H12317

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:	H12317

LOCALITY

State:	Alaska
General Locality:	Kodiak Island
Sub-locality:	Ouzinkie Harbor to Southern Portion of Marmot Bay

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		**H12317**

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:	**Kodiak Island**
Sub-Locality:	**Ouzinkie Harbor to Southern Portion of Marmot Bay**
Scale:	**10000**
Dates of Survey:	**06/10/2011 to 06/30/2011**
Instructions Dated:	**04/06/2011**
Project Number:	**OPR-P136-FA-11**
Field Unit:	**NOAA Ship *Fairweather***
Chief of Party:	**CAPT David O. Neander, NOAA**
Soundings by:	**Multibeam Echo Sounder, Lead Line**
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 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

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Descriptive Report to Accompany Survey H12317

Project: OPR-P136-FA-11

Locality: Kodiak Island

Sublocality: Ouzinkie Harbor to Southern Portion of Marmot Bay

Scale: 1:10000

June 2011 - June 2011

NOAA Ship *Fairweather*

Chief of Party: CAPT David O. Neander, NOAA

A. Area Surveyed

The survey area is located near Kodiak Island, AK, within the sub-locality of Ouzinkie Harbor to Southern Portion of Marmot Bay.

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
58.025 N 152.325430556 W	57.9177166667 N 152.641666667 W

Table 1: Survey Limits

Sheet limits for OPR-P136-FA-11, H12317 were adjusted from those described in the initial Project Instructions. The correspondence associated with these limit changes is included in Appendix V this report.

A.2 Survey Purpose

The purpose of this project is to provide contemporary surveys to update National Ocean Service (NOS) nautical charting products.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

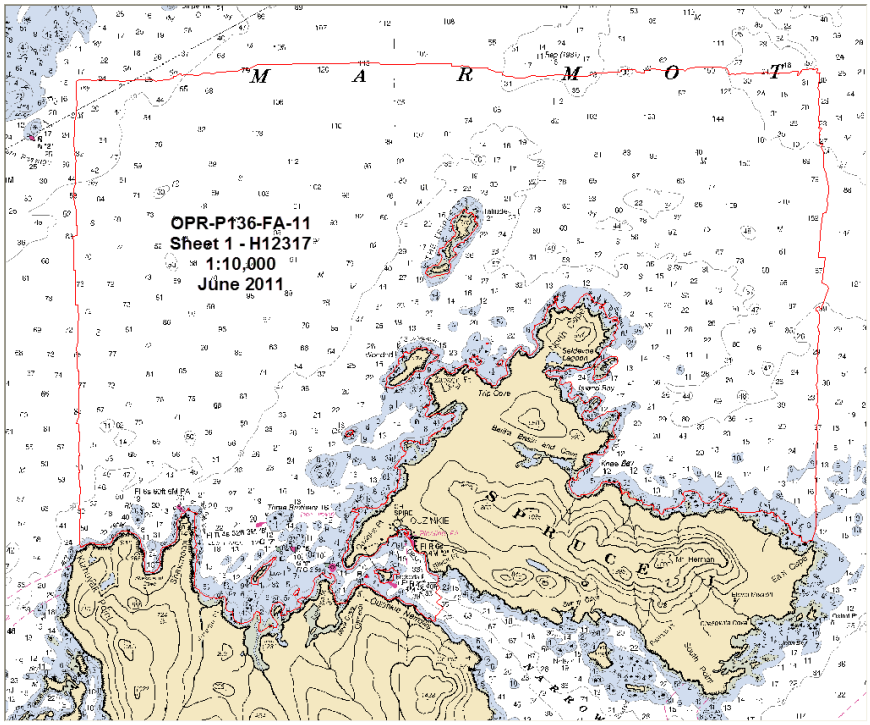


Figure 1: H12317 Survey Outline

The survey coverage deviated somewhat from the requirements described in the Project Instructions. Safety considerations limited the near shore extent of survey coverage in some areas. In areas where rocks and shoals were prevalent, a near shore NALL was generated for safe survey operations. Within Ouzinkie Narrows near shore survey operations were limited by the presence of strong currents. Near shore survey coverage was also limited by the presence of kelp in numerous areas throughout the project area. Fishing gear off Shakmanof Point and Entrance Point and construction on the Ouzinkie Wharf limited near shore coverage in these areas.

A.5 Survey Statistics

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

	HULL ID	*2808*	*2806*	*S220*	*2805*	*Total*
LNM	**SBES Mainscheme**	0.00	0.00	0.00	0.00	0.00
	MBES Mainscheme	252.95	288.91	94.80	250.82	887.48
	Lidar Mainscheme	0.00	0.00	0.00	0.00	0.00
	SSS Mainscheme	0.00	0.00	0.00	0.00	0.00
	SBES/MBES Combo Mainscheme	0.00	0.00	0.00	0.00	0.00
	SBES/SSS Combo Mainscheme	0.00	0.00	0.00	0.00	0.00
	MBES/SSS Combo Mainscheme	0.00	0.00	0.00	0.00	0.00
	SBES/MBES Combo Crosslines	7.90	32.70	0.00	8.36	48.96
	Lidar Crosslines	0.00	0.00	0.00	0.00	0.00
Number of Bottom Samples						18
Number of DPs						21
Number of Items Items Investigated by Dive Ops						0
Total Number of SNM						57.82

Table 2: Hydrographic Survey Statistics

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

Survey Dates
06/10/2011
06/11/2011
06/12/2011
06/13/2011
06/14/2011
06/15/2011
06/16/2011
06/17/2011
06/21/2011
06/24/2011
06/27/2011
06/28/2011
06/29/2011
06/30/2011

Table 3: Dates of Hydrography

A.6 Shoreline

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

A.7 Bottom Samples

Bottom samples were conducted at a total of 18 locations on sheet H12317. The supplied bottom sample Project Reference File was used as a preliminary guide for determining appropriate bottom sample sites. Fourteen bottom sample locations correspond with sites identified by the supplied file. The remaining four bottom sample locations were selected based on the anticipated bottom type and suitability as potential anchorage locations.

Fourteen new bottom samples, twelve currently charted bottom types, and additional rocky seabed areas created during office processing are 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	*2805*	*2806*	*2807*	*2808*	*S220*	*2302*	*1905*
LOA	8.64 meters	8.64 meters	8.64 meters	8.64 meters	70.4 meters	7.0 meters	5.79 meters
Draft	1.12 meters	1.12 meters	1.12 meters	1.12 meters	4.7 meters	0.4 meters	0.66 meters

Table 4: Vessels Used

Figure 2: Launch 2808 With Mounted LANDMark Marine Laser Scanner

A LANDMark Marine Laser Scanner was mounted on survey launch 2808 to gather point cloud data of shoreline features while concurrently acquiring multibeam data. The mounting configuration for the laser scanner is illustrated in Figure 2. For more specific information refer to Applannix LANDMark Marine Test Report prepared by Physical Scientist Grant Froelich of Pacific Hydrographic Branch and included in Appendix V of this report.

B.1.2 Equipment

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

Manufacturer	Model	Type
RESON	7125	MBES
RESON	7111	MBES
Applanix	POS/MV V4	Vessel Attitude System
Applanix	POS/MV V4	Positioning System
RESON	SVP 70 and SVP 71	Sound Speed System
Brooke Ocean	MVP 200	Sound Speed System
SeaBird	CBE 19plus	Sound Speed System

Table 5: Major Systems Used

Vessel Name	FAIRWEATHER	Launch 2805	Launch 2806	Launch 2807	Launch 2808	Ambar 700	Skiff
Hull Number	S 220	2805	2806	2807	2808	2302	1905
Builder	Aerojet-General Shipyards	All American Marine	All American Marine	All American Marine	All American Marine	Marine Silverships, Inc	SeaArk
Length Overall	70.4 m (231')	8.64 m (28' 6")	8.64 m (28' 6")	8.64 m (28' 6")	8.64 m (28' 6")	7.0 m (23')	5.79 m (19')
Beam	12.8 m (42')	3.48 m (11' 5")	3.48 m (11' 5")	3.48 m (11' 5")	3.48 m (11' 5")	2.9 m (9' 4")	2.44 m (8')
Draft, Maximum	4.7 m (15' 6")	1.12 m (3' 8")	1.12 m (3' 8")	1.12 m (3' 8")	1.12 m (3' 8")	0.4 m (1' 4")	0.66 m (1' 2")
Cruising Speed	12.5 knots	24 knots	24 knots	24 knots	24 knots	22 knots	25 knots
Max Survey Speed	6 knots	8 knots	8 knots	8 knots	8 knots		
Primary Echo-sounder(s)	RESON 7111,	RESON 7125	RESON 7125	RESON 7125	RESON 7125		
Sound Velocity Equipment	SBE 19plus, MVP 200, SVP70	SBE 19plus, SVP71	SBE 19plus, SVP71	SBE 19plus, SVP71	SBE 19plus, SVP71		
Attitude & Positioning Equipment	POS/MV V4	POS/MV V4	POS/MV V4	POS/MV V4	POS/MV V4		
Type of operation	MBES	MBES	MBES	MBES	MBES Laser Scanner	Shore Station	Shoreline, Shore Station

Figure 3: Specifications of platform vessels used for acquisition on sheet H12317

B.2 Quality Control

B.2.1 Crosslines

Surface differencing in CARIS HIPS and SIPS was used to assess crossline agreement with main scheme lines on sheet H12317. Percentage of crosslines collected to main scheme lines is 5.5%. Figure 4 depicts a difference between a 16-meter surface made with main scheme lines only and a 16-meter surface made with

crosslines only. The areas of extreme disagreement are the result of steeply sloping regions where even a slight horizontal offset results in major differences in depth. Additional areas of disagreement exist when comparing crosslines acquired by survey launches to main scheme lines acquired by S220 using the RESON 7111 system.

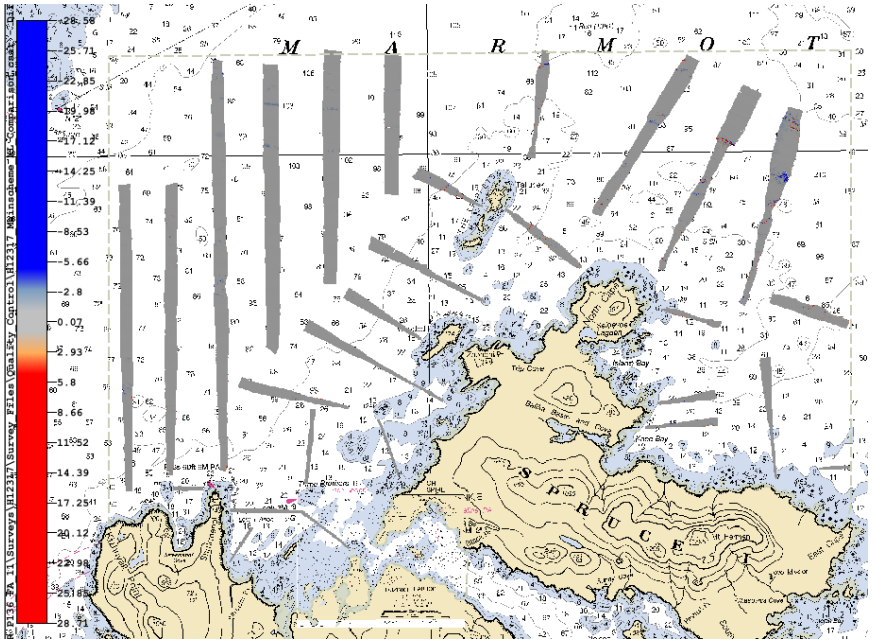


Figure 4: Results of surface differencing a 16-meter surface made with main scheme lines only and a 16-meter surface made using crosslines only for sheet H12317

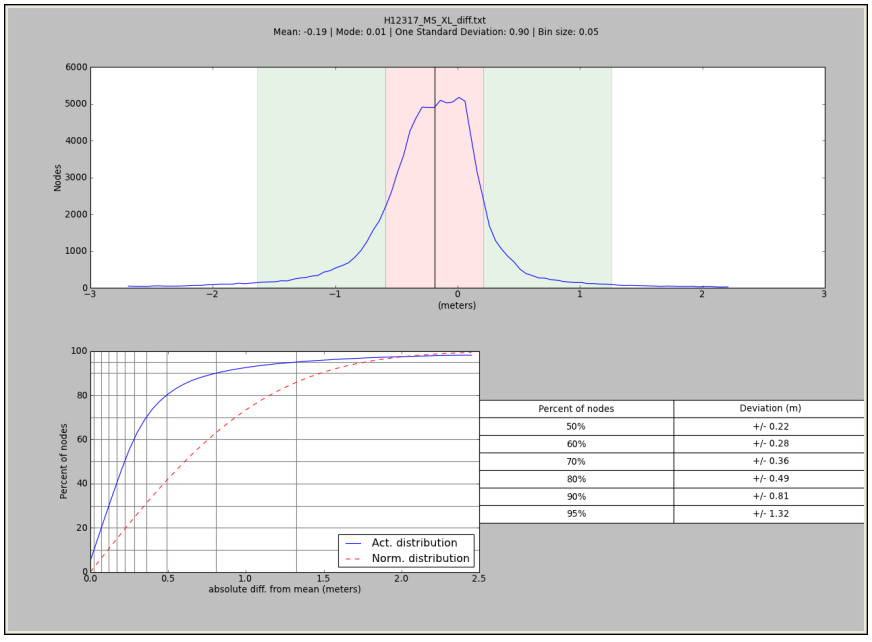


Figure 5: Statistics derived from surface differencing between a 16-meter surface generated from main scheme lines and a 16-meter surface generated from crosslines on sheet H12317

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.01meters	0.1meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
2805	2.0meters/second		0.5meters/second
2806	2.0meters/second		0.5meters/second
2807	2.0meters/second		0.5meters/second
2808	2.0meters/second		0.5meters/second
S220	0.5meters/second	0.5meters/second	0.5meters/second

Table 7: Survey Specific Sound Speed TPU Values

B.2.3 Junctions

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12320	1:40000	2011	NOAA Ship FAIRWEATHER	E

Table 8: Junctioning Surveys

H12320

The areas of overlap between sheet H12317 and the concurrently surveyed sheet H12320 were reviewed using CARIS Subset Editor for sounding consistency and in CARIS HIPS and SIPS by surface differencing 16-meter combined surfaces to assess surface agreement. The results of this surface differencing are displayed in figure 6. The soundings and surfaces are generally in agreement. Similarly to the crossline comparison within sheet H12317, some steeply sloping areas resulted in significant differences in acquired depths between the two sheets. In these areas very slight horizontal offsets can result in significant vertical differences between the two sheets. In the area of overlap between the two sheets over 80% of nodes

deviated by less than one meter. See Figure 8 for an image depicting the area of overlap between the two sheets.

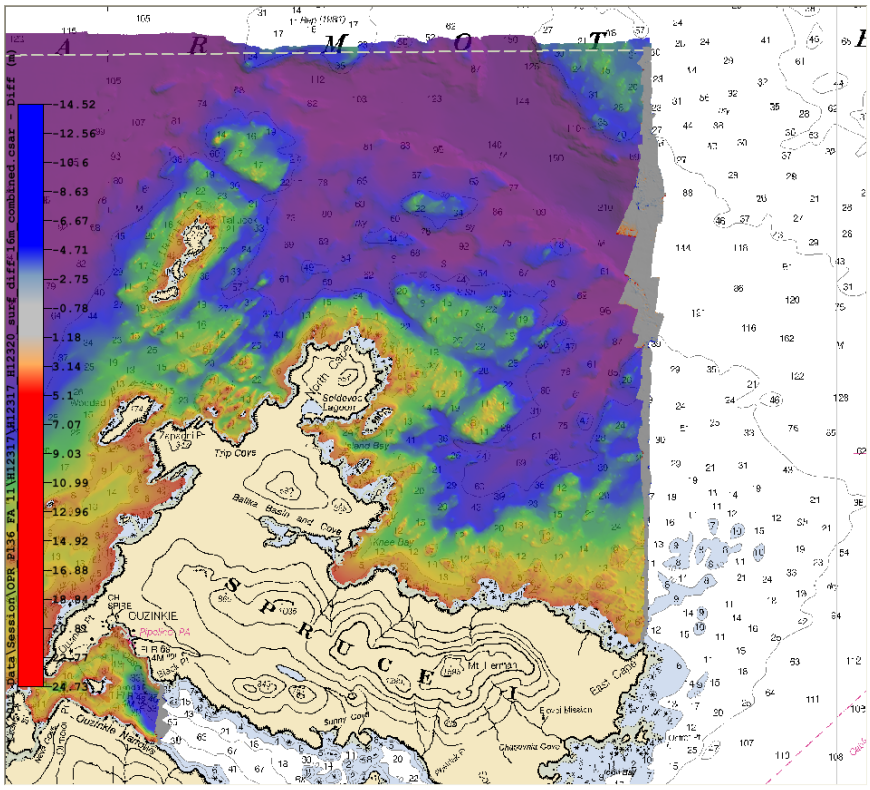
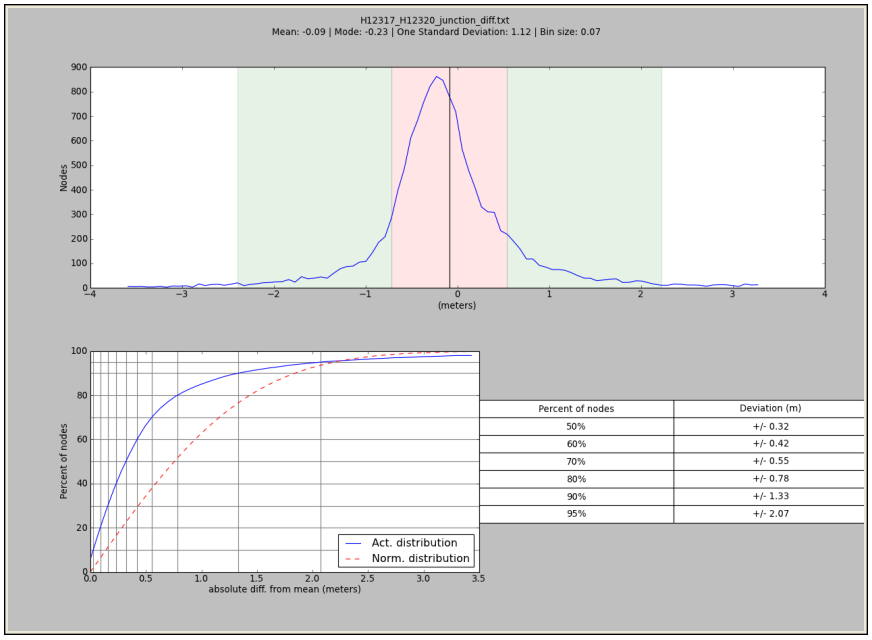


Figure 6: Results of surface differencing 16-meter surfaces in the area of overlap between sheet H12317 and sheet H12320



Percent of nodes	Deviation (m)
50%	+/- 0.32
60%	+/- 0.42
70%	+/- 0.55
80%	+/- 0.78
90%	+/- 1.33
95%	+/- 2.07

Figure 7: Statistics resulting from a surface difference of of the overlaping 16-meter surfaces of sheets H12317 and H12320

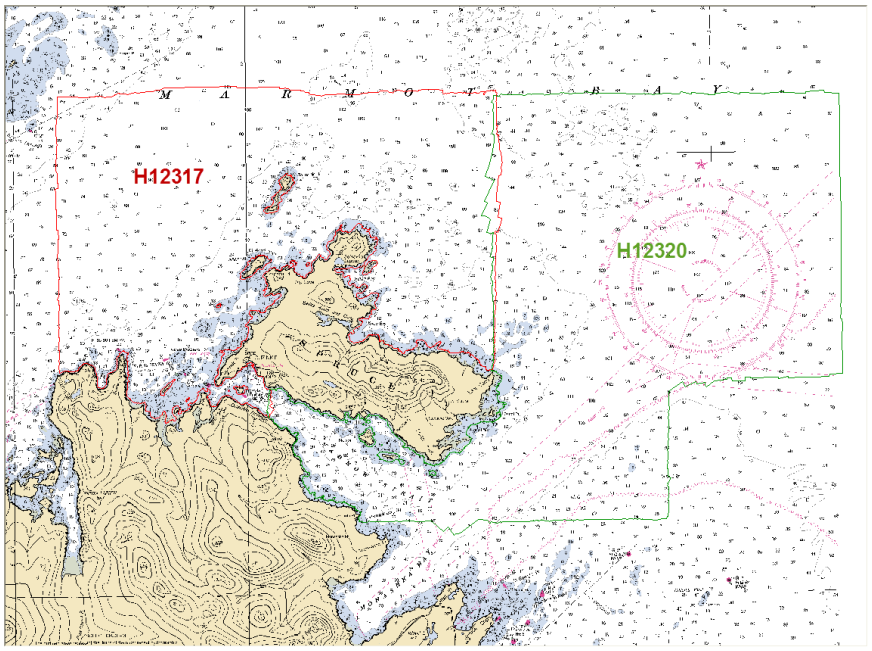


Figure 8: Junctions between sheet H12317 and sheet H12320

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.2.5.1RESON 7111 Issues

Data acquired on sheet H12317 with the RESON 7111 system installed on Fairweather S220 displayed occasional inconsistencies. In particular the outermost RESON 7111 beams frequently had characteristics that did not agree with other overlapping data. For this reason all survey lines conducted using the RESON 7111 were filtered to exclude data outside nadir by more than 68 degrees on both the port and starboard sides of the swath. Filtering of this nature did result in some coverage gaps. To minimize these gaps some filtered data was re-accepted after close inspection in CARIS HIPS Subset mode. An example of the 7111 outerbeam issue is pictured in Figure 9.

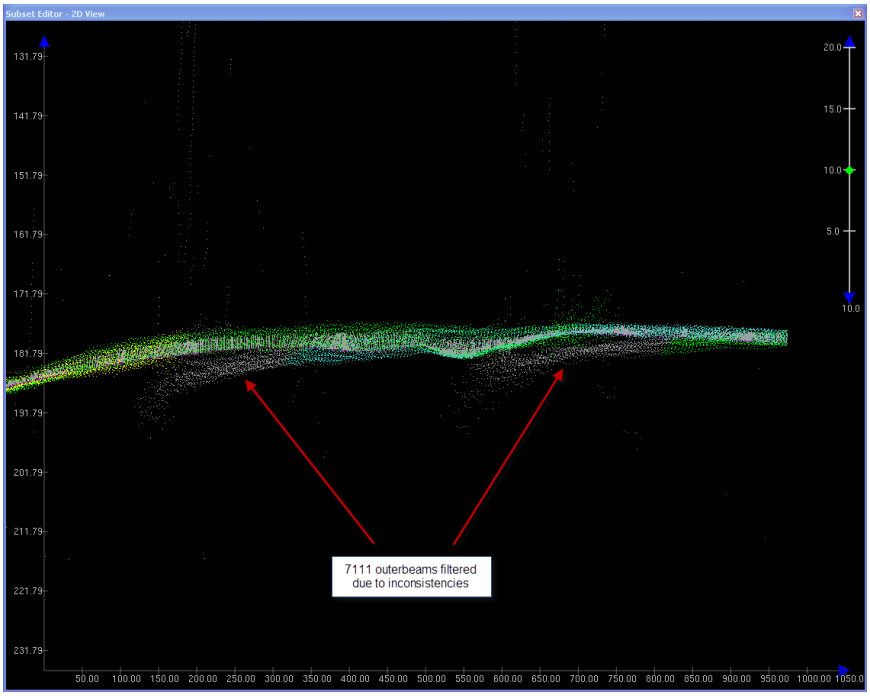


Figure 9: RESON 7111 data on sheet H12317 displayed using CARIS Subset Editor with a vertical exaggeration of 10.

