H12299

NOAA Form 76-35A

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	H12299

LOCALITY

State:	New York
General Locality:	Block Island Sound
Sub-locality:	Vicinity of Cerberus Shoal

2011

CHIEF OF PARTY
CDR Lawrence Krepp

LIBRARY & ARCHIVES

Date:

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H12299**

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:	**New York**
General Locality:	**Block Island Sound**
Sub-Locality:	**Vicinity of Cerberus Shoal**
Scale:	**20000**
Dates of Survey:	**09/12/2011 to 11/15/2011**
Instructions Dated:	**06/29/2011**
Project Number:	**OPR-B363-TJ-11**
Field Unit:	**NOAA Ship *Thomas Jefferson***
Chief of Party:	**CDR Lawrence Krepp**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean lower low water**
H-Cell Compilation Units:	***meters at Mean lower low water***

Remarks:

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Descriptive Report to Accompany Survey H12299

Project: OPR-B363-TJ-11

Locality: Block Island Sound

Sublocality: Vicinity of Cerberus Shoal

Scale: 1:20000

September 2011 - November 2011

NOAA Ship *Thomas Jefferson*

Chief of Party: CDR Lawrence Krepp

A. Area Surveyed

Survey sheet area is in the vicinity of Cerberus Shoal, between Little Gull Island and Montauk NY

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
40.5291666667 N 73.7433333333 W	40.3961111111 N 73.8269444444 W

Table 1: Survey Limits

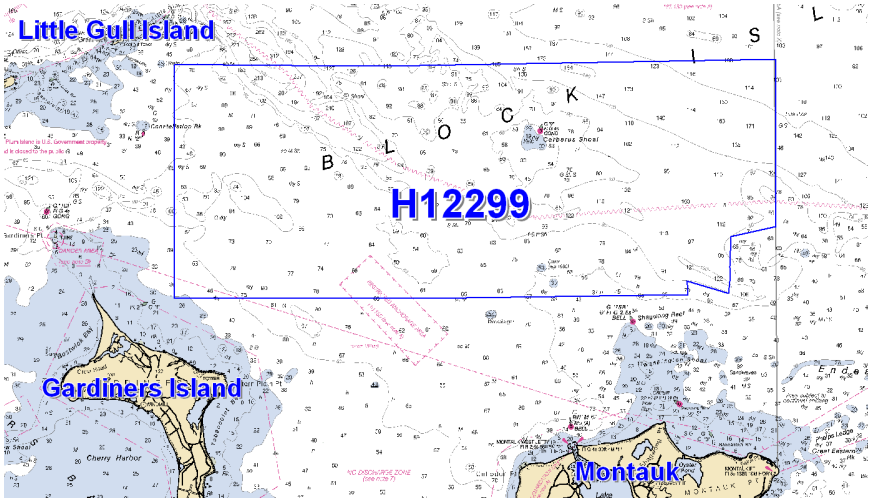

Figure 1: Survey Limits for H12299

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

A.2 Survey Purpose

This project is being conducted in support of NOAA's Office of Coast Survey to provide contemporary hydrographic data in order to update the nautical charting products and reduce the survey backlog within the area. In addition, data from this project will support the Long Island Sound Seafloor Mapping Initiative for the States of Connecticut and New York. This project also responds, in part, to the concerns raised by the Northeast Marine Pilots for new hydrographic surveys to support deep draft (60') vessels transiting the areas traffic lanes. This project will cover approximately 228 nm2 of which 138 nm2 are critical survey areas as designated in the NOAA Hydrographic Survey Priorities, 2010 edition.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-B363-TJ-11, dated 29th July, 2011. No additional work is needed to complete this survey. No changes significant to navigation have been noted and it is recommended that this survey receive normal processing priority.

A.4 Survey Coverage

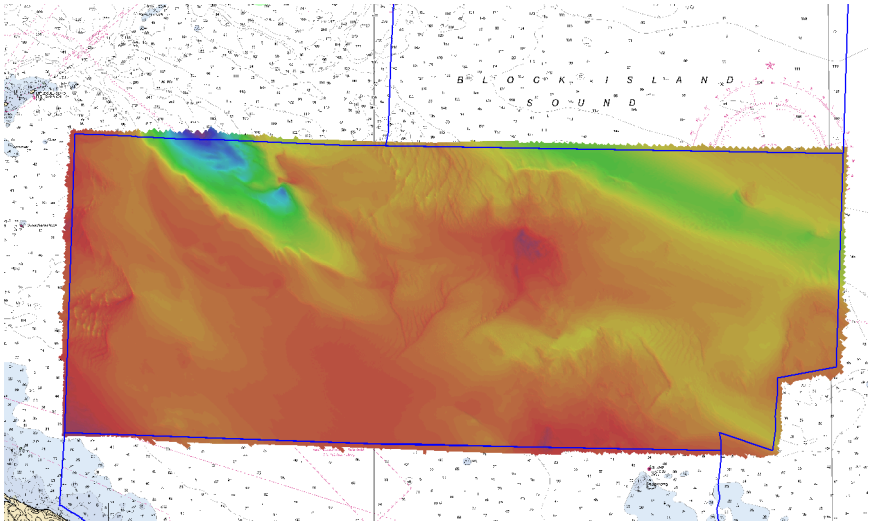

Figure 2: H12299 multibeam echosounder survey coverage.

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

A.5 Survey Statistics

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

	HULL ID	*S-222*	*3101*	*3102*	*Total*
LNM	**SBES Mainscheme**	0	0	0	0
	MBES Mainscheme	1466.86	96.30	47.04	1610.2
	Lidar Mainscheme	0	0	0	0
	SSS Mainscheme	0	0	0	0
	SBES/MBES Combo Mainscheme	0	0	0	0
	SBES/SSS Combo Mainscheme	0	0	0	0
	MBES/SSS Combo Mainscheme	0	0	0	0
	SBES/MBES Combo Crosslines	53.14	0	0	53.14
	Lidar Crosslines	0	0	0	0
Number of Bottom Samples					16
Number of DPs					0
Number of Items Items Investigated by Dive Ops					0
Total Number of SNM					59.8

