H12372

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:	H12372

LOCALITY

State:	Alaska
General Locality:	Chatham Strait
Sub-locality:	Vicinity of Port Conclusion

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		**H12372**

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 Port Conclusion**
Scale:	**10000**
Dates of Survey:	**09/29/2011 to 10/08/2011**
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**
H-Cell Compilation Units:	***meters 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 Rednotes 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/.

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Descriptive Report to Accompany Survey H12372

Project: OPR-O322-FA-11

Locality: Chatham Strait

Sublocality: Vicinity of Port Conclusion

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 Port Conclusion.

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
56.3283333333 N 134.609722222 W	56.2261111111 N 134.684166667 W

Table 1: Survey Limits

Survey Limits were modified due to time constrains. See figure 1 for survey limit extent.

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 covers 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

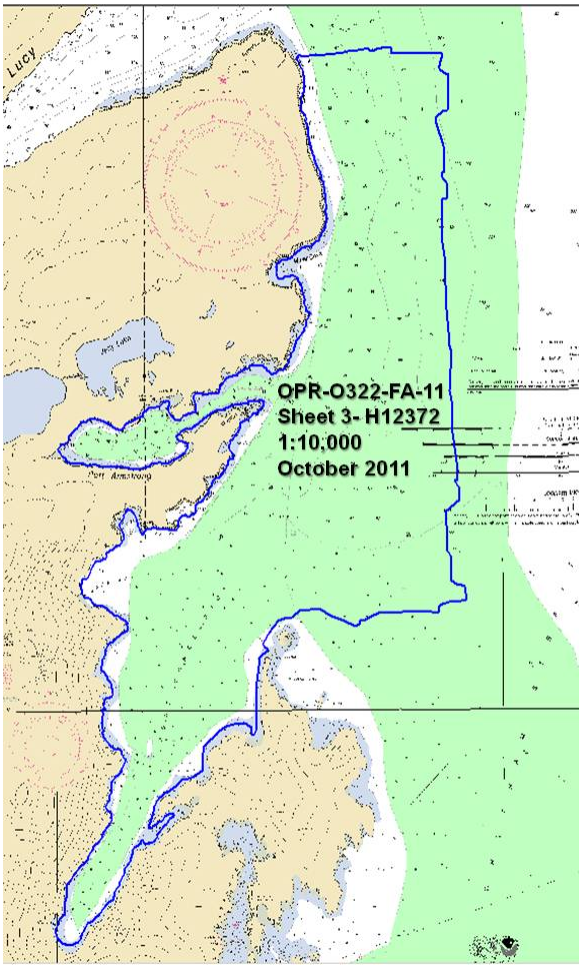


Figure 1: H12372 Survey Outline

Survey Coverage was in accordance with the requirements in the Project Instructions and the HSSD except for in areas with prevalent kelp. In these areas boat crews collected MBES data up to the kelp line and made notations on boatsheets for feature attribution.

A.5 Survey Statistics

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

	HULL ID	*2808*	*2806*	*S220*	*Total*
LNM	**SBES Mainscheme**	0.00	0.00	0.00	0.00
	MBES Mainscheme	21.59	58.10	37.46	117.13
	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	4.41	0.67	3.96	9.04
	Lidar Crosslines	0.00	0.00	0.00	0.00
Number of Bottom Samples					4
Number of DPs					0
Number of Items Items Investigated by Dive Ops					0
Total Number of SNM					5.31

Table 2: Hydrographic Survey Statistics

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

Survey Dates
09/29/2011
10/05/2011
10/06/2011
10/07/2011
10/08/2011

Table 3: Dates of Hydrography

A.6 Shoreline

Shoreline was investigated in accordance with the Project Instructions and the HSSD.

A.7 Bottom Samples

Four bottom samples were acquired in accordance with the Project Instructions or the HSSD. Bottom samples are included in the Final Feature File and the Final Feature Report located in Appendix II.

Three of the four bottom samples were recommended for charting. The fourth bottom sample was in conflict with a new rocky seabed area and, therefore, was not recommended for charting.

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	***S220***	***2806***	***2808***
LOA	70.4 meters	8.64 meters	8.64 meters
Draft	4.7 meters	1.12 meters	1.12 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	7111	MBES
RESON	8160	MBES
RESON	7125	MBES
Applanix	POS/MV V4	Vessel Attitude System
Applanix	POS/MV V4	Positioning System
Brooke Ocean	MVP 200	Sound Speed System
RESON	SVP70	Sound Speed System
Sea Bird	SBE 19plus	Sound Speed System
RESON	SVP71	Sound Speed System

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 7.7%. Differences in crosslines to main scheme lines are believed to be caused by tides and abrupt 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 greatest consistent change in depth of ~29 m, located on a slope of a depth change of approximately 20 to 160 meters. Due to time constraints, the depth range from 286.10 m to 476.30 m in the north-east corner of the survey area was not crossed by crosslines.

The surface difference is submitted in Separates\II Digital Data folder. See figure 2 for graphical representation of variances between crosslines and main scheme and figure 3 for statistical information.

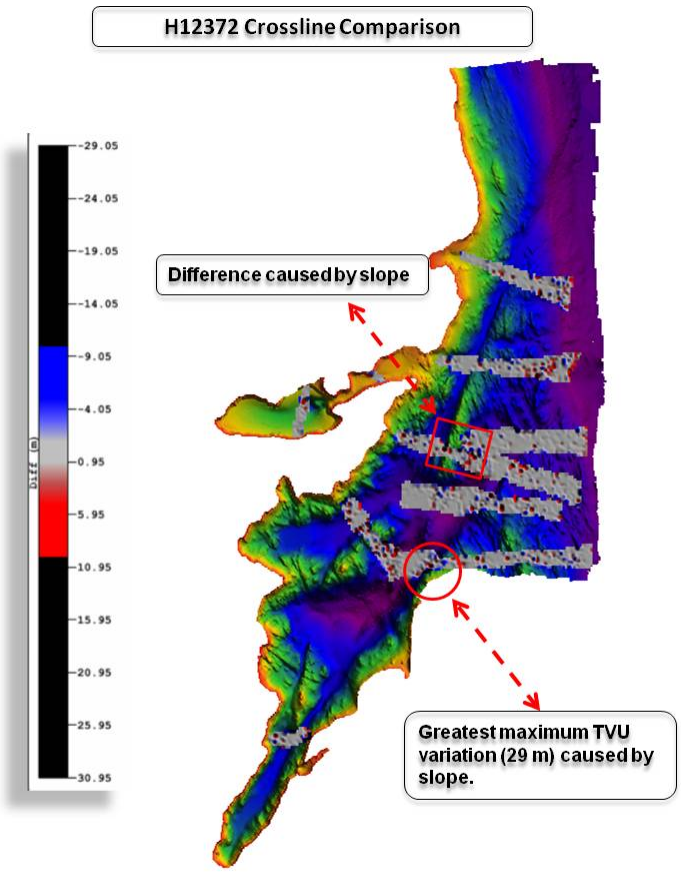
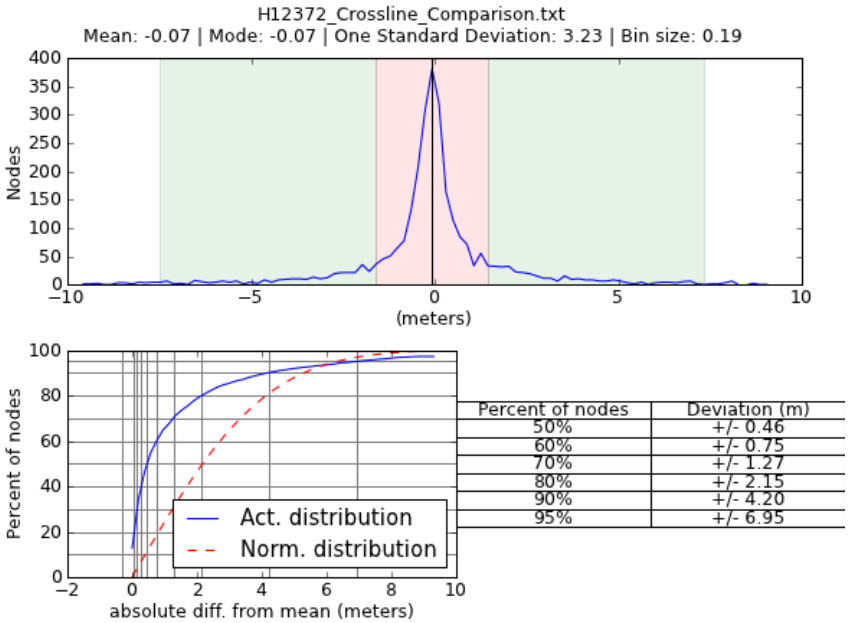


Figure 2: Graphical representation of differences between crossline and mainscheme surfaces



Percent of nodes	Deviation (m)
50%	+/- 0.46
60%	+/- 0.75
70%	+/- 1.27
80%	+/- 2.15
90%	+/- 4.20
95%	+/- 6.95

Figure 3: Statistical information for differences between crossline to main scheme

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
2806	2	n/a	0.5
2808	2	n/a	0.5
S220	0.5	0.5	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
H12374	1:10000	2011	NOAA Ship FAIRWEATHER	E
H12371	1:10000	2011	NOAA Ship FAIRWEATHER	N

Table 8: Junctioning Surveys

H12374

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. See figure 4 for planned areas of overlap. Surface differencing in CARIS HIPS ad SIPS was used to assess junction and surface agreement between all sheets for sounding consistency. Differences in junctions are believed to be caused by abrupt slope changes.

See figure 5 for graphical representation of junction comparison variances between H12372 32m_Combine surface and H12374_32m_Combine surface and figure 6 for statistical information between surfaces.