Data is adequate for charting.

B.2.5.1Isolated Data Dropouts

Data acquired on Wednesday, June 29, 2011 (DN180) by Hydrographic Survey Launch 2806 displayed three brief but distinct data dropouts on line 2011M_1800127. At the time launch 2806 was acquiring data near the southern edge of sheet H12317 in the area of Low Island Anchorage. The acquisition log notes no issues observed by personnel aboard the launch during the time of acquisition. At present the exact reason for the data gaps is unknown, though it appears to have been an isolated incident.

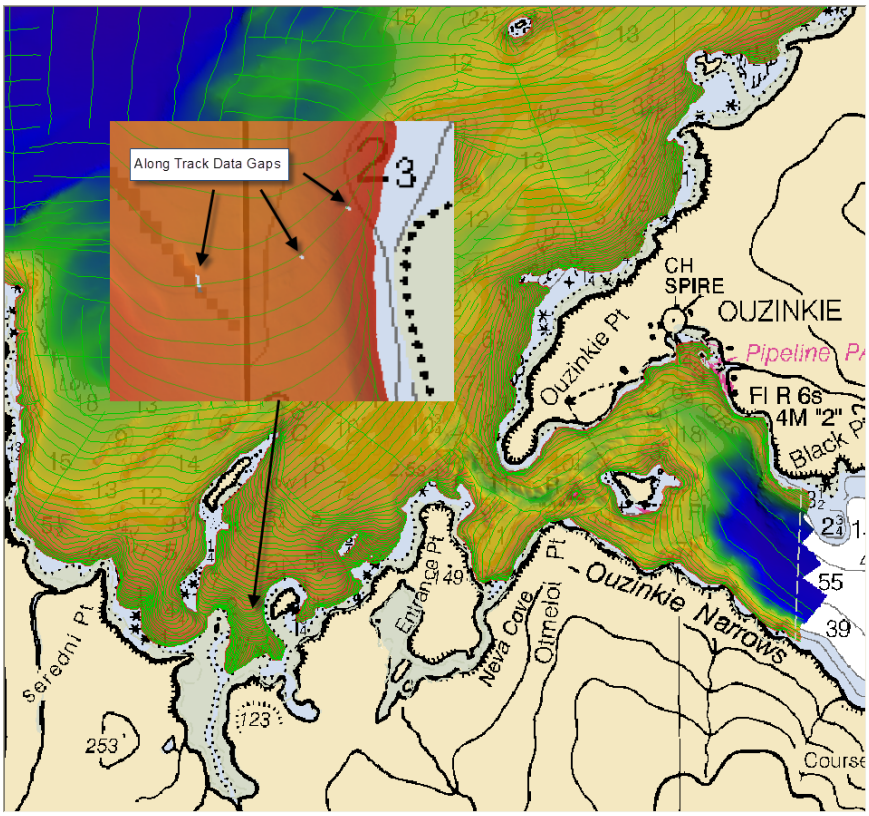


Figure 10: Data gaps in line 2011M_1800127 acquired on sheet H12317 by launch 2806.

Data is adequate for charting.

B.2.6 Factors Affecting Soundings

B.2.6.1 None Exist

There were no other factors that affected corrections to soundings.

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.

More precisely, during acquisition of sheet H12317 survey launches manually deployed a CTD approximately every two to three hours.When acquiring with S220 the MVP was operated at an interval of approximately one cast every 30 minutes. The exception was line 2011M_1781743 acquired by S220 on day number 178. During the time of acquisition by S220, survey launch 2806 was working in reasonably close proximity. The sound speed data collected by launch 2806 on day number 178, using a CTD, was used to develop sound speed values for the processing of hydrographic data acquired by S220 on that day.

B.2.8 Coverage Equipment and Methods

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

B.2.9 Obstacles Encountered Limiting Extents of Coverage

Obstacles were encountered within the boundaries of sheet H12317 that limited the extents of multibeam coverage, particularly in nearshore areas. As already represented on chart 16594, kelp is present in many of the nearshore areas within the limits of sheet H12317. Effective hydrographic survey operations were frequently limited by the offshore extent of kelp, both in areas where kelp is noted on the chart and in additional areas where new kelp has been included in the H12317 Final Feature File. Another obstacle limiting the acquisition of data was the presence of set net fishing gear near Shakmanof Point and Entrance Point. Figure 11 illustrates where the gaps in coverage due to the presence of the fishing gear occurred. During the period of acquisition on sheet H12317 the pier on the west side of Ouzinkie Harbor was under construction. Due to the presence of barge and pile driving equipment effective survey acquisition was limited in this area.

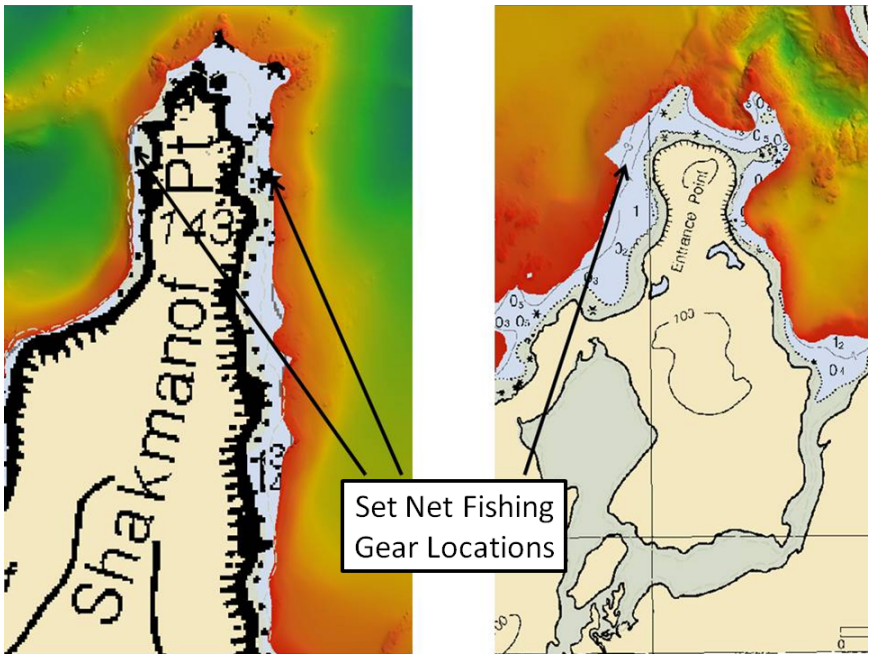


Figure 11: Locations of Set Net Fishing Gear Limiting Survey Coverage near Shakmanof Point and Entrance Point

B.2.10 Holiday Assessment

Complete multibeam coverage was obtained within the limits of H12317. 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 H12317. Most holidays resulted from shadows generated in areas with very dynamic and complex sea floor. Steeply sloping areas in particular resulted in small data gaps that persisted as holidays. Upon further investigation the shoalest features were consistently represented. Interpolated surfaces were made for the 1-meter and 2-meter finalized surfaces to further assess the presence of holidays in shallow water areas.

When viewing multiple finalized surfaces some apparent holidays exist at the depth threshold changes between surfaces. Again this is usually in steeply sloping areas and in all instances the shoalest features are properly depicted.

Apparent holidays found on sheet H12317 are depicted in Figures 12 through 15.

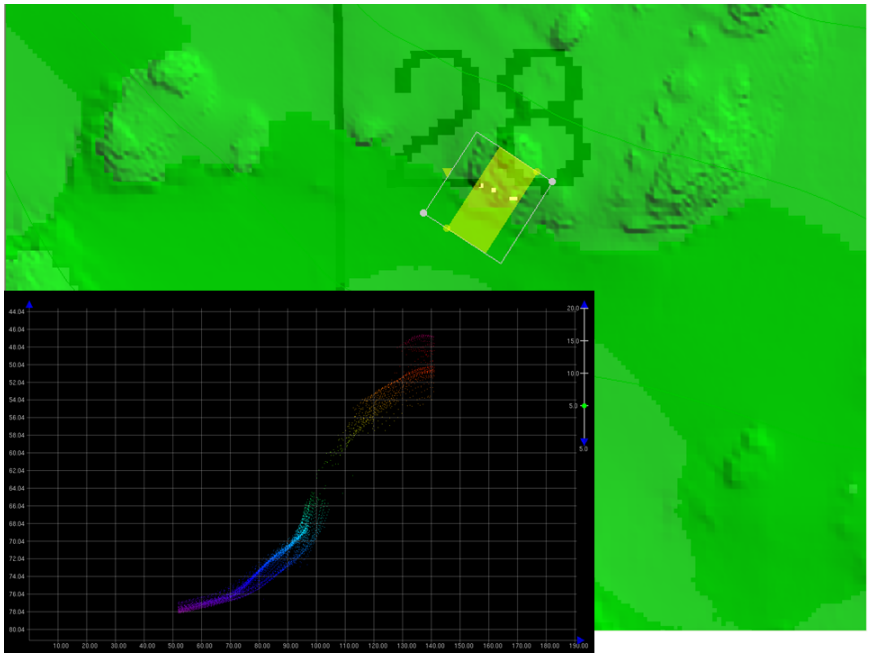


Figure 12: Holiday in the NE corner of sheet H12317

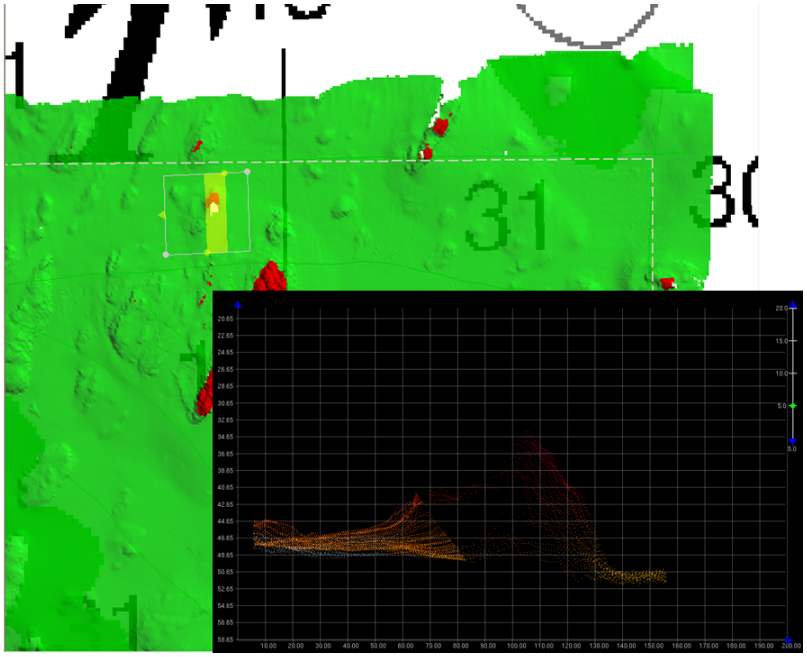


Figure 13: Holiday in the NE corner of sheet H12317

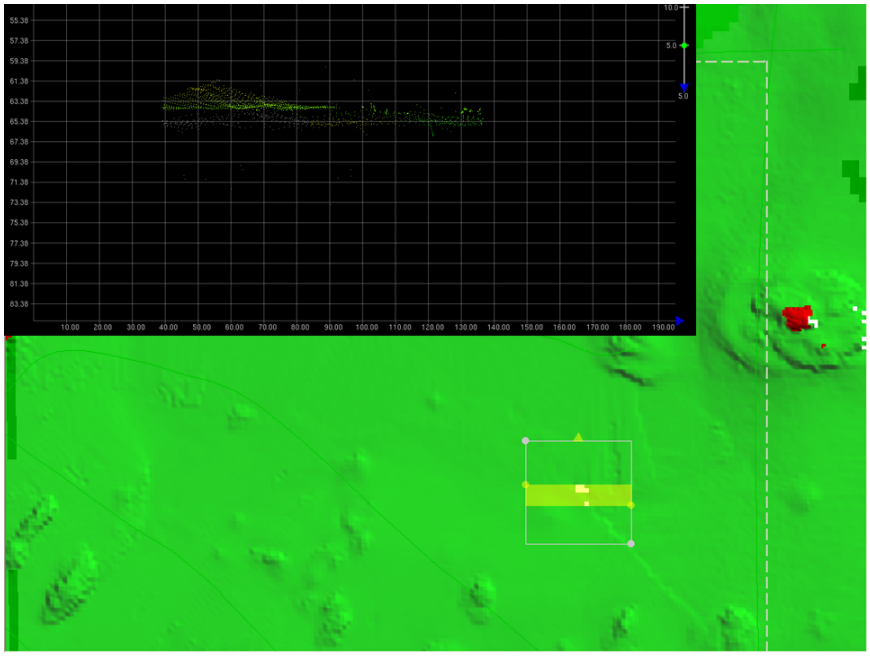


Figure 14: Holiday in the NE corner of sheet H12317

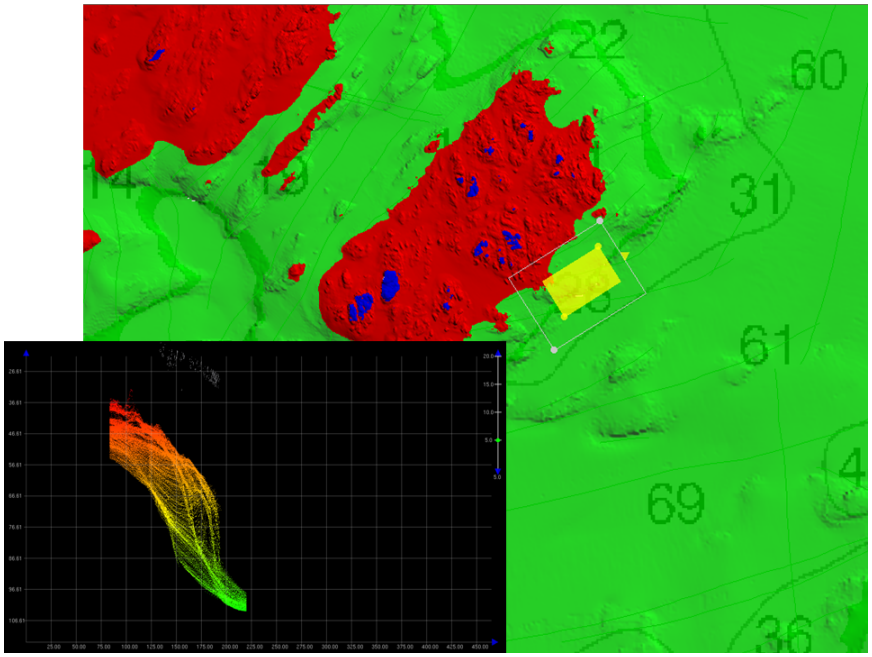


Figure 15: Holiday existing E of North Cape

Data is adequate for charting.

B.2.11 IHO Uncertainty

All data meet the data accuracy specifications as stated in the NOS Hydrographic Surveys Specifications and Deliverables (HSSD) dated April 2011. To assess vertical accuracy standards, a child layer titled "IHO_1" was created for each of the 1-meter, 2-meter, 4-meter, and 8-meter finalized surfaces up to depths of 100 meters using the equation as stated in section C.2.1 of the DAPR. A child layer titled "IHO_2" was created for the 8-meter and 16-meter finalized surfaces for depths over 100 meters using the equation as stated in section C.2.1 of the DAPR. The resulting analysis is presented in Standards Compliance Review in Appendix V.

B.2.12 Density

Density requirements for H12317 were achieved with at least 99.73% of finalized surfaces nodes containing five or more soundings, see Standards Compliance Review in Appendix V.

B.2.13 Improper Units in Original Composite Source File

Within the Original Composite Source File the depths associated with the three underwater rocks included in the file appeared to labeled with the improper units. The underwater rock depth values did appear to match the depths found on chart 16594, which was indicated as the source for these depths. However the depth values indicated in the Original Composite Source File were labeled with units in meters when the actual depth values appeared to match the charted depth in fathoms.

Depth values were correct, units are adjustable via software display variables.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction 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 a 7k file and submitted directly to NGDC to be archived and to PHB where the data will be processed.

Specific processing methods have not been established and no backscatter has been processed as of this writing.

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	1	05/09/2011	Processing
Caris	HIPS/SIPS	7.1	0	2	08/08/2011	Processing
Caris	Notebook	3.1	0	3	02/25/2011	Processing
Caris	Notebook	3.1	1	0	09/02/2011	Processing
NOAA	Pydro	11.7-10	0	r3548-r3638	11/03/2011	Processing
Applanix	PosPAC	5.4	1	0	07/15/2011	Processing

Table 9: Software Updates

The following Feature Object Catalog was used: Object Catalog Version #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
H12317_1m	CUBE	1 meters	-	NOAA_1m	Complete MBES
H12317_2m	CUBE	2 meters	-	NOAA_2m	Complete MBES
H12317_4m	CUBE	4 meters	-	NOAA_4m	Complete MBES
H12317_8m	CUBE	8 meters	-	NOAA_8m	Complete MBES
H12317_16m	CUBE	16 meters	-	NOAA_16m	Complete MBES
H12317_1m_Final_0to20	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
H12317_2m_Final_18to40	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
H12317_4m_Final_36to80	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES
H12317_8m_Final_72to160	CUBE	8 meters	72 meters - 160 meters	NOAA_8m	Complete MBES
H12317_16m_Final_144to350	CUBE	16 meters	144 meters - 350 meters	NOAA_16m	Complete MBES
H12317_16m_Combined	CUBE	16 meters	-	NOAA_16m	Complete MBES

Table 10: CARIS Surfaces

All field sheet extents were adjusted using 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 one, two, four and eight meter CUBE BASE surfaces in Survey H12317. A finalized 32-meter surface was not created even though a small portion of the survey extended deeper than 320 meters. The finalized 16-meter surface extends from 144 to 350 meters to include all of the data from the deepest parts of the survey. All density requirements were met within the 16-meter surface.

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 TVU at that depth, the noisy data have been rejected and the surface recomputed.

Concur with clarification: The NOAA CUBE parameters mandated in the HSSD were also used for the creation of the sixteen meter CUBE surface with the exception of the depth range used.

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 H12317 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 H12317 requires 67 designated soundings and 9 outstanding soundings. Four of the designated soundings and four of the outstanding soundings were reported as Dangers to Navigation. Sixty-seven designated soundings were required to accurately represent the sea floor. Five soundings were flagged as outstanding for feature creation in CARIS Notebook.

B.5.5 True Heave

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 preformed for the following vessels and days:

Launch 2805 on day numbers 163, 164, 165, 166, and 172
Launch 2806 on day numbers 164, 166, 172, 178, and 181
Launch 2808 on day numbers 163, 179, and 180

TrueHeave data could not be applied to MBES data for Launch 2806 day number 162 lines 2011M_1621653, 2011M_1621702, 2011M_1621711, 2011M_1621714, and 2011M_1621719 due to the fact that the POS file was not logging properly. Trueheave also could not be applied to MBES data for Launch 2806 day number 167 line 2011M_1671747 due to a POS disconnect while logging this line. In all of the aforementioned instances the MBES data was investigated in CARIS Subset mode and data quality for those lines was not affected by the lack of TrueHeave.

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
Kodiak Island, AK	9457292

Table 11: NWLON Tide Stations

File Name	Status
9457292.tid	Verified Observed

Table 12: Water Level Files (.tid)

File Name	Status
P136FA2011CORP.zdf	Final
P136FA2011CORP--.zdf	Final

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

A request for final approved tides was sent to N/OPS1 on 07/09/2011. The final tide note was received on 07/21/2011.

Preliminary zoning is accepted as the final zoning for project OPR-P136-FA-11.

P136FA2011CORP.zdf was the tide file used for all correctors to soundings in CARIS HIPS. To enable the application of the tide file in CARIS Notebook the original .zdf file needed to be edited to include only one tide station. P136FA2011CORP--.zdf reflects this edit whose only difference is to exclude tide station 9457292 from the tide station list. It was determined by the field that this excluded tide station had no

effect on the tide zones where hydrography was collected. Both files are submitted in the tides folder of the processed data.

Tide note appended

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 methods described in the DAPR. The Post Processing Kinematic (PPK) method is the primary method of positioning of MBES soundings on sheet H12317. Correctors from the GPS base station established neat Three Brothers Islands was used for post processing all vessel-day POS/MV files. Smooth Best Estimate of Trajectory (SBET) and associated error (RMS) data were applied to all MBES data in CARIS HIPs with the exception of the following lines.

The SBET files were not applied to launch 2806 on day number 162 line numbers 2011M_1621653, 2011M_1621702, 2011M_1621711, 2011M_1621714, and 2011M_1621719 because POS/MV data were not effectively logged during that time.

The SBET file was not successfully applied to lines 2011M_1672103 and 2011M_1672133, acquired by launch 2805 on Day Number 167. The reason for this was that post processing of the Trueheave file was not successful for the time of acquisition of these two lines.

The SBET file was applied to line 2011M_1671747 acquired by Launch 2806 on Day Number 167. However during acquisition of data on this line POS/MV connection was lost. Due to the disconnect Trueheave did not apply to this line. Upon application of the SBET file to this line the overall length of the line changed from 239.63 m to 232.21 m. Following application of the SBET file the remaining data associated with this line was inspected and the remaining processed data did not appear to be negatively affected by the lack of Trueheave combined with partial application of SBET file.

The following user installed stations were used for horizontal control:

HVCR Site ID	Base Station ID
TRIPLET	TRIP

Table 14: User Installed Base Stations

Differential correctors from the USCG beacon at Kodiak, AK (313 kHz) were used during real-time acquisition when not otherwise noted in the acquisition logs, and were the sole method of positioning of detached positions (DP) and bottom samples as there is currently no functionality for applying Smoothed Best Estimate of Trajectory (SBET) files to these types of data.

For further details regarding the processing and quality control checks preformed see H12317 POSPac Processing Logs spreadsheet location in the SBET folder with the GNSS data. See also the OPR-P136-FA-11 Horizontal and Vertical Control Report, submitted under separate cover.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Kodiak, AK (313 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
16594	1:20000	13	04/1998	05/18/2011	06/11/2011
16594	1:78900	13	04/1998	05/18/2011	06/11/2011

Table 16: Largest Scale Raster Charts

16594

The survey results generally agree with the contours and trends found on the 1:20,000 inset on chart 16594. Slight discrepancies exist with the charted 10 fathom contour. The charted 6 fathom 3 foot depth in the vicinity of Ouzinkie was not found in the survey data.