Table 2: Hydrographic Survey Statistics

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

Survey Dates
09/12/2011
09/13/2011
09/14/2011
09/15/2011
09/16/2011
09/20/2011
09/21/2011
09/22/2011
09/23/2011
09/25/2012
10/02/2011
10/12/2011
10/14/2011
10/16/2011
10/17/2011
10/18/2011
10/19/2011
10/20/2011
10/23/2011
10/24/2011
10/25/2011
10/27/2011
11/01/2011
11/02/2011
11/06/2011
11/07/2011
11/08/2011
11/09/2011
11/10/2011
11/15/2011

Table 3: Dates of Hydrography

A.6 Shoreline

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

A.7 Bottom Samples

Sixteen bottom samples were acquired based on the density of existing bottom samples and the variability seen in the MB surface

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	***S-222***	***3101***	***3102***
LOA	210 feet	31 feet	31 feet
Draft	15 feet	3 feet	3 feet

Table 4: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Applanix	POSMV	Vessel Attitude System
Seabird	Seacat19+	Sound Speed System
Brooke Ocean	MVP100	Sounds Speed System
Reson	7125 ROV	MBES
Reson	7125 SV1	MBES

Table 5: Major Systems Used

Data were acquired by NOAA Ship Thomas Jefferson, launch 3101 and launch 3102. NOAA Ship Thomas Jefferson, launch 3101 and launch 3102 acquired Reson 7125 multibeam echo sounder (MBES) soundings and sound velocity profiles. Sea bed samples were collected by NOAA Ship Thomas Jefferson. Vessel configurations, equipment operation and data acquisition and processing were consistent with specifications described in the DAPR.

B.2 Quality Control

B.2.1 Crosslines

Crossline comparison was completed using a difference surface created in CARIS Bathy DataBASE. Mainscheme data generally agreed well, with maximum disagreement occurring near the outer beams. Normal differences were within 20cm, with maximums in the outer beams of 50cm. The computed statistics of the difference surface were: mean: 0.05m, stdev: 0.16m. Data was also compared visually using standard deviation surfaces and no large standard deviations were discovered.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.102meters	0meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S222, 3101, 3102	4meters/second	1.0meters/second	0.2meters/second

Table 7: Survey Specific Sound Speed TPU Values

CO-OPS provided tide uncertainty values for the TCARI surface and the VDATUM solution as part of the Total Propagated Uncertainty (TPU) calculation performed within CARIS HIPS and SIPS. TPU is calculated and written to each line's HDCS file (CARIS processed data format). When surfaces are created, an uncertainty child layer is created. This child layer represents the amount of uncertainty for individual nodes in the surface based on a combination of a priori values from equipment vendors, values determined from environmental observation in the field, and from automated empirical analysis of data in real-time. Once all investigated features have been reviewed and least depths have been designated, surfaces are finalized. In finalization, the standard deviation for each node in the surface is multiplied by 1.96 to provide the 95% (2-sigma) confidence value for the node. This 2-sigma standard deviation is compared to the computed Total Vertical Uncertainty (TVU) for each node. The larger of the two values is retained as the finalized Uncertainty for each node. Uncertainty is reported in meters. IHO has established allowable TVU values for each order of survey. This survey meets IHO Order I TVU requirements in 99.86% of nodes in the final surface. Areas that did not meet IHO Order1 were located in rocky areas with high standard deviation values.

B.2.3 Junctions

H12299 was compared with H12298 from the same project.

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H12298	1:10000	2011	NOAA Ship THOMAS JEFFERSON	N

Table 8: Junctioning Surveys

H12298

The junction with H12298 was compared using a difference surface in CARIS Bathy DataBASE. The surveys had a mean difference of 0.1m and a standard deviation of 0.2m

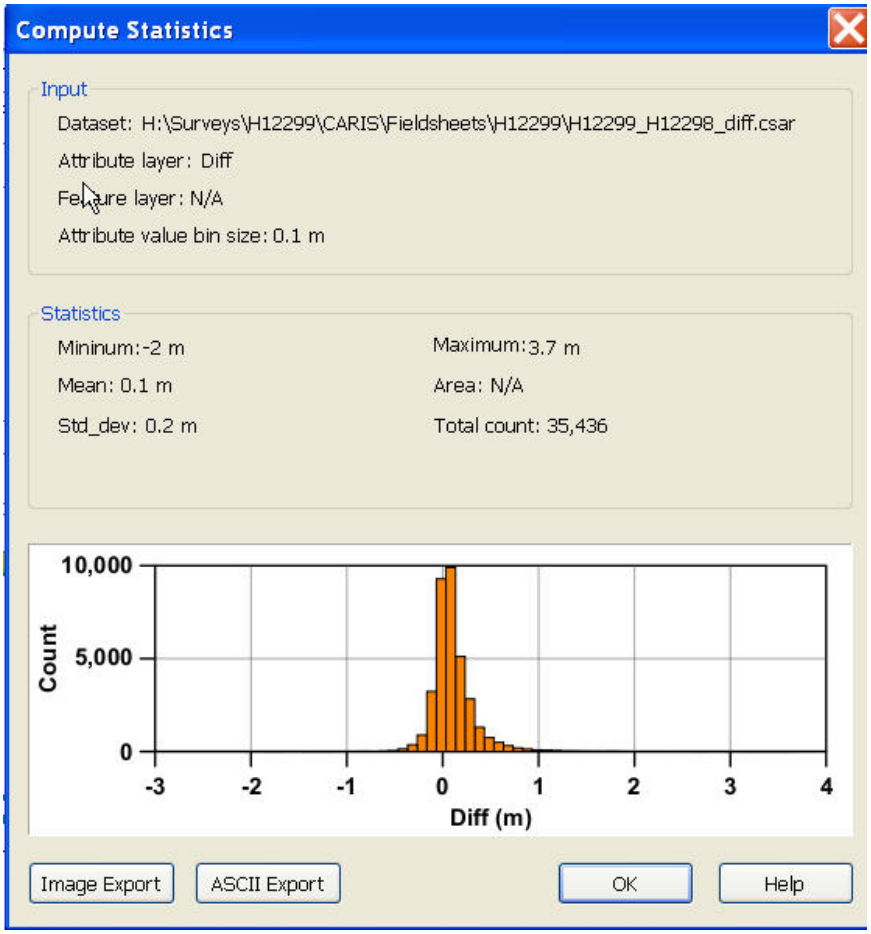

Figure 3: Summary of the H12299 and H12298 difference surface

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

B.2.5.1None Exist

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

B.2.6 Factors Affecting Soundings

B.2.6.1 None Exist

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: On survey launch 3101 and 3102, sound speed data was collected with a CTD approximately every two hours. The ship used a Moving Vessel Profiler with casts occurring approximately every 20 minutes. Sounds speed profiles are analyzed for data quality, concatenated and then applied to the bathymetry using the "nearest in distance within time - 2 hours" mode in Caris HIPS and SIPS.