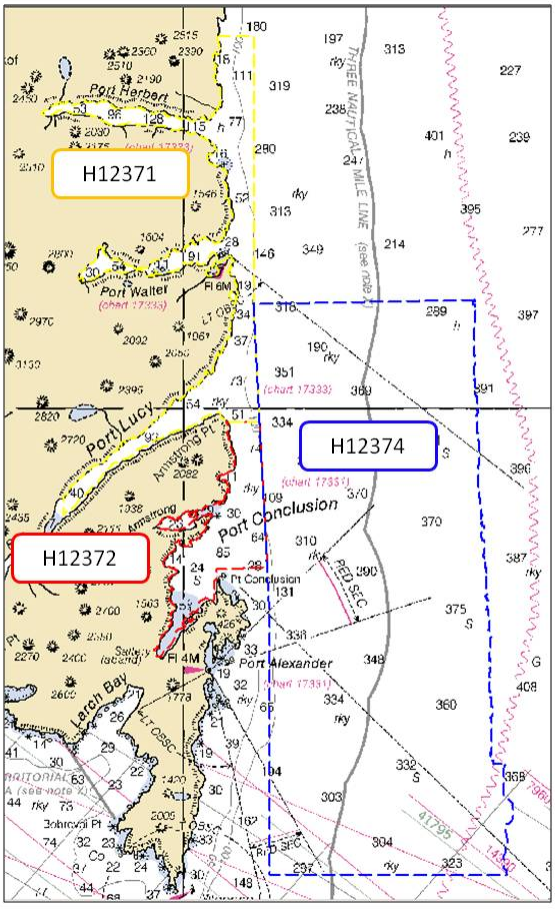


Figure 4: Planned junctions between H12371, H12372, and H12374.

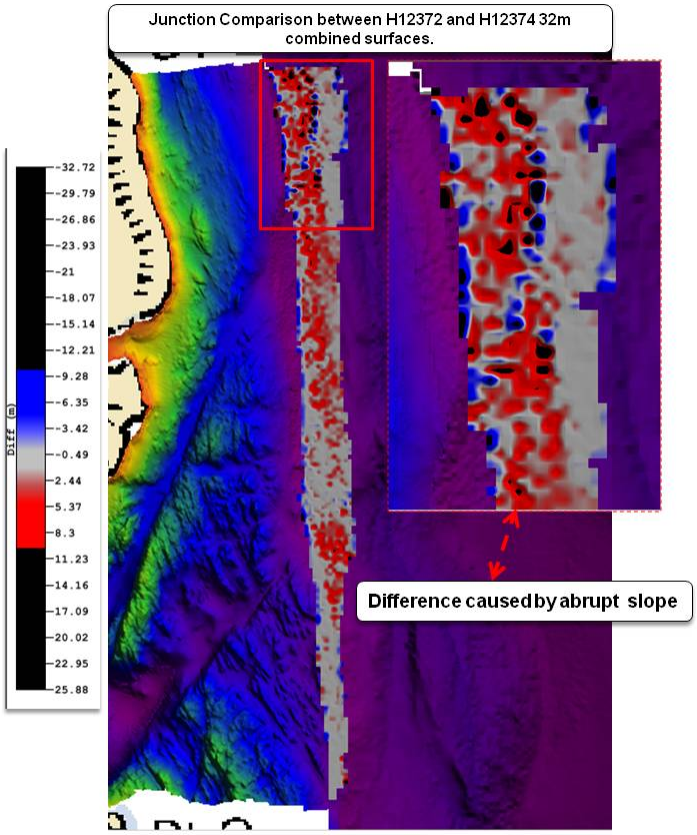
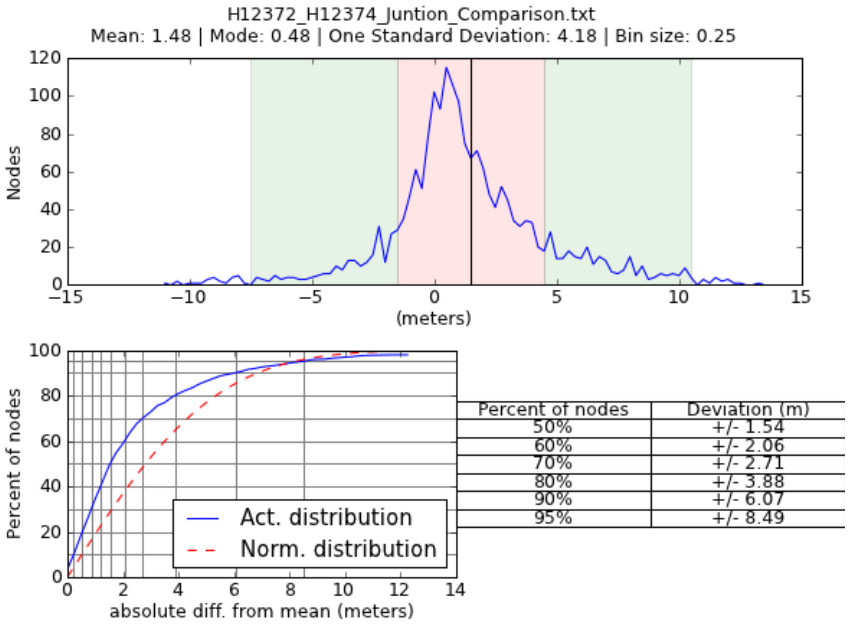


Figure 5: Graphical representation of differences between junction H12372 and H12374.



Percent of nodes	Deviation (m)
50%	+/- 1.54
60%	+/- 2.06
70%	+/- 2.71
80%	+/- 3.88
90%	+/- 6.07
95%	+/- 8.49

Figure 6: Statistical information for junction comparison between sheet H12372 and H12374.

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

See figure 7 for graphical representation of junction comparison variances between H12372 32m_Combine surface and H12371_32m_Combine surface and figure 8 for statistical information between surfaces.

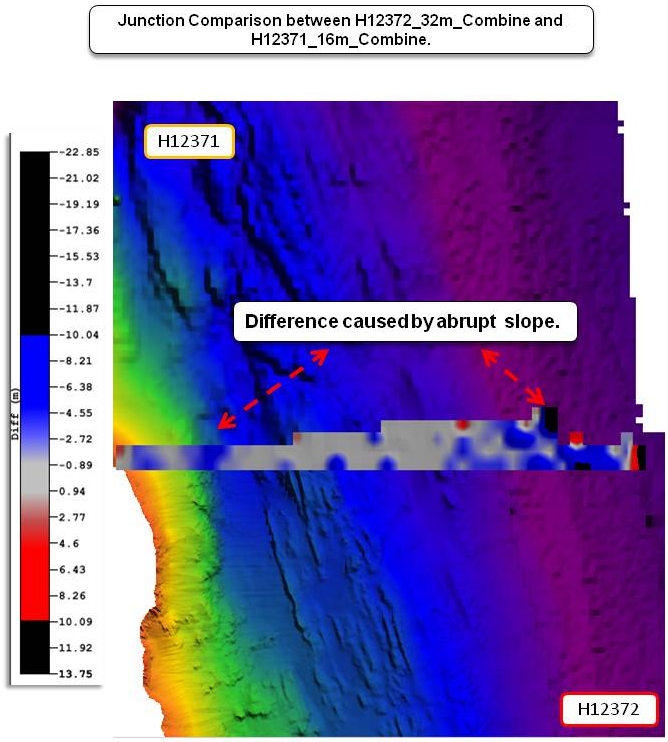
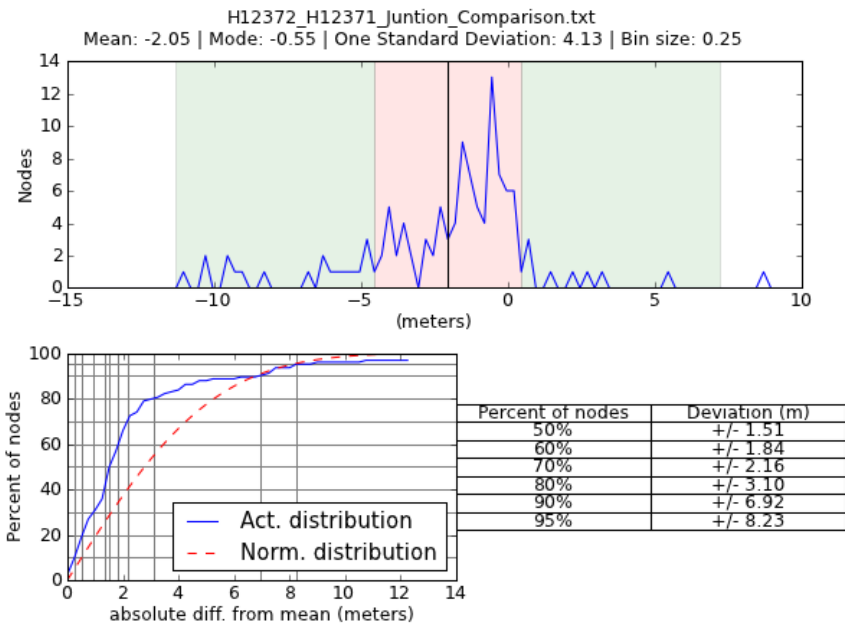


Figure 7: Graphical representation of differences between junction H12372 and H12371.



Percent of nodes	Deviation (m)
50%	+/- 1.51
60%	+/- 1.84
70%	+/- 2.16
80%	+/- 3.10
90%	+/- 6.92
95%	+/- 8.23

Figure 8: Statistical information for junction comparison between sheet H12372 and H12371.

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.

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. There was numerous satellite count below four, very high PDOP values.