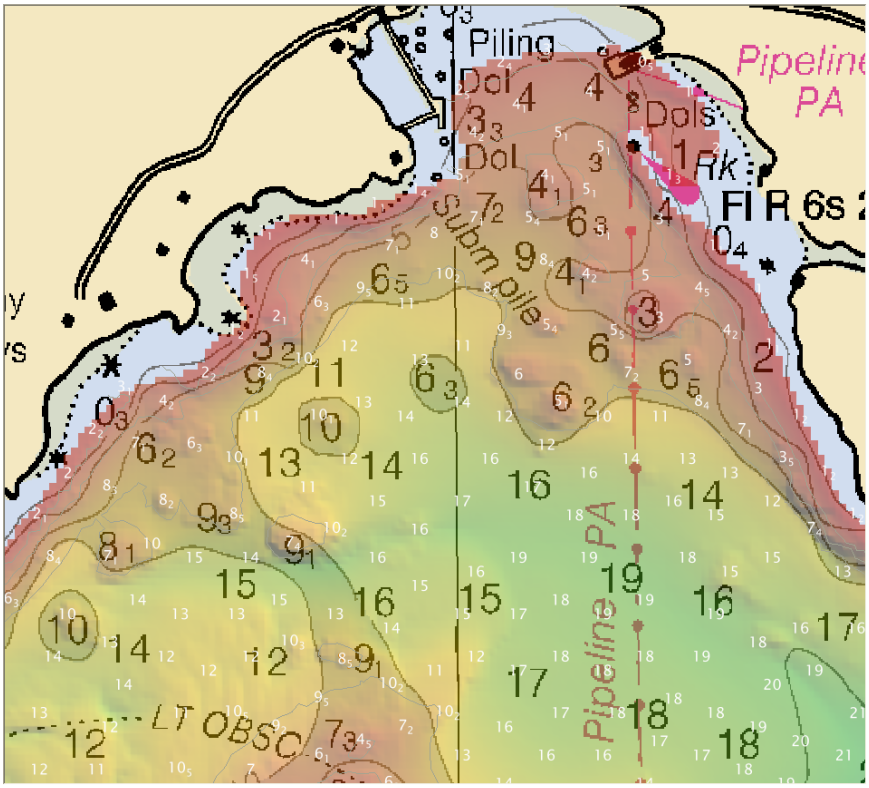


Figure 16: Surveyed soundings compared to charted depths in the area of Ouzinkie

16594

The survey results generally agree with the overall contours and trends of chart 16594. The survey trends and shoal depths are particularly well represented in the charted area west of Zapadni Point. East of Zapadni Point many of the charted shoal areas do not represent the shallowest soundings found in the survey data and some shoals are not charted whatsoever. This is especially true in the areas around Trip Cove, between The Triplets and North Cape, immediately offshore of North Cape, near Island and Knee Bays, and offshore of the Spruce Island shoreline from Knee Bay to East Cape.

In the area around Trip Cove (Figure 17) most of the shoal areas are represented on the chart. However even in the shoal areas that are charted the resulting surveyed soundings are often shoaler than the charted depths. Examples include MBES soundings as shoal as 8 fathoms on a 15 fathom charted depth, MBES soundings of 3 fathoms near a charted 5 and 1/2 fathom depth, and a 5 fathom 4 foot sounding on a 9 fathom charted depth.

In the vicinity of The Triplets (Figure 18) multiple soundings shallower than 10 fathoms were recorded outside the charted 10 fathom contour. The most extreme example of this was found on the east side of The Triplets where MBES data resulted in a 1 fathom 1 foot sounding near a charted depth of 36 fathoms.

Northeast of the Triplets (Figure 19) MBES data resulted in soundings under 10 fathoms in the area of a charted 14 fathom depth.

Northeast of North Cape (Figure 20) MBES data produced soundings as shoal as 9 fathom 2 feet near a charted depth of 17 fathoms.

Outside Island Bay (Figure 21) MBES data resulted in soundings as shoal as 6 fathom 3 feet outside the 10 fathom contour. A 4 fathom 5 feet sounding was acquired near and 8 fathom charted depth. Within Island Bay multiple single digit shoal soundings were detected outside the charted 10 fathom contour. The shoalest of these was 1 fathom 1 foot.

Outside Knee Bay (Figure 22) soundings as shoal as 6 fathoms were acquired by MBES in the area of charted 12 fathom depths.

Along the Spruce Island shoreline between Knee Bay and East Cape (Figure 23) MBES soundings resulted in shoal areas as shallow as 5 fathom 1 foot outside the 10 fathom contour. Further offshore additional MBES soundings were found to be shoaler than the charted depths including 13 fathom soundings in the vicinity of 20 fathom and 21 fathom charted depths.

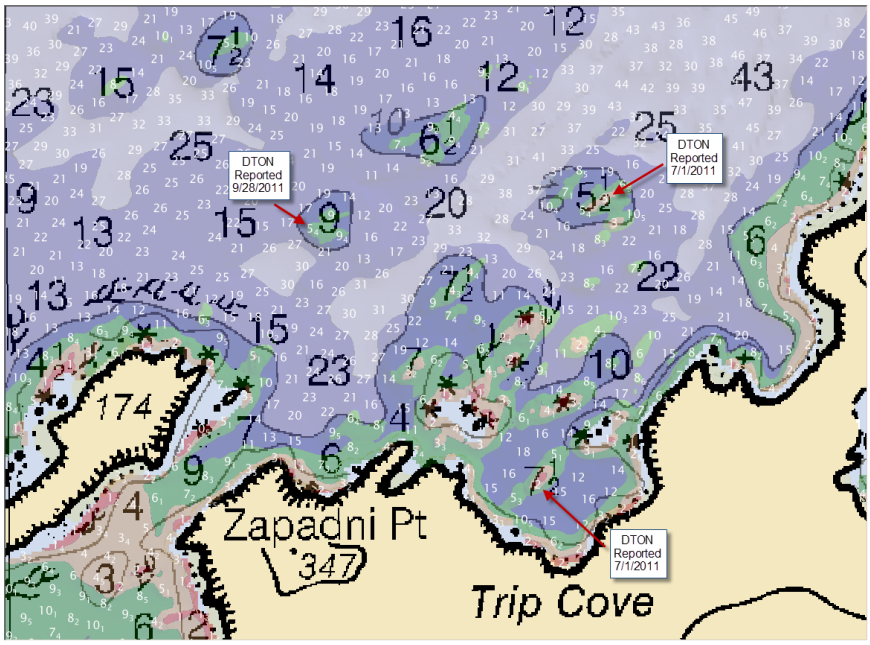


Figure 17: Surveyed soundings compared to charted depths in the area around Trip Cove

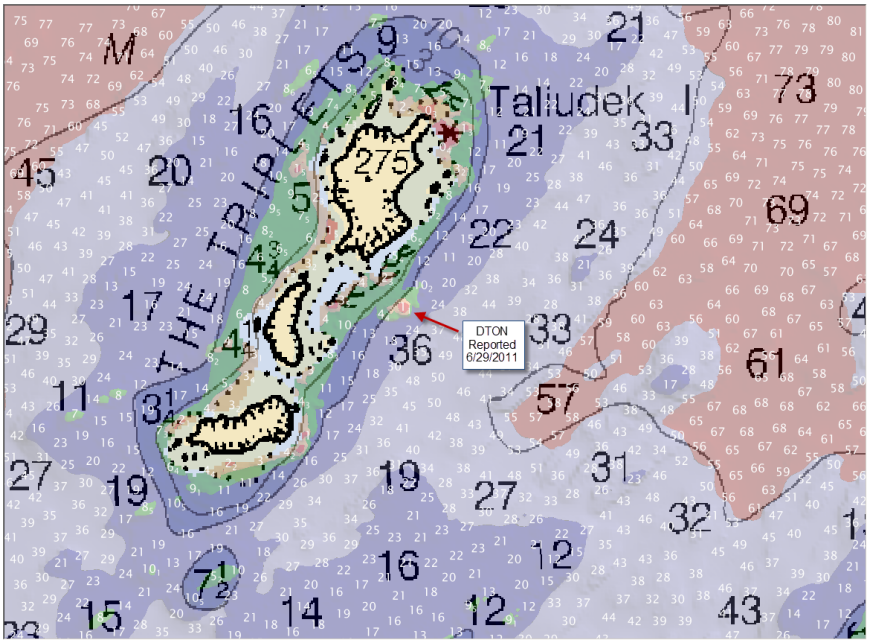


Figure 18: Surveyed soundings compared to charted depths around The Triplets

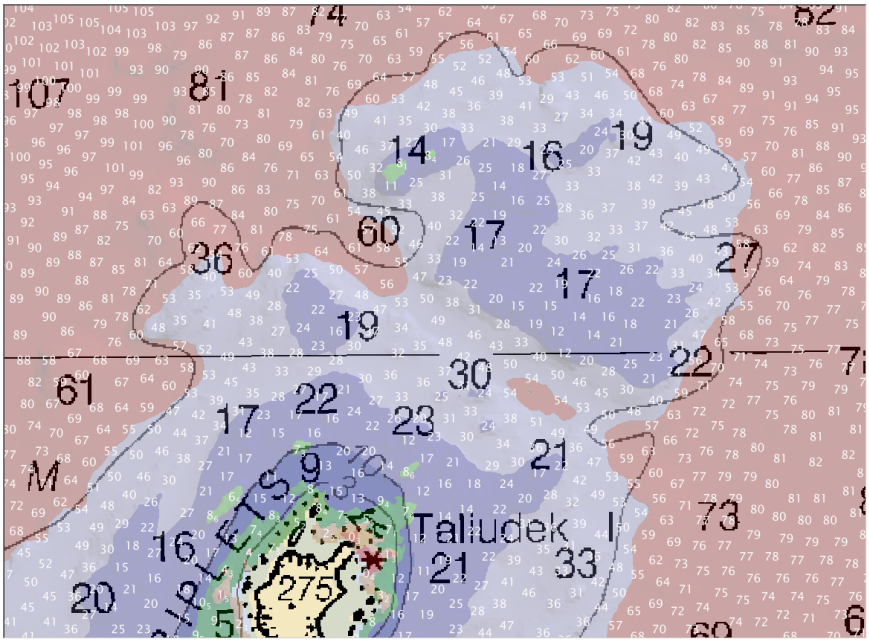


Figure 19: Surveyed soundings compared to charted depths in the area NE of Taliudek Island

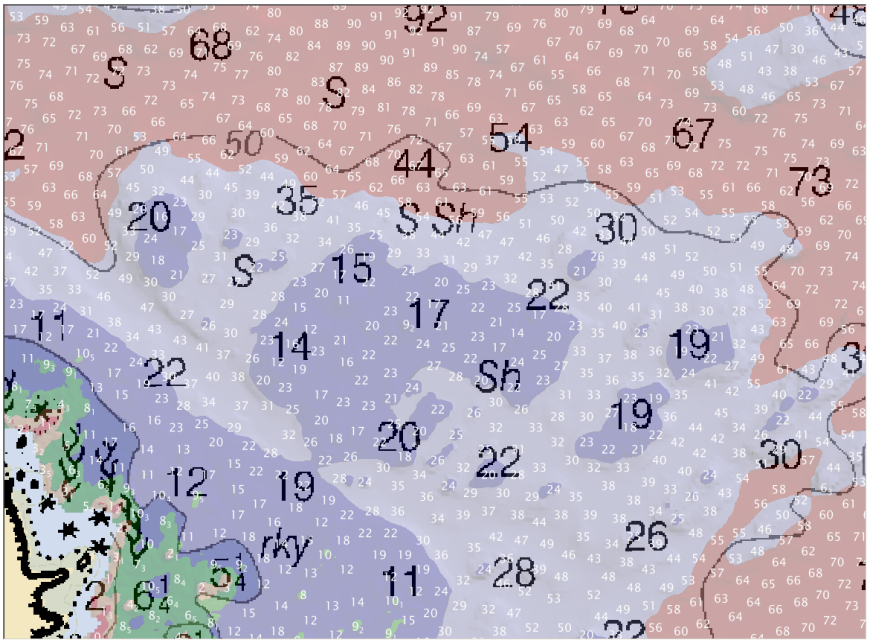


Figure 20: Surveyed soundings compared to charted depths in the area NE of North Cape

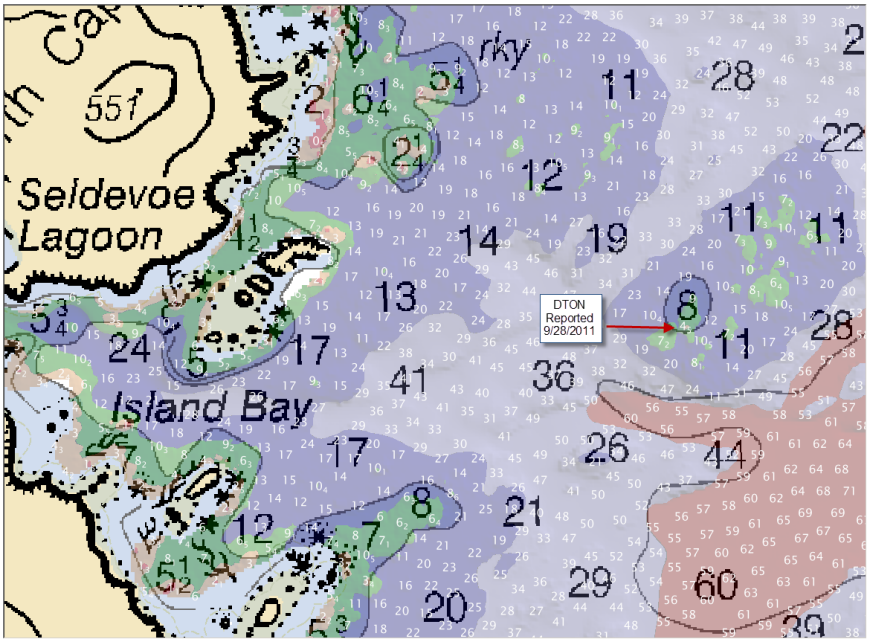


Figure 21: Surveyed soundings compared to charted depths in the area of Island Bay

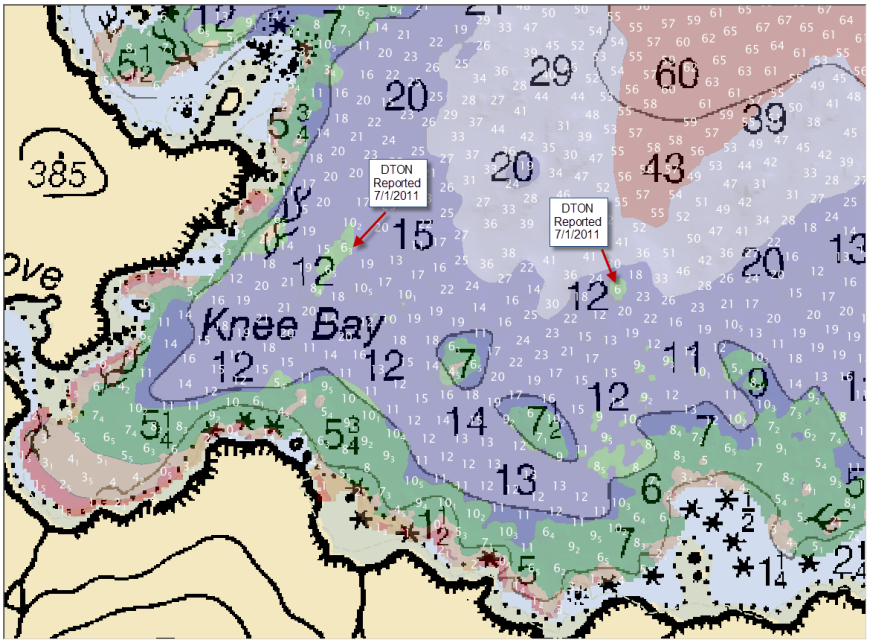


Figure 22: Surveyed soundings compared to charted depths in the area of Knee Bay

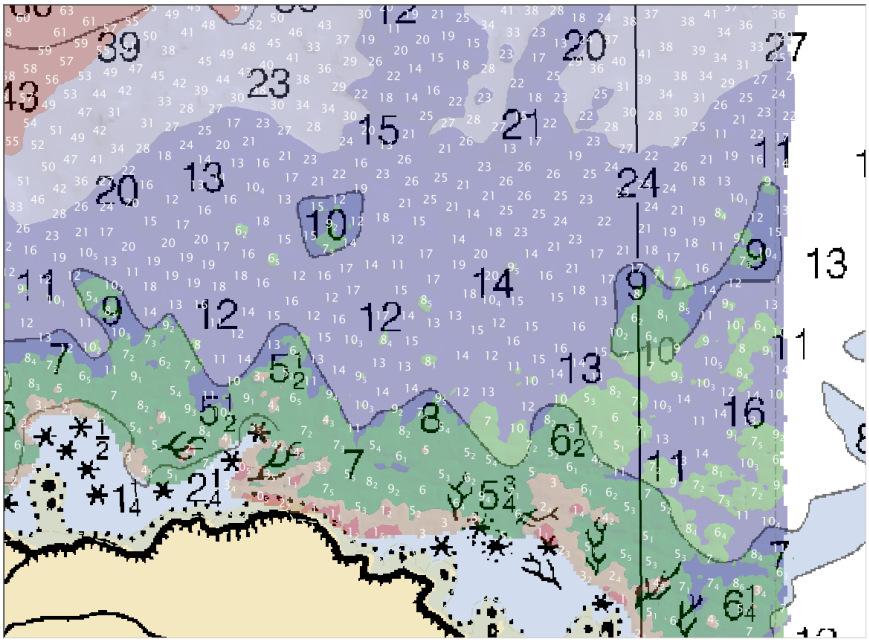


Figure 23: Surveyed soundings compared to charted depths off the Spruce Island shoreline between Knee Bay and East Cape

Concur with general areas of shoaling listed above but specific depths listed may not match those recommended for charting.

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?
US4AK5PM	1:78900	1	10/02/2011	10/04/2011	YES

Table 17: Largest Scale ENCs

US4AK5PM

Due to the preliminary status of the aforementioned Electronic Navigational Chart, no comparison was made between data acquired on sheet H12317 and ENC US4AK5PM.

D.1.3 AWOIS Items

Number of AWOIS Items Addressed: 6
Number of AWOIS Items Not Addressed: 0

There were eight AWOIS items within the limits of H12317, six of which were assigned. All assigned AWOIS items were addressed and are included in the H12317 Final Feature File and the Survey Feature Report in Appendix II. All assigned AWOIS items related to Maritime Boundary Claims and were investigated primarily using methods described in shoreline acquisition. Multibeam data within the AWOIS radii was also consulted to make final determinations.

AWOIS item investigation results are included in appended AWOIS report.

D.1.4 Charted Features

A pipeline leading south from Ouzinkie is labeled as PA on chart 16594, however no pipeline feature was observed in the multibeam data. Figure 24 presents both the PA pipeline as well as the corresponding multibeam data.

Although not included in the provided Original Composite Source file, Chart 16594 indicates a pier on the east side of Ouzinkie. Field investigation of this area found no remains of this feature and multibeam data was collected over much of the area. Figure 25 illustrates the multibeam data overlaid on the area of Chart 16594 with this feature. It is recommended that the charted pier be removed from the chart.

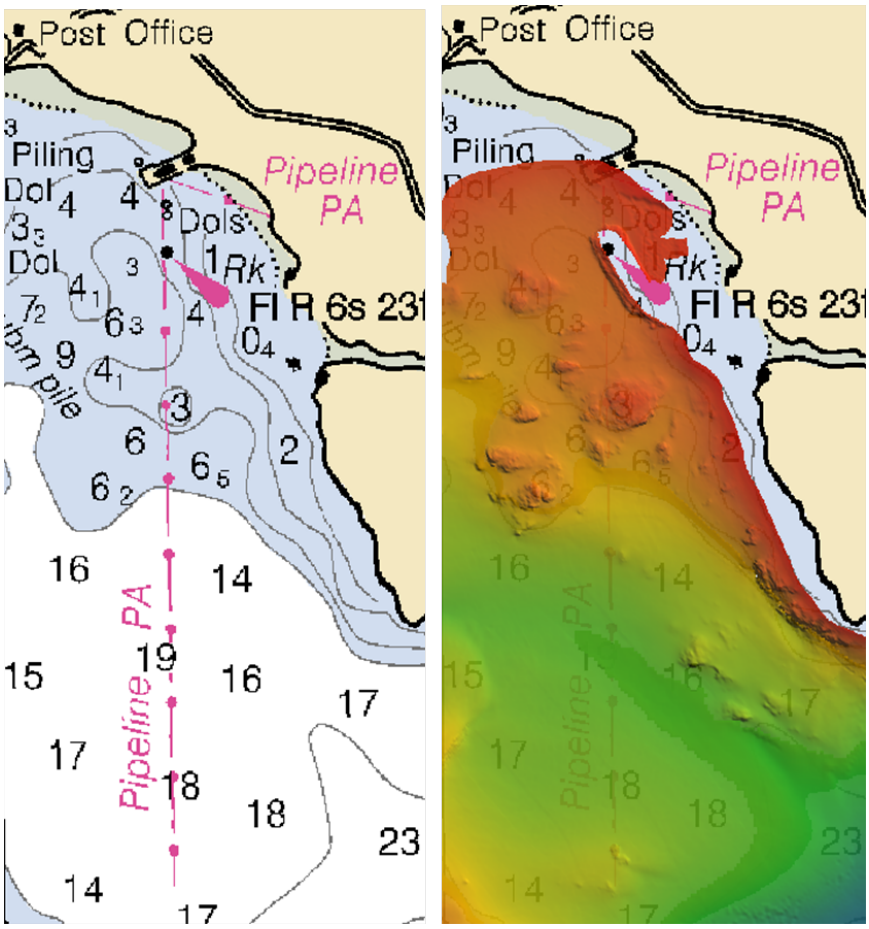


Figure 24: Comparison of charted Position Approximate pipeline to aquired MBES data as represented in Caris HIPS

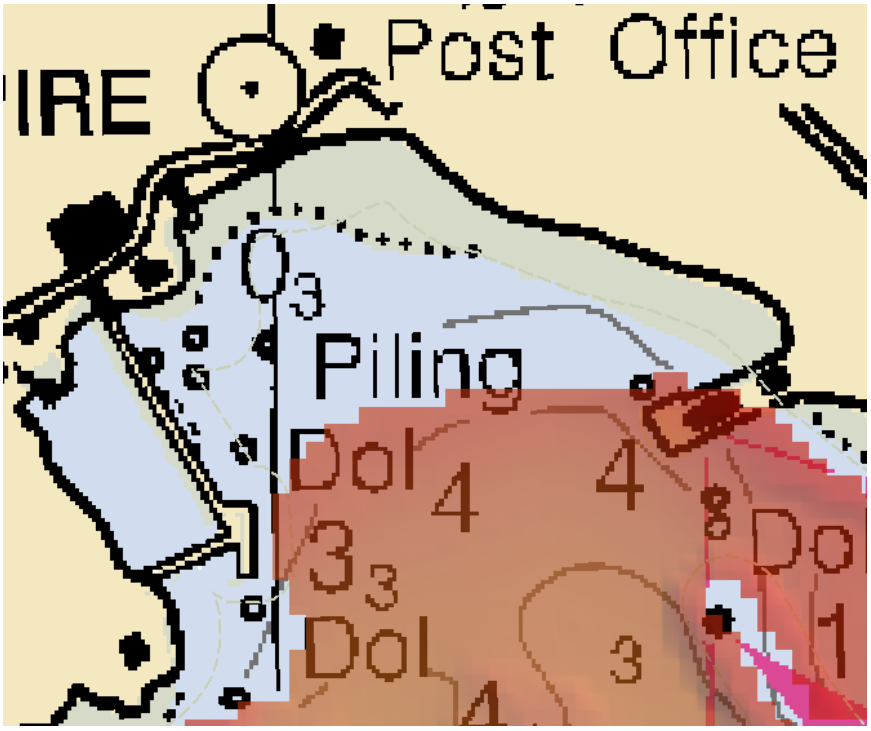


Figure 25: Charted pier east of Ouzinkie with overlayed multibeam data.

