H12691

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12691

LOCALITY

State(s):	Alaska
General Locality:	Kodiak Island, Alaska
Sub-locality:	Viekoda Bay

2015

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

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

REGISTRY NUMBER:

HYDROGRAPHIC TITLE SHEET

H12691

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:	**Kodiak Island, Alaska**
Sub-Locality:	**Viekoda Bay**
Scale:	**40000**
Dates of Survey:	**09/20/2015 to 10/21/2015**
Instructions Dated:	**09/09/2015**
Project Number:	**OPR-P136-RA-15**
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. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

Table of Contents

List of Tables

List of Figures

Descriptive Report to Accompany Survey H12691

Project: OPR-P136-RA-15

Locality: Kodiak Island, Alaska

Sublocality: Viekoda Bay

Scale: 1:40000

September 2015 - October 2015

NOAA Ship Rainier

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

A. Area Surveyed

The survey area is referred to as "Viekoda Bay" within the Project Instructions. The area encompasses approximately 34 square nautical miles, which includes Viekoda Bay, Uganik East Passage, and Terror Bay (Figure 1).

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
57° 59' 3.59" N 153° 18' 39.72" W	57° 43' 50.79" N 153° 12' 43.5" W

Table 1: Survey Limits

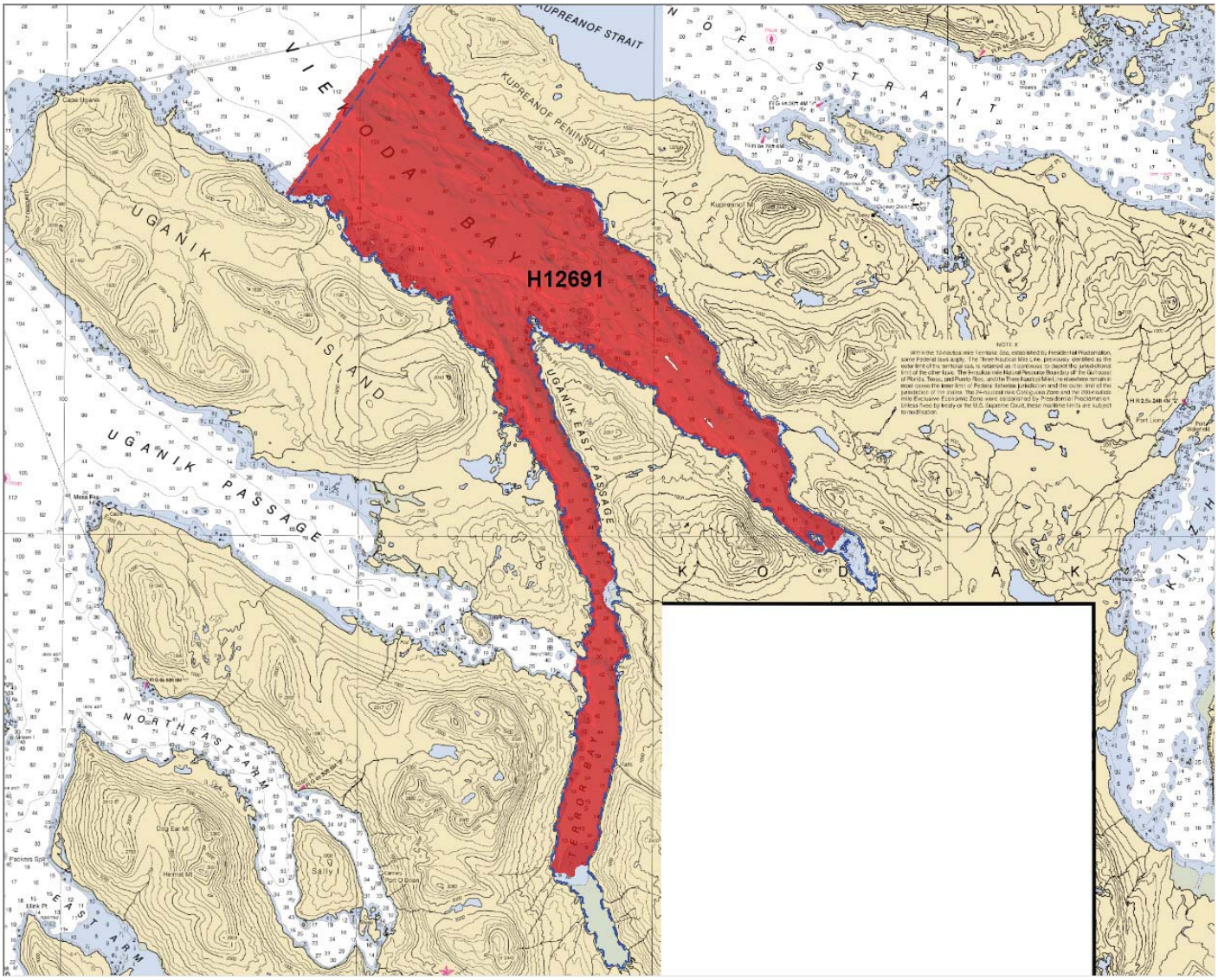


Figure 1: H12691 survey area as assigned in Project Instructions (Charts 16594_1 and 16597_1).

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

A.2 Survey Purpose

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

The finalized CSAR IHO compliance tool within Pydro was used to analyze multibeam echosounder (MBES) data density. All finalized surfaces meet the HSSD data density requirement (Figures 2-6).

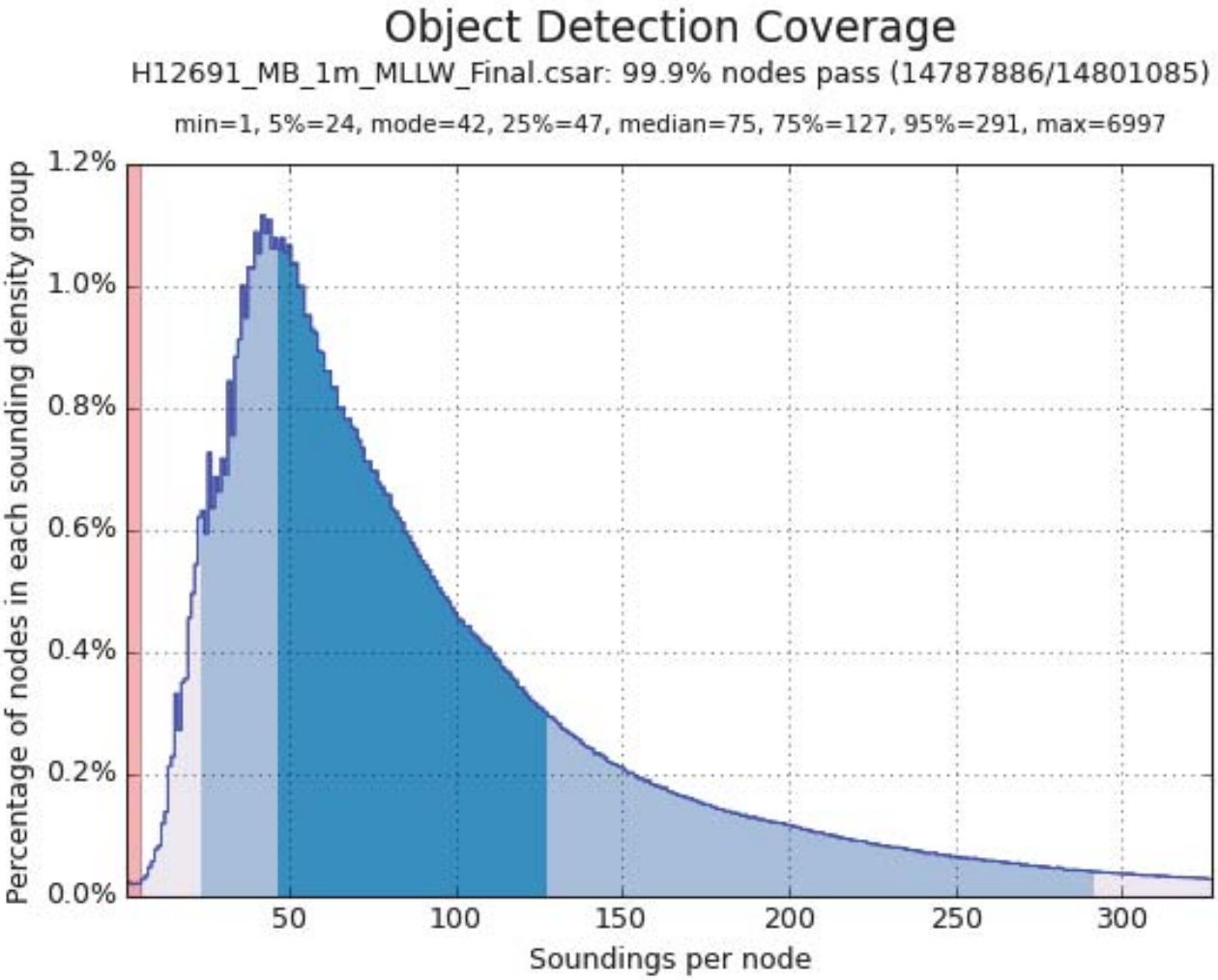


Figure 2: Pydro derived histogram plot showing HSSD compliance of H12691 MBES data within the 1-meter finalized CUBE surface.

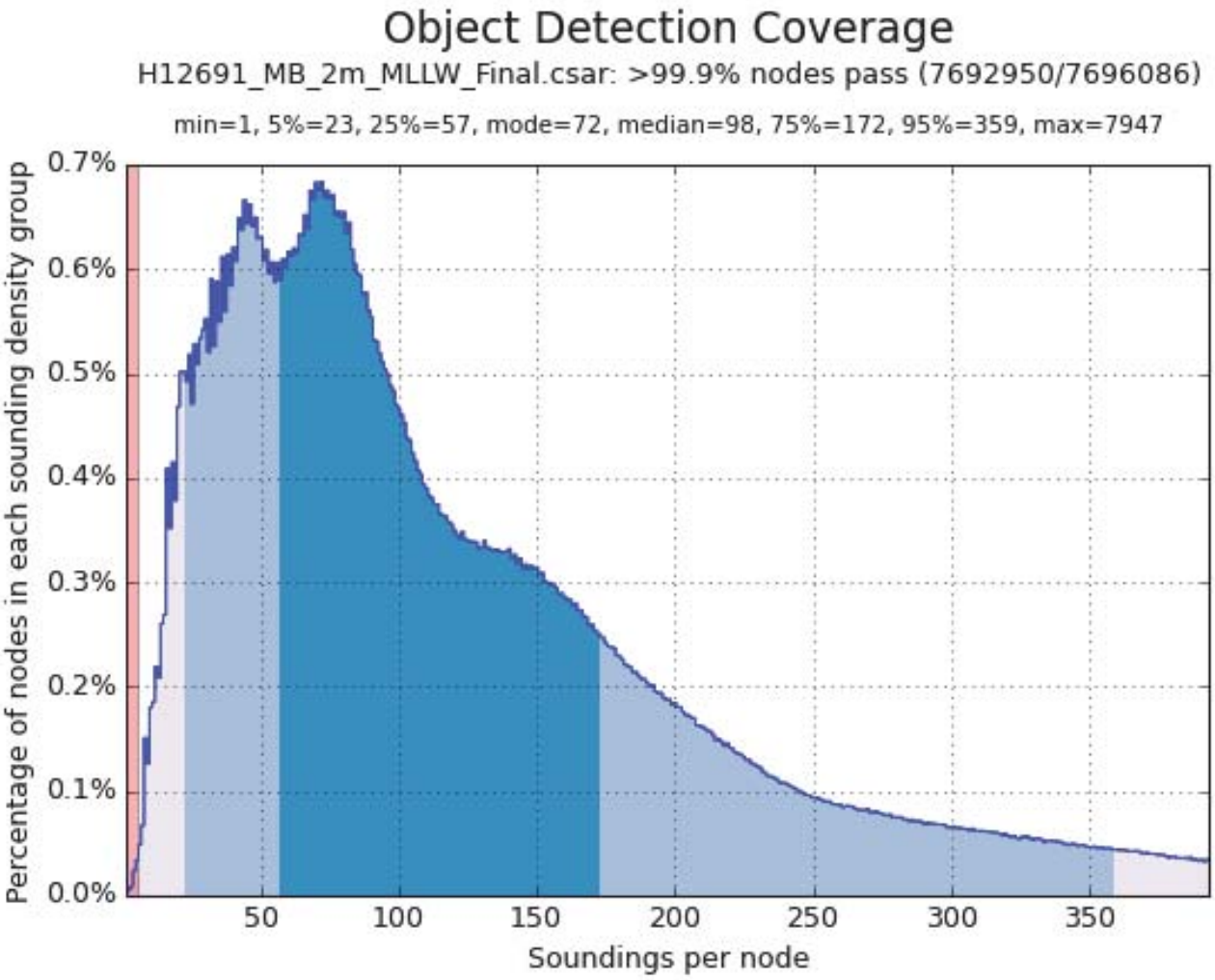


Figure 3: 2-meter finalized CUBE surface data density compliance.

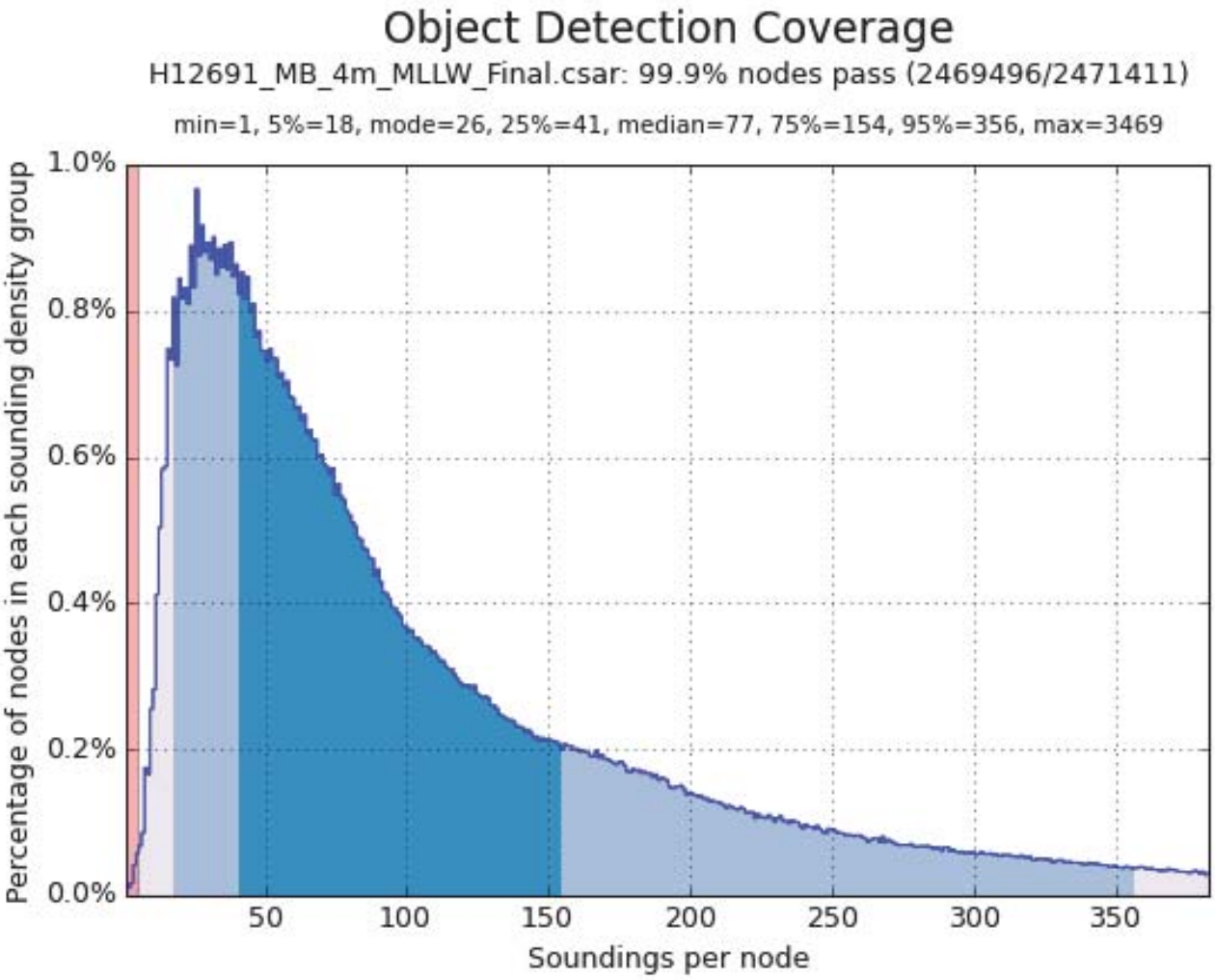


Figure 4: 4-meter finalized CUBE surface data density compliance.

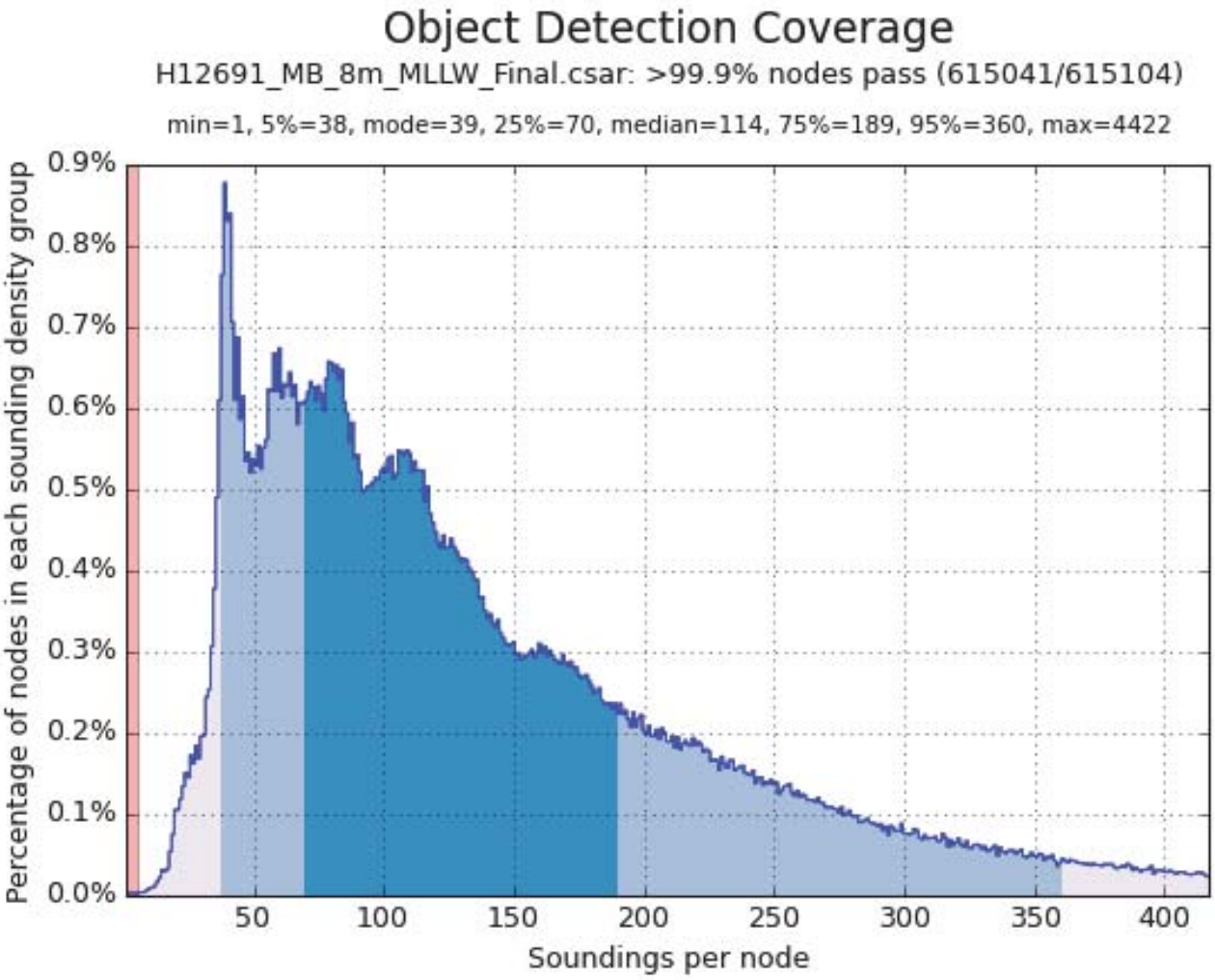


Figure 5: 8-meter finalized CUBE surface data density compliance.

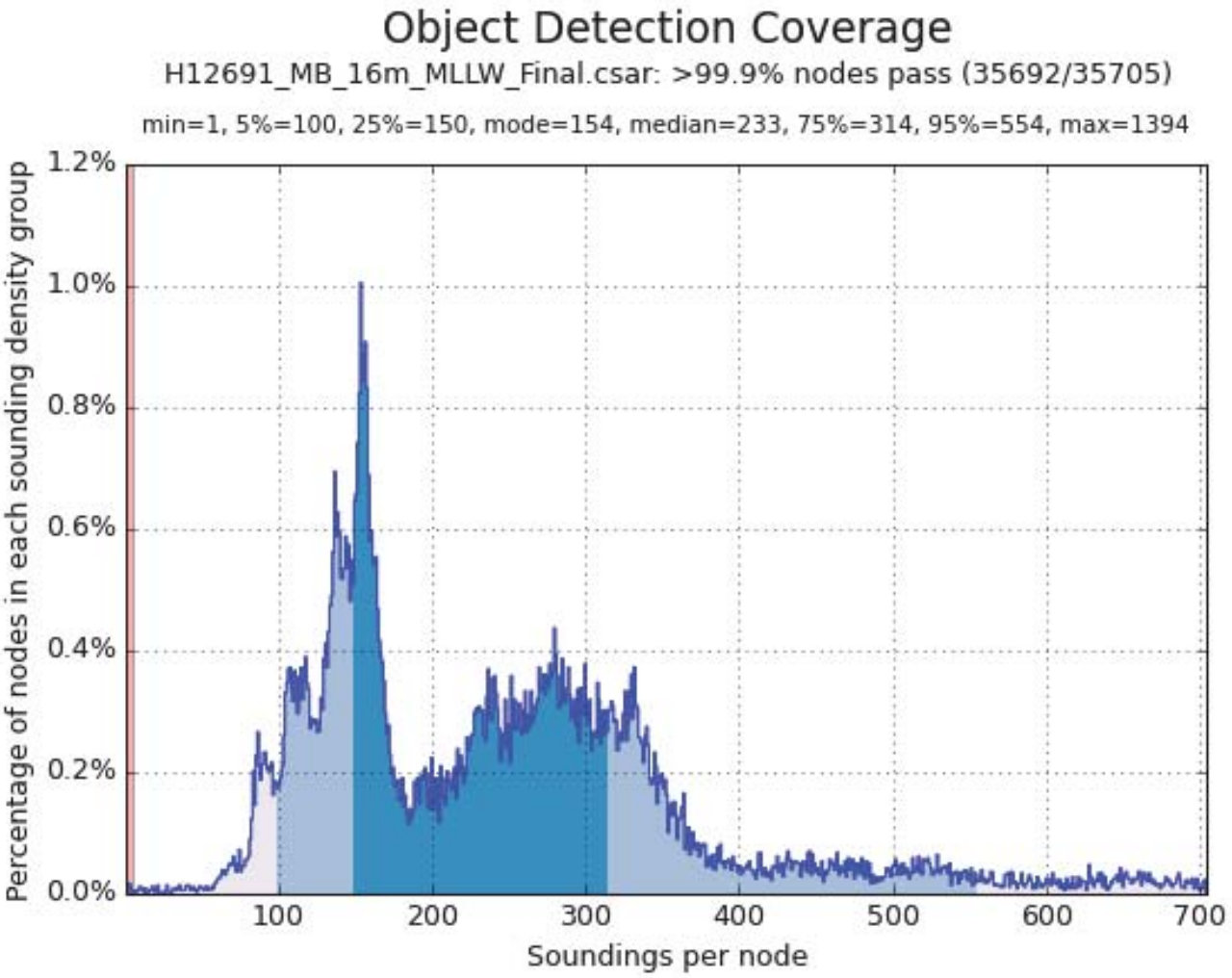


Figure 6: 16-meter finalized CUBE surface data density compliance.

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 water depth	100m spaced Set Line Spacing with Single Beam Echosounder (SBES) or MBES with concurrent backscatter.
Greater than 8 meters water depth	MBES with concurrent backscatter.

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

Line 0013 acquired by S221 on DN263 and line 2207 acquired by launch 2802 on DN275 would not accept Applanix POSPac Smoothed Best Estimate of Trajectory (SBET) corrections. Therefore, these lines could not be analyzed using the Ellipsoidally Referenced Zoned Tides (ERZT) method. Holidays were only created by the removal of line 0013. These holidays are in relatively deep water where no threats to safe navigation exist (Figure 7).

Due to time constraints, nearshore acquisition along some stretches of Viekoda Bay did not meet coverage requirements. On the final day of acquisition (DN294), priority was assigned to areas where reaching the 4-meter contour provided more coverage over dynamic seafloor where hazards could potentially exist (Figures 8-10).

The coverage requirement was not met in areas that could not be navigated safely due to dangerous shoals, which were widespread throughout the survey area (Figure 11).

At the head of Viekoda Bay the seafloor was very shoal. During shoreline verification, skiffs were not even able to navigate these waters safely. Due to these factors and time constraints, survey coverage did not reach the entire southeast extent of the sheet limits (Figure 12).

A holiday measuring approximately 510 meters long and 4 to 20 meters wide along the western side of Viekoda bay resulted from HYPACK/HYSWEEP software errors on launch 2802 DN294. The HYPACK created matrix crashed multiple times within the HYSWEEP module which resulted in data loss. This system malfunction occurred during the final hours of data acquisition and no time was available to reacquire over the holiday (Figure 13).

On launch 2803 DN264, the Applanix POSMV primary antenna lost satellite connectivity. This resulted in heave artifacts where the data could not be sufficiently corrected. It was necessary to delete lines affected by this artifact which resulted in holidays. Where one line was deleted, the shoalest point in proximity (37 meters) has full survey coverage (Figure 14). Where another was deleted, the survey coverage reaches the 4-meter contour (Figure 15).

A holiday measuring approximately 26 meters long by 8 meters wide is present at the end of line 2803_2015_2950008. Due to time constraints on the final day of acquisition, the holiday was unable to be covered (Figure 16).

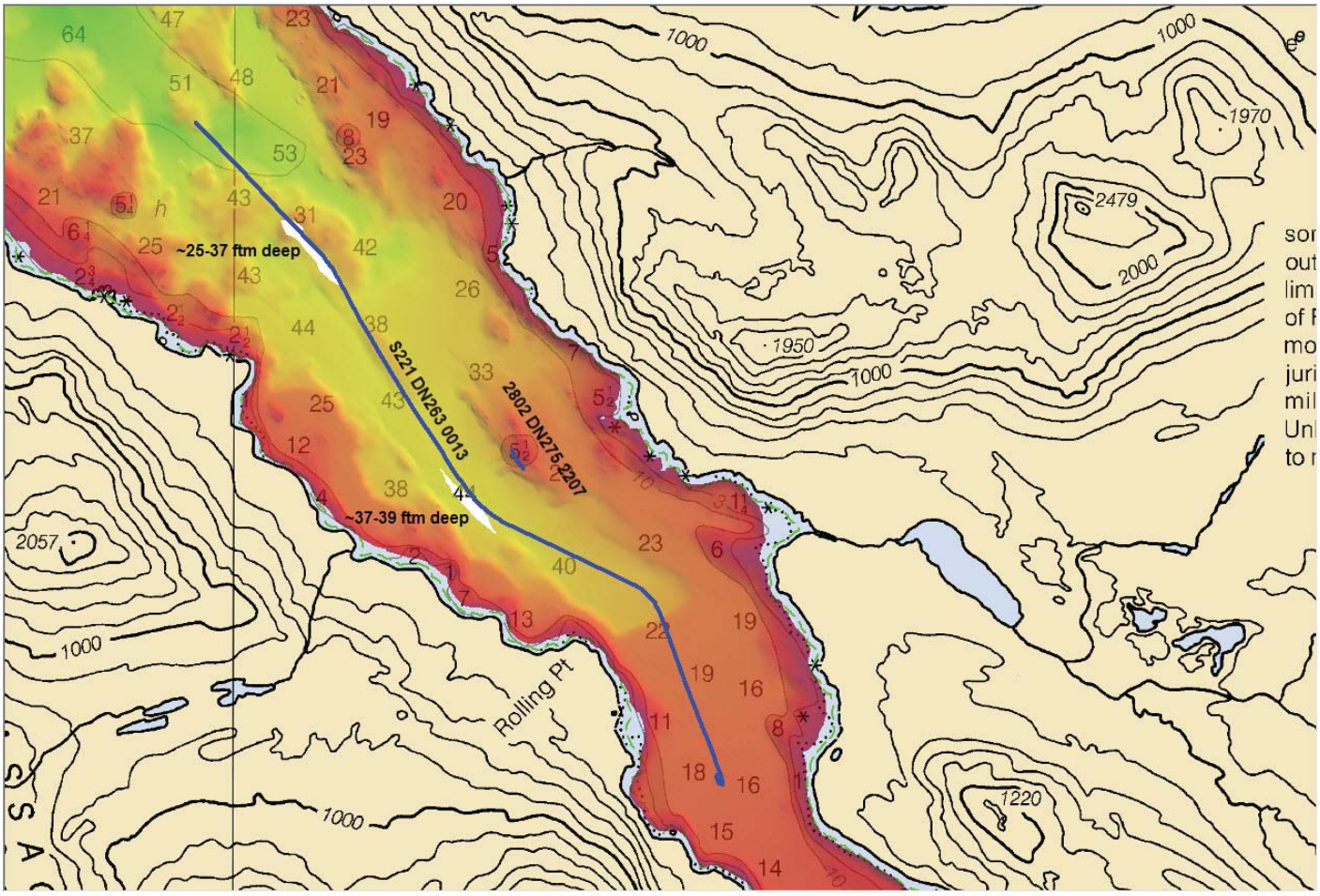


Figure 7: Line 0013 acquired by S221 on DN263 and line 2207 acquired by launch 2802 on DN275. Holidays exist where line 0013 has been removed from the grid. No holidays exist where line 2207 has been deleted.

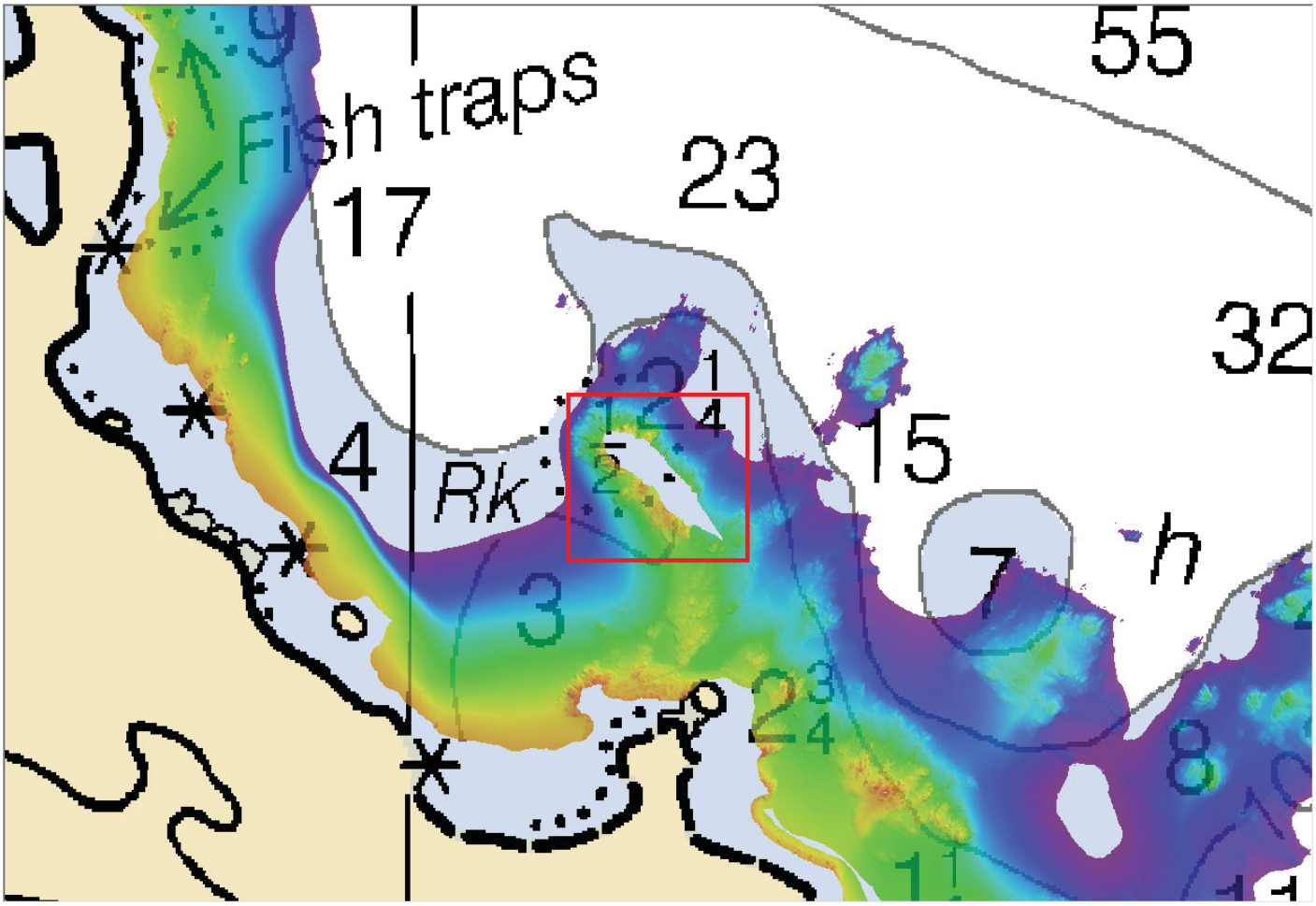


Figure 8: Rocky area off western shore of Veikoda Bay was not completely covered due to time constraints.

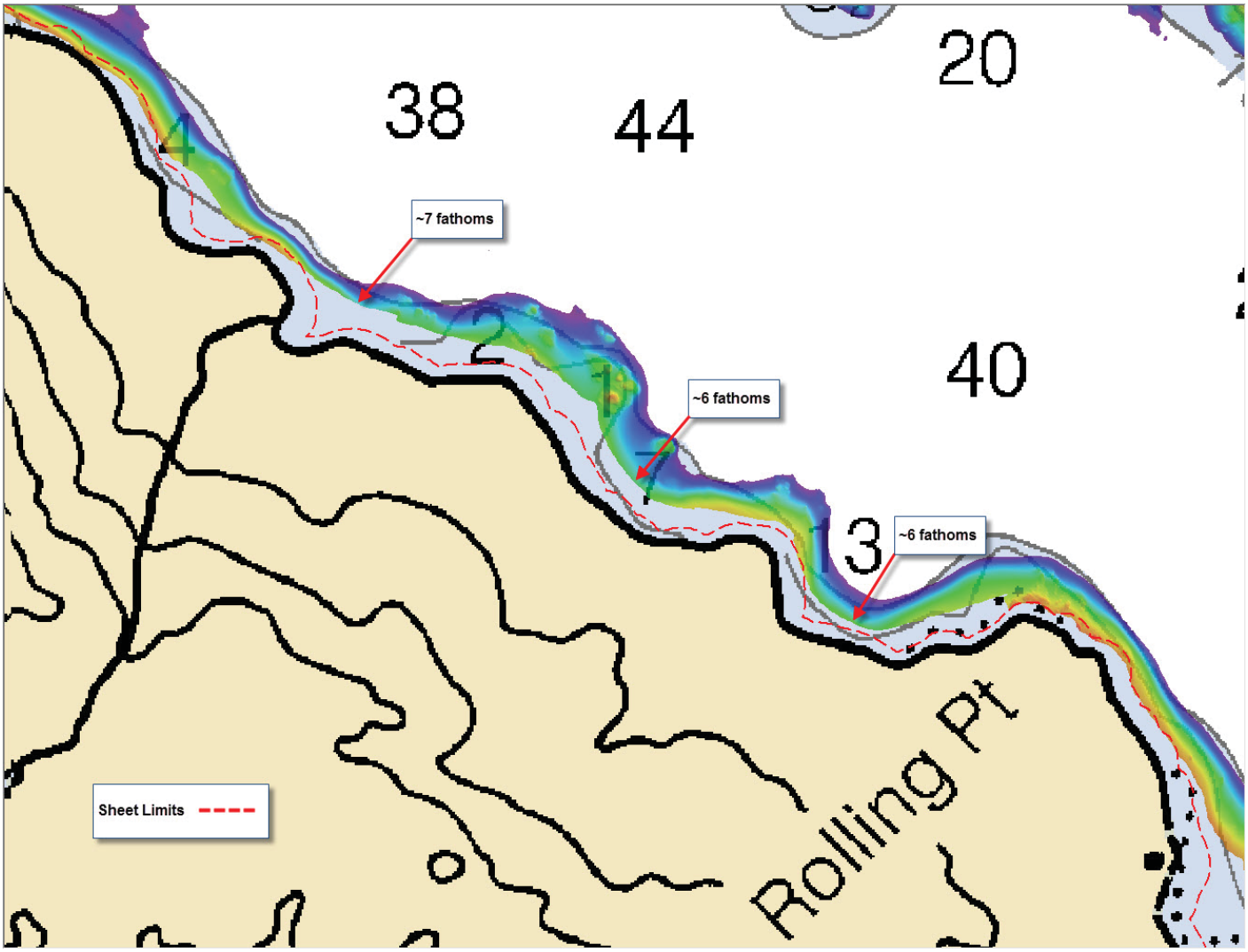


Figure 9: Northwest of Rolling Point, survey coverage only reached 6 to 7 fathoms.

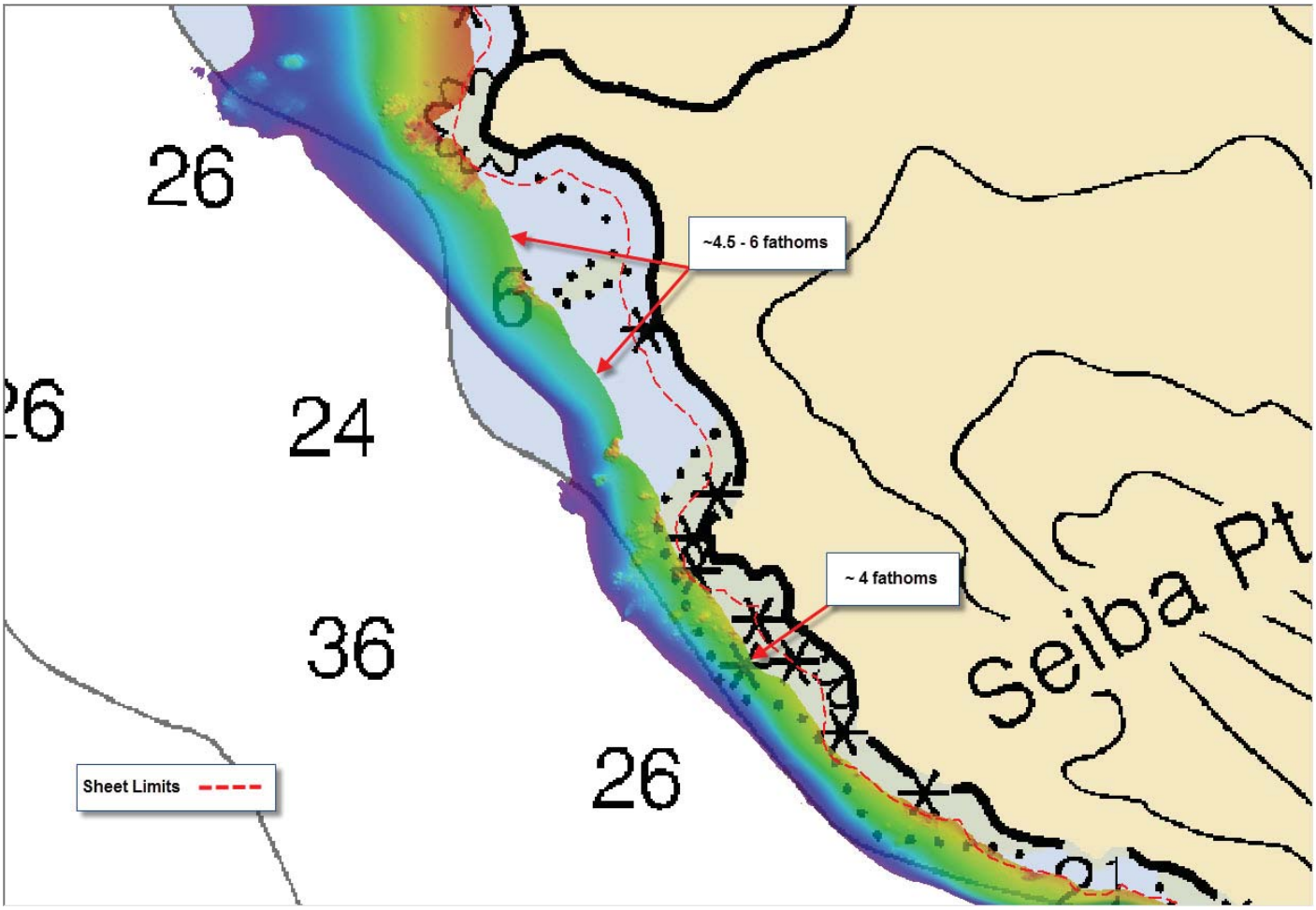


Figure 10: Northwest of Seiba Point, survey coverage only reached 4 to 6 fathoms.