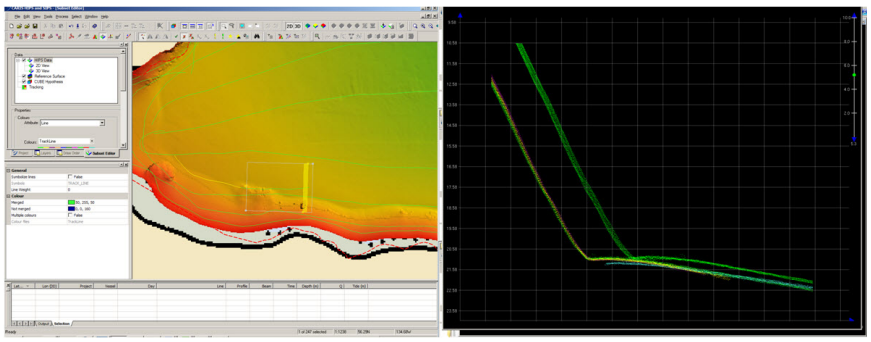


Figure 9: Line logged with RESON sync error and POS/MV heading light on.

This issue could not be verified during office processing and review. There was no mention of diminished PDOP in the acquisition or processing logs and there was no indication of horizontal offset in the data as displayed in Figure 9. The data is adequate for charting.

B.2.6 Factors Affecting Soundings

B.2.6.1 Sound Speed.

Sound speed artifacts were observed in surfaces. The artifacts appear in areas where there is an out flow of fresh water from a stream. The MBES data were reviewed in CARIS subset mode with appropriate reference surfaces. The reference surface accurately depicts the seafloor and does not exceed IHO specification.

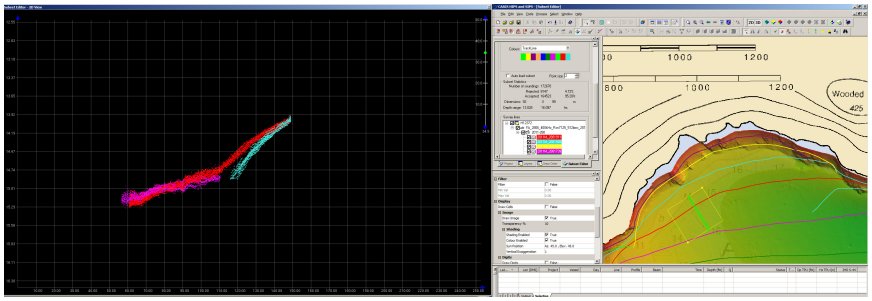


Figure 10: H12372 Sound Velocity Artifacts

The data is adequate for charting despite the sound speed artifacts.

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 except as noted below:

Sound velocity corrections were reapplied, to all data, with the profile selection method of nearest in distance withing time 4 hours.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Holiday Assessment.

Complete multibeam coverage was obtained within the limits of H12372. For holidays larger than three surface grid nodes, the corresponding multibeam side scan was examined and no navigationally significant items were found. The least depths of all navigationally significant features are represented by H12372.

The holiday located south of Pt Eliza, 56° 17' 40.81" N, 134° 38' 44.56" W, the least depth is represented. The holiday is depicted below in Figure 11.

The holiday located in Port Conclusion Shoal, 56° 15' 40.81" N, 134° 39' 58.38" W, the least depth is represented. The holiday is depicted below in Figure 12.

The holiday located in Minor Cove, 56° 18' 16.99" N, 134° 37' 53.76" W, the least depth is represented. The holiday is depicted below in Figure 13.

The holiday located North East Corner of H12372, 56° 19' 22.09" N, 134° 36' 51.35" W the least depth is represented. The holiday is depicted below in Figure 14.

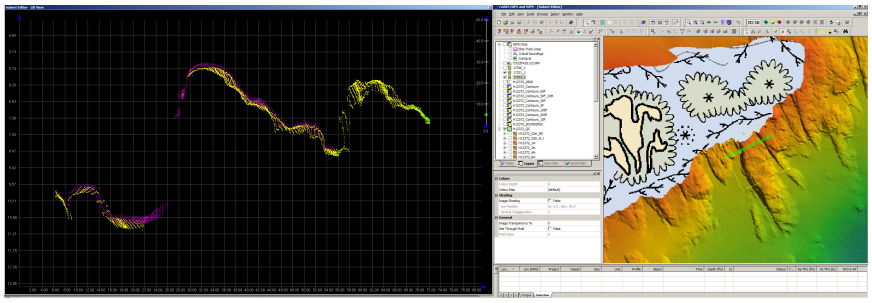


Figure 11: South of Pt Eliza Holiday.

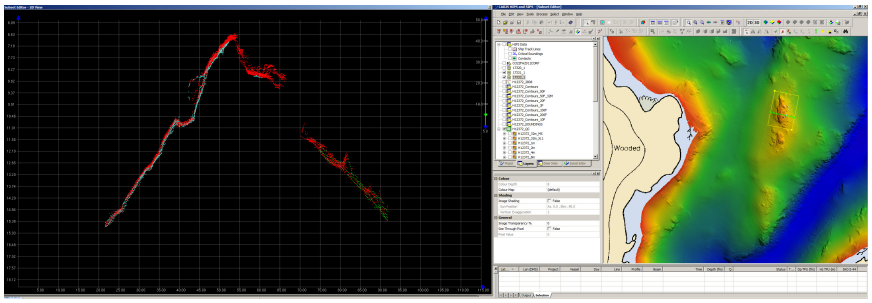


Figure 12: Port Conclusion Shoal Holiday.

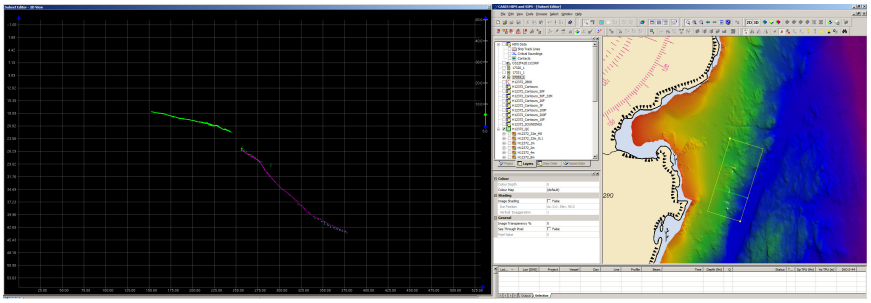


Figure 13: Minor Cove Holiday.

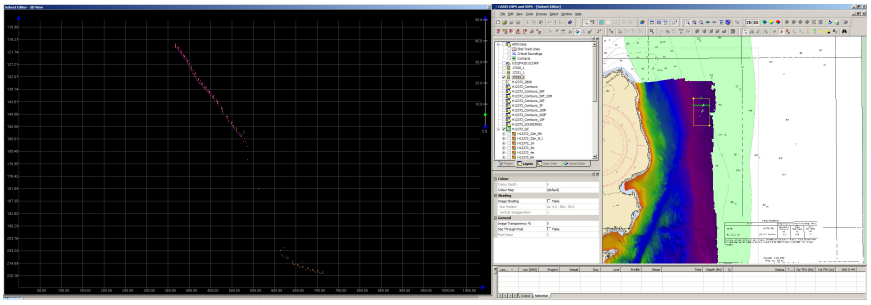


Figure 14: North East Corner of H12372 Holiday.

The holidays have been reviewed and it appears they are a result of downslope shadowing. The least depths are represented in these areas and the holidays are not represented in the survey coverage. 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. It was found that 95.85% of nodes in the finalized 8-meter grid meet or exceed IHO Order 1 specifications, 100% meet the IHO Order 2 for all depths of survey H12372, see Standards Compliance Review in Appendix V. To assess vertical accuracy standards, a child layer titled "IHO1" was created for each of the 1- meter, 2-meter, 4-meter, and 8-meter finalized surfaces and "IHO2" child layer for each of the 8-meter, 16-meter and 32-meter finalized surfaces, using the equation as stated in section C. 2.1 of the DAPR. Some areas offshore the survey did not meet IHO order 1, due to abrupt slopes. See figure 14 for graphical representation.

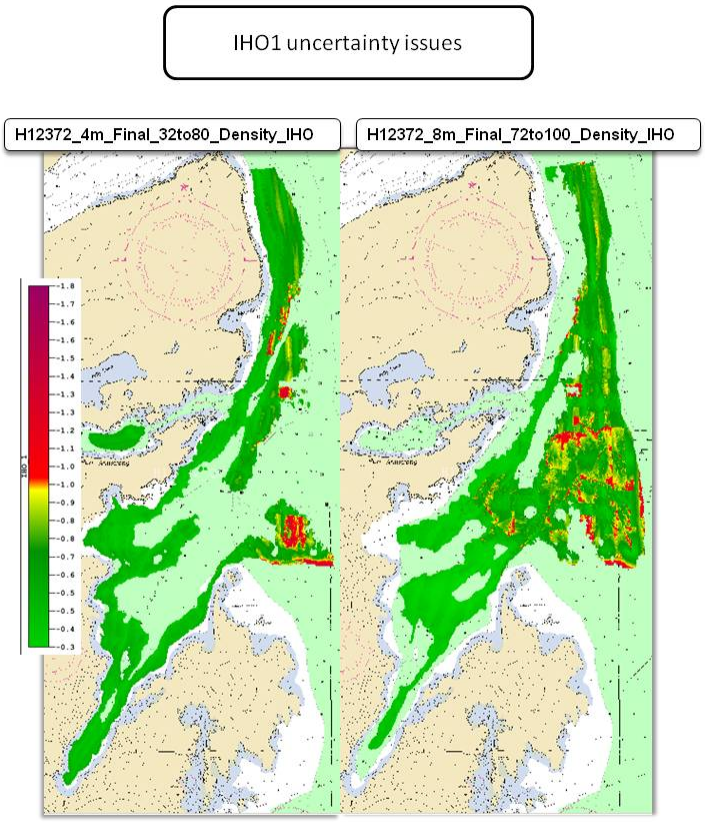


Figure 15: IHO Uncertainty issues.