Recommend retaining the pipeline as charted. Concur with recommendation to remove the currently charted pier on the east side of Ouzinkie and recommend charting the new shoreline construction to the south of the currently charted pier per current aerial photography or shoreline files.

D.1.5 Uncharted Features

During acquisition on sheet H12317 no new uncharted features were identified for investigation.

D.1.6 Dangers to Navigation

The follwing DTON reports were submitted to the processing branch:

DTON Report Name	Date Submitted
H12317_DTON	2011-06-29
H12317_DTON_Report2	2011-07-01
H12317_DTON_Report3	2011-09-28
H12317_DTON_Report4	2011-12-02

Table 18: DTON Reports

Eight Dangers to Navigation were found within the limits of H12317. One of these was reported to the Marine Chart Division on June 29, 2011. Four more were reported on July 1, 2011. Two were reported

on September 28, 2011. One additional was submitted on December 5, 2011. A total of four Danger to Navigation Reports are included in Appendix I of this report.

Depths listed in the submitted DTON reports may vary from those recommended for charting after further office review and final tide application. Office review identified a shoaler rock with a depth of 2.518 fathoms at 57-58-03.018N 152-27-16.470W that is recommended for charting over the DTON 1.1 from Report 2, a rock of 3.043 fathoms at 57-58-06.299N 152-27-18.813W.

D.1.7 Shoal and Hazardous Features

All navigationally significant shoal features were investigated using MBES and/or shoreline acquisition techniques.

D.1.8 Channels

No controlled channels exist within the limits of sheet H12317. Although Low Island Anchorage is not a designated anchorage, acquired soundings within the bay agreed well with charted depths. Low Island Anchorage was also used multiple times as a satisfactory anchorage by NOAA Ship Fairweather while conducting survey operations in the area.

D.2 Additional Results

D.2.1 Shoreline

Fairweather personnel conducted limited shoreline verification and reconnaissance at times near predicted low or negative tides within the survey limits. Annotations, information, and diagrams collected on DP forms and boat sheets during field operations are scanned and included in the digital Separates I folder. Shoreline verification procedures for survey H12317 conform to those detailed in the DAPR, with the exceptions as discussed below.

As mentioned previously in this report a Landmark laser scanner mounted on Launch 2808 was used for supplementary shoreline acquisition and verification on sheet H12317 while concurrently acquiring multibeam data.

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.

Feature processing procedures were followed as outlined in the DAPR. Within the survey area several charted ledges, reefs, and mean lower low water lines are in conflict with the contemporary hydrographic data. In accordance with agreements reached with the Hydrographic Branches, these features were not further processed by field personnel.

In order to minimize field and processing time spent documenting and digitizing charted MLLW features, appropriate cartographic decisions regarding disproving charted MLLW features that were found to be in conflict with hydrography were conducted during office compilation.

D.2.2 Prior Surveys

No comparison was made between prior surveys and the data acquired for sheet H12317.

D.2.3 Aids to Navigation

The extents of Survey H12317 included eight aids to navigation (ATONs). Each of the ATONs was found to serve its intended purpose.

D.2.4 Overhead Features

No overhead features exist within the boundaries of sheet H12317.

D.2.5 Submarine Features

As mentioned previously in this report the pipeline with Position Approximate charted running south from Ouzinkie was not observed in MBES data.

D.2.6 Ferry Routes and Terminals

Although not depicted on navigational charts of the area, Alaska Marine Highway System ferry routes pass through the boundaries of survey H12317. These ferry routes run near the northern limit of the survey and also pass through Ouzinkie Narrows en route to and from Kodiak, Alaska. A geographical representation of these routes can be found as a System Map on the Alaska Marine Highway System website at www.dot.state.ak.us/amhs/map.shtml.

Recommend charting ferry routes per the Alaska Marine Highway System.

D.2.7 Platforms

No platforms exist within the limits of sheet H12317.

D.2.8 Significant Features

Tidal rips and strong currents were found in Ouzinkie Narrows consistent with those represented on chart 16594 and described in United States Coast Pilot 9 Alaska: Cape Spencer to Beaufort Sea, Chapter 5, Section 210.

D.2 Construction and Dredging

During the period of acquisition on survey H12317 there was active construction on the Ouzinkie Wharf located on the west side of Ouzinkie Harbor. As mentioned previously the presence of this construction and the associated equipment did create limits to acquisition in the immediate vicinity. It is not expected that upon completion of this construction the resulting wharf will be significantly different from the structure currently represented on chart 16594.

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	2011-12-09
Horizontal and Vertical Control Report	2011-12-09
Coast Pilot Report	2011-11-07

Approver Name	Approver Title	Approval Date	Signature
CAPT David O. Neander, NOAA	Chief of Party	12/09/2011	2011.12.12 07:57:17 -08'00'
ENS Adam C. Pfundt, NOAA	Sheet Manager	12/09/2011	ENS Steven Loy 2011.12.12 08:06:19 -08'00'
CST Lynnette V. Morgan	Chief Survey Technician	12/09/2011	David Moehl 2011.12.22 09:19:35 -08'00'
LT Caryn M. Zacharias, NOAA	Field Operations Officer	12/09/2011	Caryn M. Zacharias 2011.12.22 09:30:47 -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	Detached 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 : July 13, 2011

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P136-FA-2011
HYDROGRAPHIC SHEET: H12317

LOCALITY: Ouzinkie Harbor to Southern Portion of Marmot Bay, AK
TIME PERIOD: June 10 - 30, 2011

TIDE STATION USED: 945-7292 Kodiak Island, AK
Lat. 57° 43.9'N Long. 152° 30.7' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 2.397 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project OPR-P136-FA-2011, H12317, during the time period between June 10 - 30, 2011.

Please use the zoning file "P136FA2011CORP" submitted with the project instructions for North Coast of Kodiak Island. Zones SWA98A, SWA106A, SWA271, SWA272 and SWA273 are the applicable zones for H12317.

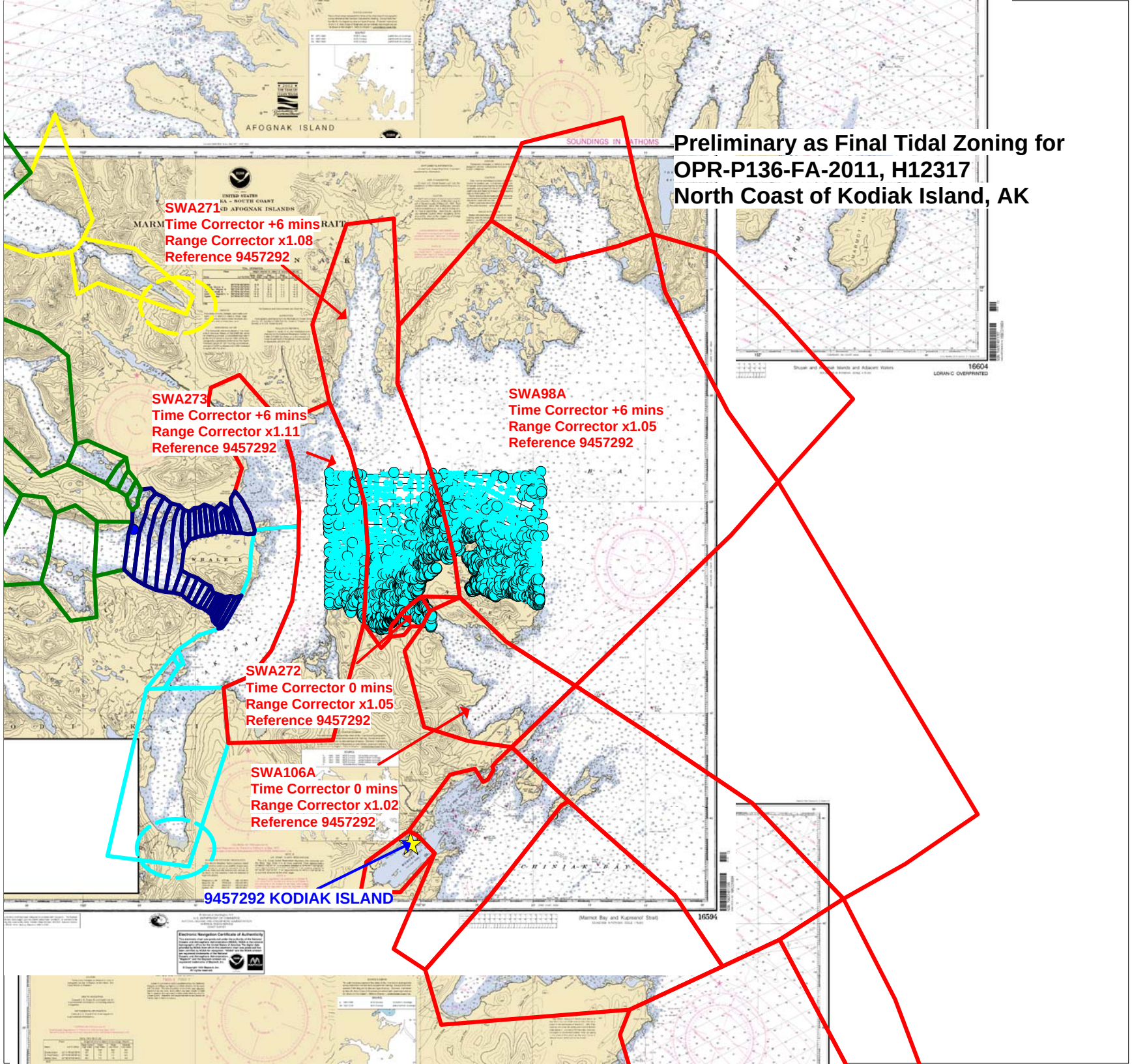
Refer to attachments for zoning information.

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: 2011.07.21 09:25:34 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final Tidal Zoning for
OPR-P136-FA-2011, H12317
North Coast of Kodiak Island, AK
SWA271
Time Corrector +6 mins
Range Corrector x1.08
Reference 9457292
SWA273
Time Corrector +6 mins
Range Corrector x1.11
Reference 9457292
SWA98A
Time Corrector +6 mins
Range Corrector x1.05
Reference 9457292
SWA272
Time Corrector 0 mins
Range Corrector x1.05
Reference 9457292
SWA106A
Time Corrector 0 mins
Range Corrector x1.02
Reference 9457292
9457292 KODIAK ISLAND
AFOGNAK ISLAND
SOUNDINGS IN FATHOMS
16604
16594

From	"ops.fairweather" <ops.fairweather@noaa.gov>
Sent	Wednesday, September 28, 2011 4:40 am
To	Nautical Data Branch <OCS.NDB@noaa.gov>
Cc	chiefst Fairweather <chiefst.fairweather@noaa.gov> , CAPT David Neander <co.fairweather@noaa.gov> , phb.chief@noaa.gov , Crescent Moegling <Crescent.Moegling@noaa.gov> , NOAA James Crocker <James.M.Crocker@noaa.gov> , xo fairweather <xo.fairweather@noaa.gov> , Matthew Forney <Matthew.Forney@noaa.gov> , adam.pfundt@noaa.gov , lucy.hick@noaa.gov
Bcc	
Subject	H12317 DTON Report #3, OPR-P136-FA-11 Kodiak, AK
Attachments	H12317_DTON_Report3.zip 1.1MB

NDB,

Please see the attached report.

Respectfully,
Caryn

--
LT Caryn Zacharias (Arnold), NOAA
Field Operations Officer
NOAA Ship Fairweather
1010 Stedman Street
Ketchikan, AK 99901
Ship Cell 907-254-2842
Ship Sat 808-659-0054

Sun Java™ System Messenger Express Welcome Adam Pfundt • Help • Log Out

Folders | Inbox | Sent | Trash | Drafts | Addresses | Options

Adam.Pfundt@noaa.gov: Sent

Compose | Reply | Reply All | Forward | Delete | Printable | Add Addresses | Previous | Next | Close | Move message to folder:

From <Adam.Pfundt@noaa.gov>
Sent Friday, June 24, 2011 6:23 am
To cathleen barry <Cathleen.Barry@noaa.gov>
Subject Re: Ouzinkie Floating Dock Classification

Dear Cathleen,

Thank you so much for your valuable input in this matter. The clarification is really appreciated. You are correct in your observation of a metal causeway and ramp leading to the floating docks. At present it is classified as a SLCONS; pier (jetty); always dry. This seemed like a pretty reasonable set of attributes to me but if you think something else is more appropriate I would certainly be open to additional assistance. Thanks again.

Very respectfully,

ENS Adam Pfundt

----- Original Message -----
From: cathleen barry <Cathleen.Barry@noaa.gov>
Date: Thursday, June 23, 2011 10:45 pm
Subject: Re: Ouzinkie Floating Dock Classification
To: Adam.Pfundt@noaa.gov

> Hello, Adam...
>
> Your confusion is well founded. I have asked the same question of MCD
> myself. Despite the way the S-57 catalog characterizes SLCONS as
> "fixed (not afloat)..." we are instructed to characterize these as you
> suggested, as SLCONS, CATSLC=pier/jetty, WATLEV=floating.They even
> have a picture in the Nautical Chart Manual, Volume 3, Section F.4
> Shoreline Construction, with an image titled "floating pier". Do I
> also see a ramp leading across the water from shore to one of the
> piers? If this needs to be encoded it can be either CAUSWY or BRIDGE.
>
> Cathleen
>
> On 6/23/2011 2:58 PM, Adam.Pfundt@noaa.gov wrote: Dear Ms. Barry,
>

iPlanet™ Messenger Express Welcome Adam Pfundt • help • logout

Folders | Inbox | Sent | Trash | Drafts | Addresses | Options

adam.pfundt@noaa.gov: **Sent**

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From	<Adam.Pfundt@noaa.gov>
Sent	Thursday, June 23, 2011 9:58 pm
To	cathleen.barry@noaa.gov
Cc	"chiefst.fairweather" <chiefst.fairweather@noaa.gov> , _OMAO MOP OPS Fairweather <ops.fairweather@noaa.gov> , tyanne.faulkes@noaa.gov
Bcc	
Subject	Ouzinkie Floating Dock Classification
Attachments	216610C.jpg 1.3MB

Dear Ms. Barry,

While managing hydrographic sheet H12317, Ouzinkie Harbor to Southern Portion of Marmot Bay, I had a question regarding the floating docks found in the area of Ouzinkie, AK. At present these floating docks are classified PONTON, Pontoon Lines. I believe they should instead be categorized as SLCONS; Pier/Jetty; Wooden; Floating based on images and information provided in Features Management Guide for the Field Ver. 2.0. However, based on the S-57 ENC Object Catalogue, SLCONS are fixed, not afloat. A third posibility might be MORFAC, Mooring/Warping facility. I have attached images of the aforementioned structures. I was hoping you could provide some guidance as to the most accuracte and correct classification for these features. Thank you in advance for your assitance in this manner.

ENS Adam Pfundt
Junior Officer
NOAA Ship FAIRWEATHER

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Adam.Pfundt@noaa.gov: Inbox

Compose | Reply | Reply All | Forward | Delete | Printable | Add Addresses | Previous | Next | Close | Move message to folder:

From	cathleen barry <Cathleen.Barry@noaa.gov>
Sent	Friday, June 24, 2011 3:37 pm
To	"chiefst.fairweather" <ChiefST.Fairweather@noaa.gov> , Adam.Pfundt@noaa.gov
Cc	_OMAO MOP OPS Fairweather <OPS.Fairweather@noaa.gov> , Tyanne.Faulkes@noaa.gov
Subject	Re: Ouzinkie Floating Dock Classification
Attachments	vCard(cathleen_barry) 1K

Lynn, Adam...

I just confirmed this with two experts at MCD. The pier should be CATSLC=pier/jetty, and the structure leading to the piers should be BRIDGE, CATBRG=Footbridge. MCD confirmed that these should be re-categorized correctly for the chart update.

My call to MCD started a dialog there on the difference between PONTONs and Piers/Jetties. Their experts agreed (after some discussion) that PONTONs should be reserved for bridge floats and similar. I will clarify more on this with the next update to the Features Management Guide for the Field.

Thanks for asking! Cathleen

On 6/23/2011 5:27 PM, chiefst.fairweather wrote:

> Hi Cathleen,
>
> A little additional info. The item came to us classified as PONTON, SORIND of GC-10732 from RSD.
>
> Thanks, Lynn
>
> On 6/23/2011 9:58 PM, adam.pfundt@noaa.gov wrote:
>
> > Dear Ms. Barry,
> >
> > While managing hydrographic sheet H12317, Ouzinkie Harbor to Southern
> > Portion of Marmot Bay, I had a question regarding the floating docks
> > found in the area of Ouzinkie, AK. At present these floating docks are
> > classified PONTON, Pontoon Lines. I believe they should instead be
> > categorized as SLCONS; Pier/Jetty; Wooden; Floating based on images
> > and information provided in Features Management Guide for the Field
> > Ver. 2.0. However, based on the S-57 ENC Object Catalogue, SLCONS are
> > fixed, not afloat. A third posibility might be MORFAC, Mooring/Warping
> > facility. I have attached images of the aforementioned structures. I

Subject: RE: P136 proposed new sheet layouts
From: Kyle Ward <Kyle.Ward@noaa.gov>
Date: Wed, 08 Jun 2011 09:55:34 -0400
To: "'chiefst.fairweather'" <chiefst.fairweather@noaa.gov>, '_OMAO MOP OPS Fairweather' <ops.fairweather@noaa.gov>, _OMAO MOP CO Fairweather <co.fairweather@noaa.gov>
CC: "'james.m.crocker'" <James.M.Crocker@noaa.gov>, 'Mark Friese' <Mark.Friese@noaa.gov>, "'J. Corey Allen'" <Corey.Allen@noaa.gov>

Matt,
HSD approves the suggested changes to the sheet limits. Please be sure to make the name changes in the DR and include a copy of this email in the correspondence section of the applicable DRs. Please make sure the SNM changes are reflected in the monthly report spreadsheet.

The necessary name and SNM changes for the sheets are in red.

H12317, SNM = 56, Ouzinkie Harbor to Southern Portion of Marmot Bay

H12318, SNM = 60, Vicinity of Kazakof Bay and Duck Bay

H12319, SNM = 35, Northeaster Portion of Marmot Bay

H12320, SNM= 74, Narrow Strait to Marmot Bay

Mark and Corey,
I made the changes to survey tracker, Survey Details and Monthly Progress Estimate.

Regards,
Kyle

From: james.m.crocker [mailto:James.M.Crocker@noaa.gov]
Sent: Tuesday, June 07, 2011 8:39 AM
To: Kyle Ward
Subject: Fwd: P136 proposed new sheet layouts

-------- Original Message --------
Subject:P136 proposed new sheet layouts
Date: Mon, 06 Jun 2011 17:27:25 +0000
From:FOO Fairweather <OPS.Fairweather@noaa.gov>
To:NOAA James Crocker <James.M.Crocker@noaa.gov>, NOAA Megan Greenaway <Megan.Greenaway@noaa.gov>, NOAA CO FA <CO.Fairweather@noaa.gov>, NOAA Chief ST Fairweather <ChiefST.Fairweather@noaa.gov>

CDR,
attached are images, *.hob and *.tab files for proposed changes to P136 sheets. The thinking behind this is to 1) ensure completion of the area around Spruce Island and southern Marmot Bay, 2) concentrate hydro in the areas that will fall within 20km radius of the Spruce Isl. HorCon base station. and 3) Reduce the number of sheet managers for the project. The priority would be H12317, H12320, H12319.

v/r/
Matt

Matthew Jaskoski LT/NOAA
Field Operations Officer
NOAA Ship Fairweather
1010 Stedman St
Ketchikan, AK 99901
907-254-2842 (ship's cell)
808-659-0054 (ship's sat)
907-254-0032 (FOO Cell)
757-647-3356 (Personal Cell)

Applanix™ LANDMark™ Marine Test Report

Grant Froelich
Pacific Hydrographic Branch

Contents:

1| Background

The Applanix™ LANDMark™ Marine mobile mapping system is a purpose-built, dual axis 10 KHz scanning laser LiDAR system for marine vessels integrated with a POS MV™ that produces a georeferenced point cloud of XYZ+Intensity. The system costs approximately $150,000. The system was tested by Atlantic Hydrographic Branch & *Thomas Jefferson* in February 2011 and according to the email from LT(jg) Ryan Wartick dated 2/24/11, produced "really good [looking data that] was very easily brought into Caris BDB where [shoreline] contacts could be identified and their heights and positions determined." Because the testing environment during the AHB test was primarily surrounded by man-made cultural features, the recommendations from that test include conducting a similar test in Alaska, where there are little-to-no cultural features and the rugged/densely forested shoreline consists of many difficult items to illuminate with LiDAR.

2| Test Plan

The LANDMark™ Marine system used for demonstration/evaluation purposes comes pre-mounted on a mounting plate that includes the IMU and GNSS antennas making installation relatively simple. AHB reported it took only a few hours to install the system to the TJ launch. Bruce Francis from Applanix™ has made himself available to help with the installation and training. I would like to test the LANDMark™ Marine system during my deployment onboard *Fairweather* during the OPR-P136-FA-11 North Coast of Kodiak Island, Alaska project. Discussions with the Operations Officer of *Fairweather* indicate that the best time to install and test the system will be during the second leg of the project (June 20th to July 1st) during which tides will be most favorable for shoreline work. This will also allow Mr. Francis to fly into Kodiak during the weekend inport of June 17th-June 19th and help install the system on a launch and conduct operational training before the ship is underway to the project area on the 20th. I propose to install the LANDMark™ Marine system on launch 2808, which also has the tilted head Reson SeaBat®8125 mounted for near shore hydrography. AHB/TJ reported that in reduced visibility environments, the effective range of the laser is reduced to ~200m, however this should still provide plenty of range to illuminate shoreline features from the survey launch while collecting tilted

head 8125 data. Ideally, the combination of the LiDAR point cloud above the water's surface and tilted MBES data below the surface will provide a seamless dataset of the near shore environment; however that is not the primary objective of this evaluation. LiDAR data collection should occur in conjunction with *Fairweather's* normal tilted head 8125 data acquisition for the project so there should be no additional launch time needed. All data from the test will be stored on a portable hard drive supplied by PHB.