No abnormal sound velocity issues were present in the data.

B.2.8 Coverage Equipment and Methods

99.47% of nodes in H12299 met the density requirements (Figure 4).

The finalized surface has 2541159 nodes with 107550371 soundings.

Object Detection Coverage

99.47% | PASS

Nodes with 5 or more soundings **99.47%** (2527567/2541159).
Sounding count average is **42.32** soundings per node.
Sounding count mode is **23** soundings per node.

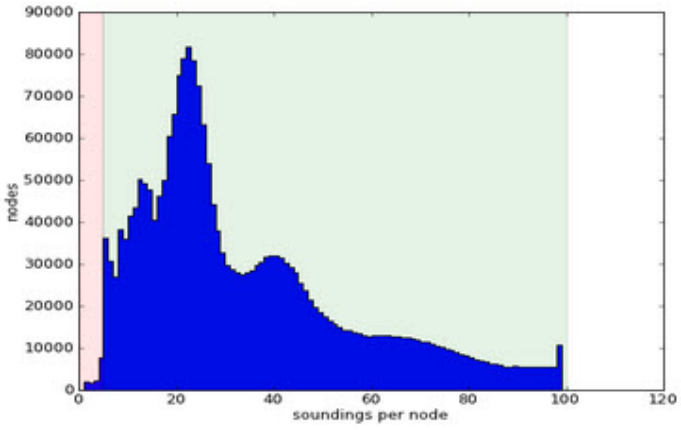

Figure 4: H12299 8m Combined Surface Density Analysis

B.2.9 Systematic Errors

All of the lines listed as DN284 were acquired on October 12, 2011 which is actually DN285. No data was logged for this project on October 11th or 13th. To reduce the possibility of corrupting or misnaming files it was decided to leave the entire day's files as DN284 which include sound velocity, true heave and HDCS line data.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

HDCS sounding data were reduced to mean lower low (MLLW) primarily with a VDATUM solution. Twenty percent of lines were processed to TCARI when issues with ERS processing did not allow for an SBET solution. See the Vertical and Horizontal Control Section for more information.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was logged as an s7k file and submitted to the IOCM processing center and directly to NGDC, and is not included with the data submitted to AHB.

B.5 Data Processing

B.5.1 Software Updates

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

Manufacturer	Name	Version	Service Pack	Hotfix	Installation Date	Use
Caris	HIPS/SIPS	7.1	2	2	08/24/2012	Processing
Caris	Bathy DataBASE	3.2	2	7	07/26/2012	Processing

Table 9: Software Updates

The following Feature Object Catalog was used: NOAAProfileField.xml

B.5.2 Surfaces

The following CARIS surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
I12299_MB_50cm_MLLW_1of5_Fina	CUBE	0.5 meters	0 meters - 20 meters	NOAA_0.5m	Object Detection
H12299_MB_1m_MLLW_2of5_Final	CUBE	1 meters	19 meters - 30 meters	NOAA_1m	Object Detection
H12299_MB_2m_MLLW_3of5_Final	CUBE	2 meters	28 meters - 40 meters	NOAA_2m	Complete MBES
H12299_MB_4m_MLLW_4of5_Final	CUBE	4 meters	36 meters - 80 meters	NOAA_4m	Complete MBES
H12299_MB_8m_MLLW_5of5_Final	CUBE	8 meters	72 meters - 160 meters	NOAA_8m	Complete MBES
H12299_MB_8m_MLLW_Combined	CUBE	8 meters	0 meters - 160 meters	N/A	Complete MBES

Table 10: CARIS Surfaces

See Appendix V for the email that discusses why the 1m resolution ODMB grid was extended to a depth of 30m instead of 20m.

C. Vertical and Horizontal Control

As per FPM section 5.2.3.2.3, no HVCR was filed as horizontal or vertical control stations were not established by the field party for this survey. A summary of horizontal and vertical control for this survey follows.

C.1 Vertical Control

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

Standard Vertical Control Methods Used:

TCARI

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

Station Name	Station ID
Newport, RI	8452660
New London, CT	8461490
Montauk, NY	8510560

Table 11: NWLON Tide Stations

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

Station Name	Station ID
Orient Harbor	8511671

Table 12: Subordinate Tide Stations

File Name	Status
H:\Surveys\H12299\CARIS \Tide\Verified\8452660.tid	Verified Observed
H:\Surveys\H12299\CARIS \Tide\Verified\8461490.tid	Verified Observed
H:\Surveys\H12299\CARIS \Tide\Verified\8510560.tid	Verified Observed
H:\Surveys\H12299\CARIS \Tide\Verified\8511671.tid	Verified Observed

Table 13: Water Level Files (.tid)

File Name	Status
H:\Surveys\H12299\CARIS \Tide\B363TJ2011_final.tc	Final

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

A request for final approved tides was sent to N/OPS1 on 11/22/2011. The final tide note was received on 01/06/2012.

Non-Standard Vertical Control Methods Used:

VDatum

Ellipsoid to Chart Datum Separation File:

H:\Surveys\H12299\CARIS\SBET\H12299_SBET.txt

Crosslines with and without SBETs applied were compared using Pydro's Time Series Comparison tool. Stats were: N,mean,stdev = 146343, 0.066, 0.049. See Appendix V for the interim deliverable memo and resulting VDATUM approval memo.
The majority, 80%, of H12299 was processed to the ellipsoid and used the OPs provided VDATUM separation model to reduce data to MLLW. Of the lines that were processed to VDATUM, the following had errors in the HIPS RMS error data application:
Launch 3101: DN 289 Lines 800_1324, 801_1341, DN 287 Lines 800_1902, 804_1939
S-222: DN 306 Line 492_2157, DN 293 Line 344_1618, DN 256 Lines 392_1303, 907_0400, DN 257 Line 372_0231, DN 259 Line 486_0745 and DN 284 Line 531_1941.