Due to the steep slopes and possible sound speed refraction, slightly higher uncertainties are to be expected. The data is adequate for charting.

B.2.11 Density

Density requirements for the 1m, 2m, 4m, 8m, 16m and 32m finalized surfaces were achieved with at least 95.74% 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 reductions procedures conform to those detailed in the DAPR.

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 and submitted to NGDC to be archived and to the Pacific Hydrographic Branch for processing.

This data will be archived at NGDC, but branches are not currently processing the 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	Notebook	3.1	1	0	09/02/2011	Processing
NOAA	Pydro	v11.9-10-11 (r3603-3638-3691)	0	0	12/08/2011	Processing
Applanix	PosPAC	5.4	1	0	10/13/2011	Processing
Caris	Bathy DataBASE	3.2	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
H12372_1m	CUBE	1 meters	-	NOAA_1m	Complete MBES
H12372_2m	CUBE	2 meters	-	NOAA_2m	Complete MBES
H12372_4m	CUBE	4 meters	-	NOAA_4m	Complete MBES
H12372_8m	CUBE	8 meters	-	NOAA_8m	Complete MBES
H12372_16m	CUBE	16 meters	-	NOAA_16m	Complete MBES
H12372_32m	CUBE	32 meters	-	NOAA_32m	Complete MBES
H12372_1m_Final_0to20	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
H12372_2m_Final_16to40	CUBE	2 meters	16 meters - 40 meters	NOAA_2m	Complete MBES
H12372_4m_Final_32to80	CUBE	4 meters	32 meters - 80 meters	NOAA_4m	Complete MBES
H12372_8m_Final_64to160	CUBE	8 meters	64 meters - 160 meters	NOAA_8m	Complete MBES
H12372_16m_Final_128to320	CUBE	16 meters	128 meters - 320 meters	NOAA_16m	Complete MBES
H12372_32m_Final_256to640	CUBE	32 meters	256 meters - 640 meters	NOAA_32m	Complete MBES
H12372_32m_Combine	CUBE	32 meters	-	NOAA_32m	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, sixteen, and thirty-two meters. The NOAA CUBE parameters mandated in HSSD were used for the creation of all CUBE BASE surfaces in Survey H12372.

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.

As there was significant down sloping 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.

The original 32-meter combined surface that was created according to specification was not an appropriate resolution for compilation due to the inshore nature of this survey. In order to appropriately compile the data to the large scale charts in the region, a 16-meter combined surface, H12372_16m_Combined.csar, was created and 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 final tide and sound velocity application is noted in the H12372 Data Log spreadsheet. 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 5.2.1.2 of the HSSD. Survey H12372 requires 1 designated sounding 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 2806 days 280; Launch 2808 day 278.

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

B.5.6 Data Processing Deviations

All Reson 8160 and 7111 data were filtered to 65 degrees off nadir on both port and starboard to remove poor quality data. Data were reaccepted in several locations to fill gaps created by filtering.
A survey line (2011X_2810000.HSX) was deleted after raw data submission due to poor quality.

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 10/28/2011.

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 Single Base 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 H12372 POSPAC Processing Logs spreadsheet 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 CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
PORTALEX	AB48

Table 14: CORS Base Stations

Differential correctors from the U.S. Coast Guard beacon at Level Island, AK were used during real-time acquisition when not otherwise noted in the acquisition logs.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Level Island (295 kHz)

Table 15: USCG DGPS Stations

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	11/05/2011	10/25/2011
17331	1:10000	8	06/2007	11/05/2011	10/25/2011
17333	1:20000	9	11/2007	11/05/2011	10/25/2011

Table 16: Largest Scale Raster Charts

17320

Soundings from survey H12372 generally agreed within one to two fathoms with charted depths on chart 17320. Contours generated in CARIS HIPS closely approximated the charted 100 fathom contour. Notable exceptions to this general agreement are listed and shown in the figures below.

Vicinity of Port Conclusion: many disagreements between surveyed depths and charted soundings. Examples include a 24 fathom charted depth that was surveyed with MBES at 11 fathoms, 30 fathom charted depth that was surveyed with MBES at 22 fathoms, 85 fathom charted depth that was surveyed with MBES at 70 fathoms, 64 fathom charted depth that was surveyed with MBES at 49 fathoms. See figure 16 for graphical representation.

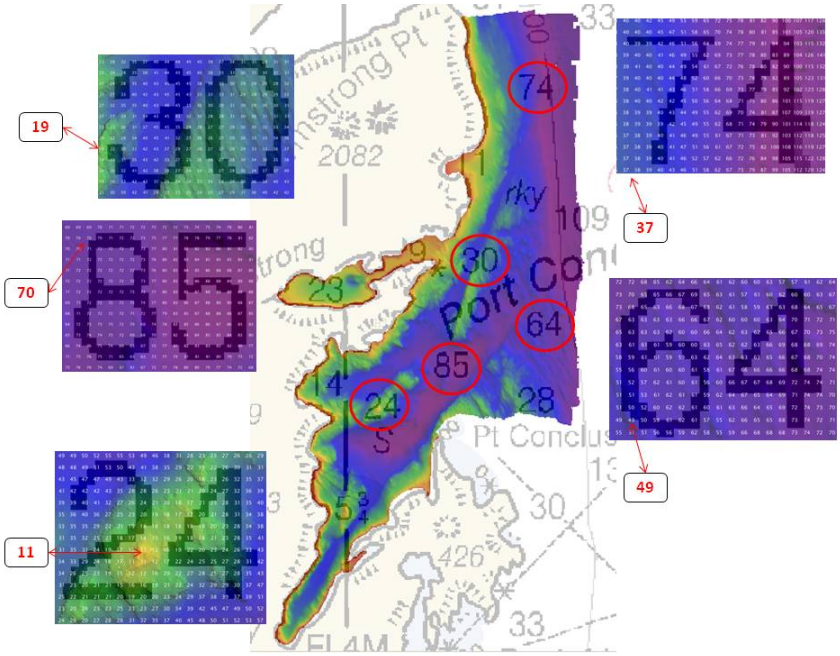


Figure 16: Disagreement between charted depths (17320) and surveyed soundings near Port Conclusion. ***Update charted depths and contours based on new survey data.***

17331

Soundings from survey H12372 generally agreed within one to two fathoms with charted depths on chart 17331. Contours generated in CARIS HIPS closely approximated the charted 3, 5 and 10 fathom contours. Notable exceptions to this general agreement are listed and shown in the figures below.

South of Port Conclusion: many disagreements between surveyed depths and charted soundings. Examples include a 6 fathom 1 foot sounding discovered in the vicinity of a 5 3/4 fathom charted depth. A 28 fathom charted depth that was surveyed with MBES at 18 fathoms, 30 fathom charted depth that was surveyed with MBES at 18 fathoms, 46 fathom charted depth that was surveyed with MBES at 33 fathoms and 30 fathom charted depth that was surveyed with MBES at 21 fathoms. See figure 17 and 18.

North of Port Conclusion: a 44 fathom charted depth that was surveyed with MBES at 30 fathoms, 38 fathom charted depth that was surveyed with MBES at 28 fathoms, 35 fathom charted depth that was surveyed with MBES at 22 fathoms and 70 fathom charted depth that was surveyed with MBES at 58 fathoms. See figure 19.

North - East Port Armstrong: 46 fathom charted depth that was surveyed with MBES at 21 fathoms; 28 fathom charted depth that was surveyed with MBES at 18 fathoms. See figure 20.

Chart 17331 noted areas previously surveyed by wire drag techniques as a green tint. The hydrographer recommends removing the green tint and notation of wire drag surveys for all the area covered by 100% MBES.

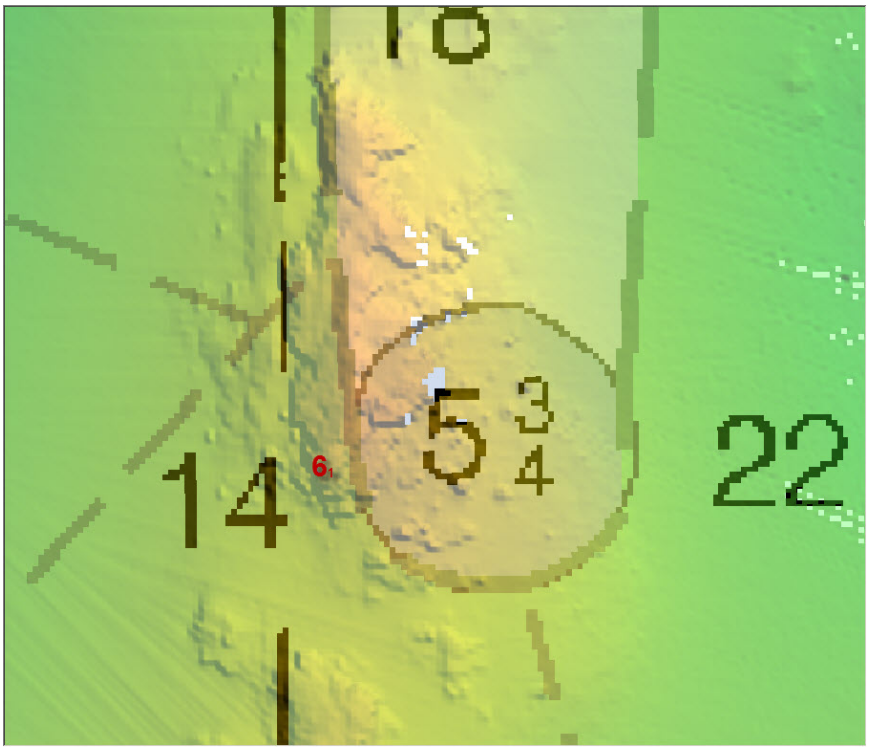


Figure 17: A new least depth and position for Port Conclusion shoal.

