

**F00646**

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

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area

Registry Number: F00646

**LOCALITY**

State(s): Alaska

General Locality: North Coast of Kodiak Island

Sub-locality: Vicinity of Woody Island Channel

**2014**

CHIEF OF PARTY  
Edward J. Van Den Ameele, CDR/NOAA

**LIBRARY & ARCHIVES**

Date:

**HYDROGRAPHIC TITLE SHEET**

**F00646**

**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(s): **Alaska**

General Locality: **North Coast of Kodiak Island**

Sub-Locality: **Vicinity of Woody Island Channel**

Scale: **10000**

Dates of Survey: **08/19/2014 to 10/22/2014**

Instructions Dated: **08/19/2014**

Project Number: **OPR-P136-RA-14**

Field Unit: **NOAA Ship *Rainier***

Chief of Party: **Edward J. Van Den Ameele, CDR/NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Pacific Hydrographic Branch**

Soundings Acquired in: **meters at Mean Lower Low Water**

**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. 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 (NCEI) and can be retrieved via <http://www.ngdc.noaa.gov/>.*

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## Descriptive Report to Accompany Survey F00646

Project: OPR-P136-RA-14

Locality: North Coast of Kodiak Island

Sublocality: Vicinity of Woody Island Channel

Scale: 1:10000

August 2014 - October 2014

**NOAA Ship *Rainier***

Chief of Party: Edward J. Van Den Ameele, CDR/NOAA

### A. Area Surveyed

The project area is referred to as Sheet 8: "Vicinity of Woody Island Channel" within the Project Instructions. The area is in the vicinity of North Coast of Kodiak Island, Alaska (Figure 1).

#### A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
57° 49' 34.2" N 152° 27' 9.12" W	57° 44' 20.4" N 152° 18' 19.29" W

*Table 1: Survey Limits*

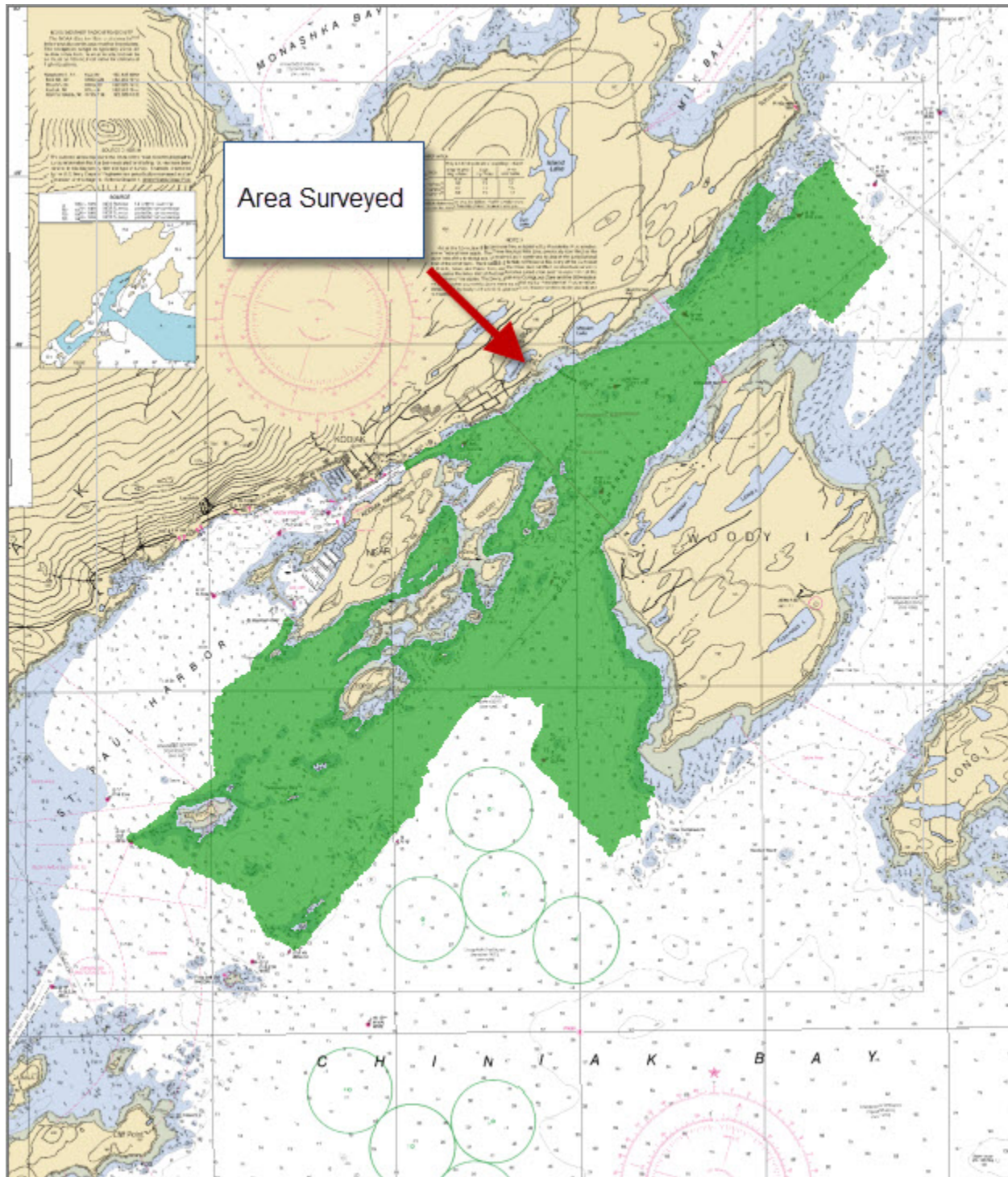


Figure 1: Overview of F00646 survey area (Chart 16580).

Survey data were acquired within survey limits in accordance with the requirements in the Project Instructions and the HSSD.

## A.2 Survey Purpose

The purpose of this survey is to provide contemporary data to update National Ocean Service (NOS) nautical charting products, which will support Kodiak's large fishing fleet and increasing levels of passenger vessel traffic.

## A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Data acquired on survey F00646 met complete multibeam coverage requirements outlined in section 5.2.2.2 of the HSSD, including data density requirements. In order to extract statistics of the data density achieved, the density layer of each finalized surface was queried within Caris then examined in Excel. Overall, the required data density was achieved in 99.90% of nodes.

## A.4 Survey Coverage

The following table lists the coverage requirements for this survey as assigned in the project instructions:

Water Depth	Coverage Required
Inshore limit to 8 meters	25 m spaced Set Line Spacing with SBES or MBES with concurrent backscatter
Greater than 8 meters	MBES with concurrent backscatter

Complete multibeam echosounder (MBES) coverage was achieved within the limits of hydrography as specified in the Project Instructions with the following exceptions:

Survey coverage did not meet the sheet limits along many portions near the shoreline and islands; conditions in these areas were deemed unsafe due to navigational hazards Figure 2-3).

A small holiday near a 10 fathom curve was found in the Northwest section of the survey area caused by inadequate overlap between survey days Figure 4).



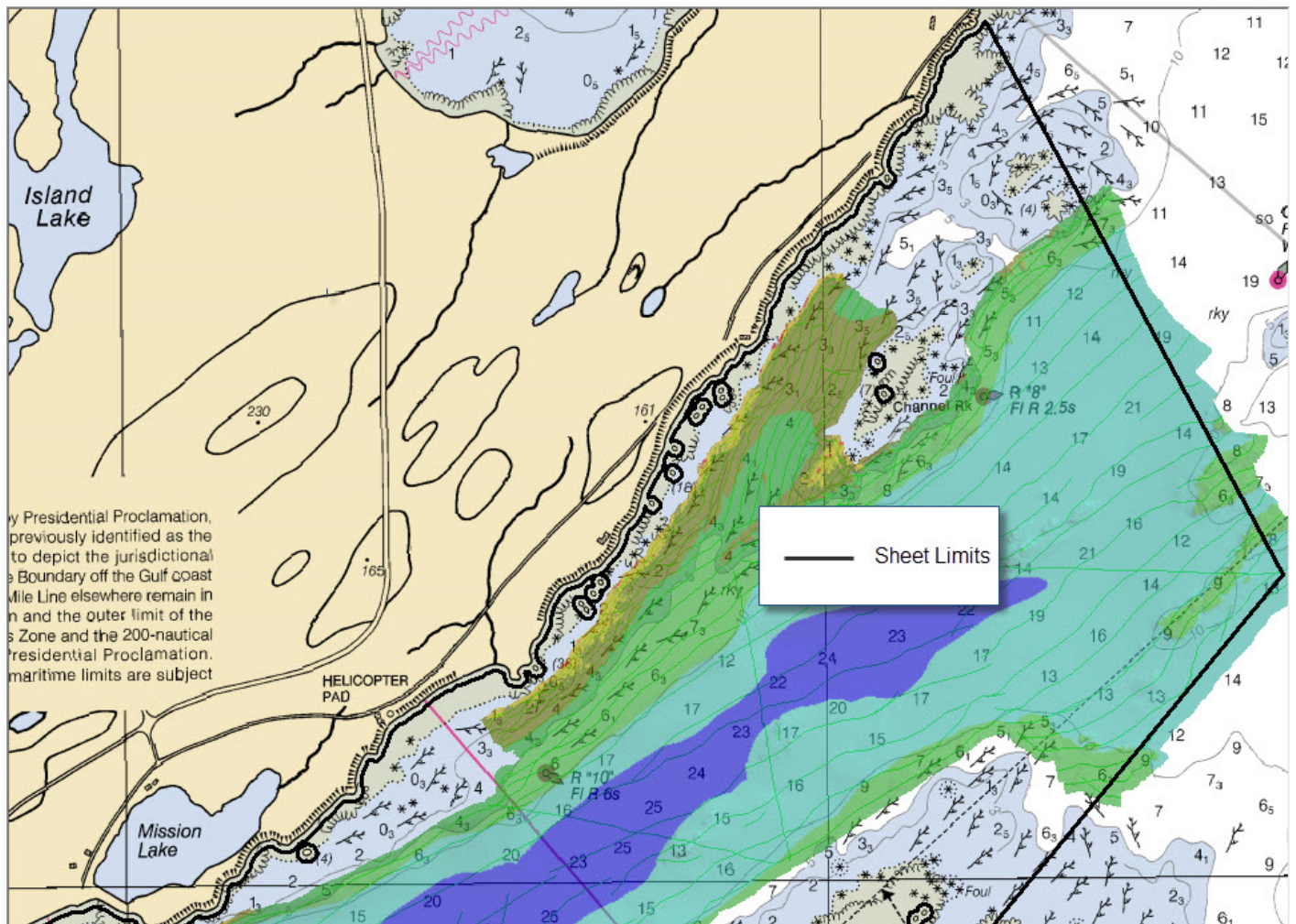
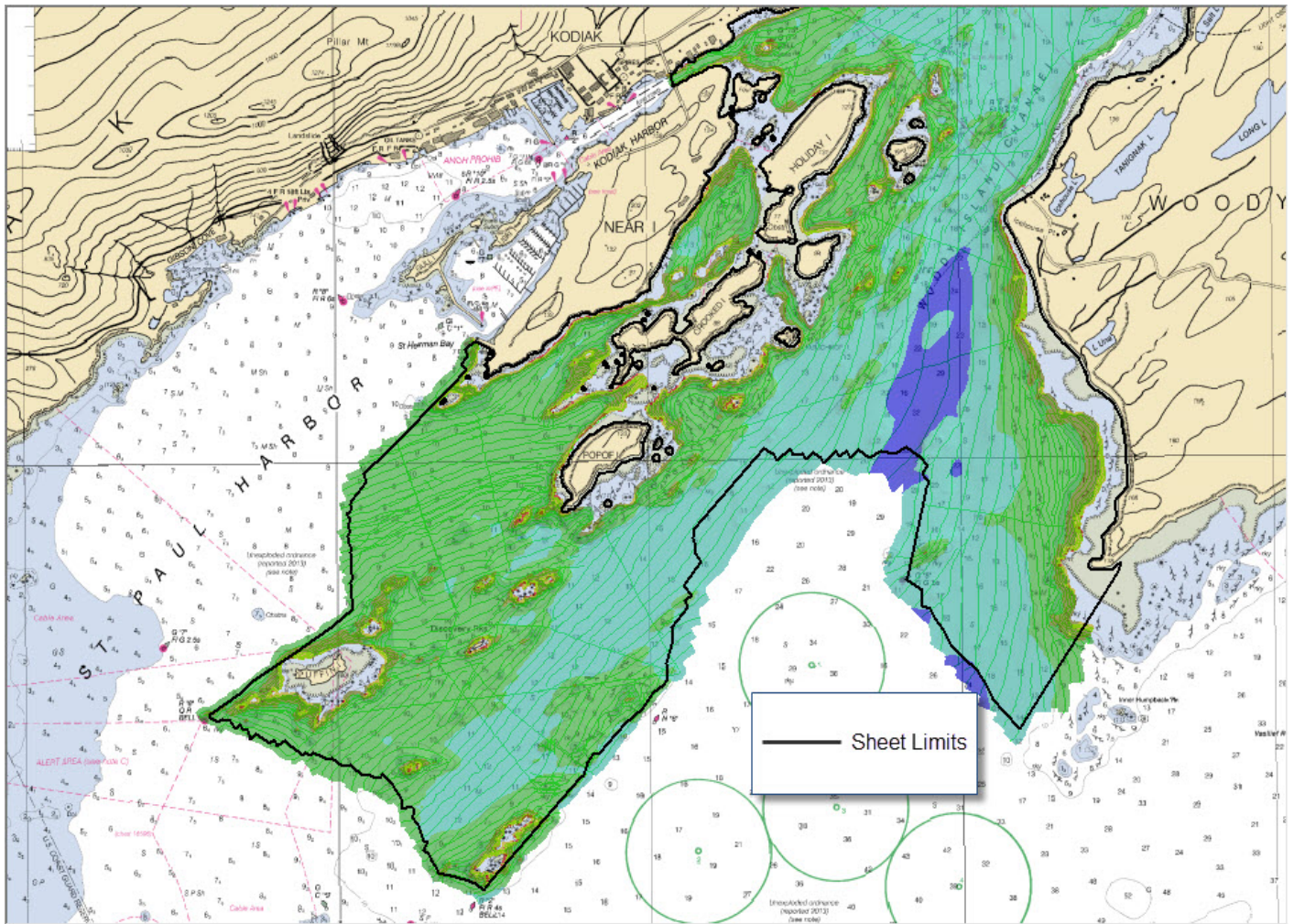
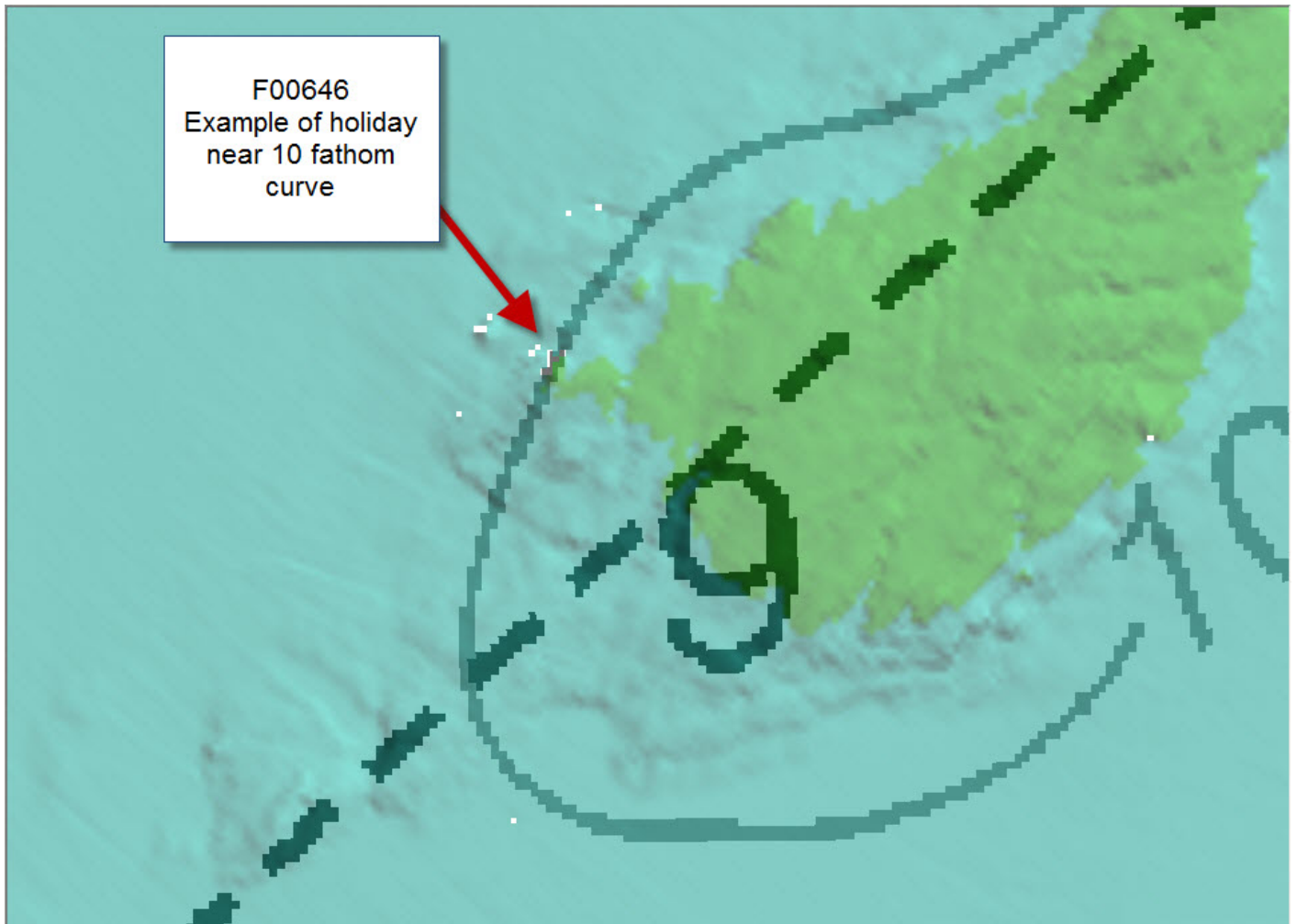


Figure 2: Multibeam coverage did not reach the shoreline due to navigational hazards and proximity to shore (Chart 16595).



*Figure 3: Multibeam coverage did not reach the sheet limits in the unnavigable areas surrounding many of the islands (Chart 16595).*





*Figure 4: Holiday caused by inadequate overlap coverage on outer beams between day number 233 and day number 236 (Chart 16595).*

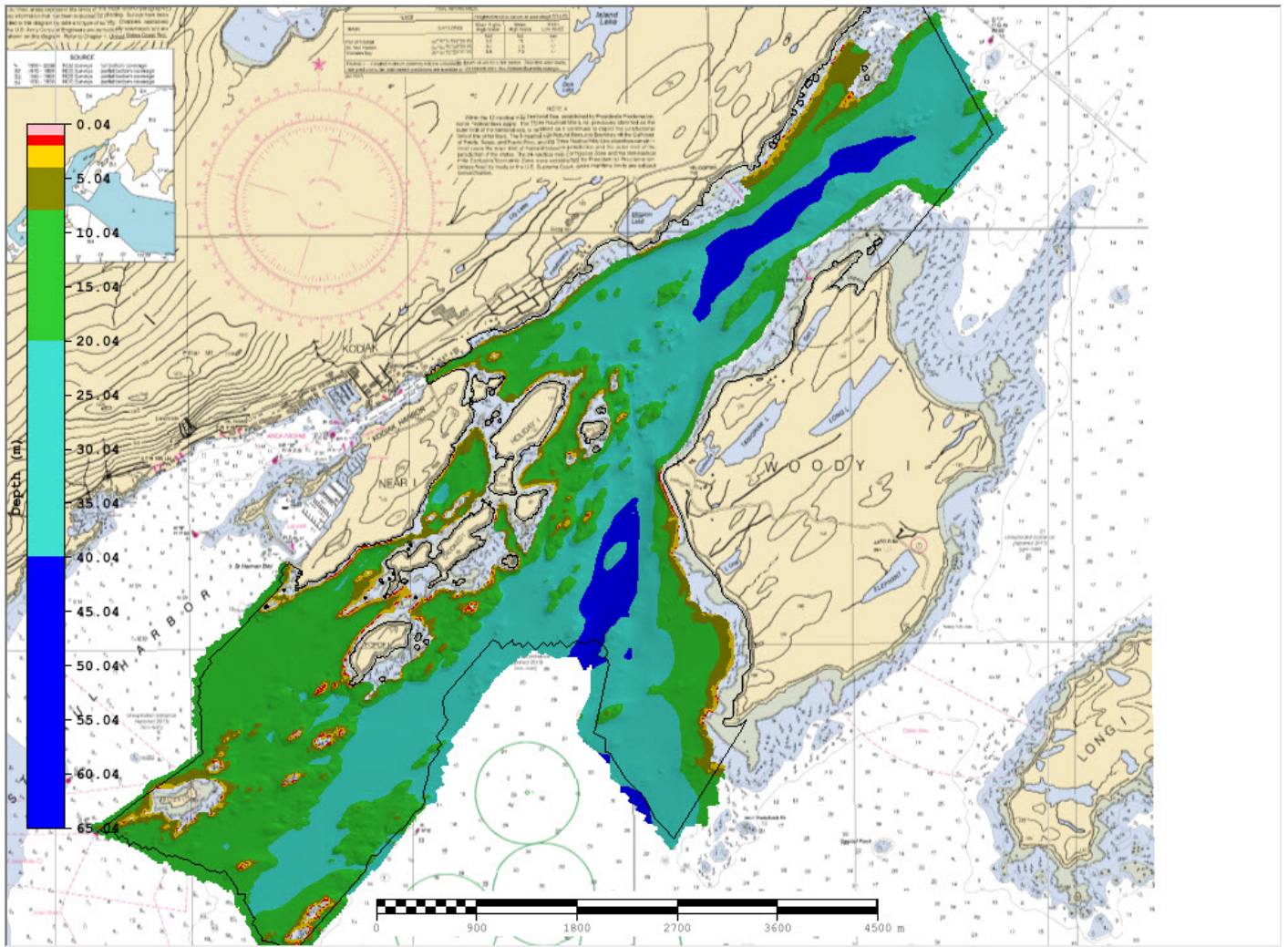


Figure 5: F00646 survey limits (Chart 16595).

### A.5 Survey Statistics

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



	<b>HULL ID</b>	<i>2801</i>	<i>2802</i>	<i>2803</i>	<i>2804</i>	<b><i>Total</i></b>
<b>LNM</b>	<b>SBES Mainscheme</b>	0	0	0	0	0
	<b>MBES Mainscheme</b>	66.207	78.949	64.778	27.696	237.63
	<b>Lidar Mainscheme</b>	0	0	0	0	0
	<b>SSS Mainscheme</b>	0	0	0	0	0
	<b>SBES/SSS Mainscheme</b>	0	0	0	0	0
	<b>MBES/SSS Mainscheme</b>	0	0	0	0	0
	<b>SBES/MBES Crosslines</b>	2.6513	8.8406	0	0	11.4919
	<b>Lidar Crosslines</b>	0	0	0	0	0
<b>Number of Bottom Samples</b>						11
<b>Number Maritime Boundary Points Investigated</b>						0
<b>Number of DPs</b>						0
<b>Number of Items Investigated by Dive Ops</b>						0
<b>Total SNM</b>						5.13

*Table 2: Hydrographic Survey Statistics*

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

<b>Survey Dates</b>	<b>Day of the Year</b>
08/19/2014	231
08/20/2014	232

<b>Survey Dates</b>	<b>Day of the Year</b>
08/21/2014	233
08/22/2014	234
08/23/2014	235
08/24/2014	236
08/25/2014	237
08/26/2014	238
09/09/2014	252
10/21/2014	294
10/22/2014	295

*Table 3: Dates of Hydrography*

## **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:

<b>Hull ID</b>	<b>2801</b>	<b>2802</b>	<b>2803</b>	<b>2804</b>	<b>1905</b>	<b>1906</b>
<b>LOA</b>	8.8 meters	8.8 meters	8.8 meters	8.8 meters	5.7 meters	5.8 meters
<b>Draft</b>	1.1 meters	1.1 meters	1.1 meters	1.1 meters	0.3 meters	0.3 meters

*Table 4: Vessels Used*



*Figure 6: NOAA Ship Rainier launch 2804*

## B.1.2 Equipment

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

<b>Manufacturer</b>	<b>Model</b>	<b>Type</b>
Reson	SVP 71	Sound Speed System
Seabird	SBE 19 Plus	Conductivity, Temperature, and Depth Sensor
Seabird	SBE 19	Conductivity, Temperature, and Depth Sensor
Applanix	POS-MV V4	Positioning and Attitude System
Reson	7125-B	MBES
Reson	7125 SV2	MBES

*Table 5: Major Systems Used*

## B.2 Quality Control

### B.2.1 Crosslines

Crosslines acquired for this survey totaled 4.84% of mainscheme acquisition.

Multibeam crosslines were acquired using the Reson 7125 on Launch 2801 (RA-4) and Launch 2802 (RA-5). A 2m CUBE surface was created using only mainscheme lines, a second 2m CUBE surface was created using only crosslines, and a difference surface was generated in Caris at a 2m resolution. The difference surface was compared to the allowable uncertainty value within the HSSD for the observed depths, and statistics were calculated in Excel. In total, 99.4% of the depth difference between F00646 mainscheme and crossline data are within the requirements of the HSSD.

### B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

<b>Measured</b>	<b>Zoning</b>	<b>Method</b>
0 meters	0.056 meters	Discrete Zoning

*Table 6: Survey Specific Tide TPU Values*

Hull ID	Measured - CTD	Measured - MVP	Surface
2801	3 meters/second	0 meters/second	0.15 meters/second
2802	3 meters/second	0 meters/second	0.15 meters/second
2803	3 meters/second	0 meters/second	0.15 meters/second
2804	3 meters/second	0 meters/second	0.15 meters/second

*Table 7: Survey Specific Sound Speed TPU Values*

Uncertainty values were measured and applied in accordance with Section B.4 of the DAPR.

Uncertainty values of submitted finalized grids were calculated in Caris using the “Greater of the Two” of uncertainty and standard deviation (scaled to 95%). To visualize where uncertainty requirements were met, for each surface a custom “HSSD Compliance” layer was created, based on the difference between the calculated uncertainty of the nodes and the allowable uncertainty defined in the HSSD. To quantify the extent to which requirements were met, the HSSD Compliance layers were queried within Caris and examined in Excel. Overall, 100.00% of the nodes of survey F00646 met the uncertainty requirements specified in the HSSD. These HSSD Compliance layers were retained in the submitted surfaces.