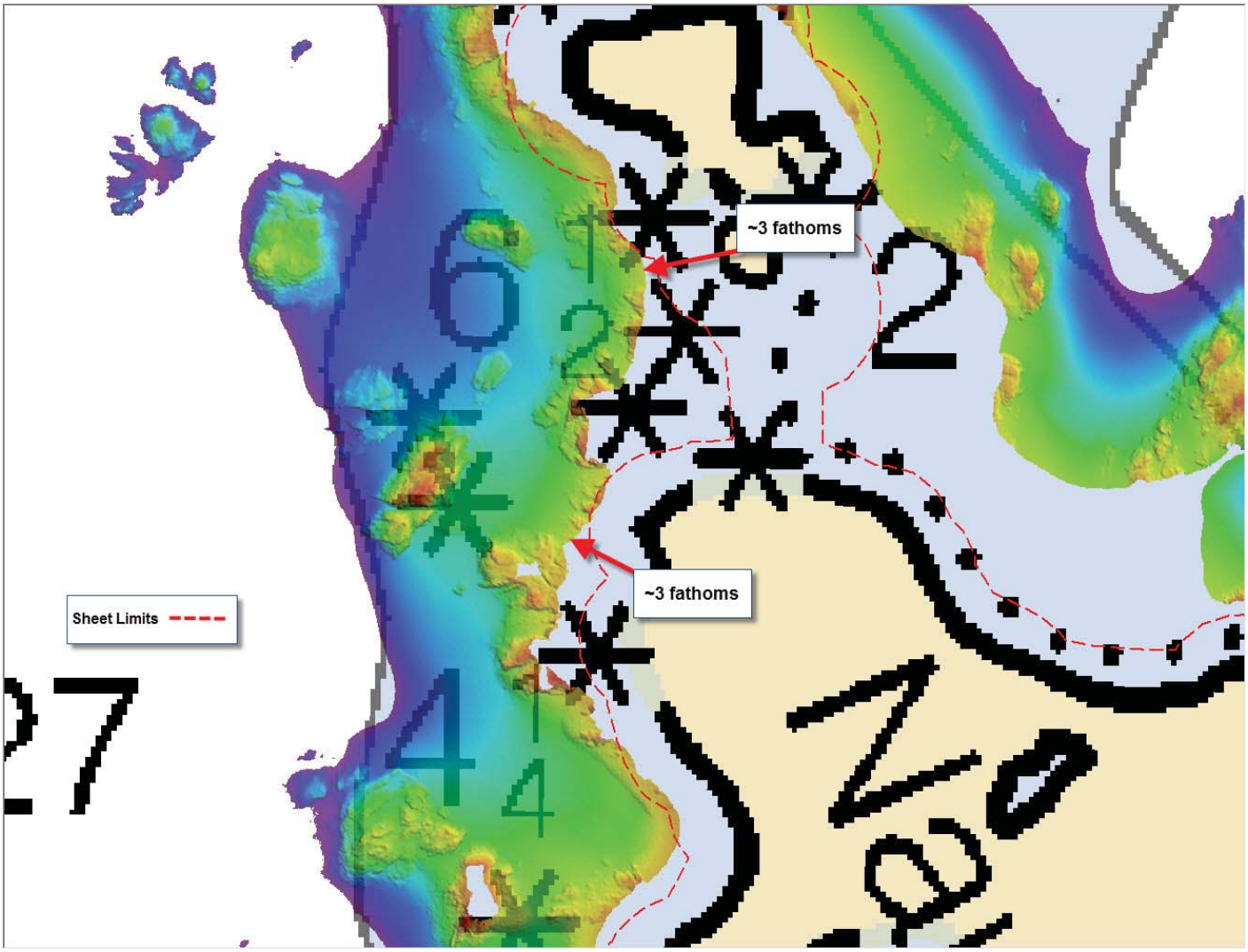


Figure 11: The many shoals surrounding Naugolka Point made it especially difficult to survey. Coverage was not met where navigation was unsafe.

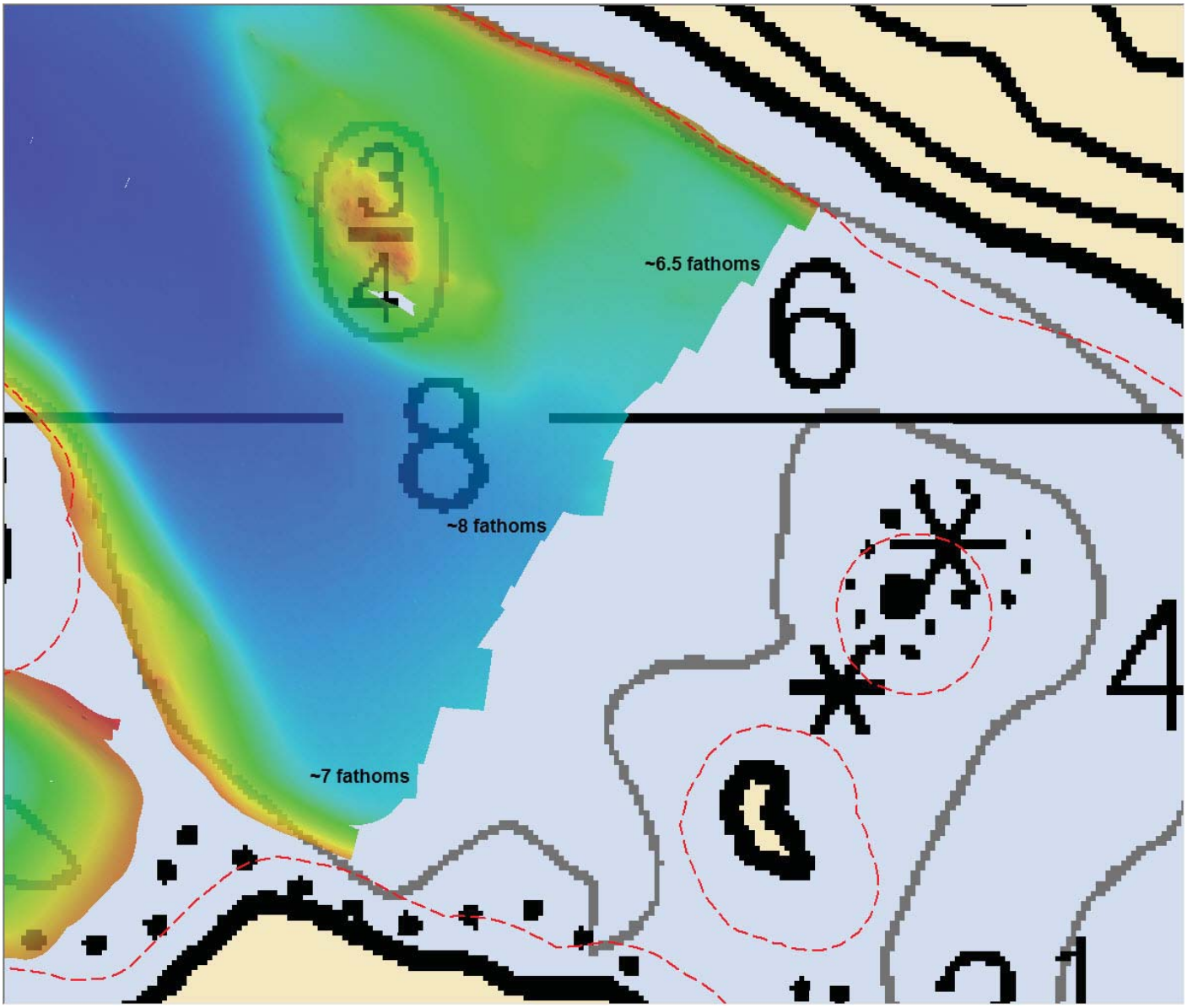


Figure 12: Towards the head of Viekoda Bay, survey coverage does not meet the southeast extents of the sheet limits. Depths along this coverage range from approximately 6.5 to 8 fathoms.

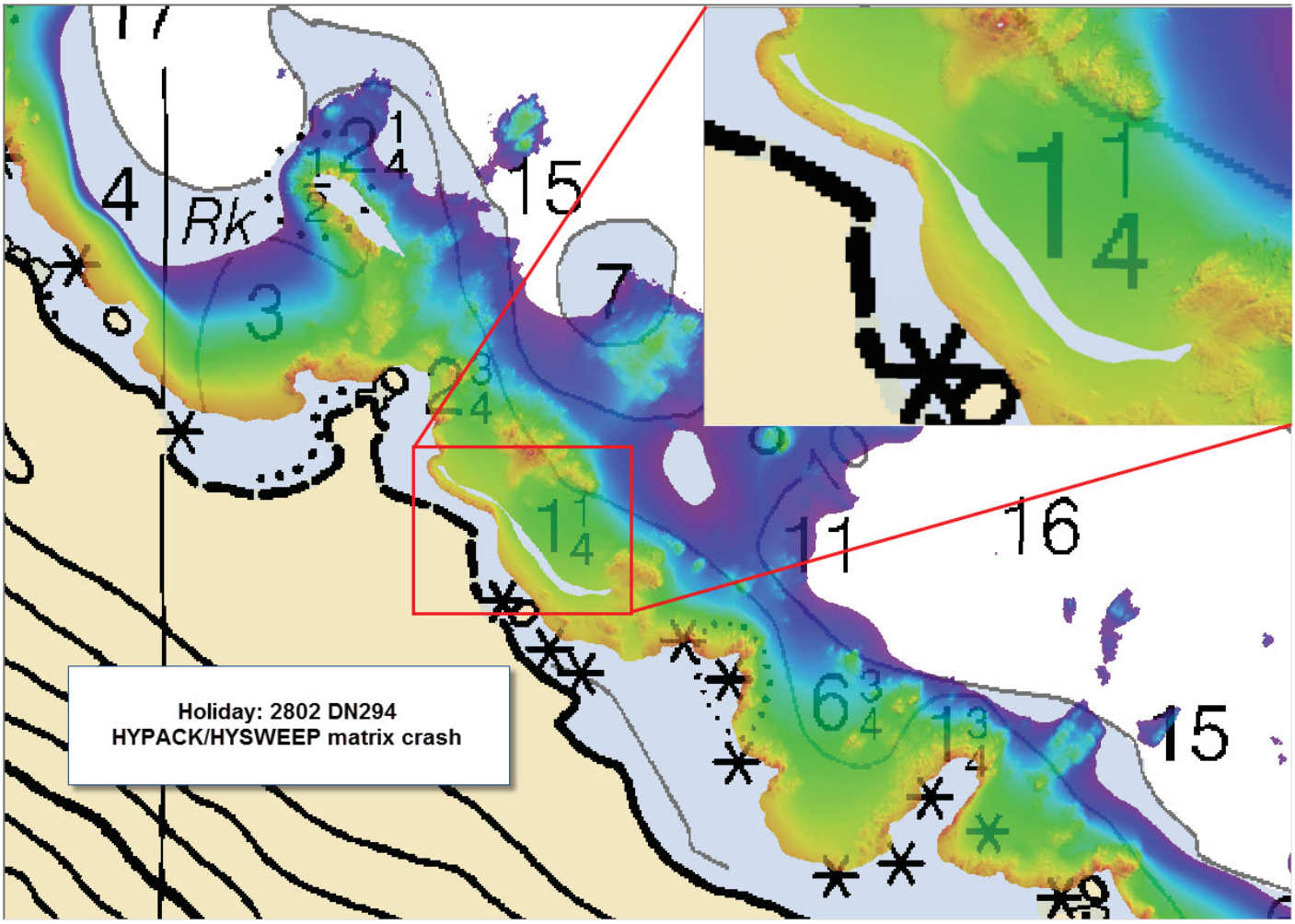


Figure 13: Holiday resulting from a HYPACK/HYSWEEP system crash on launch 2802 DN294.

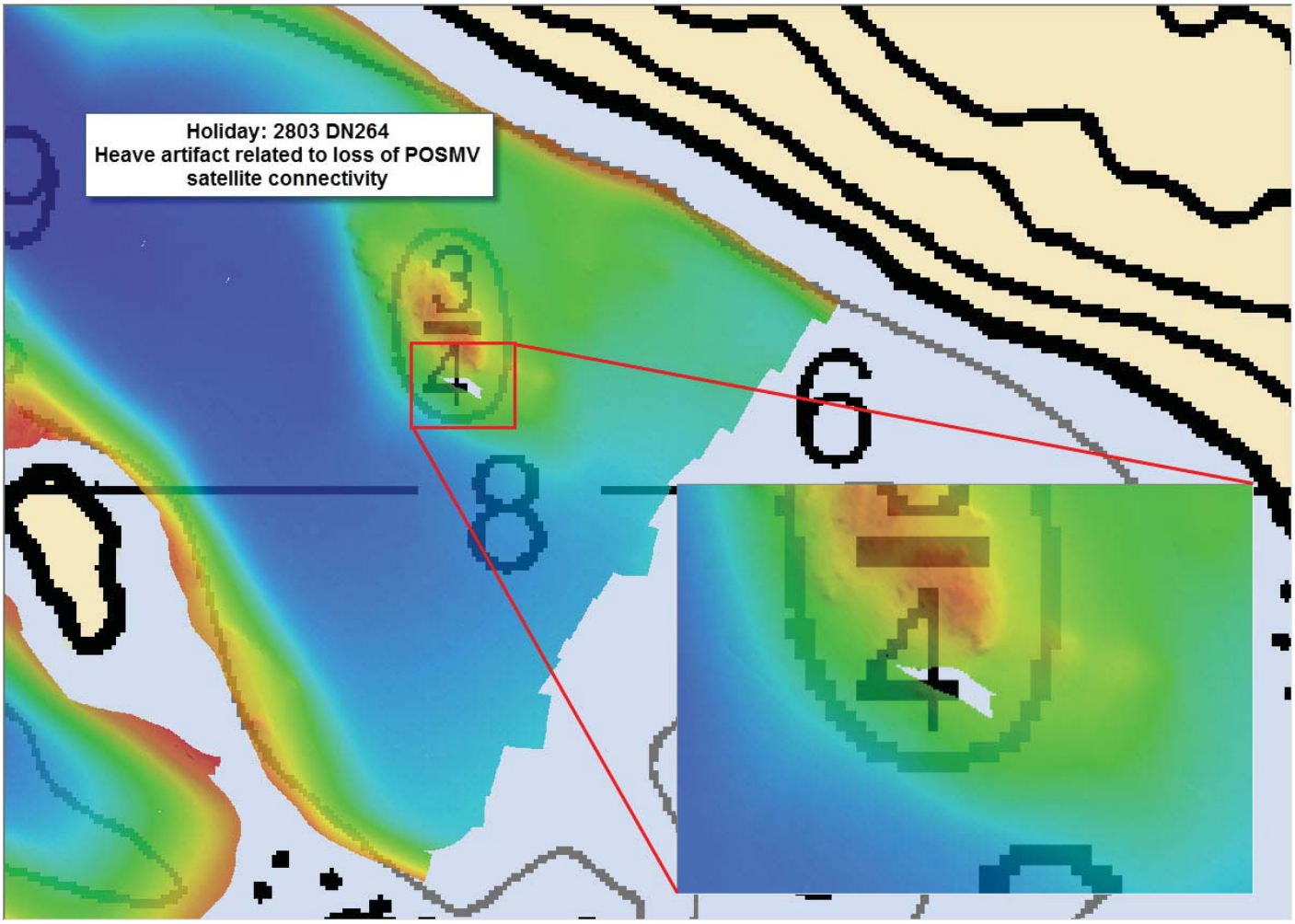


Figure 14: Holiday resulting from loss of Applanix POSMV satellite connectivity on launch 2803 DN264.

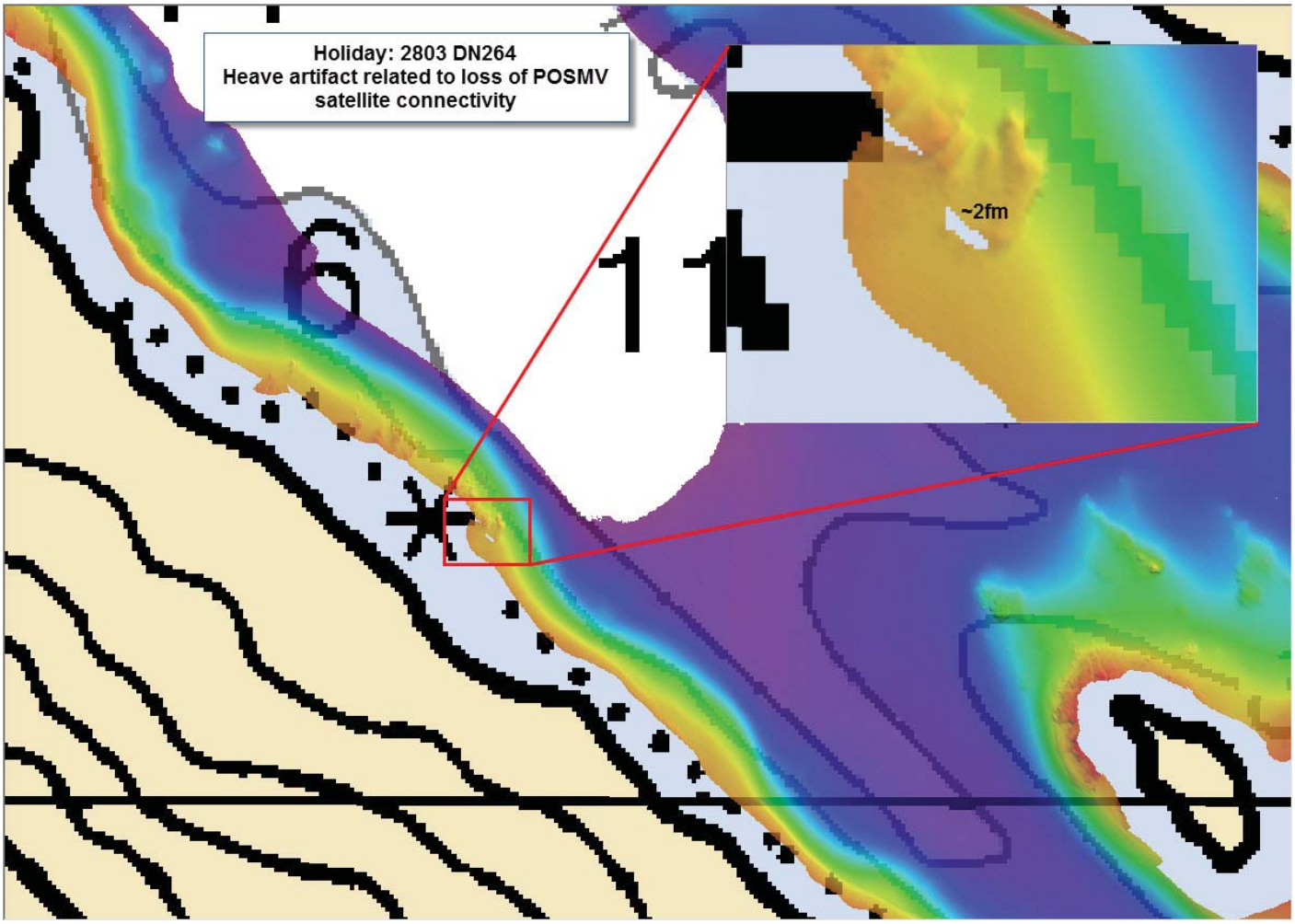


Figure 15: Holiday resulting from loss of Applanix POSMV satellite connectivity on launch 2803 DN264.

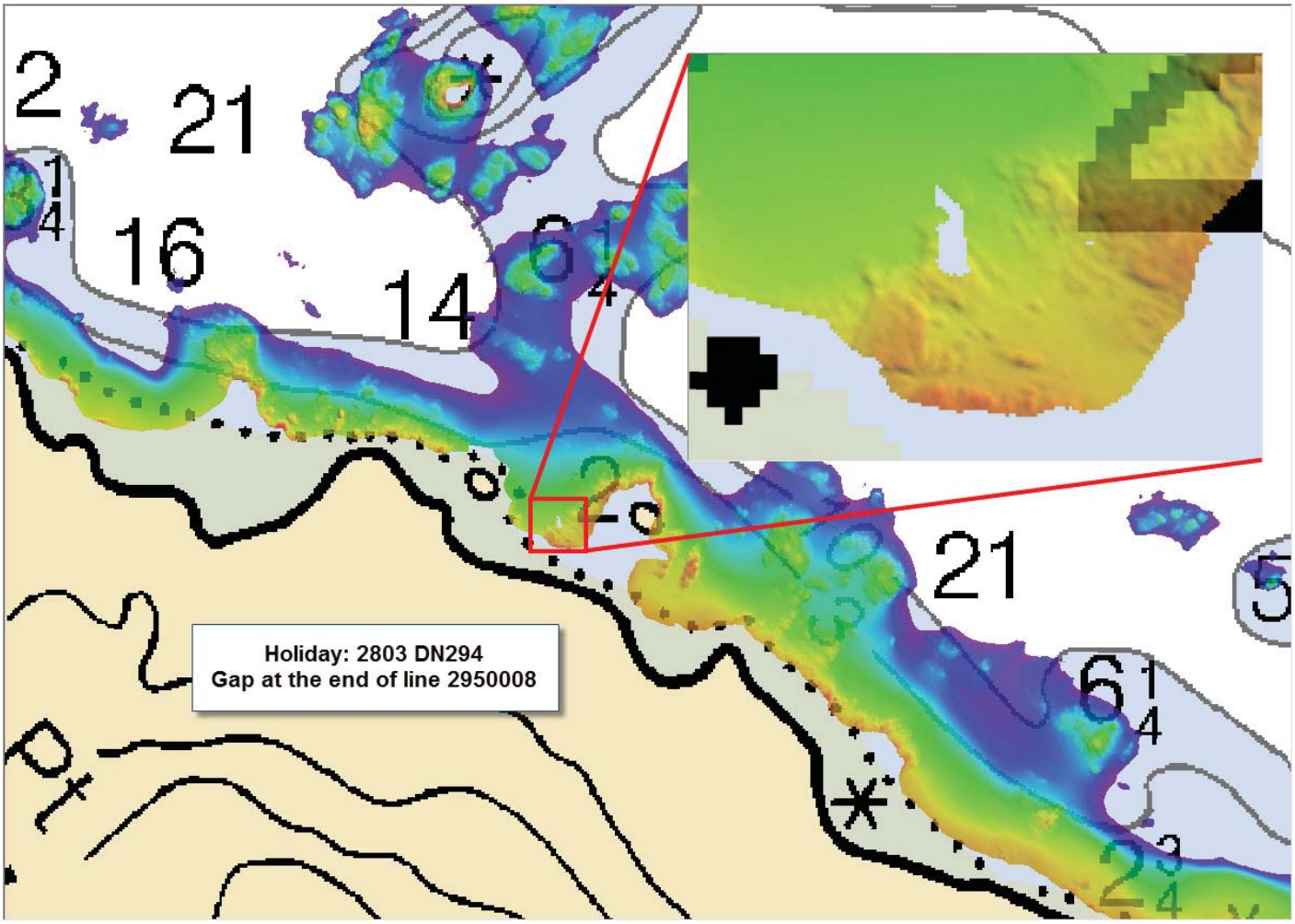


Figure 16: Holiday at the end of line 2950008 acquired by launch 2803 on DN294.

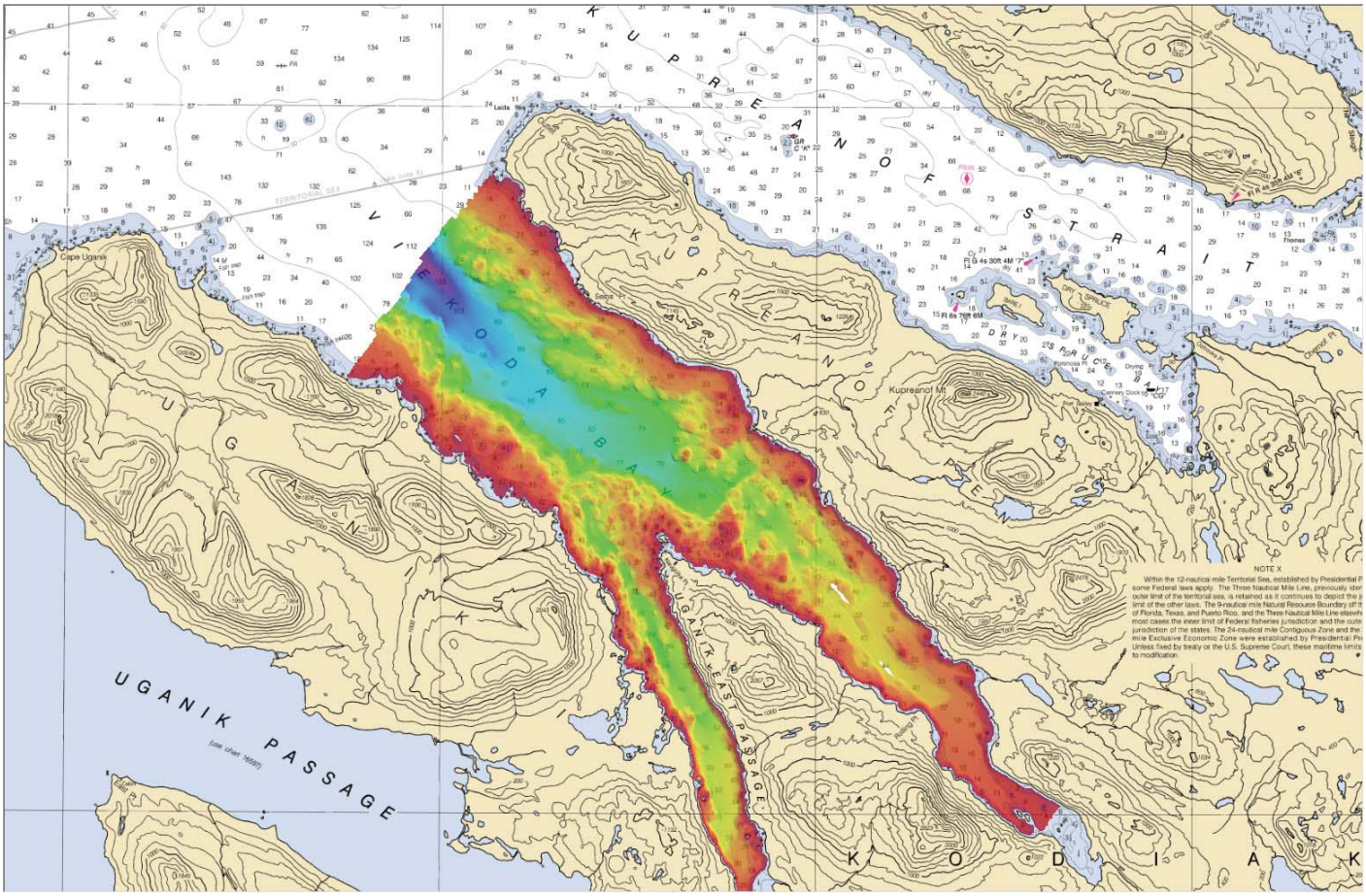


Figure 17: H12691 MBES coverage overlay on Chart 16594_1.

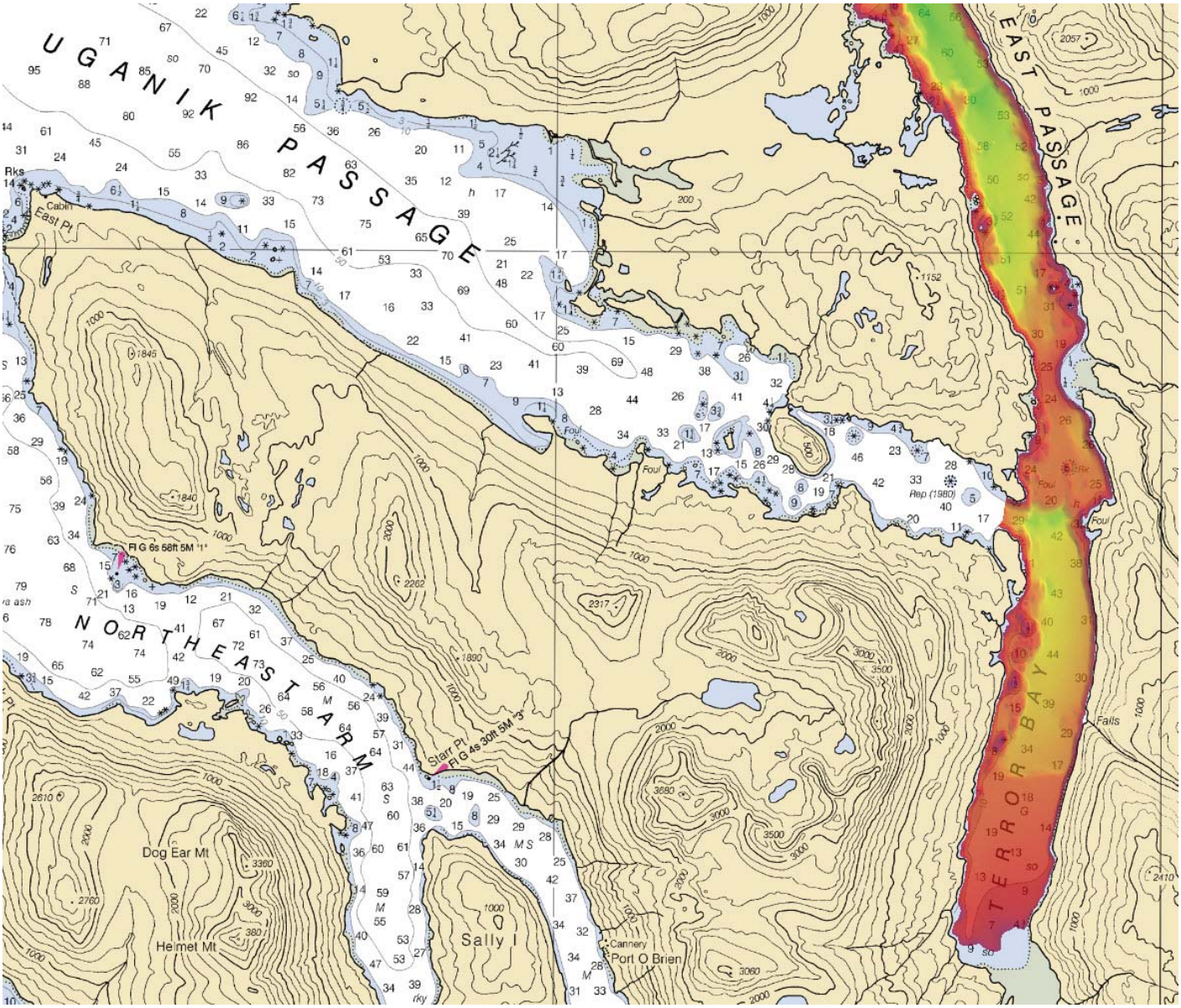


Figure 18: H12691 MBES coverage overlay on Chart 16597_1.

A.5 Survey Statistics

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

	HULL ID	*S221*	*2801*	*2802*	*2803*	*2804*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0	0	0
	MBES Mainscheme	37.01	74.14	196.25	113.96	255.43	676.79
	Lidar Mainscheme	0	0	0	0	0	0
	SSS Mainscheme	0	0	0	0	0	0
	SBES/SSS Mainscheme	0	0	0	0	0	0
	MBES/SSS Mainscheme	0	0	0	0	0	0
	SBES/MBES Crosslines	9.28	11.05	0	9.29	7.56	37.18
	Lidar Crosslines	0	0	0	0	0	0
Number of Bottom Samples							11
Number Maritime Boundary Points Investigated							0
Number of DPs							74
Number of Items Investigated by Dive Ops							0
Total SNM							31.38

Table 2: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/20/2015	263
09/21/2015	264

Survey Dates	Day of the Year
09/22/2015	265
10/01/2015	274
10/02/2015	275
10/08/2015	281
10/15/2015	288
10/19/2015	292
10/21/2015	294

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:

Hull ID	*S221*	*2801*	*2802*	*2803*	*2804*	*1905*	*1906*
LOA	70.4 meters	8.8 meters	8.8 meters	8.8 meters	8.8 meters	5.7 meters	5.8 meters
Draft	4.7 meters	1.1 meters	1.1 meters	1.1 meters	1.1 meters	0.3 meters	0.3 meters

Table 4: Vessels Used

All data for H12691 was acquired by the NOAA Ship Rainier (S221), launches (2801, 2802, 2803, and 2804) and skiffs (1905, 1906). The ship and launches acquired MBES depth soundings, sound speed profiles, and bottom samples. The skiffs (1905 and 1906) conducted shoreline verification.

B.1.2 Equipment

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

Manufacturer	Model	Type
Applanix	POS MV v4	Positioning and Attitude System
Kongsberg	EM710	MBES
Reson	SeaBat 7125 SV2	MBES
Reson	SeaBat 7125-B	MBES
Reson	SVP70	Sound Speed System
Reson	SVP71	Sound Speed System
Sea-Bird Electronics	SBE 19plus and SBE 19 SEACAT Profiler	Conductivity, Temperature, and Depth Sensor
ODIM Brooke Ocean	MVP 200	Sound Speed System
Applied Microsystems	MicroCTD	Conductivity, Temperature, and Depth Sensor

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Crosslines acquired for this survey totaled 5.49% of mainscheme acquisition.

Multibeam crosslines were acquired using the Reson 7125-B on launches 2801 (RA-4), 2803 (RA-3), and the Reson 7125 SV2 on launch (RA-6). A 4 meter CUBE surface was created using only mainscheme lines, and a second 4-meter CUBE surface was created using only crosslines. A difference surface was generated from these two surfaces in Caris at a 4-meter resolution. This difference surface was compared to the IHO allowable total vertical uncertainty (TVU) standards. In total, 98.94% of the depth differences between H12691 mainscheme and crossline data met HSSD TVU standards (Figure 19). This analysis was performed on H12691 data reduced to Mean Lower-Low Water (MLLW) using Ellipsoidally Referenced Zoned Tides (ERZT) methods.

A mainscheme to crossline comparison of H12691 data reduced to MLLW using Discrete Zoned Tides was also conducted. Discrete Zoned Tides mainscheme to crossline data differed by an average of 0.028 meters with a standard deviation of 0.416 meters. ERZT mainscheme to crossline data differed by an average of 0.044 meters with a standard deviation of 0.401 meters (Figure 20).

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	616,087	602,893	97.86%
Greater than 100m	Order 2	650,382	650,145	99.96%
	TOTAL:	1,266,469	1,253,038	98.94%

Figure 19: Summary table indicating the percentage of difference surface nodes between H12691 mainscheme and crossline ERZT data that met HSSD allowable TVU standards.

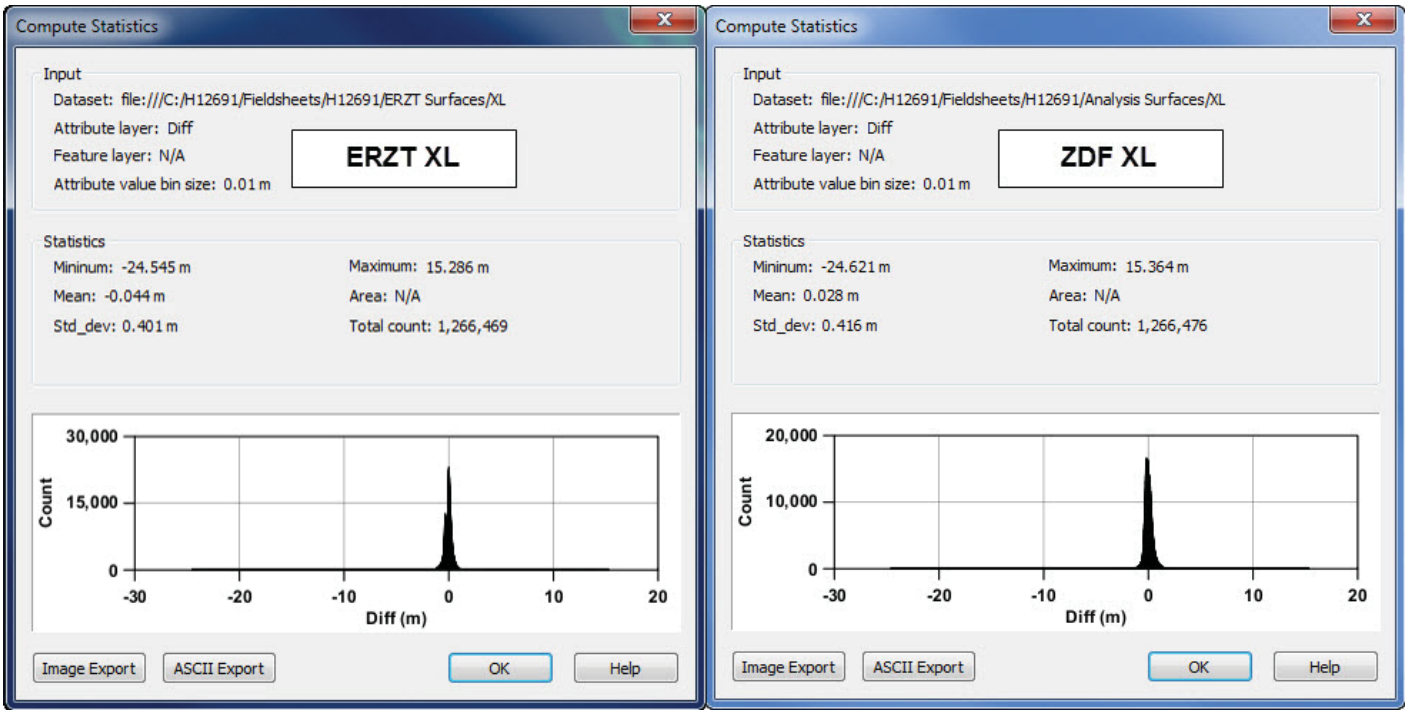


Figure 20: H12691 MBES mainscheme to crossline comparison statistics using ERZT (left) and Discrete Zoned Tides (right).

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning	Method
0.035003 meters	0 meters	ERZT

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
2801, 2802, 2803, 2804	3.0 meters/second		0.15 meters/second
S221		1.0 meters/second	0.05 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.

Total Propagated Uncertainty (TPU) values for H12691 were derived from a combination of fixed values for equipment and vessel characteristics, as well as field assigned values for sound speed uncertainties. ERZT uncertainty was calculated using a standard error estimator, wherein the mean of the ERZT standard deviation layer was divided by the square root of an estimated number of survey lines in a given node. This measured tide error uncertainty of 0.035003 meters was entered to account for ERZT processing methods.

In addition to the usual a priori estimates of uncertainty, some real-time and post processed uncertainty sources were also incorporated into the depth estimates of this survey. Real-time uncertainties from Reson MBES sonars were recorded and applied during post processing. Applanix TrueHeave (POS) files, which record estimates of heave uncertainty, were also applied during post processing. Finally, the post processed uncertainties associated with vessel roll, pitch, yaw and navigation, were applied in Caris HIPS using SBET/RMS files generated using POSPac software.