3| Objectives

- Determine how well the LANDMark™ Marine system handles issues that typically pose problems for airborne based LiDAR systems like:
    - Illuminating non-ideal laser reflectors like kelp, moss and/or sea creature covered rocks
    - Illuminating rocks surrounded by breakers
    - Illuminating features covered by dense foliage
- Determine the Level of Effort required to:
    - Install the system
    - Collect data with the system, including training operators & processors
    - Clean the point cloud data from a less than ideal LiDAR environment
    - Select the high point or seaward most point of a feature from the point cloud and use it to populate a feature in the Final Feature File (including tide correction, if necessary) using CARIS Bathy DataBASE
- Determine the Level of Effort saved by:
    - Collecting a XYZ+Intensity point cloud of shoreline features that is easily referenced to the Ellipsoid using Applanix™ POSPac™ MMS
    - Collecting digital images via digital camera with geotagging capabilities concurrently with the LiDAR point cloud to help deconflict shoreline features during post processing and feature attribution
    - Collecting LiDAR data and 100% coverage tilted MBES data concurrently, in a single pass at survey speed, ideally producing a seamless DTM of the near shore environment
- Determine how LiDAR dataset size could impact the limited field unit and branch storage systems
- Determine if a Final Feature File (FFF) populated by information from the LANDMark™ Marine system is comparable to the Final Feature File populated by traditional shoreline techniques

4| Results

Install the system

On the weekend of July 17th-19th, Bruce Francis from Applanix, LT Matthew Jaskoski, ENS Steven Loy and I installed and tested the Applanix LANDMark Marine Laser Scanner on *Fairweather* Launch 2808 during the Kodiak inport. The installation began on Saturday afternoon and consisted of assembling and mounting the prefabricated mounting platform to the cabin roof of 2808, installing the dedicated IMU and GNSS antennae to the mounting platform, installing the laser, and installing two POS PCS systems (see Figure 1). The laser itself is mounted with only a single bolt through the bottom. The second PCS was a backup for the primary PCS system which was a new Version 5 PCS being tested. Installation of the hardware was completed in less than two hours. Installation and configuration of the software to account for a starboard side mount took an additional couple of hours. The system was completely installed and troubleshot by Sunday morning, giving ample time to train operators on how to collect data.

For a permanent installation, the additional GNSS antennae, IMU and PCS would not be needed. The existing POS MV systems could be utilized once the offsets between the laser and the IMU are determined.

Figure 1. LANDMark Laser installed on 2808

Collect data with the system, including training operators & processors

The LANDMark system was very easy to learn. The logging software was contained in a single window with minimal configuration settings (see Figure 2). Setting up the logging software consisted of 6 one mouse click steps, which could be skipped if you saved your settings previously. Logging data consisted of two clicks. The simplicity of the logging software had both advantages and disadvantages. While it was extremely easy to learn and to then teach operators, it provided almost no information in real time about the data being collected other than a counter that showed the number of data points collected so far. There was no indication if the feature of interest had been completely captured until the data was processed later in the evening. While a Hypack driver exists to show the laser data in real time as a Side Scan channel, this was not able to be tested on 2808 due to fears of corrupting the 7125 MBES data being collected concurrently. A similar driver exists for QPS' QINSy and the Reson PDS2000 logging software. While having these 3rd party drivers available is a plus, the native logging software should be able to display the laser returns in a similar fashion to the sonar wedges found in MBES logging software provided by manufacturers such as Reson or Kongsberg in order to provide real time quality assessment and ensure features of interest are being completely captured.

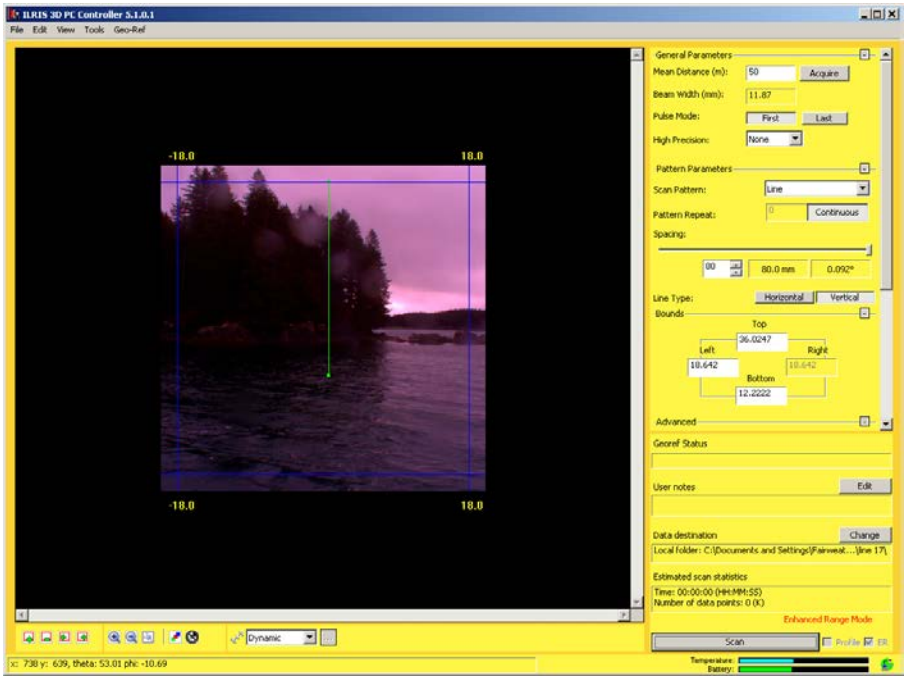

Figure 2. Screenshot of LANDMark logging software.
Note: The image shown in the middle is static and is not updated after the initial scan occurs.

For purposes of this test the laser was activated whenever 2808 had its starboard side facing the shoreline while collecting 7125 MBES data. While the recommended speed was 4 knots, 2808 collected data at normal survey speeds of 6-8 knots. To compensate for the faster speed and resulting lower density data, multiple scans were made while the launch was collecting MBES data closer and closer to shore. No additional time was spent collecting laser data. This resulted in datasets that contained the

same, if not better, data densities as a single, slow speed pass. The LANDMark system had no problem reaching the shoreline from any of the distances tested with its stated range of 1700 meters with 80% reflectivity.

While the LANDMark system contains an internal camera, it does not record pictures that can be used during post processing. To aid in resolving ambiguity in the point cloud data during post processing a personally owned digital still camera with geotagging capabilities was utilized while collecting the laser data. While this camera was personally owned, any camera with geotagging capabilities could be used, even a smart phone. The photos were geotagged using the EXIF v2.3 standard during creation and then displayed in their geographic position in Google Earth Pro. Being able to display the geotagged photos in CARIS Bathy DataBASE along with the point cloud data during post processing is not possible at this time, but an enhancement request has been made to allow this.

Data sizes for the raw laser file were very small and proved no problem to store on the launch computer for the duration of the project. Typical raw file sizes were around 85 MB for a 15 minute long line.

Processing the data was also very easy to learn. Again, this was mostly due to the spartan nature of the software (see Figure 3). The raw laser files were added to a queue, an SBET referenced to the laser location was selected to provide georeferencing, and an output format with selected messages was chosen. The raw files were converted to an ASCII XYZ format with GPS Time, Easting, Northing, Elevation and 8-bit Scaled Intensity values. The parsing to XYZ was very quick usually lasting seconds to minutes for each line collected. The XYZ files were then imported in Bathy DataBASE as a CSAR point cloud using a custom .info file created for this project. The .info file was created using the BDB_Information_File_Editor.exe program available at CARIS' support website. This process was equally as fast as the parsing of the raw file to XYZ, usually lasting seconds to minutes for each line.

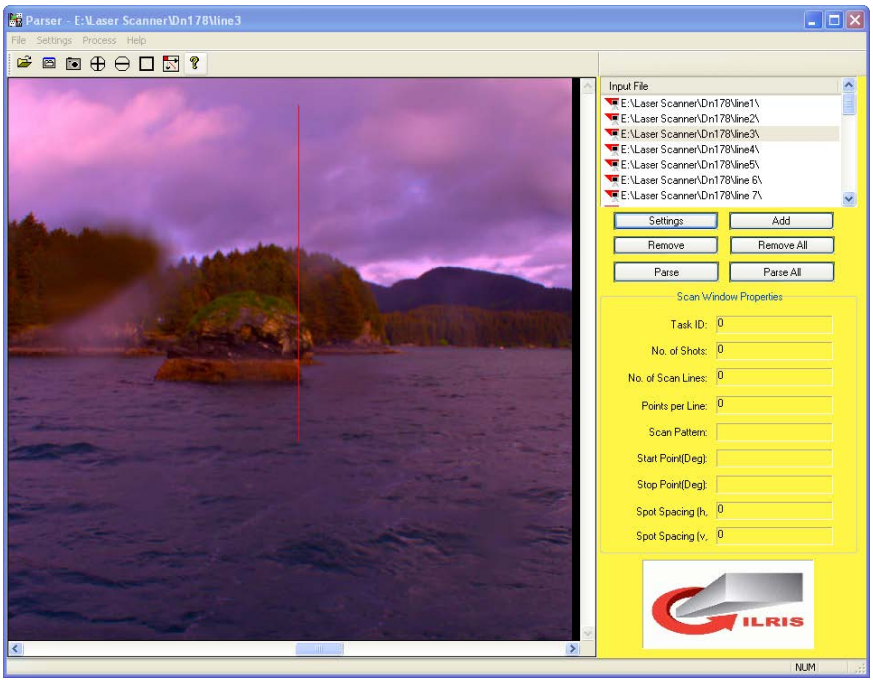

Figure 3. Screenshot of processing software

XYZ file sizes were also very small and easy to manage. An 85 MB raw file usually created a 9 MB XYZ file, which in turn created a 10 MB CSAR file. These small file sizes meant that I could store the whole project on a removable flash drive with lots of space to spare for other data associated with the project.

The biggest time sink during the initial processing was creating the SBET referenced to the laser location. POSPac MMS was used to create an IN-Fusion Single Baseline project using the data from the dedicated POS MV and the GPS base station, *Triplet*, set up by *Fairweather* personnel. Once this project was created and the GNSS-Inertial processor run, a separate export of the data referenced to the laser location then had to be performed. This would usually take around 45 minutes each day.

Clean the point cloud data from a less than ideal LiDAR environment

Once the data was in Bathy DataBASE processing was straightforward. The data was able to be examined in 2D and 3D subset mode allowing for the cleaning of anomalous data points. The data collected by the LANDMark system was very clean, however. There were very few fliers around features, with the majority being reflections off birds or white caps and other sea surface reflections usually in the middle of the bay or channel. The laser had no problem illuminating rocks that were partially submerged or covered in kelp, moss and/or sea life. It also had no problem illuminating features through dense foliage and would typically reveal more features than could be seen with the naked eye.

It was found to be faster to clean anomalous data points out by using the Extract Surface tool to simply cut those portions of the data in deep water out. It was also beneficial to use an Intensity filter during the Surface Extraction, filtering out all points with an intensity value less than 25. The combination of

the intensity filter and exclusion of data in deep water excluded most of the fliers, leaving just a handful of points around features to be cleaned using Subset mode. The filtering and extracting of the surface took around 30 minutes for the entire dataset of 47,005,133 points.

Select the high point or seaward most point of a feature from the point cloud and use it to populate a feature in the Final Feature File (including tide correction, if necessary) using CARIS Bathy DataBASE

The XYZ and CSAR file created from it were referenced to the ellipsoid and needed to be shifted to chart datum to provide the correct height/depth for charting purposes. This was accomplished using the ERSconv.py ERZT Pydro script developed by LT(jg) Glen Rice and Jack Riley. After supplied the necessary files a separation file is generated in IVS format. This was imported into IVS' DMagic and exported as an ASCII XYZ file so that Bathy DataBASE would be able to read it. Future versions of the script will allow for a direct export that will be compatible with CARIS products. The separation model was then applied to the CSAR point cloud using the Vertical Shift tool in Bathy DataBASE. This process took a very long time to complete but that is due to a bug in the Bathy DataBASE version 3.2 software that should be fixed in Service Pack 2. A 0.5 GB file took around 3 hours to shift in v3.2 while in v3.0 it took 6 minutes.

Once the point cloud data was shifted to MLLW it was easy to pick points either in 2D or 3D subset mode and designating a sounding or simply by selecting a group of points in the map window and choosing the desired point by either least depth or seaward most extent. The 3D viewer also proved to be very valuable in determining points of interest (see Figure 4). The points were then imported into a HOB file for appropriate S-57 attribution. The process of selecting a point and making it a feature would generally take seconds.

This is where the geotagged photos proved to be absolutely indispensable. While the point cloud data was extremely dense, it was sometimes difficult to recognize what a feature was without a photo providing some additional data. This was often true of features near the shoreline that were grouped with other features.

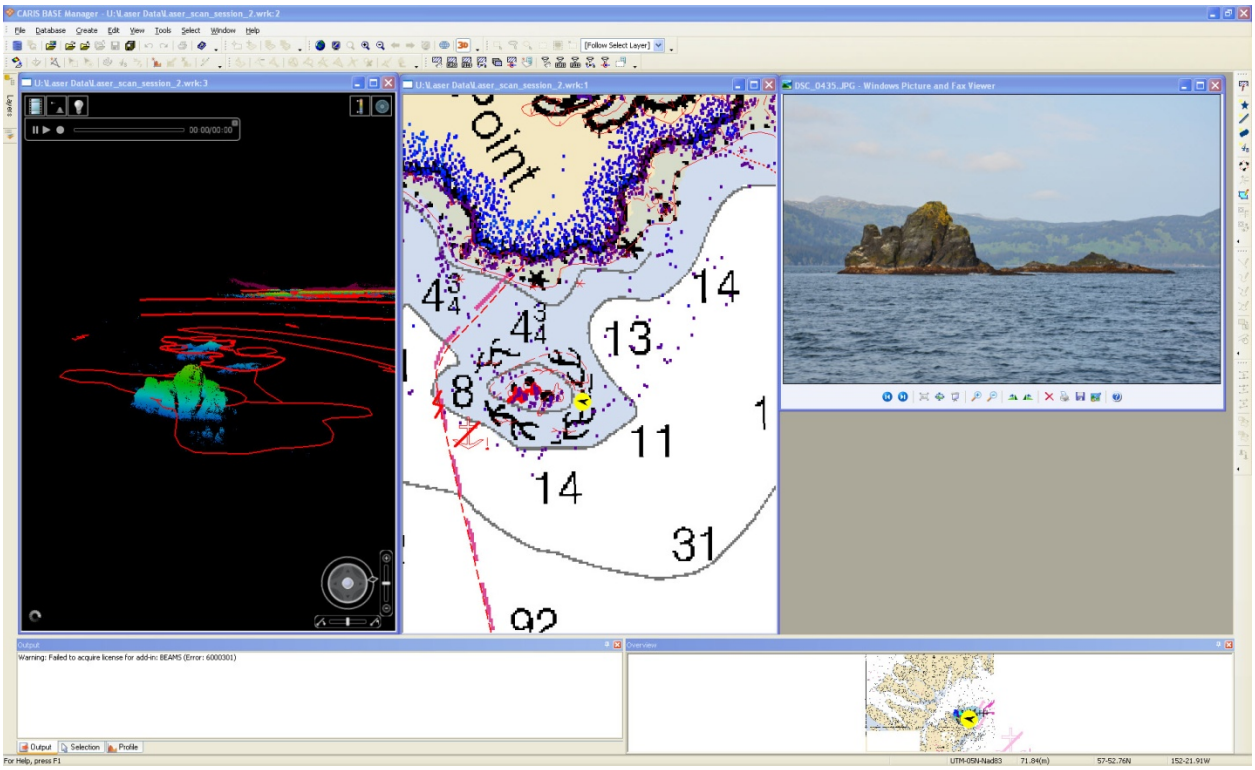

Figure 4. Using 3D mode with a georeferenced photo to examine data. Photo is being displayed in Windows Picture and Fax Viewer, not in Bathy DataBASE.

Viewing the data colored by intensity was also helpful in determining features. In some areas you could only tell the difference between points when viewed in this way. On a stretch of beach in Ouzinke Harbor there are many boats, kayaks and square plastic totes hauled up on the beach. While not navigationally significant, it was difficult to determine what they were without the help of the pictures and coloring by intensity (see Figures 5 & 6).

Figure 5. Photo of hauled out boats, kayaks and plastic totes

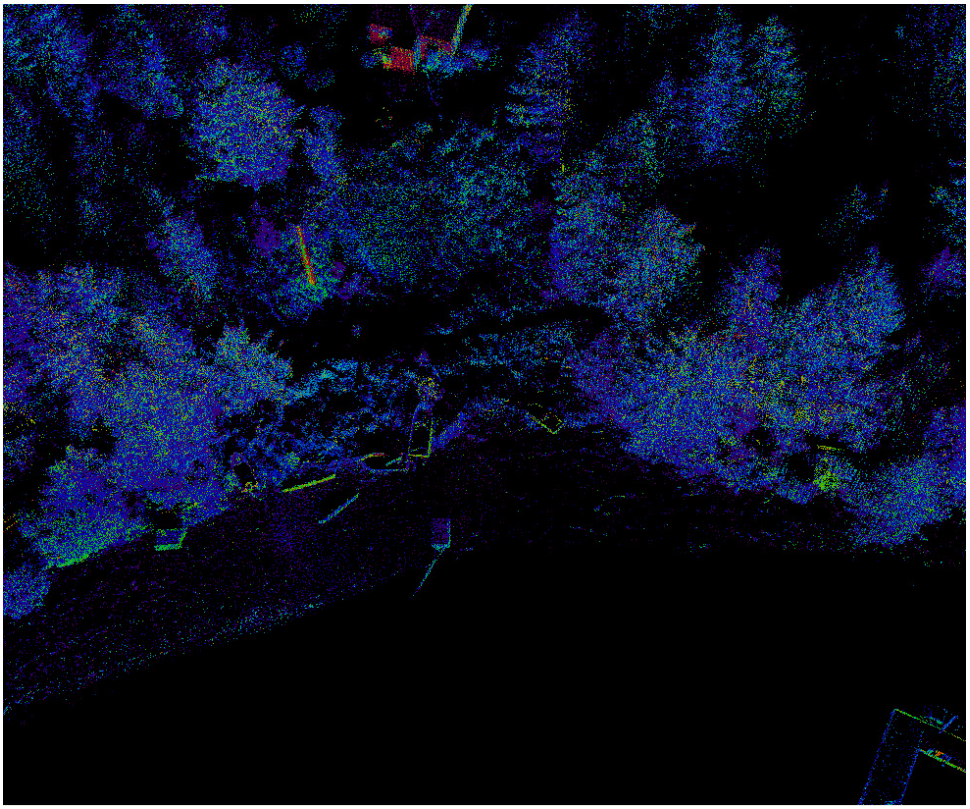

Figure 6. 3D mode view of laser data colored by intensity looking down at same area as Figure 5

The complete coverage of the laser data afforded me the ability to S-57 attribute heights and extents on features that *Fairweather* personnel were unable to determine using traditional shoreline methods. The laser data allows the processor to determine what the most significant point of the feature is in a relaxed, warm, dry environment rather than a cold, wet, time sensitive environment. It will also allow the cartographer more data points to make cartographic decisions at the branch rather than the single point currently collected.

While there were many examples found during this test, the best example of how valuable this data could be was a navigationally significant rock cluster south of Sunny Cove. It is depicted on the RNC as a Dangerous Underwater Rock with Uncertain Depth and two ink blobs resembling land areas (see Figure 7). In reality it is very different looking with four distinct rock clusters; with the northwestern-most rock being the highest (see Figure 8). The laser data clearly shows all the rocks, even some hidden from view in the photo and provides coordinates for the high points and extents, which vary greatly from the chart (see Figures 9 & 10). Traditional shoreline methods resulted in retaining the center and eastern rock but with no additional height information. The northwestern-most rock was not addressed. Spending no additional time in the field and staying at a safe stand-off distance the laser data was able to determine least depths and extents for the charted center rock and the two outer charted rocks could be disproved.