The remaining 20% of lines from H12299 did not have GPS tides applied and instead were processed with TCARI tides:
Launch 3101: DN 287 Time 1350-1654, DN 298 Time 1514-2002, DN 312 Time 1226-1350, 2004-2013
Launch 3102: DN 313, DN 314 Time 1749-2007
S-222: DN 258 Time 1338-2254, DN 264 Time 0635-1012, DN 266 Line 504_0036, DN 287 Time 1807-1908, DN 290 Line 412_1518, DN 292 Line 450_2047, DN 296 Time 1433-2029, DN 314 Time1638-2006

C.2 Horizontal Control

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

The following PPK methods were used for horizontal control:

Smart Base

The following CORS Stations were used for horizontal control:

HVCR Site ID	Base Station ID
XMTS	XMTS
MOR5	MOR5
NCDU	NCDU
ACU5	ACU5
ACU6	ACU6
NYRH	NYRH
CTMA	CTMA
CTGU	CTGU
CTGR	CTGR
URIL	URIL

Table 15: CORS Base Stations

The following DGPS Stations were used for horizontal control:

DGPS Stations
Sandy Hook, NJ (286kHz)
Moriches, NY (293 kHz)

Table 16: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

D.1.1 Raster Charts

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

Chart	Scale	Edition	Edition Date	LNM Date	NM Date
13209	1:40000	26	08/2011	09/11/2012	09/01/2012
13212	1:20000	39	06/2010	09/11/2012	09/01/2012

Table 17: Largest Scale Raster Charts

13209

The survey generally agreed well with charted depths, with certain areas of discrepancy occurring where sand waves have shifted over time. See ENC US5MA22M Discussion Below.

13212

The survey generally agreed well with charted depths, with certain areas of discrepancy occurring where sand waves have shifted over time. See ENC US5CN42M Discussion Below.

D.1.2 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US5MA22M	1:40000	20	07/13/2012	09/06/2012	NO
US5CN42M	1:20000	7	06/25/2012	08/24/2012	NO

Table 18: Largest Scale ENCs

US5MA22M

The survey generally agreed well with charted depths, with certain areas of discrepancy occurring where sand waves have shifted over time:

The charted 90ft contour in the southeast corner of H12299 sheet limits has migrated as much as 1020m to the west due to shifting sand waves (Figure 5).

There is a charted 89ft sounding located at 41-10-07.49N, 71-51-21.76W that seems to be erroneous. It is only on the ENC, not on the raster chart 13209. H12299 data disproves this charted ENC depth and contours (Figure 6).

The charted 120ft contour in the northeast corner of H12299 has migrated about 640 meters to the south (Figure 7).

A new 60ft contour exists in the center of the southern limits of H12299 along with some 60ft contour migration to its north (Figure 8).

The charted 30ft contour located in the southwest corner of H12299 sheet limits has migrated almost 300m to the north (Figure 9).

Figure 5: ENC US5MA22M Charted 90ft Contour (black) shown with H12299 Survey Contours (Pink)