Uncertainty values of submitted final grids were calculated in Caris using the "Greater of the Two" of uncertainty and standard deviation (scaled to 95%). The finalized CSAR IHO compliance tool within Pydro was used to analyze H12691 MBES uncertainty (Figures 21-25).

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 uncertrainty defined in the HSSD. Using this method, areas of concentrated IHO non-compliance were found in the final 2-meter CUBE surface on the east and west sides of Terror Bay (Figure 26). On the steep eastern slope, the CUBE surface undulates above and below soundings. Therefore, the CUBE surface exceeds accepted IHO TVU (Figure 26). On the western slope, there is a vertical offset between lines 2802_2015_2812043 and 2802_2015_2652329 which causes the CUBE surface to exceed the accepted IHO TVU (Figure 28).

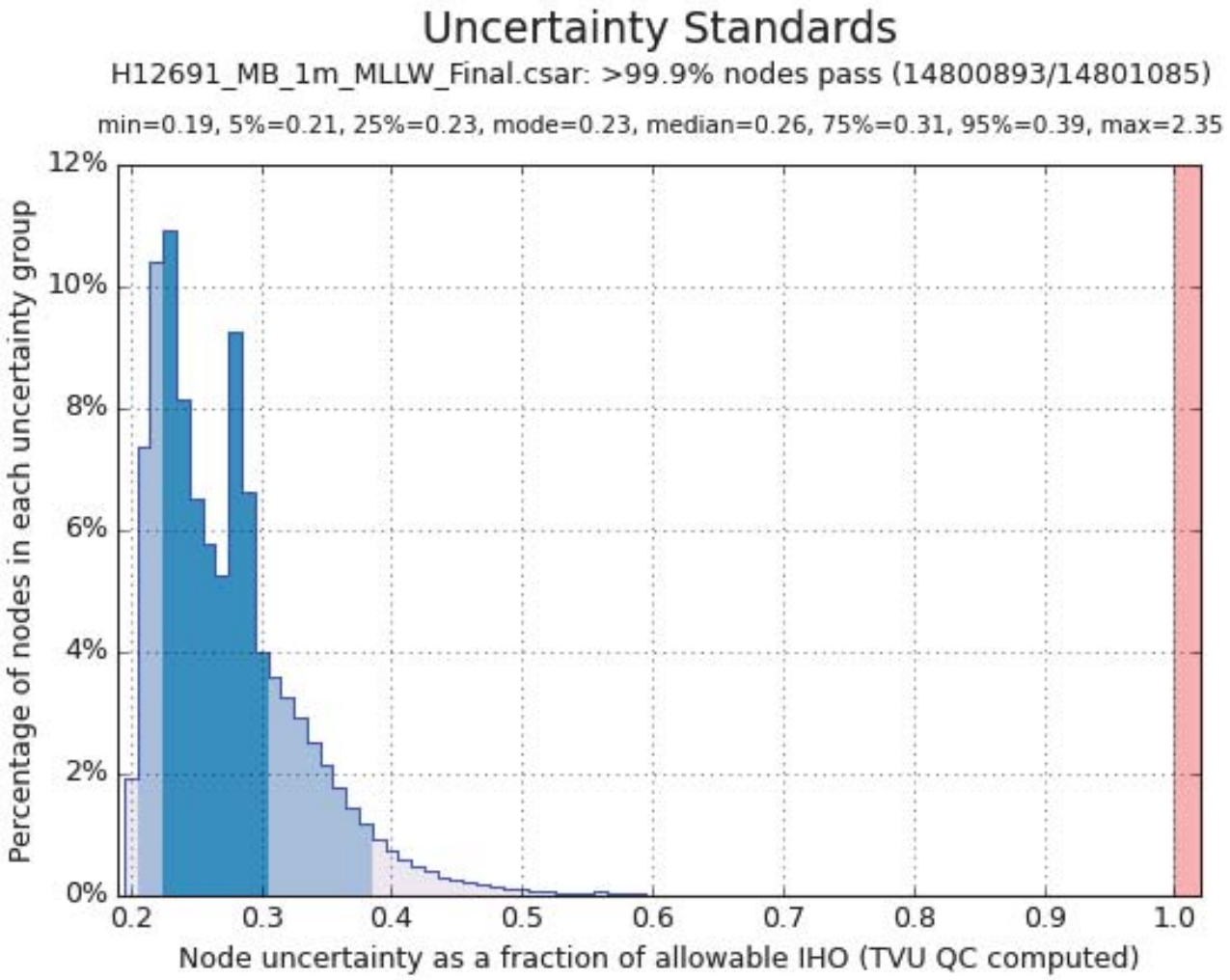


Figure 21: 1-meter finalized surface meets HSSD uncertainty standards.

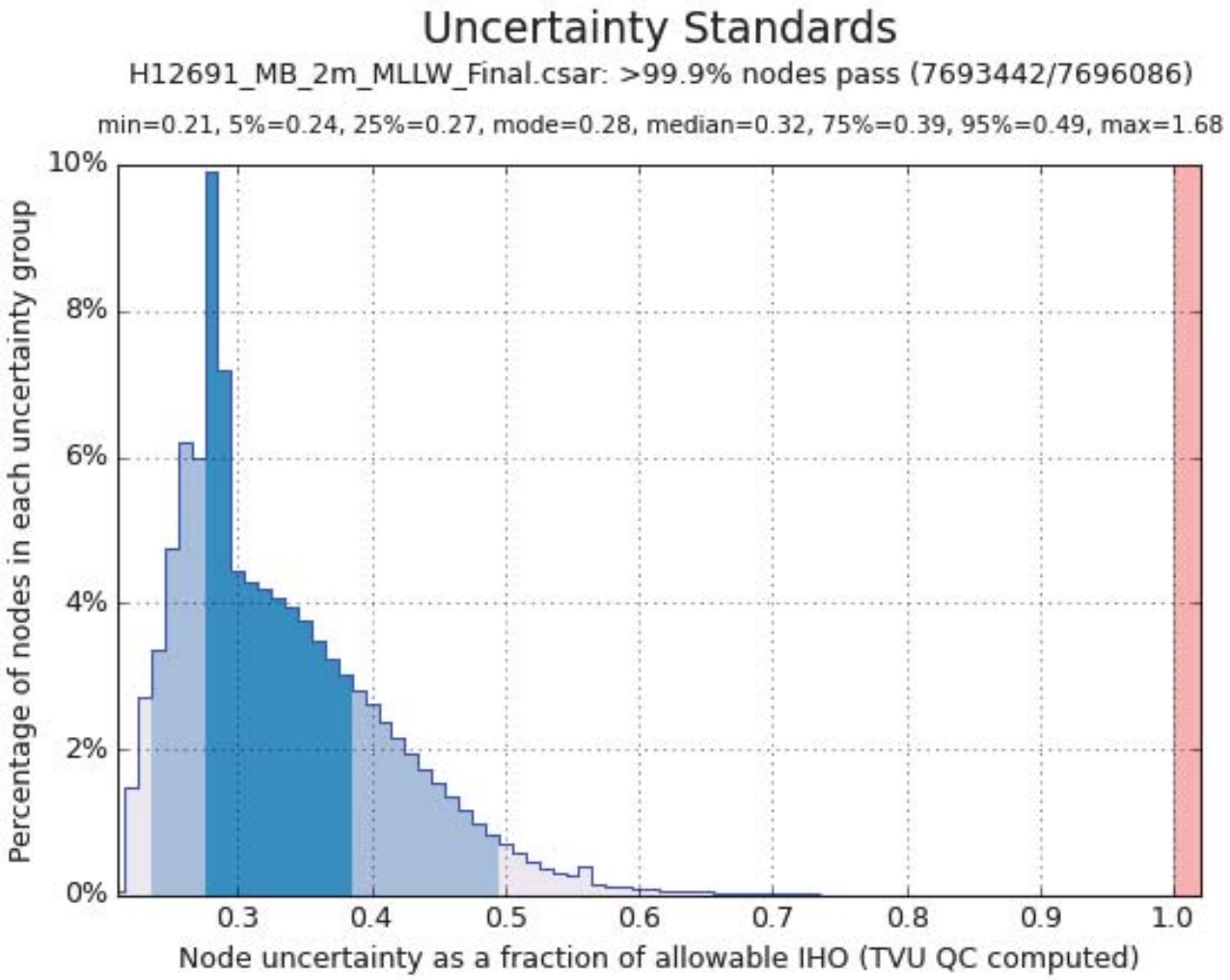


Figure 22: 2-meter finalized surface meets HSSD uncertainty standards.

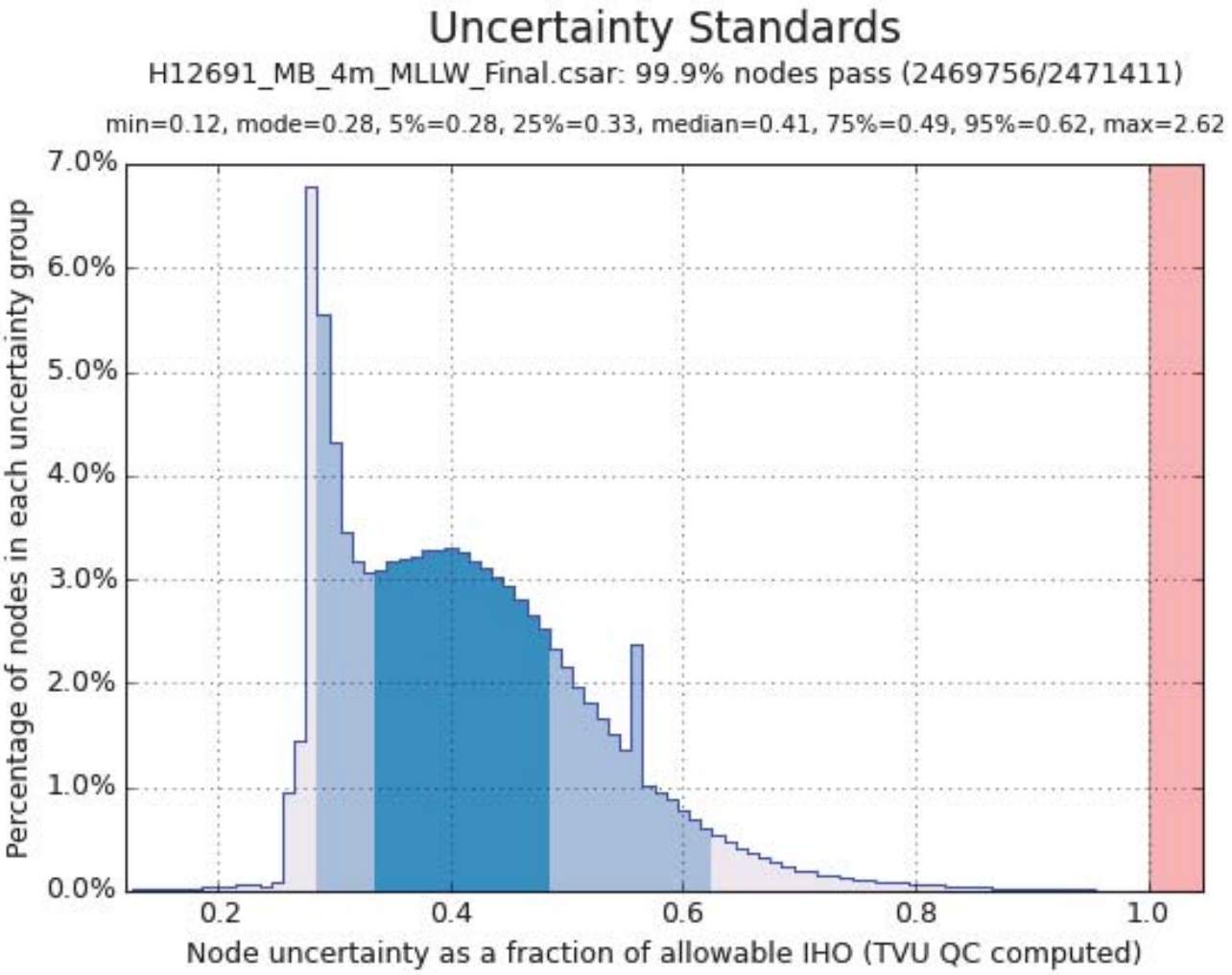


Figure 23: 4-meter finalized surface meets HSSD uncertainty standards.

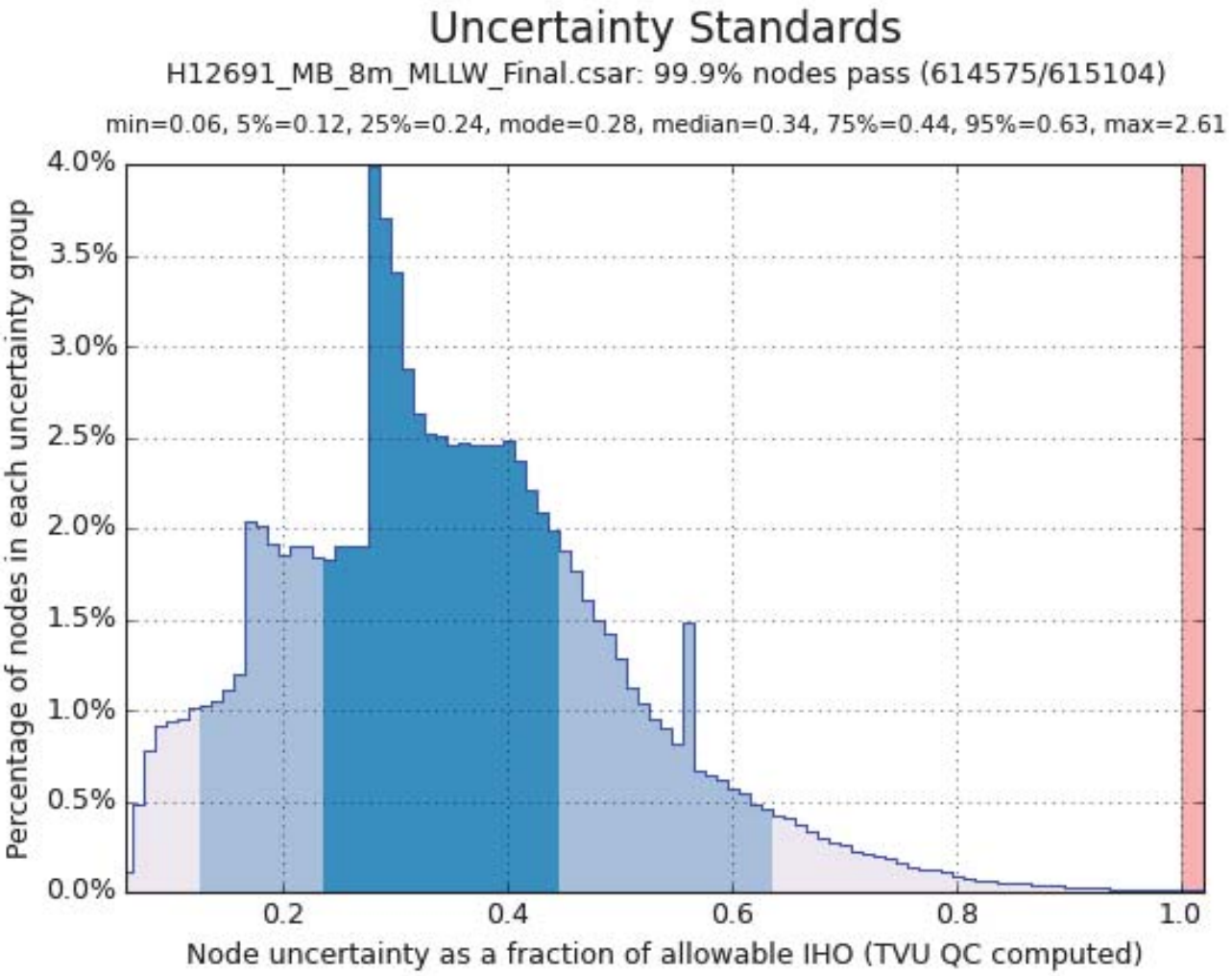


Figure 24: 8-meter finalized surface meets HSSD uncertainty standards.

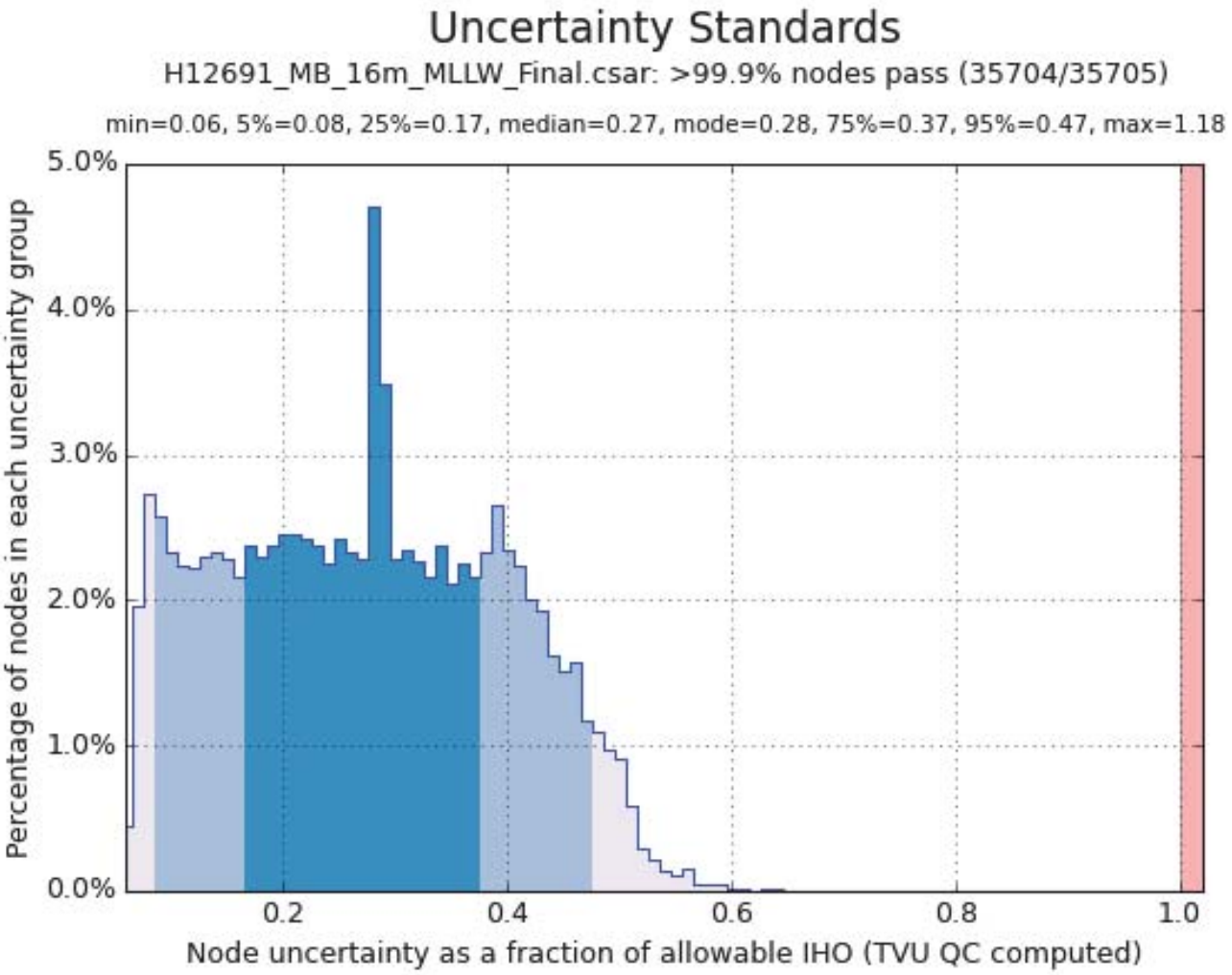


Figure 25: 16-meter finalized surface meets HSSD uncertainty standards.

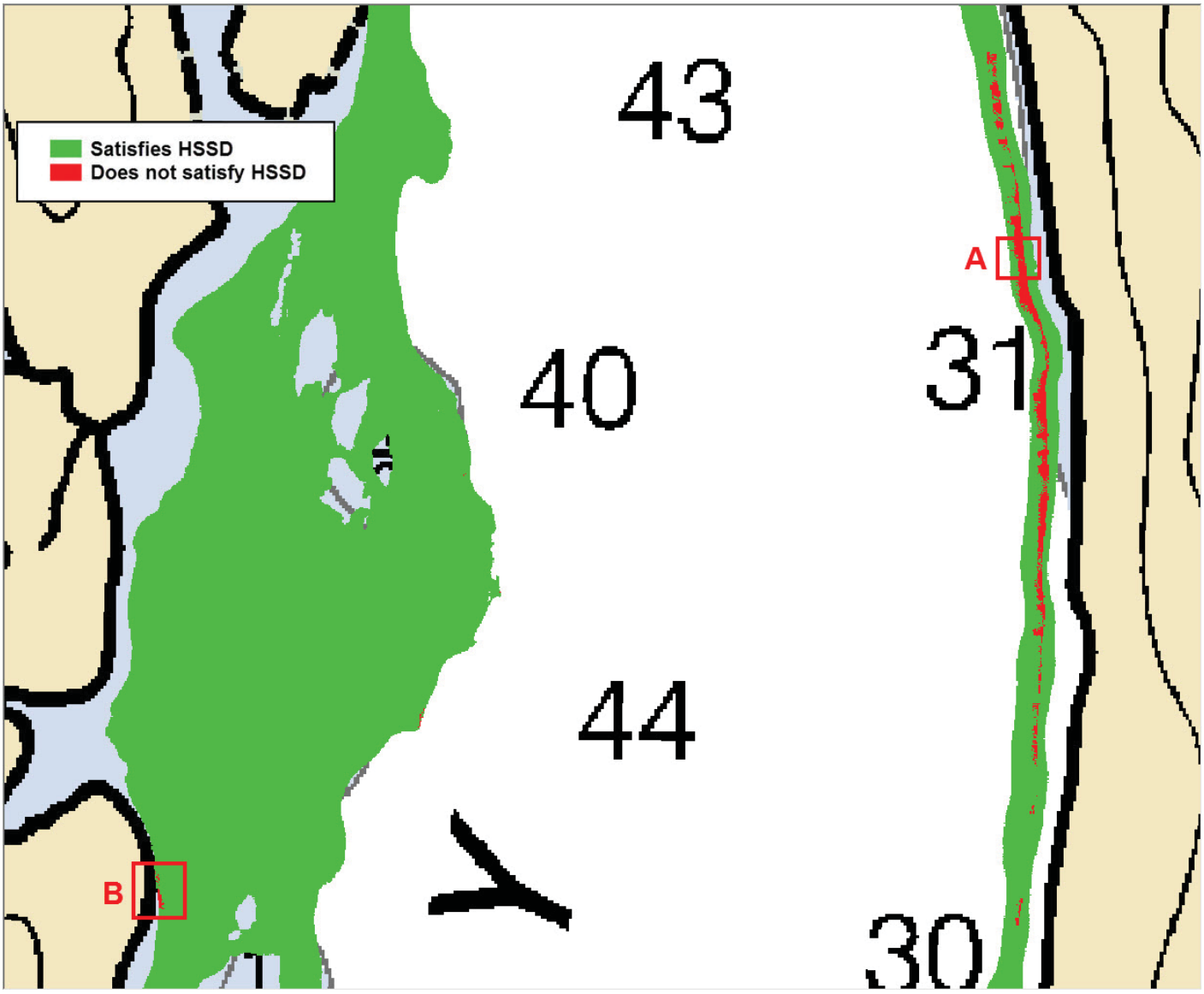


Figure 26: Areas of HSSD non-compliance in 2-meter finalized surface.

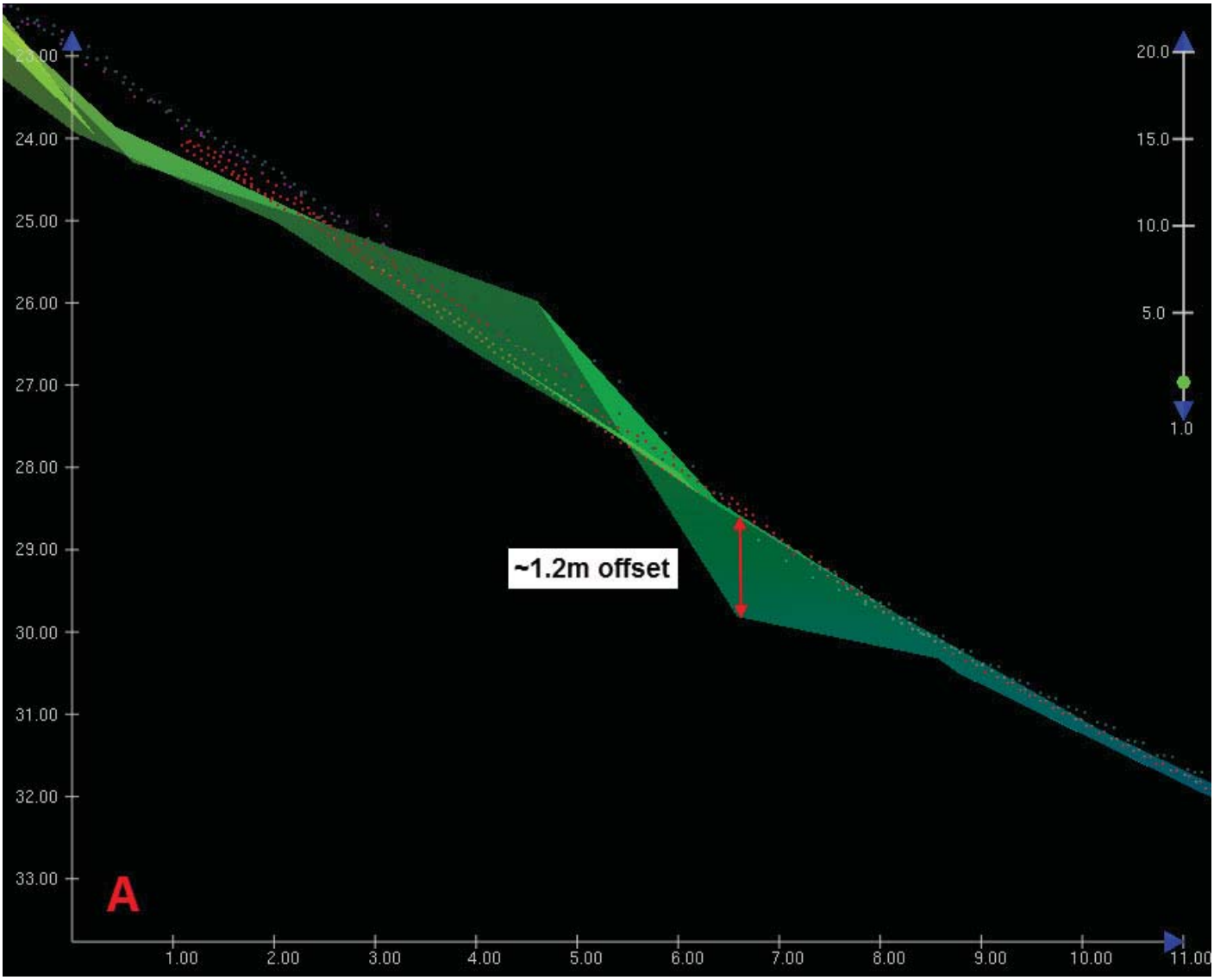


Figure 27: Surface undulation on steep slope causing IHO non-compliance.

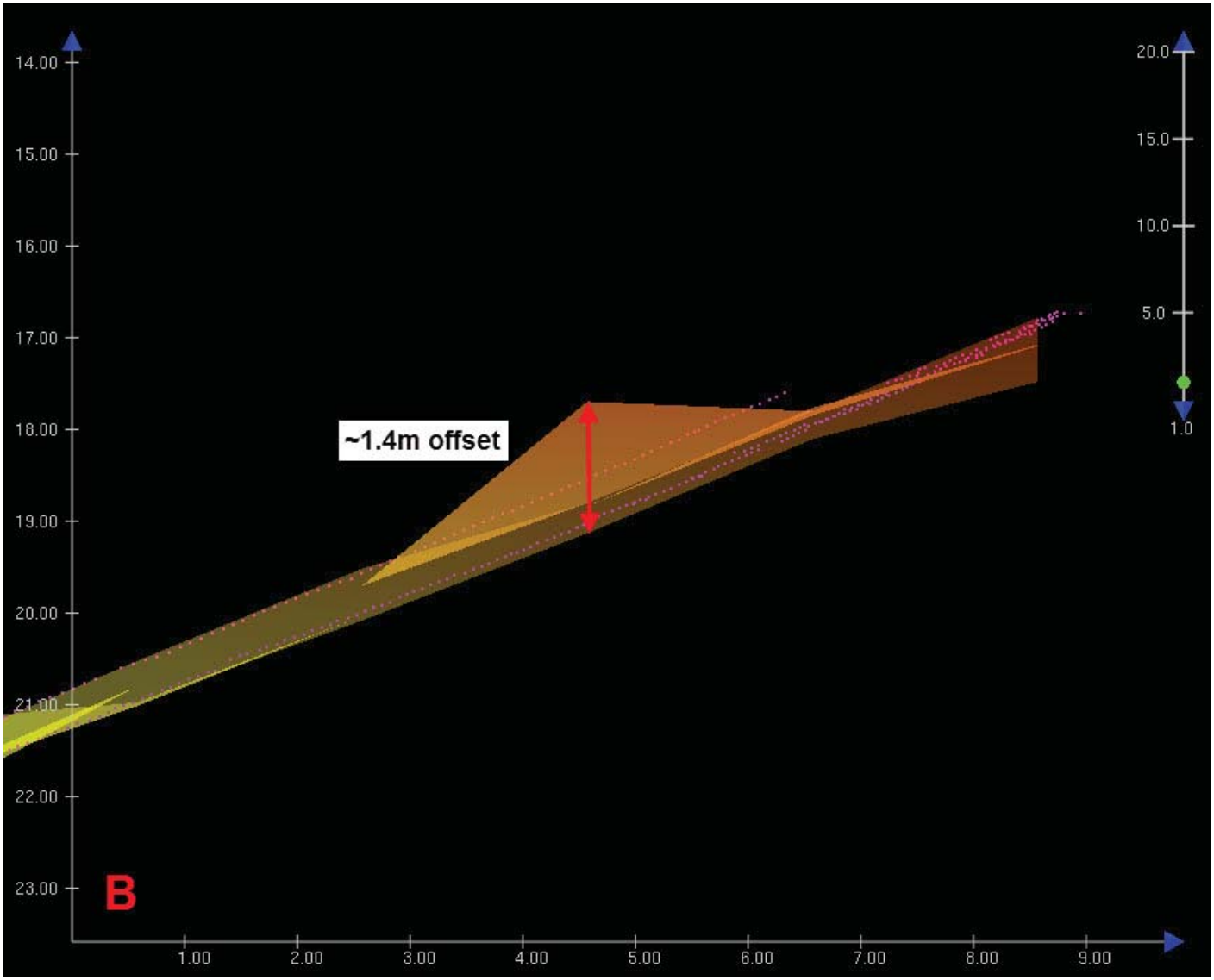


Figure 28: Line offset causing IHO non-compliance.

B.2.3 Junctions

One junction comparison was completed for H12691 with survey H12692, which was acquired concurrently by Rainier.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12692	1:40000	2015	NOAA Ship RAINIER	NW

Table 8: Junctioning Surveys

H12692

Overlap with survey H12692 ranges from approximately 200 to 750 meters wide along the northwestern boundary of H12691 (Figure 29). Depths in the junction area range from approximately 4 to 220 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 0.012 meters with a standard deviation of 0.436 meters. In total, 98.64% of the depth differences between H12691 and junction survey H12692 are within allowable uncertainties (Figure 30).

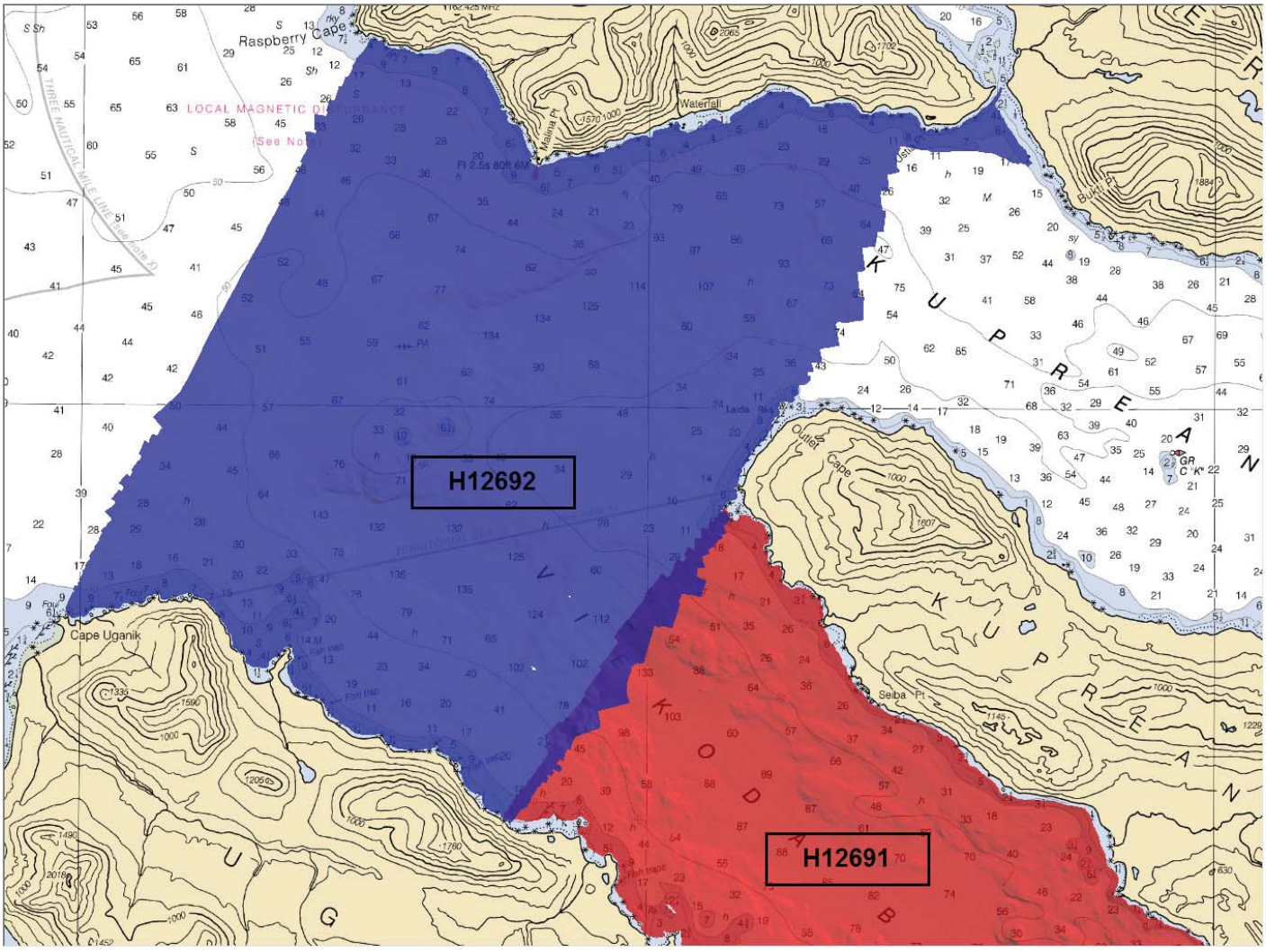


Figure 29: H12691 junction with H12692.

Depth range	IHO Order	Number of nodes	Nodes satisfying HSSD accuracy	Percent nodes satisfying HSSD accuracy
Less than 100m	Order 1	18,324	17,767	96.96%
Greater than 100m	Order 2	24,836	24,806	99.88%
	TOTAL:	43,160	42,573	98.64%

Figure 30: Summary table indicating the percentage of nodes from the junction overlap that met HSSD allowable TVU standards.

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

Kelp

Thick patches of kelp were seen mostly along the eastern and western shore of Viekoda Bay (Figure 31-33). MBES data in these areas were investigated using CARIS Subset Editor. Soundings that obviously represented kelp and not the seafloor were rejected. When unable to clearly distinguish between kelp and the seafloor, the soundings were retained.

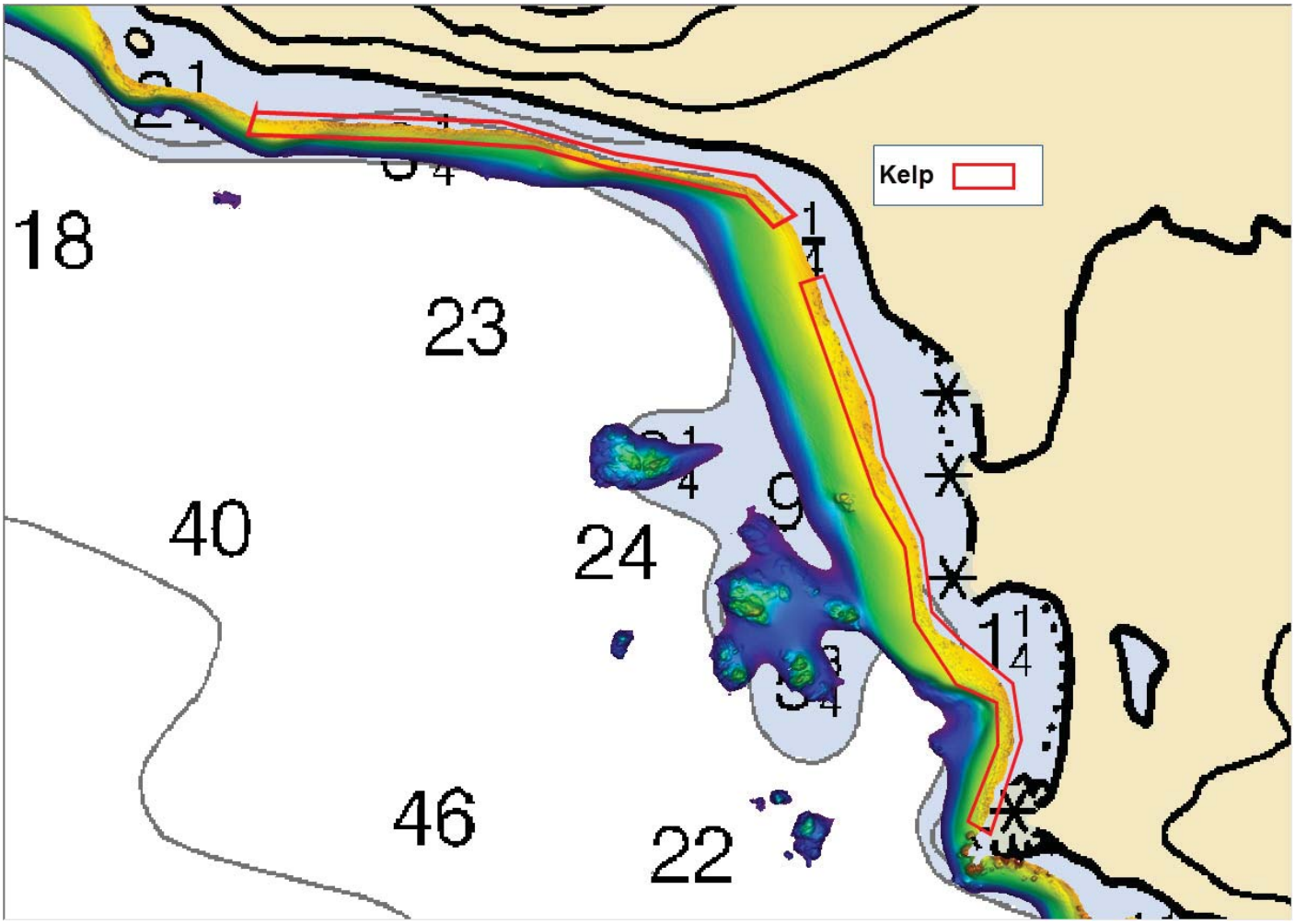


Figure 31: Kelp beds along the eastern shore of Viekoda Bay.