### **B.2.3 Junctions**

Two junction comparisons were completed for F00646. H10912 and H10913 were completed in 1999 by NOAA Ship *Rainier*. Depth comparisons were performed using the CARIS Difference Surface and Caris Subset Editor (Figure 7).



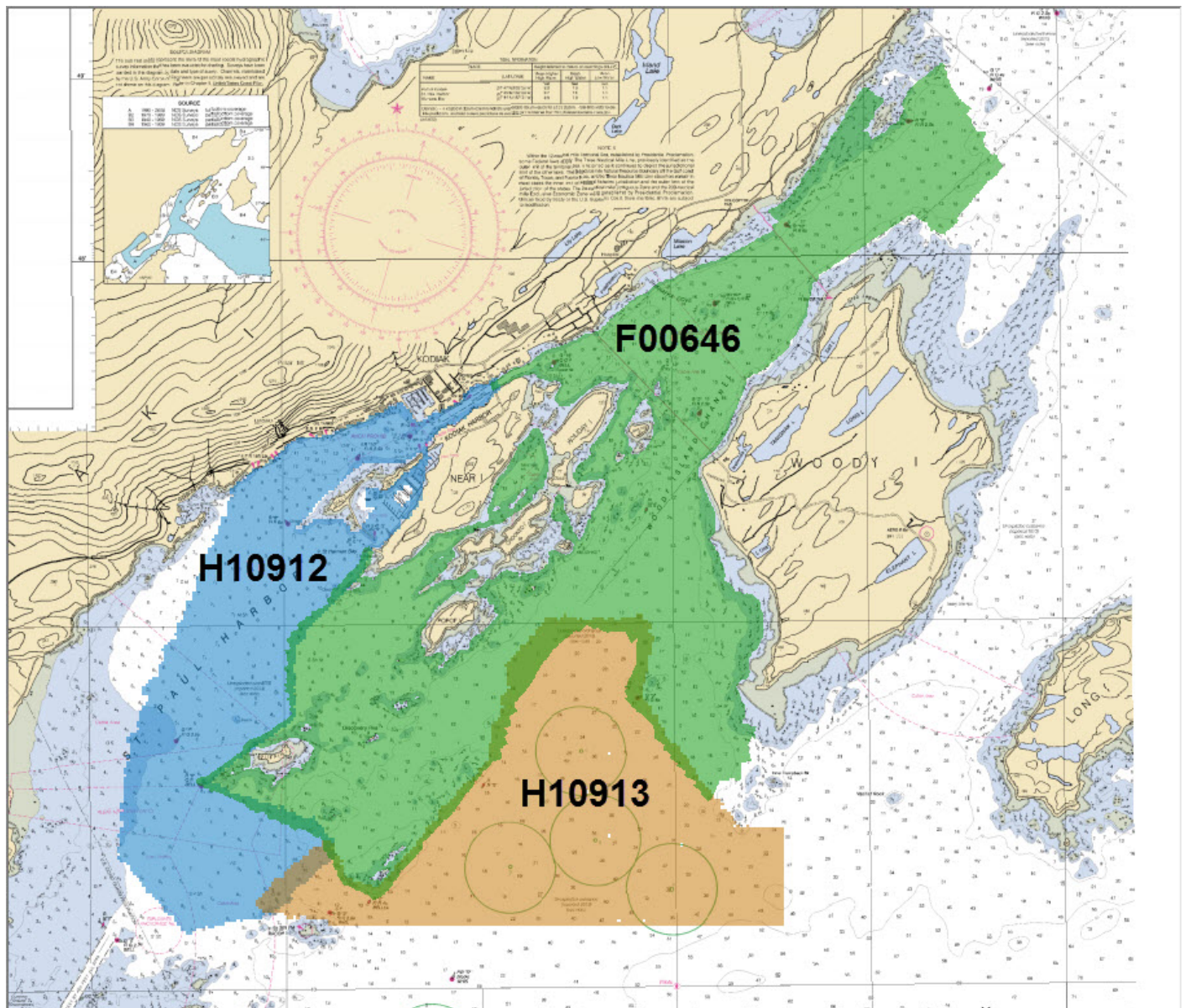


Figure 7: F00646 junction with H10912 and H10913.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H10912	1:20000	1999	NOAA Ship RAINIER	W
H10913	1:10000	1999	NOAA Ship RAINIER	SE

Table 8: Junctioning Surveys

H10912

F00646

Overlap with survey H10912 was approximately 120 meters wide along the western boundary of F00646 (Figure 8). Depths in the junction area range from 5 to 20 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. Analysis of the difference surface indicated a mean difference of 0.33 meters with a standard deviation of 0.21 meters. In total, 95.4% of the depth differences between F00646 and junction survey H1092 are within allowable uncertainties.

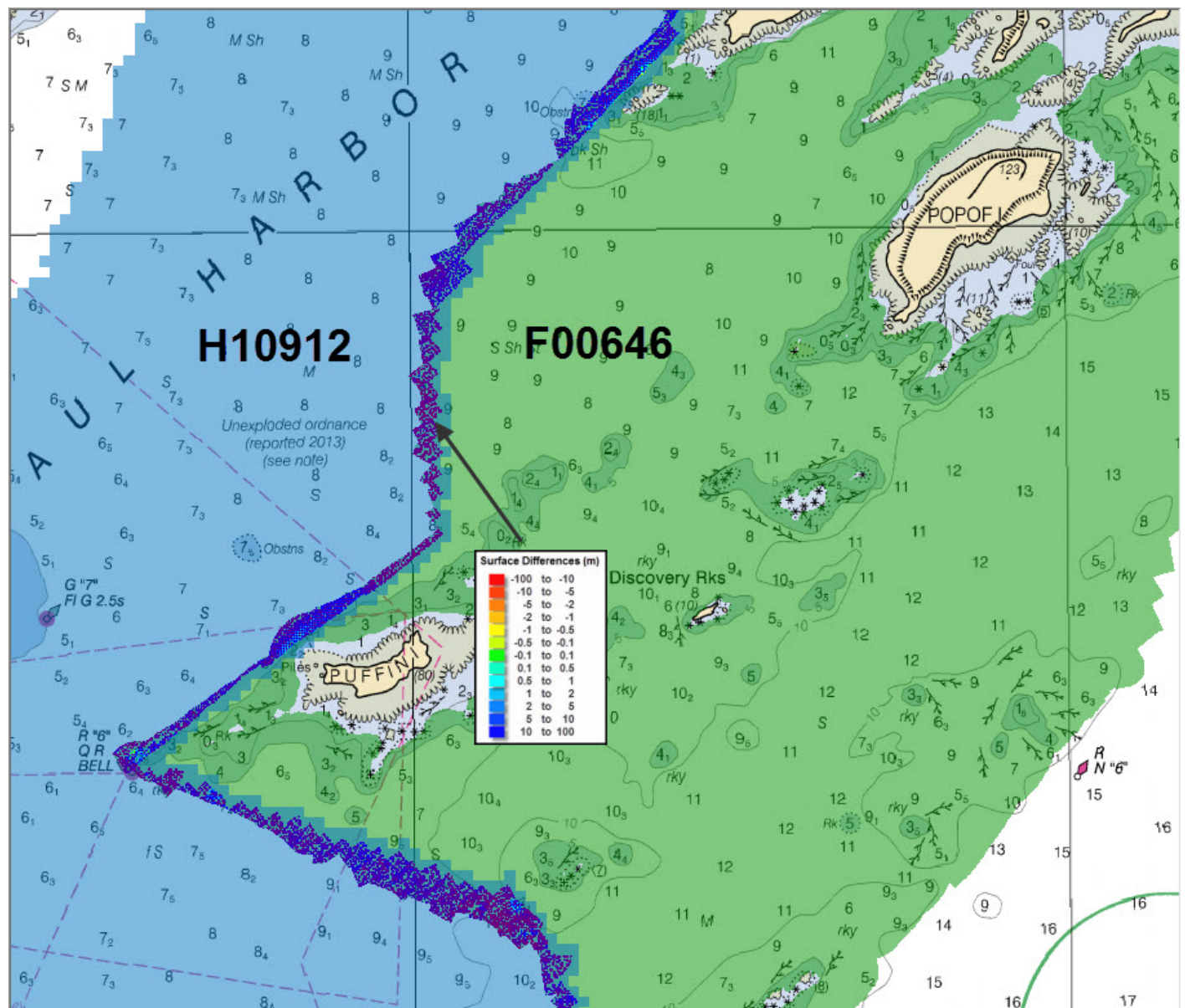


Figure 8: Junction F00646/H10912 difference surface.



## H10913

## F00646

Overlap with survey H10913 was approximately 150 meters wide along the southern boundary of F00646 (Figure 9). Depths in the junction area range from 10 to 30 meters. For the respective depths, the difference surface was compared to the allowable TVU standards specified in the HSSD. Analysis of the difference surface indicated a mean difference of 0.32 with a standard deviation of 0.48 meters. In total, 92.1% of the depth differences between F00646 and junction survey H1093 are within allowable uncertainties.

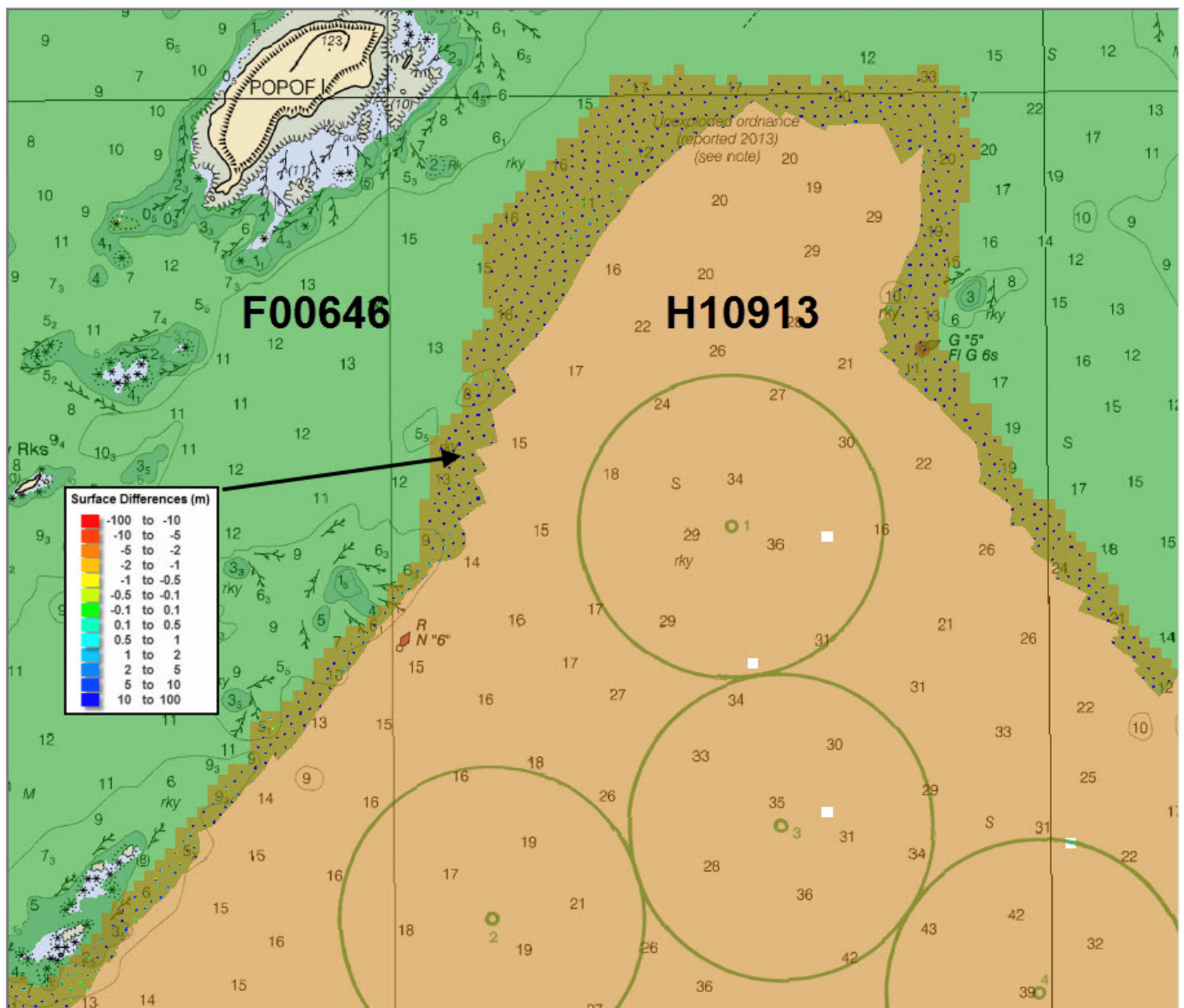


Figure 9: Junction F00646/H10913 difference surface.



#### **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**

There were no conditions or deficiencies that affected equipment operational effectiveness.

#### **B.2.6 Factors Affecting Soundings**

##### Vertical Offset

Vertical offsets were observed in some areas where data was acquired by different vessels on different days. The observed offsets range from approximately 0.15 to 0.30 meters. GPS tide data decreased the offsets but did not eliminate the issue. The source of the offsets are unknown but all affected MBES data falls within NOAA HSSD standards (Figure 10-12).

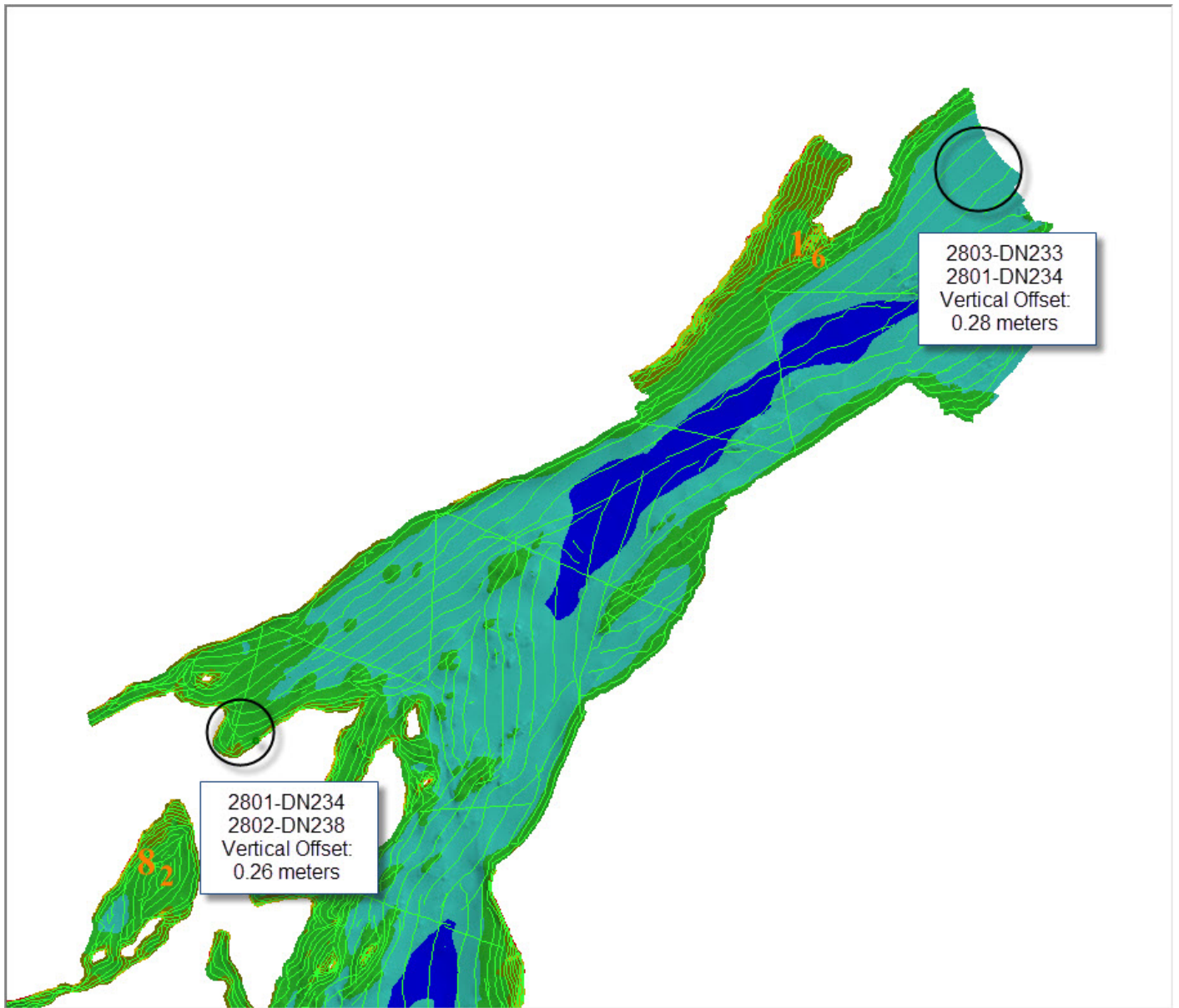


Figure 10: Example areas of vertical offsets.

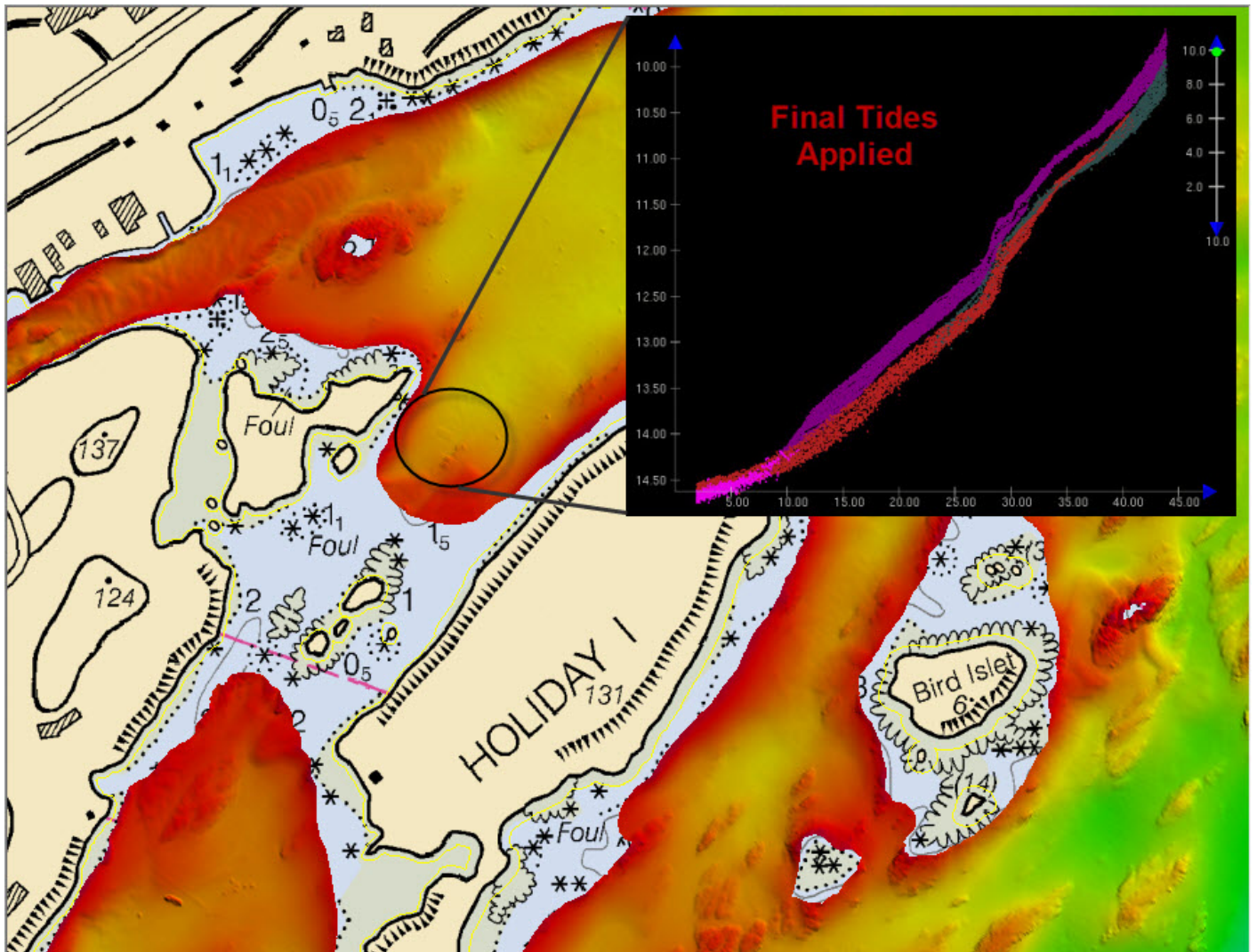


Figure 11: Example of vertical offset in subset view with final zoned tides applied. Data colored by line.

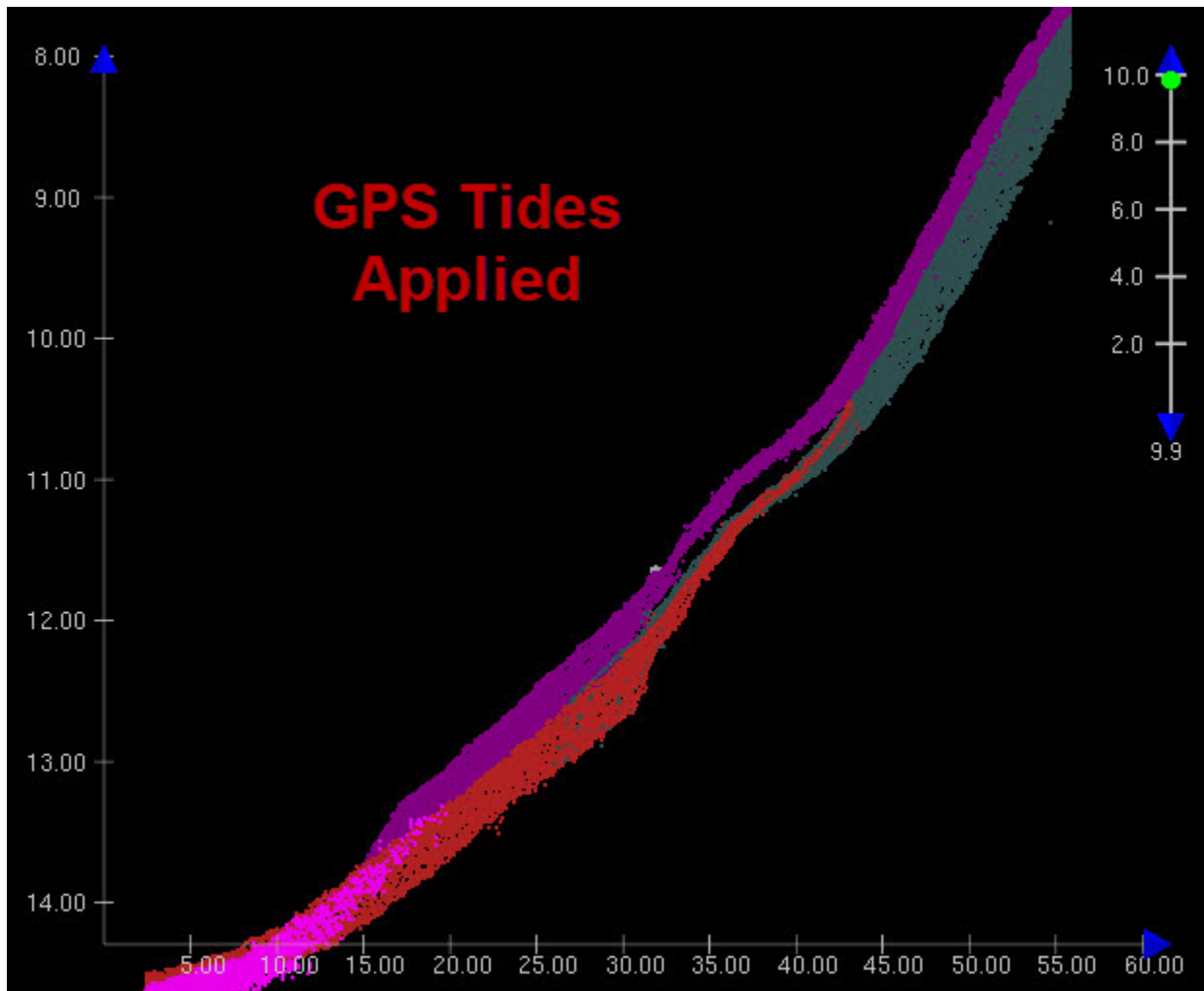


Figure 12: Subset view of data with GPS tides applied.

***The application of GPS tides to the data were for QC purposes only.***

#### Kelp

Kelp was encountered in shoal areas of the survey (Figure 13). MBES data in these areas was examined using Caris subset editor; soundings that obviously represented kelp and not the sea floor, were rejected. When unable to clearly distinguish between kelp and the sea floor, the soundings were retained.