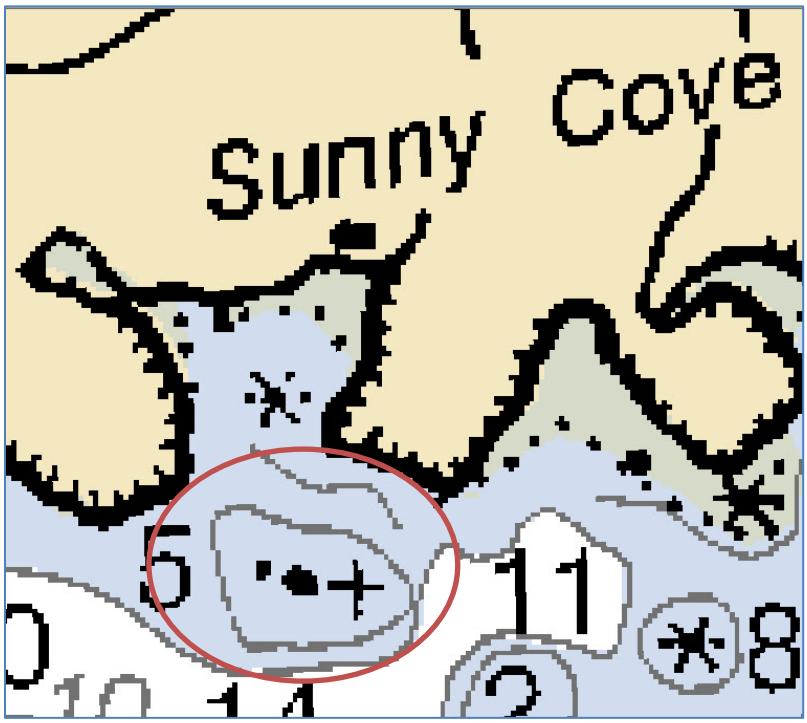

Figure 7. RNC depiction of rock cluster south of Sunny Cove

Figure 8. Photo of rock cluster looking north

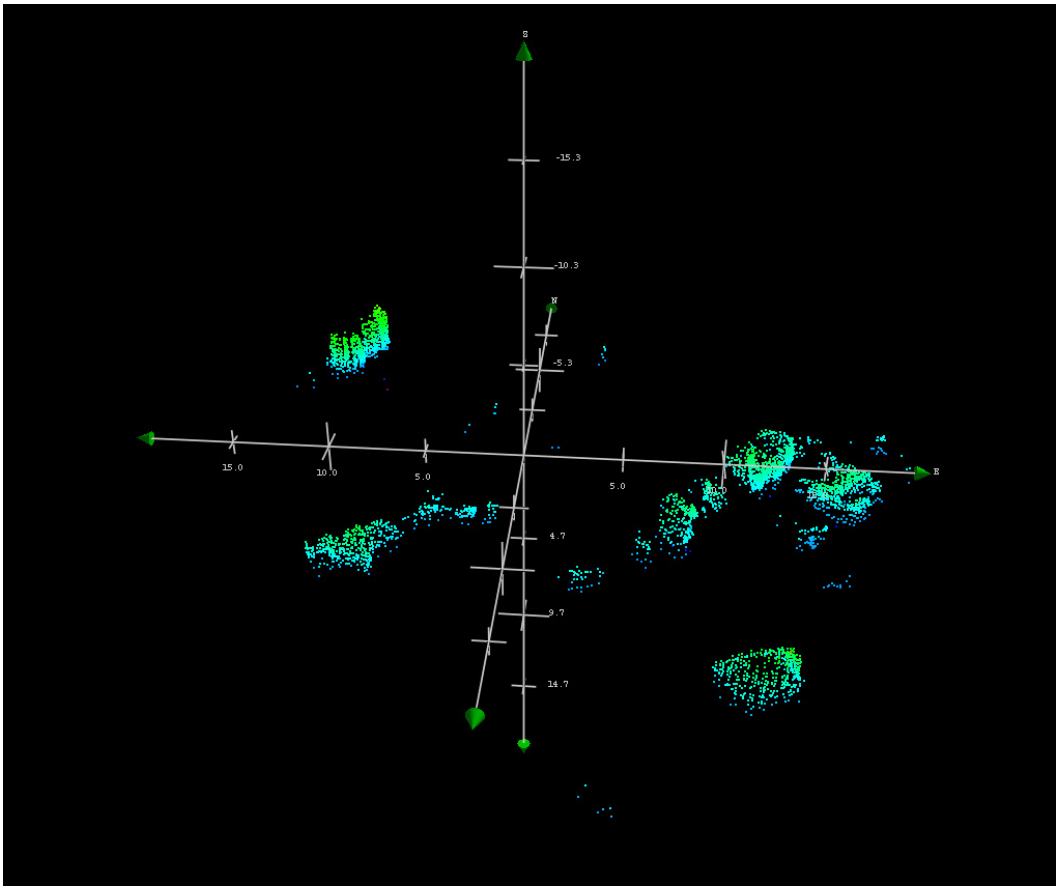

Figure 9. 3D mode view of laser data of rock cluster

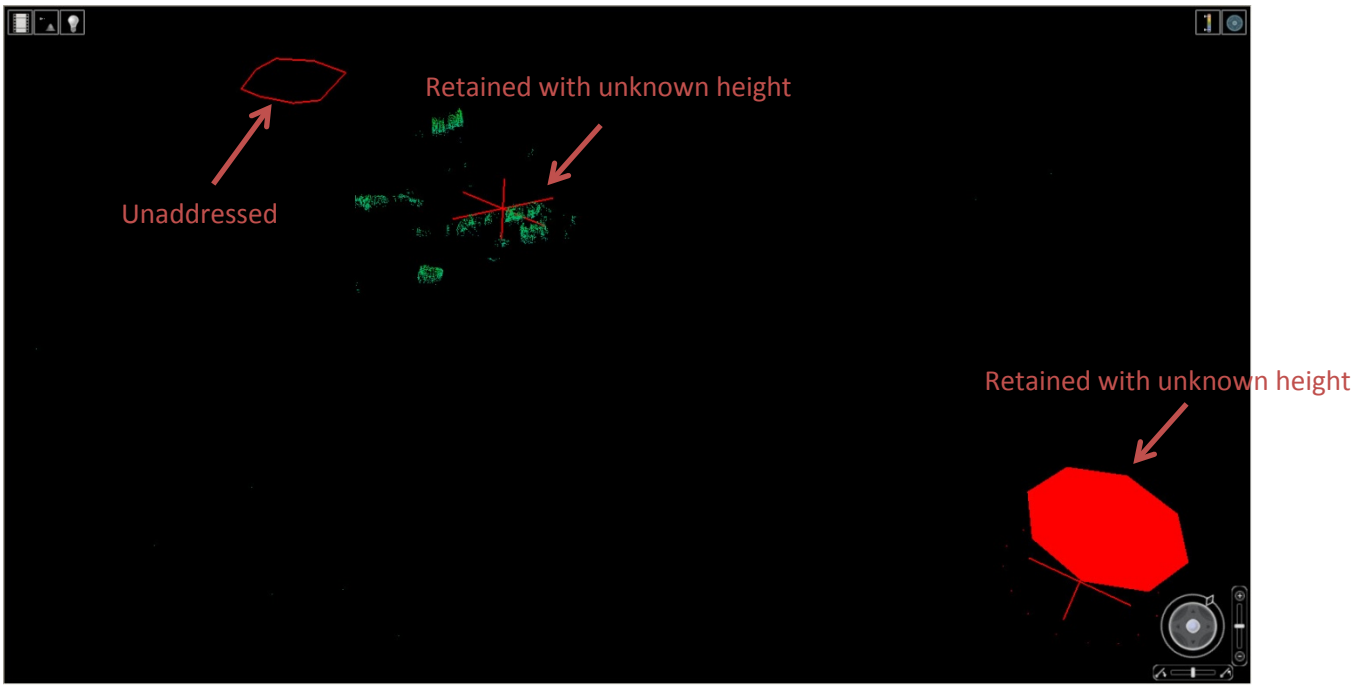

Figure 10. Laser data in 3D mode with ENC positions of rock cluster and traditional shoreline evaluation of features

The laser data proved to be exceptionally clear and useful in Ouzinke Harbor. The many hard, reflective surfaces and easily identifiable features made this the most viewed dataset by *Fairweather* personnel. The entire extents of the harbor, from the breakwater to the new construction occurring on the western side were completely captured with no additional time being spent other than what was required to collect MBES in the area (see Figures 11-13). This technology would prove to be extremely useful for NRT harbor surveys, despite not having Bathy DataBASE keys, due to the data's XYZ format which can be easily parsed by many programs.

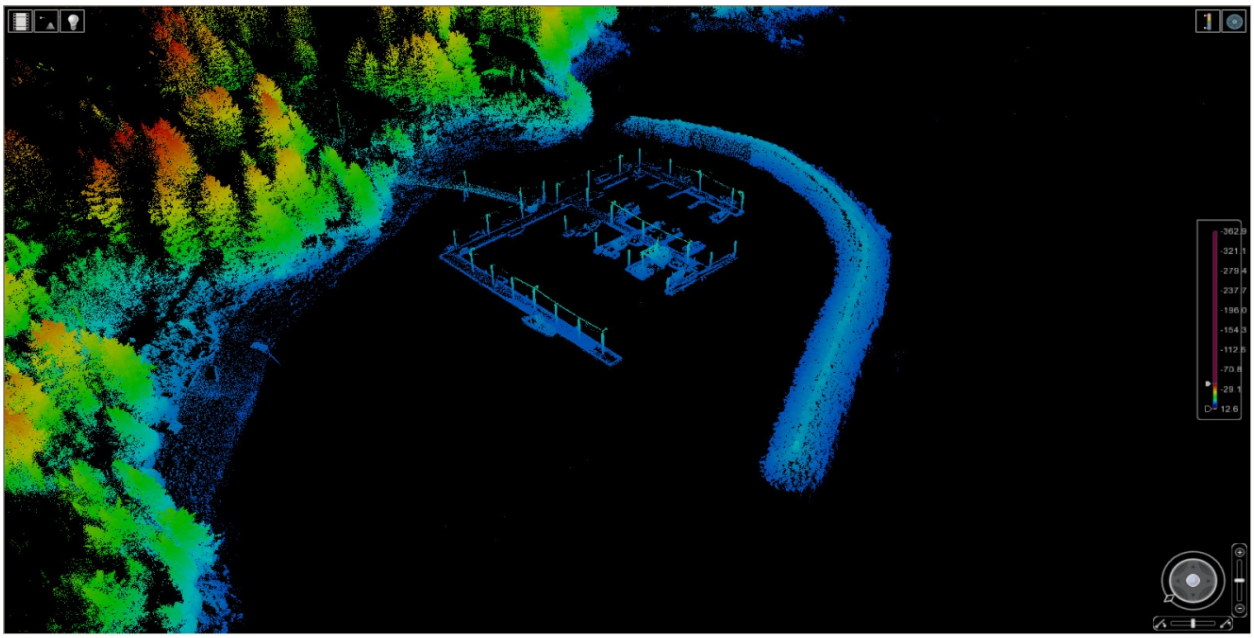

Figure 11. 3D mode view of Ouzinke Harbor

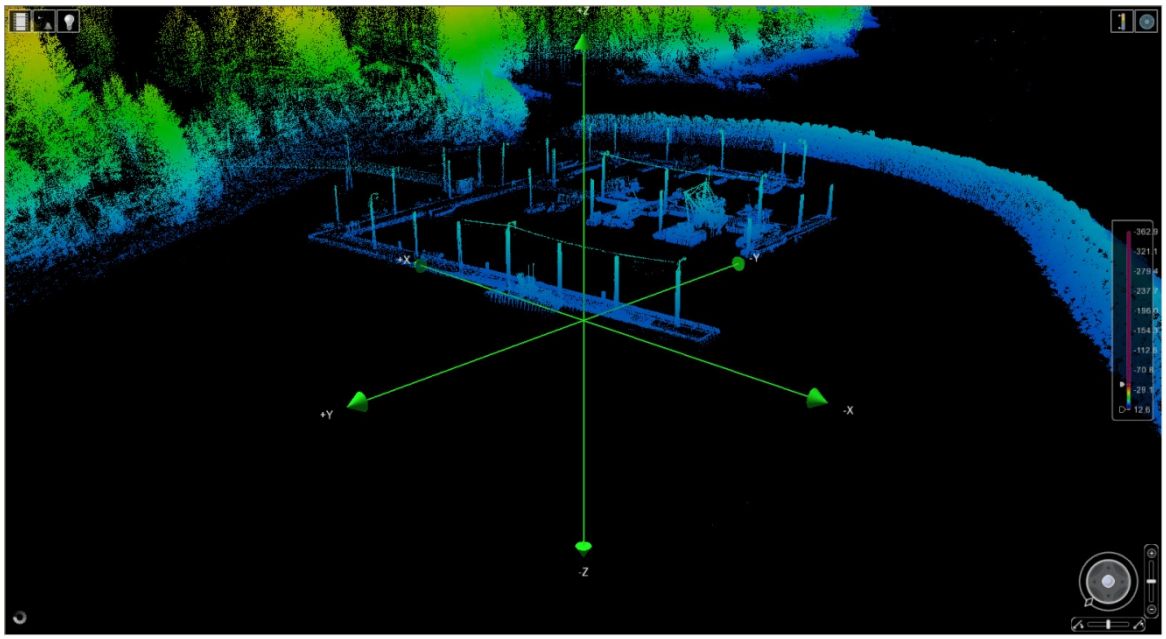

Figure 12. Close up of Ouzinke Harbor and slips

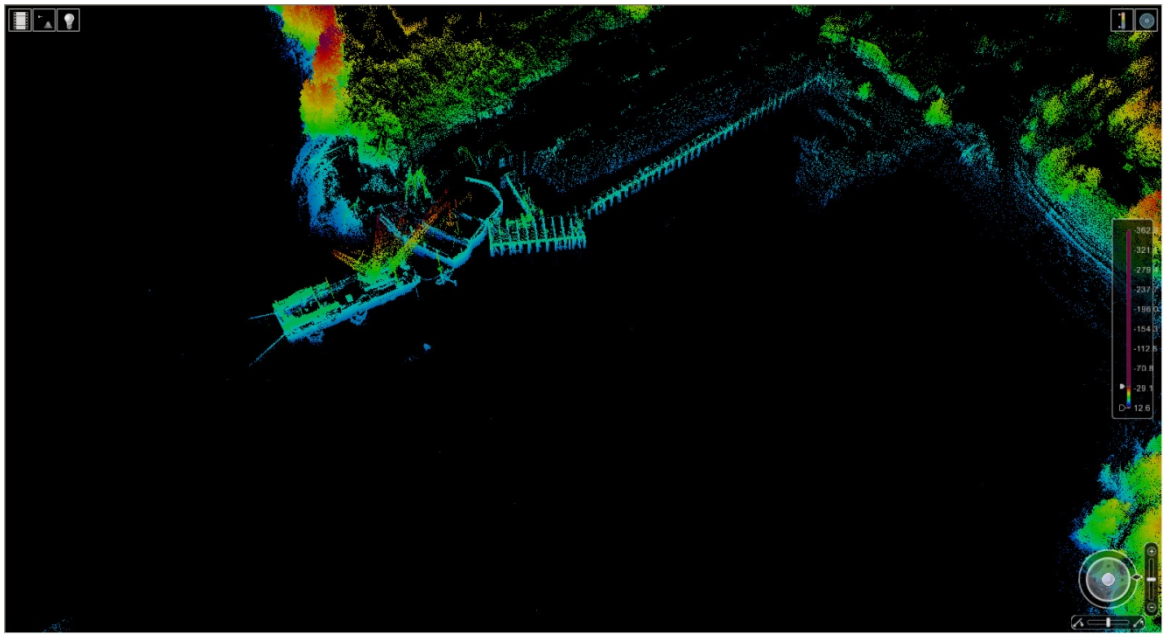

Figure 13. 3D mode view of construction occurring on west side of Ouzinke Harbor. Notice multiples of crane arm on barge as it was moving during acquisition

Acquisition Days	4
Additional acquisition time to MBES collection	0
Number of lines run	97
Total raw laser data size	3.59 GB
Total ASCII XYZ data size	2.17 GB
CSAR point cloud size (unedited)	2.49 GB
CSAR point cloud size (edited)	1.85 GB
Number of points (unedited)	47,005,133
Number of points (edited)	40,818,003
POSPac processing time (per day)	~45 minutes
Convert raw laser to XYZ time (per line)	<2 minutes
Convert XYZ to CSAR point cloud (per line)	<2 minutes
Shift dataset to chart datum	8 hours*
Filter dataset time	~30 minutes
Pick features and S-57 attribute (per feature)	<15 seconds

* Time delay due to bug discovered in software to be fixed in Bathy DataBASE 3.2 SP2. Corrected time should be closer to 30 minutes

Table 1. Summary of Statistics

5| Recommendations

CARIS Bathy DataBASE is an ideal tool for dealing with this laser data because it can retain the data in point cloud format, handle the amount of data in the laser point clouds, clean the data in a manner familiar to NOAA hydrographers (2D & 3D subset), shift the point clouds to a new vertical datum, and turn points directly into S-57 attributed features. Following a quick demonstration PHB cartographers were highly enthusiastic about the possibilities this data in Bathy DataBASE could provide them during HCell compilation to remove ambiguity and/or correct issues in field delivered products.

The Applanix LANDMark system performed extremely well in a less than ideal environment for a laser and it was quite easy to populate a Final Feature File with data from it using Bathy DataBASE. The extended range capability provided more than enough range to fully illuminate shoreline features from a safe distance. The direct integration with a POS MV provided extremely consistent and accurate positioning of the data points, with no mismatches between any of the overlapping line files, even in an occasionally active sea state.

The level of effort saved by being able to collect a complete 3D point cloud of the shoreline while concurrently collecting MBES data at a safe distance from shore I believe far outweighs the level of effort being expended with traditional shoreline methods. However, the process is not quite ready for full production yet. There are a number of improvements that need to be made by both Applanix and

CARIS to be able to collect and process this data in a full production environment. Those improvements are:

Applanix:

- Improvements to the logging software to allow real time viewing of data being collected
- Using the internal camera of the LANDMark system to create geotagged photos for use in post processing
- Improving the redundant step of exporting an SBET referenced to the laser location after an SBET has already been created for the project

CARIS:

- Allow viewing of geotagged photos in Bathy DataBASE (HelpDesk Request ID 01101163)
- Perform Vertical Shift on S-57 Features (HelpDesk Request ID 01102201)
- Improve speed of Vertical Shifting (HelpDesk Request ID 01102185)

Applanix and CARIS have both been made aware of these recommendations for improvement.

Despite the need for improvement I strongly feel that this technology is where shoreline acquisition should be headed in the immediate future. The laser worked extremely well in Alaska in an environment that typically causes problems for LiDAR systems and has proven itself in more cultural feature-rich environments. The increase in safety of operations, savings in acquisition time, increased accuracy of data, and having a full coverage dataset of the shoreline are huge advantages over traditional methods that cannot be overstated. This data would also be of great interest to IOCM users and other, nontraditional, OCS customers who cannot map the near shore due to inability to directly access it, like the California Seafloor Mapping Project.

Finally, I recommend that HSTP conduct controlled testing of other laser scanner systems to determine if other manufacturers can provide the same level of data quality and ease of use as Applanix. A list of potential systems is found below.

Special thanks go out to Peter Stewart from Applanix for helping to get the project off the ground; Bruce Francis from Applanix for flying out to Kodiak and all his help in setting up the system and providing training; the officers and crew of *Fairweather* who assisted me every step of the way, especially Matt Jaskoski and Steve Loy for helping to install and uninstall the system, Matt Abraham for driving 2808 every day it was deployed during the leg, Leslie Flowers for putting up with me constantly trying to push her to somehow find use for the laser data collected on her sheet; and Glen Rice for providing help with the ERZT Pydro script.

List of Potential Laser Scan Systems for Further Testing
(listed in no particular order)

Riegl VMX-250-CS6 (http://www.riegl.com/nc/products/mobile-scanning/produktdetail/product/scannersystem/6/)
Topcon IP-S2 (http://www.topconpositioning.com/ips2)
MDL Dynascan (http://www.mdl.co.uk/en/dynascan--14739)
Optech Lynx (http://www.optech.ca/lynx.htm)

H12317 Danger to Navigation Report

Registry Number: H12317
State: Alaska
Locality: Kodiak Island
Sub-locality: Ouzinkie Harbor to Southern Portion of Marmot Bay
Project Number: OPR-P136-FA-11
Survey Dates: June 10, 2011 - June 30, 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16580	14th	01/01/2008	1:350,000 (16580_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_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	Rock	2.12 m	57° 59' 06.8" N	152° 28' 07.7" W	---

1 - Danger To Navigation

1.1) 4024/512

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 59' 06.8" N, 152° 28' 07.7" W
Least Depth:	2.12 m (= 6.95 ft = 1.159 fm = 1 fm 0.95 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.058 m ; **TVU (TPEv)** ±0.284 m
Timestamp:	2011-165.19:03:52.234 (06/14/2011)
Survey Line:	h12317 / fa_2805_400khz_rsn7125_512bms_2011 / 2011-165 / 2011m_1651855
Profile/Beam:	4024/512
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (Reson 7125 SV). The feature is a 1.16 fm sounding located offshore of the charted 10 fm contour near a charted 36 fm depth.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2805_400khz_rsn7125_512bms_2011/2011-165/2011m_1651855	4024/512	0.00	000.0	Primary

Hydrographer Recommendations

Cartographically-Rounded Depth (Affected Charts):

1fm (16594_1, 16580_1, 16013_1, 530_1)

1fm 1ft (531_1)

2.1m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam
	VALSOU - 2.119 m

WATLEV - 3:always under water/submerged

Feature Images

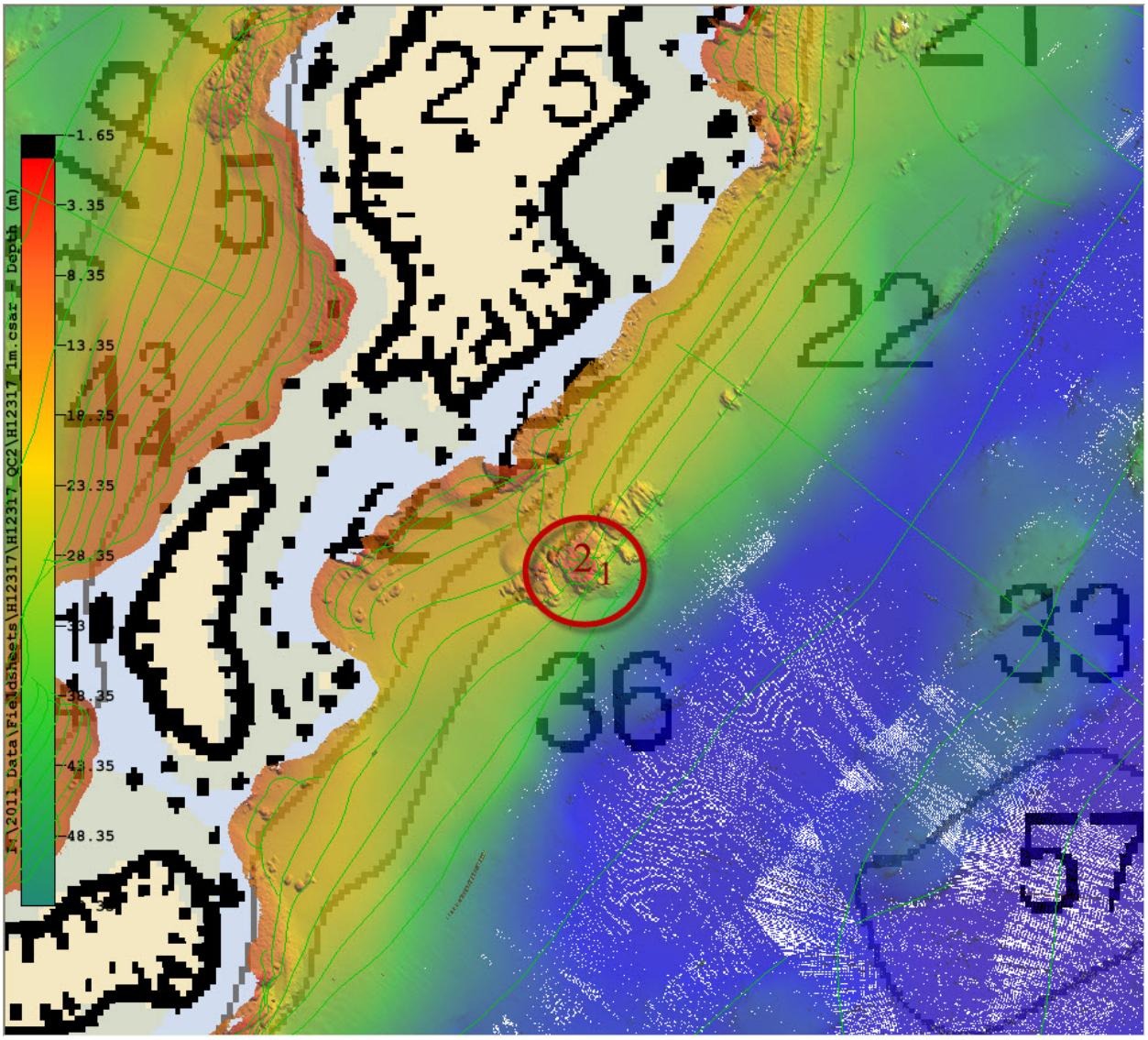

Figure 1.1.1

H12317 Danger to Navigation Report

Registry Number: H12317
State: Alaska
Locality: Kodiak Island
Sub-locality: Ouzinkie Harbor to Southern Portion of Marmot Bay
Project Number: OPR-P136-FA-11
Survey Dates: June 10, 2011 - June 30, 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16580	14th	01/01/2008	1:350,000 (16580_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_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	Rock	5.37 m	57° 58' 06.3" N	152° 27' 18.8" W	---
1.2	Rock	1.60 m	57° 57' 26.6" N	152° 27' 36.1" W	---
1.3	Rock	10.59 m	57° 56' 16.3" N	152° 22' 57.2" W	---
1.4	Rock	11.84 m	57° 56' 22.2" N	152° 24' 09.7" W	---

1 - Danger To Navigation

1.1) 403/188

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 58' 06.3" N, 152° 27' 18.8" W
Least Depth:	5.37 m (= 17.61 ft = 2.936 fm = 2 fm 5.61 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.082 m ; **TVU (TPEv)** ±0.263 m
Timestamp:	2011-165.23:44:46.002 (06/14/2011)
Survey Line:	h12317 / fa_2808_200khz_rsn7125_256bms_2011 / 2011-165 / 2011m_1652344
Profile/Beam:	403/188
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (Reson 7125 SV). The feature is a rock with a least depth substantially shallower than the surrounding charted depths.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2808_200khz_rsn7125_256bms_2011/2011-165/2011m_1652344	403/188	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2 ¾fm (16594_1, 16580_1, 16013_1, 530_1)

2fm 5ft (531_1)