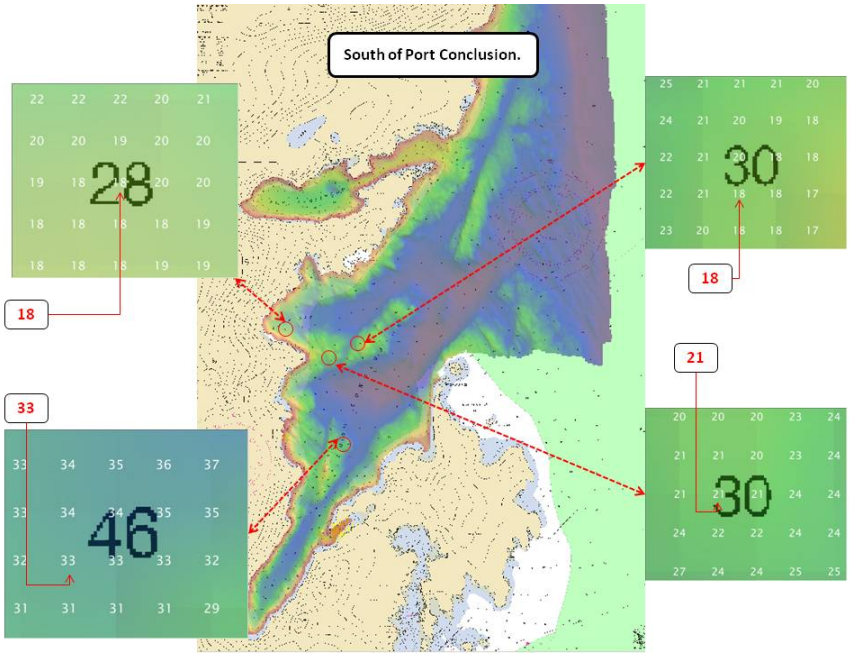


Figure 18: Disagreement between charted depths (17331) and surveyed soundings near South of Port Conclusion.

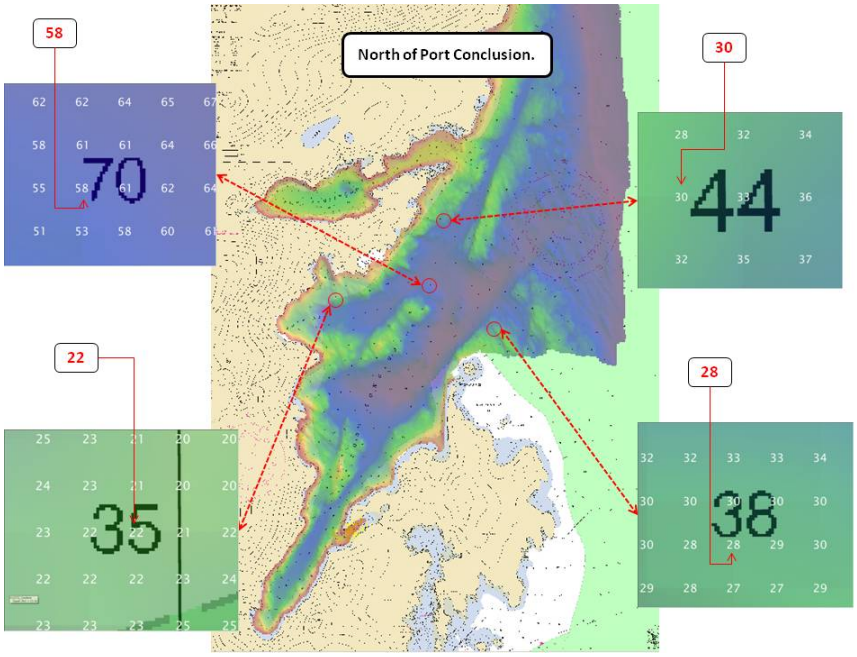


Figure 19: Disagreement between charted depths (17331) and surveyed soundings near North of Port Conclusion.

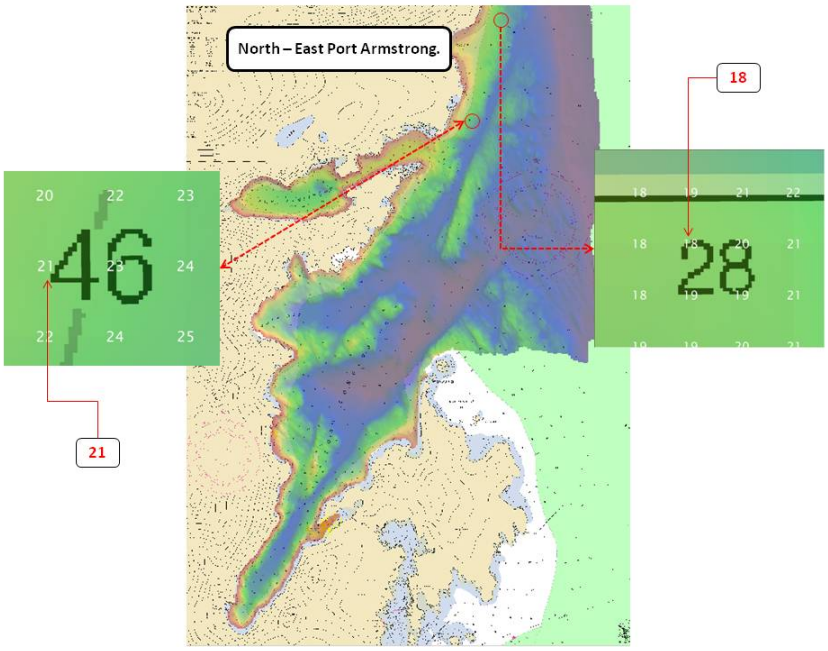


Figure 20: Disagreement between charted depths (17331) and surveyed soundings near North East of Port Armstrong.

Update charted depths and contours based on new survey data.

17333

Soundings from survey H12372 generally agreed within one to two fathoms with charted depths on chart 17333. Contours generated in CARIS HIPS closely approximated the charted 3, 5, 10, 20, 100 fathom contours. Notable exceptions to this general agreement are listed and shown in the figures below.

East of Minor Cove: many disagreements between surveyed soundings and charted depths. Examples include a 46 fathom charted depth that was surveyed with MBES at 21 fathoms and 28 fathom charted depth that was surveyed with MBES at 18 fathoms. See figure 21.

South of Port Armstrong: 42 fathom charted depth that was surveyed with MBES at 24 fathoms and a 44 fathom charted depth that was surveyed with MBES at 25 fathoms. See figure 22.

See figure 23 and 24 for contour trends which were digitized in CARIS HIPS and SIPS, depicting discrepancies with chart H17333.

Chart 17333 noted areas previously surveyed by wire drag techniques as a green tint. The hydrographer recommends removing the green tint and notation of wire drag surveys for all the area covered by 100% MBES.

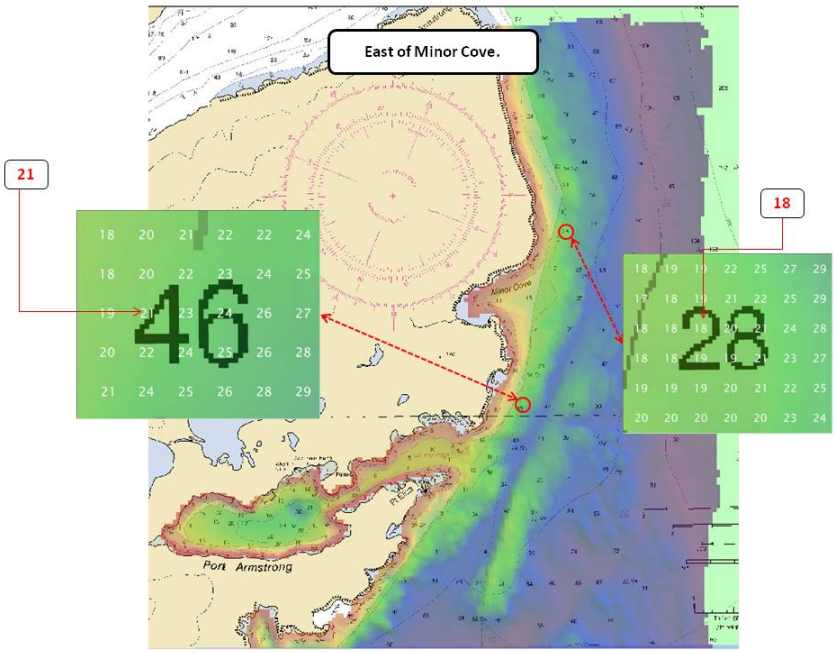


Figure 21: Disagreement between charted depths (17333) and surveyed soundings near East of Minor Cove.

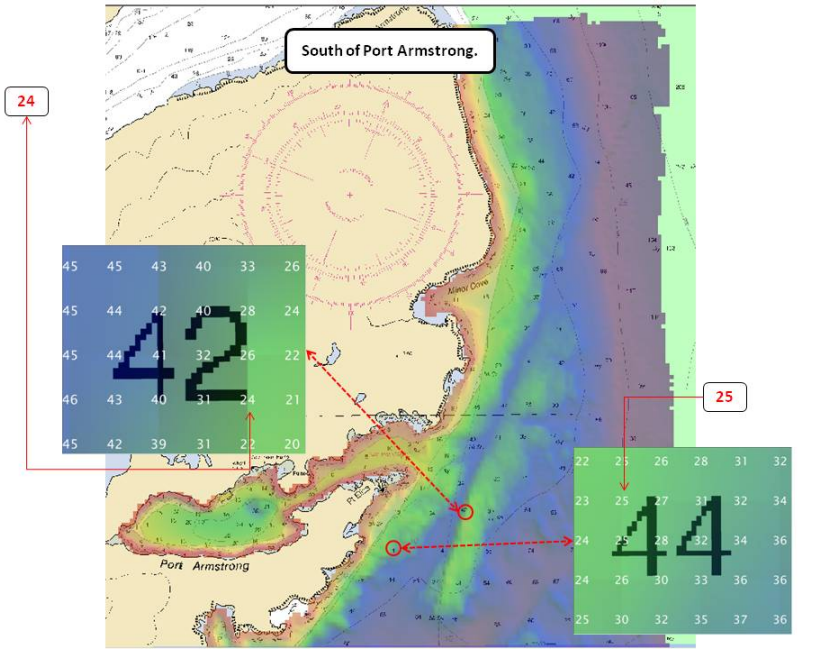


Figure 22: Disagreement between charted depths (17333) and surveyed soundings near South of Port Armstrong.

