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.

Digitally signed by Peter S. Holmberg
DN: cn=Peter S. Holmberg, o, ou, email=peter.holmberg@noaa.gov, c=US
Date: 2012.05.15 11:05:43 -07'00'

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.

David Zezula
2012.05.15 11:12:53 -07'00'