5.4m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam
	VALSOU - 5.369 m

Feature Images

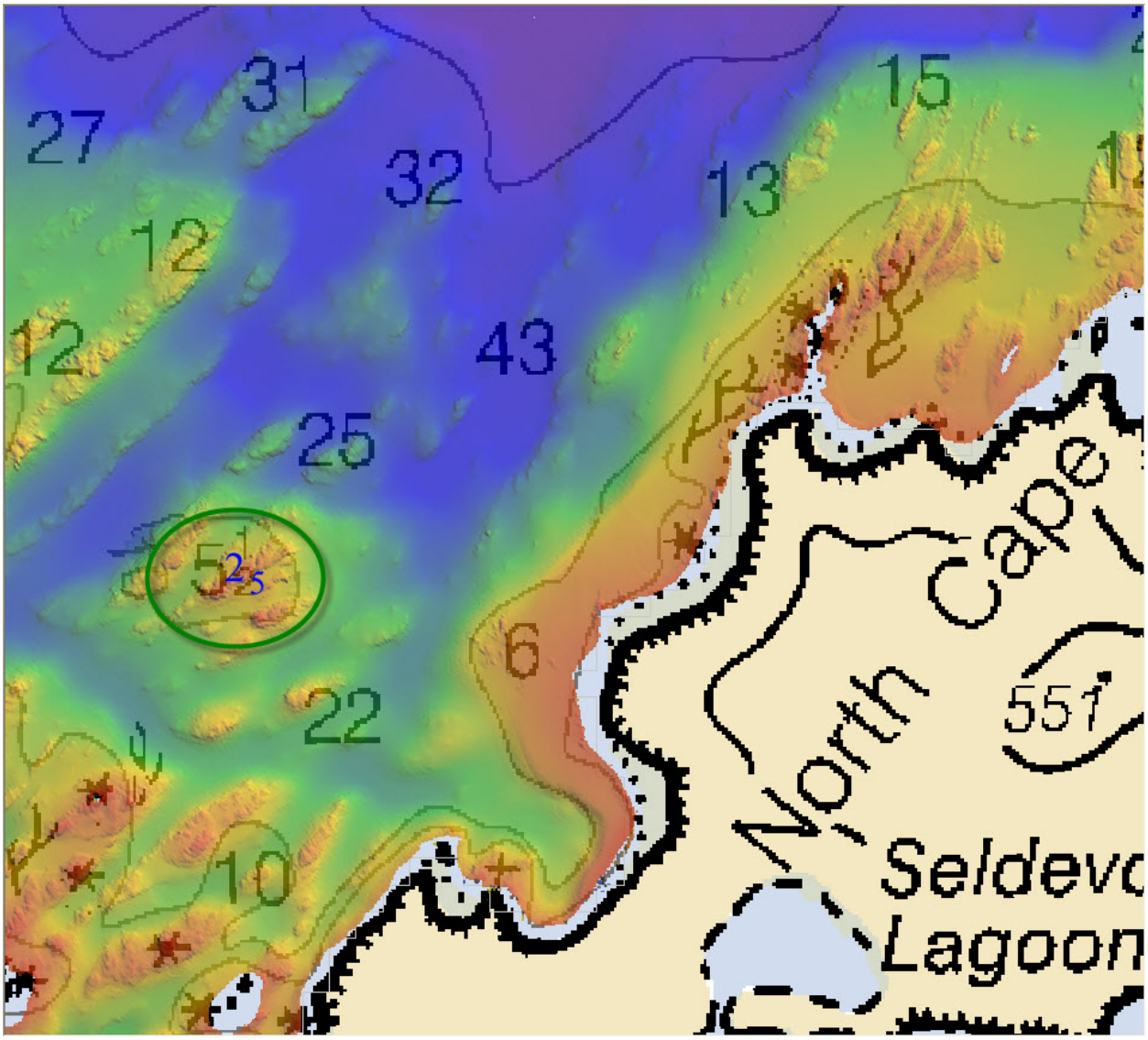

Figure 1.1.1

1.2) 303/375

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 57' 26.6" N, 152° 27' 36.1" W
Least Depth:	1.60 m (= 5.26 ft = 0.877 fm = 0 fm 5.26 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.071 m ; **TVU (TPEv)** ±0.312 m
Timestamp:	2011-165.21:29:32.999 (06/14/2011)
Survey Line:	h12317 / fa_2806_400khz_rsn7125_512bms_2011 / 2011-165 / 2011m_1652128
Profile/Beam:	303/375
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (Reson 7125 SV). The feature is a rock with a least depth substantially shallower than the surrounding charted depths.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2806_400khz_rsn7125_512bms_2011/2011-165/2011m_1652128	303/375	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

0 ¾fm (16594_1, 16580_1, 16013_1, 530_1)

0fm 5ft (531_1)

1.6m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam
	VALSOU - 1.603 m

Feature Images

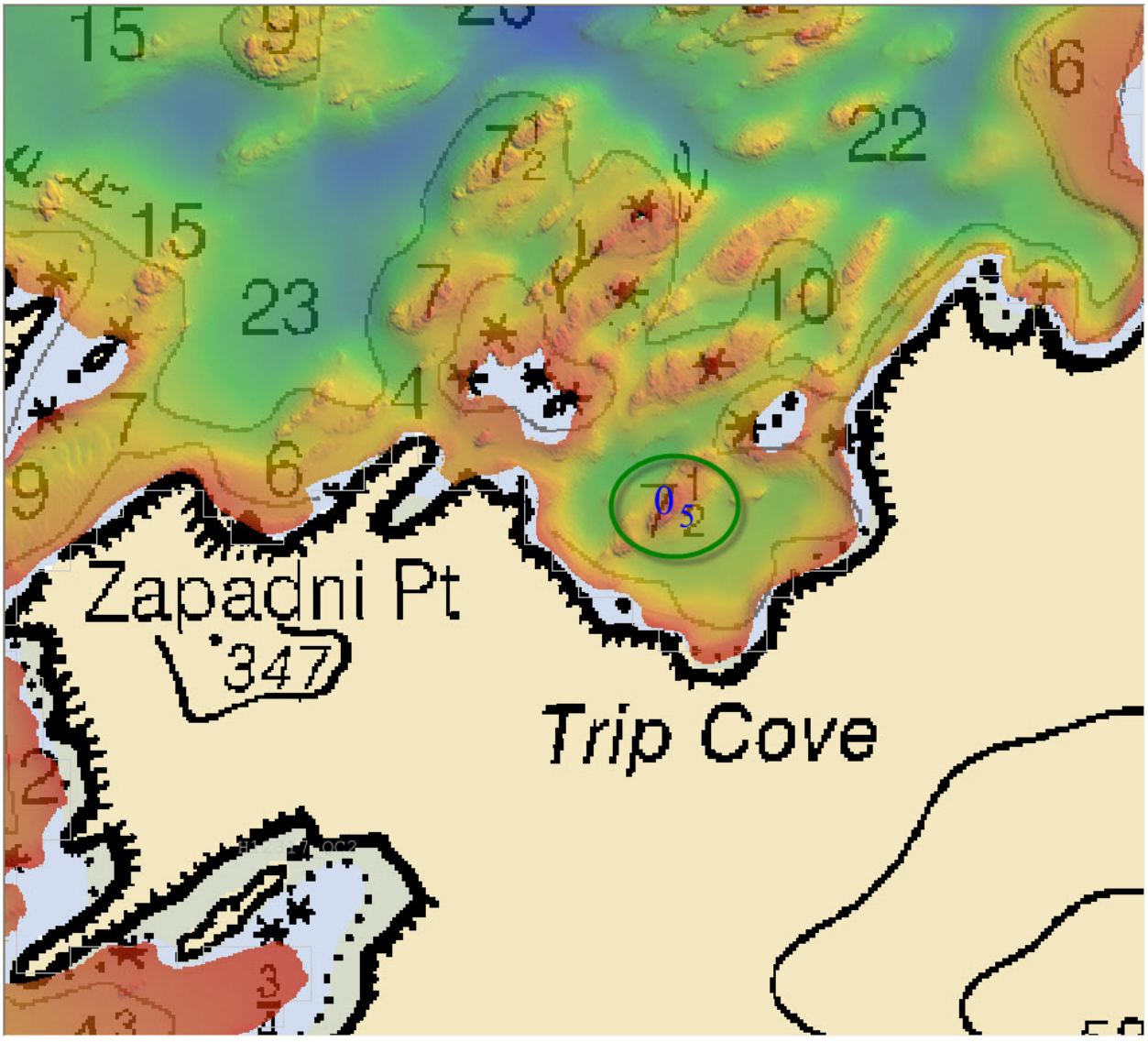

Figure 1.2.1

1.3) 159/467

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 56' 16.3" N, 152° 22' 57.2" W
Least Depth:	10.59 m (= 34.75 ft = 5.792 fm = 5 fm 4.75 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.151 m ; **TVU (TPEv)** ±0.292 m
Timestamp:	2011-172.22:31:36.299 (06/21/2011)
Survey Line:	h12317 / fa_2805_400khz_rsn7125_512bms_2011 / 2011-172 / 2011m_1722231
Profile/Beam:	159/467
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (Reson 7125 SV). The feature is a rock with a least depth substantially shallower than the surrounding charted depths.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2805_400khz_rsn7125_512bms_2011/2011-172/2011m_1722231	159/467	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

5 ¾fm (16594_1, 16580_1, 16013_1, 530_1)

5fm 5ft (531_1)

10.6m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam
	VALSOU - 10.592 m

Feature Images

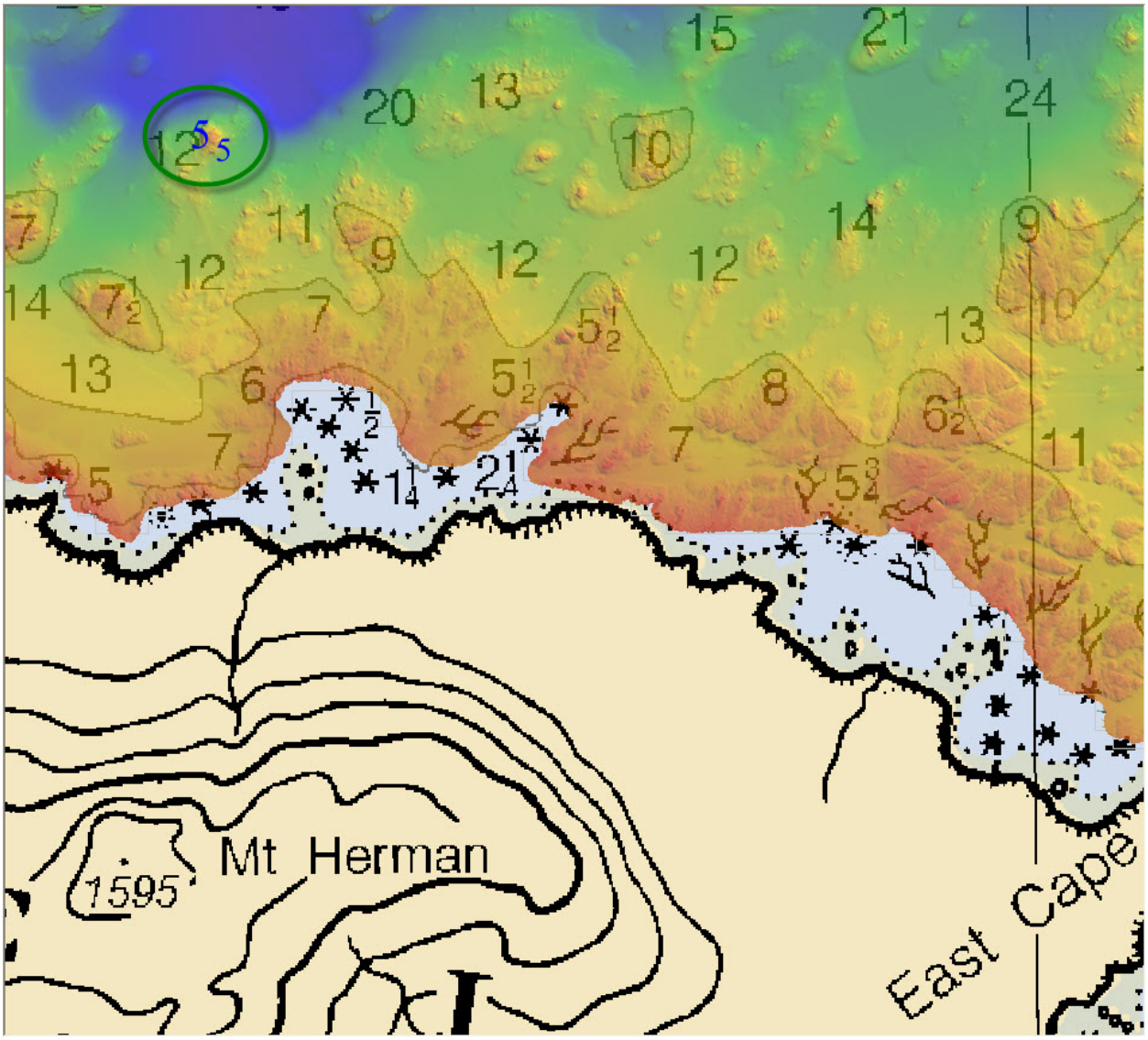

Figure 1.3.1

1.4) 914/480

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 56' 22.2" N, 152° 24' 09.7" W
Least Depth:	11.84 m (= 38.83 ft = 6.472 fm = 6 fm 2.83 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.129 m ; **TVU (TPEv)** ±0.271 m
Timestamp:	2011-166.20:11:29.258 (06/15/2011)
Survey Line:	h12317 / fa_2808_400khz_rsn7125_512bms_2011 / 2011-166 / 2011m_1662009
Profile/Beam:	914/480
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (Reson 7125 SV). The feature is a rock with a least depth substantially shallower than the surrounding charted depths.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2808_400khz_rsn7125_512bms_2011/2011-166/2011m_1662009	914/480	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

6 ½fm (16594_1, 16580_1, 16013_1, 530_1)

6fm 3ft (531_1)

11.8m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam
	VALSOU - 11.836 m

Feature Images

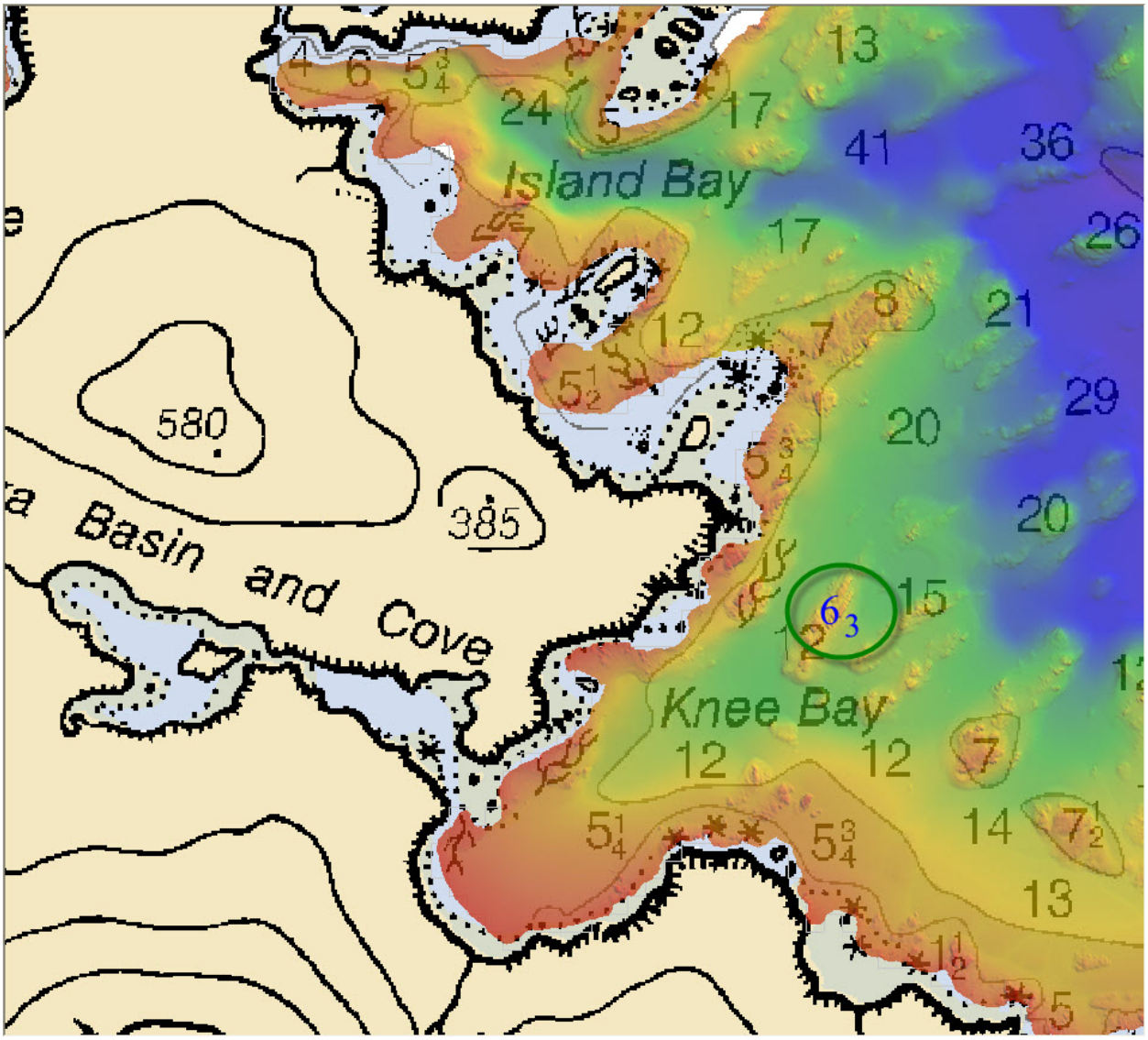

Figure 1.4.1

H12317 Danger to Navigation Report

Registry Number: H12317
State: Alaska
Locality: Kodiak Island
Sub-locality: Ouzinkie Harbor to Southern Portion of Marmot Bay
Project Number: OPR-P136-FA-11
Survey Dates: June 10, 2011 - June 30, 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16580	14th	01/01/2008	1:350,000 (16580_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_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	Rock	8.86 m	57° 57' 23.3" N	152° 22' 48.0" W	---
1.2	Rock	10.15 m	57° 58' 02.3" N	152° 28' 37.2" W	---

1 - Dangers To Navigation

1.1) 90/86

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 57' 23.3" N, 152° 22' 48.0" W
Least Depth:	8.86 m (= 29.06 ft = 4.844 fm = 4 fm 5.06 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.075 m ; **TVU (TPEv)** ±0.284 m
Timestamp:	2011-175.20:45:45.902 (06/24/2011)
Survey Line:	h12317 / fa_2805_200khz_rsn7125_256bms_2011 / 2011-175 / 2011m_1752045
Profile/Beam:	90/86
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (RESON 7125). The feature is a rock with a least depth substantialy shallower than the surrounding charted depths. Final Tidal Zoning has been applied to this feature.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2805_200khz_rsn7125_256bms_2011/2011-175/2011m_1752045	90/86	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

4 ¾fm (16594_1, 16580_1, 16013_1, 530_1)

4fm 5ft (531_1)

8.9m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam

VALSOU - 8.859 m

Feature Images

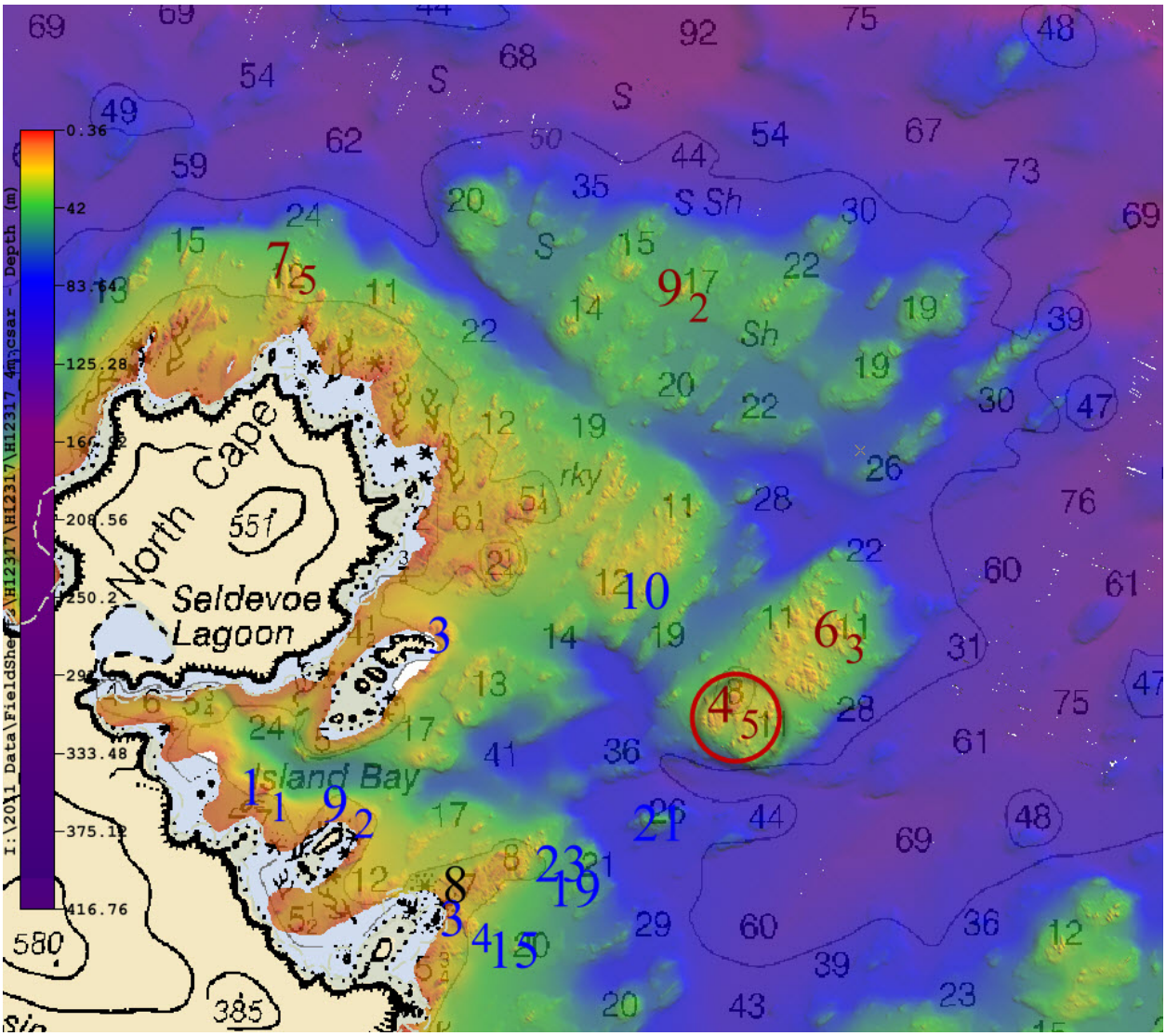

Figure 1.1.1

1.2) 206/115

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 58' 02.3" N, 152° 28' 37.2" W
Least Depth:	10.15 m (= 33.31 ft = 5.552 fm = 5 fm 3.31 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.084 m ; **TVU (TPEv)** ±0.264 m
Timestamp:	2011-165.21:11:36.376 (06/14/2011)
Survey Line:	h12317 / fa_2808_200khz_rsn7125_256bms_2011 / 2011-165 / 2011m_1652111
Profile/Beam:	206/115
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (RESON 7125). The feature is a rock with a least depth substantialy shallower than the surrounding charted depths. Final Tidal Zoning has been applied to this feature.