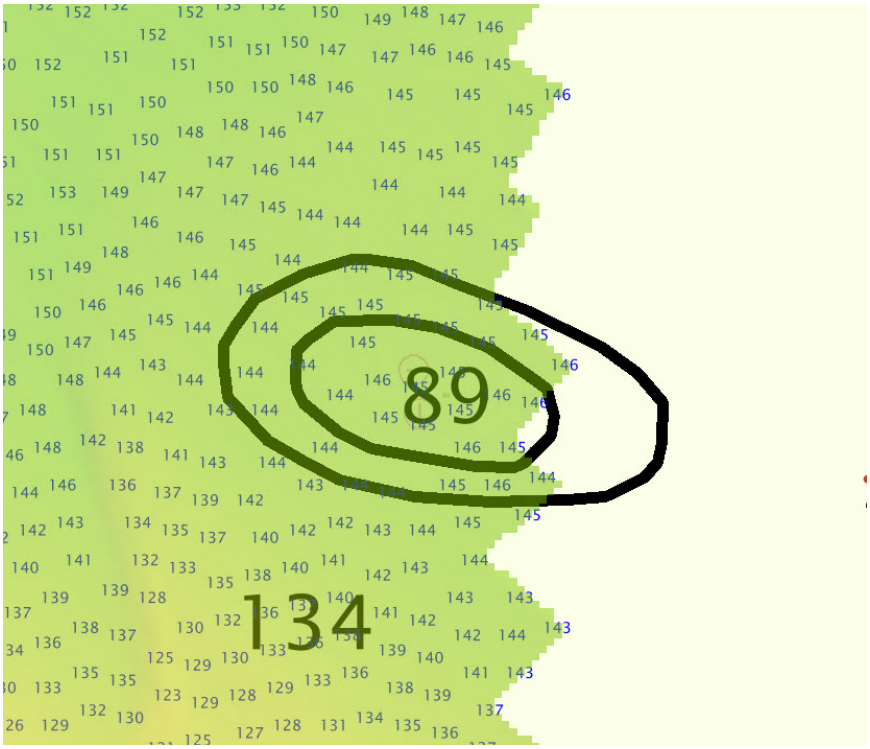

Figure 6: ENC US5MA22M Charted 89ft Sounding disproved by H12299 survey data

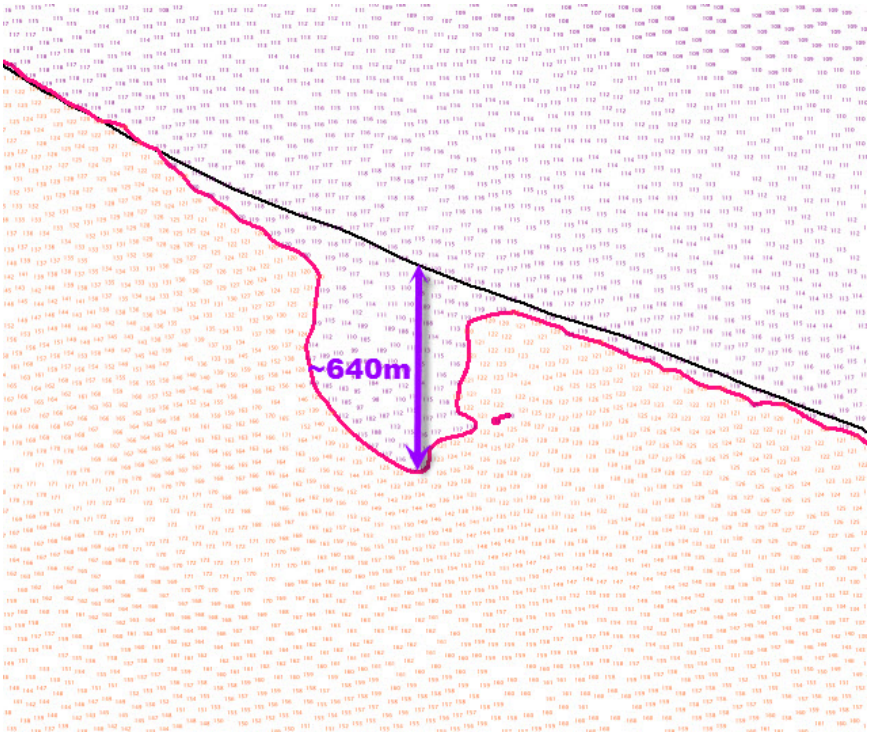

Figure 7: ENC US5MA22M Charted 120ft Contour (black) shown with H12299 Survey contour (pink)

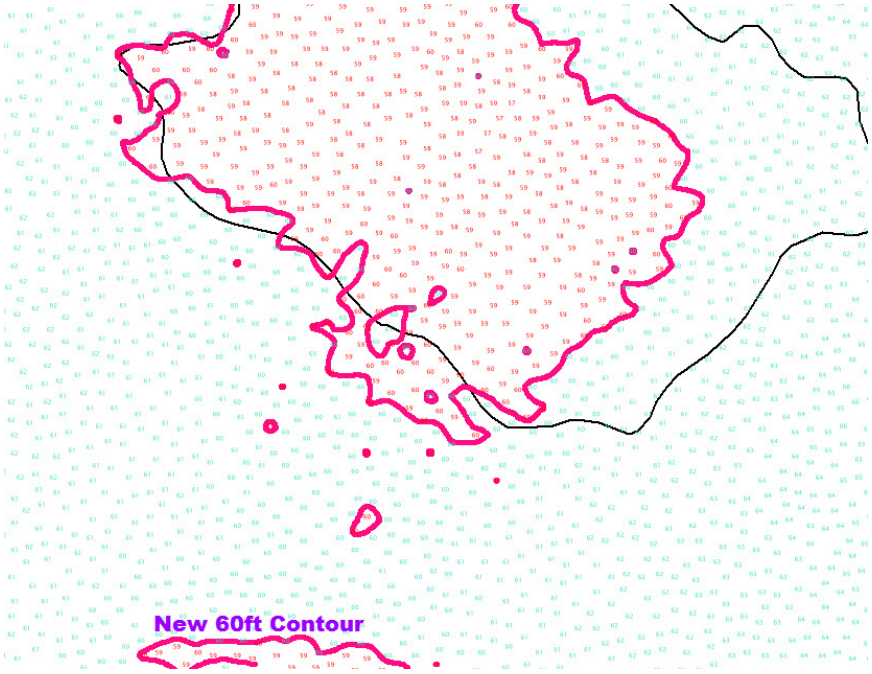

Figure 8: ENC US5MA22M Charted 60ft contour (black) shown with H12299 survey contour (pink)

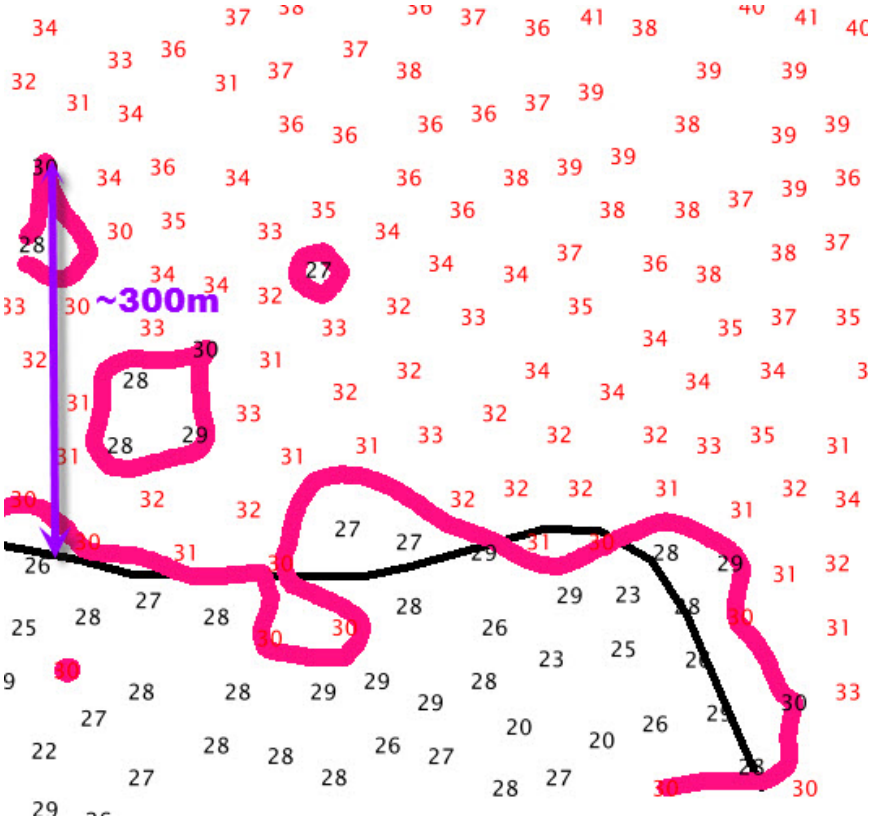

Figure 9: ENC US5MA22M Charted 30ft Contour (black) shown with H12299 survey contour (pink)

US5CN42M

The survey generally agreed well with charted depths, with certain areas of discrepancy occurring where sand waves have shifted over time:

The charted 60ft contour and bullet contour in the northwest corner of sheet H12299 has shifted about 500m to the east due to sand wave migration (Figure 10).

The charted 60ft contour in the northwest corner of sheet H12299 has shifted about 170m to the east and two new 60ft bullet contours are present (Figure 11).