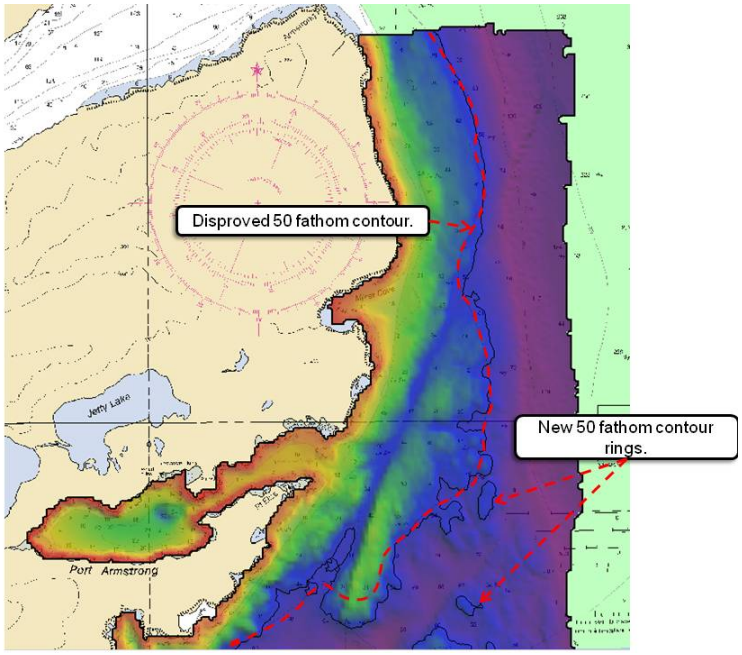


Figure 23: Disagreement between charted contour (17333) and surveyed 50 fathom contour near East of Port Armstrong.

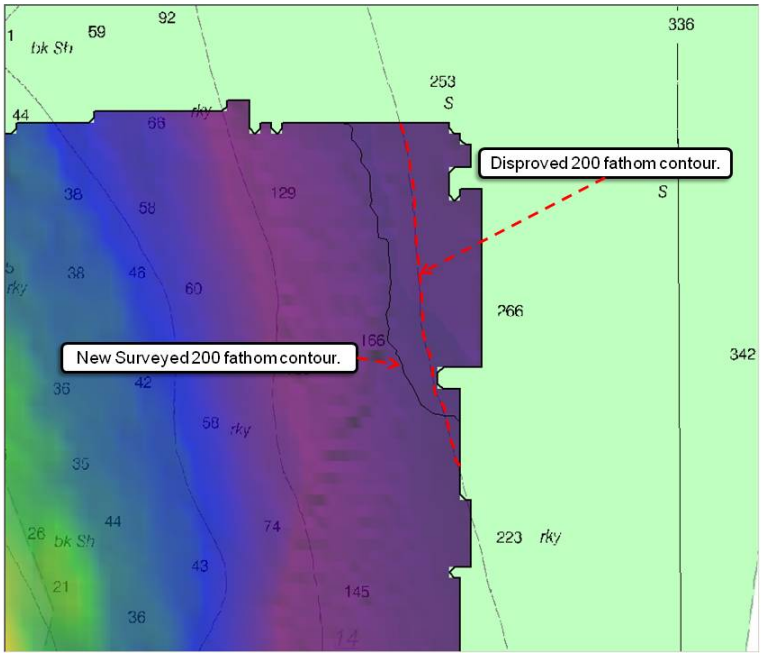


Figure 24: Disagreement between charted contour (17333) and surveyed 200 fathom contour near the north east portion of H12372.

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
US5AK08E	1:10000	1	08/02/2011	08/02/2011	YES
US5AK09E	1:20000	1	08/02/2011	08/02/2011	YES

Table 17: Largest Scale ENCs

US3AK4PM

Soundings from survey H12372 generally agreed within one to two fathoms with charted depths on chart US3AK4PM. Contours generated in CARIS HIPS closely approximated the charted 100 fathom contour.

Update charted depths and contours based on new survey data.

US5AK08E

Soundings from survey H12372 generally agreed within one to two fathoms with charted depths on chart US5AK08E. Contours generated in CARIS HIPS closely approximated the charted 3, 5 and 10 fathom contours. Notable exceptions to this general agreement are listed and shown in the figures below.

South of Port Conclusion: many disagreements between surveyed soundings and charted depths. Examples include a 6 fathom 1 foot sounding in the vicinity of a 5 3/4 fathom charted depth. A 28 fathom charted depth that was surveyed with MBES at 18 fathoms, 30 fathom charted depth that was surveyed with MBES at 18 fathoms, 46 fathom charted depth that was surveyed with MBES at 33 fathoms and 30 fathom charted depth that was surveyed with MBES at 21 fathoms. See figure 25 and 26.

North of Port Conclusion: a 44 fathom charted depth that was surveyed with MBES at 30 fathoms, 38 fathom charted depth that was surveyed with MBES at 28 fathoms, 35 fathom charted depth that was surveyed with MBES at 20 fathoms and 70 fathom charted depth that was surveyed with MBES at 51 fathoms. See figure 27.

North - East Port Armstrong: 46 fathom charted depth that was surveyed with MBES at 21 fathoms; 28 fathom charted depth that was surveyed with MBES at 18 fathoms. See figure 28.

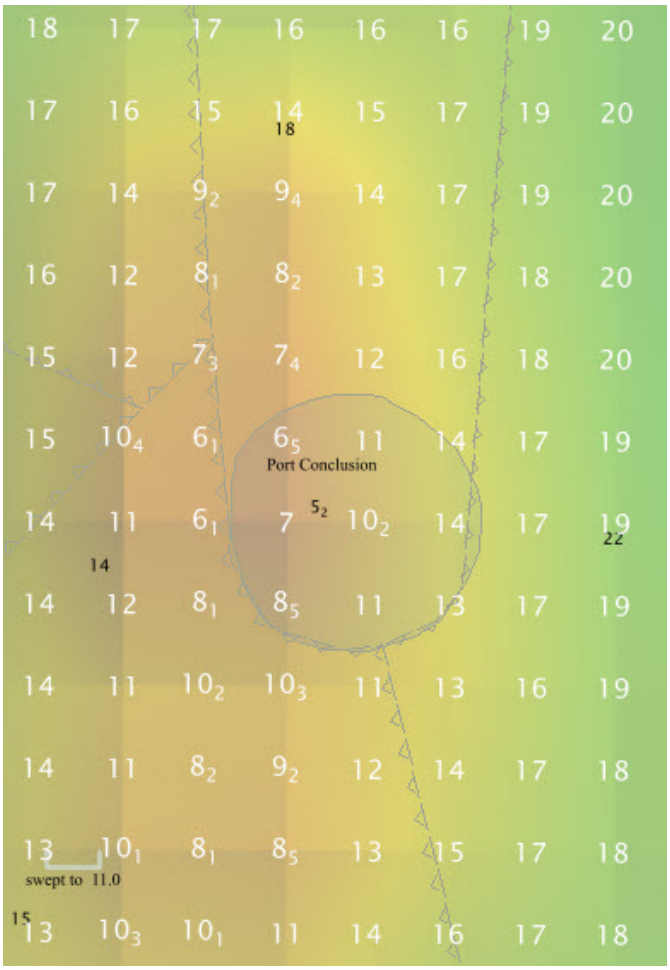


Figure 25: A new least depth and position for Port Conclusion shoal.

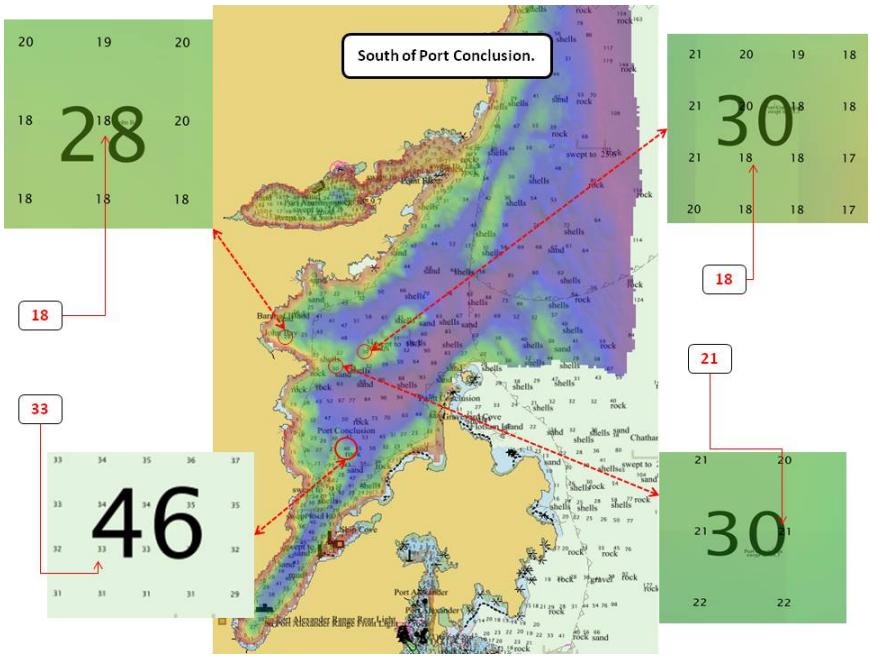


Figure 26: Disagreement between charted depths (US5AK08E) and surveyed soundings near South of Port Conclusion.