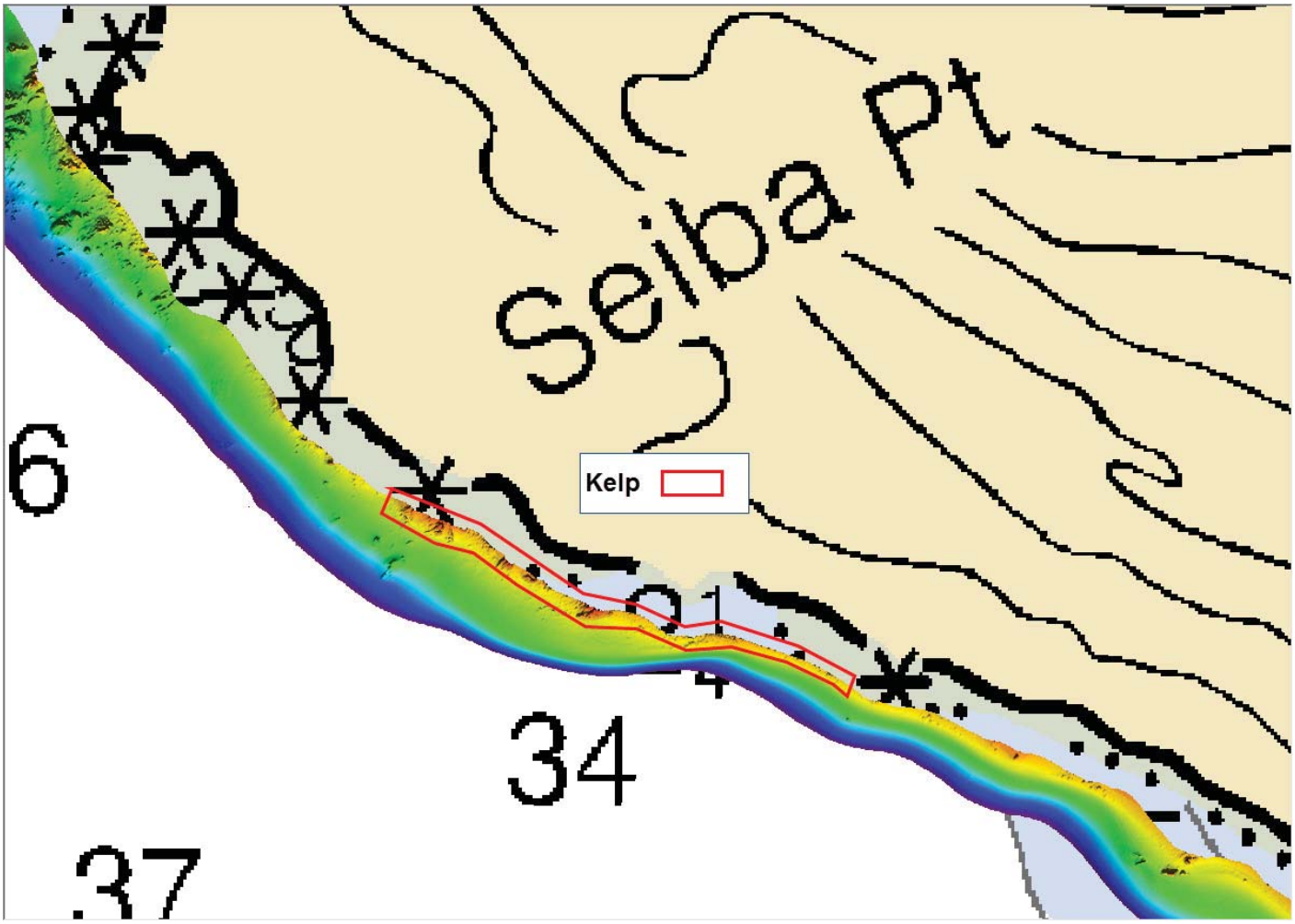


Figure 32: Kelp beds along the eastern shore of Seiba Point, Viekoda Bay.

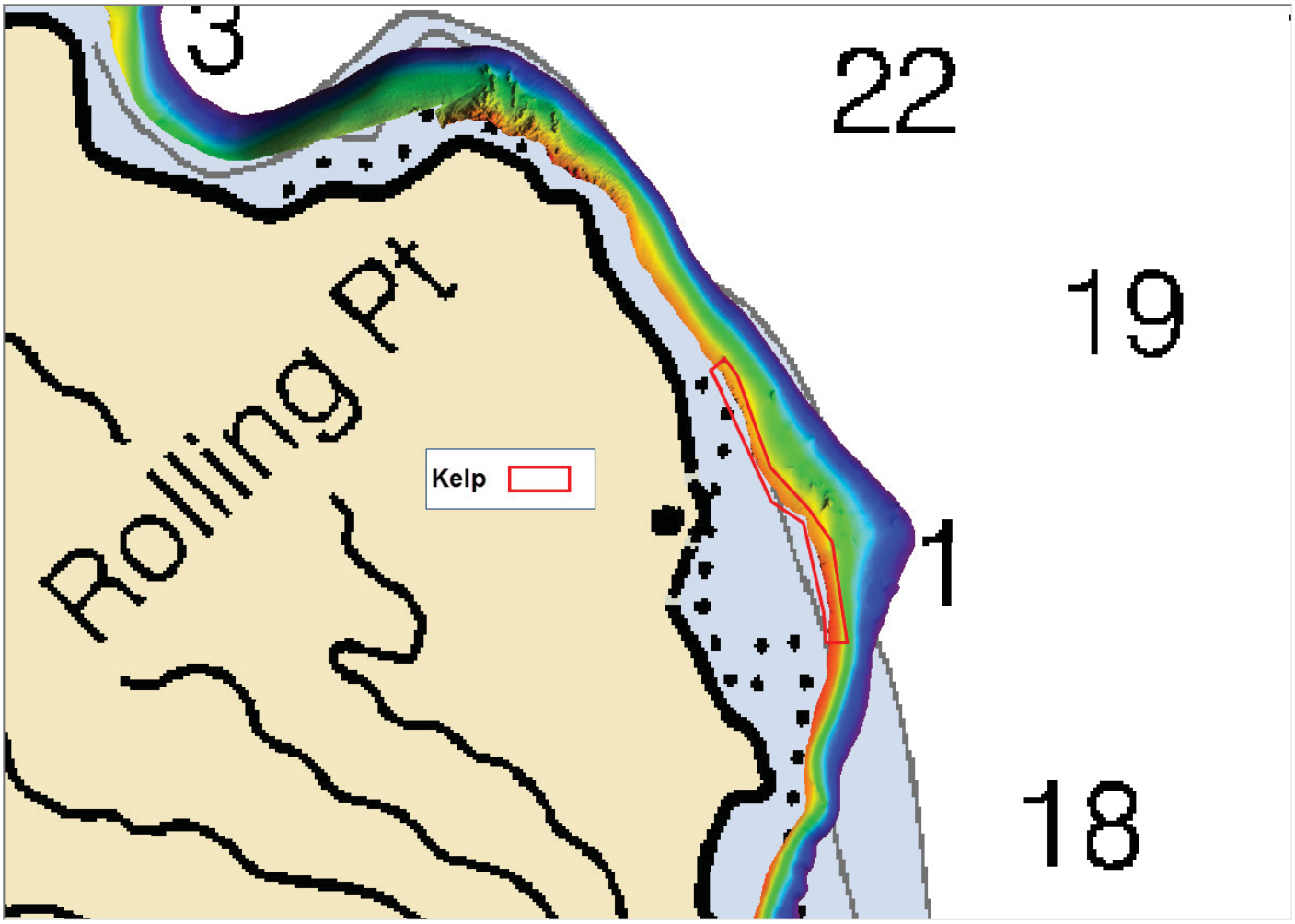


Figure 33: Kelp beds along the western shore near Rolling Point, Viekoda Bay.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: All launch sound speed profiles were acquired using either the SBE 19plus or SBE19 SEACAT CTD probes at discrete locations within the survey area at least once every four hours, when significant changes in surface speed were observed, or when surveying a new area. For MBES operations conducted on S221 (Rainier), sound speed profiles were acquired using the ODIM Brooke Ocean MVP200 in the same manner and frequency as with the launch CTD casts. A sheet-wide concatenated sound speed file was created and applied to survey lines using the "Nearest in distance within time (4 hours)" profile selection method.

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.

It was determined in office review that systematic roll bias errors exist in the data for 2801's RESON 7125, 200kHz transceiver. The HVF contains a roll bias correction of -0.67 degrees, but the data is at optimal intra-line alignment with a roll bias corrector value of -0.42 degrees.

B.4 Backscatter

Raw Backscatter was logged as a 7k file and has been sent to the Processing Branch. Backscatter was not processed by the field unit.

Raw backscatter data was submitted to NCEI and data was processed into mosaic GeoTIFF images during office processing.

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 and SIPS	9.0.21

Table 9: Primary bathymetric data processing software

The following Feature Object Catalog was used: NOAA Extended Attribute Files V_5_3_3. All features were processed using Caris HIPS and SIPS 9.0 and Caris Notebook 3.1.

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
H12691_MB_1m_MLLW	CUBE	1 meters	-1.52 meters - 232.21 meters	NOAA_1m	Complete MBES
H12691_MB_2m_MLLW	CUBE	2 meters	-1.46 meters - 224.24 meters	NOAA_2m	Complete MBES
H12691_MB_4m_MLLW	CUBE	4 meters	-1.14 meters - 222.99 meters	NOAA_4m	Complete MBES
H12691_MB_8m_MLLW	CUBE	8 meters	-1.13 meters - 222.67 meters	NOAA_8m	Complete MBES
H12691_MB_16m_MLLW	CUBE	16 meters	-0.42 meters - 222.05 meters	NOAA_16m	Complete MBES
H12691_MB_1m_MLLW_Final	CUBE	1 meters	-2 meters - 20 meters	NOAA_1m	Complete MBES
H12691_MB_2m_MLLW_Final	CUBE	2 meters	12 meters - 40 meters	NOAA_2m	Complete MBES
H12691_MB_4m_MLLW_Final	CUBE	4 meters	33 meters - 80 meters	NOAA_4m	Complete MBES
H12691_MB_8m_MLLW_Final	CUBE	8 meters	72 meters - 160 meters	NOAA_8m	Complete MBES
H12691_MB_16m_MLLW_Final	CUBE	16 meters	144 meters - 320 meters	NOAA_16m	Complete MBES

Table 10: Submitted Surfaces

All Caris CUBE surfaces were created with lines reduced to MLLW via ERZT methods. Twenty-seven soundings were designated in accordance with HSSD requirements.

The 1-meter, 2-meter, and 4-meter grid resolution ranges were expanded to minimize holidays due to acoustic shadows around shoals and on steep slopes, and to include the full range of survey coverage. See Appendix V for required documentation.

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:

ERZT

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

Station Name	Station ID
Seldovia	9455500

Table 11: NWLON Tide Stations

The following subordinate water level stations were established for this survey:

Station Name	Station ID
South Arm, Uganik Bay, AK	9457588

Table 12: Subordinate Tide Stations

File Name	Status
9455500	Final Approved

Table 13: Water Level Files (.tid)

File Name	Status
P136RA2015_Rev2_CORP	Final

Table 14: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 10/23/2015. The final tide note was received on 03/07/2016.

The NWLON tide station in Seldovia, AK (9455500) and the subordinate tide station installed by Rainier personnel in South Arm, Uganik Bay, AK (9457588) served as the controls for datum determination and water level reducers for survey H12691. A complete description of the vertical and horizontal control for this survey can be found in the accompanying OPR-P136-RA-15 Horizontal and Vertical Control Report (HVCR), submitted under a separate cover.

Non-Standard Vertical Control Methods Used:

Ellipsoid to Chart Datum Separation File:

H12691_WGS84_MLLW_SEP_1000m.csar

Ellipsoidally Referenced Zoned Tides (ERZT) methods were used to transform between the ellipsoid and water level data. A 1000-meter resolution separation model between the ellipsoid and MLLW was computed using the real-time position measurements observed during the survey relative to the water line and the loaded ZDF tide file. GPS tides were then computed using the above separation model and the corrected GPS-height-to-water level data (SBET). The 1000-meter resolution separation model was generated in WGS84 due to the SBETs being exported in WGS84. For additional information see the OPR-P136-RA-15 ERS/ERZT Capability Memo included with the supplemental correspondence.

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) Zone 5 North.

The following PPK methods were used for horizontal control:

Smart Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
AC27	AC27MNEIL_AK2004
AC08	CAPDOUGLASAK2007
AC38	QUARTZ_CRKAK2005
AC67	PILLARMTN_AK2006
KOD6	KODIAK 6
KOD5	KODIAK 5
AC34	OldHarbor_AK2006
AC39	SHUYAKISSPAK2006
AC45	SITKINAKISAK2006
AC24	KINGSALMONAK2006
SELD	SELD_AKDA_AK2000
AC26	CAPE_GULL_AK2008
AC02	AkhiokCorpAK2005

Table 15: CORS Base Stations

The following DGPS Stations were used for horizontal control:

DGPS Stations
Kodiak 313kHz

Table 16: USCG DGPS Stations

C.3 Additional Horizontal or Vertical Control Issues

3.3.1 Lines without SBETs

Applanix POSPac Smooth Best Estimate and Trajectory (SBET) corrections could not be applied to line 0013 acquired by S221 on DN263 because the Delayed Heave time extents do not entirely cover the line.

SBET corrections were also not applied to line 2207 acquired by launch 2802 on DN275 because Delayed Heave failed to apply to the line. Therefore, these lines could not be analyzed using ERZT methods. The HDCS data for these lines has been retained for submission, but has been omitted from the final CUBE surfaces.

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were made using a Caris sounding and contour layer derived from a 16-meter combined CUBE surface. The contours and soundings were overlaid on the charts and compared for general agreement and to identify areas of significant change. Charts 16594, 16597, and 16576 show good agreement where they overlap. Chart 16594 was used to make comparisons in Viekoda Bay and Chart 16597 was used to make comparisons in Uganik East Passage and Terror Bay

As noted but not tabulated, this survey also falls on chart 16576 which includes depth curves at 10 fathom intervals. Shoaling and contour trends are similar for 16576 and chart 16594.
It should also be noted that chart 16594 corresponds to ENC US4AK5PM and chart 16597 corresponds to ENC US4AK5QM.

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	1:78900	14	01/2015	04/05/2016	04/09/2016
16597	1:80000	10	04/2015	04/05/2016	04/09/2016

Table 17: Largest Scale Raster Charts

16594

In Viekoda Bay, the 10-fathom and 3-fathom contours are mostly seen to be inshore from what is charted (Figures 34-36). There are also many shoals offshore of the charted 10-fathom contour (Figures 37). The 50-fathom contour tends to fall further offshore than what is charted (Figures 38-39). Derived soundings often disagree with what is charted. Many shoaling trends are seen offshore and deepening trends are seen nearshore.

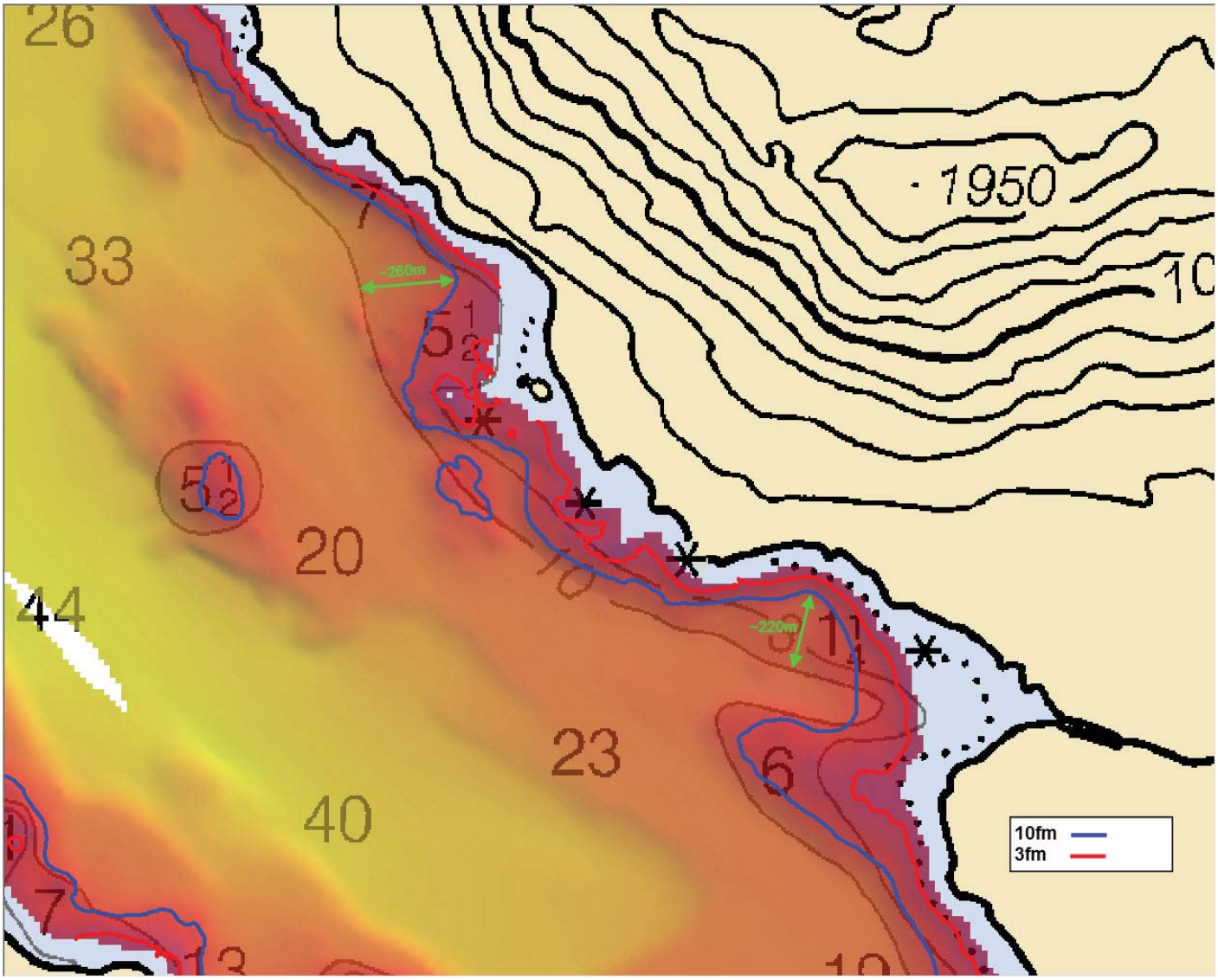


Figure 34: Variation of the 10 and 3-fathom contour showing deeper depths inshore of what is charted.

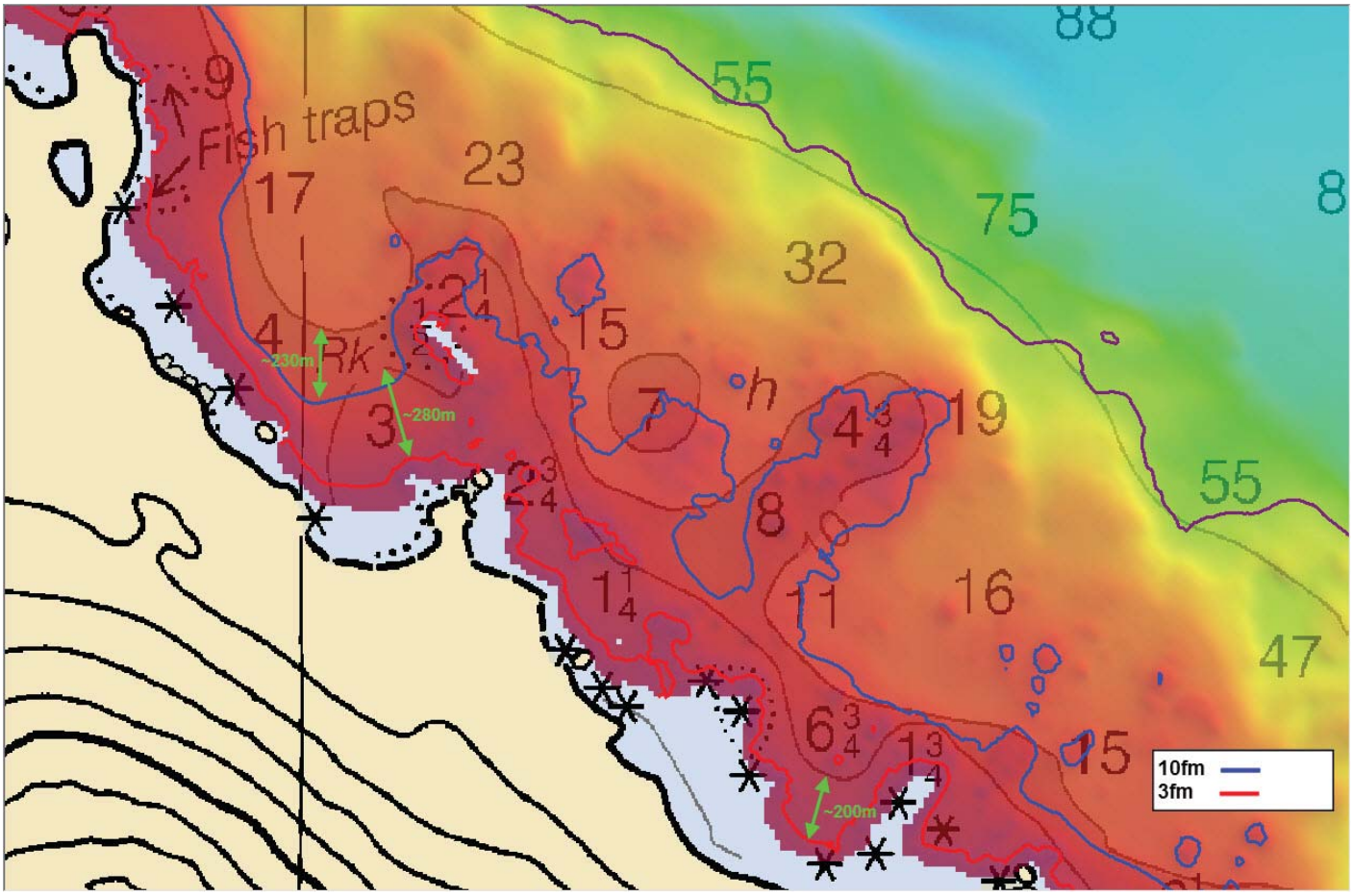


Figure 35: Variation of the 10 and 3-fathom contour showing deeper depths inshore of what is charted.

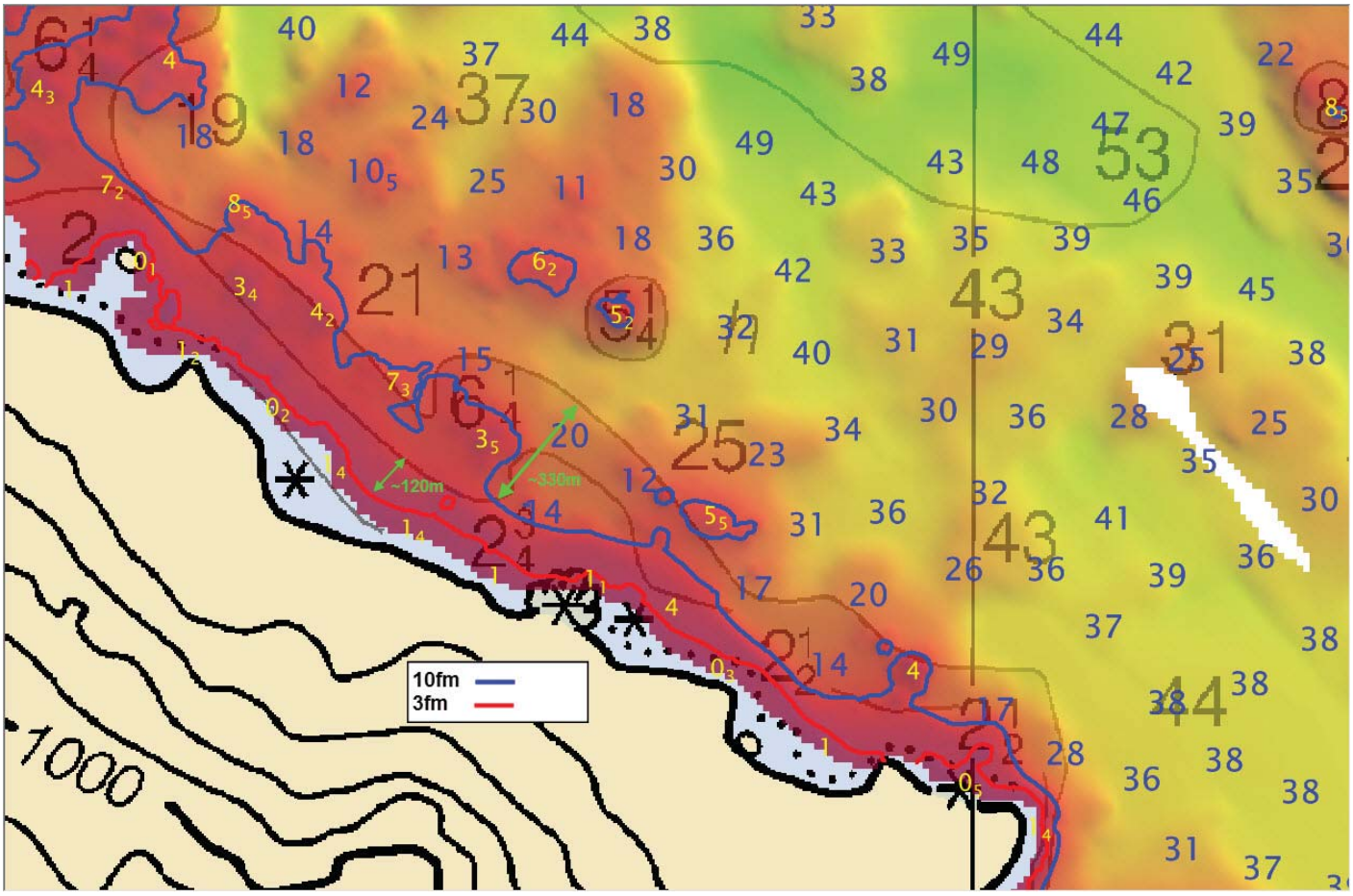


Figure 36: Variation of the 10 and 3-fathom contour showing deeper depths inshore of what is charted. Some shoals are offshore of the charted 10-fathom contour.

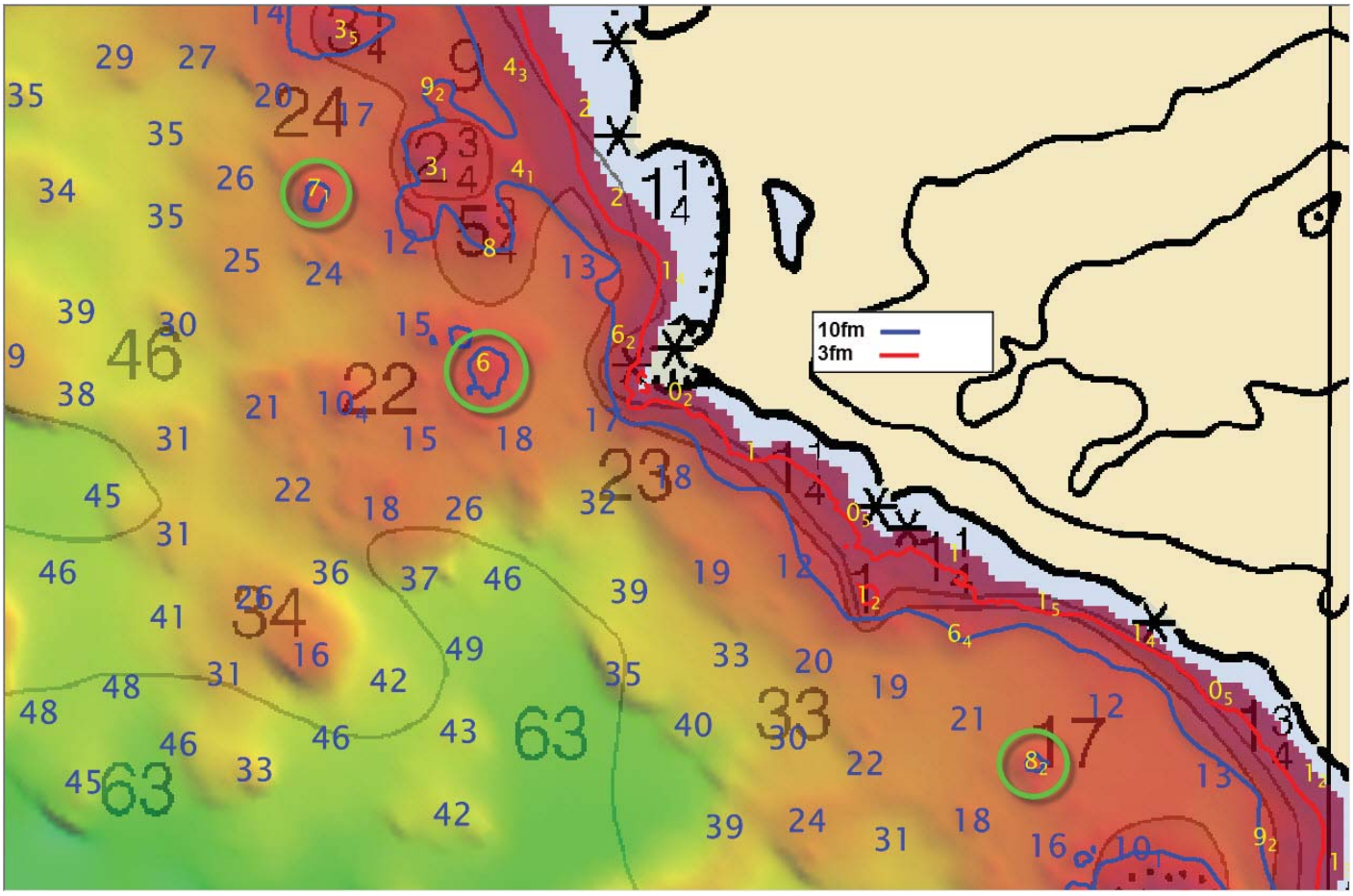


Figure 37: Shoals offshore of the 10-fathom contour.

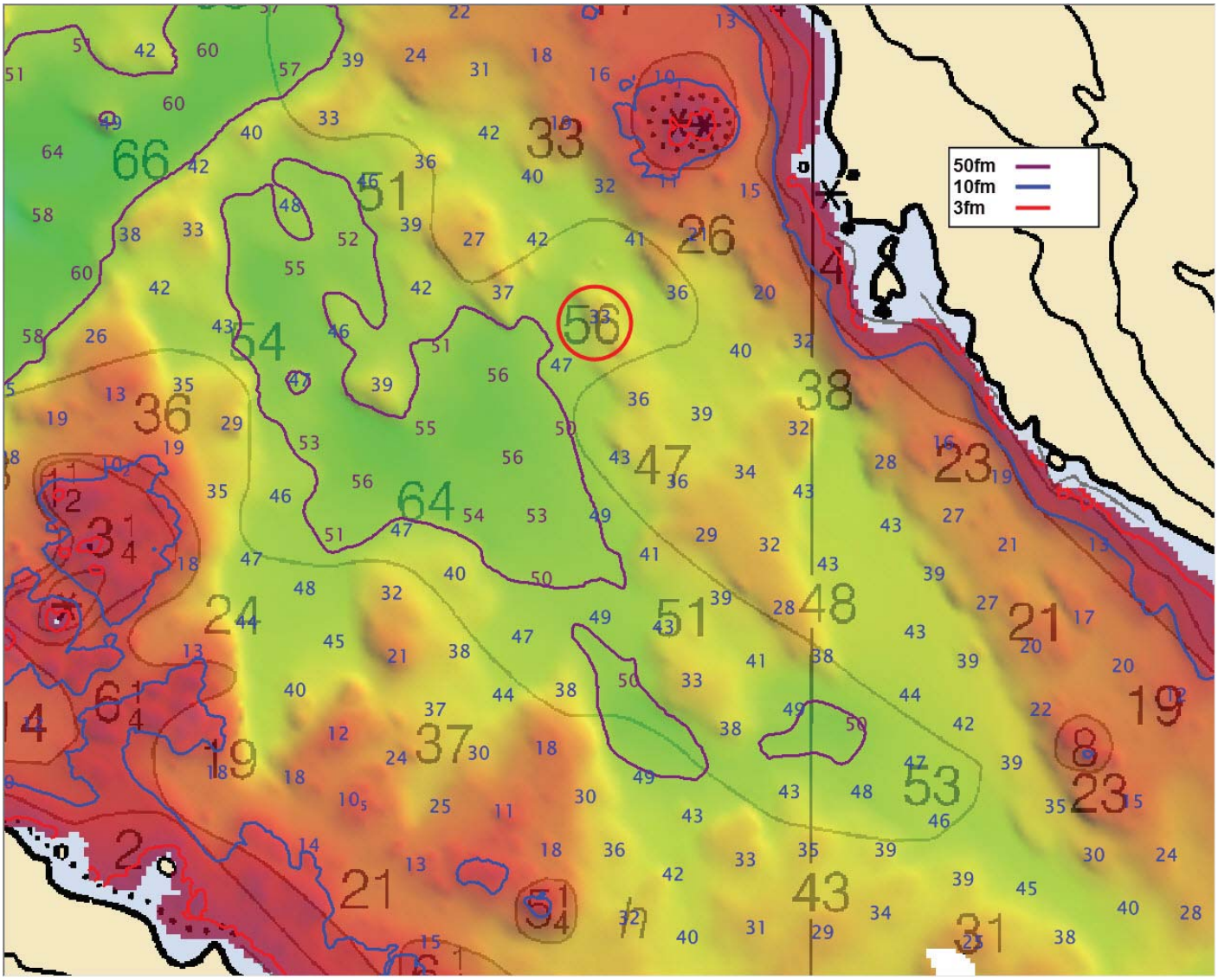


Figure 38: Variation of the 50-fathom contour which shows shoaler depths extending offshore. A sounding shoaler by 23-fathoms is highlighted.

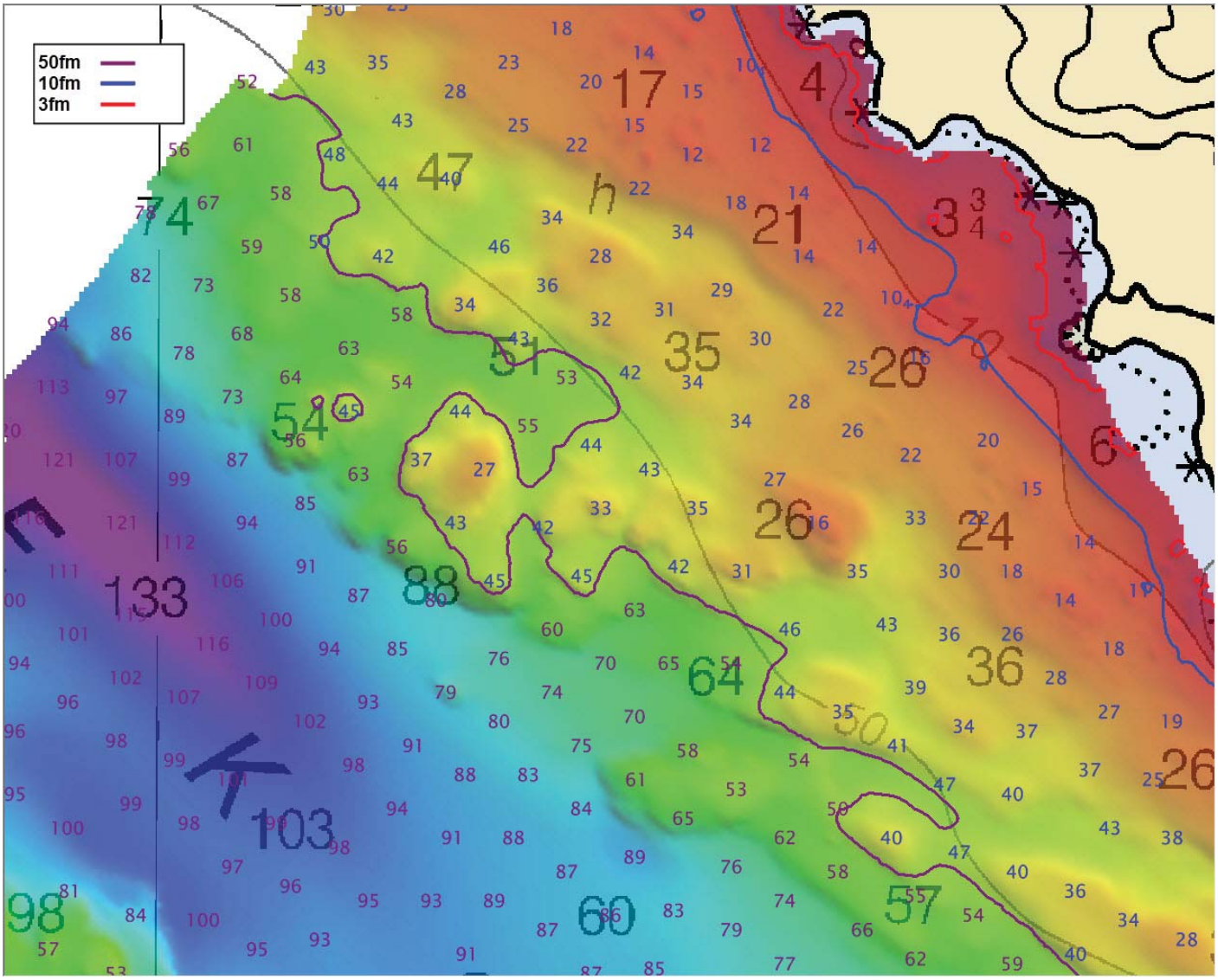


Figure 39: Variation of the 50-fathom contour, which shows shoaler depths extending further offshore.

16597

The overall trends in Uganik East Passage and Terror Bay are similar to what is seen in Viekoda Bay. Many shoaling trends are also seen offshore (Figures 40-41). Derived soundings show deepening trends along the western nearshore (42), while derived soundings along the eastern nearshore generally stay consistent with what is charted. There are also shoals offshore of the charted 10-fathom contour (Figure 43-44).

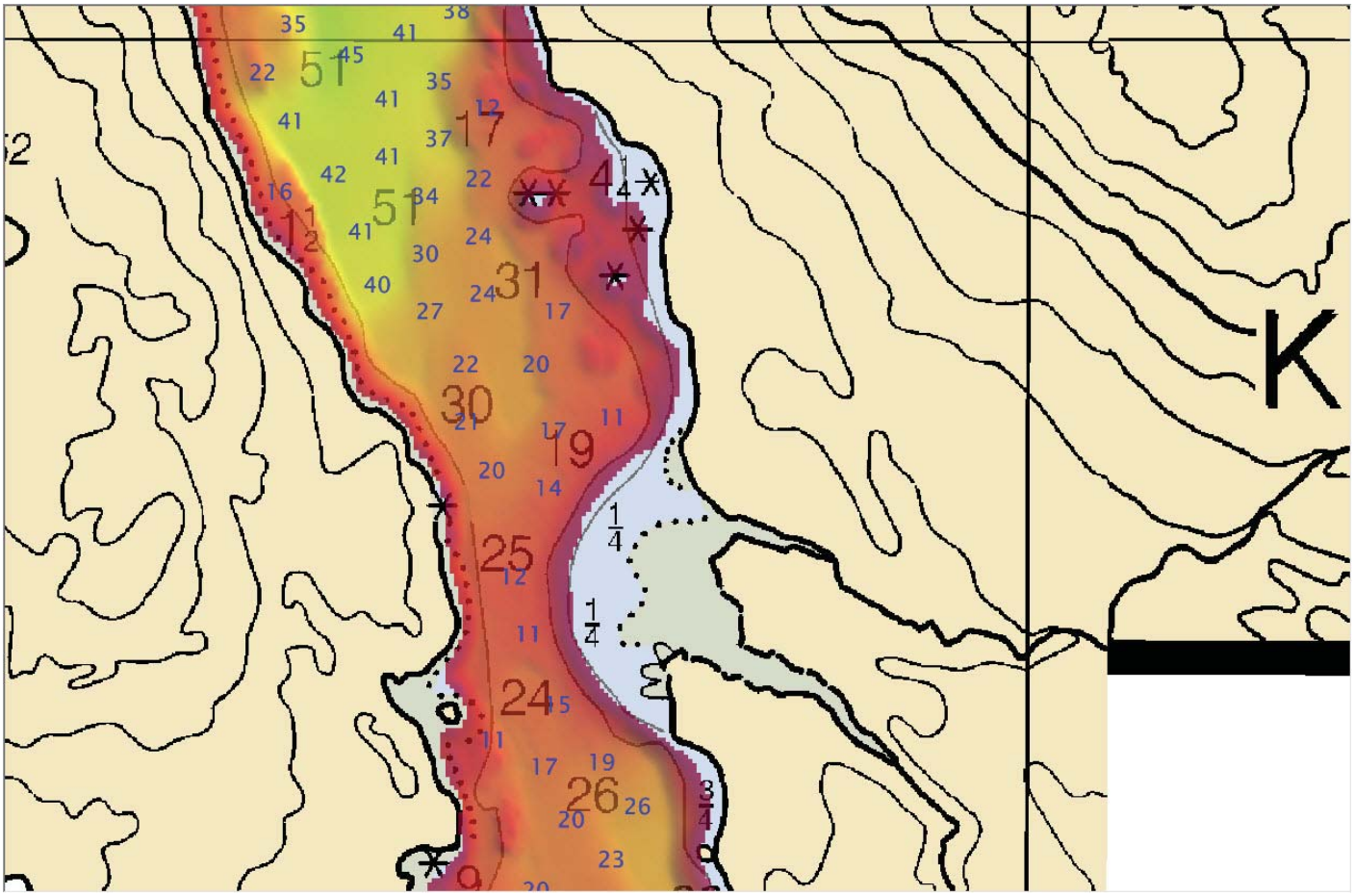


Figure 40: Soundings are generally shoaler than what is charted through Uganik East Passage and Terror Bay.