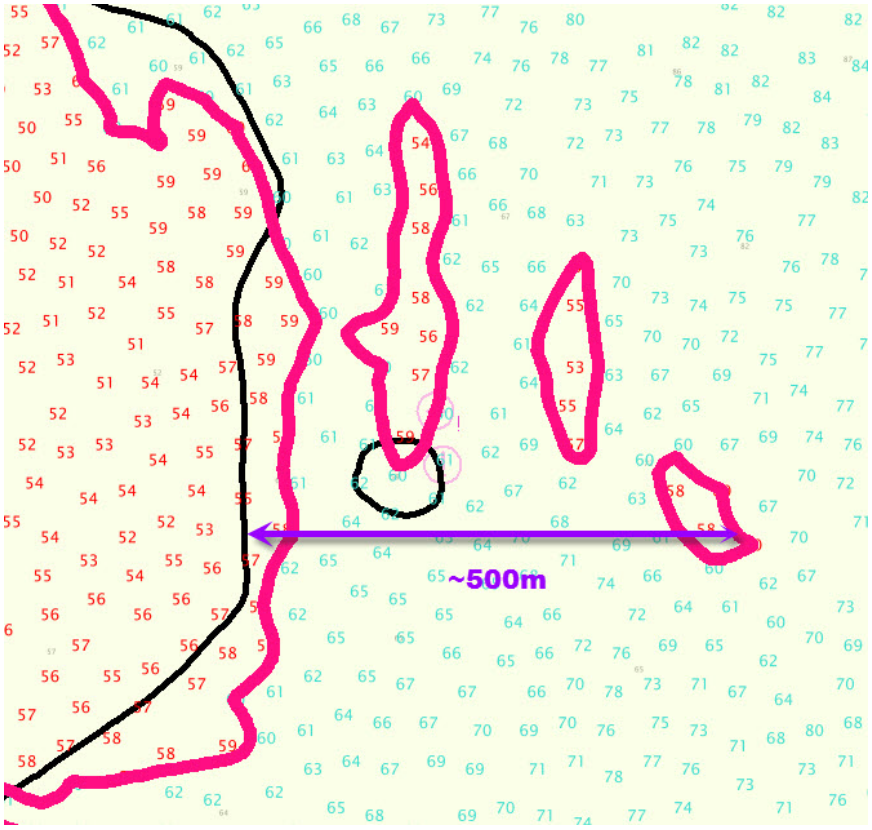

Figure 10: US5CN42M Charted 60ft Contour (black) shown with H12299 survey contours (pink)

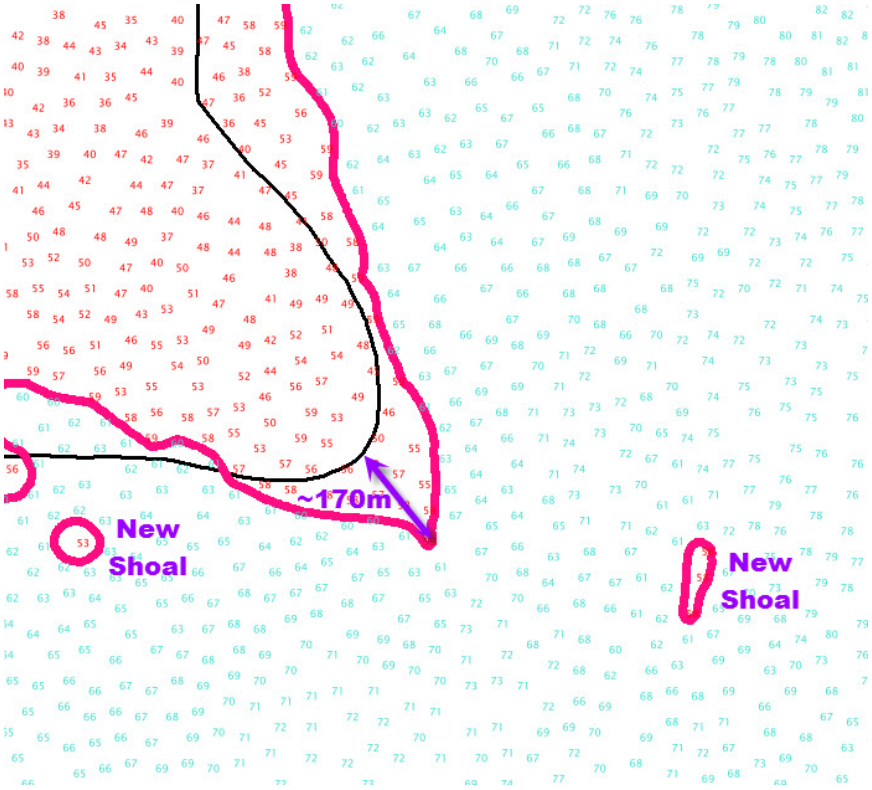

Figure 11: US5CN42M Charted 60ft Contour (black) shown with H12299 survey contours (pink)

D.1.3 AWOIS Items

Number of AWOIS Items Addressed: 2
Number of AWOIS Items Not Addressed: 0

AWOIS item #7412, a charted 35 foot sounding, was disproved but depths as shallow as 34 feet do exist approximately 180 meters SSW of the charted 35 foot depth (see figure 12).

AWOIS item #7410 had conflicting information in the AWOIS database existing both as a shoal and an obstruction. The instructions for investigation were to determine if AWOIS 7410 was an obstruction or a shoal and to find the least depth. It was determined that AWOIS 7410 is a shoal, though the charted 63ft sounding has been disproved by current survey data. It is recommended to update the AWOIS database and update the chart with current survey sounding data (see figure 13).