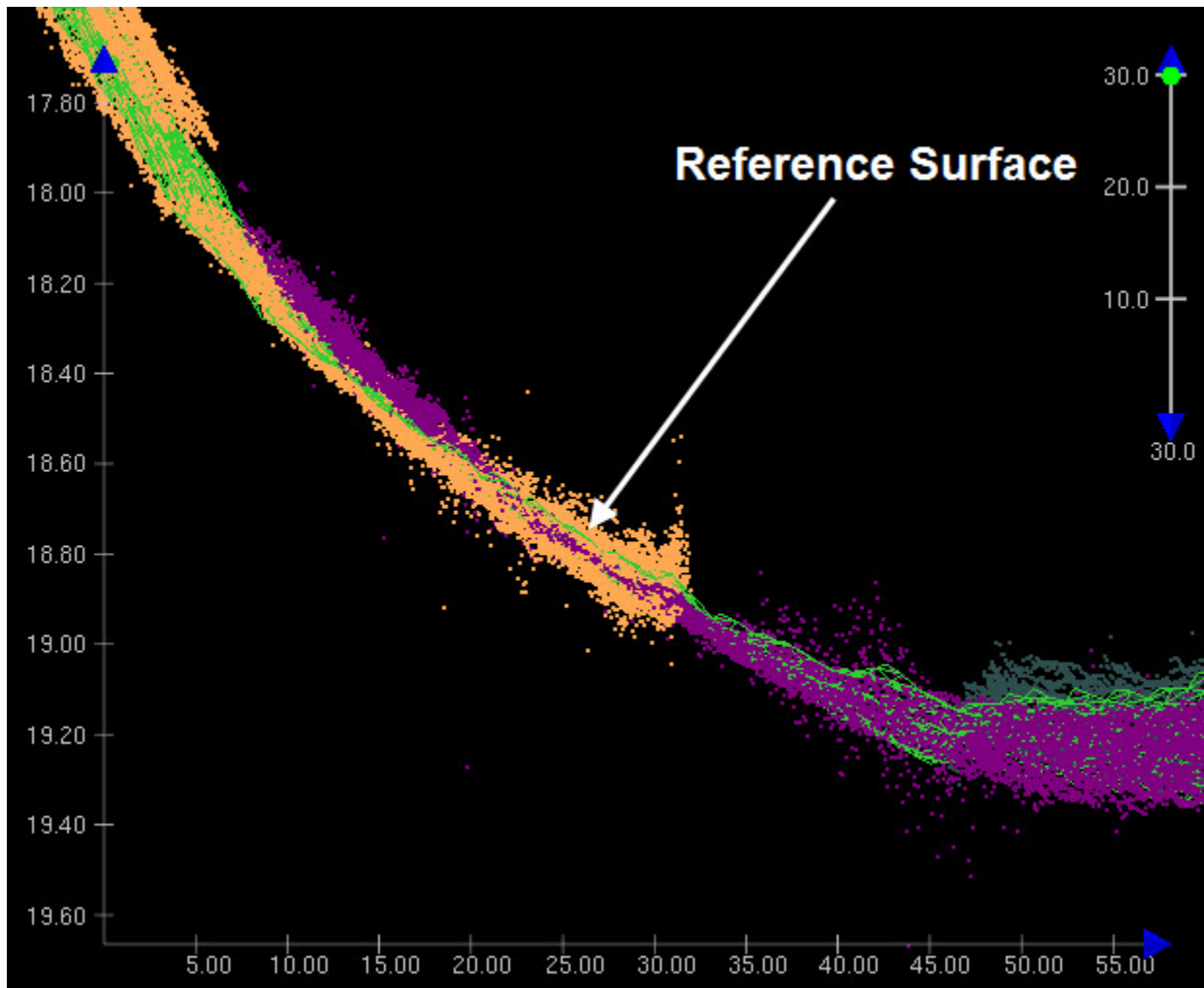


Figure 13: Subset view showing seafloor obscured by kelp and resulting reference surface.

### B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Sound speed profiles were acquired on Rainier's launches using SBE 19plus CTD probes at discrete locations within the survey area at least once every four hours, when significant changes in surface sound speed were observed, or when surveying a new area. All casts were concatenated into a master file for the launches, and applied to appropriate lines using the "Nearest in distance within time (4 hours)" profile selection method.

Sound speed profiles were collected, processed, and applied as described in the DAPR.

### B.2.8 Coverage Equipment and Methods

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

## 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 acquired but not formally processed by Rainier personnel. Spot checks were conducted in accordance with the FPM to ensure backscatter quality. Backscatter was logged as .7k file and submitted to NGDC.

## B.5 Data Processing

### B.5.1 Primary Data Processing Software

The following software program was the primary program used for bathymetric data processing:

Manufacturer	Name	Version
CARIS	HIPS	8.1.12

*Table 9: Primary bathymetric data processing software*

The following Feature Object Catalog was used: NOAA Profile V\_5\_3\_2.

### B.5.2 Surfaces

The following surfaces and/or BAGs were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00646_MBES_1m_MLLW	CUBE	1 meters	0 meters - 63 meters	NOAA_1m	Complete MBES

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00646_MBES_2m_MLLW	CUBE	2 meters	0 meters - 63 meters	NOAA_2m	Complete MBES
F00646_MBES_4m_MLLW	CUBE	4 meters	0 meters - 63 meters	NOAA_4m	Complete MBES
F00646_MBES_1m_MLLW_Final	CUBE	1 meters	0 meters - 20 meters	NOAA_1m	Complete MBES
F00646_MBES_2m_MLLW_Final	CUBE	2 meters	18 meters - 40 meters	NOAA_2m	Complete MBES
F00646_MBES_4m_MLLW_Final	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES

*Table 10: Submitted Surfaces*

## 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	945-7292

*Table 11: NWLON Tide Stations*

File Name	Status
9457292.tid	Final Approved

Table 12: Water Level Files (.tid)

File Name	Status
P136RA2014_AddCORP.zdf	Final

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

A request for final approved tides was sent to N/OPS1 on 10/23/2014. The final tide note was received on 11/20/2014.

F00646 MBES and shoreline data was corrected using water level and zoning files listed above.

## C.2 Horizontal Control

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

The projection used for this project is Universal Transverse Mercator (UTM).

The following PPK methods were used for horizontal control:

Smart Base

Vessel kinematic data (POS files) were post-processed with Applanix POSPac and POSGNSS software using Smart Base processing methods described in the DAPR. SBET and RMS data was applied to all survey lines with the exception of RMS on survey line 2804\_2014\_RA2942246A.



The following CORS Stations were used for horizontal control:

<b>HVCR Site ID</b>	<b>Base Station ID</b>
AC08	Capdouglasak2007 (Homer, Alaska)
AC26	Cape Gull AK2008 (Kukak Bay, Alaska)
AC38	Quartz Crkak2005 (Kodiak, Alaska)
AC39	Shuyakisspak2006 (Shuayk Island, Alaska)
AC43	Seal Rocksak2007 (Seward, Alaska)
AC45	Sitkinakisak2006 (Island of Sitkinak, Alaska)
AC67	Pillarmtn Ak2006 (Kodiak, Alaska)
KOD6	Kodiak 6 (Kodiak, Alaska)
AB13	Chigniklgnak2006 (Chignik Lagoon, Alaska)

*Table 14: CORS Base Stations*

The following DGPS Stations were used for horizontal control:

<b>DGPS Stations</b>
Kodiak, AK -313 KHz

*Table 15: USCG DGPS Stations*

## **D. Results and Recommendations**

### **D.1 Chart Comparison**

Chart comparisons were performed using a Caris sounding layer based on the 2m surface from F00646 and a contour layer based on the 2m surface. The contours and soundings were overlaid on the charts and compared for general agreement and to identify areas of significant change.

### D.1.1 Raster Charts

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

<b>Chart</b>	<b>Scale</b>	<b>Edition</b>	<b>Edition Date</b>	<b>LNLM Date</b>	<b>NM Date</b>
16595	1:20000	16	10/2012	01/13/2015	01/17/2015

*Table 16: Largest Scale Raster Charts*

#### 16595

16595

The comparison of soundings from Chart 16595 and F00646 showed general agreement except for the following:

At north end of Woody Island, 8-10 fathom soundings were acquired over a 5 fathom 3 feet charted depth (Figure 14).

At northeast end of project area, 14 fathom soundings were acquired over a 18 fathom charted depth (Figure 15).

Southeast of Popof Island, 3-4 fathom soundings were acquired over a 1 fathom 5 feet charted depth (Figure 16).

Comparison of contours showed no navigationally significant changes (Figure 17-19).

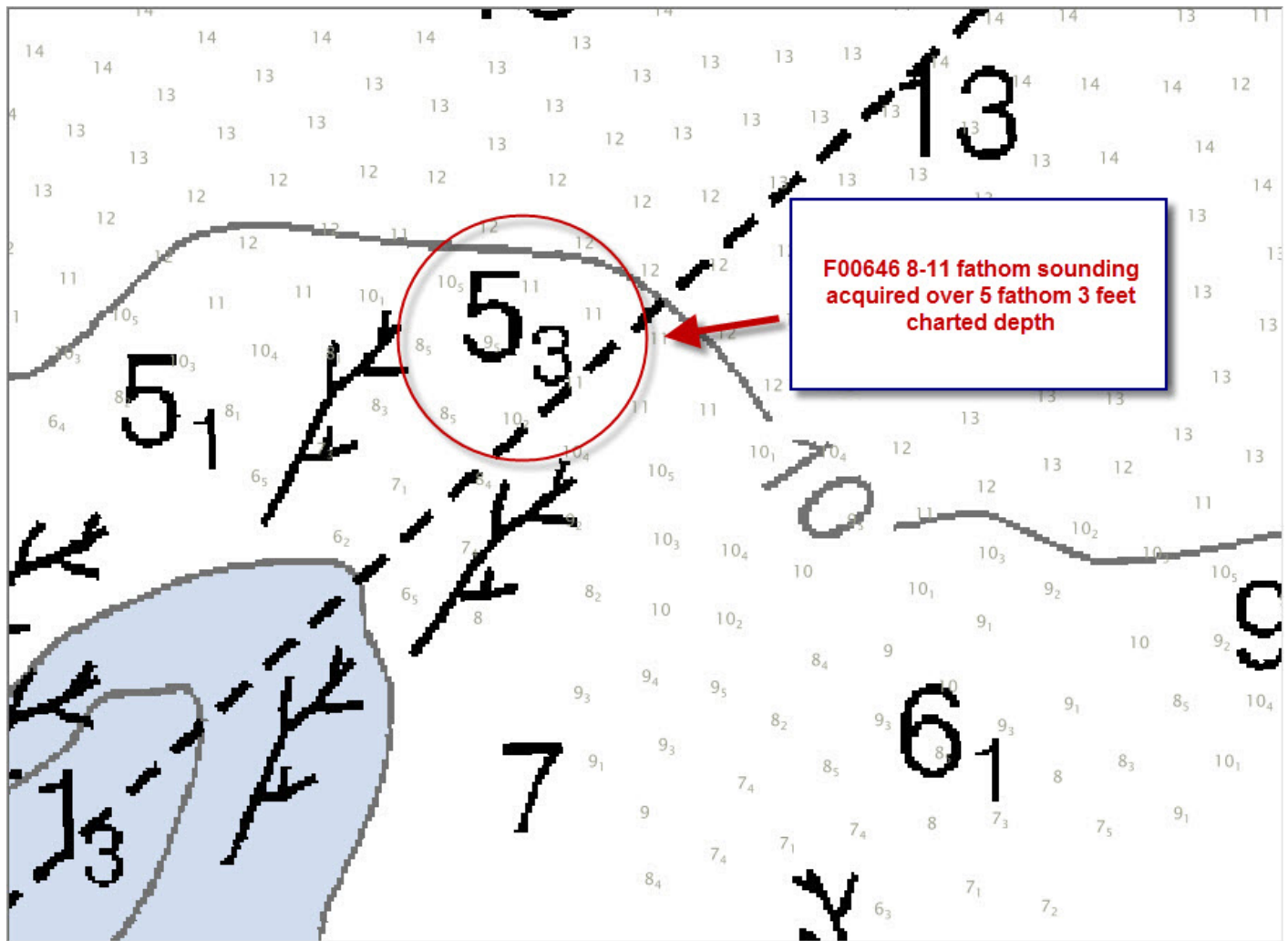
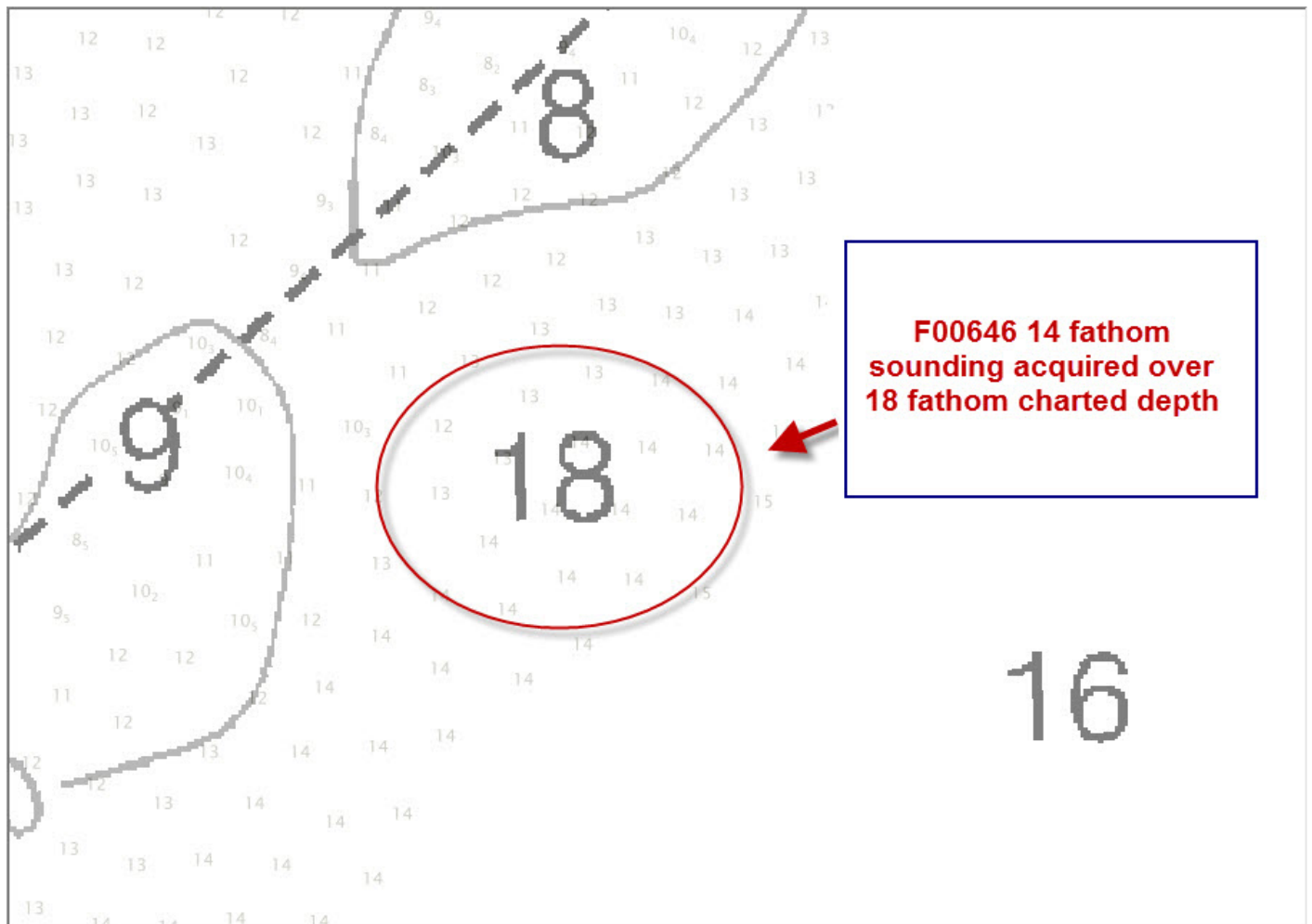


Figure 14: Section of Chart 16595 with F00646 selected soundings overlaid in red. Note the 8-11 fathom soundings over the 5 fathom 3 feet charted depth.



*Figure 15: Section of Chart 16595 with F00646 selected soundings overlaid in red. Note the 14 fathom soundings over the 18 fathom charted depth.*

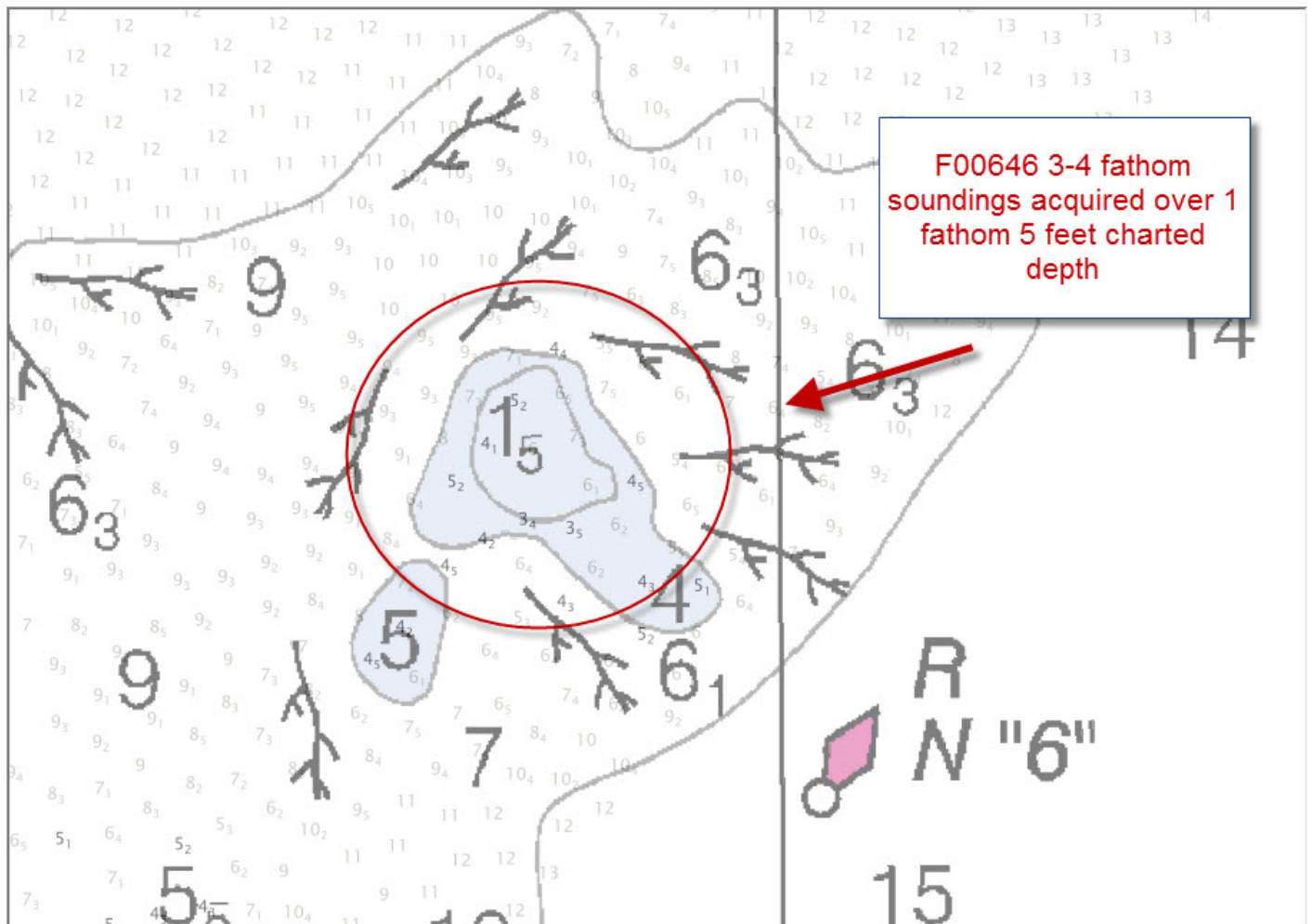


Figure 16: Section of Chart 16595 with F00646 selected soundings overlaid in red. Note the 3-4 fathom soundings over the 1 fathom 5 feet charted depth.

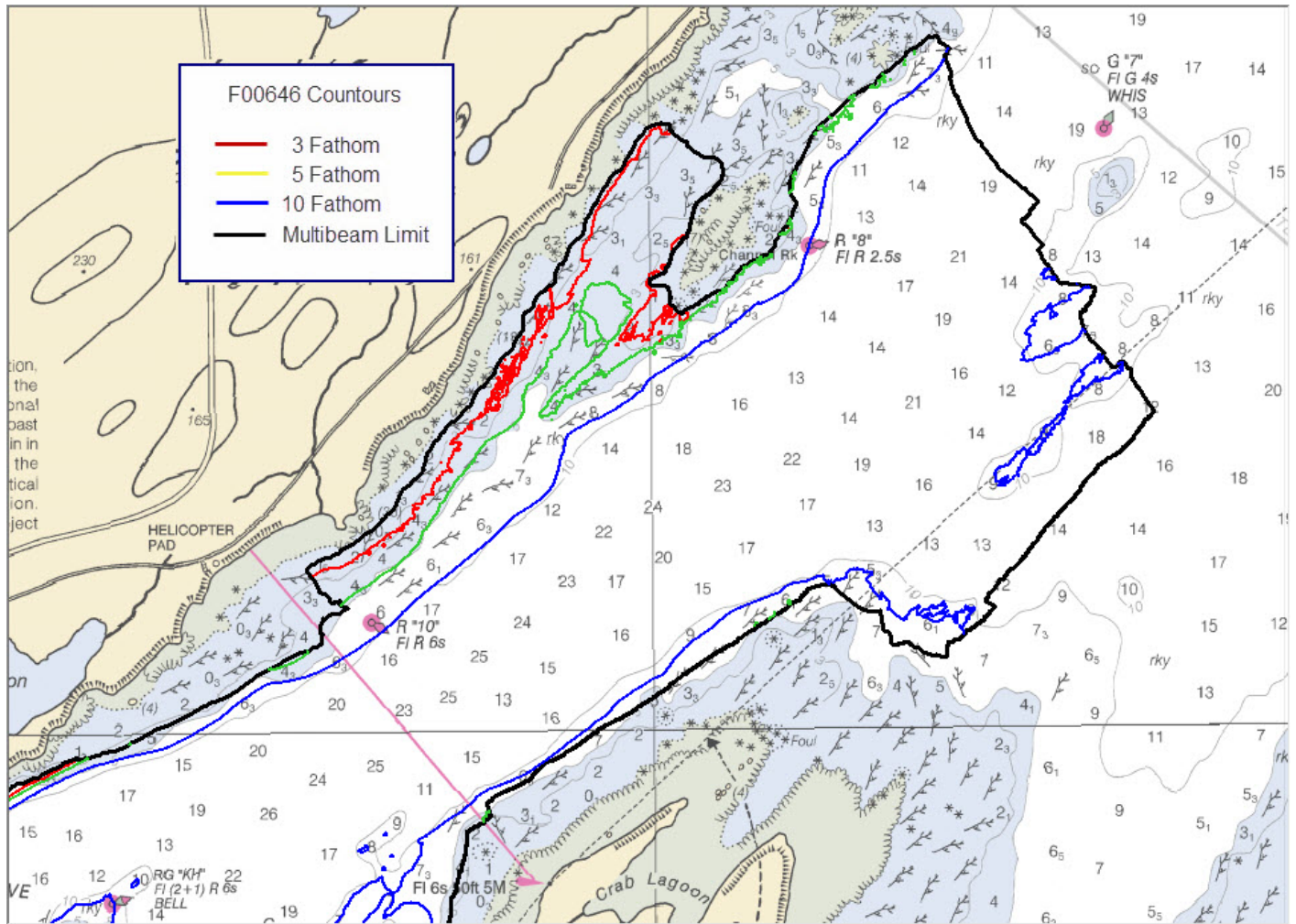


Figure 17: Chart 16595 overlaid with F00646 contours, Northeast section.



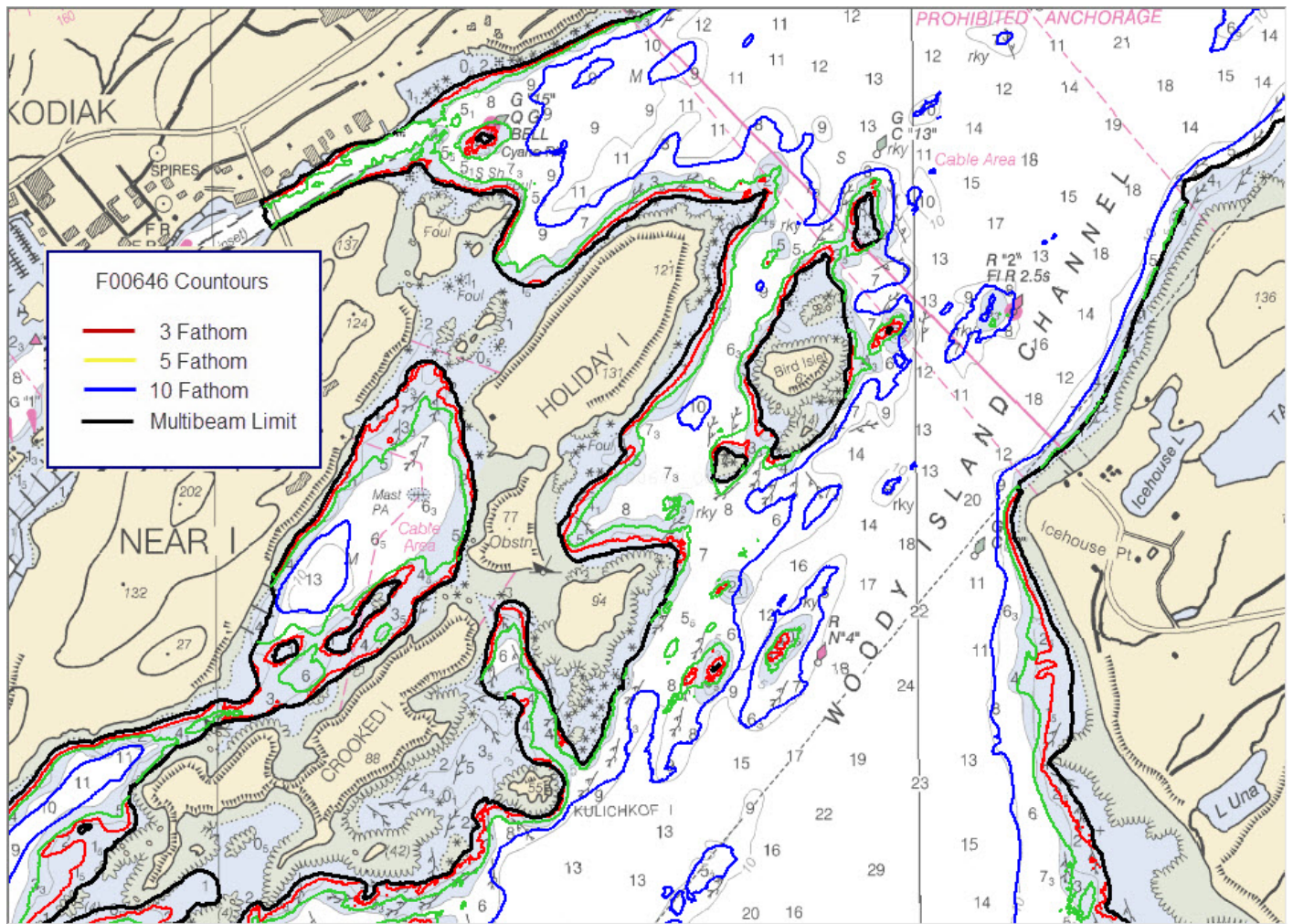


Figure 18: Chart 16595 overlaid with F00646 contours, mid section.