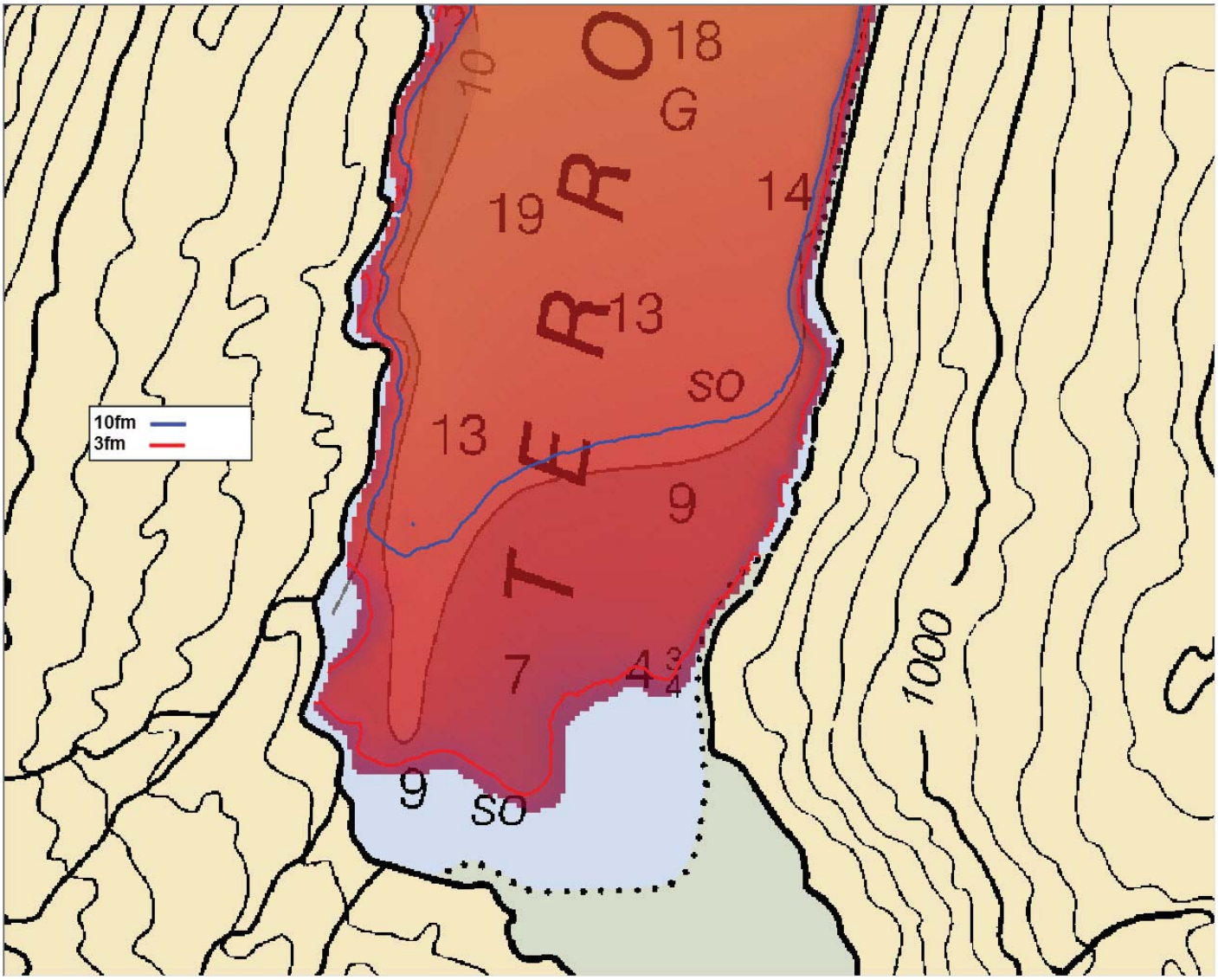


Figure 41: Variation of the 10-fathom contour which shows shoaler depths further offshore than what is charted.

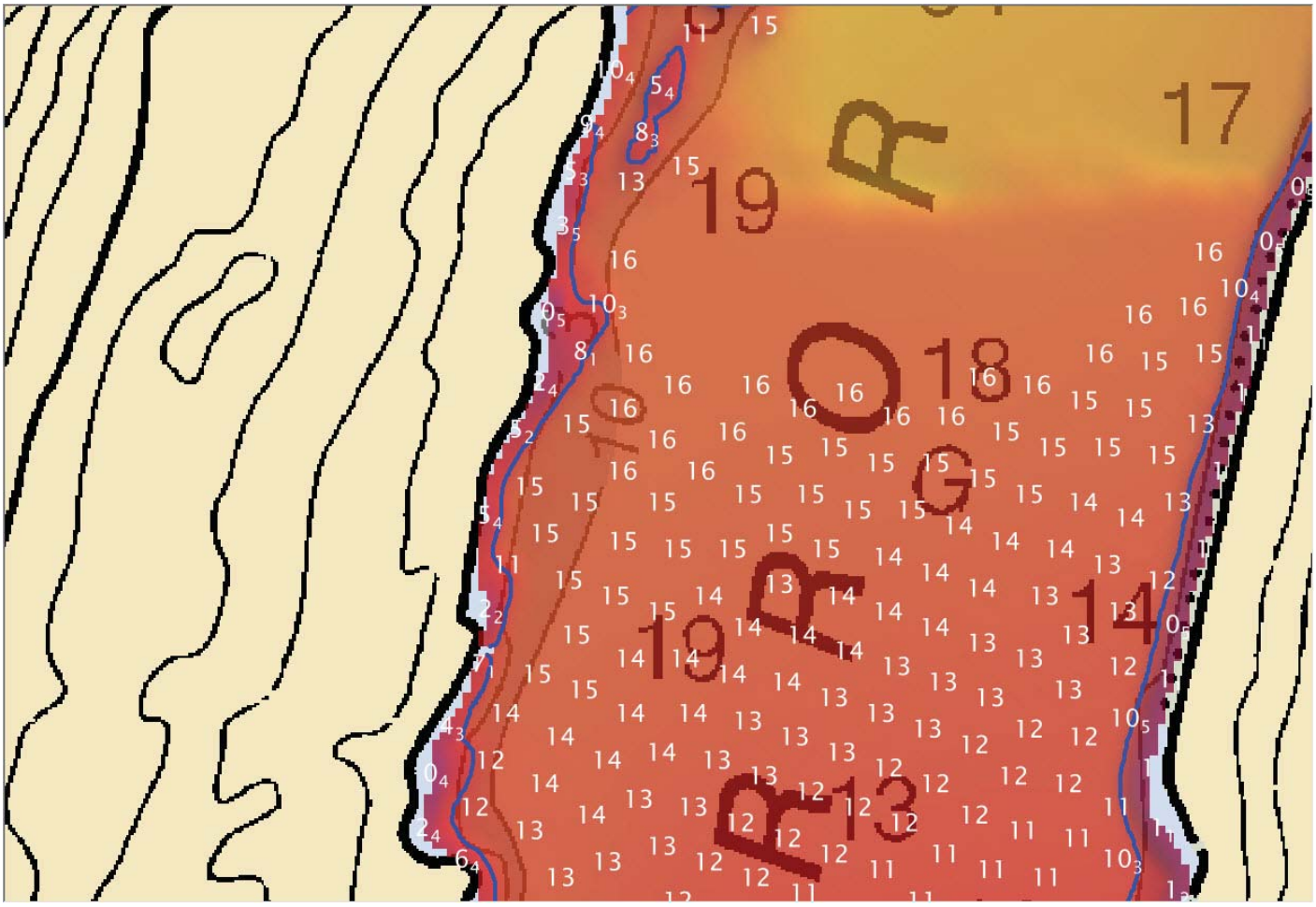


Figure 42: Deepening trend along western nearshore.

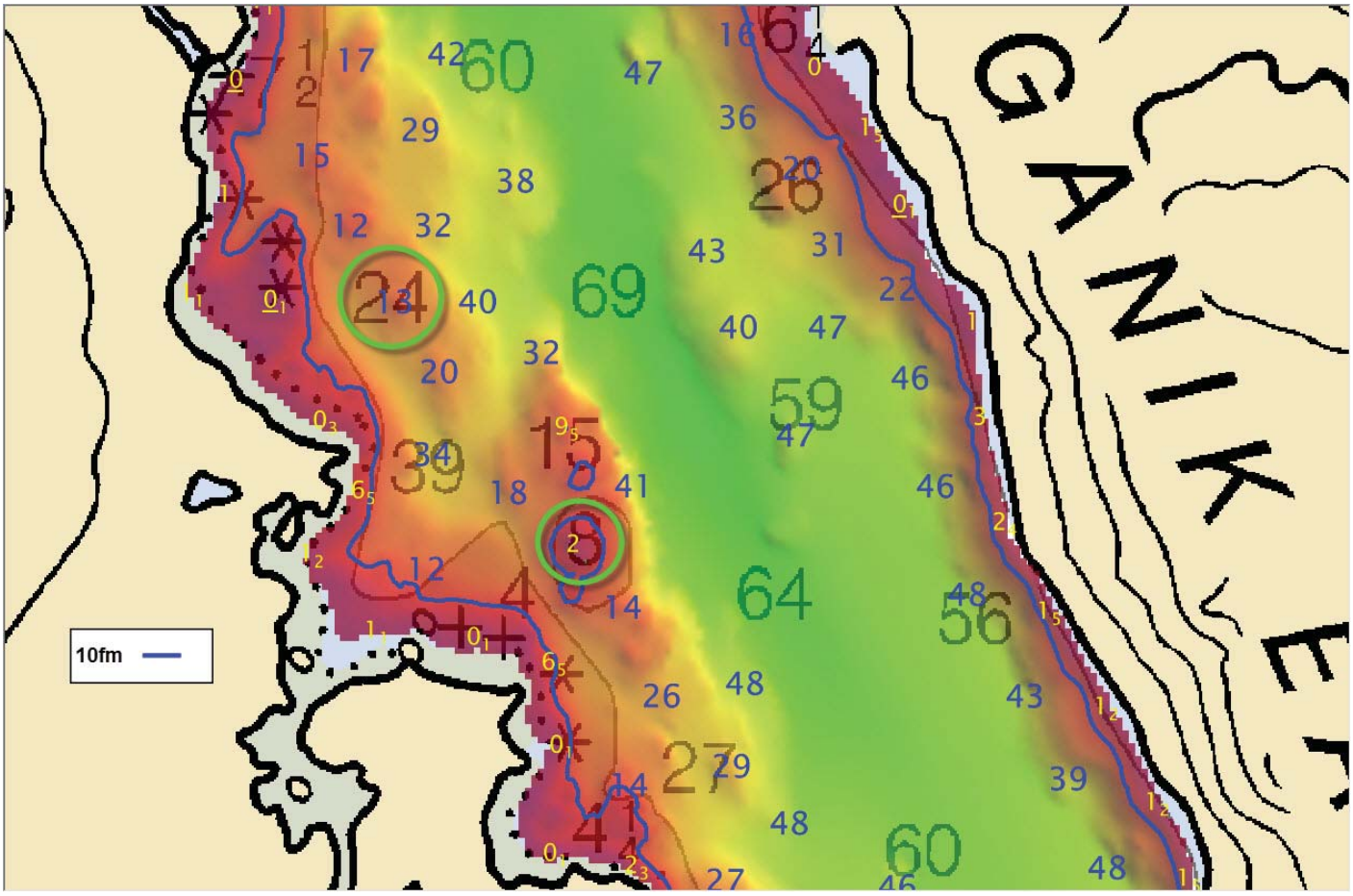


Figure 43: A selection of soundings much shoaler than what is charted.

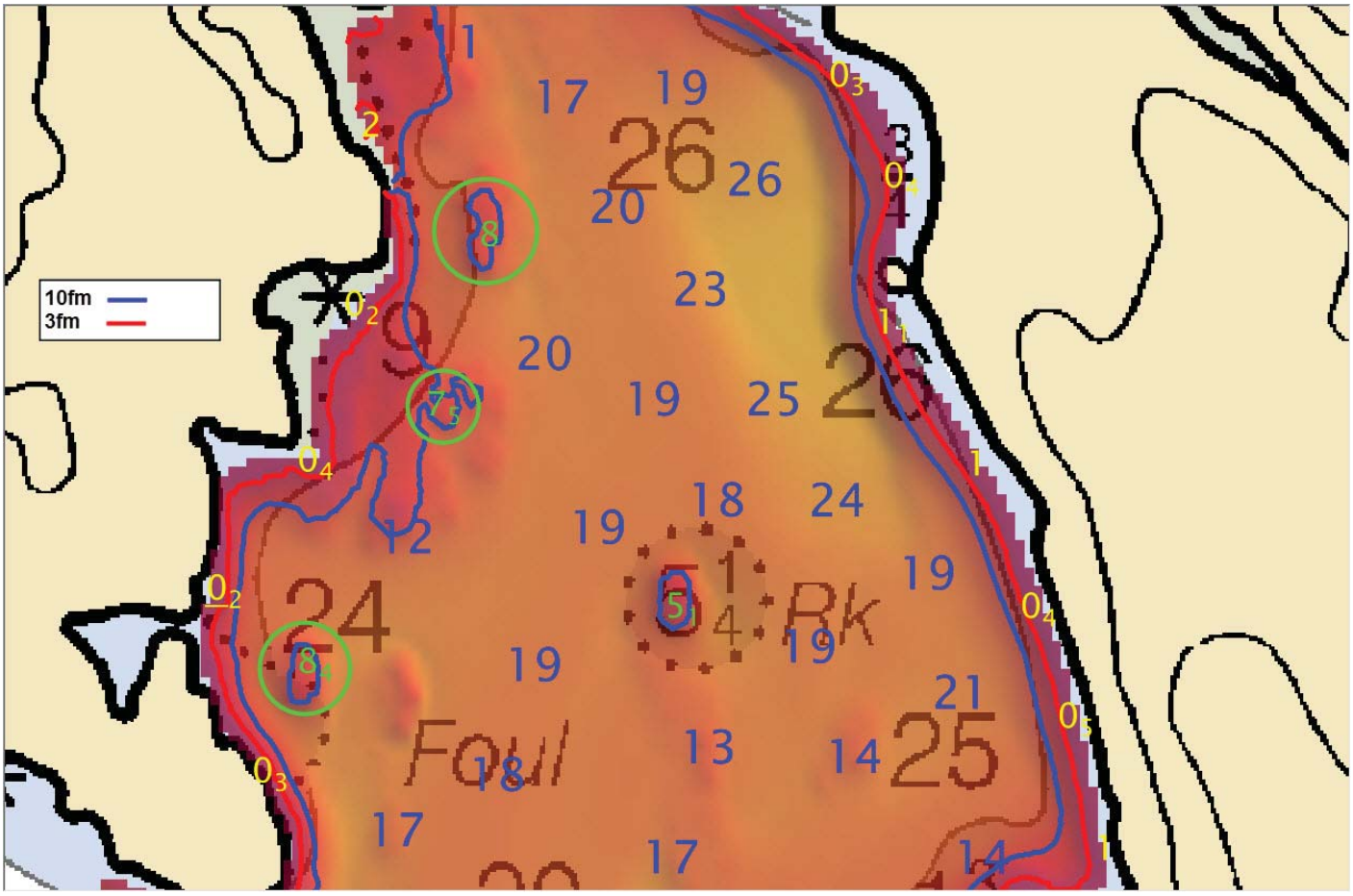


Figure 44: Shoals offshore of the charted 10-fathom contour.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

No charted features exist for this survey.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

D.1.5 Dangers to Navigation

The following DTON reports were submitted:

DTON Report Name	Date Submitted
H12691 DTON Report	2015-09-28
H12691 DTON Report	2015-12-02
H12691 DTON Report	2016-05-06

Table 18: DTON Reports

Danger to Navigation Reports are included in Appendix I of this report.

DTON reports are appended. Note that final processing of data has resulted in minor changes to depths for some of the features and soundings reported. It should also be noted that some of the DTONs initially reported as soundings were later classified and compiled as rocks. In addition, within the context of the complete update to the chart and chart scale , some of the submitted DTONs were not selected during compilation, mostly due to shoaler and more prominent features in the vicinity.

D.1.6 Shoal and Hazardous Features

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

D.1.7 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.1.8 Bottom Samples

Ten proposed bottom sample locations were identified in the Project Reference File and eleven were collected. Samples were collected in the vicinity of the proposed sites. Acquired bottom samples are addressed with S-57 attribution and recorded in the Final Feature File submitted with this report.

D.2 Additional Results

D.2.1 Shoreline

Shoreline verification was conducted near predicted low water in accordance with the applicable sections of the NOAA HSSD and FPM. There were 147 assigned features for this survey. All but one of the assigned

features were addressed as required with the S-57 attribution and recorded in the H12691 Final Features File to best represent the features at survey scale.

Features found by leveling are referenced to estimated depths that have been corrected using discrete zoning, whereas features found using multibeam coverage have depths referenced to the 1-meter final CUBE surface which was corrected using ERZT methods.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

No Aids to navigation (ATONs) exist for this survey.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

The surveyed extents include two Fish Farm area features which represent navigationally significant underwater obstructions. The location and intended purpose of charted Fish Farm features in the surveyed area were verified and addressed.

D.2.6 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.7 Platforms

No platforms exist for this survey.

D.2.8 Significant Features

No Significant Features exist for this survey.

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

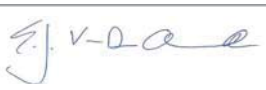
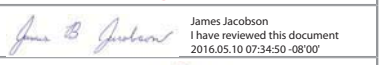
No new insets are recommended for this area.

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	05/06/2016	
Steven Loy, LT/NOAA	Field Operations Officer	05/06/2016	
James B. Jacobson	Chief Survey Technician	05/06/2016	
Eli R. Smith	Sheet Manager	05/06/2016	

F. Table of Acronyms

Acronym	Definition
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
FFF	Final Feature File
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
HSSD	Hydrographic Survey Specifications and Deliverables

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
TPE	Total Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United Stated Coast Guard
UTM	Universal Transverse Mercator
XO	Executive 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 : March 03, 2016

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: OPR-P136-RA-2015
HYDROGRAPHIC SHEET: H12691

LOCALITY: Viekoda Bay, Kodiak Island, AK
TIME PERIOD: September 20 - October 22, 2015

TIDE STATION USED: 9455500 Seldovia, AK
Lat. 59° 26.4'N Long. 151° 43.2' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 5.25 m

REMARKS: RECOMMENDED ZONING

Preliminary zoning for this project was provided under project P136-RA-2015. Preliminary zoning is accepted as the final zoning for Registry No. H12691 for the time period of September 20 - October 22, 2015.

Please use the zoning file P136RA2015_Rev2_CORP submitted with the project instructions for OPR-P136-RA-2015. Zones SS18, SS23, SS24, and SS29A are the applicable zones for H12691.

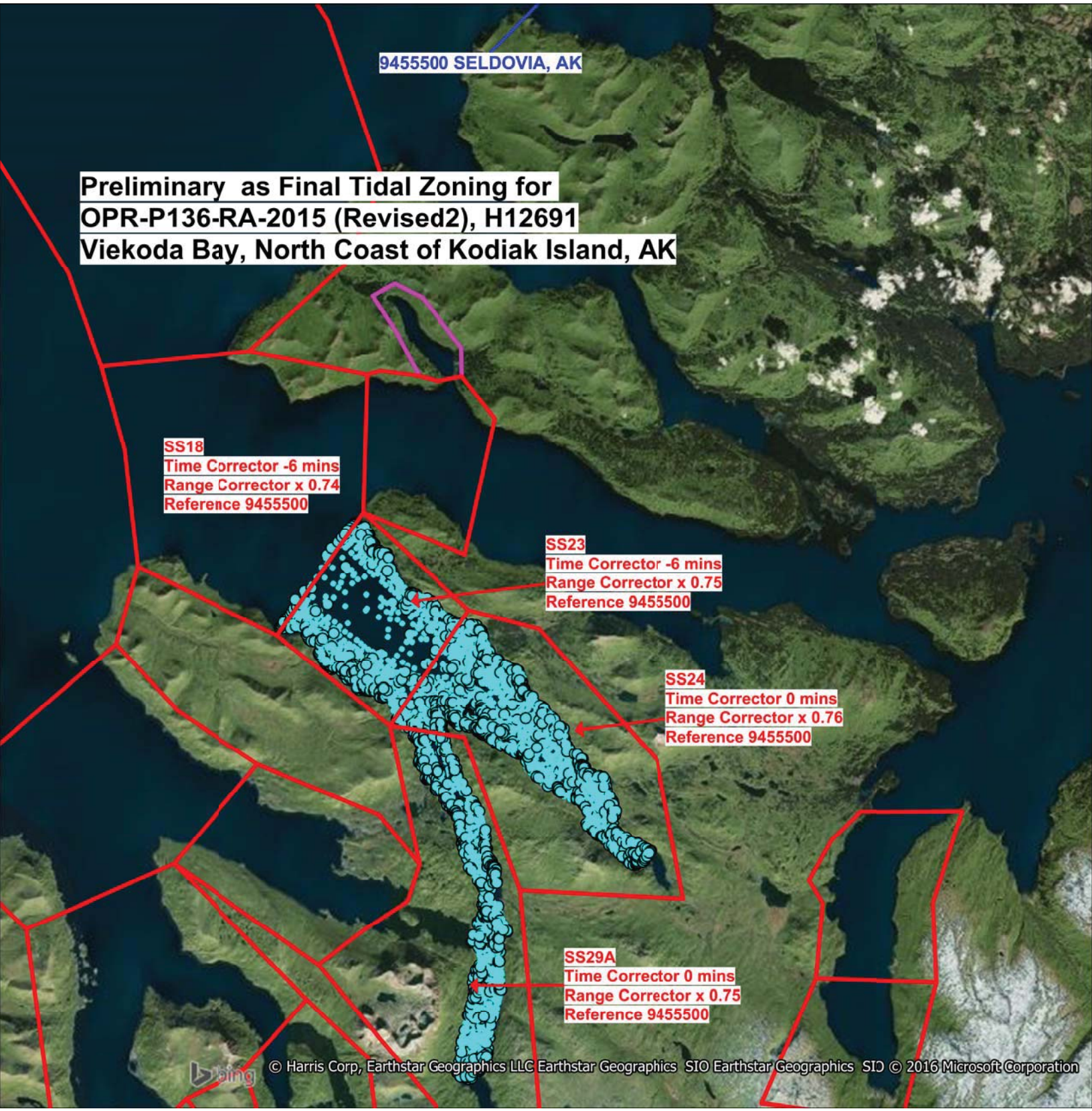
Refer to attachments for zoning information.

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).

MICHALSKI.MICHAEL.PAUL.1280465174

Digitally signed by MICHALSKI.MICHAEL.PAUL.1280465174
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=MICHALSKI.MICHAEL.PAUL.1280465174
Date: 2016.03.07 15:34:40 -05'00'

ACTING CHIEF, PRODUCTS AND SERVICES BRANCH


9455500 SELDOVIA, AK
Preliminary as Final Tidal Zoning for
OPR-P136-RA-2015 (Revised2), H12691
Viekoda Bay, North Coast of Kodiak Island, AK
SS18
Time Corrector -6 mins
Range Corrector x 0.74
Reference 9455500
SS23
Time Corrector -6 mins
Range Corrector x 0.75
Reference 9455500
SS24
Time Corrector 0 mins
Range Corrector x 0.76
Reference 9455500
SS29A
Time Corrector 0 mins
Range Corrector x 0.75
Reference 9455500
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H12691 Danger to Navigation Report

Registry Number: H12691
State: Alaska
Locality: Kodiak Island
Sub-locality: Viekoda Bay
Project Number: OPR-P136-RA-15
Survey Dates: 9/20/2015 - present

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	14th	01/01/2015	1:78,900 (16594_1)	USCG LNM: 4/7/2015 (8/18/2015) CHS NTM: None (7/31/2015) NGA NTM: 2/24/2007 (8/22/2015)
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	Shoal	10.02 m	57° 52' 17.0" N	153° 07' 42.0" W	---

1 - Dangers To Navigation

1.1) 2772/273

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 52' 17.0" N, 153° 07' 42.0" W
Least Depth:	10.02 m (= 32.89 ft = 5.481 fm = 5 fm 2.89 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.084 m
Timestamp:	2015-263.23:40:44.676 (09/20/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-263 / 2804_2015ra2632331
Profile/Beam:	2772/273
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

5 fathom, 3 foot sounding located in Viekoda Bay between significantly deeper charted depths. Predicted tides are applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015ra2632331	2772/273	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per H12691 digital data.

Cartographically-Rounded Depth (Affected Charts):

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

5fm 3ft (531_1)

10.0m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 1:depth known
	SORDAT - 20150920
	SORIND - US,US,graph,H12691

TECSOU - 3:found by multi-beam

Feature Images

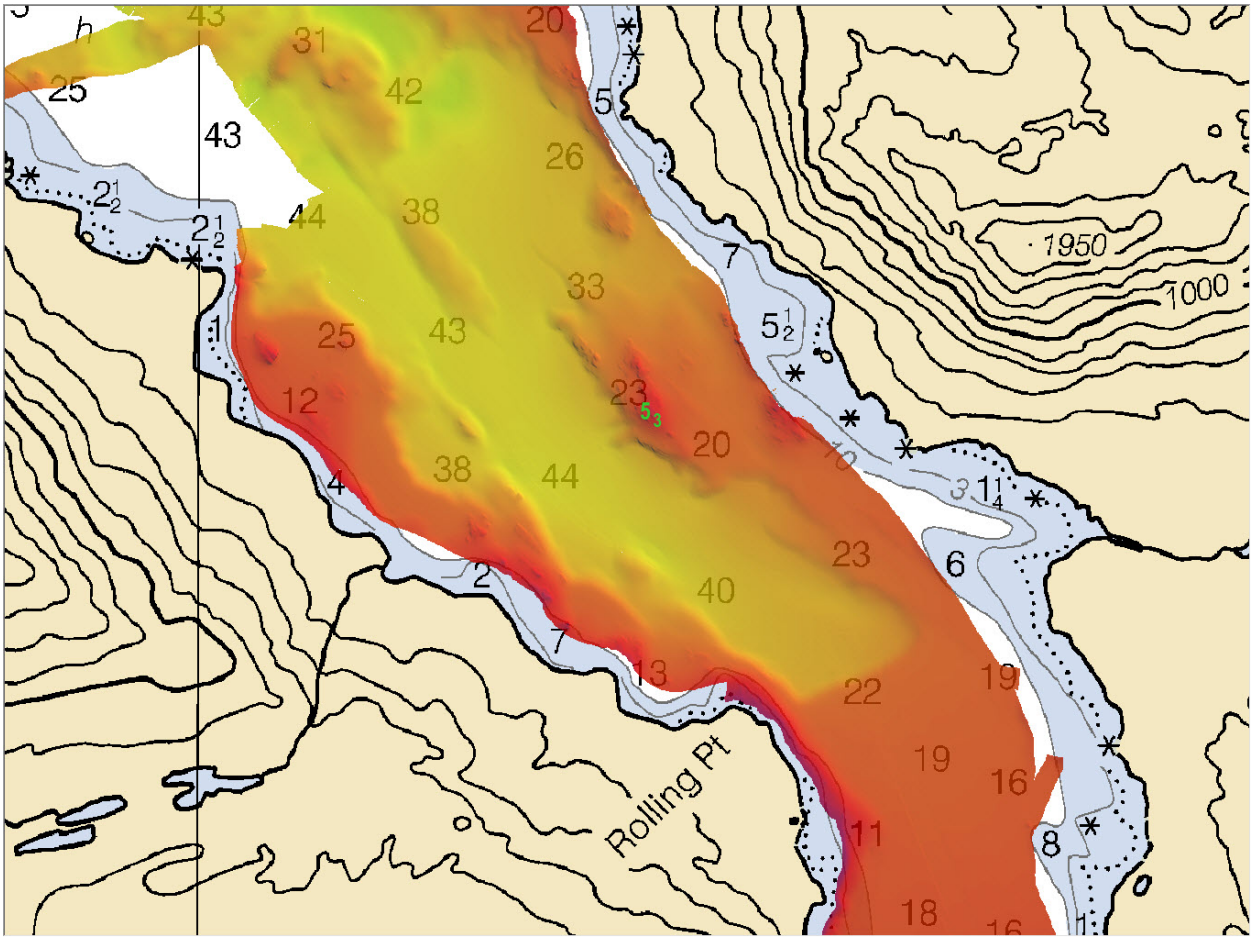


Figure 1.1.1

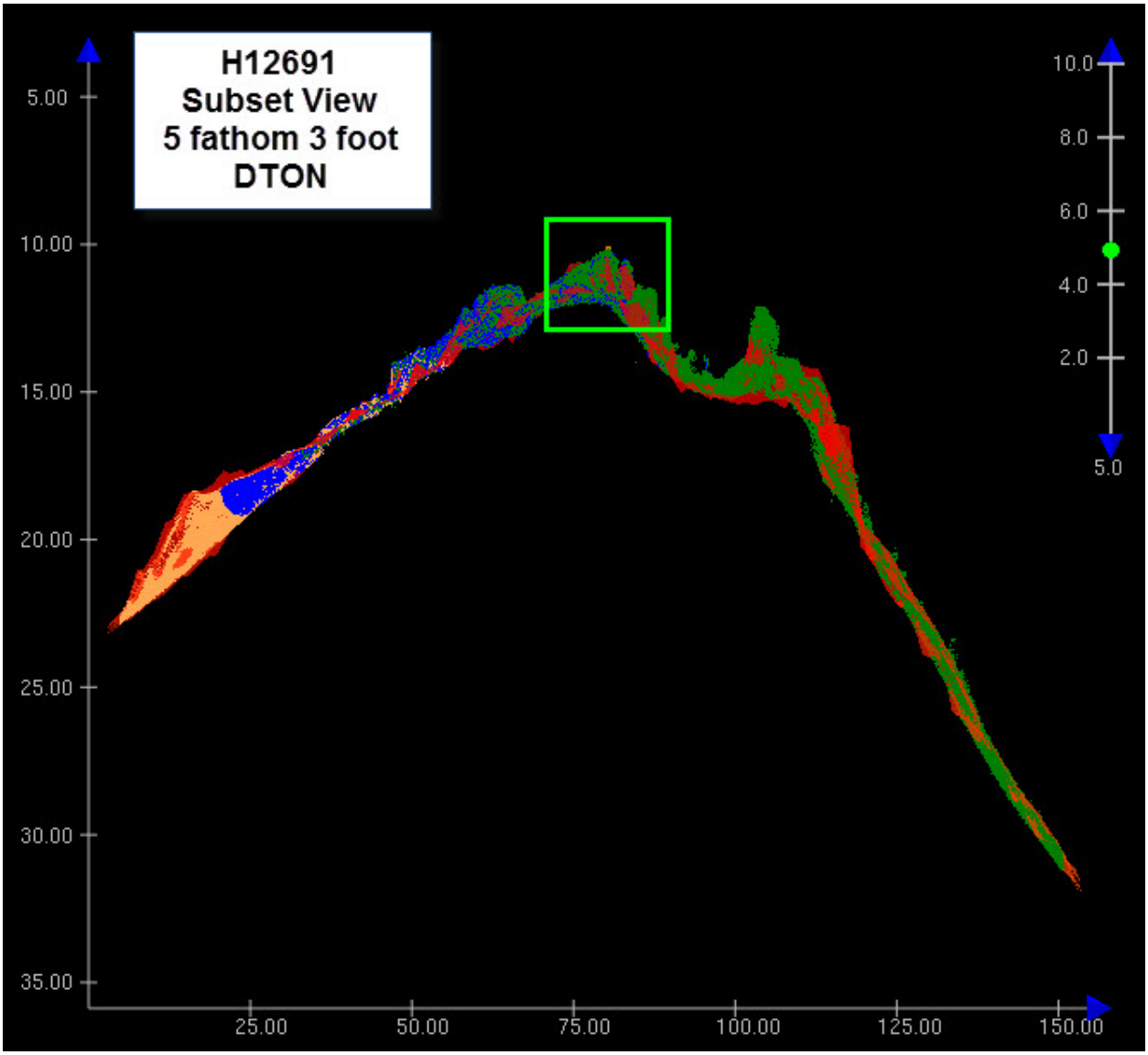

H12691
Subset View
5 fathom 3 foot
DTON
5.00
10.00
15.00
20.00
25.00
30.00
35.00
25.00
50.00
75.00
100.00
125.00
150.00
10.0
8.0
6.0
4.0
2.0
5.0

Figure 1.1.2

H12691 Danger to Navigation Report

Registry Number: H12691
State: Alaska
Locality: Kodiak Island, AK
Sub-locality: Viekoda Bay
Project Number: OPR-P136-RA-15
Survey Dates: 9/20/2015 - 10/21/2015

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16597	9th	03/01/2005	1:80,000 (16597_1)	[L]NTM: ?
16576	4th	09/01/2003	1:80,000 (16576_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	Shoal	7.10 m	57° 53' 26.8" N	153° 15' 33.8" W	---
1.2	Shoal	5.27 m	57° 55' 44.4" N	153° 12' 17.6" W	---
1.3	Shoal	6.22 m	57° 55' 55.4" N	153° 12' 31.4" W	---
1.4	Shoal	2.00 m	57° 55' 09.6" N	153° 11' 10.9" W	---
1.5	Shoal	1.30 m	57° 50' 05.9" N	153° 03' 55.9" W	---
1.6	Shoal	1.77 m	57° 51' 46.1" N	153° 08' 15.9" W	---
1.7	Shoal	9.52 m	57° 53' 20.2" N	153° 10' 54.6" W	---
1.8	Shoal	2.66 m	57° 54' 04.5" N	153° 12' 32.0" W	---

1.9	Shoal	7.71 m	57° 54' 00.1" N	153° 13' 40.7" W	---
1.10	Shoal	8.20 m	57° 54' 12.2" N	153° 14' 04.9" W	---
1.11	Shoal	1.86 m	57° 54' 02.9" N	153° 14' 32.2" W	---
1.12	Shoal	9.05 m	57° 56' 19.6" N	153° 21' 11.0" W	---
1.13	Shoal	15.45 m	57° 53' 37.2" N	153° 09' 05.2" W	---
1.14	Shoal	5.92 m	57° 53' 44.4" N	153° 13' 24.1" W	---
1.15	Rock	1.23 m	57° 55' 20.0" N	153° 19' 38.1" W	---

1 - Dangers To Navigation

1.1) 840/164

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 53' 26.8" N, 153° 15' 33.8" W
Least Depth:	7.10 m (= 23.29 ft = 3.882 fm = 3 fm 5.29 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.087 m
Timestamp:	2015-289.00:25:16.540 (10/16/2015)
Survey Line:	h12691 / 2803_reson7125_lf_256 / 2015-288 / 2803_2015__2890023
Profile/Beam:	840/164
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2803_2015__2890023	840/164	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3 ¾fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

3fm 5ft (16576_1, 531_1)

7.1m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

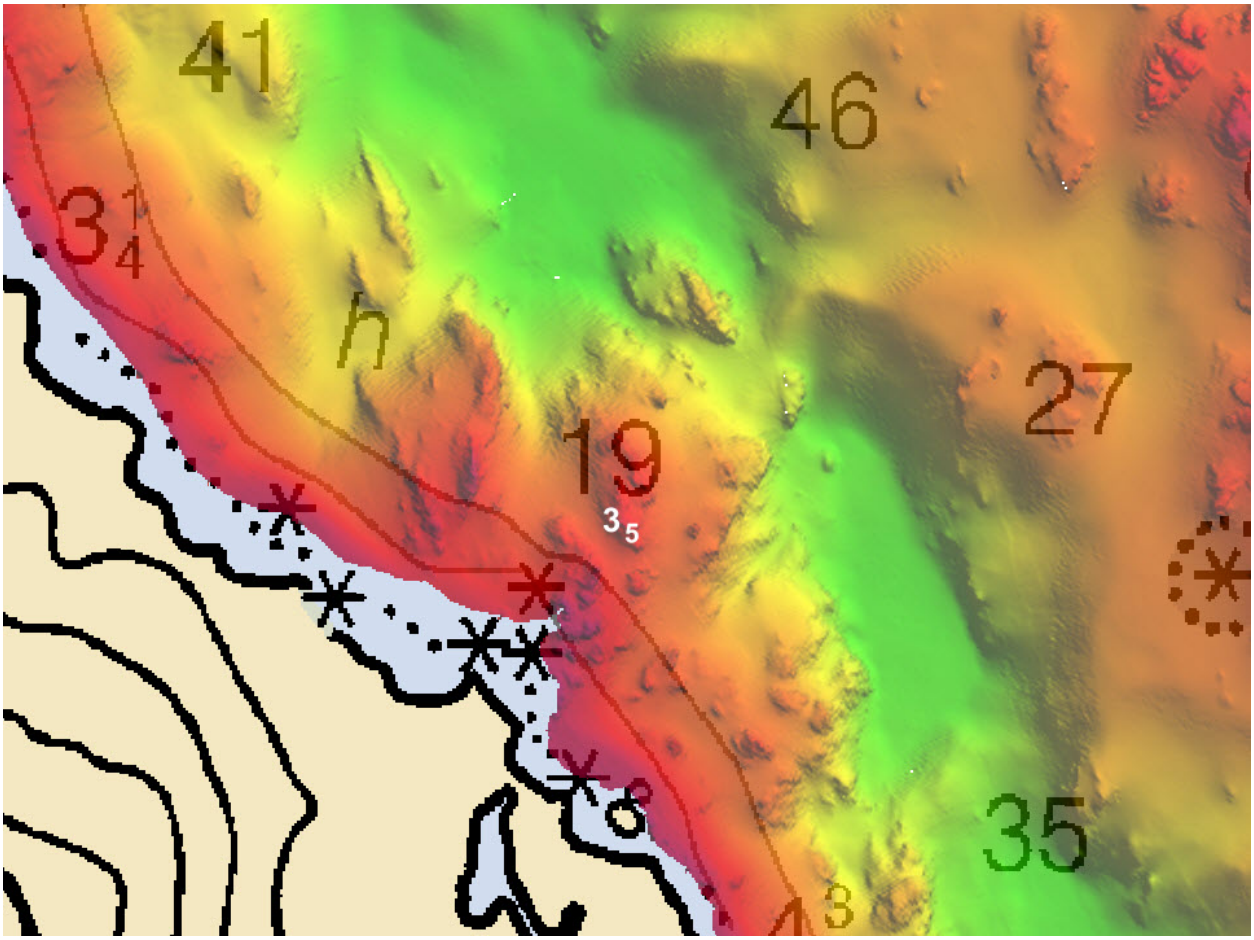


Figure 1.1.1

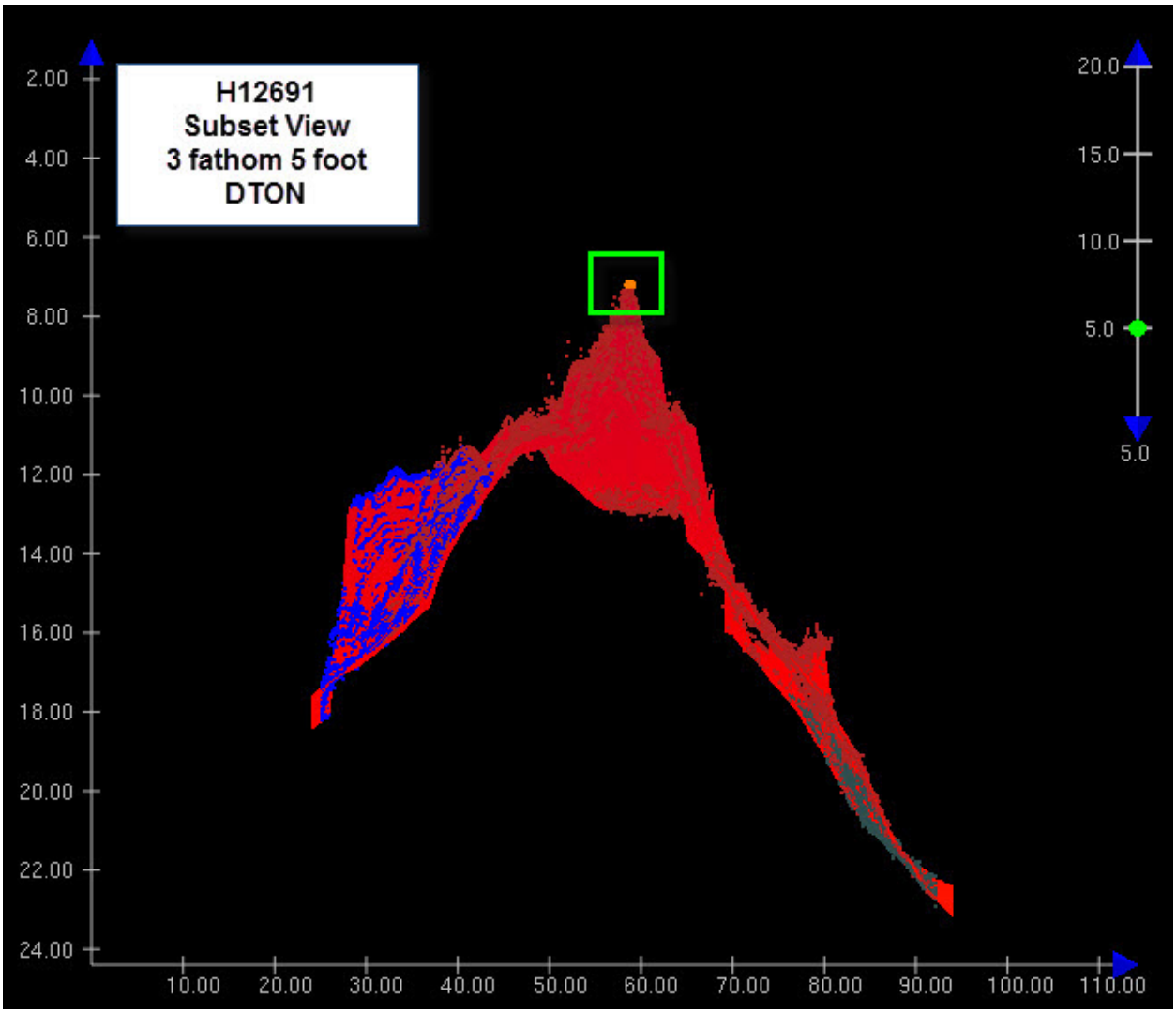

H12691
Subset View
3 fathom 5 foot
DTON
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
20.0
15.0
10.0
5.0
5.0