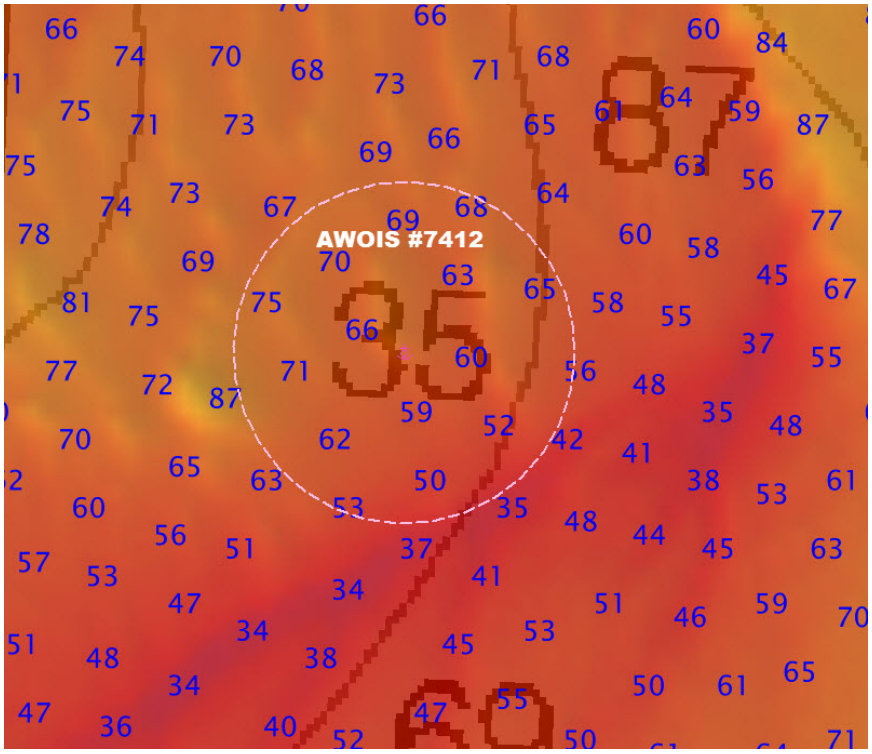

Figure 12: AWOIS 7412: Charted 35 ft sounding disproved by survey H12299

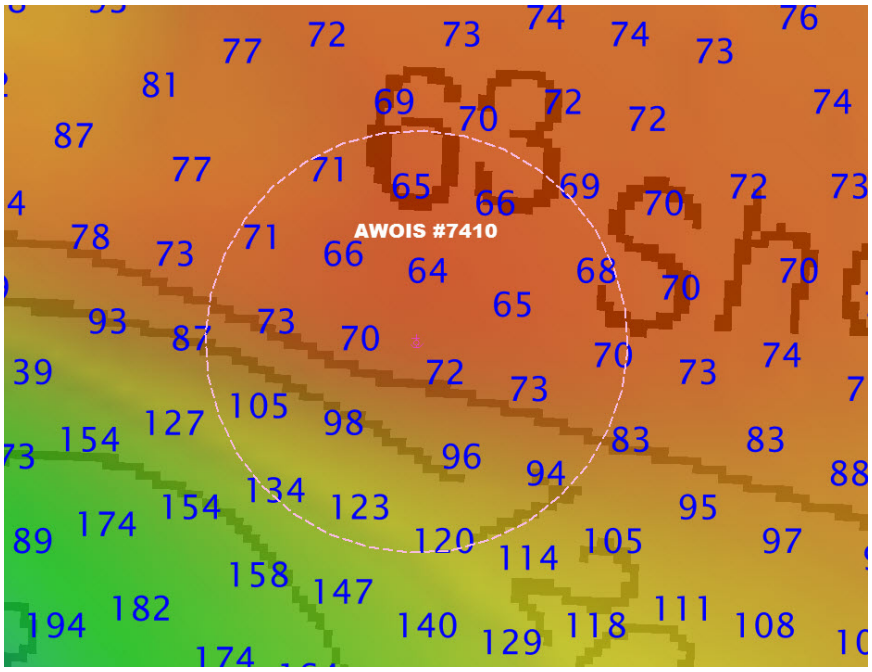

Figure 13: AWOIS 7410: Charted 63 ft sounding disproved by survey H12299

D.1.4 Charted Features

A reported 53 ft obstruction at 41-07.96'N, 071-57.06'W has been found to be a 56ft underwater rock. The hydrographer recommends updating the charted obstruction with a 56ft UWTROC (Figure 14).

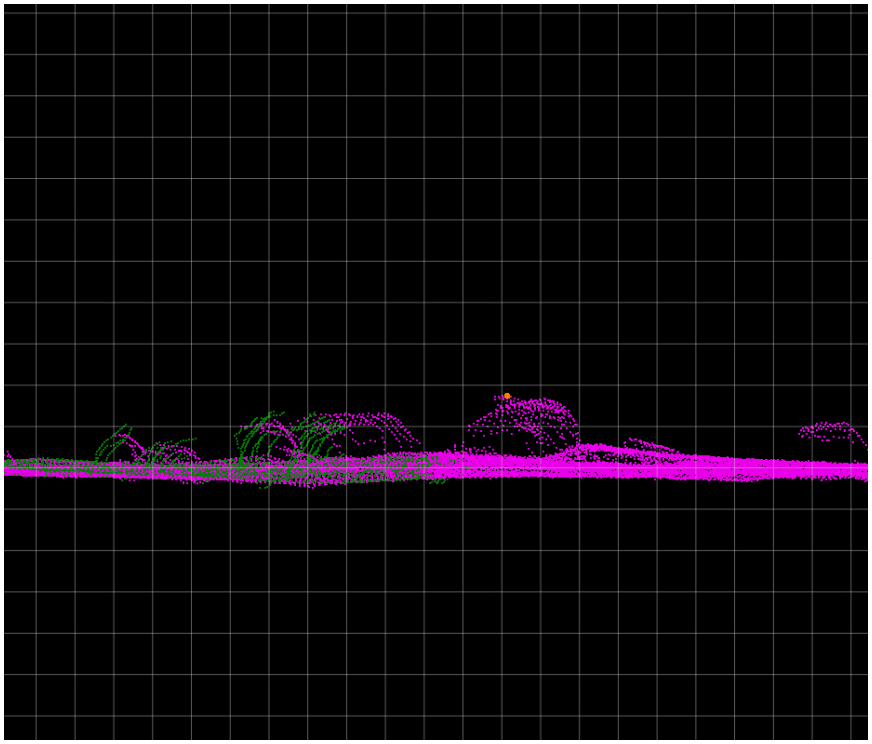

Figure 14: 56ft Rock

D.1.5 Uncharted Features

A wreck was discovered by this survey at location 41-11.49'N, 071-57.46'W. The 33 meter long wreck with a least depth of 123ft is laying keel down (Figure 15).