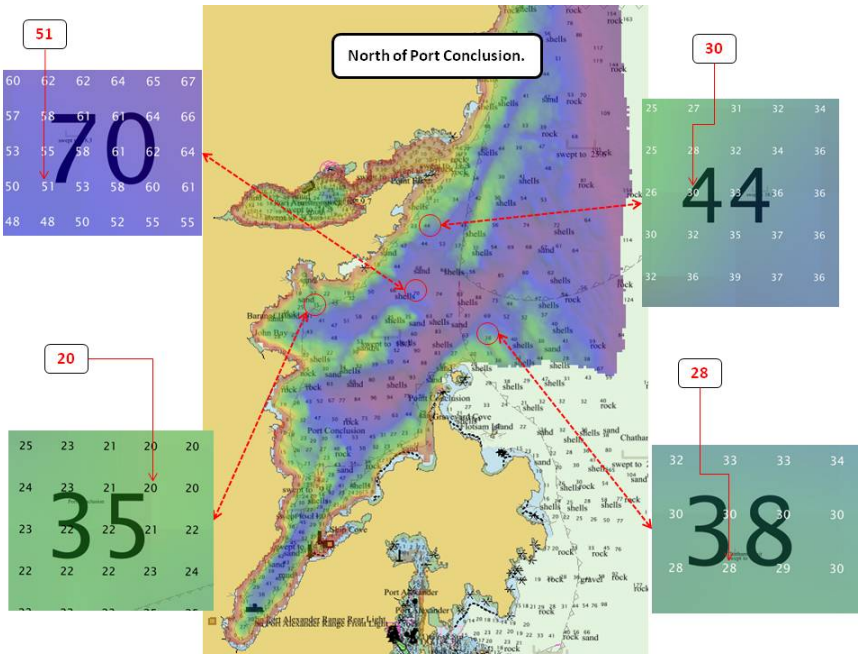


Figure 27: Disagreement between charted depths (US5AK08E) and surveyed soundings near North of Port Conclusion.

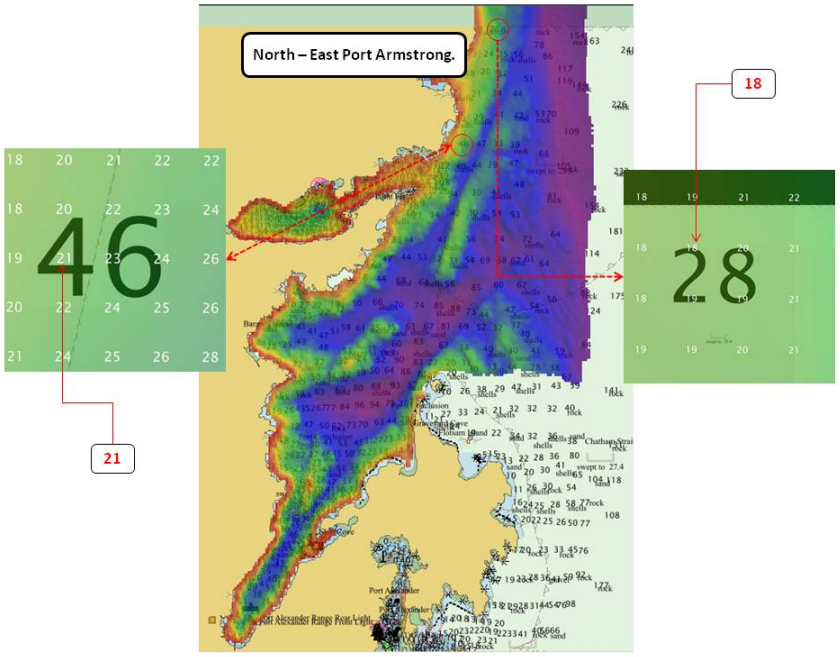


Figure 28: Disagreement between charted depths (US5AK08E) and surveyed soundings near North East of Port Armstrong.

Update charted depths and contours based on new survey data.

US5AK09E

Soundings from survey H12372 generally agreed within one to two fathoms with charted depths on chart US5AK09E. Contours generated in CARIS HIPS closely approximated the charted 3, 5, 10, 20, 100 fathom contours. Notable exceptions to this general agreement are listed and shown in the figures below.

East of Minor Cove: many disagreements between surveyed soundings and charted depths. Examples include a 46 fathom charted depth that was surveyed with MBES at 21 fathoms and 28 fathom charted depth that was surveyed with MBES at 18 fathoms. See figure 29.

South of Port Armstrong: 42 fathom charted depth that was surveyed with MBES at 24 fathoms and a 44 fathom charted depth that was surveyed with MBES at 25 fathoms. See figure 30.

See figure 31 and 32 for contour trends which were digitized in CARIS HIPS and SIPS, depicting discrepancies with chart H17333.

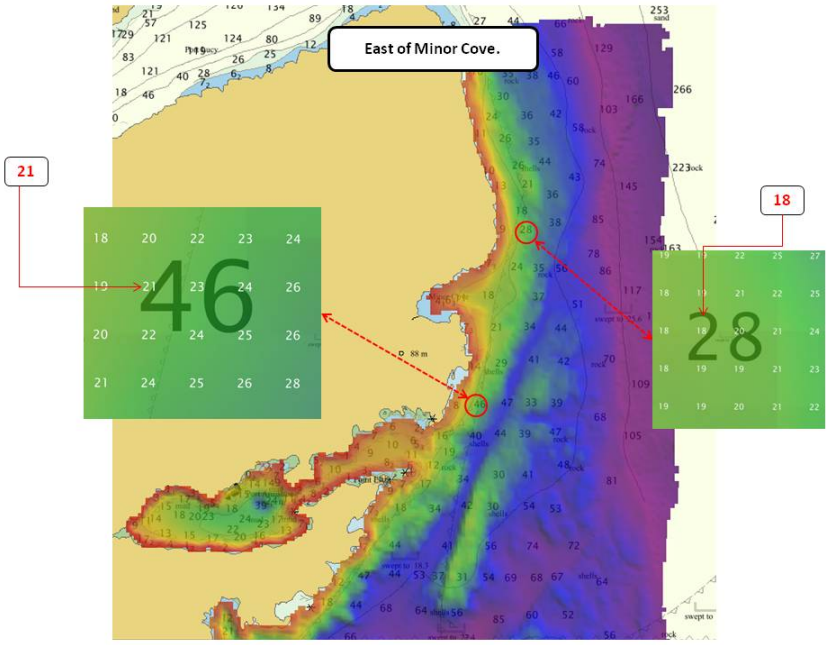


Figure 29: Disagreement between charted depths (US5AK09E) and surveyed soundings near East of Minor Cove.

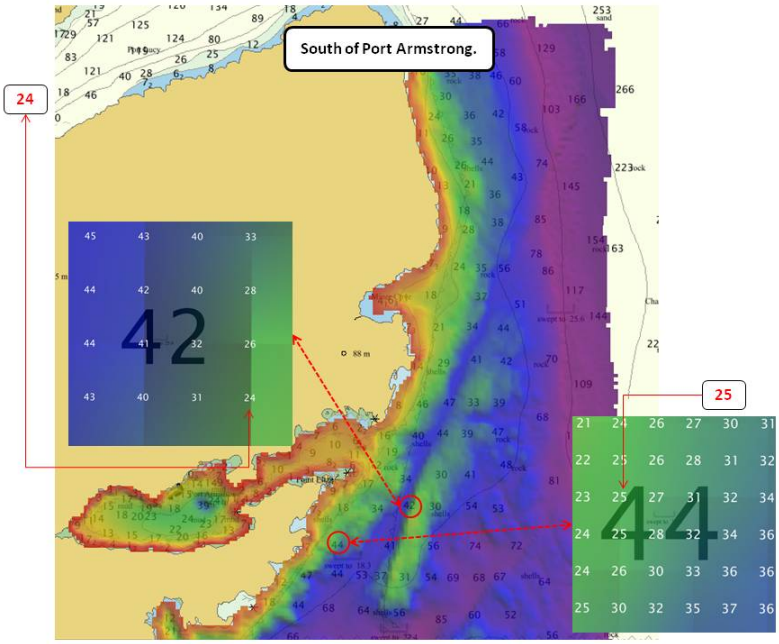


Figure 30: Disagreement between charted depths (US5AK09E) and surveyed soundings near South of Port Armstrong.

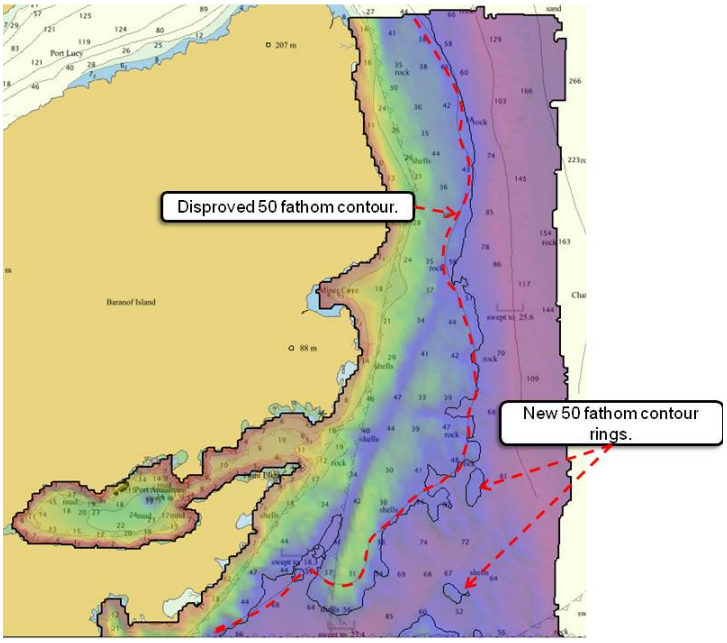


Figure 31: Disagreement between charted contour (US5AK09E) and surveyed 50 fathom contour near East of Port Armstrong.