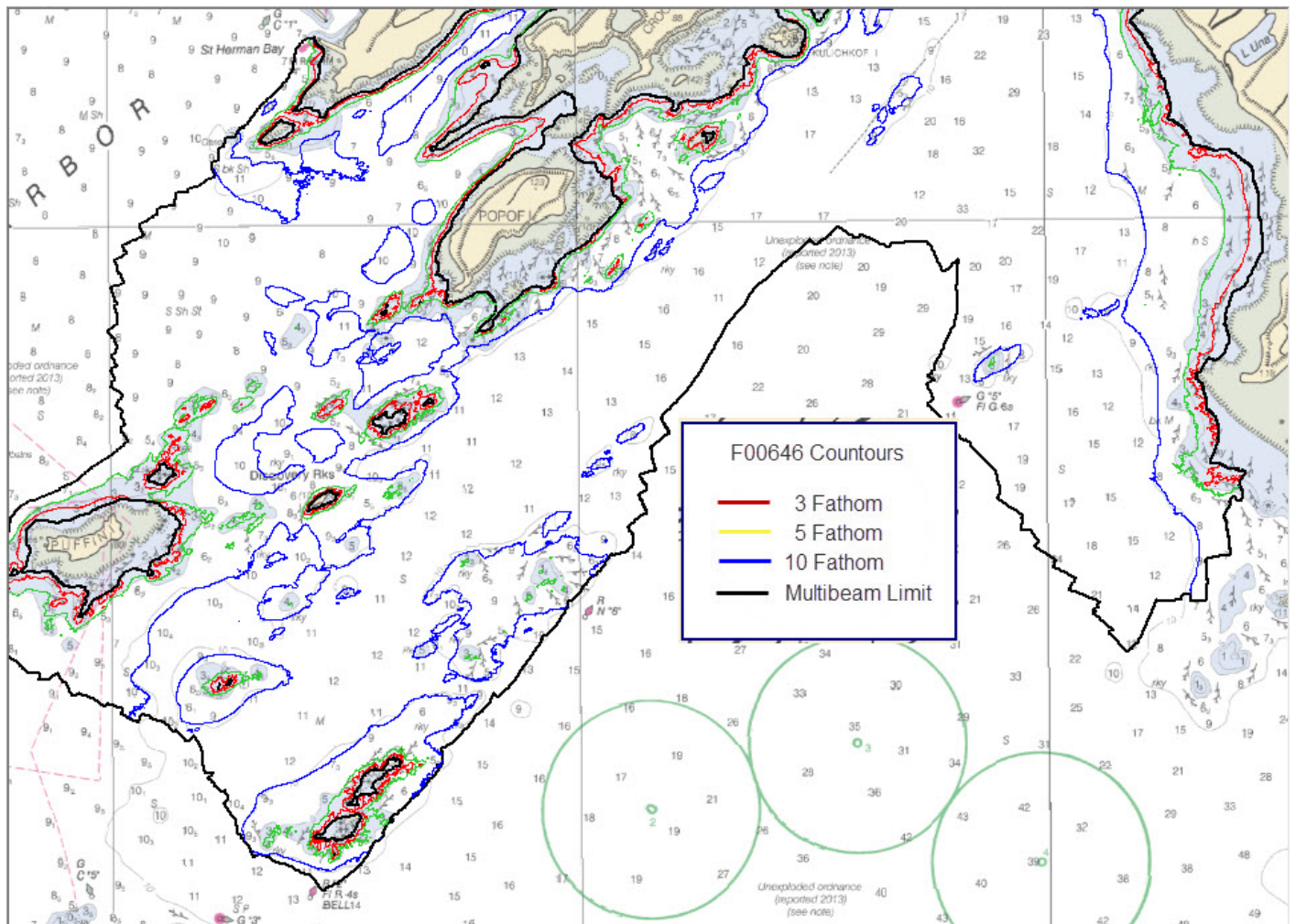


Figure 19: Chart 16595 overlaid with F00646 contours, South section.

### D.1.2 Electronic Navigational Charts

The following are the largest scale ENC's, which cover the survey area:

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5AK5EM	1:20000	8	02/05/2013	10/08/2014	NO

Table 17: Largest Scale ENC's

US5AK5EM

US4AK5EM



Electronic Navigation Chart (ENC) US4AK5EM coincides with raster Chart 16595. Navigation information contained on the ENC matches the raster, therefore a comparison between F00646 and the ENC is equivalent to the preceding comparison with Chart 16549.

*Chart 16596 and ENC US5AK5DM, both 1:10,000 scale were not included in the chart comparison. The chart and ENC were evaluated against the survey data at the branch; no significant discrepancies were found between them.*

### **D.1.3 Maritime Boundary Points**

No Maritime Boundary Points were assigned for this survey.

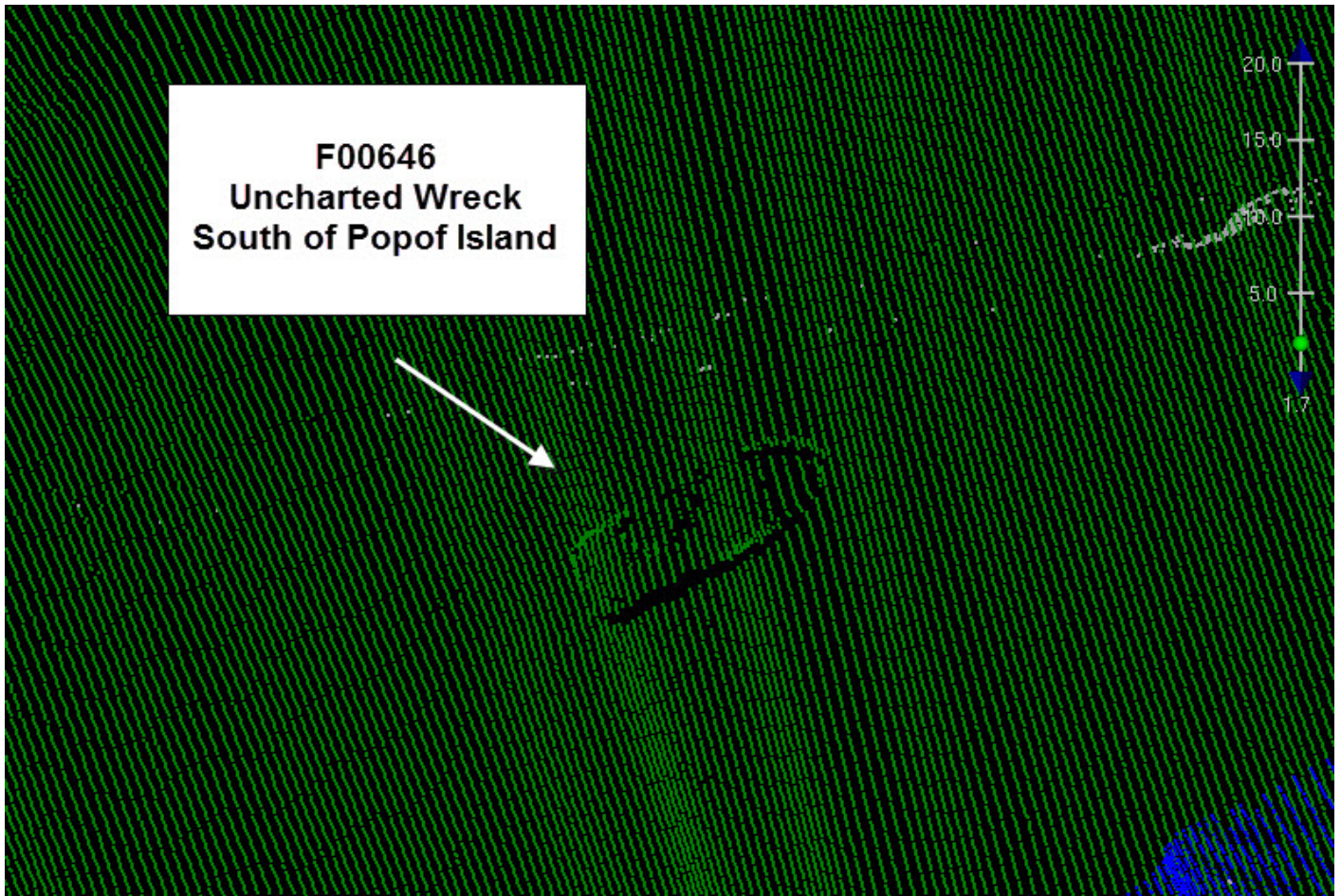
### **D.1.4 Charted Features**

F00646 contained one feature charted as PA from Chart 16595. This feature was investigated and identified in the MBES coverage. The feature was updated in the Final Feature File to reflect the proper position and least depth, and the least depth is reflected in the submitted surfaces.

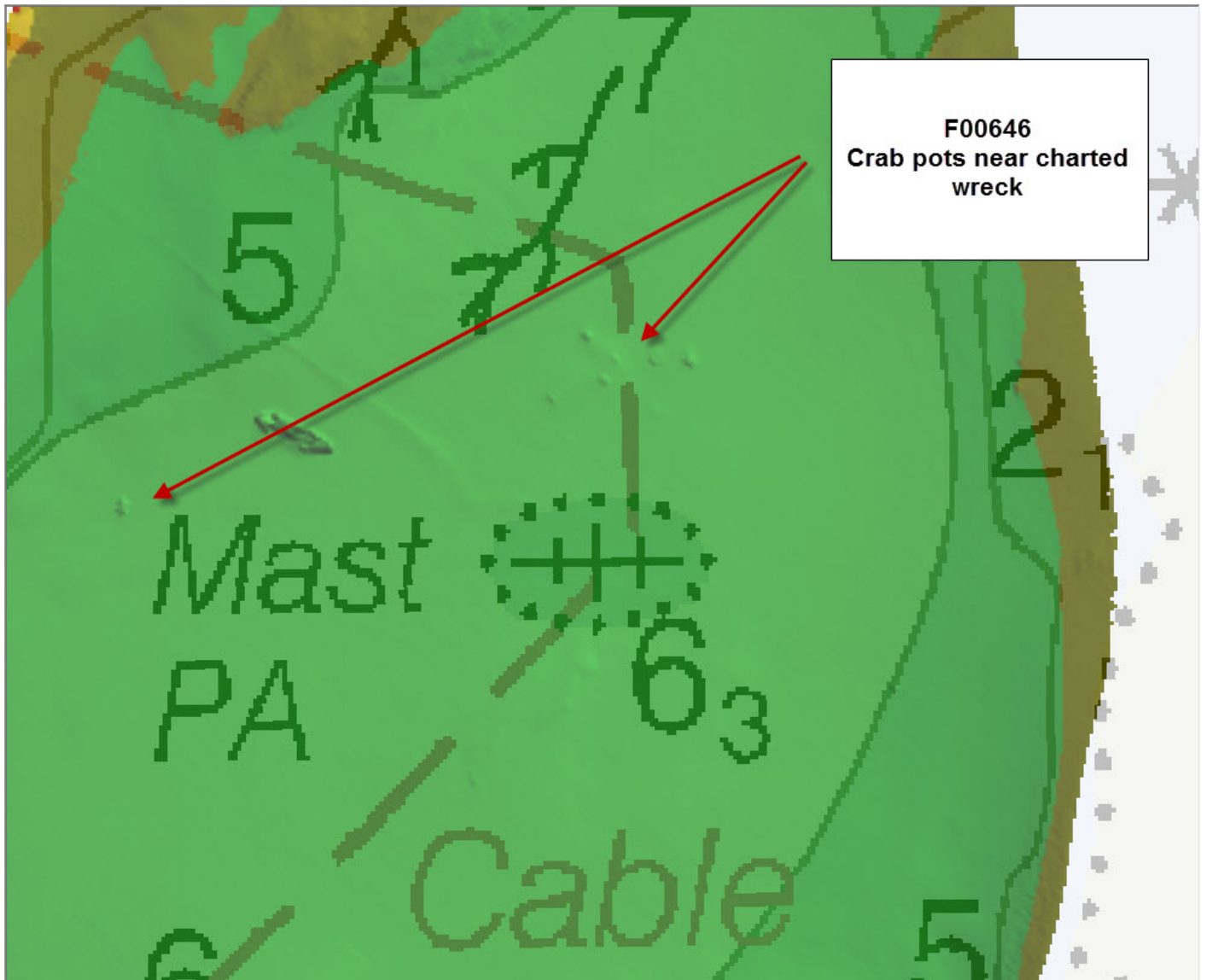
*The PA feature is the charted Wreck PA shown in figure 21 below. The wreck was repositioned to the northwest.*

### **D.1.5 Uncharted Features**

One uncharted, non-dangerous wreck and several crab pots was found within survey area. The position and other information for the uncharted wreck is attributed in the F00646 Final Feature File submitted with this report (Figure 20-21). Channel between Near Island and Crooked Island is heavily used for seaplane landings and take off (Figure 22).



*Figure 20: F00646 uncharted wreck south of Popof Island.*



*Figure 21: F00646 crab pots near charted wreck south of Holiday Island.*



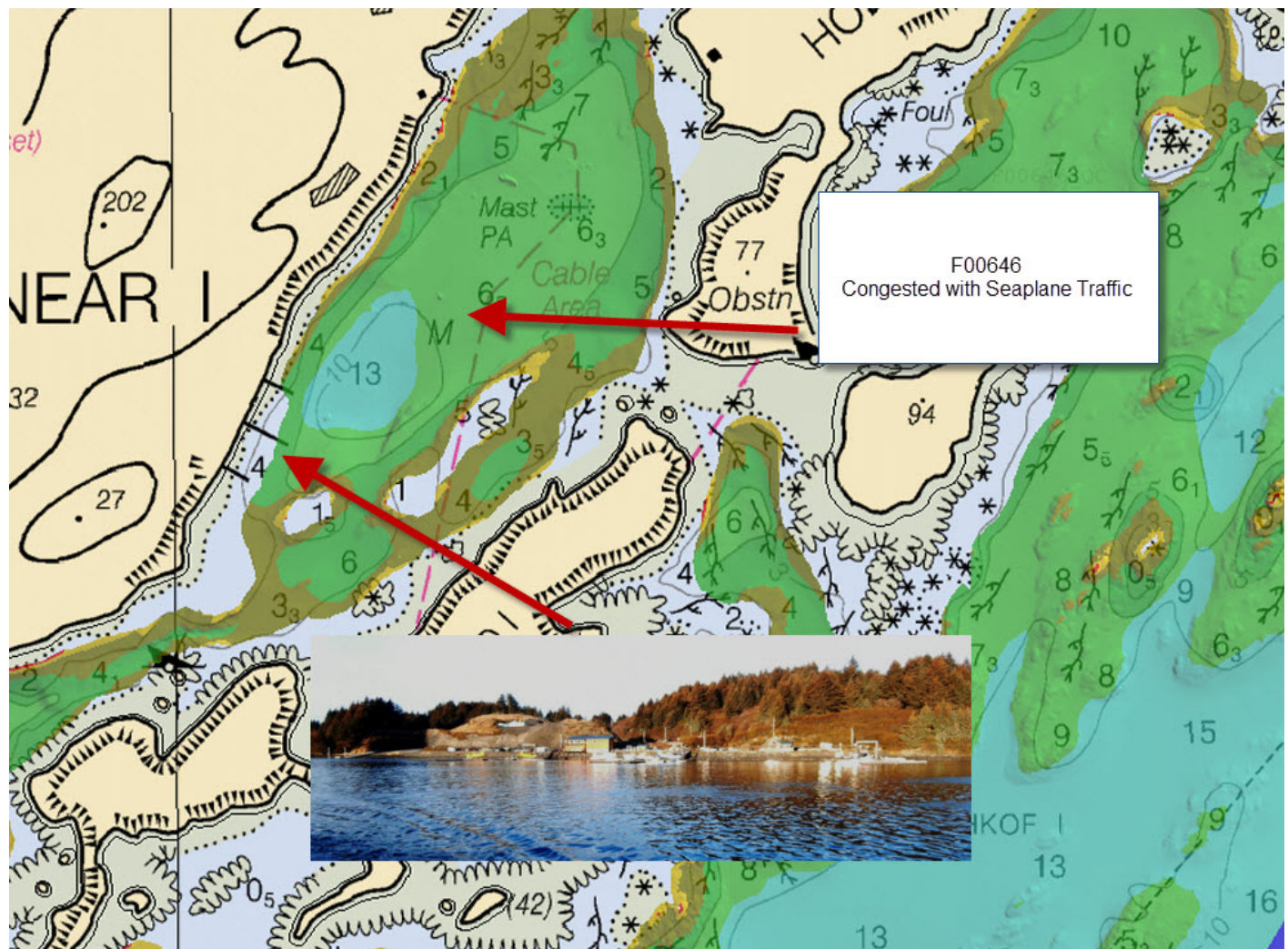


Figure 22: F00646 area east of Near Island is active seaplane runway.

### D.1.6 Dangers to Navigation

A total of seven DTONS were submitted for F00646. Two DTONS were submitted on 9/1/2014 and five DTONS were submitted on 3/10/2015.

*All DTONS have been charted and were included in the chart update product. The DTON report is attached.*

### D.1.7 Shoal and Hazardous Features

All shoal and hazardous features were investigated in accordance with the Project Instruction and the HSSD, and are addressed in the Final Feature File submitted with this report.

### **D.1.8 Channels**

No channels exist for this survey. There are no designated anchorages, precautionary areas, safety fairways, traffic separation schemes, pilot boarding areas, or channel and range lines within the survey limits.

### **D.1.9 Bottom Samples**

Fourteen proposed bottom sample locations were identified in the Project Reference File. All samples were collected at the proposed sites. Three of the samples were not collected after three failed attempts. Acquired bottom samples are addressed with S-57 attribution and recorded in the Final Feature File submitted with this report.

*The Final Feature File states that two bottom sample locations were not collected after three failed attempts and one bottom sample was "not addressed." Eleven new bottom types were included in the chart update product.*

## **D.2 Additional Results**

### **D.2.1 Shoreline**

Shoreline investigation results are contained within the F00646. Final Feature File submitted with this report.

F00646 Final Feature File contains 92 features that were not addressed due to time constraints. Survey operations were suspended on 10/22/2014 to facilitate transit across the Gulf of Alaska. The majority of the non addressed features were along the western edge of the project area (Figure 23-24).



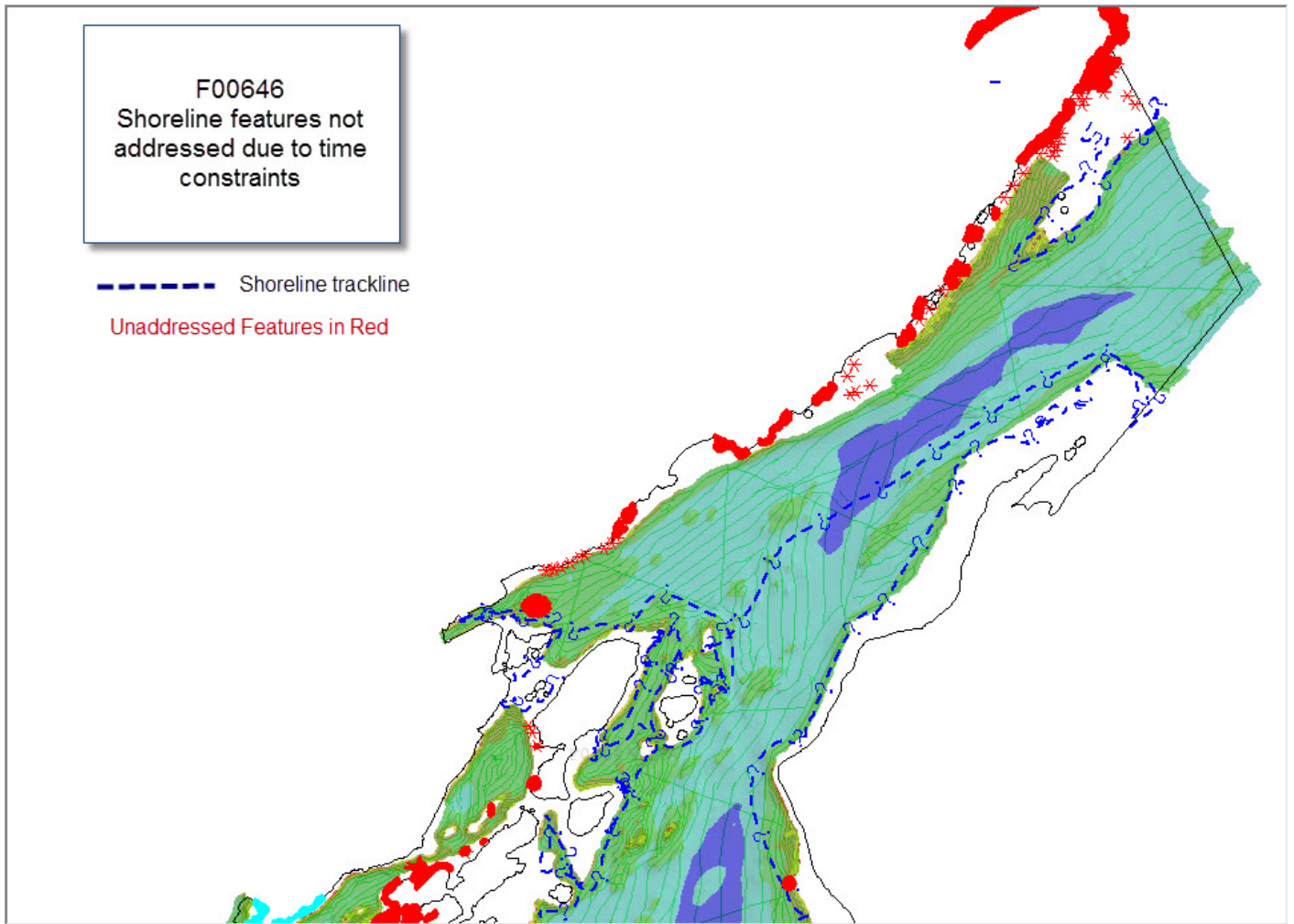


Figure 23: F00646 with non addressed features along northern section of project area.

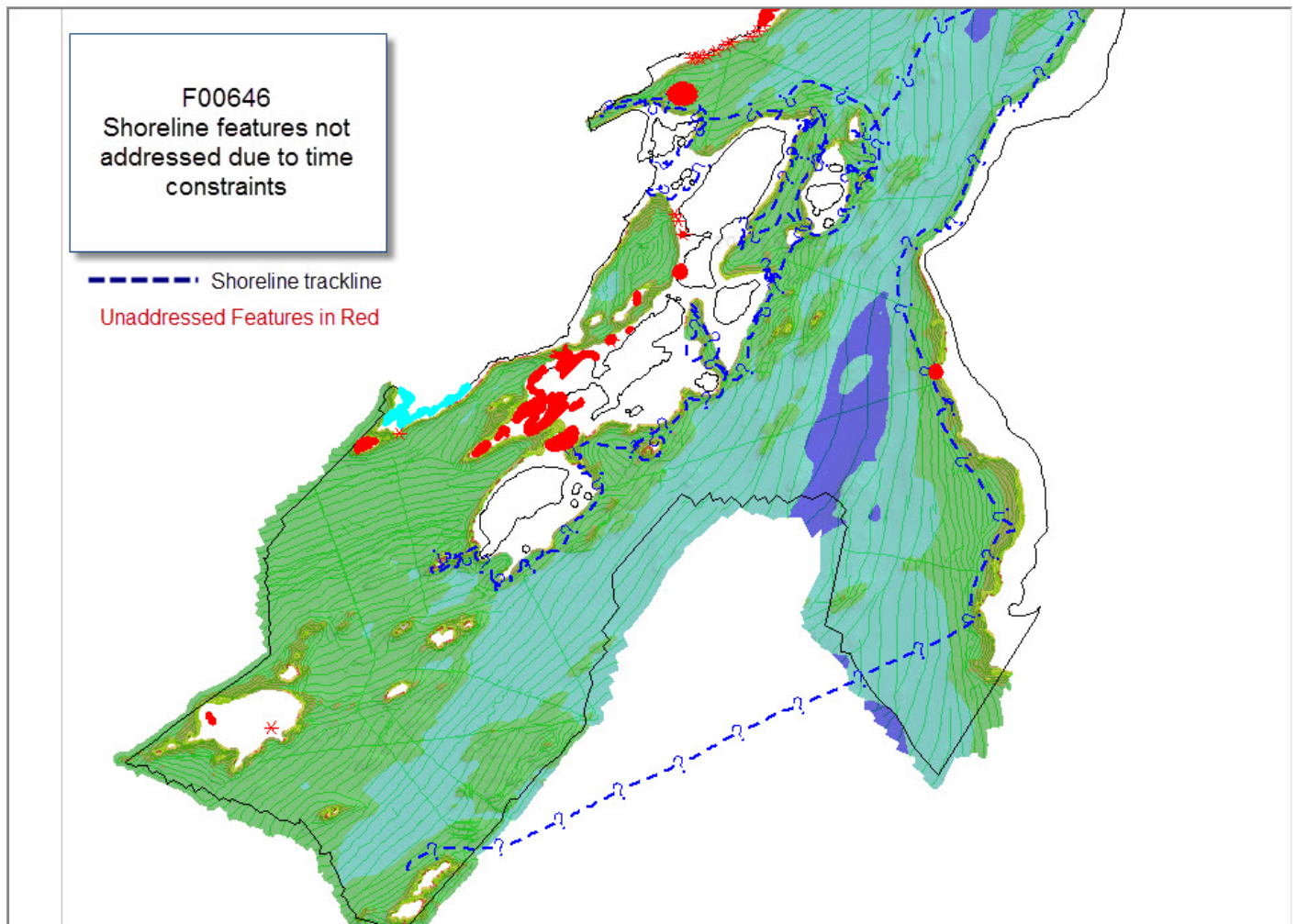


Figure 24: F00646 with non addressed features along southern section of project area. *The Final Feature File contains 86 features that were not addressed.*

### D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

### D.2.3 Aids to Navigation

Aids to navigation (ATON) were not assigned to F00646.

### D.2.4 Overhead Features

F00646 survey limits extend under Fred Zharoff Memorial Bridge connecting Kodiak to Near Island. The bridge does not present a navigational hazard (Figure 25).