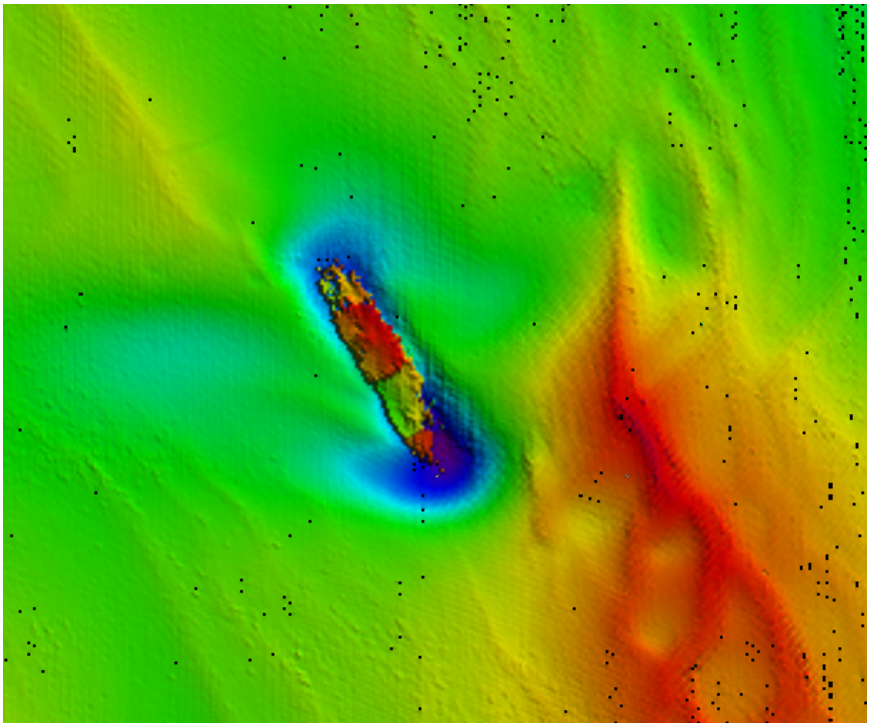

Figure 15: Wreck discovered by H12299

D.1.6 Dangers to Navigation

The follwing DTON reports were submitted to the processing branch:

DTON Report Name	Date Submitted
H12299 DtoN Report	2012-09-19

Table 19: DTON Reports

Danger to Navigation Report is included in Appendix I of this report.

D.1.7 Shoal and Hazardous Features

A 17ft shoal area was found in the vicinity of Cerberus Shoal. Charted least depths of 19ft should be updated with current survey data (Figure 16).

Several shoal rocks and shifted sand waves throughout survey H12299 are not represented on the chart. These rocks and shoals were not considered DtoNs due to local vessel traffic considerations but are included in the final feature file. See submitted H12299_FFF.000 for all feature information.

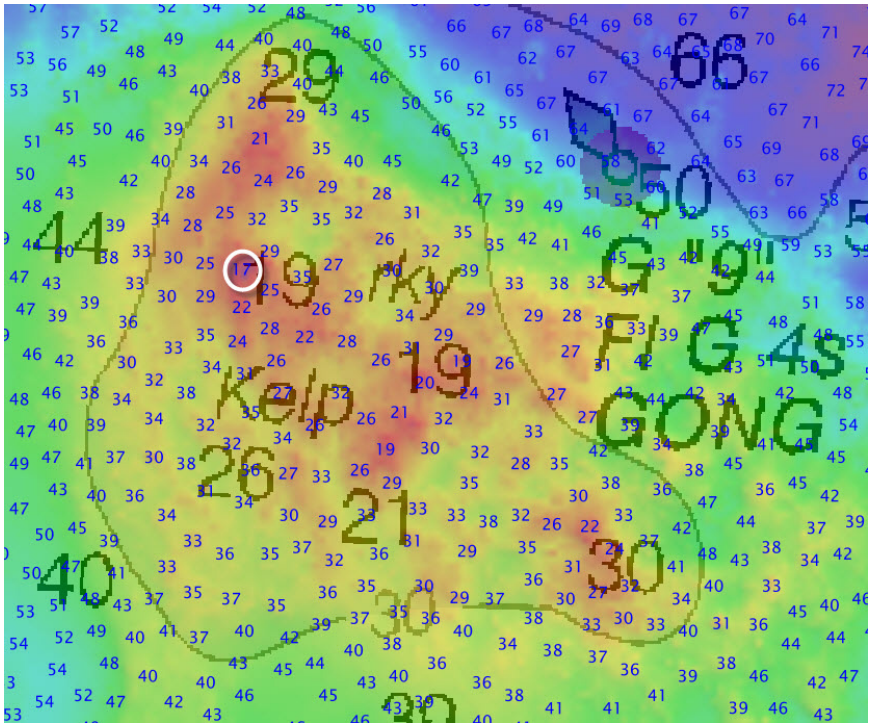

Figure 16: Surveyed 17ft soundings near charted 19ft soundings.

D.1.8 Channels

No USACE maintained channels exist within the limits of H12299

D.2 Additional Results

D.2.1 Shoreline

There were no shoreline verification requirements for H12299

D.2.2 Prior Surveys

Results of prior surveys are represented by charted features and soundings as discussed in chart comparisons above

D.2.3 Aids to Navigation

One ATON exists within the extents of the sheet at position 41-10-27.5N, 71-57-03.9W. The navigational aid was found to be accurately charted in both description and position.

D.2.4 Overhead Features

There are no bridges or overhead cable crossings within the limits of H12299

D.2.5 Submarine Features

A submarine cable runs across H12299 limits. No cables were observed in this survey so any which do exist are assumed to be properly buried. The hydrographer has no recommendations regarding these.

D.2.6 Ferry Routes and Terminals

There are no ferry routes within the limits of H12299

D.2.7 Platforms

There are no platforms within the limits of H12299

D.2.8 Significant Features

Part of a restricted anchorage area is included in the sheet limits. No significant obstructions were found and it is recommended to retain the anchorage area but update included depths as per survey results.

D.2 Construction and Dredging

No construction or dredging was observed within the limits of H12299

E. Approval Sheet

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

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

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

The Data Acquisition and Processing Report for OPR-D304-TJ-11 is submitted separately and contains additional information relevant to this survey.

Approver Name	Approver Title	Approval Date	Signature
LT William Winner, NOAA	Field Operations Officer	10/02/2012	
CDR Lawrence T. Krepp, NOAA	Commanding Officer	10/03/2012	
ENS Andrew Clos, NOAA	Sheet Manager	10/02/2012	Andrew Clos 2012.10.02 19:04:48 -04'00'

F. Table of Acronyms

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

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

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