Figure 1.1.2

1.2) 1197/146

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 55' 44.4" N, 153° 12' 17.6" W
Least Depth:	5.27 m (= 17.30 ft = 2.883 fm = 2 fm 5.30 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.079 m
Timestamp:	2015-281.00:30:11.932 (10/08/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-280 / 2804_2015__2810028
Profile/Beam:	1197/146
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2810028	1197/146	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

2 ¾fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

2fm 5ft (16576_1, 531_1)

5.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

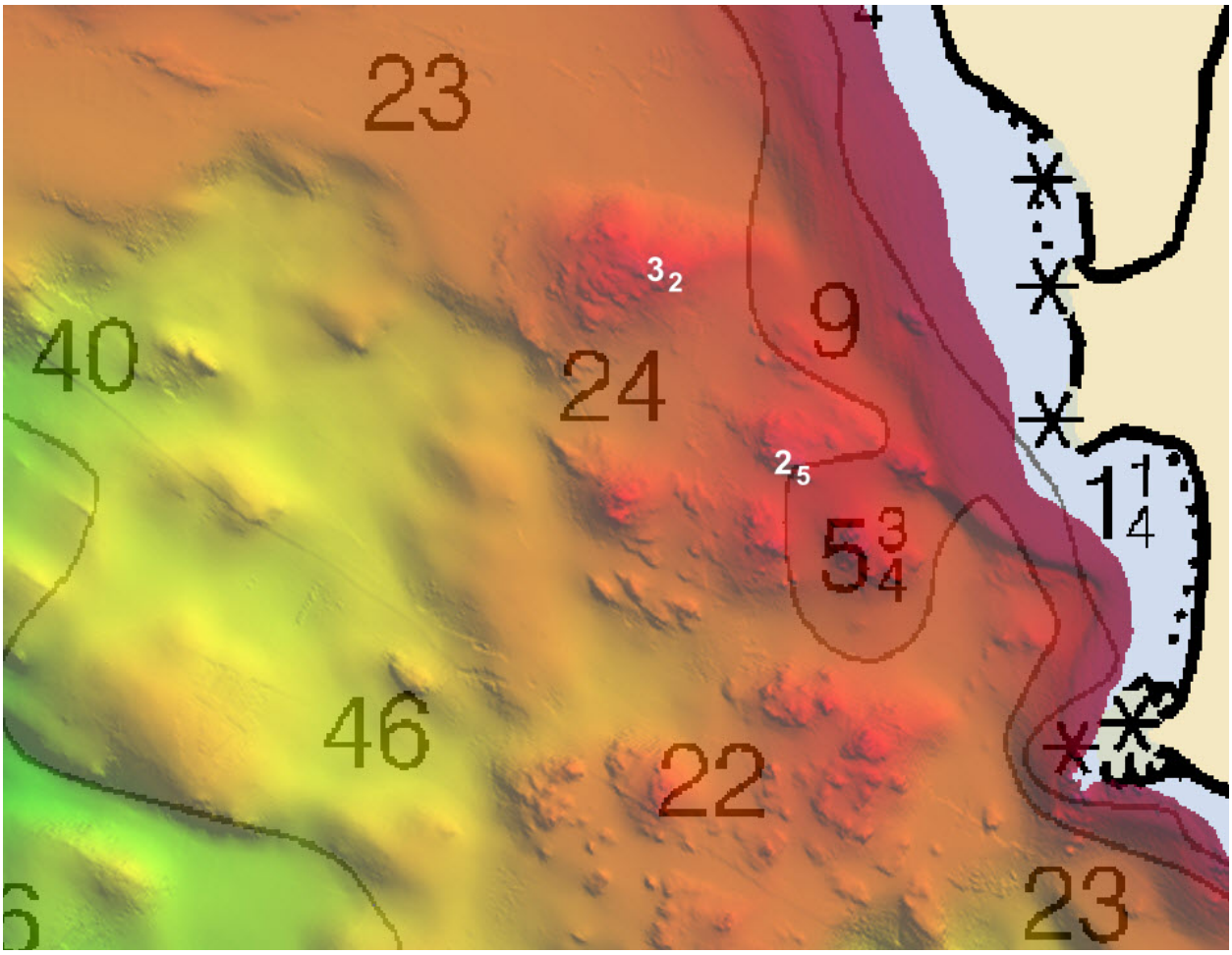


Figure 1.2.1

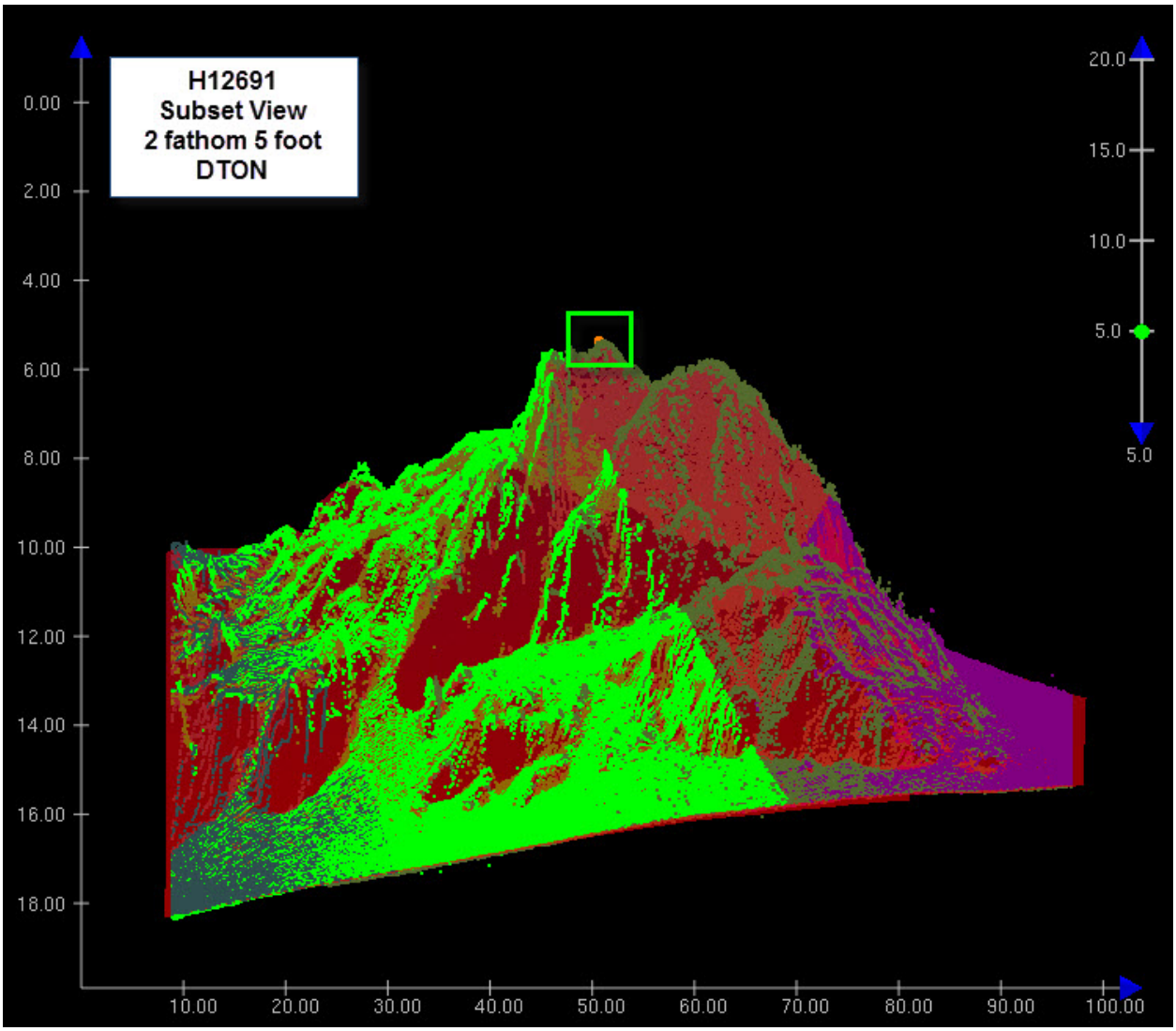

H12691
Subset View
2 fathom 5 foot
DTON
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
20.0
15.0
10.0
5.0
5.0

Figure 1.2.2

1.3) 222/421

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 55' 55.4" N, 153° 12' 31.4" W
Least Depth:	6.22 m (= 20.39 ft = 3.399 fm = 3 fm 2.39 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.963 m ; **TVU (TPEv)** ±0.092 m
Timestamp:	2015-294.21:16:15.072 (10/21/2015)
Survey Line:	h12691 / 2801_reson7125_hf_512 / 2015-294 / 2801_2015__2942115
Profile/Beam:	222/421
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2801_2015__2942115	222/421	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3 ¼fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

3fm 2ft (16576_1, 531_1)

6.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

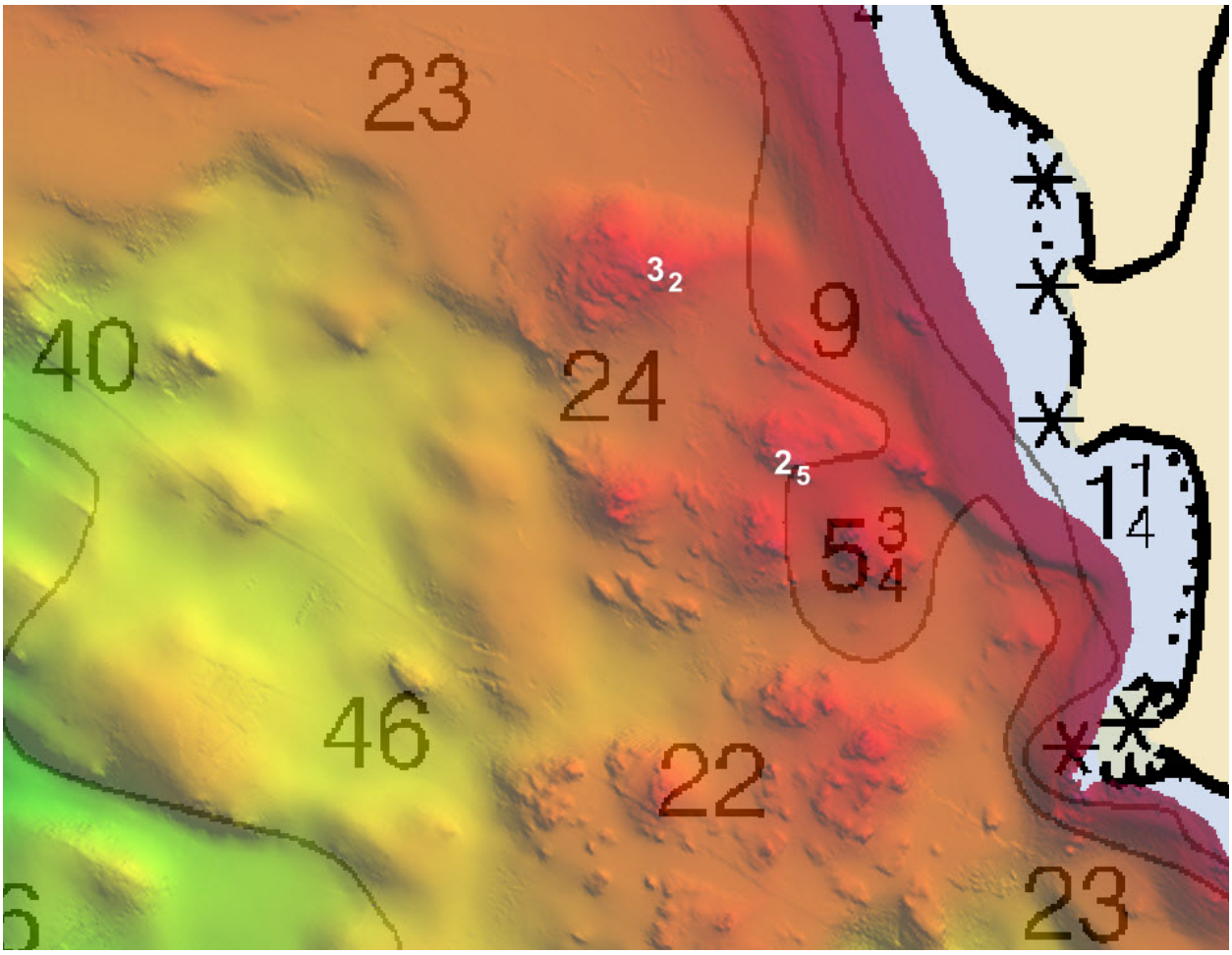


Figure 1.3.1

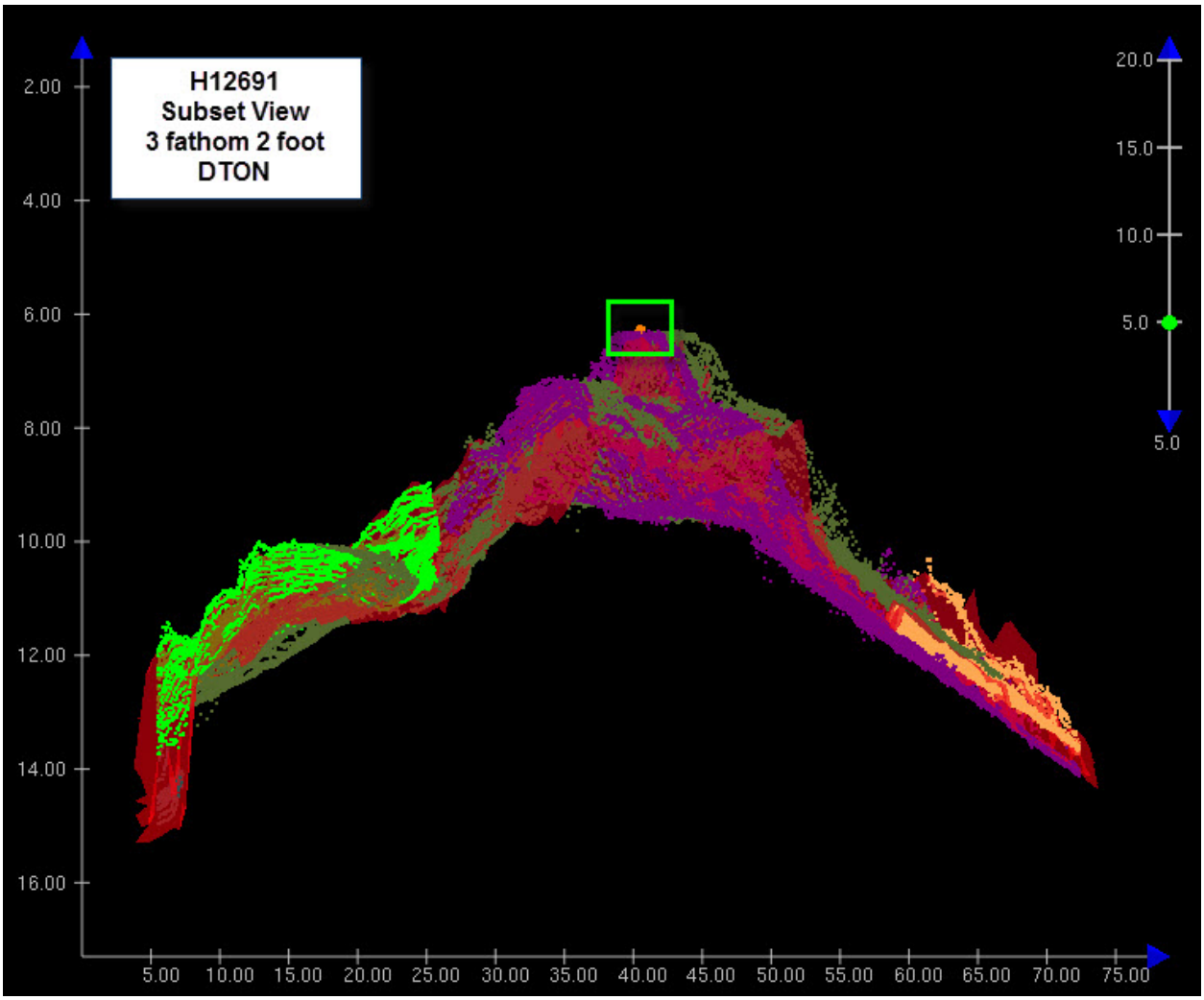

H12691
Subset View
3 fathom 2 foot
DTON
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
75.00
20.0
15.0
10.0
5.0
5.0

Figure 1.3.2

1.4) 6094/134

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 55' 09.6" N, 153° 11' 10.9" W
Least Depth:	2.00 m (= 6.55 ft = 1.091 fm = 1 fm 0.55 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.960 m ; **TVU (TPEv)** ±0.072 m
Timestamp:	2015-292.22:27:22.777 (10/19/2015)
Survey Line:	h12691 / 2802_reson7125_lf_256 / 2015-292 / 2802_2015__2922217
Profile/Beam:	6094/134
Charts Affected:	16594_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding affects the 10 fathom contour. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2802_2015__2922217	6094/134	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

1fm 0ft (531_1)

2.0m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

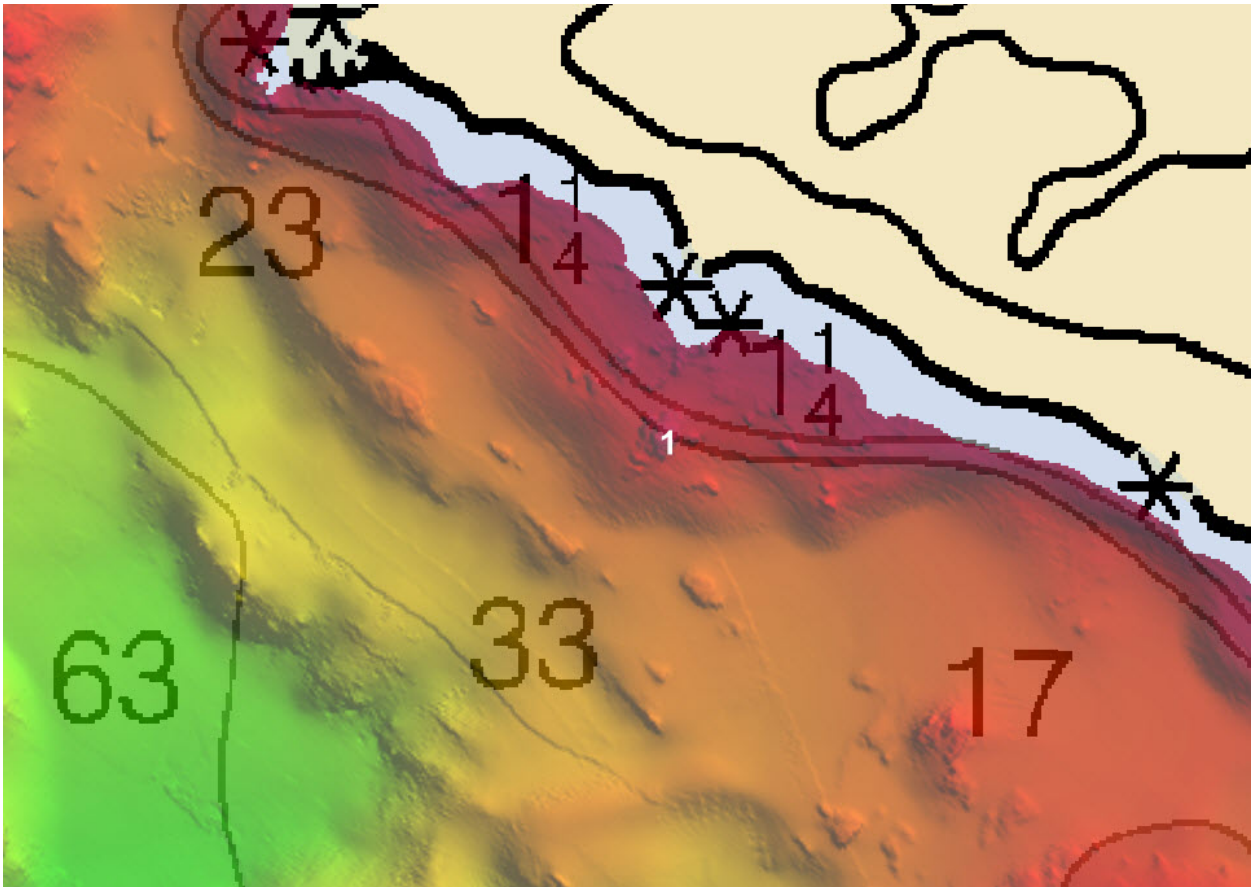


Figure 1.4.1

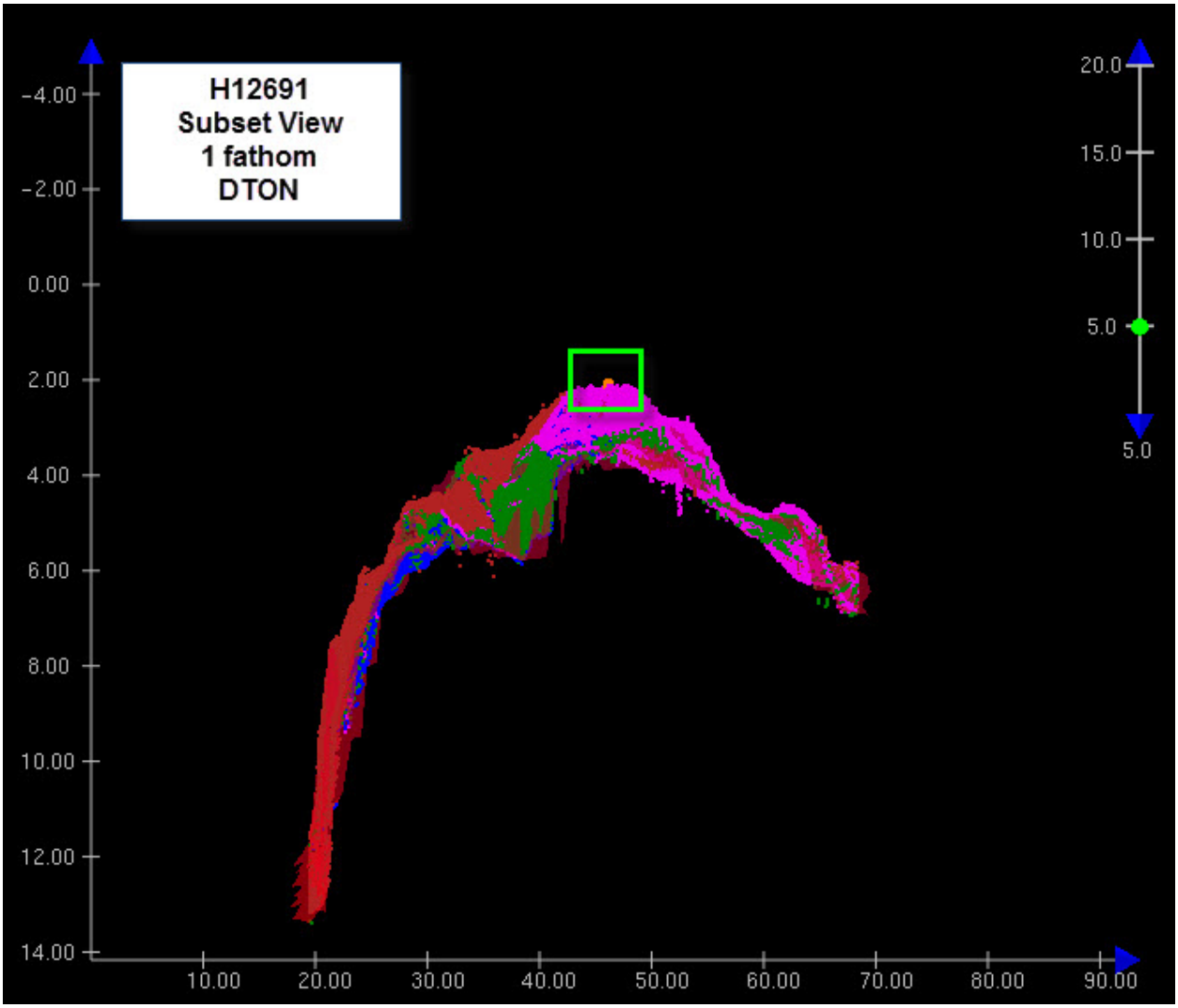

H12691
Subset View
1 fathom
DTON
-4.00
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
20.0
15.0
10.0
5.0
5.0

Figure 1.4.2

1.5) 191/511

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 50' 05.9" N, 153° 03' 55.9" W
Least Depth:	1.30 m (= 4.27 ft = 0.712 fm = 0 fm 4.27 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.077 m
Timestamp:	2015-264.22:43:12.659 (09/21/2015)
Survey Line:	h12691 / 2802_reson7125_hf_512 / 2015-264 / 2802_2015__2642242_0001
Profile/Beam:	191/511
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2802_2015__2642242_0001	191/511	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

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

0fm 4ft (531_1)

1.3m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

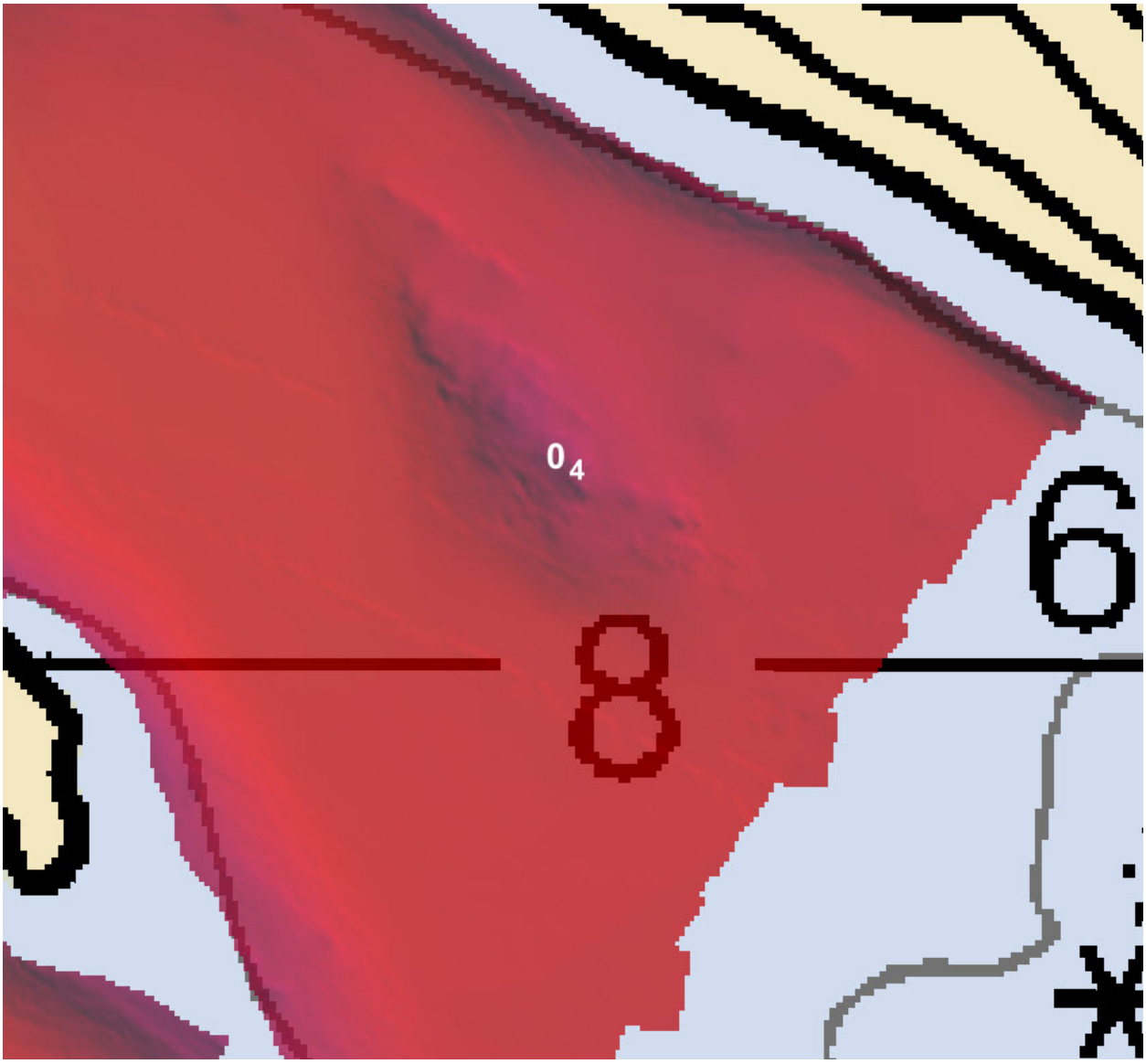


Figure 1.5.1

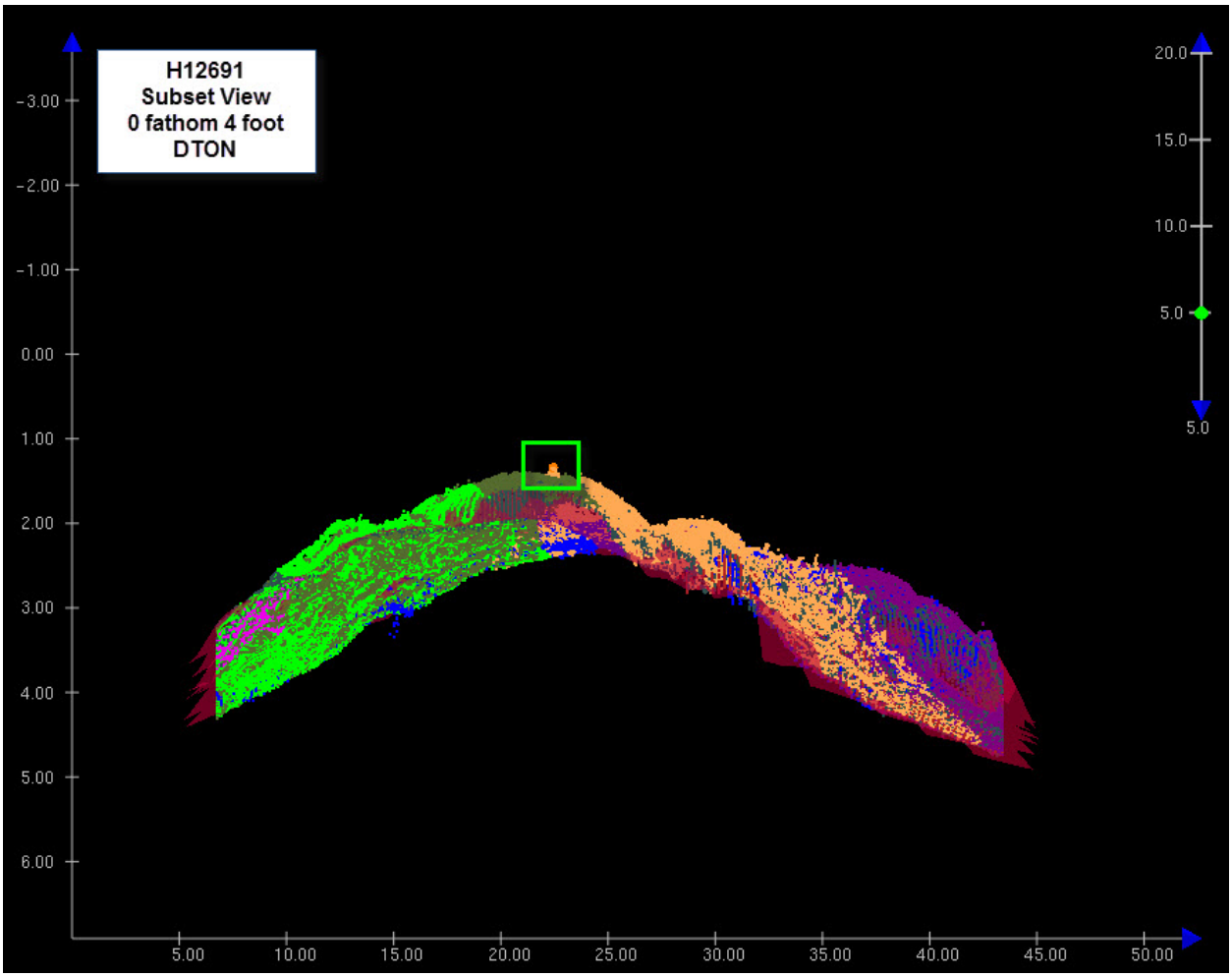

H12691
Subset View
0 fathom 4 foot
DTON
-3.00
-2.00
-1.00
0.00
1.00
2.00
3.00
4.00
5.00
6.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
20.0
15.0
10.0
5.0
5.0

Figure 1.5.2

1.6) 8274/337

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 51' 46.1" N, 153° 08' 15.9" W
Least Depth:	1.77 m (= 5.80 ft = 0.966 fm = 0 fm 5.80 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.074 m
Timestamp:	2015-295.02:04:26.468 (10/22/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-294 / 2804_2015__2950153
Profile/Beam:	8274/337
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding affects the 10 fathom contour. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2950153	8274/337	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

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

1fm 0ft (531_1)

1.7m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

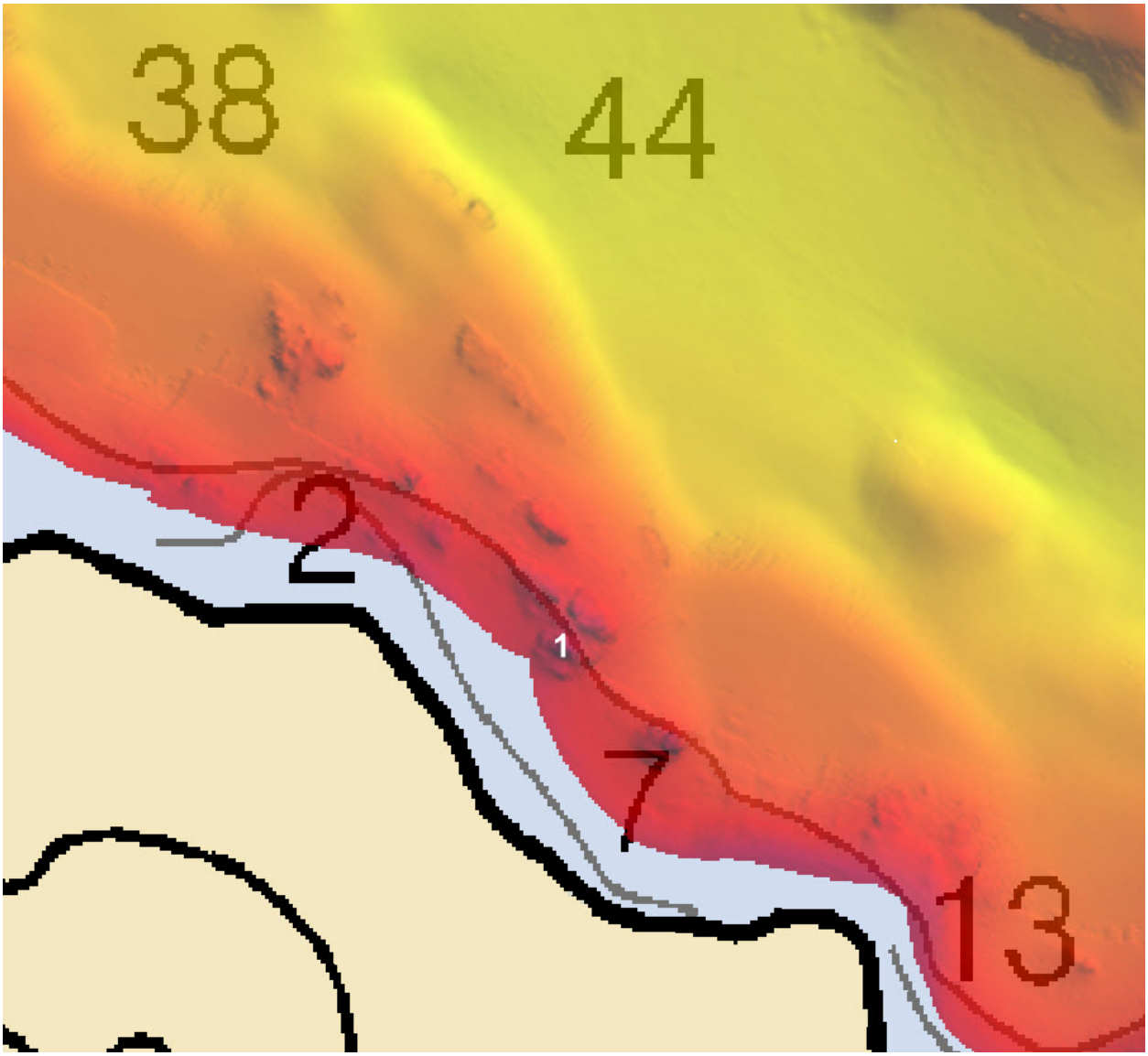


Figure 1.6.1

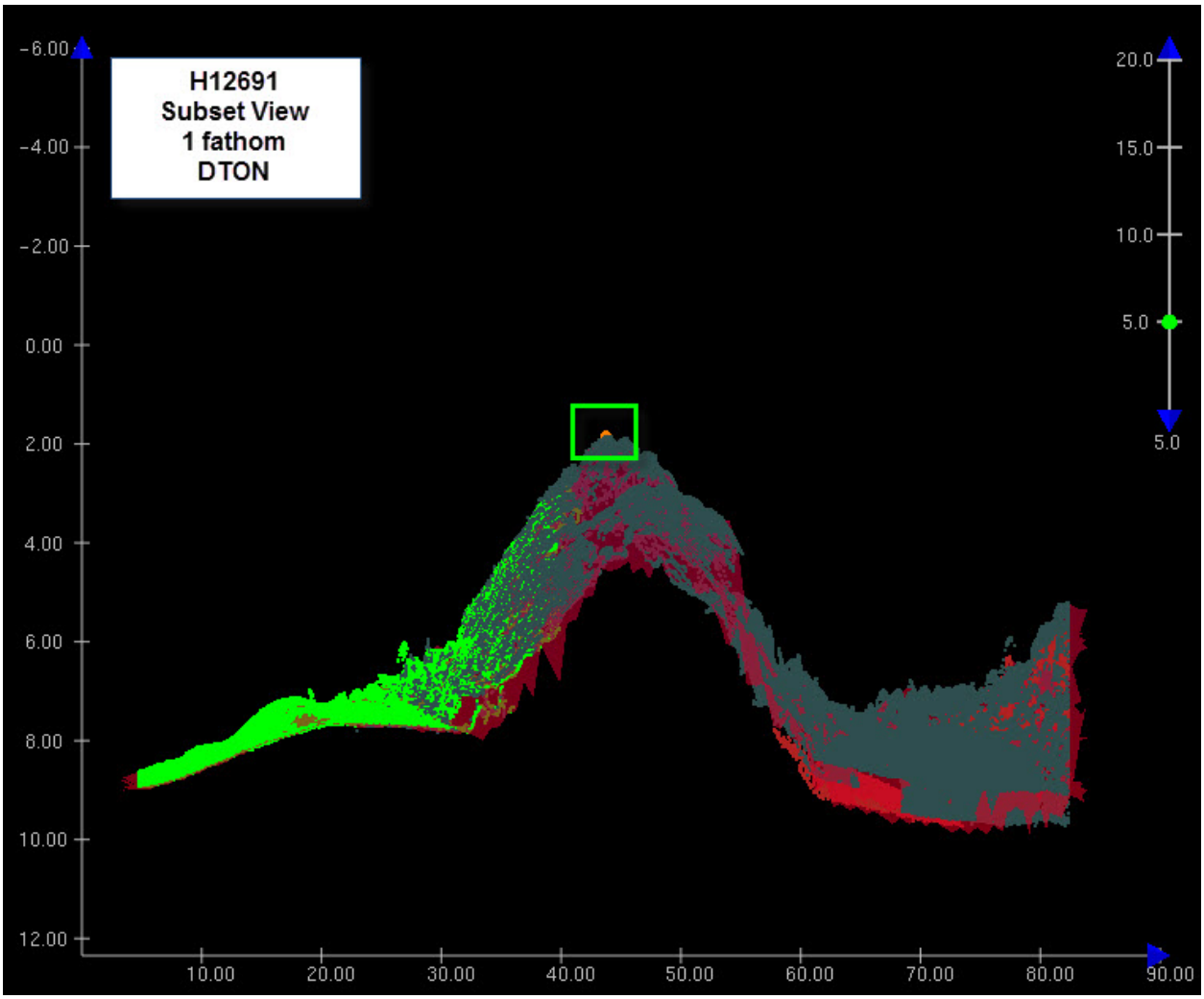

H12691
Subset View
1 fathom
DTON
-6.00
-4.00
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
20.0
15.0
10.0
5.0
5.0