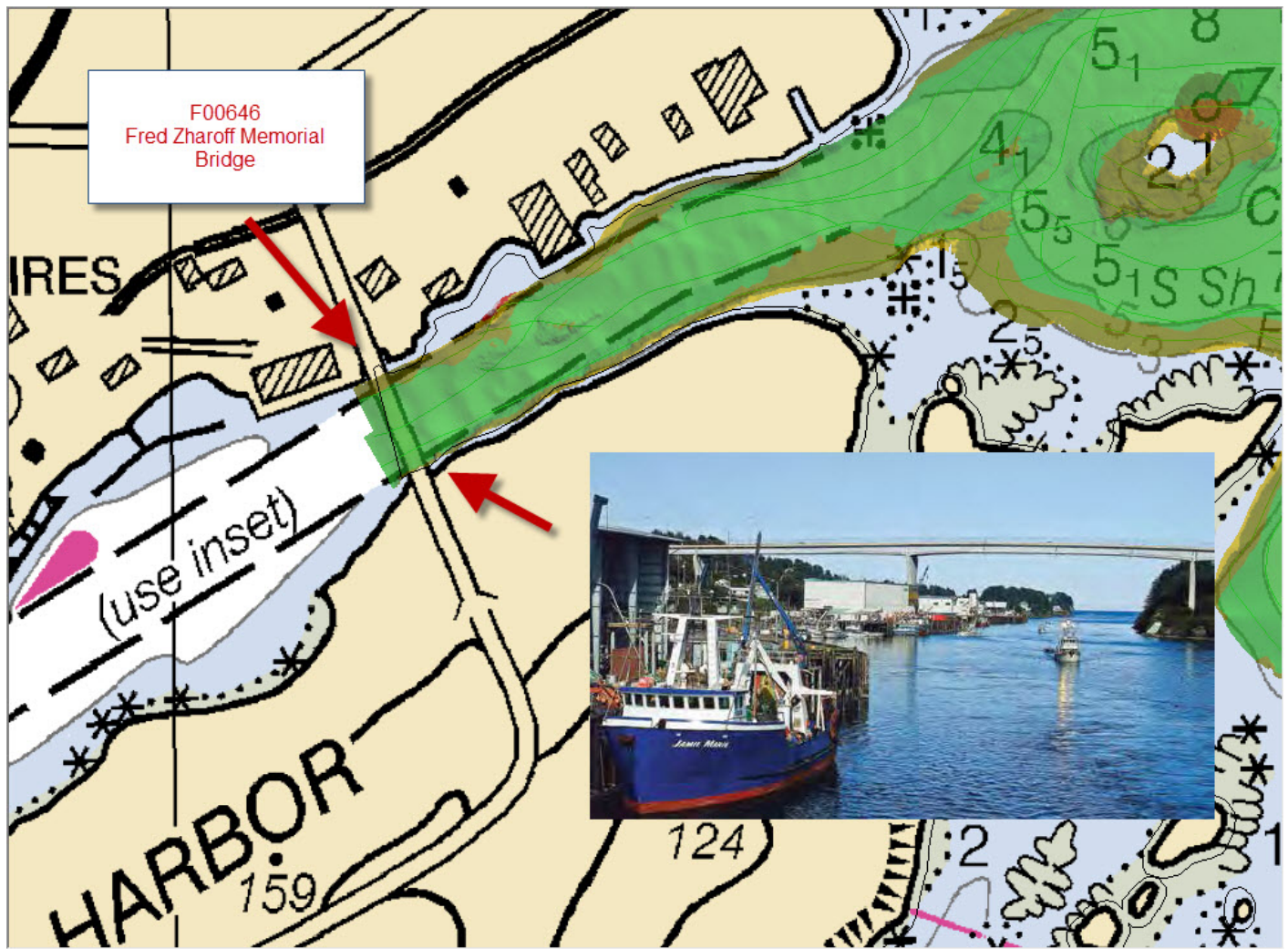


Figure 25: F00646 overhead bridge.

*The survey limits were clipped at the east side of the bridge during office processing.*

#### D.2.5 Submarine Features

F00646 submarine cable south of Holiday Island attributed in F00646 Final Feature File submitted with this report (Figure 26).



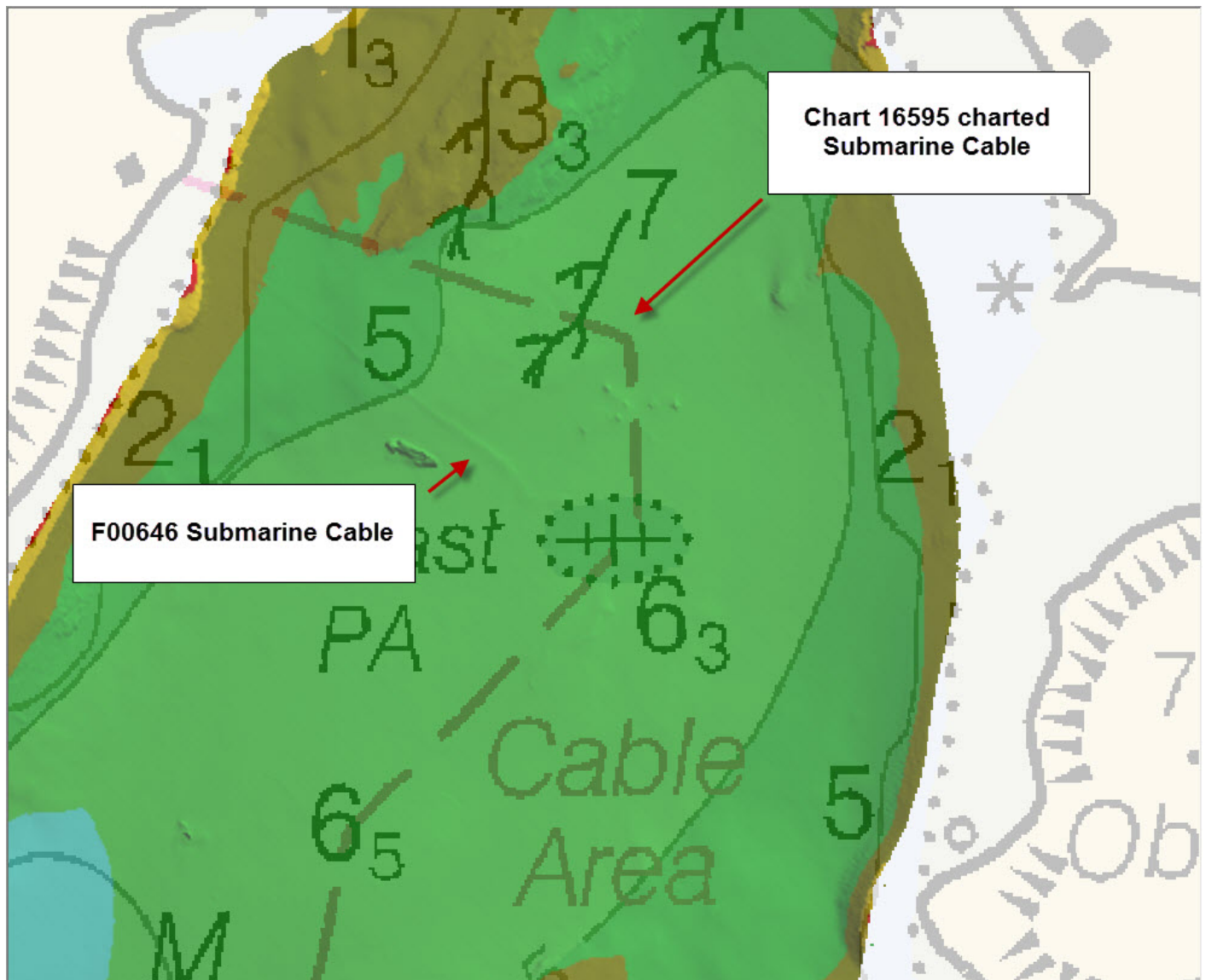


Figure 26: F00646 submarine cable south of Holiday Island.

*Two newly surveyed cables (one shown in Figure 26) lie outside the charted cable area.*

#### D.2.6 Ferry Routes and Terminals

Uncharted ferry routes Port Lions AK to Kodiak AK and Kodiak AK to Chenega AK transverse the northern area of the survey (Figure 27).

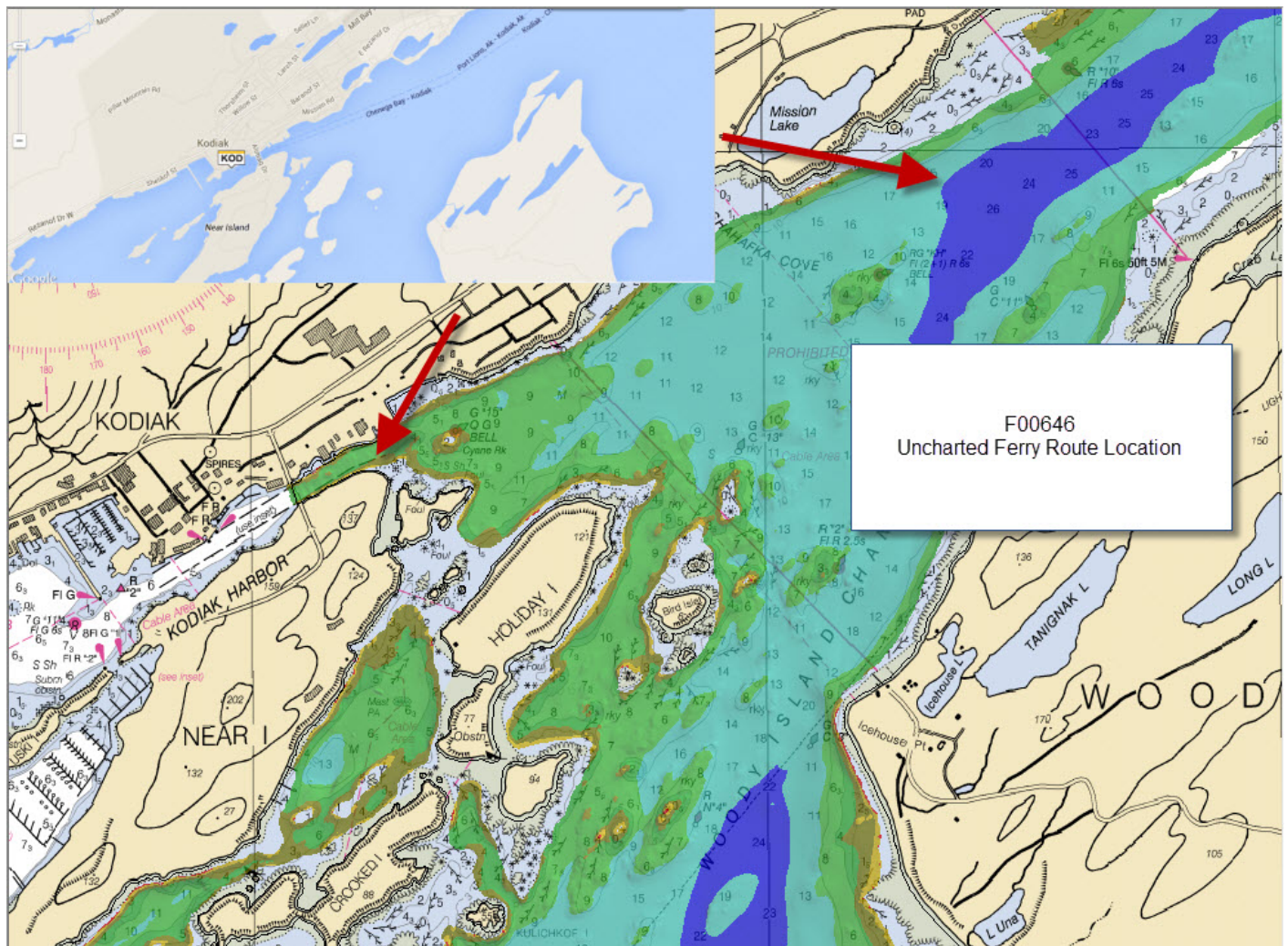


Figure 27: F00646 uncharted ferry routes entering Kodiak Harbor.

### D.2.7 Platforms

No platforms exist for this survey.

### D.2.8 Significant Features

A feature resembling large craters was located southwest of Near Island and south of St. Herman Bay and southeast of sheet limits (Figure 28-29).



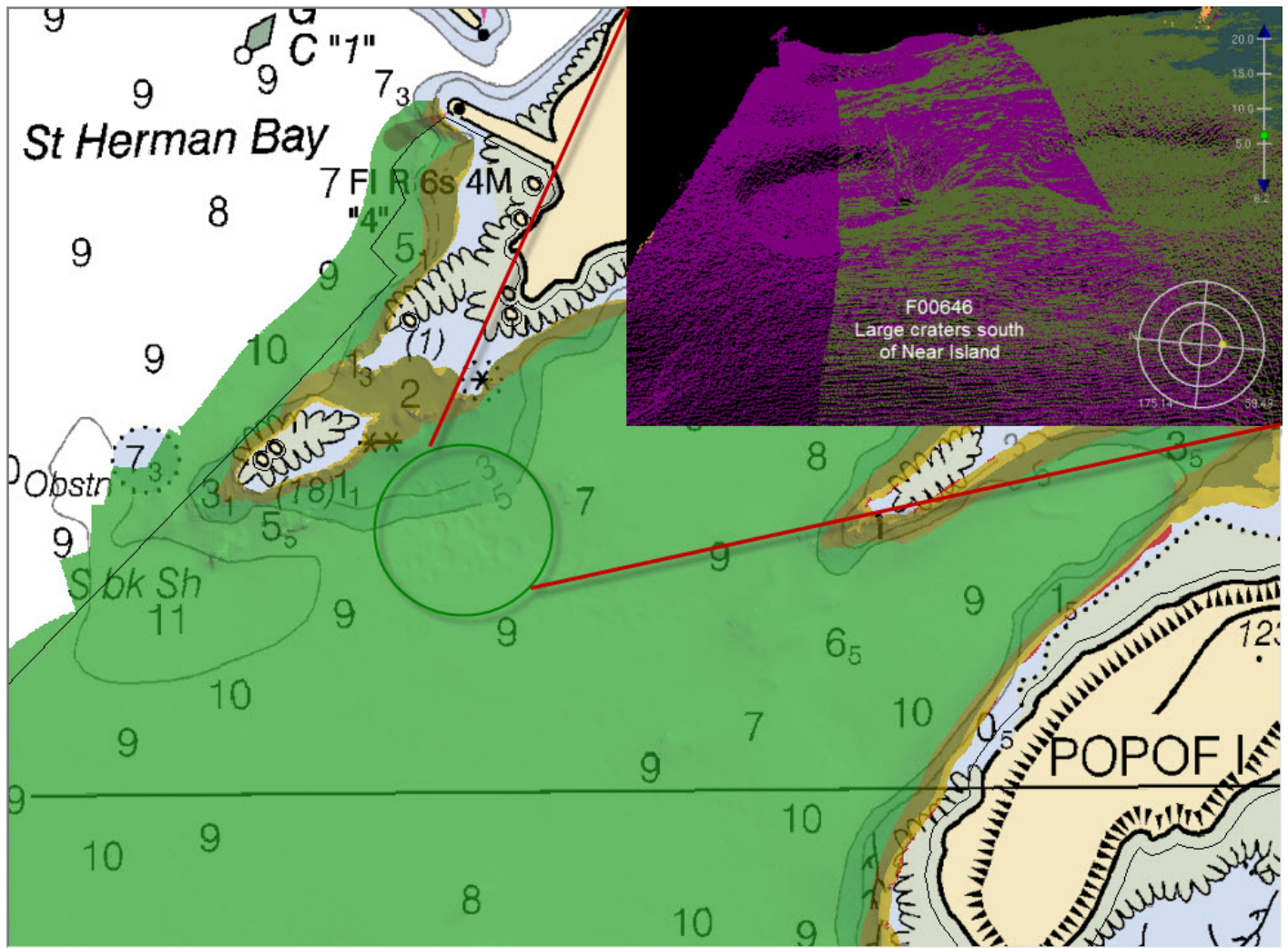


Figure 28: F00646 large craters near St. Herman Bay.

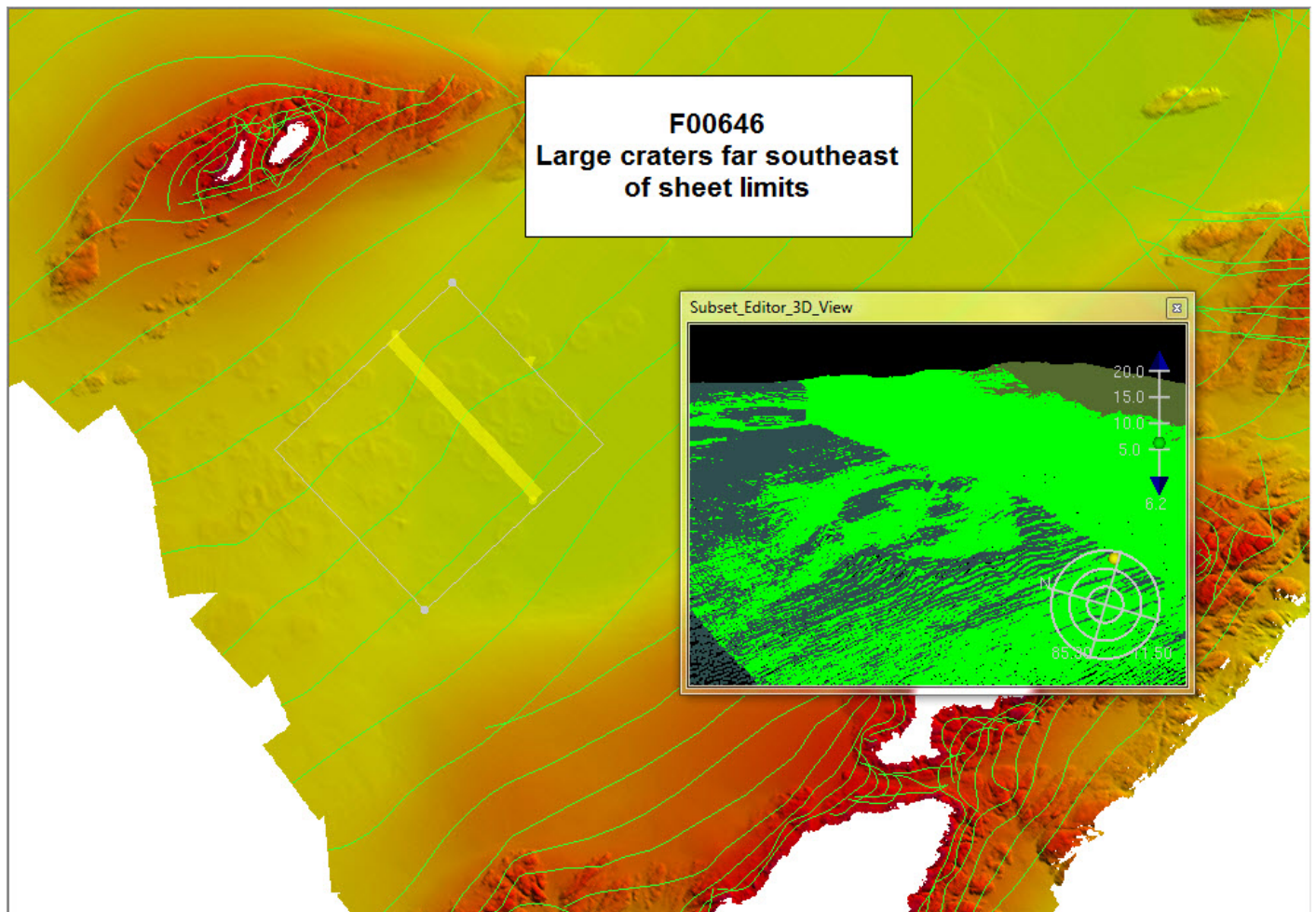


Figure 29: F00646 large craters southeast of sheet limits.

### D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

### D.2.10 New Survey Recommendation

No new surveys or further investigations are recommended for this area.

### D.2.11 Inset Recommendation

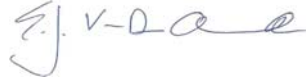

No new insets are recommended for this area.

## E. Approval Sheet

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

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

The survey data meets or exceeds requirements as set forth in the NOS Hydrographic Surveys and Specifications Deliverables Manual, Field Procedures Manual, 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.

Approver Name	Approver Title	Approval Date	Signature
Edward J. Van Den Ameele, CDR/NOAA	Commanding Officer, NOAA Ship RAINIER	04/09/2015	
Adam Pfundt, LTJG/NOAA	Field Operations Officer, NOAA Ship RAINIER	04/09/2015	 Adam Pfundt I have reviewed this document 2015.04.09 14:48:45 -07'00'
James B. Jacobson	Chief Survey Technician, NOAA Ship RAINIER	04/09/2015	 James Jacobson I have reviewed this document 2015.04.10 10:37:31 -07'00'
Thomas L. Burrow	Assistant Survey Technician, NOAA Ship RAINIER	04/09/2015	

## F. Table of Acronyms

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

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



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



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** November 19, 2014

**HYDROGRAPHIC BRANCH:** Pacific  
**HYDROGRAPHIC PROJECT:** OPR-P136-RA-2014  
**HYDROGRAPHIC SHEET:** F00646

**LOCALITY:** Vicinity of Woody Island Channel, Kodiak Island, AK  
**TIME PERIOD:** August 19 - October 22, 2014

**TIDE STATION USED:** 945-7292 Kodiak Island, AK  
Lat. 57° 43.8'N Long. 152° 30.8'W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 2.400 meters

**REMARKS: RECOMMENDED ZONING**

Preliminary zoning is accepted as the final zoning for project OPR-P136-RA-2014, F00646, during the time period between August 19 - October 22, 2014.

Please use the zoning file P136RA2014\_AddCORP submitted with the project instructions for OPR-P136-RA-2014. Zones SWA106, SWA110, SWA110A are the applicable zones for F00646.

**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).

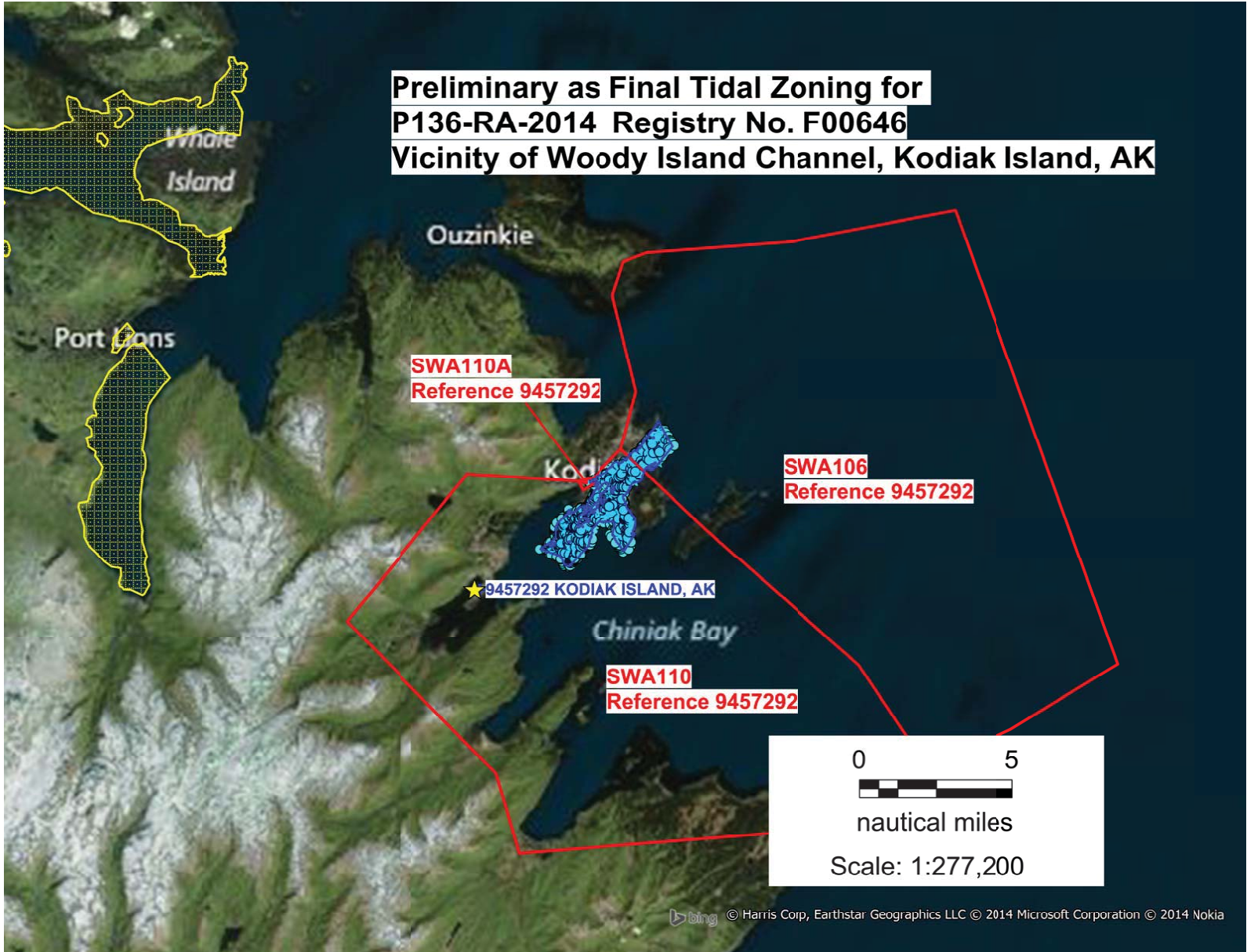
**BURKE.PATRICK**  
**K.B.1365830335**

Digitally signed by  
BURKE.PATRICK.B.1365830335  
DN: c=US, o=U.S. Government, ou=DoD,  
ou=PKI, ou=OTHER,  
cn=BURKE.PATRICK.B.1365830335  
Date: 2014.11.19 15:49:53 -05'00'

ACTING CHIEF, OCEANOGRAPHIC DIVISION



**Preliminary as Final Tidal Zoning for  
P136-RA-2014 Registry No. F00646  
Vicinity of Woody Island Channel, Kodiak Island, AK**



# F00646 Danger to Navigation Report

**Registry Number:** F00646  
**State:** Alaska  
**Locality:** Kodiak Island  
**Sub-locality:** Woody Island  
**Project Number:** OPR-P136-RA-14  
**Survey Dates:** 08/19/2014 - 10/22/2014

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16595	15th	11/01/2004	1:10,000 (16595_2)	[L]NTM: ?
16595	16th	10/01/2012	1:20,000 (16595_1)	USCG LNM: 9/2/2014 (12/2/2014) CHS NTM: None (9/26/2014) NGA NTM: 2/24/2007 (11/29/2014)
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	1.63 m	57° 48' 36.5" N	152° 20' 02.1" W	---
1.2	Rock	3.56 m	57° 47' 13.1" N	152° 22' 24.8" W	---
1.3	Rock	1.08 m	57° 46' 35.0" N	152° 22' 39.2" W	---
1.4	Rock	1.70 m	57° 46' 20.4" N	152° 24' 28.2" W	---
1.5	Rock	1.82 m	57° 46' 37.7" N	152° 23' 50.7" W	---

# **1 - Dangers To Navigation**



## 1.1) Profile/Beam 262/121 / 2804\_2014ra2942133

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 57° 48' 36.5" N, 152° 20' 02.1" W  
**Least Depth:** 1.63 m (= 5.35 ft = 0.891 fm = 0 fm 5.35 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.075$  m ; **TVU (TPEv)**  $\pm 0.132$  m  
**Timestamp:** 2014-294.21:34:21.357 (10/21/2014)  
**Survey Line:** f00646 / 2804\_reson7125\_hf\_512 / 2014-294 / 2804\_2014ra2942133  
**Profile/Beam:** 262/121  
**Charts Affected:** 16595\_1, 16594\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

0.891 fathom sounding acquired approximately 20 meters east of charted 2 fathom depth.

#### Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2014ra2942133	262/121	0.00	000.0	Primary

#### Hydrographer Recommendations

[None]

#### Cartographically-Rounded Depth (Affected Charts):

0  $\frac{3}{4}$ fm (16595\_1, 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  
 SORDAT - 20141022  
 SORIND - US,US,graph,F00646  
 TECSOU - 3:found by multi-beam

VALSOU - 1.630 m

WATLEV - 3:always under water/submerged

Office Notes: Concur

### Feature Images

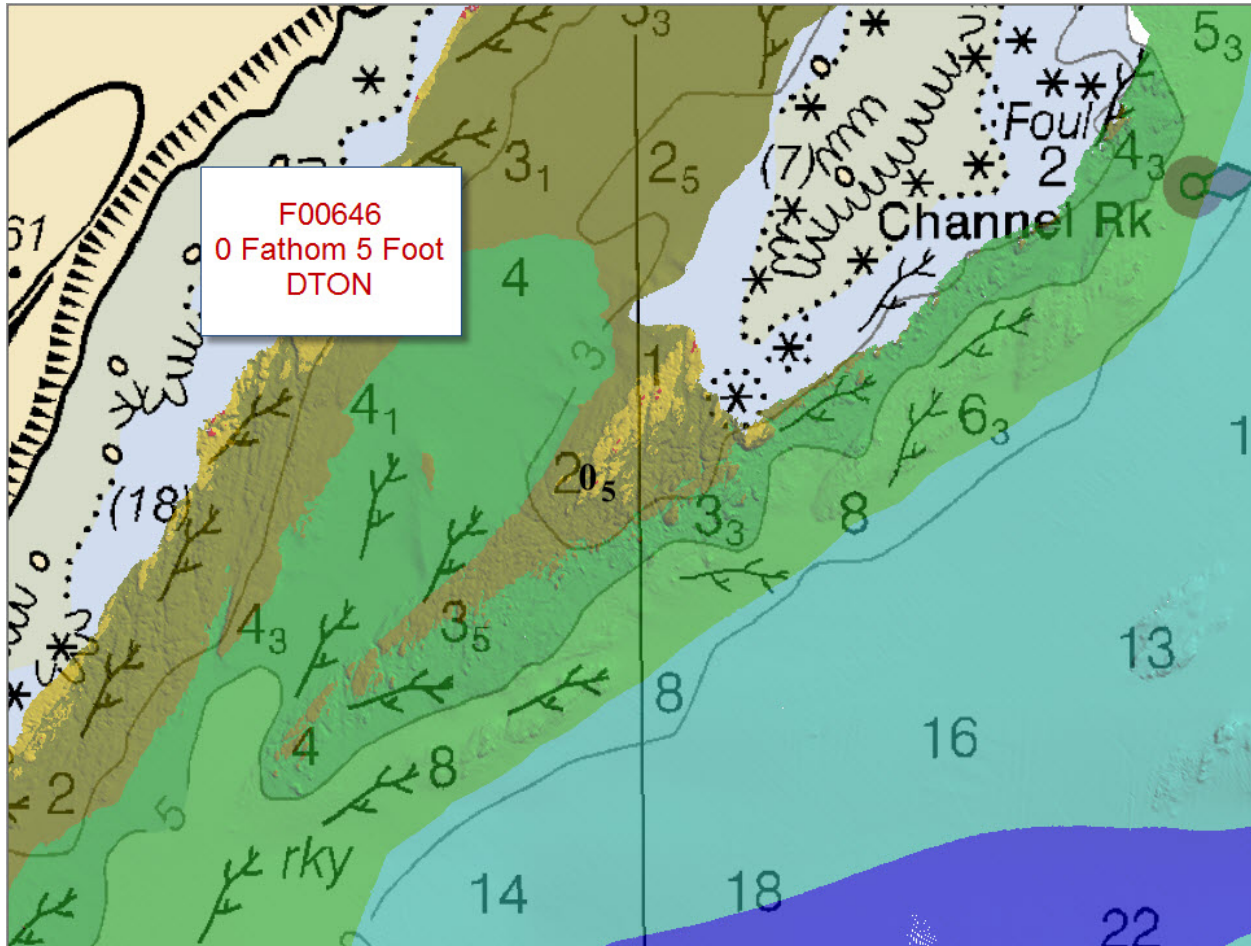


Figure 1.1.1





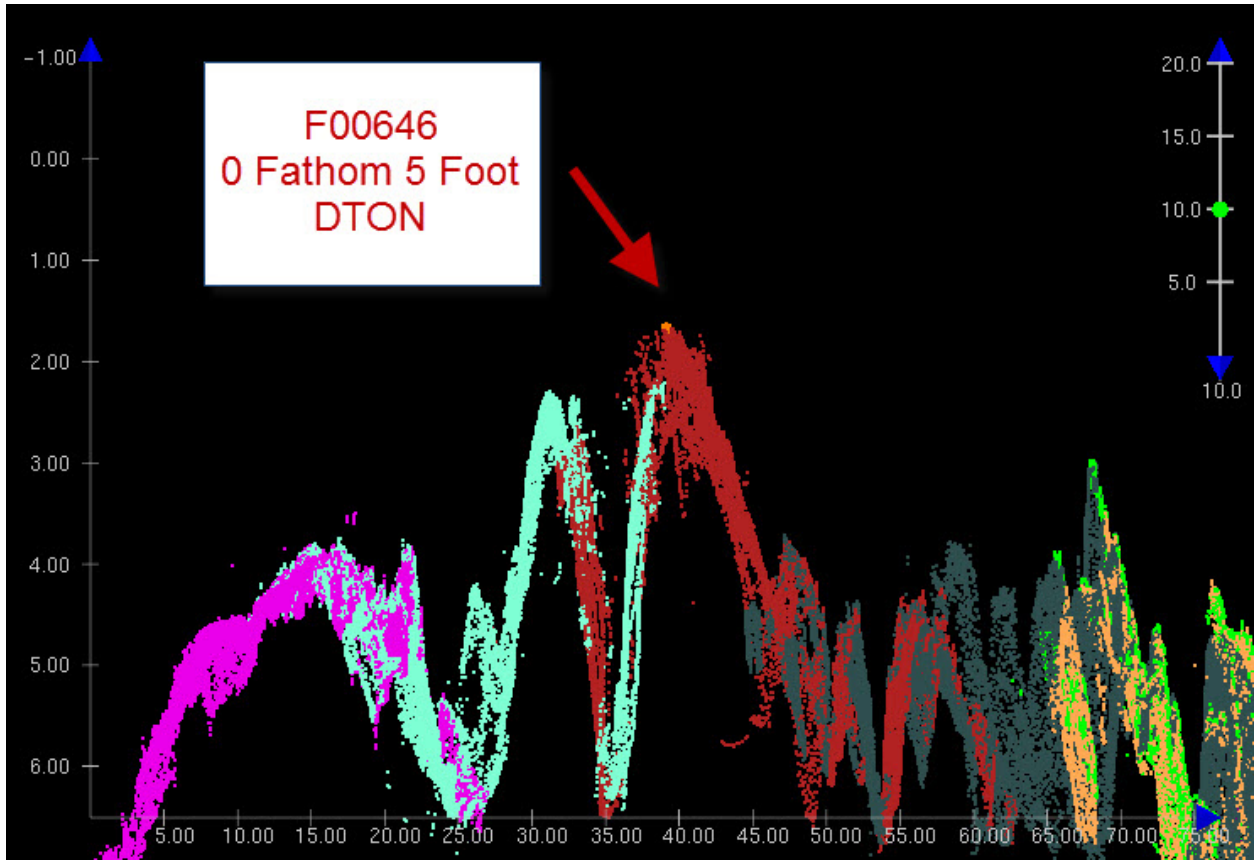


Figure 1.1.3

**1.2) Profile/Beam 1123/47 / 2804\_2014ra2951757****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 57° 47' 13.1" N, 152° 22' 24.8" W  
**Least Depth:** 3.56 m (= 11.70 ft = 1.949 fm = 1 fm 5.70 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.099$  m ; **TVU (TPEv)**  $\pm 0.136$  m  
**Timestamp:** 2014-295.17:59:09.571 (10/22/2014)  
**Survey Line:** f00646 / 2804\_reson7125\_hf\_512 / 2014-295 / 2804\_2014ra2951757  
**Profile/Beam:** 1123/47  
**Charts Affected:** 16595\_1, 16594\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

**Feature Correlation**

Source	Feature	Range	Azimuth	Status
2804_2014ra2951757	1123/47	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

**Cartographically-Rounded Depth (Affected Charts):**

2fm (16595\_1, 16594\_1, 16580\_1, 16013\_1, 530\_1)

1fm 5ft (531\_1)

3.5m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20141022  
 SORIND - US,US,graph,F00646  
 TECSOU - 1:found by echo-sounder  
 VALSOU - 3.565 m

WATLEV - 3:always under water/submerged

Office Notes: Concur

### Feature Images

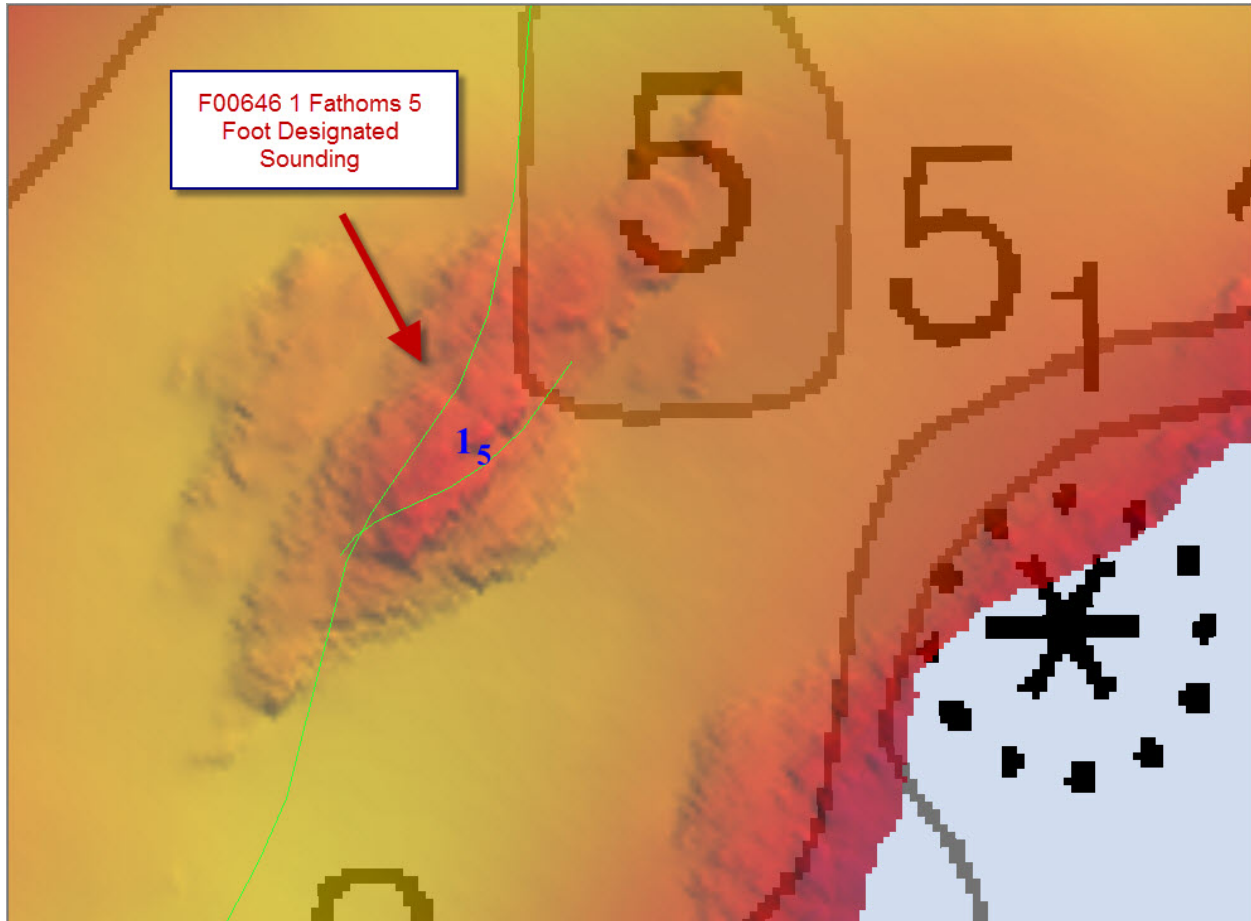


Figure 1.2.1



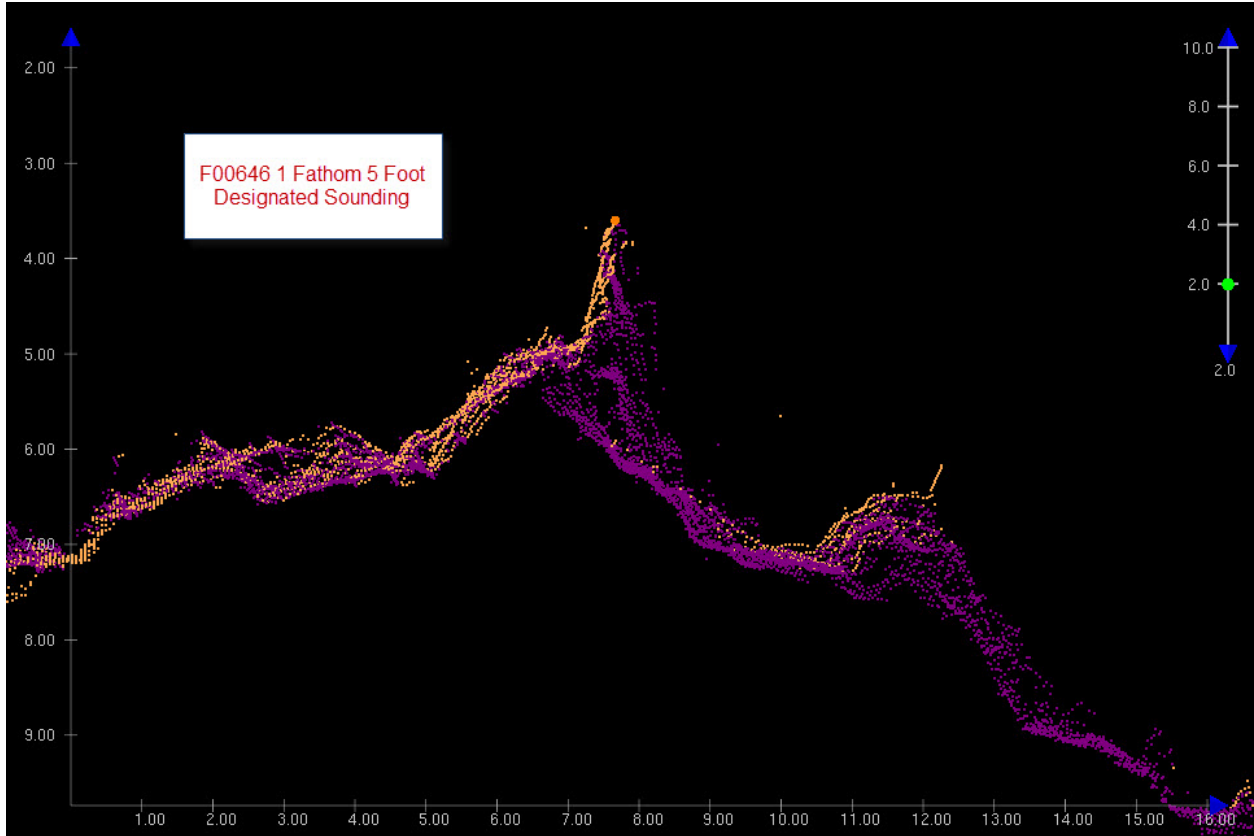


Figure 1.2.2

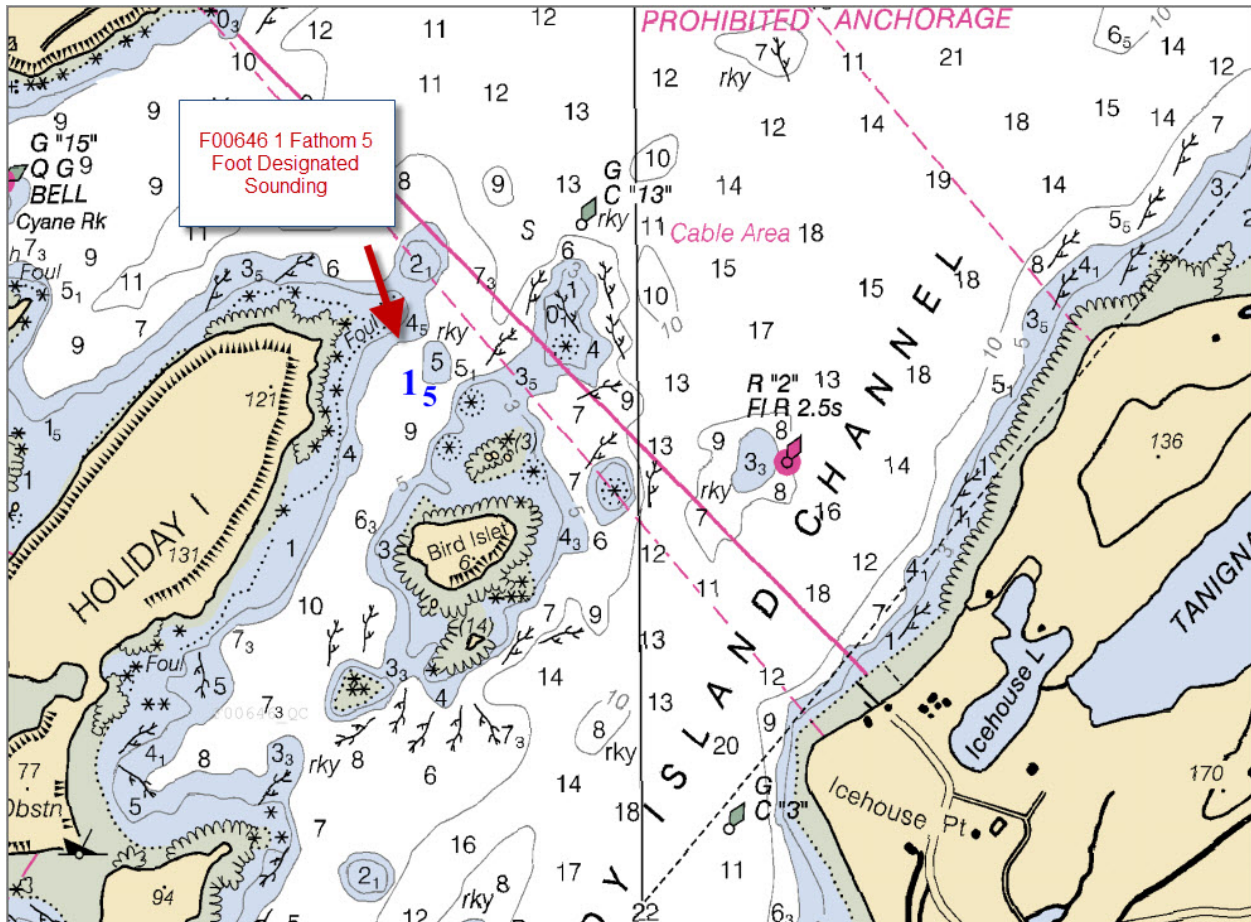


Figure 1.2.3

### 1.3) Profile/Beam 831/40 / 2804\_2014ra2312203

## DANGER TO NAVIGATION

### Survey Summary

**Survey Position:** 57° 46' 35.0" N, 152° 22' 39.2" W  
**Least Depth:** 1.08 m (= 3.55 ft = 0.591 fm = 0 fm 3.55 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.068$  m ; **TVU (TPEv)**  $\pm 0.130$  m  
**Timestamp:** 2014-231.22:04:00.000 (08/19/2014)  
**Survey Line:** f00646 / 2804\_reson7125\_hf\_512 / 2014-231 / 2804\_2014ra2312203  
**Profile/Beam:** 831/40  
**Charts Affected:** 16595\_1, 16594\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

[None]

### Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2014ra2312203	831/40	0.00	000.0	Primary

### Hydrographer Recommendations

[None]

#### Cartographically-Rounded Depth (Affected Charts):

0 ½fm (16595\_1, 16594\_1, 16580\_1, 16013\_1, 530\_1)

0fm 3ft (531\_1)

1.1m (500\_1, 50\_1)

### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 20141022  
 SORIND - US,US,graph,F00646  
 TECSOU - 1:found by echo-sounder