Feature Correlation

Address	Feature	Range	Azimuth	Status
h12317/fa_2808_200khz_rsn7125_256bms_2011/2011-165/2011m_1652111	206/115	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

5 ½fm (16594_1, 16580_1, 16013_1, 530_1)

5fm 3ft (531_1)

10.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	TECSOU - 3:found by multi-beam

VALSOU - 10.153 m

Feature Images

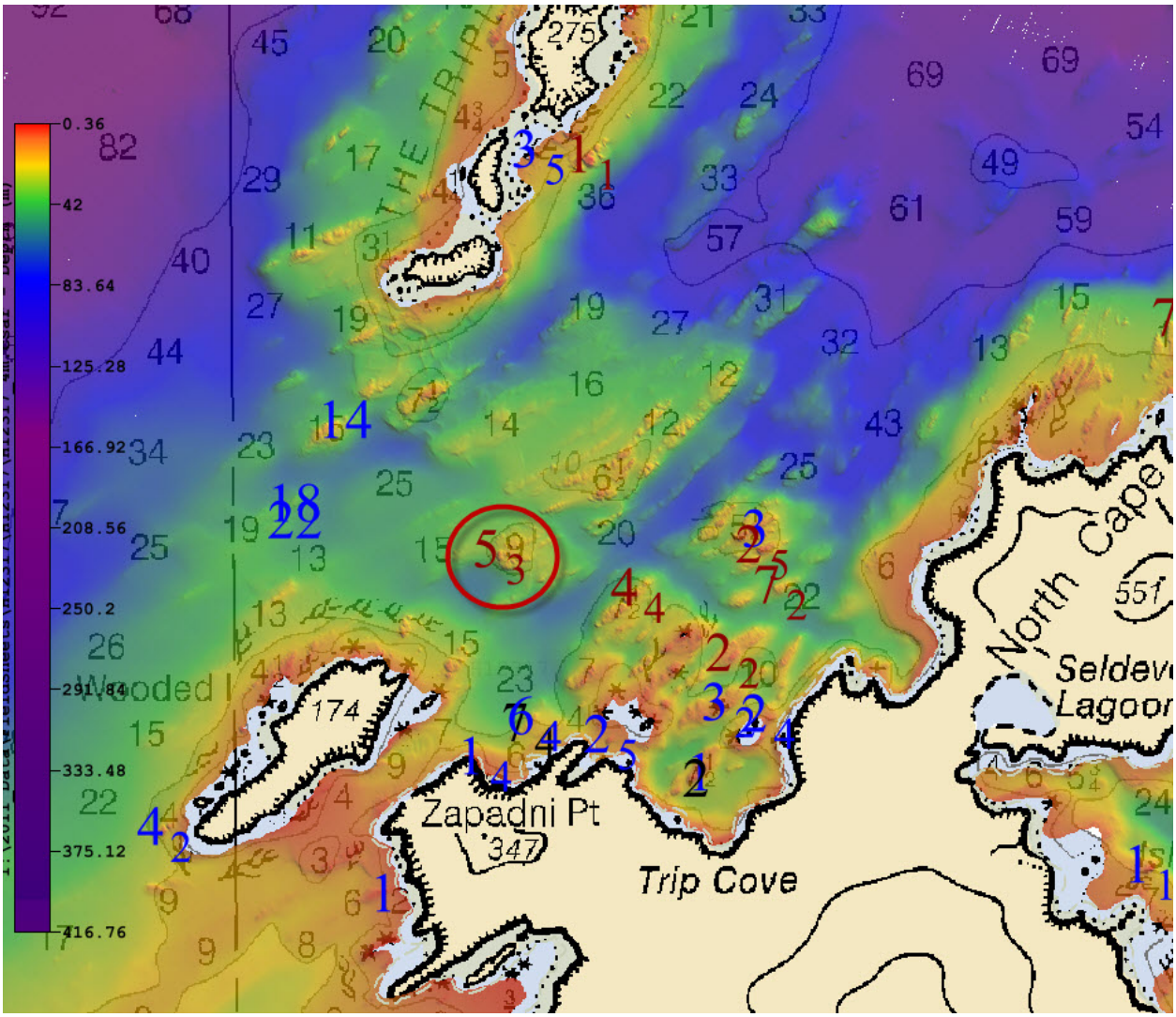

Figure 1.2.1

H12317 Danger to Navigation Report

Registry Number: H12317
State: Alaska
Locality: Kodiak Island
Sub-locality: Ouzinkie Harbor to Southern Portion of Marmot Bay
Project Number: OPR-P136-FA-11
Survey Dates: June 10, 2011 - June 30, 2011

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16580	14th	01/01/2008	1:350,000 (16580_1)	[L]NTM: ?
16013	30th	07/01/2006	1:969,761 (16013_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	Rock	6.64 m	57° 55' 22.0" N	152° 19' 27.1" W	---

1 - Dangers To Navigation

1.1) 194/5

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 55' 22.0" N, 152° 19' 27.1" W
Least Depth:	6.64 m (= 21.77 ft = 3.629 fm = 3 fm 3.77 ft)
TPU (±1.96σ):	**THU (TPEh)** ±0.150 m ; **TVU (TPEv)** ±0.317 m
Timestamp:	2011-167.20:46:35.070 (06/16/2011)
Survey Line:	h12317 / fa_2806_400khz_rsn7125_512bms_2011 / 2011-167 / 2011m_1672046
Profile/Beam:	194/5
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

The navigable area was covered with 100% MBES (Reson 7125 SV). The feature is a rock with a least depth substantially shallower than the surrounding charted depths.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2011m_1672046	194/5	0.00	000.0	Primary

Hydrographer Recommendations

Update with surveyed sounding.

Cartographically-Rounded Depth (Affected Charts):

3 ½fm (16594_1, 16580_1, 16013_1, 530_1)

3fm 4ft (531_1)

6.6m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	VALSOU - 6.636 m

Feature Images

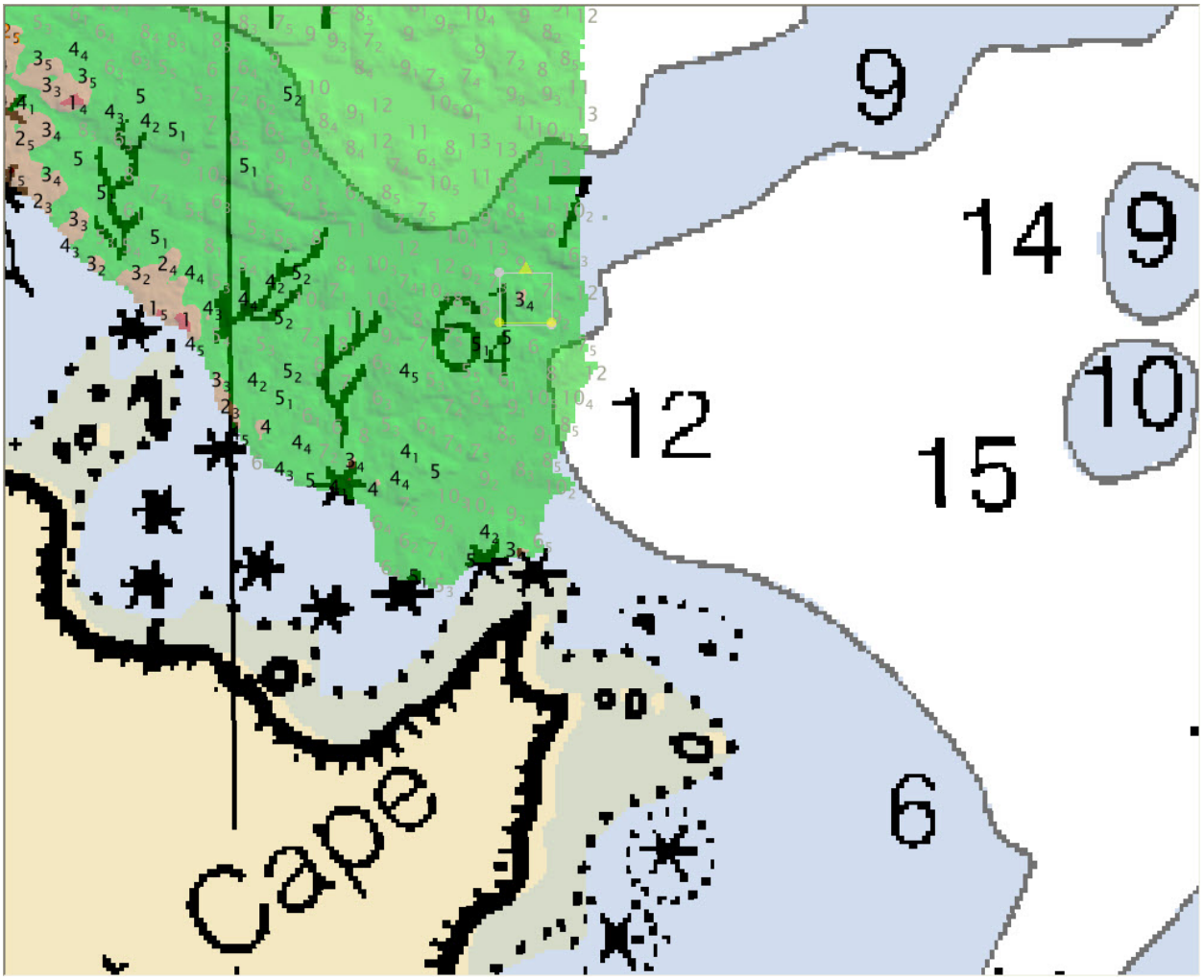

Figure 1.1.1

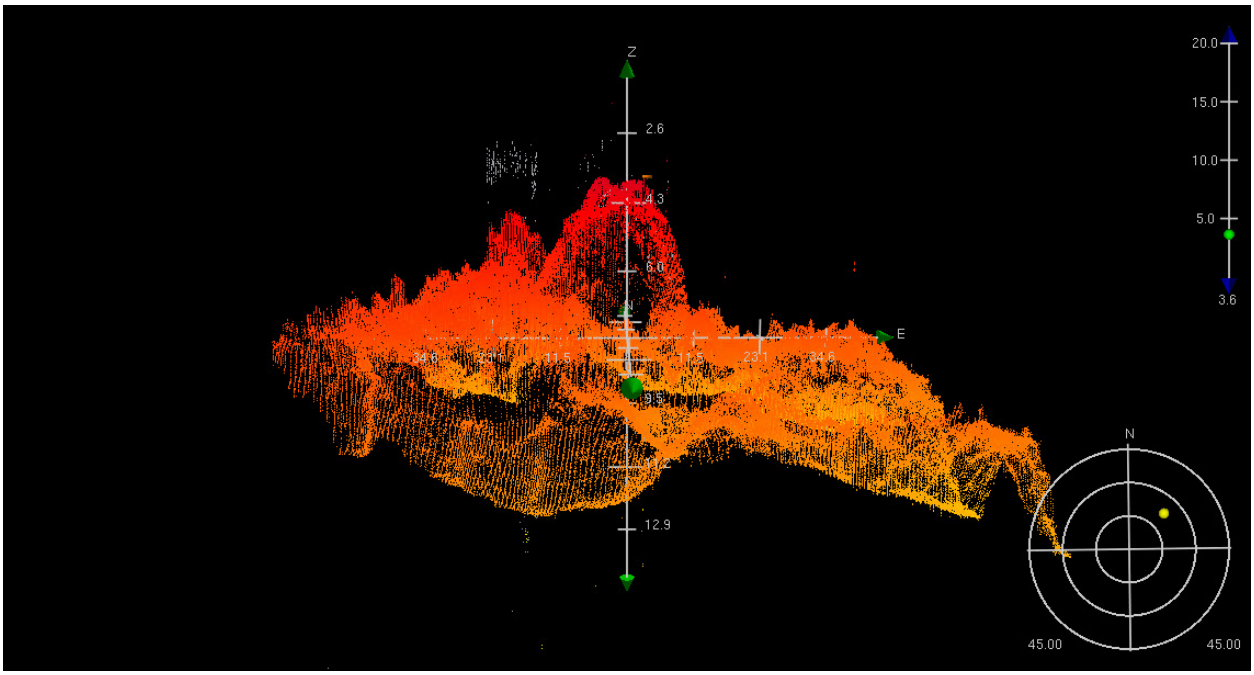

Figure 1.1.2

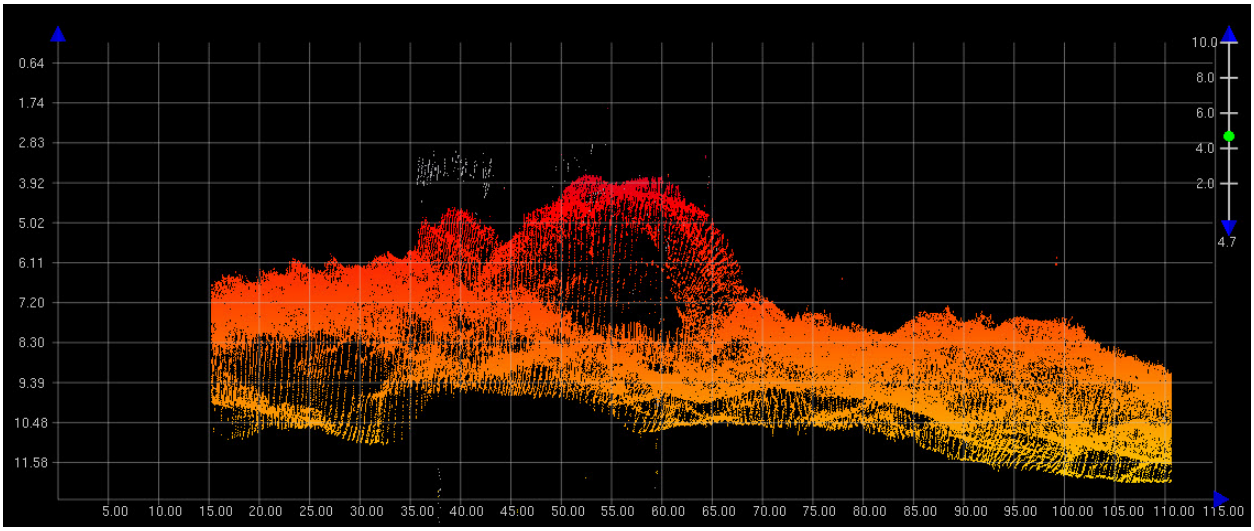

Figure 1.1.3

3 - AWOIS Features

3.1) 0_ 1302700075 00196 / H12317_Final_Feature_File.000

Survey Summary

Survey Position: 57° 55' 26.5" N, 152° 20' 22.4" W

Least Depth: -0.25 m (= -0.82 ft = -0.137 fm = 0 fm 5.18 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2011-166.18:52:33.000 (06/15/2011)

Dataset: H12317_Final_Feature_File.000

FOID: 0_ 1302700075 00196(FFFE4DA5A02B00C4)

Charts Affected: 16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: AWOIS (#54027) - Geographic cell (10732) rock verified with leveling and position by field operations.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12317_Final_Feature_File.000	0_ 1302700075 00196	0.00	000.0	Primary
H12317_Final_Feature_File.000	0_ 1302700082 00211	56.82	137.2	Secondary (grouped)

Hydrographer Recommendations

Retain and chart geographic cell rock and use this surveyed position as the seaward most low water extent in the area for maritime boundary updates.

Cartographically-Rounded Depth (Affected Charts):

0fm (16594_1, 16580_1, 16013_1, 530_1)

0fm 1ft (531_1)

-.2m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: NINFOM - Assigned

QUASOU - 1:depth known

SORDAT - 20110630

SORIND - US,US,graph,H12317

TECSOU - 12:found by levelling

VALSOU - -0.250 m

WATLEV - 5:awash

Office Note: Concur.

Feature Images

Figure 3.1.1

3.2) 0_ 1302700080 00204 / H12317_Final_Feature_File.000

Survey Summary

Survey Position: 57° 58' 06.8" N, 152° 24' 26.5" W

Least Depth: -1.57 m (= -5.14 ft = -0.857 fm = 0 fm 0.86 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2011-166.16:52:28.000 (06/15/2011)

Dataset: H12317_Final_Feature_File.000

FOID: 0_ 1302700080 00204(FFFE4DA5A03000CC)

Charts Affected: 16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: AWOIS (#54028) - Charted (16594) rock verified with leveling and position by field operations.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12317_Final_Feature_File.000	0_ 1302700080 00204	0.00	000.0	Primary
H12317_Final_Feature_File.000	0_ 1302700038 00095	23.32	045.9	Secondary (grouped)
H12317_Final_Feature_File.000	0_ 1302700077 00047	23.32	045.9	Secondary (grouped)

Hydrographer Recommendations

Retain charted rock and use this surveyed position as the seaward most low water extent in the area for maritime boundary updates.

Cartographically-Rounded Depth (Affected Charts):

0 ¾fm (16594_1, 16580_1, 16013_1, 530_1)

0fm 5ft (531_1)

-1.6m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: NINFOM - Assigned

QUASOU - 1:depth known

SORDAT - 20110630

SORIND - US,US,graph,H12317

TECSOU - 12:found by levelling

VALSOU - -1.568 m

WATLEV - 4:covers and uncovers

Office Note: Concur.

Feature Images

Figure 3.2.1

3.3) US 0000002111 00001 / H12317_Final_Feature_File.000

Survey Summary

Survey Position: 57° 58' 17.8" N, 152° 24' 47.2" W

Least Depth: -1.45 m (= -4.76 ft = -0.794 fm = 0 fm 1.24 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2011-166.16:36:17.000 (06/15/2011)

Dataset: H12317_Final_Feature_File.000

FOID: US 0000002111 00001(02260000083F0001)

Charts Affected: 16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: AWOIS (#54029) - Charted (16594) islet determined to be seaward most rock based on leveling by field operations.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12317_Final_Feature_File.000	US 0000002111 00001	0.00	000.0	Primary
H12317_Final_Feature_File.000	0_ 1302700069 00174	9.88	132.8	Secondary (grouped)
H12317_Final_Feature_File.000	0_ 1302700082 00040	155.32	214.1	Secondary (grouped)

Hydrographer Recommendations

Delete islet, chart rock and use surveyed position as the seaward most low water extent in the area for maritime boundary updates.

Cartographically-Rounded Depth (Affected Charts):

0 ¾fm (16594_1, 16580_1, 16013_1, 530_1)

0fm 5ft (531_1)

-1.5m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20110630

SORIND - US,US,graph,H12317

TECSOU - 12:found by levelling

VALSOU - -1.452 m

WATLEV - 4:covers and uncovers

Office Note: Concur.

Feature Images

Figure 3.3.1

3.4) US 0000002092 00001 / H12317_Final_Feature_File.000

Survey Summary

Survey Position: 57° 58' 27.6" N, 152° 25' 04.7" W

Least Depth: -0.07 m (= -0.21 ft = -0.036 fm = 0 fm 5.79 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2011-166.15:57:00.000 (06/15/2011)

Dataset: H12317_Final_Feature_File.000

FOID: US 0000002092 00001(02260000082C0001)

Charts Affected: 16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: AWOIS (#54030) - New position of seaward most charted (16594) rock was found by field operations.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12317_Final_Feature_File.000	US 0000002092 00001	0.00	000.0	Primary
H12317_Final_Feature_File.000	0_ 1302700082 00038	34.67	169.9	Secondary (grouped)

Hydrographer Recommendations

Chart rock at surveyed position and use as the seaward most low water extent in the area for maritime boundary updates.

Cartographically-Rounded Depth (Affected Charts):

0fm (16594_1, 16580_1, 16013_1, 530_1)

0fm 0ft (531_1)

-.1m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: QUASOU - 1:depth known

SORDAT - 20110630

SORIND - US,US,graph,H12317

TECSOU - 12:found by levelling

VALSOU - -0.065 m

WATLEV - 5:awash

Office Note: Concur.

Feature Images

Figure 3.4.1

3.5) 0_ 1302700077 00003 / H12317_Final_Feature_File.000

Survey Summary

Survey Position: 57° 59' 30.6" N, 152° 27' 55.6" W

Least Depth: -0.29 m (= -0.94 ft = -0.157 fm = 0 fm 5.06 ft)

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2011-173.21:58:11.000 (06/22/2011)

Dataset: H12317_Final_Feature_File.000

FOID: 0_ 1302700077 00003(FFFE4DA5A02D0003)

Charts Affected: 16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

UWTROC/remrks: AWOIS (#54034) - Geographic cell (10732) rock verified with leveling and position by field operations.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12317_Final_Feature_File.000	0_ 1302700077 00003	0.00	000.0	Primary

Hydrographer Recommendations

Retain and chart geographic cell rock and use this surveyed position as the seaward most low water extent in the area for maritime boundary updates.

Cartographically-Rounded Depth (Affected Charts):

0fm (16594_1, 16580_1, 16013_1, 530_1)

0fm 1ft (531_1)

-.3m (500_1, 50_1)

S-57 Data

Geo object 1: Underwater rock / awash rock (UWTROC)

Attributes: NINFOM - Assigned

QUASOU - 1:depth known

SORDAT - 20110630

SORIND - US,US,graph,H12317

TECSOU - 12:found by levelling

VALSOU - -0.287 m

WATLEV - 5:awash

Office Note: Concur.

3.6) US 0000002804 00001 / H12317_Final_Feature_File.000

Survey Summary

Survey Position: 57° 59' 38.1" N, 152° 28' 10.9" W

Least Depth: [None]

TPU (±1.96σ): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]

Timestamp: 2011-173.22:08:53.000 (06/22/2011)

Dataset: H12317_Final_Feature_File.000

FOID: US 0000002804 00001(022600000AF40001)

Charts Affected: 16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

SBDARE/remrks: AWOIS (#54046) - New seaward most extent of ledge was positioned by field operations.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12317_Final_Feature_File.000	US 0000002804 00001	0.00	000.0	Primary

Hydrographer Recommendations

Adjust position of ledge and use surveyed position as the seaward extent in the area to determine maritime boundary updates.

S-57 Data

Geo object 1: Seabed area (SBDARE)

Attributes: NATSUR - 9:rock

SORDAT - 20110630

SORIND - US,US,graph,H12317

Office Note: Concur with clarification. New seaward most extent of ledge is located at 57-59-38.2N, 152-28-11.1W

Feature Images

Figure 3.6.1

APPROVAL PAGE

H12317

Data meet or exceed current specifications as certified by the OCS survey acceptance review process. Descriptive Report and survey data except where noted are adequate to supersede prior surveys and nautical charts in the common area.

The following products will be sent to NGDC for archive

- H12317_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12317_GeoImage.pdf

The survey evaluation and verification has been conducted according current OCS Specifications.

Digitally signed by Peter S. Holmberg
DN: cn=Peter S. Holmberg, o, ou, email=peter.holmberg@noaa.gov, c=US
Date: 2012.09.04 12:47:14 -07'00'

Approved:_____

Pete Holmberg
Cartographic Team Lead, Pacific Hydrographic Branch

The survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.

David J Zezula LCDR/NOAA
David Zezula
2012.09.04 13:00:15 -07'00'

Approved:_____

CDR David Zezula, NOAA
Chief, Pacific Hydrographic Branch