Figure 1.6.2

1.7) 4554/68

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 53' 20.2" N, 153° 10' 54.6" W
Least Depth:	9.52 m (= 31.24 ft = 5.206 fm = 5 fm 1.24 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.086 m
Timestamp:	2015-292.21:36:51.942 (10/19/2015)
Survey Line:	h12691 / 2801_reson7125_lf_256 / 2015-292 / 2801_2015__2922125
Profile/Beam:	4554/68
Charts Affected:	16594_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2801_2015__2922125	4554/68	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

5 ¼fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

5fm 1ft (531_1)

9.5m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

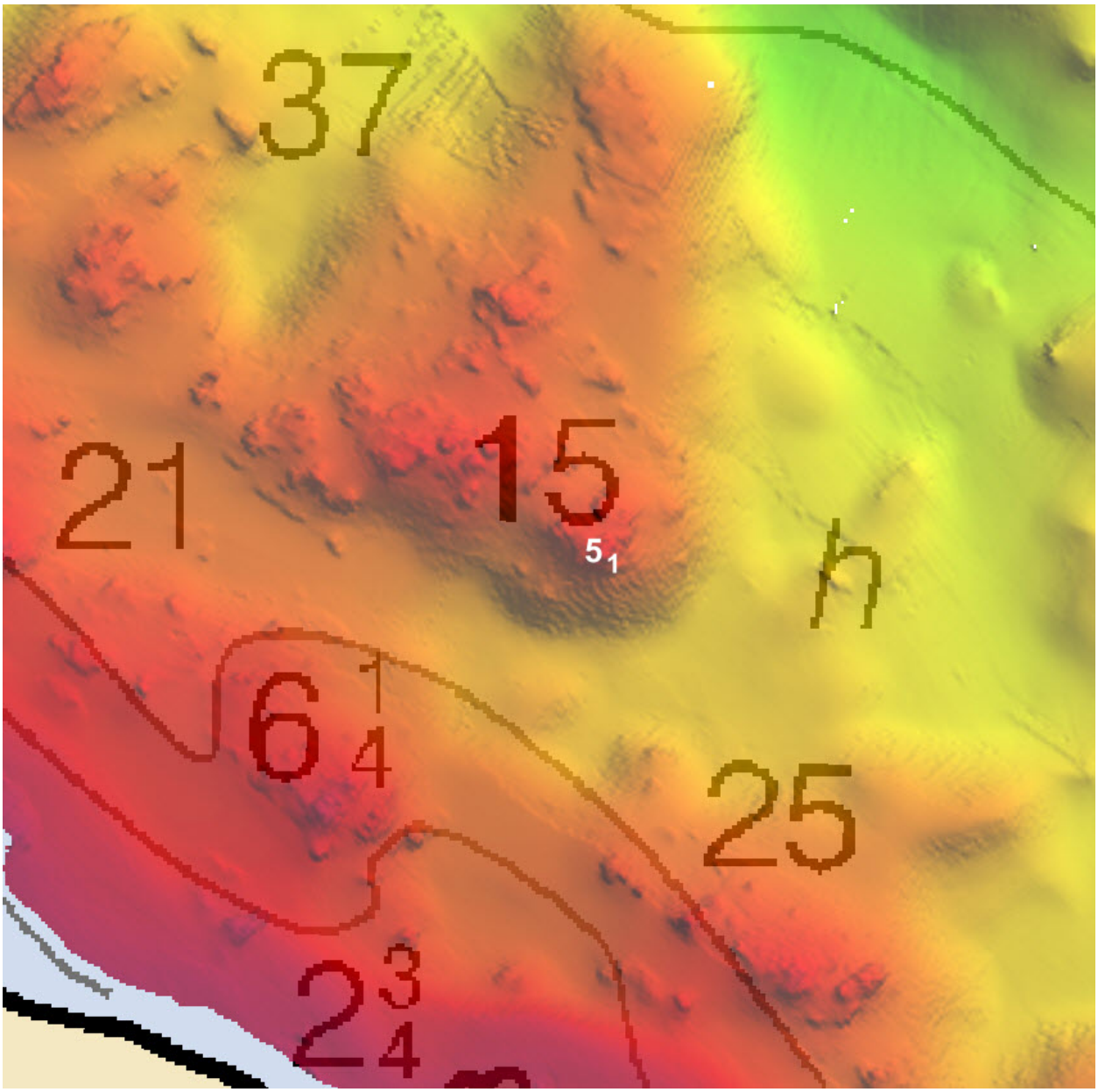


Figure 1.7.1

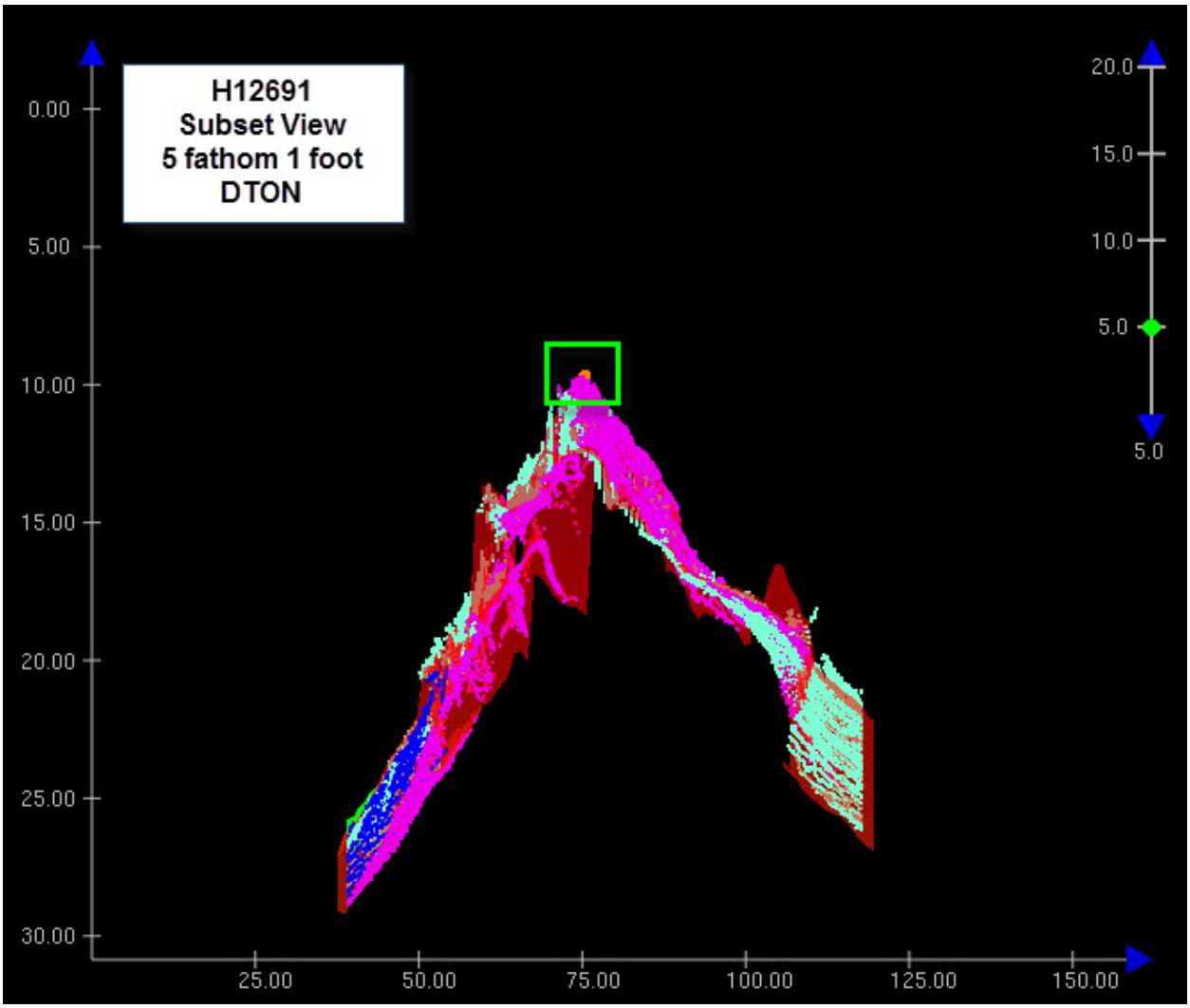

H12691
Subset View
5 fathom 1 foot
DTON
0.00
5.00
10.00
15.00
20.00
25.00
30.00
25.00
50.00
75.00
100.00
125.00
150.00
20.0
15.0
10.0
5.0
5.0

Figure 1.7.2

1.8) 272/50

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 54' 04.5" N, 153° 12' 32.0" W
Least Depth:	2.66 m (= 8.72 ft = 1.453 fm = 1 fm 2.72 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.078 m
Timestamp:	2015-292.18:52:11.953 (10/19/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-292 / 2804_2015__2921851
Profile/Beam:	272/50
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding affects the 10 fathom contour. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2921851	272/50	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1 ½fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

1fm 2ft (16576_1, 531_1)

2.6m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

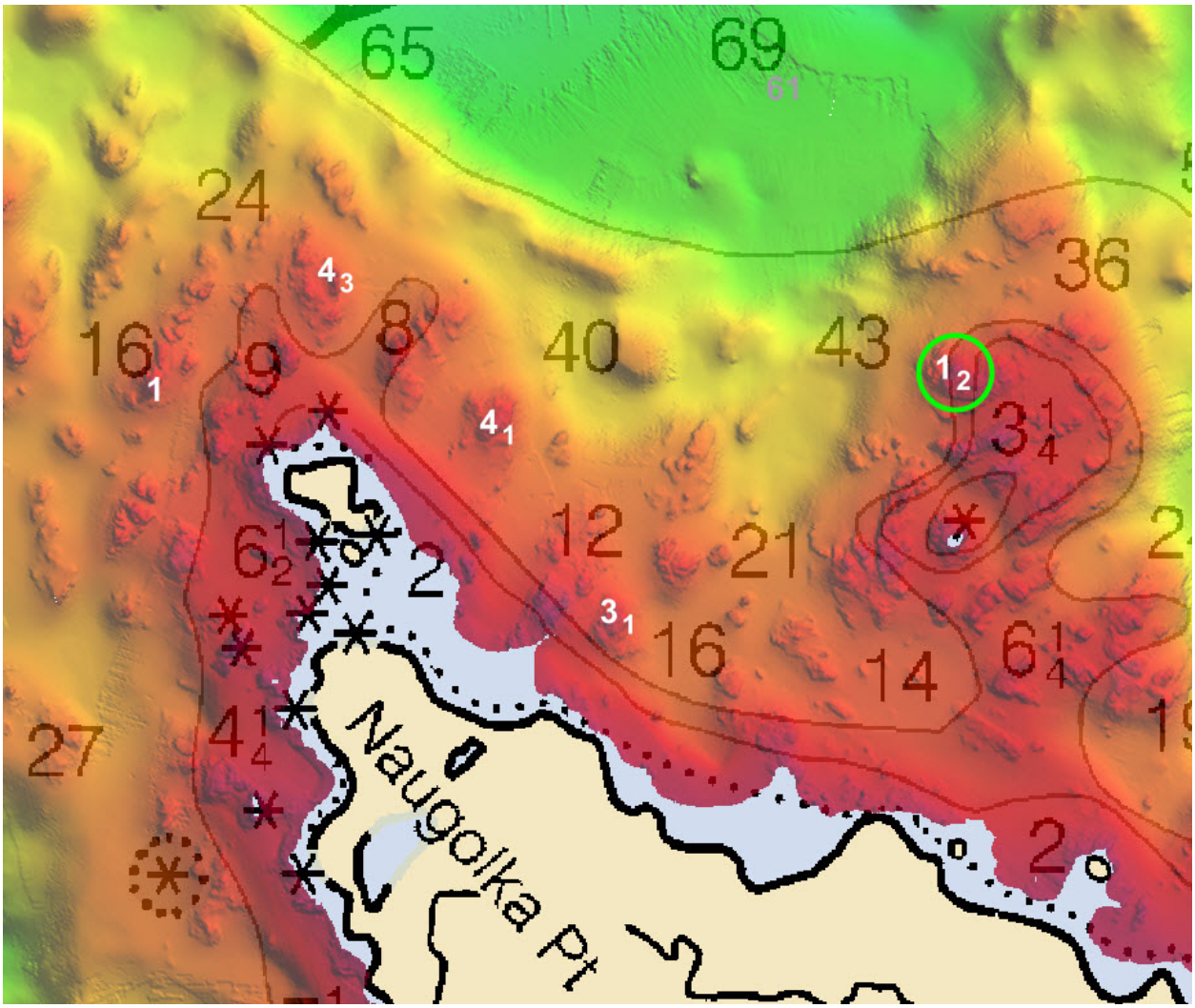


Figure 1.8.1

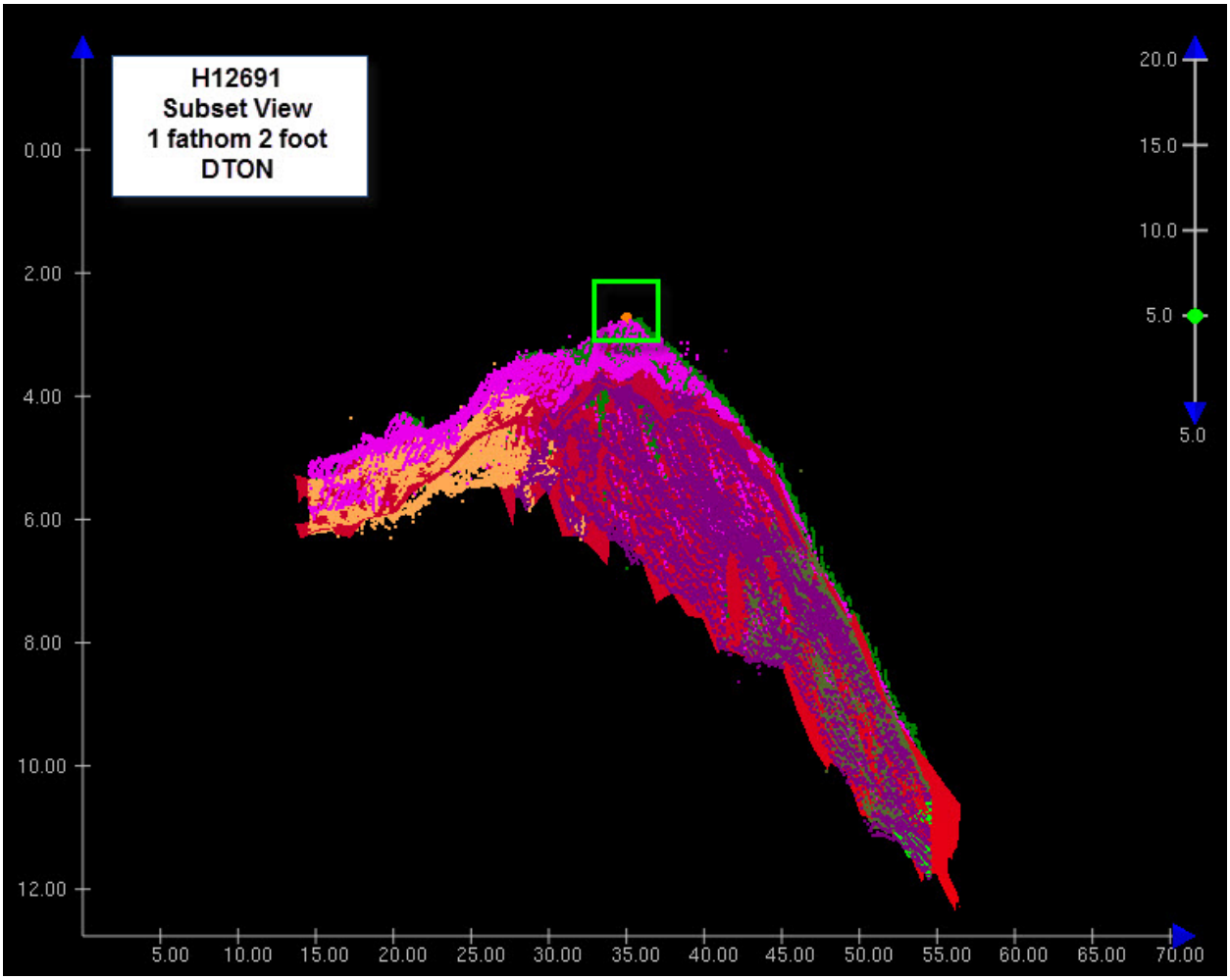

H12691
Subset View
1 fathom 2 foot
DTON
0.00
2.00
4.00
6.00
8.00
10.00
12.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
60.00
65.00
70.00
20.0
15.0
10.0
5.0
5.0

Figure 1.8.2

1.9) 776/244

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 54' 00.1" N, 153° 13' 40.7" W
Least Depth:	7.71 m (= 25.28 ft = 4.213 fm = 4 fm 1.28 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.086 m
Timestamp:	2015-290.02:18:51.568 (10/17/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-289 / 2804_2015__2900217
Profile/Beam:	776/244
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2900217	776/244	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

4 ¼fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

4fm 1ft (16576_1, 531_1)

7.7m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

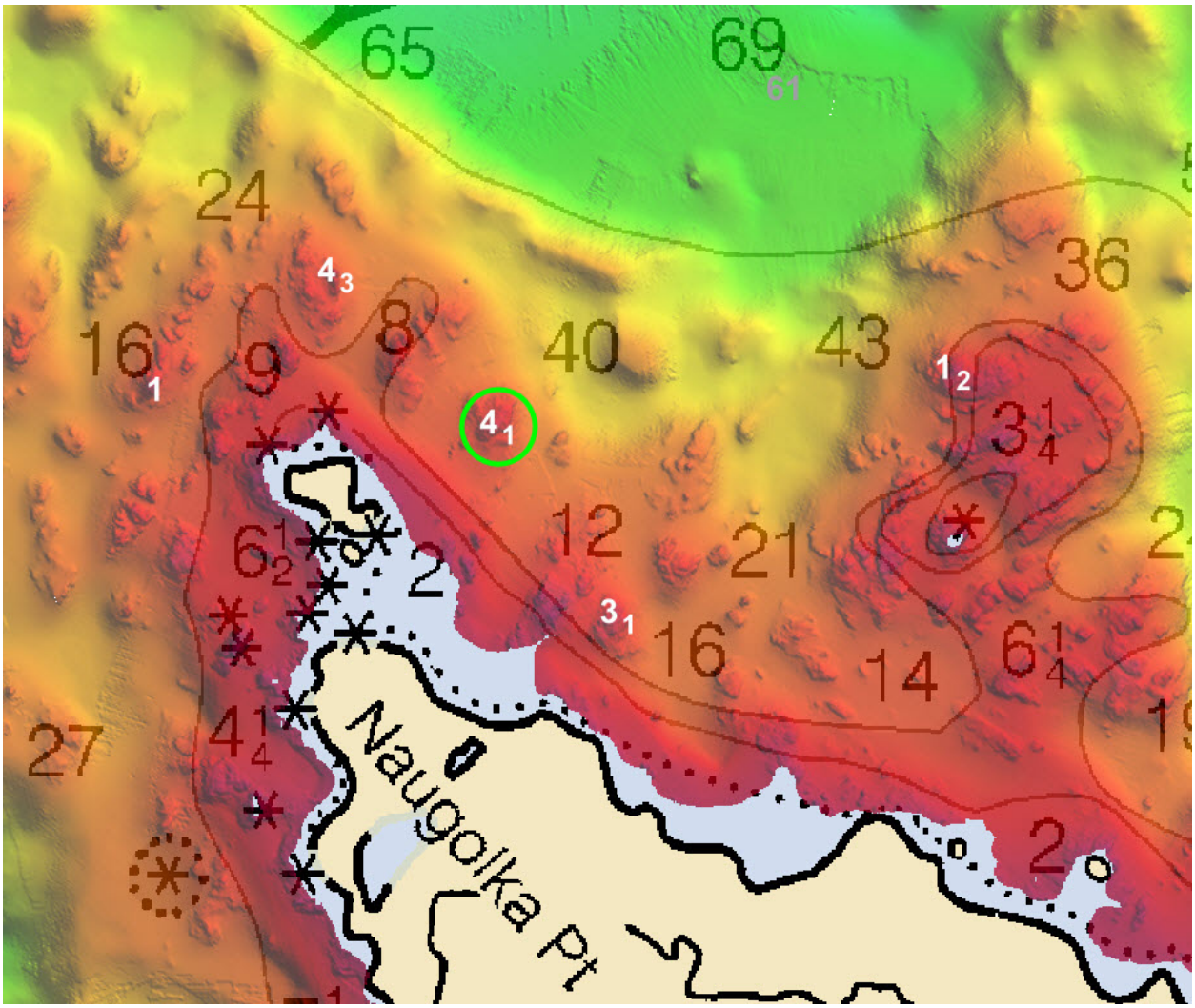


Figure 1.9.1

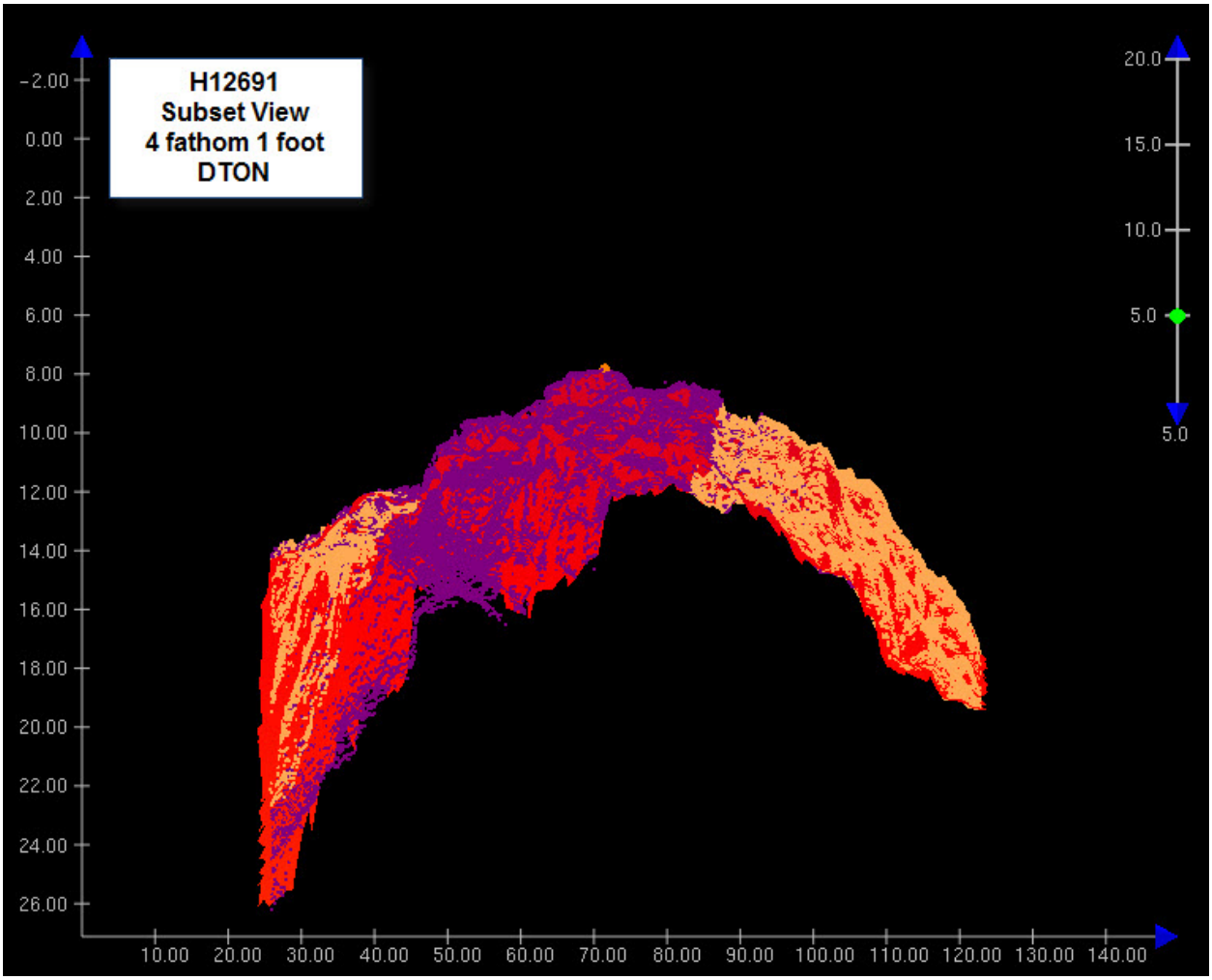

H12691
Subset View
4 fathom 1 foot
DTON
-2.00
0.00
2.00
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
20.0
15.0
10.0
5.0
5.0

Figure 1.9.2

1.10) 4027/124

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 54' 12.2" N, 153° 14' 04.9" W
Least Depth:	8.20 m (= 26.89 ft = 4.482 fm = 4 fm 2.89 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.965 m ; **TVU (TPEv)** ±0.105 m
Timestamp:	2015-290.01:09:46.729 (10/17/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-289 / 2804_2015__2900104
Profile/Beam:	4027/124
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2900104	4027/124	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

4 ½fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

4fm 3ft (16576_1, 531_1)

8.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

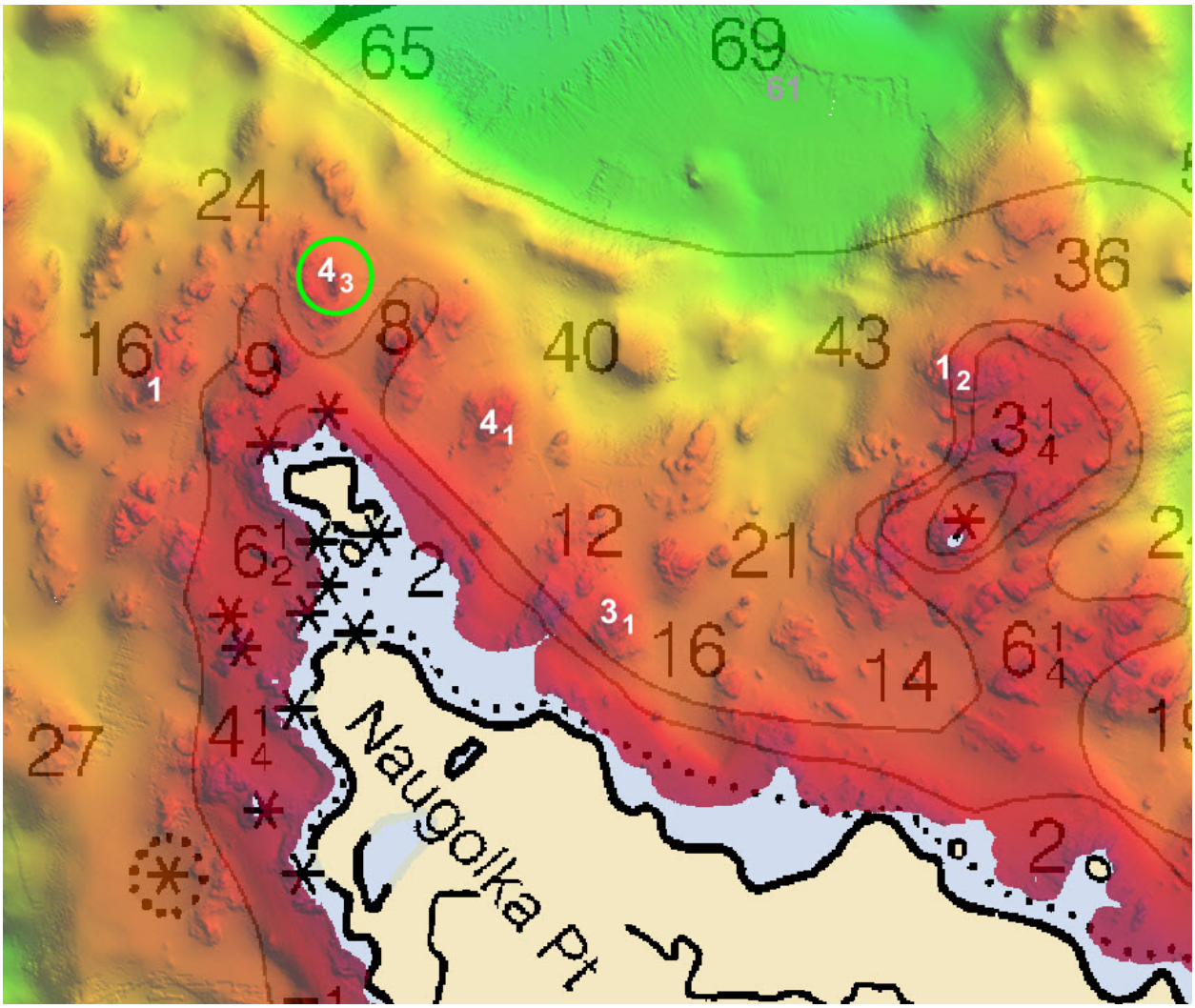


Figure 1.10.1

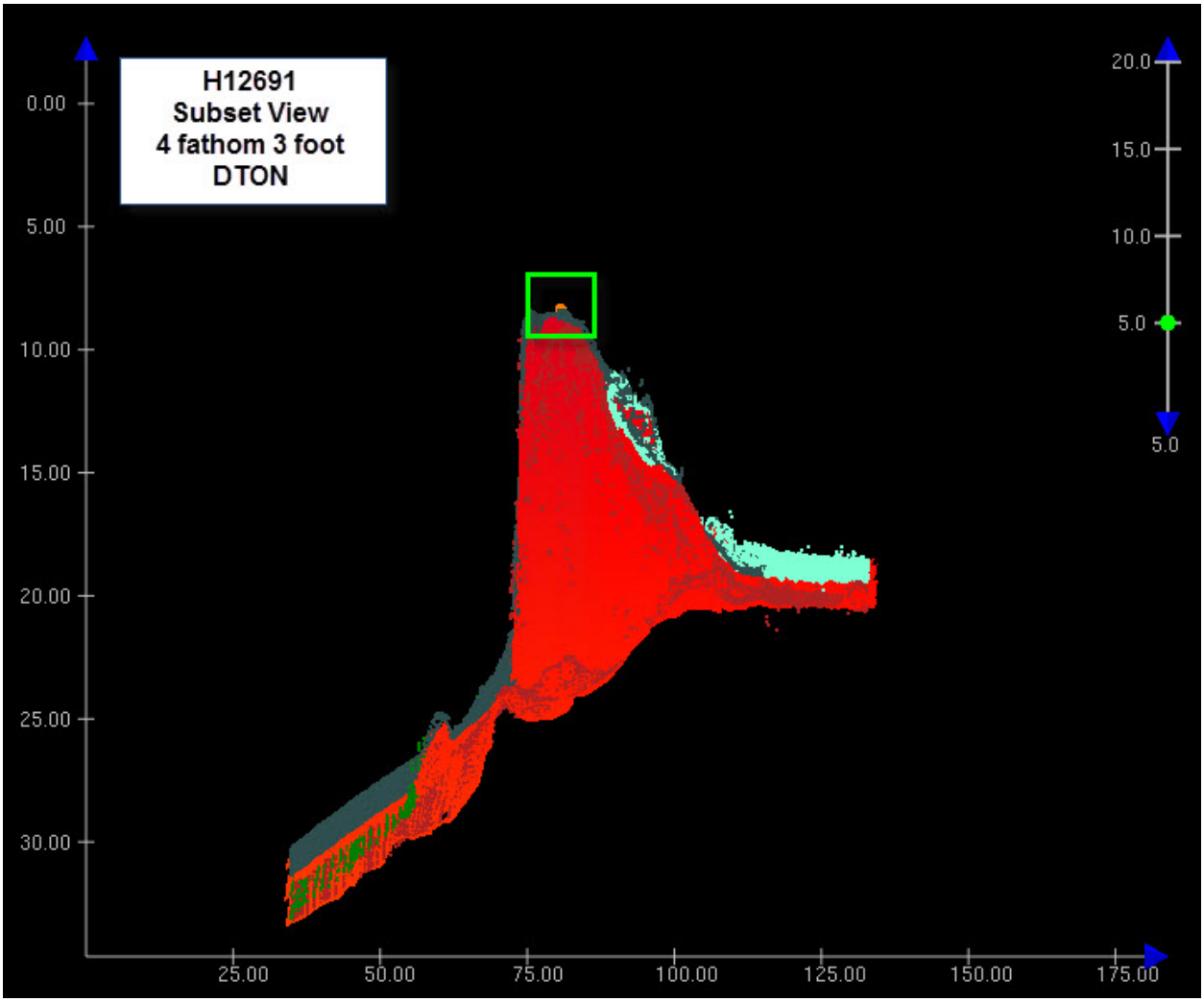

H12691
Subset View
4 fathom 3 foot
DTON
0.00
5.00
10.00
15.00
20.00
25.00
30.00
25.00
50.00
75.00
100.00
125.00
150.00
175.00
20.0
15.0
10.0
5.0
5.0

Figure 1.10.2

1.11) 100/229

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 54' 02.9" N, 153° 14' 32.2" W
Least Depth:	1.86 m (= 6.09 ft = 1.015 fm = 1 fm 0.09 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.961 m ; **TVU (TPEv)** ±0.074 m
Timestamp:	2015-293.00:20:37.200 (10/20/2015)
Survey Line:	h12691 / 2803_reson7125_hf_512 / 2015-292 / 2803_2015__2930020
Profile/Beam:	100/229
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2803_2015__2930020	100/229	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

1fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

1fm 0ft (16576_1, 531_1)