VALSOU - 1.081 m

WATLEV - 3:always under water/submerged

Office Notes: Concur

### Feature Images

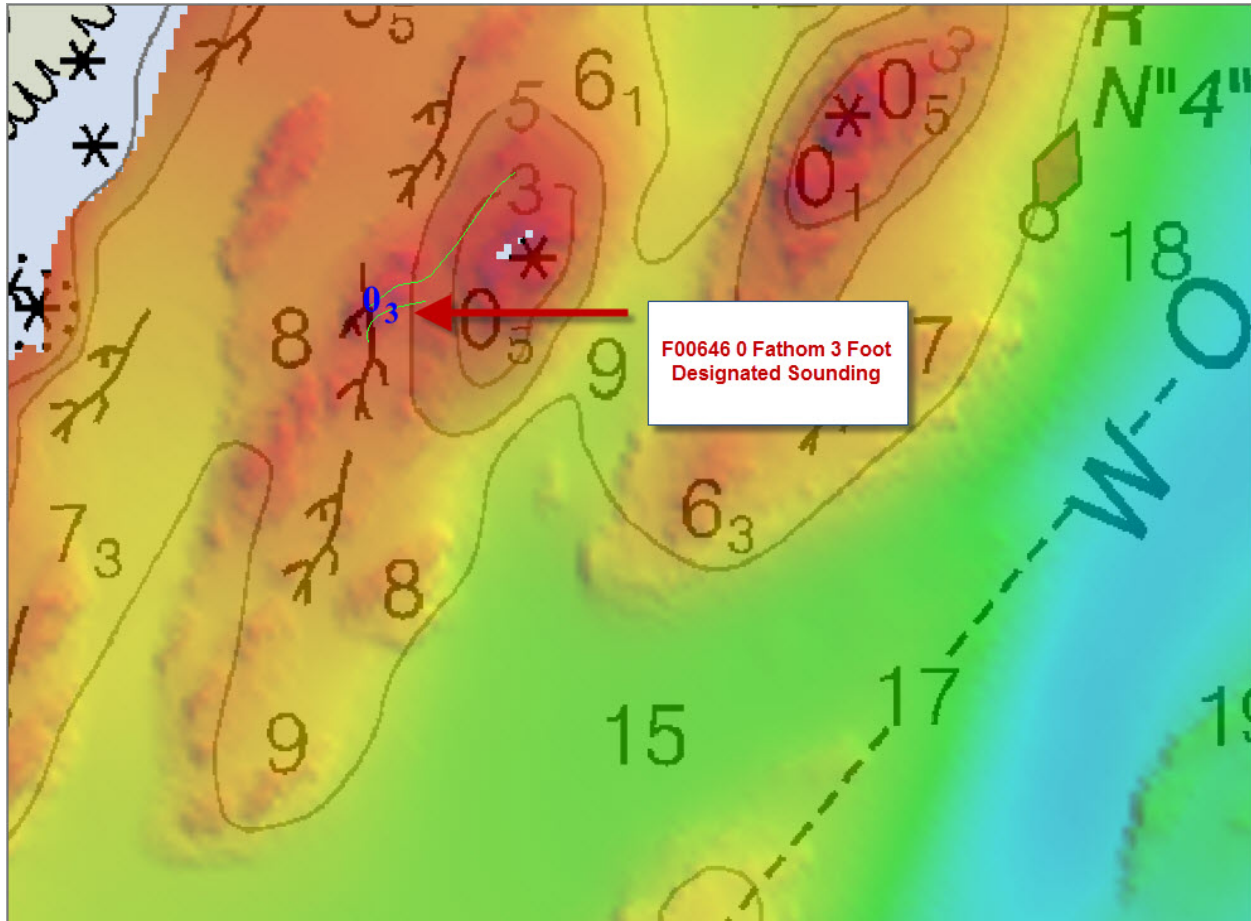


Figure 1.3.1



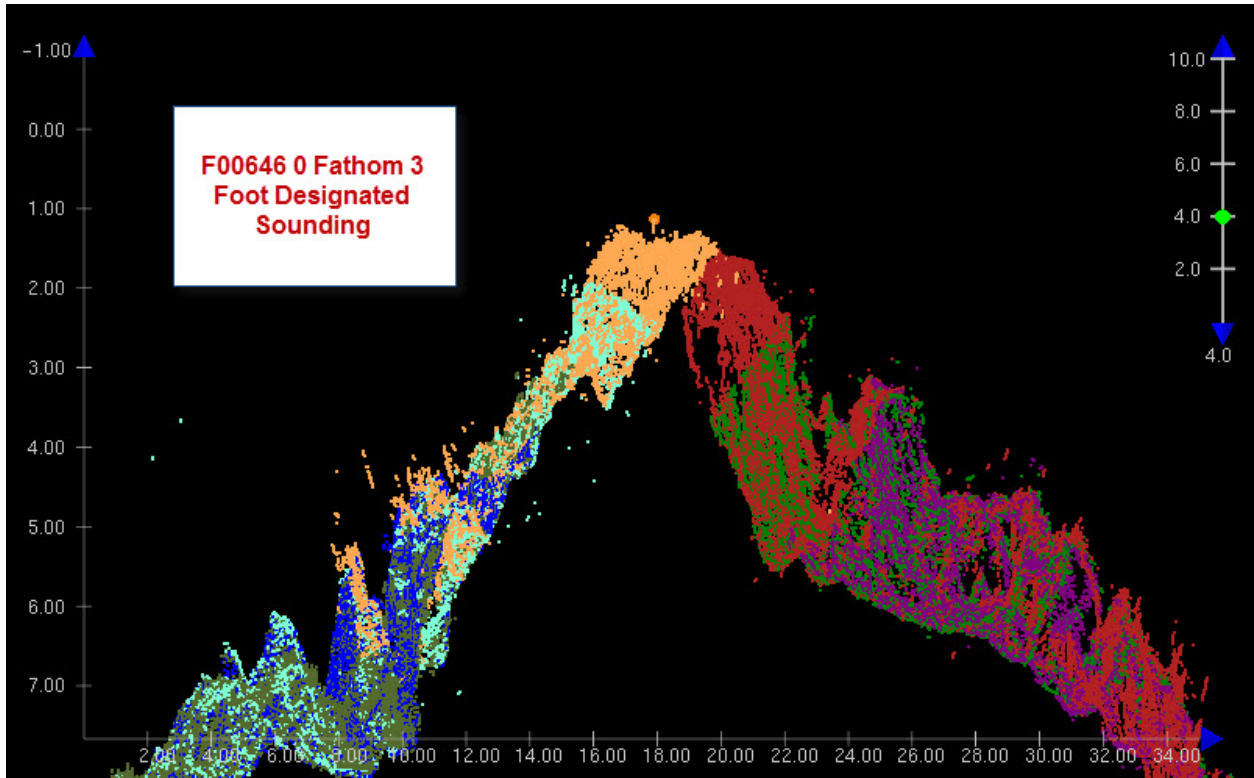


Figure 1.3.2

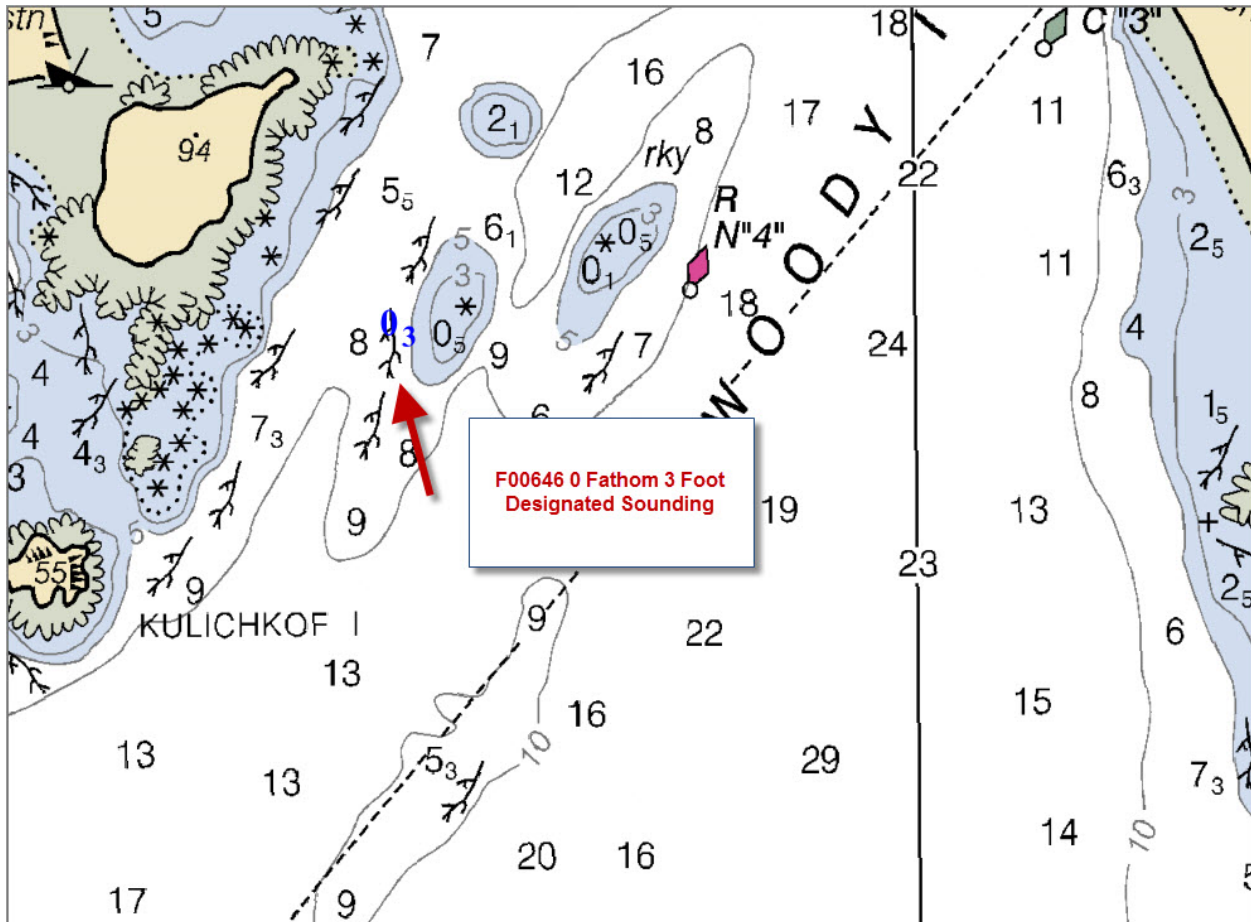


Figure 1.3.3

## 1.4) Profile/Beam 757/512 / 2802\_2014ra2341845

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 57° 46' 20.4" N, 152° 24' 28.2" W  
**Least Depth:** 1.70 m (= 5.58 ft = 0.930 fm = 0 fm 5.58 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.084$  m ; **TVU (TPEv)**  $\pm 0.132$  m  
**Timestamp:** 2014-234.18:46:05.291 (08/22/2014)  
**Survey Line:** f00646 / 2802\_reson7125\_hf\_512 / 2014-234 / 2802\_2014ra2341845  
**Profile/Beam:** 757/512  
**Charts Affected:** 16595\_2, 16595\_1, 16594\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

[None]

#### Feature Correlation

Source	Feature	Range	Azimuth	Status
2802_2014ra2341845	757/512	0.00	000.0	Primary

#### Hydrographer Recommendations

[None]

#### Cartographically-Rounded Depth (Affected Charts):

0  $\frac{3}{4}$ fm (16595\_2, 16595\_1, 16594\_1, 16580\_1, 16013\_1, 530\_1)

0fm 5ft (531\_1)

1.7m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20141022  
 SORIND - US,US,graph,F00646  
 TECSOU - 3:found by multi-beam

VALSOU - 1.700 m

WATLEV - 3:always under water/submerged

Office Notes: Concur.

### Feature Images

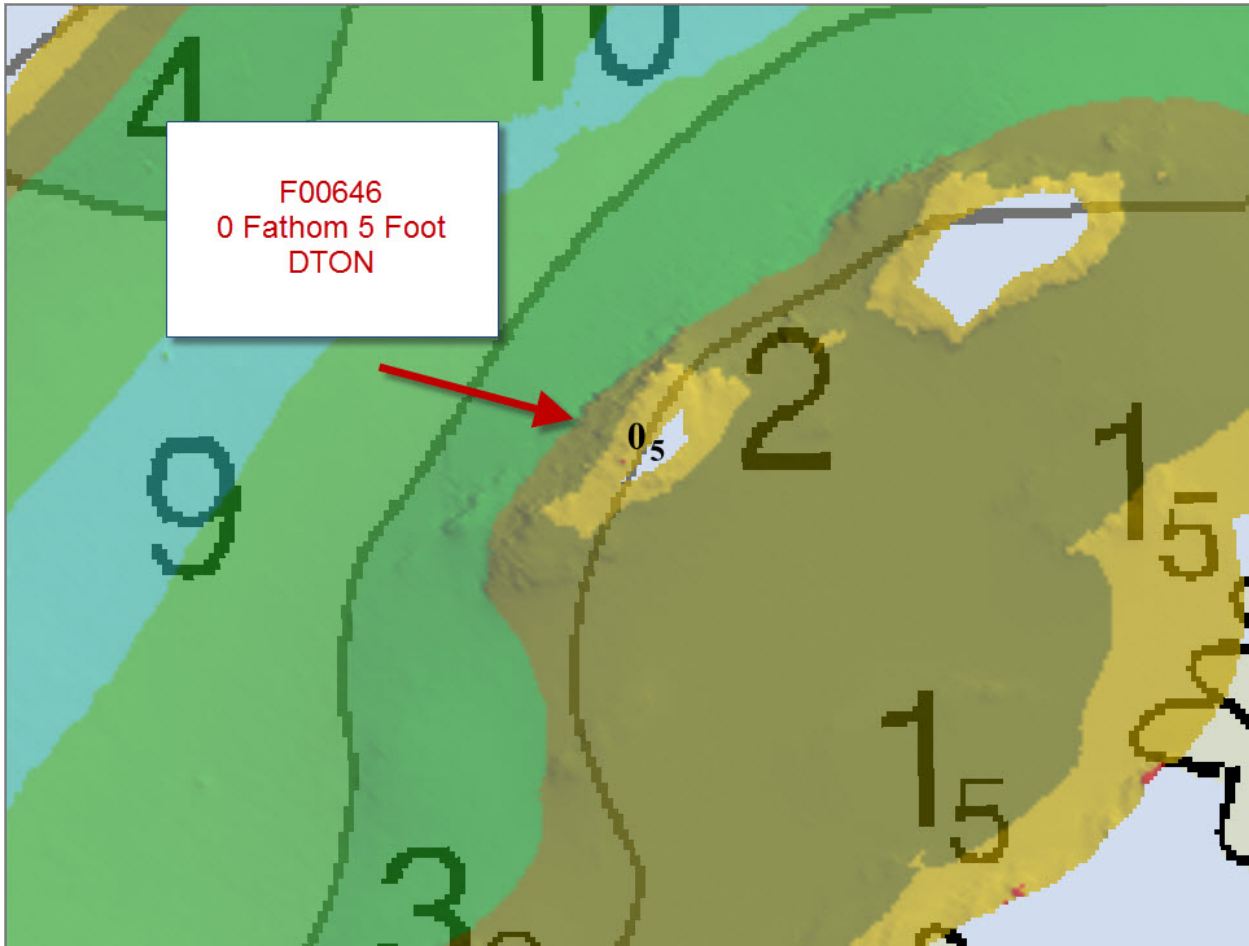


Figure 1.4.1



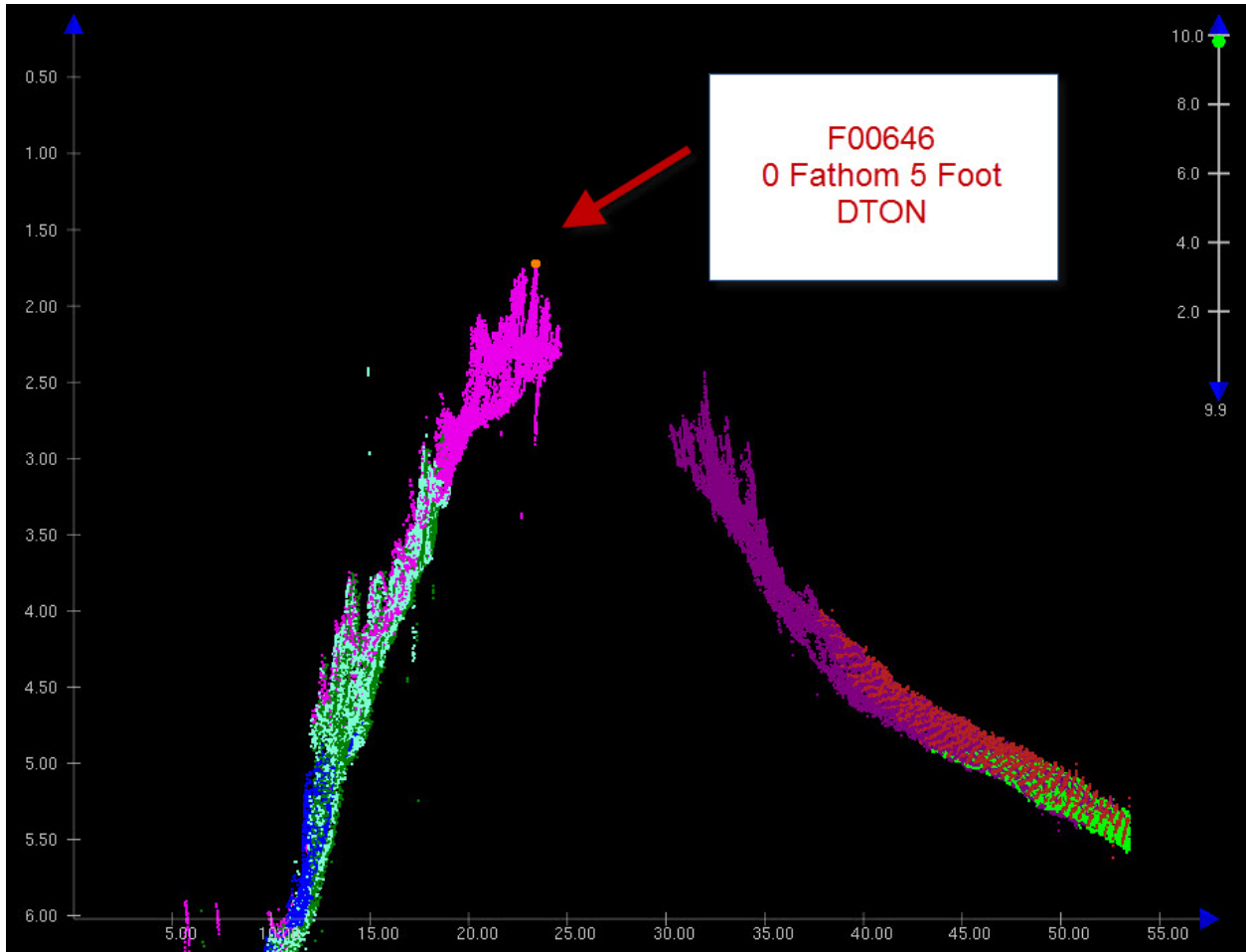


Figure 1.4.2

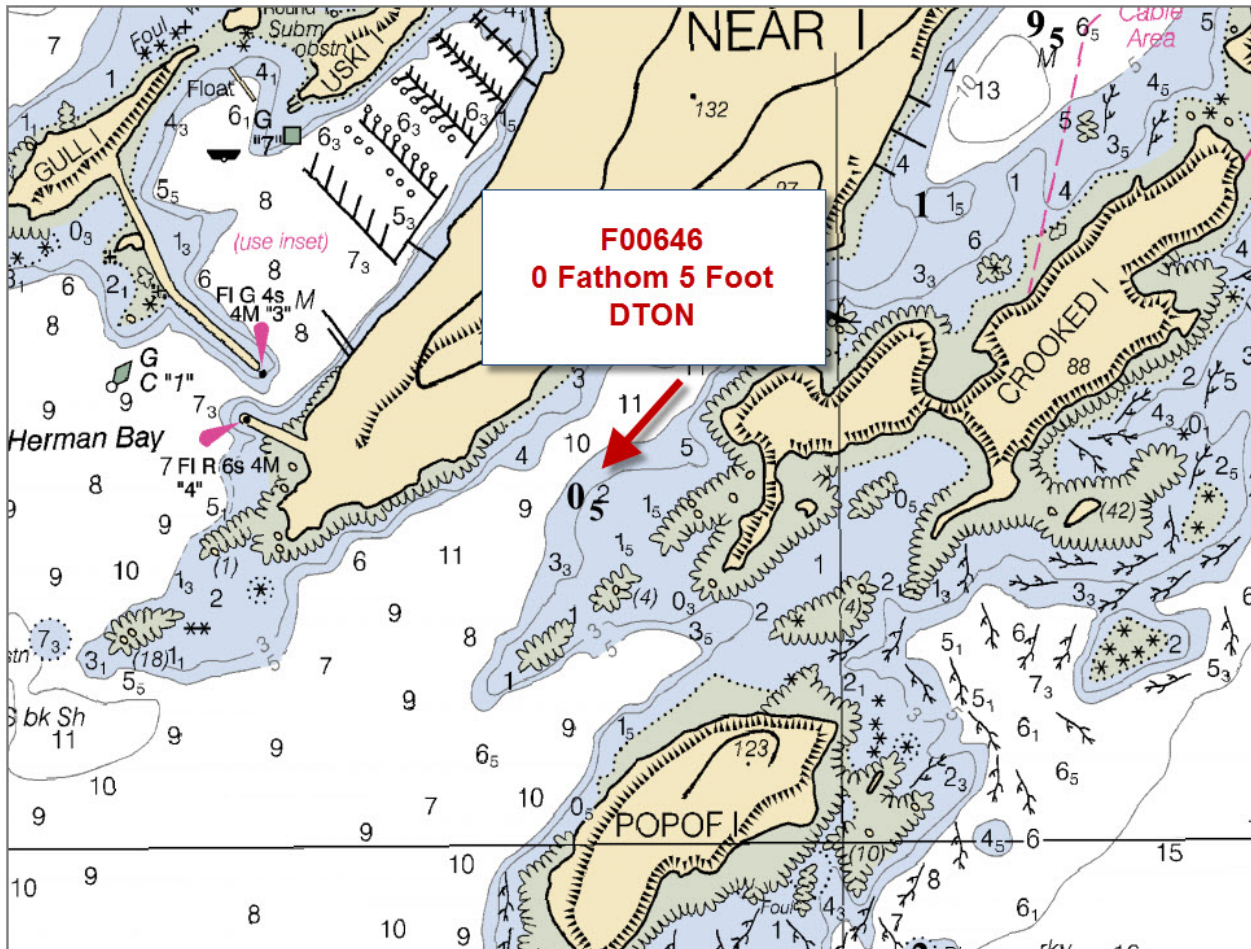


Figure 1.4.3

**1.5) Profile/Beam 123/447 / 2801\_2014ra2951935****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 57° 46' 37.7" N, 152° 23' 50.7" W  
**Least Depth:** 1.82 m (= 5.99 ft = 0.998 fm = 0 fm 5.99 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.087$  m ; **TVU (TPEv)**  $\pm 0.133$  m  
**Timestamp:** 2014-295.19:35:28.027 (10/22/2014)  
**Survey Line:** f00646 / 2801\_reson7125\_hf\_512 / 2014-295 / 2801\_2014ra2951935  
**Profile/Beam:** 123/447  
**Charts Affected:** 16595\_2, 16595\_1, 16594\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Source	Feature	Range	Azimuth	Status
2801_2014ra2951935	123/447	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

**Cartographically-Rounded Depth (Affected Charts):**

1fm (16595\_2, 16595\_1, 16594\_1, 16580\_1, 16013\_1, 530\_1)

1fm 0ft (531\_1)

1.8m (500\_1, 50\_1)

**S-57 Data**

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** SORDAT - 20141022  
 SORIND - US,US,graph,F00646  
 TECSOU - 3:found by multi-beam  
 VALSOU - 1.825 m

WATLEV - 3:always under water/submerged

Office Notes: Concur.