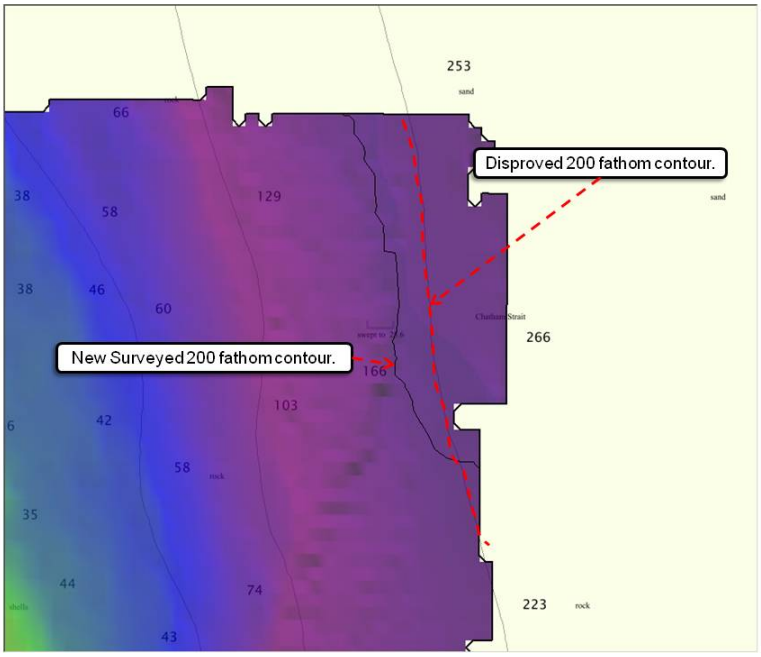


Figure 32: Disagreement between charted contour (US5AK09E) and surveyed 200 fathom contour near the north east portion of H12372.

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 H12372.

D.1.4 Charted Features

All charted features which are investigated are included in the surveys Final Feature File.

There is a 5 3/4 fm shoal located at 56-15-44.51N, 134-39-58.04W that was disproved by multibeam. A submerged 6fm 1ft rock at 56-15-44.94N, 134-39-59.56W is recommended for charting.

D.1.5 Uncharted Features

During acquisition a new obstruction was identified and investigated. Information for this feature (US 0000001684 00001) is located in the survey Final Feature File.

Figure 33: New Obstruction, Ship Cove.

The new obstruction was recommended for charting.

D.1.6 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

D.1.7 Shoal and Hazardous Features

No hazardous features exist.

D.1.8 Channels

No channels exist.

D.2 Additional Results

D.2.1 Shoreline

Fairweather personnel conducted limited shoreline verification and reconnaissance at times near predicted negative or low tides within the survey limits. 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 H12372 conform to those detailed in the DAPR.

Features from the current editions of charts 17331 and 17333 that were not depicted by the source shoreline data were imported from the corresponding ENC in CARIS Notebook with S-57 attribution into the H12372_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 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 to accommodate chart scale.

D.2.2 Prior Surveys

Prior survey comparisons were not conducted by field operations.

D.2.3 Aids to Navigation

No USCG aids in the survey area.

D.2.4 Overhead Features

No overhead features exist.

D.2.5 Submarine Features

No submarine features exist.

D.2.6 Ferry Routes and Terminals

No ferry routes exist.

D.2.7 Platforms

No drilling structures, production platforms, or well heads exist.

D.2.8 Significant Features

No unusual or scientifically significant features exist.

D.2.9 Construction and Dredging

No construction or dredging exist.

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
Coast Pilot Report	2011-12-06
HSRR	2011-08-26
DAPR	2011-12-16
HVCR	2011-12-16

Approver Name	Approver Title	Approval Date	Signature
CAPT David O. Neander, NOAA	Chief of Party	12/16/2011	2011.12.20 11:08:17 -08'00'
HST Douglas A. Bravo	Sheet Manager	12/16/2011	Douglas Bravo 2011.12.15 23:43:31 Z
CST Weston J. Renoud	Chief Survey Technician	12/16/2011	David Moehl 2011.12.20 09:05:49 -08'00'
LT Caryn M. Zacharias, NOAA	Field Operations Officer	12/16/2011	Caryn M. Zacharias 2011.12.20 12:11:04 -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

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: H12372

LOCALITY: Vicinity of Port Conclusion, Chatham Strait, AK
TIME PERIOD: September 29 - October 08, 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, H12372, during the time period between September 29 and October 08, 2011.

Please use the zoning file "O322FA2011CORP" submitted with the project instructions for OPR-O322-FA-2011. Zones SA475, SA475A, SA476, and SA476A are the applicable zones for H12372.

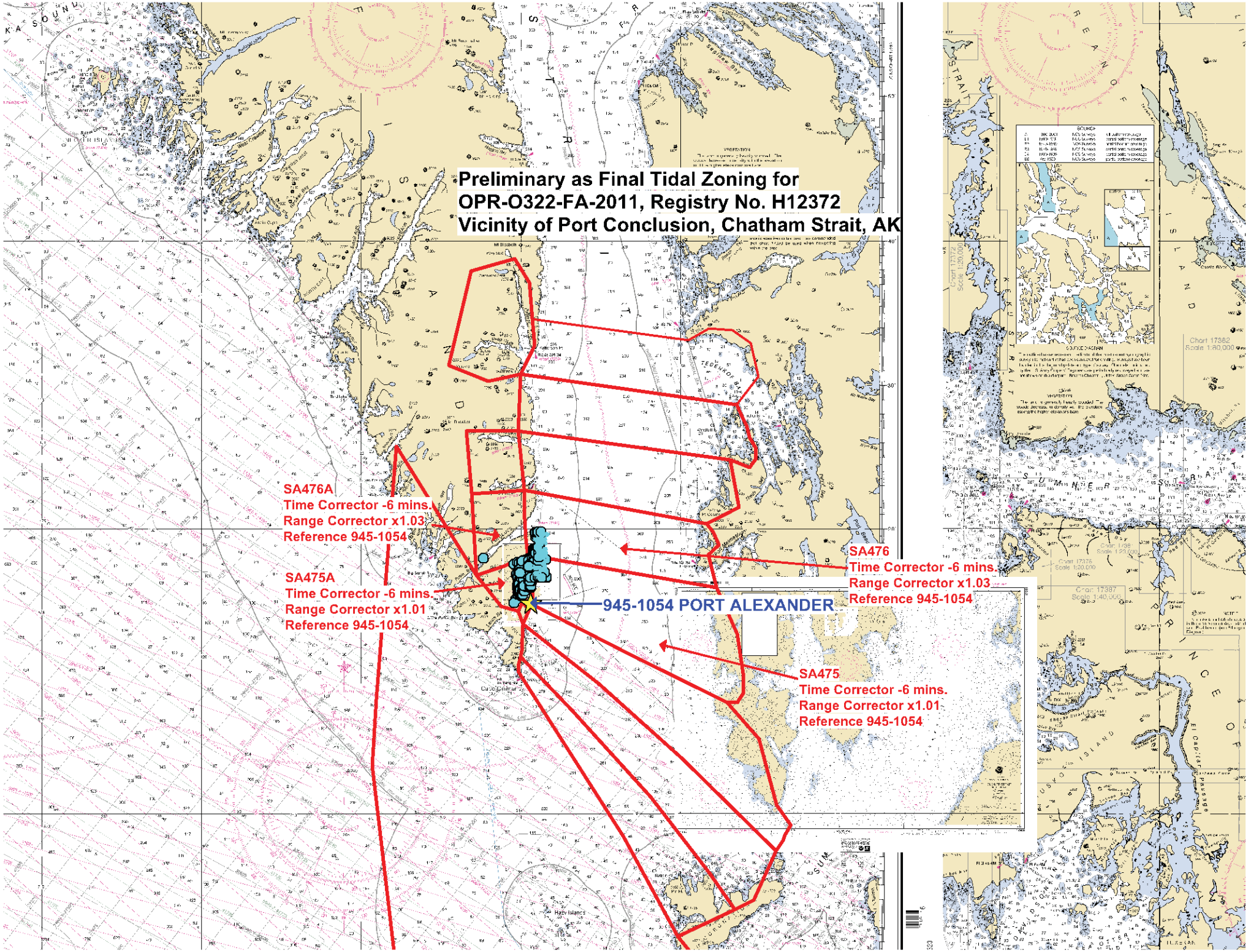
Refer to attachments for zoning information.

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 12:54:30 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final Tidal Zoning for
OPR-O322-FA-2011, Registry No. H12372
Vicinity of Port Conclusion, Chatham Strait, AK
SA476A
Time Corrector -6 mins.
Range Corrector x1.03
Reference 945-1054
SA475A
Time Corrector -6 mins.
Range Corrector x1.01
Reference 945-1054
945-1054 PORT ALEXANDER
SA476
Time Corrector -6 mins.
Range Corrector x1.03
Reference 945-1054
SA475
Time Corrector -6 mins.
Range Corrector x1.01
Reference 945-1054

APPROVAL SHEET
H12372

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
2012.05.29
10:53:36 -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 Kurt Brown
DN: cn=Kurt Brown, o=Pacific Hydrographic Branch, ou=NOAA, email=kurt.brown@noaa.gov, c=US
Date: 2012.05.29 11:17:45 -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.

Digitally signed by Peter Holmberg signing for David J. Zezula
DN: cn=Peter Holmberg signing for David J. Zezula, o, ou, email=david.j.zezula@noaa.gov, c=US
Date: 2012.05.29 13:12:15 -07'00'