1.8m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

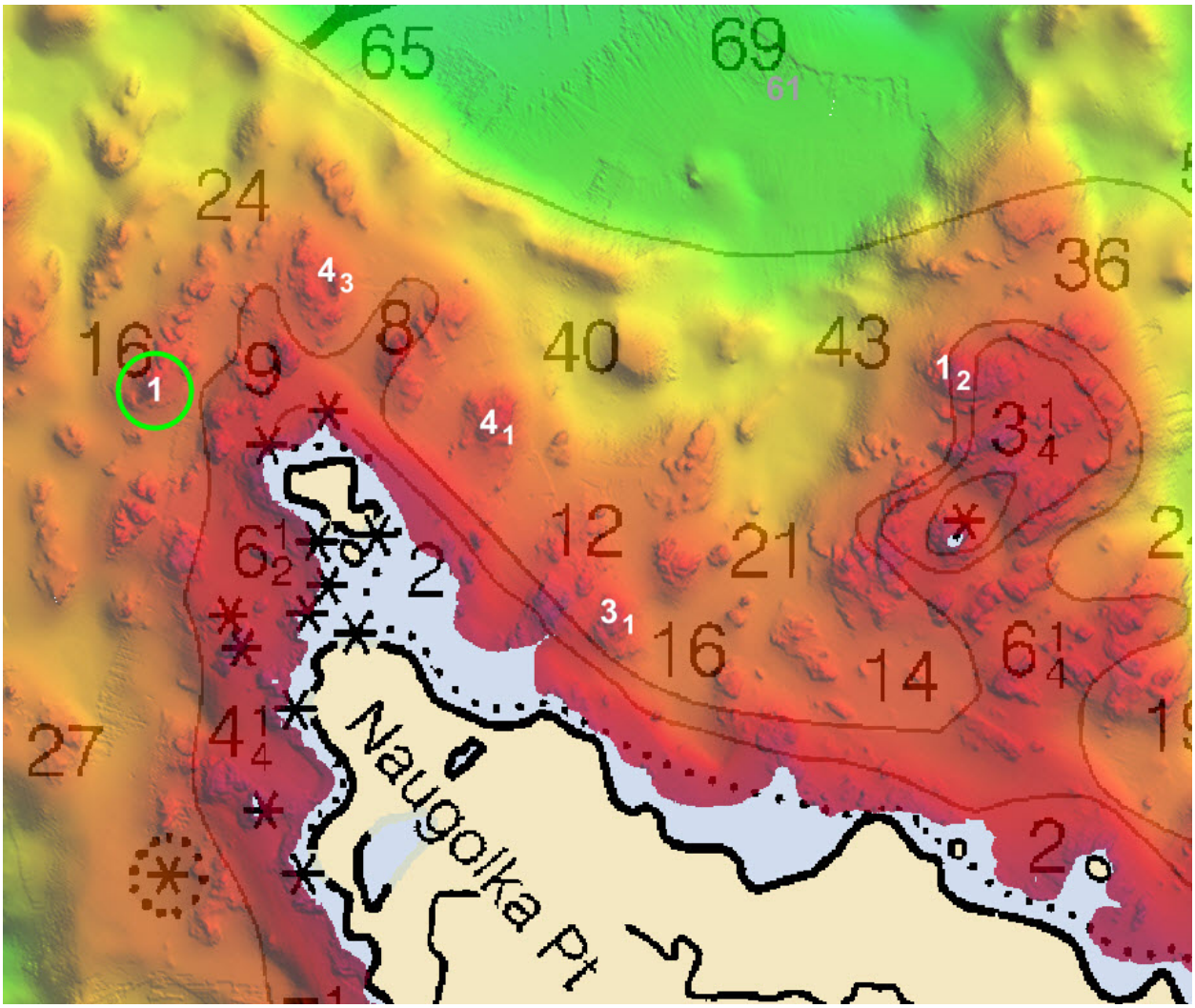


Figure 1.11.1

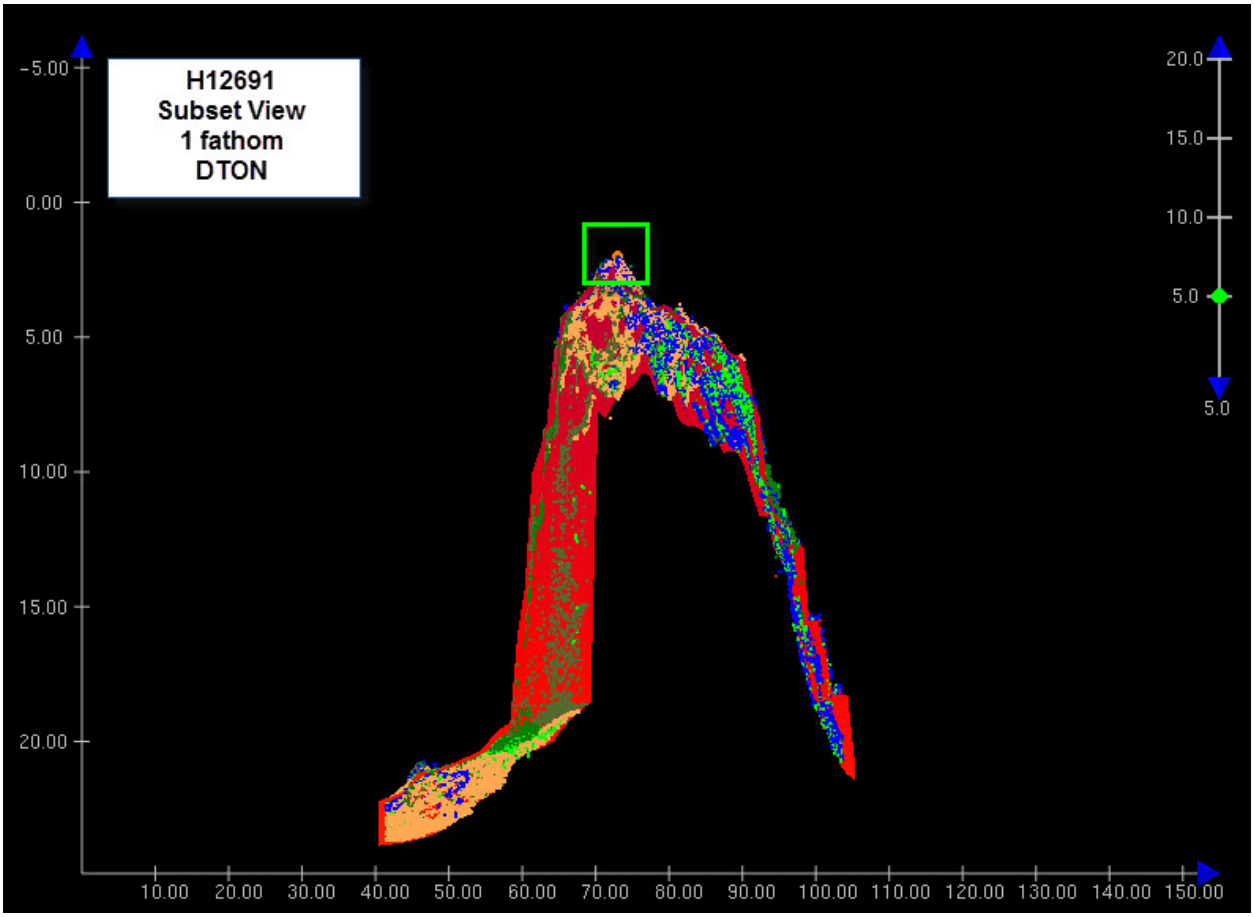

H12691
Subset View
1 fathom
DTON
-5.00
0.00
5.00
10.00
15.00
20.00
10.00 20.00 30.00 40.00 50.00 60.00 70.00 80.00 90.00 100.00 110.00 120.00 130.00 140.00 150.00
20.0
15.0
10.0
5.0
5.0

Figure 1.11.2

1.12) 163/107

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 56' 19.6" N, 153° 21' 11.0" W
Least Depth:	9.05 m (= 29.69 ft = 4.948 fm = 4 fm 5.69 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.090 m
Timestamp:	2015-292.01:01:53.981 (10/19/2015)
Survey Line:	h12691 / 2804_reson7125_lf_256 / 2015-291 / 2804_2015__2920101
Profile/Beam:	163/107
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2920101	163/107	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

5fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

4fm 5ft (16576_1, 531_1)

9.0m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

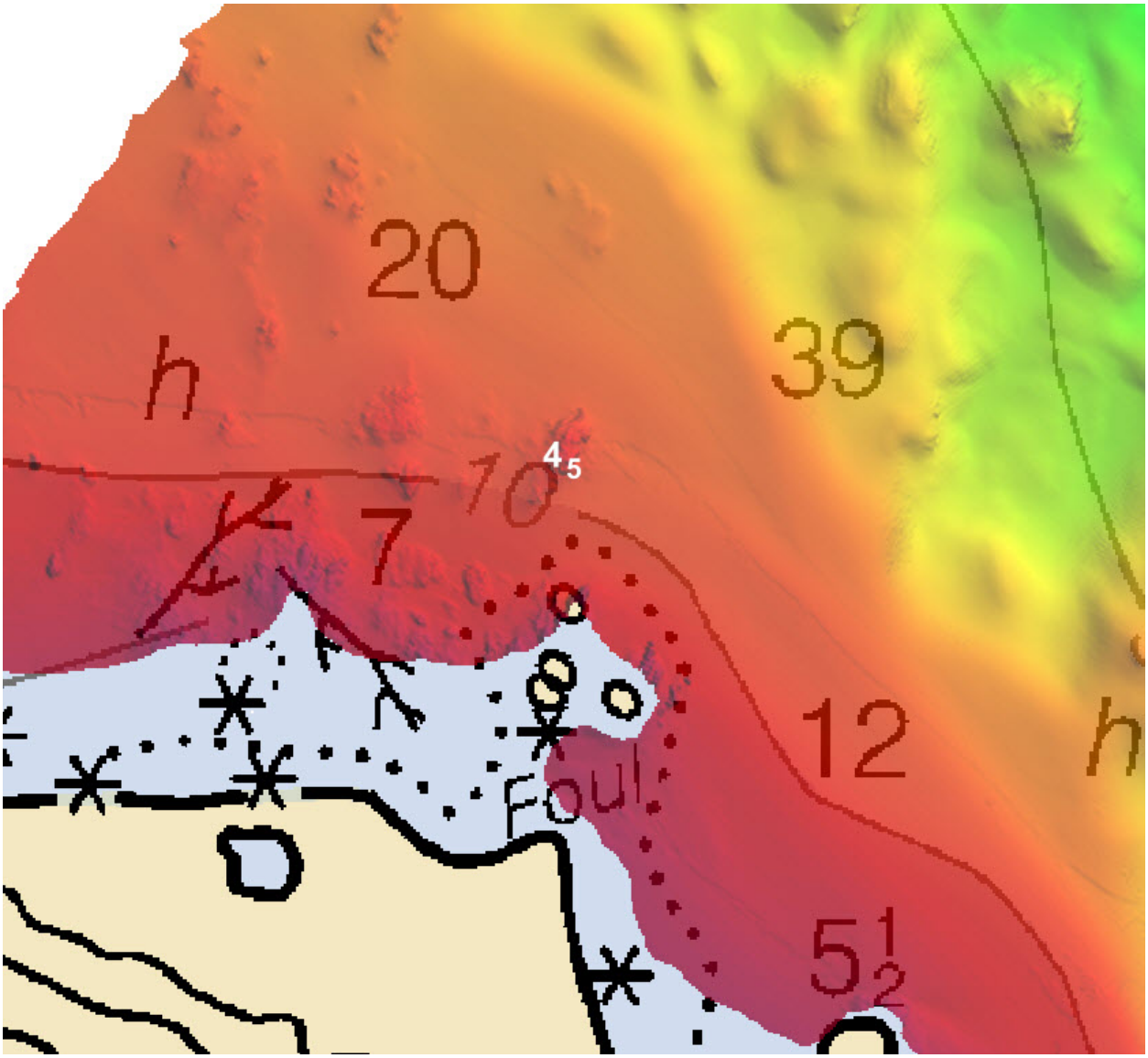


Figure 1.12.1

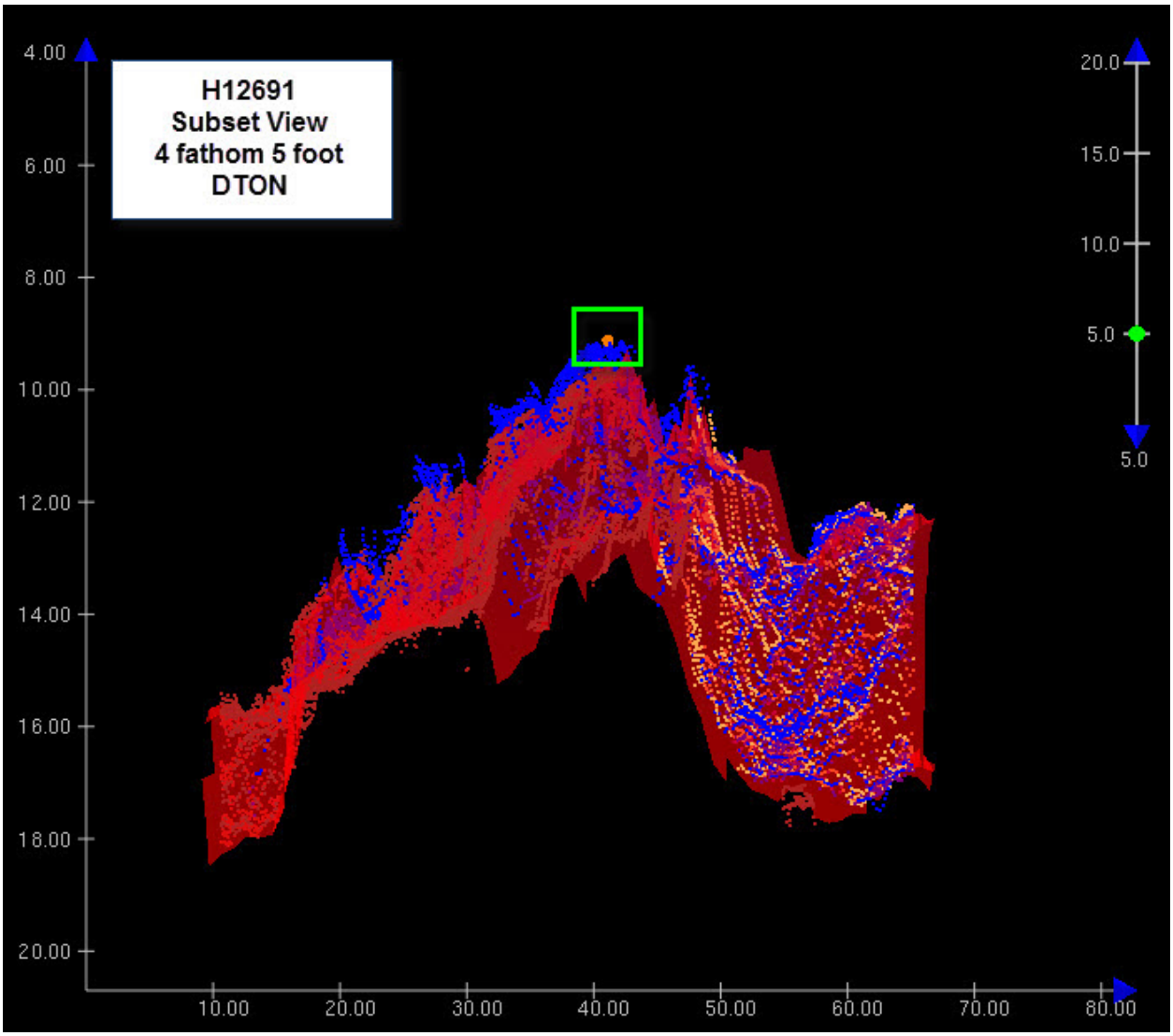

H12691
Subset View
4 fathom 5 foot
DTON
4.00
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
20.0
15.0
10.0
5.0
5.0

Figure 1.12.2

1.13) 1804/496

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 53' 37.2" N, 153° 09' 05.2" W
Least Depth:	15.45 m (= 50.68 ft = 8.447 fm = 8 fm 2.68 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.977 m ; **TVU (TPEv)** ±0.172 m
Timestamp:	2015-264.18:25:28.463 (09/21/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-264 / 2804_2015ra2641820
Profile/Beam:	1804/496
Charts Affected:	16594_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding is much shoaler than what is charted in the navigable area. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015ra2641820	1804/496	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

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

8fm 2ft (531_1)

15.4m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

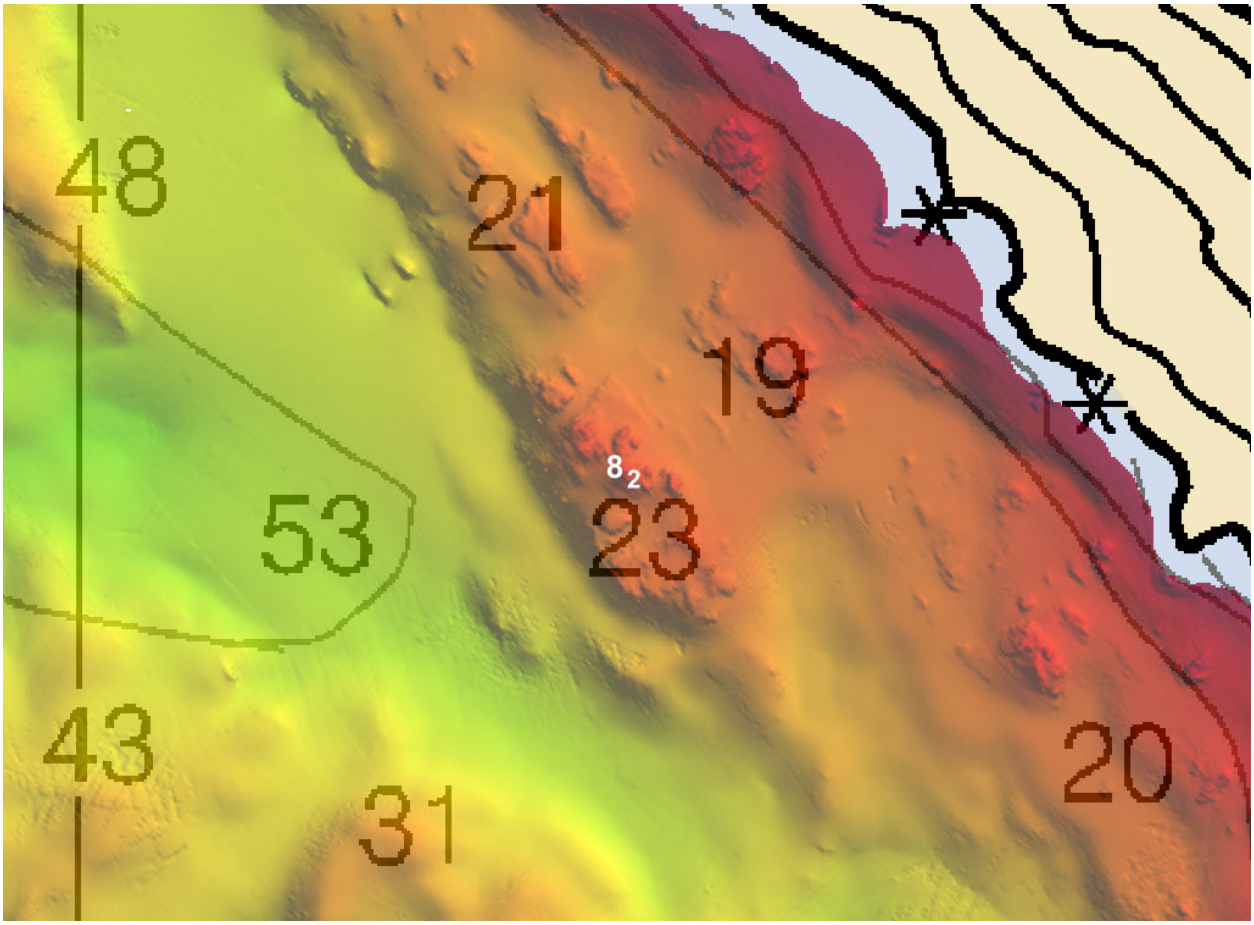


Figure 1.13.1

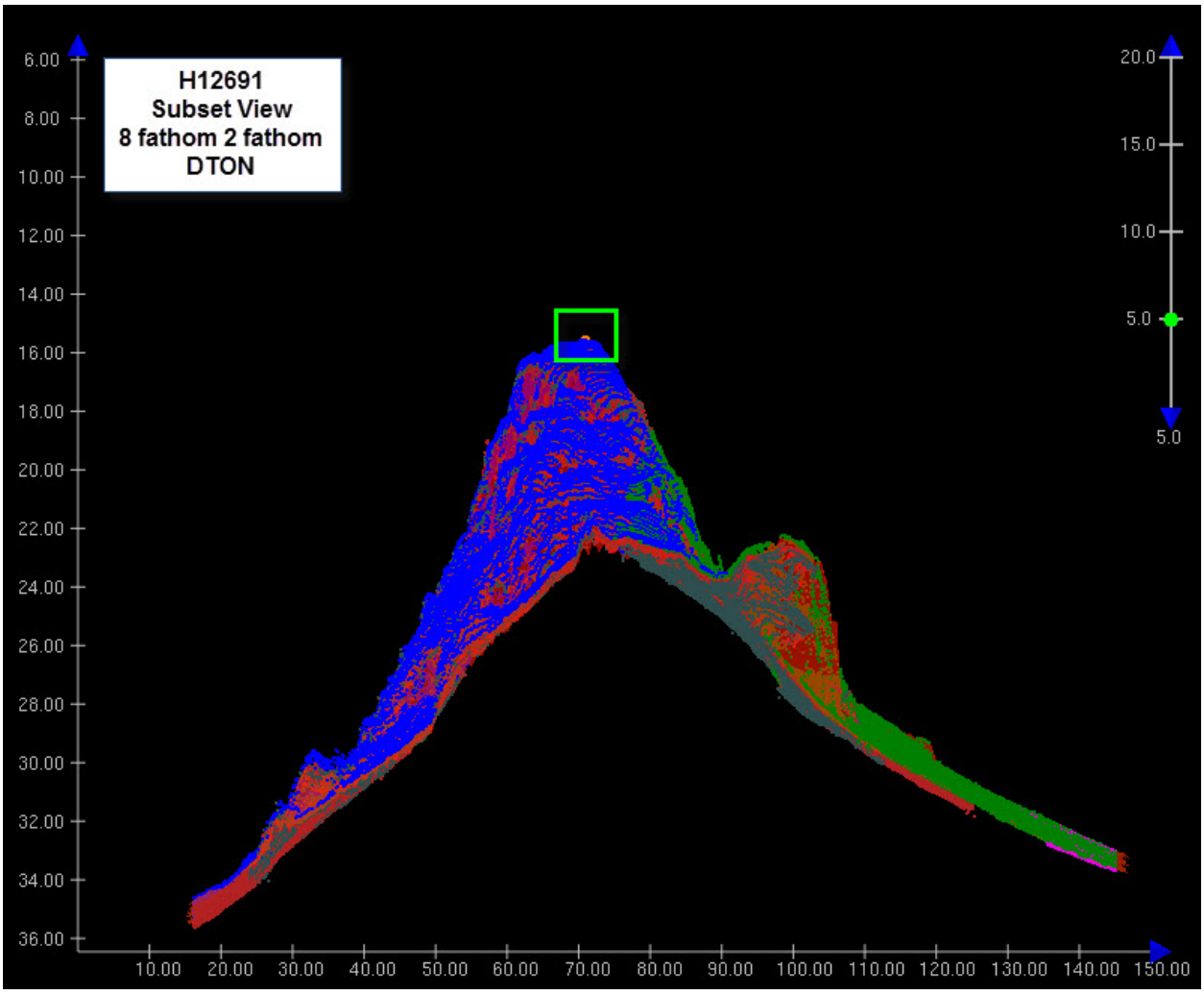

H12691
Subset View
8 fathom 2 fathom
DTON
6.00
8.00
10.00
12.00
14.00
16.00
18.00
20.00
22.00
24.00
26.00
28.00
30.00
32.00
34.00
36.00
10.00
20.00
30.00
40.00
50.00
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
20.0
15.0
10.0
5.0
5.0

Figure 1.13.2

1.14) 499/176

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 53' 44.4" N, 153° 13' 24.1" W
Least Depth:	5.92 m (= 19.44 ft = 3.239 fm = 3 fm 1.44 ft)
TPU (±1.96σ):	**THU (TPEh)** ±1.962 m ; **TVU (TPEv)** ±0.080 m
Timestamp:	2015-292.18:34:11.180 (10/19/2015)
Survey Line:	h12691 / 2804_reson7125_hf_512 / 2015-292 / 2804_2015__2921833
Profile/Beam:	499/176
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

Derived sounding affects the 10 fathom contour. Verified tides applied.

Feature Correlation

Source	Feature	Range	Azimuth	Status
2804_2015__2921833	499/176	0.00	000.0	Primary

Hydrographer Recommendations

[None]

Cartographically-Rounded Depth (Affected Charts):

3 ¼fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

3fm 1ft (16576_1, 531_1)

5.9m (500_1, 50_1)

S-57 Data

Geo object 1:	Sounding (SOUNDG)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 3:found by multi-beam

Feature Images

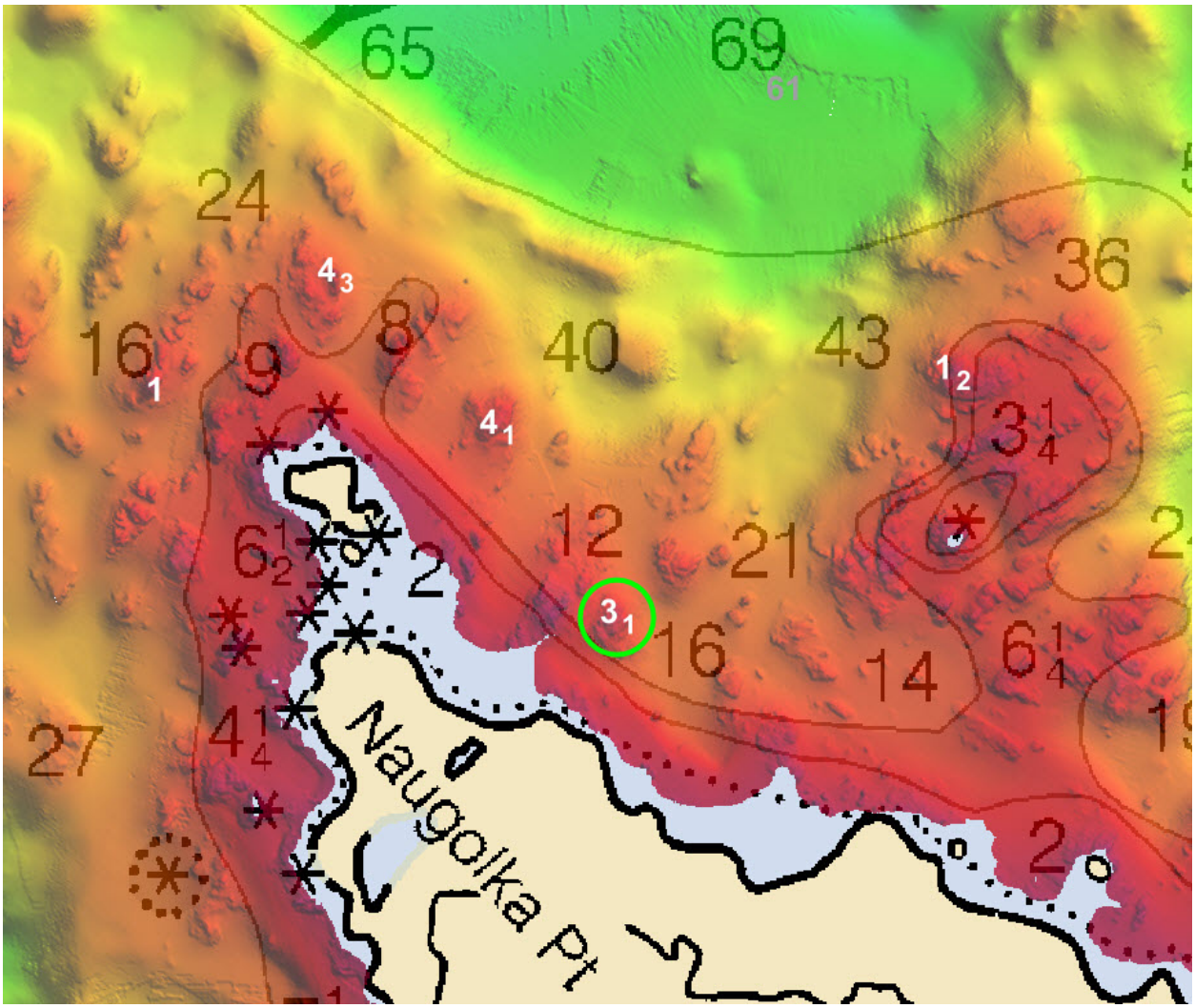


Figure 1.14.1

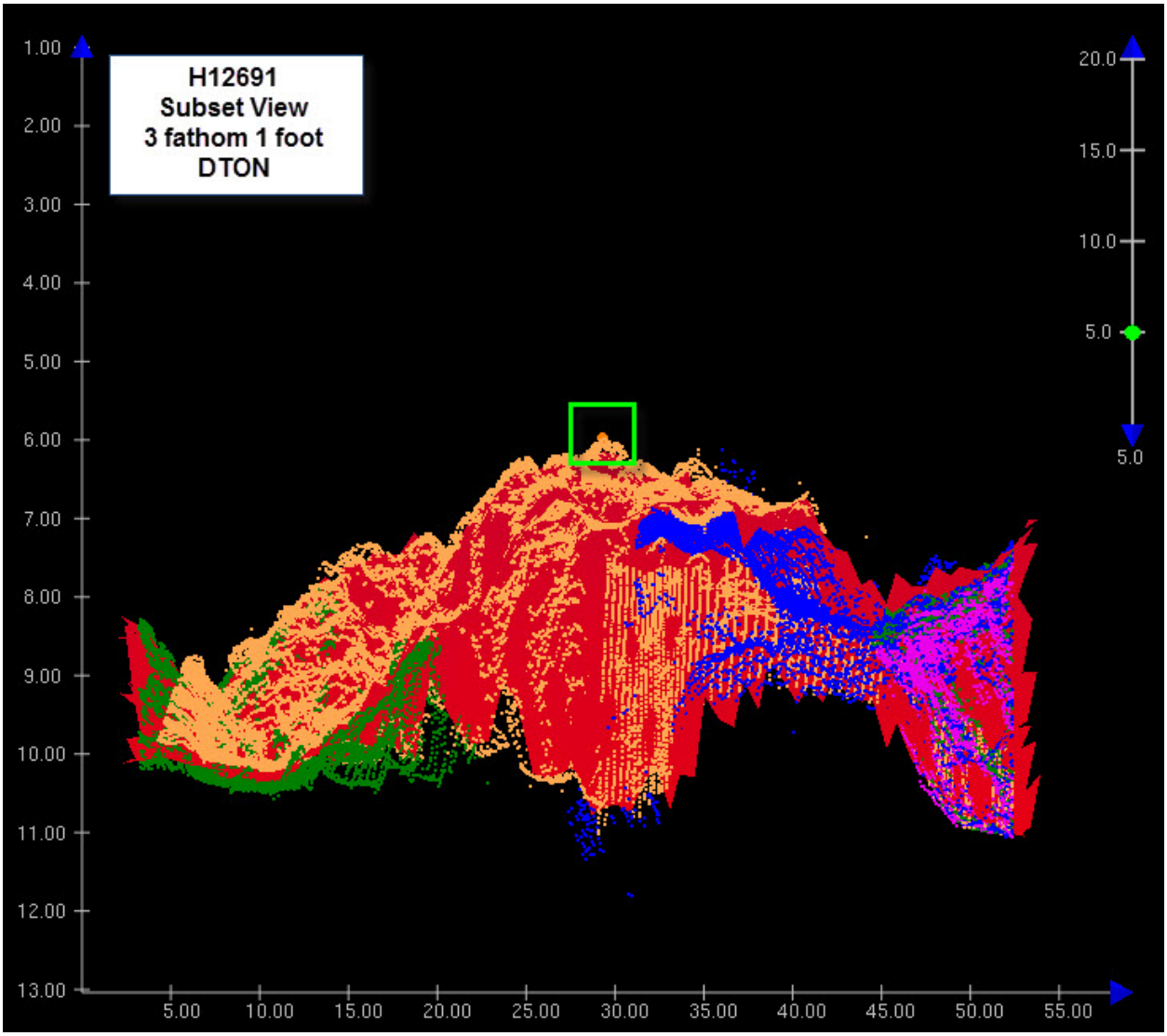

H12691
Subset View
3 fathom 1 foot
DTON
1.00
2.00
3.00
4.00
5.00
6.00
7.00
8.00
9.00
10.00
11.00
12.00
13.00
5.00
10.00
15.00
20.00
25.00
30.00
35.00
40.00
45.00
50.00
55.00
20.0
15.0
10.0
5.0
5.0

Figure 1.14.2

1.15) GP No. 1 / H12691_New_Rock_DTON.gml

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 55' 20.0" N, 153° 19' 38.1" W
Least Depth:	1.23 m (= 4.03 ft = 0.672 fm = 0 fm 4.03 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2015-274.18:45:00.000 (10/01/2015)
GP Dataset:	H12691_New_Rock_DTON.gml
GP No.:	1
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

New rock

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12691_New_Rock_DTON.gml	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart new rock.

Cartographically-Rounded Depth (Affected Charts):

0 ½fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

0fm 4ft (16576_1, 531_1)

1.2m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 12:found by levelling

VALSOU - 1.2286 m

WATLEV - 4:covers and uncovers

Feature Images

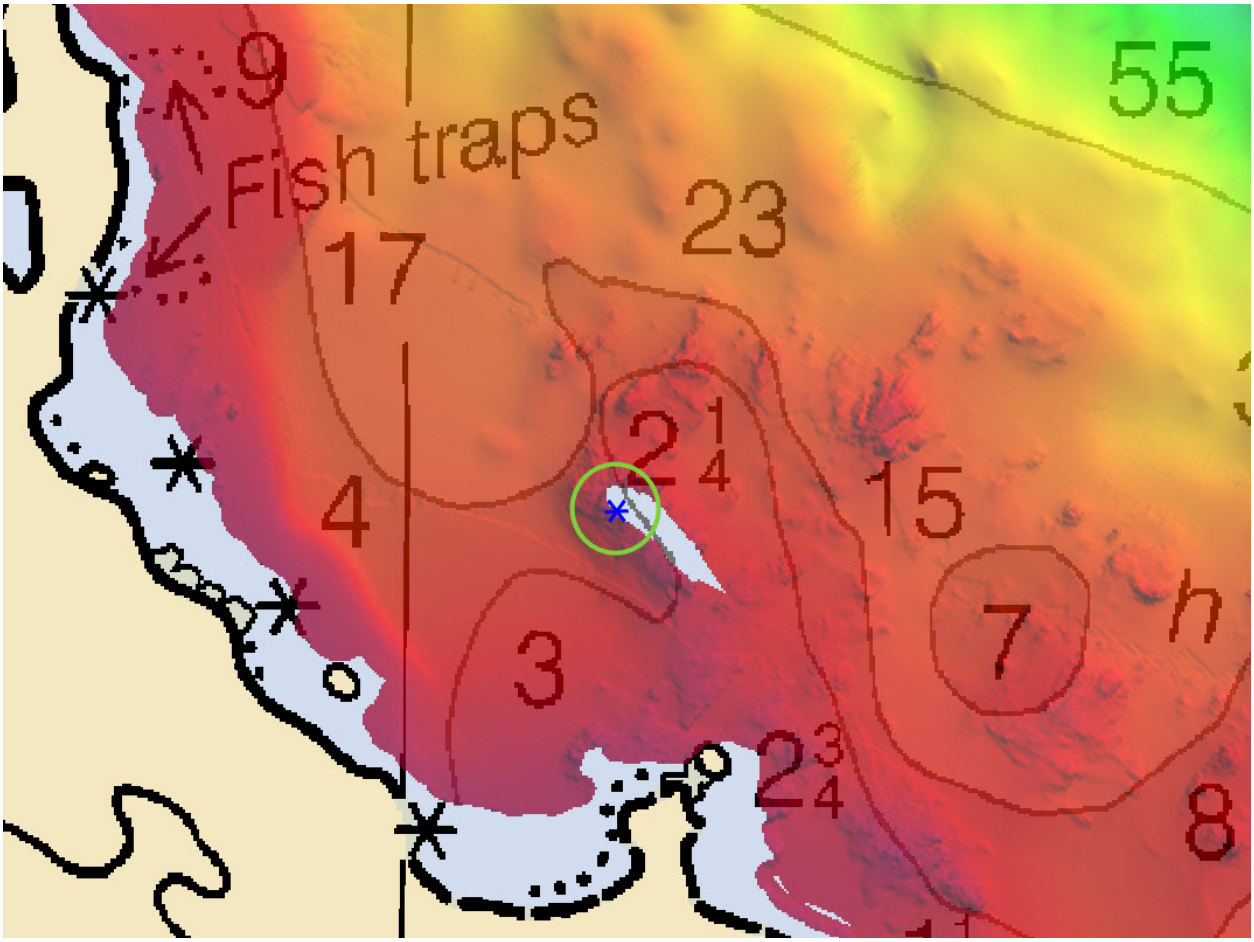


Figure 1.15.1

H12691 Danger to Navigation Report

Registry Number: H12691
State: Alaska
Locality: Kodiak Island
Sub-locality: Viekoda Bay
Project Number: OPR-136-RA-15
Survey Dates: 9/20/2015 - 10/21/2015

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
16594	13th	04/04/1998	1:78,900 (16594_1)	[L]NTM: ?
16597	9th	03/01/2005	1:80,000 (16597_1)	[L]NTM: ?
16576	4th	09/01/2003	1:80,000 (16576_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	0.15 m	57° 55' 00.4" N	153° 19' 08.1" W	---

1 - Dangers To Navigation

1.1) GP No. 1 / New_Rock_DTON.gml

DANGER TO NAVIGATION

Survey Summary

Survey Position:	57° 55' 00.4" N, 153° 19' 08.1" W
Least Depth:	0.15 m (= 0.49 ft = 0.081 fm = 0 fm 0.49 ft)
TPU (±1.96σ):	**THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp:	2015-274.18:35:00.000 (10/01/2015)
GP Dataset:	New_Rock_DTON.gml
GP No.:	1
Charts Affected:	16594_1, 16576_1, 16597_1, 16580_1, 16013_1, 531_1, 500_1, 530_1, 50_1

Remarks:

New rock

Feature Correlation

Source	Feature	Range	Azimuth	Status
New_Rock_DTON.gml	1	0.00	000.0	Primary

Hydrographer Recommendations

Chart new rock.

Arithmetically-Rounded Depth (Unit-wise Affected Charts):

0fm (16594_1, 16597_1, 16580_1, 16013_1, 530_1)

0fm 0ft (16576_1, 531_1)

0.1m (500_1, 50_1)

S-57 Data

Geo object 1:	Underwater rock / awash rock (UWTROC)
Attributes:	QUASOU - 6:least depth known
	SORDAT - 20151021
	SORIND - US,US,graph,H12691
	TECSOU - 12:found by levelling

VALSOU - 0.1482 m

WATLEV - 5:awash

Feature Images

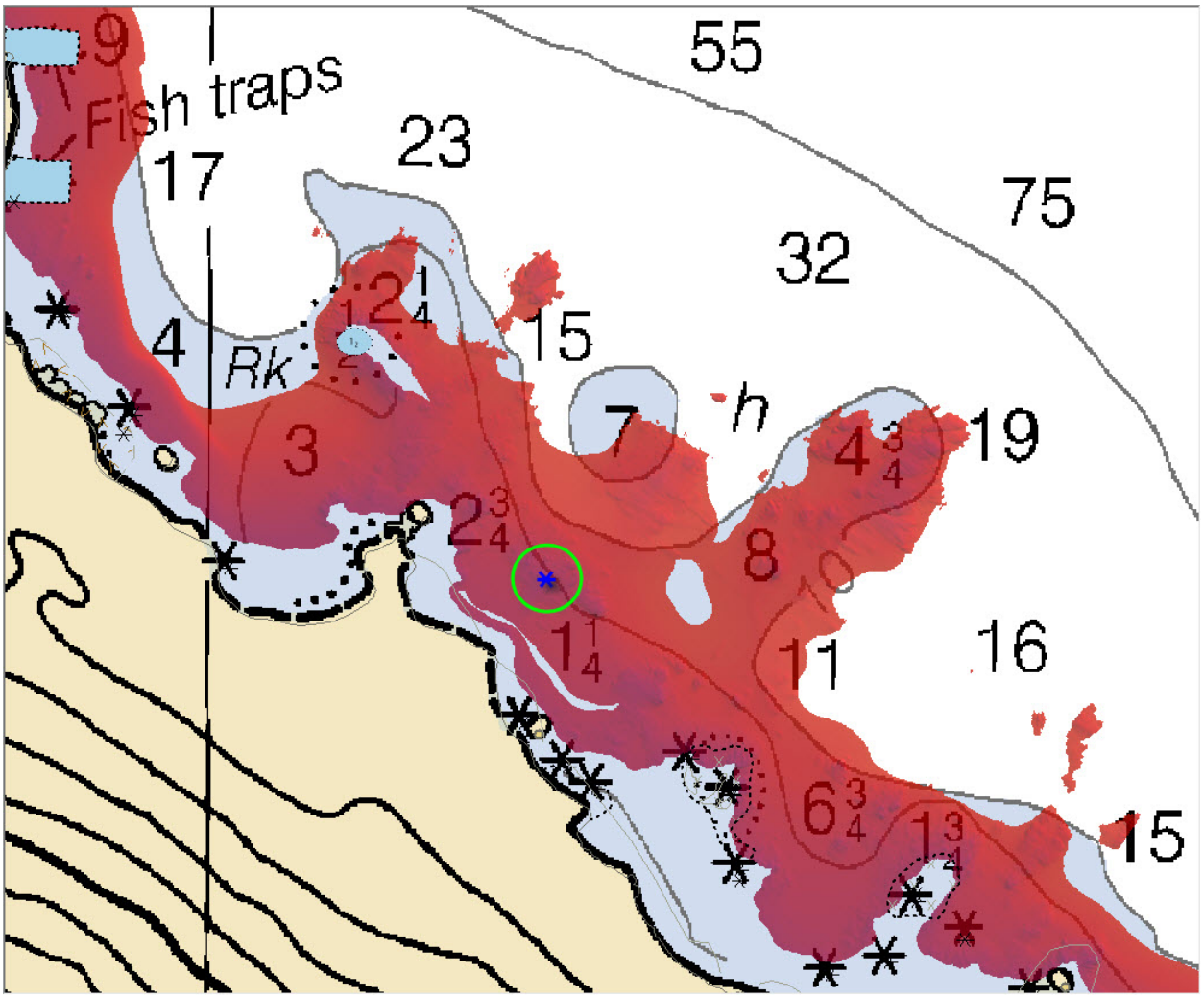


Figure 1.1.1

APPROVAL PAGE

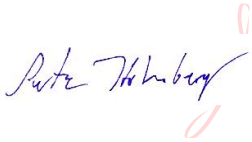
H12691

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

- H12691_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12691_GeoImage.pdf

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



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.

Approved:_____

CDR Ben Evans, NOAA
Chief, Pacific Hydrographic Branch