### Feature Images

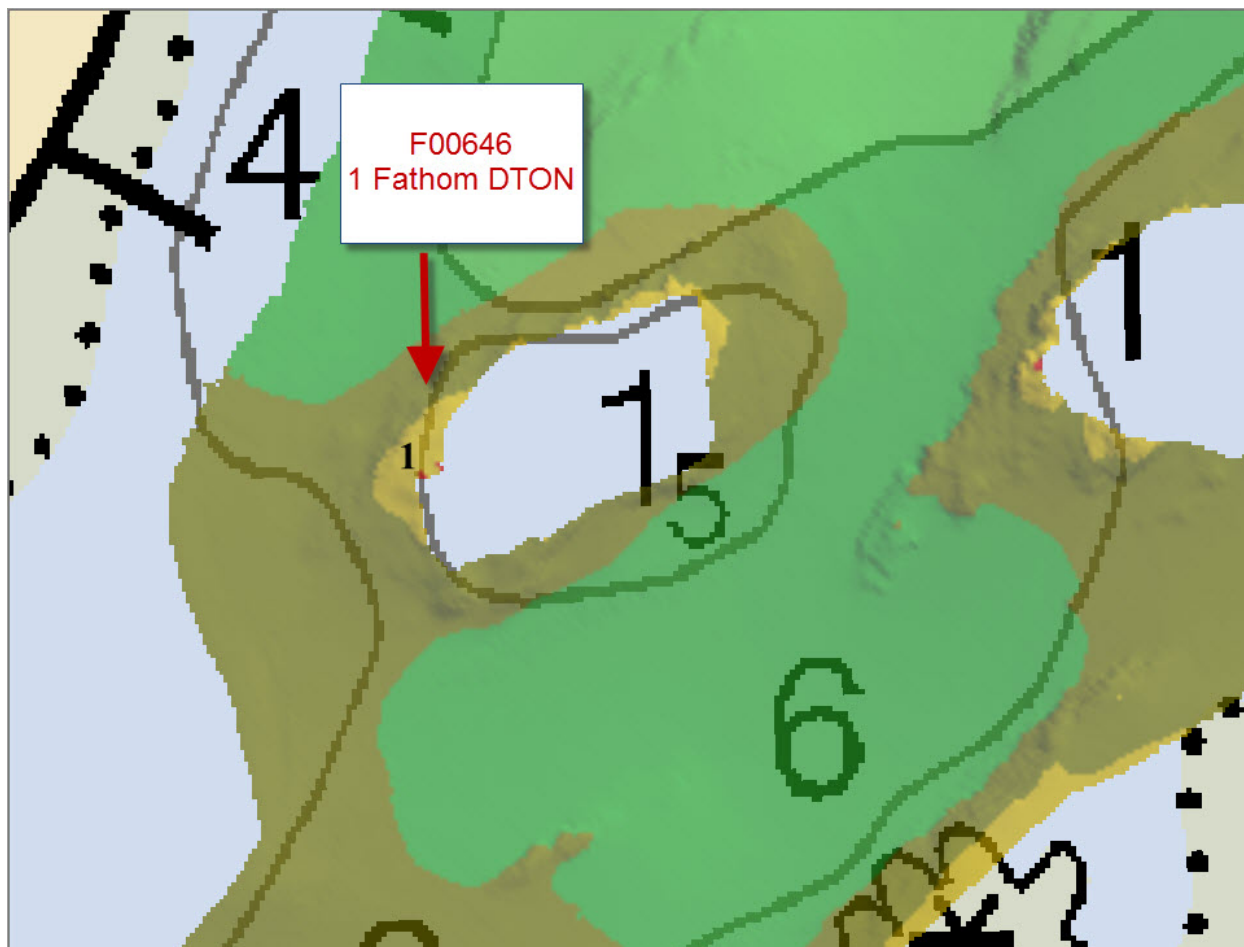


Figure 1.5.1



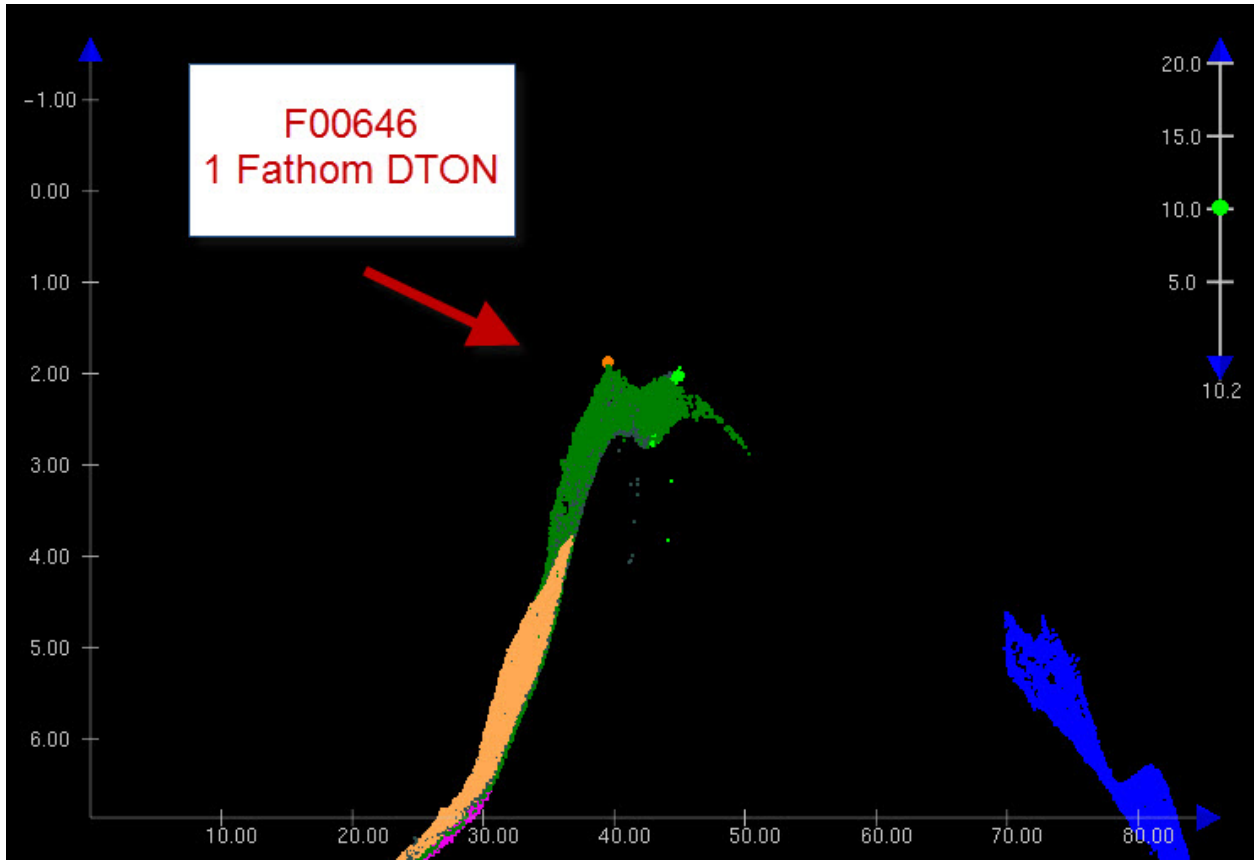


Figure 1.5.2

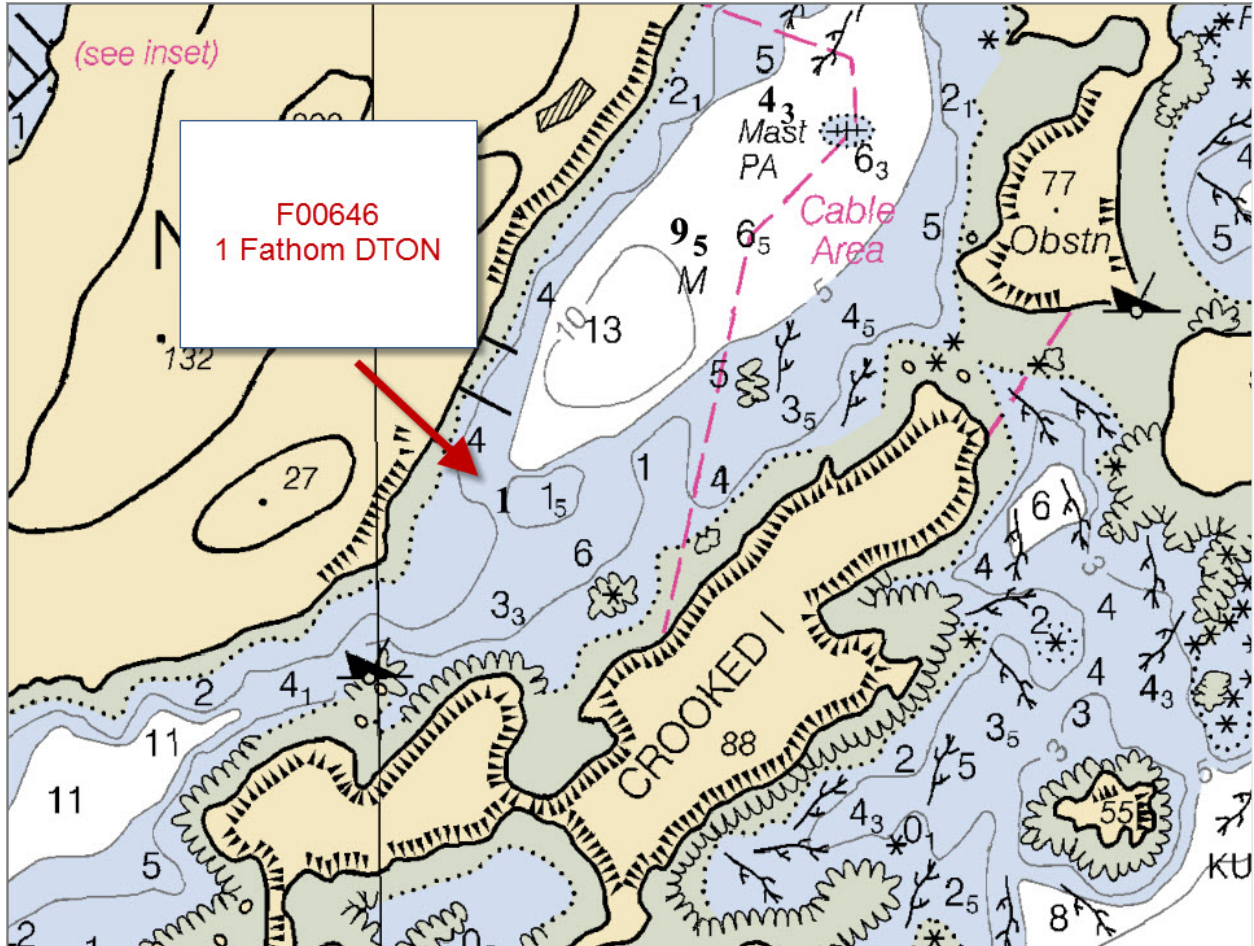


Figure 1.5.3

# F00646 Danger to Navigation Report

**Registry Number:** F00646  
**State:** Alaska  
**Locality:** Kodiak Island  
**Sub-locality:** Woody Island  
**Project Number:** OPR-P136-RA-14  
**Survey Date:** 08/19/2014

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16596	12th	07/01/2002	1:10,000 (16596_1)	[L]NTM: ?
16595	15th	11/01/2004	1:20,000 (16595_1)	[L]NTM: ?
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16593	11th	02/01/2003	1:80,000 (16593_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	9.14 m	57° 45' 01.8" N	152° 24' 40.4" W	---
1.2	Rock	3.72 m	57° 45' 53.3" N	152° 23' 51.6" W	---

# **1 - Dangers To Navigation**

**1.1) Profile/Beam 48/221 / 2802\_2014ra2312055****DANGER TO NAVIGATION****Survey Summary**

**Survey Position:** 57° 45' 01.8" N, 152° 24' 40.4" W  
**Least Depth:** 9.14 m (= 29.97 ft = 4.996 fm = 4 fm 5.97 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.094$  m ; **TVU (TPEv)**  $\pm 0.216$  m  
**Timestamp:** 2014-231.20:56:02.662 (08/19/2014)  
**Survey Line:** f00646 / 2802\_reson7125\_hf\_512 / 2014-231 / 2802\_2014ra2312055  
**Profile/Beam:** 48/221  
**Charts Affected:** 16596\_1, 16595\_1, 16594\_1, 16593\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

**Remarks:**

[None]

**Feature Correlation**

Source	Feature	Range	Azimuth	Status
2802_2014ra2312055	48/221	0.00	000.0	Primary

**Hydrographer Recommendations**

[None]

**Cartographically-Rounded Depth (Affected Charts):**

30ft (16596\_1)

5fm (16595\_1, 16594\_1, 16593\_1, 16580\_1, 16013\_1, 530\_1)

5fm 0ft (531\_1)

9.1m (500\_1, 50\_1)

**S-57 Data****Geo object 1:** Underwater rock / awash rock (UWTROC)**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known



SORDAT - 08/19/2014

SORIND - US,US,Graph,F00646

TECSOU - 3:found by multi-beam

VALSOU - 9.136 m

WATLEV - 3:always under water/submerged

Office Notes: After final tide application and rounding, a 31 ft. rock was included in the chart update product.

### Feature Images

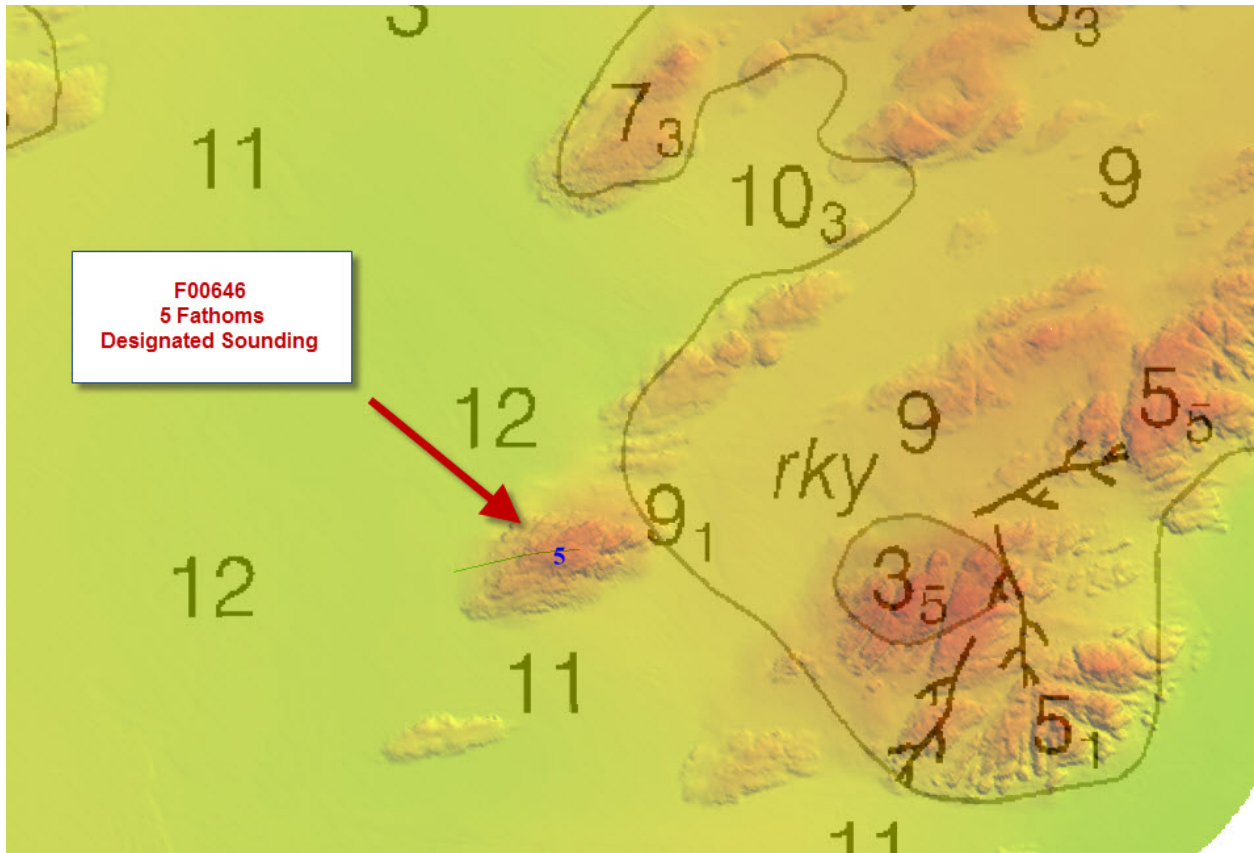


Figure 1.1.1

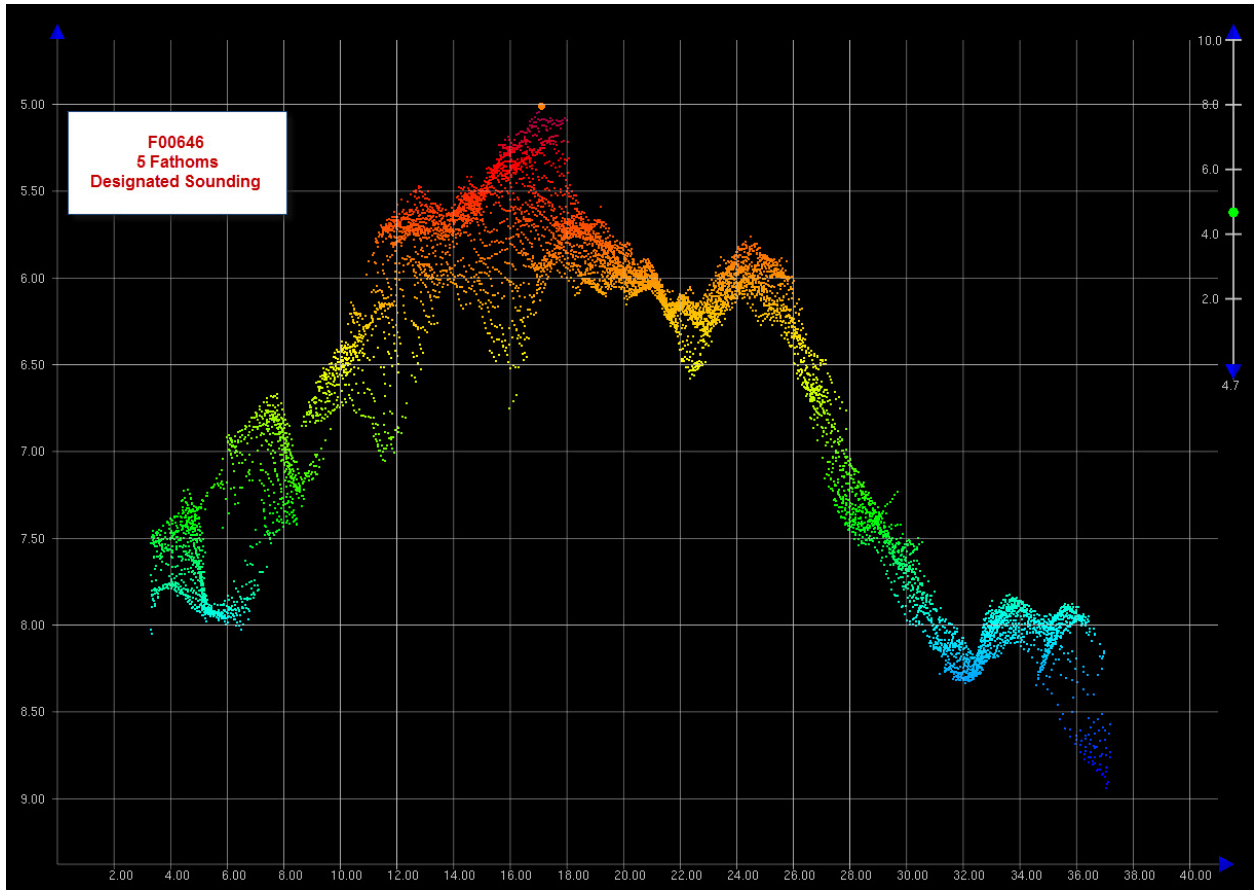


Figure 1.1.2

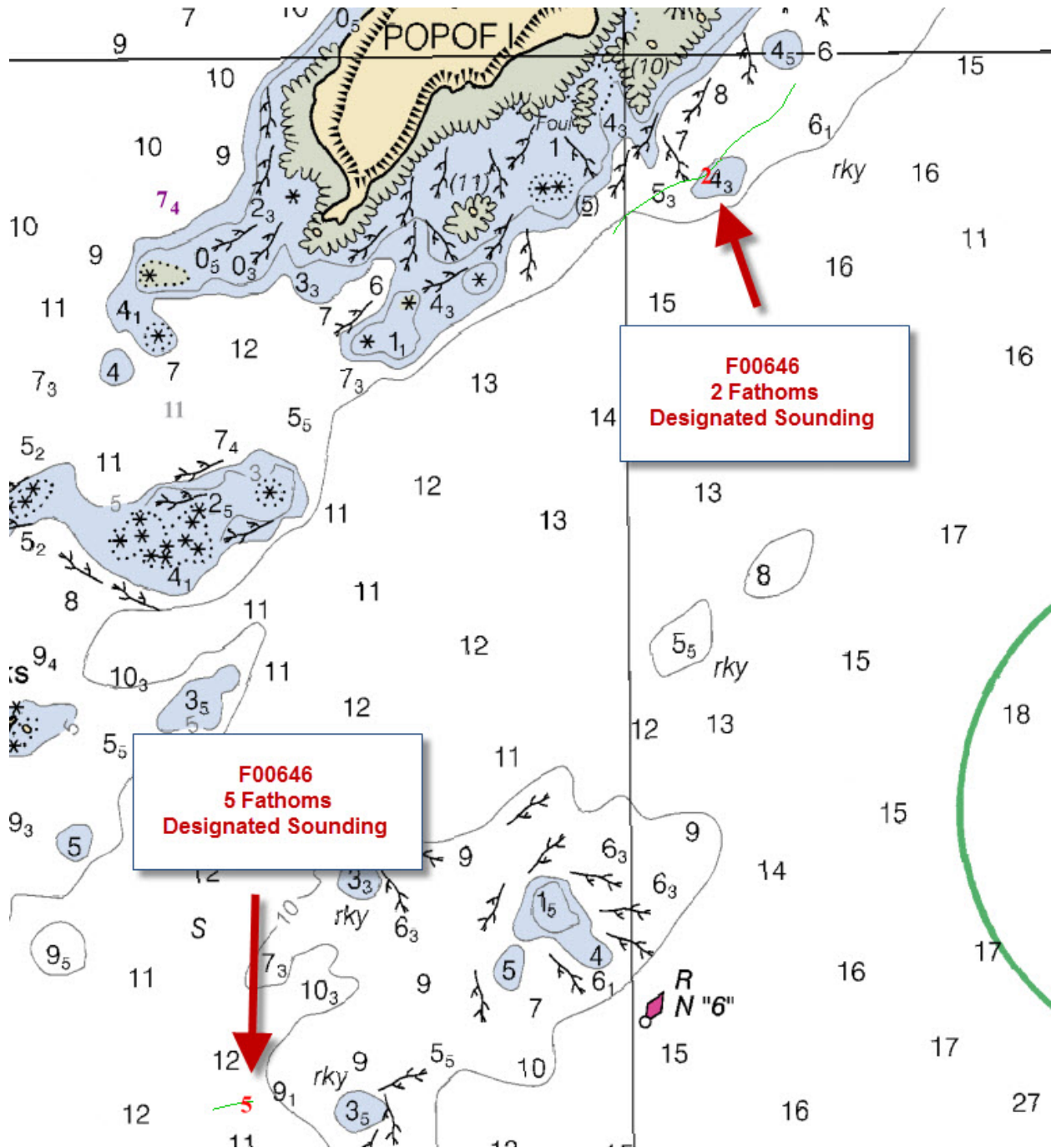


Figure 1.1.3

## 1.2) Profile/Beam 1087/223 / 2802\_2014ra2312201

### DANGER TO NAVIGATION

#### Survey Summary

**Survey Position:** 57° 45' 53.3" N, 152° 23' 51.6" W  
**Least Depth:** 3.72 m (= 12.20 ft = 2.034 fm = 2 fm 0.20 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 0.063$  m ; **TVU (TPEv)**  $\pm 0.213$  m  
**Timestamp:** 2014-231.22:02:22.132 (08/19/2014)  
**Survey Line:** f00646 / 2802\_reson7125\_hf\_512 / 2014-231 / 2802\_2014ra2312201  
**Profile/Beam:** 1087/223  
**Charts Affected:** 16595\_1, 16594\_1, 16580\_1, 16013\_1, 531\_1, 500\_1, 530\_1, 50\_1

#### Remarks:

[None]

#### Feature Correlation

Source	Feature	Range	Azimuth	Status
2802_2014ra2312201	1087/223	0.00	000.0	Primary

#### Hydrographer Recommendations

[None]

#### Cartographically-Rounded Depth (Affected Charts):

2fm (16595\_1, 16594\_1, 16580\_1, 16013\_1, 530\_1)

2fm 0ft (531\_1)

3.7m (500\_1, 50\_1)

#### S-57 Data

**Geo object 1:** Underwater rock / awash rock (UWTROC)  
**Attributes:** QUASOU - 1:depth known  
 SORDAT - 08/19/2014  
 SORIND - US,US,Graph,F00646  
 TECSOU - 3:found by multi-beam



VALSOU - 3.719 m

WATLEV - 3:always under water/submerged

Office Notes: Concur

### Feature Images

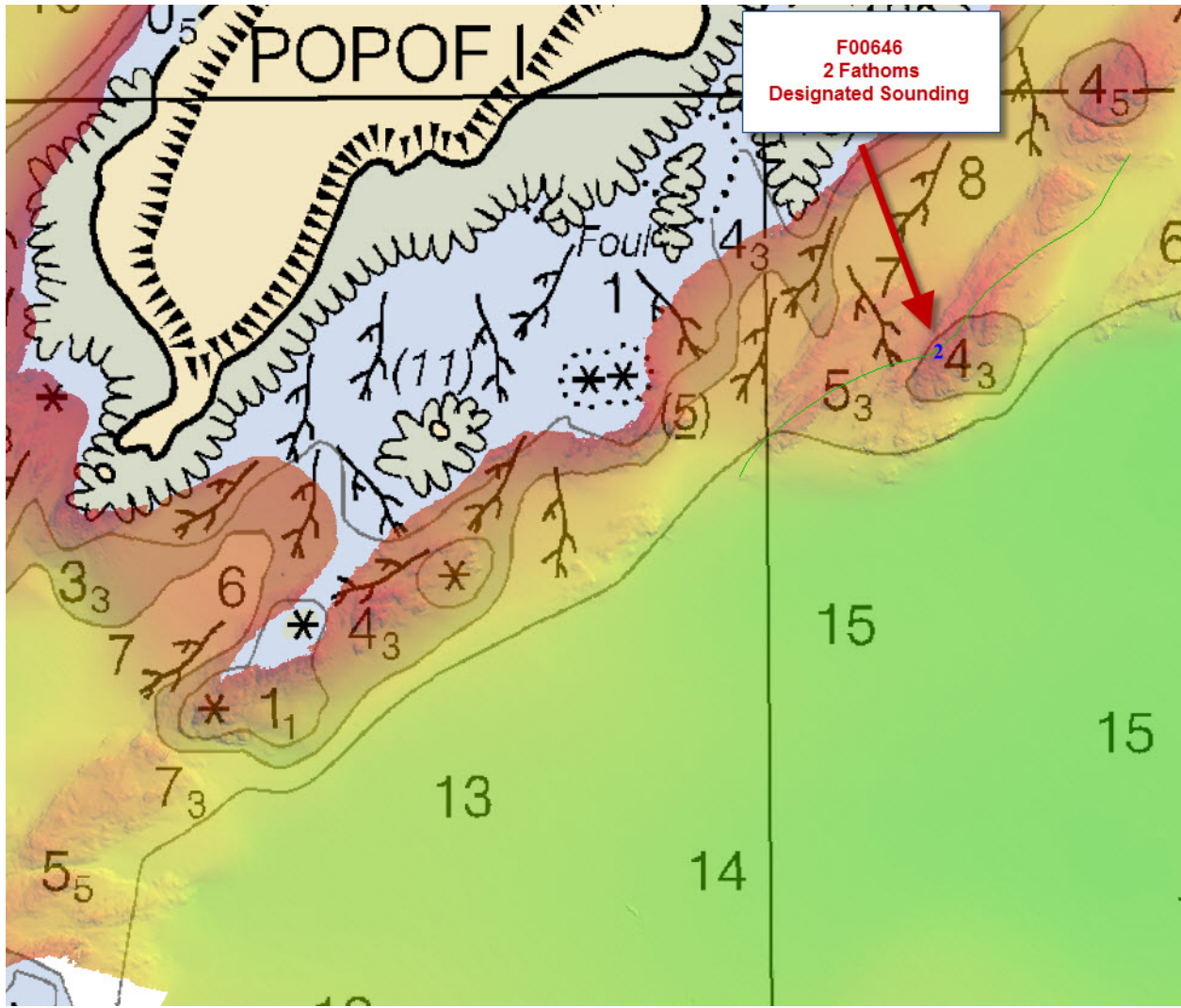


Figure 1.2.1

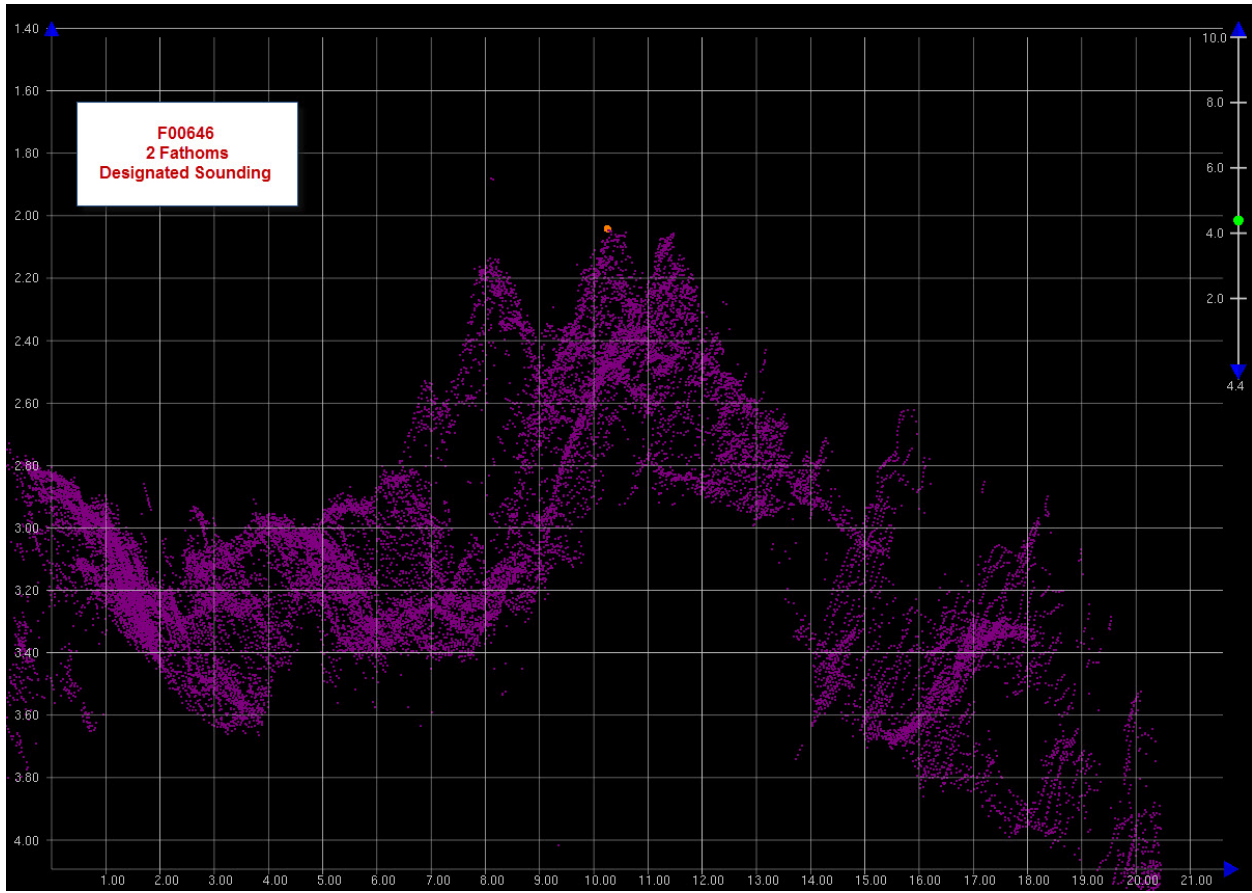


Figure 1.2.2

APPROVAL

PAGE F00646

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

- F00646\_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- F00638\_GeoImage.pdf

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

Approved: \_\_\_\_\_

**Annie Raymond**

Cartographic Team Lead, Pacific Hydrographic Branch

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

Approved: \_\_\_\_\_

**Peter Holmberg**

Acting Chief, Pacific Hydrographic Branch