

H12491

NOAA Form 76-35A

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

DESCRIPTIVE REPORT

Type of Survey: Navigable Area/Habitat Mapping

Registry Number: H12491

LOCALITY

State: New Jersey/New York

General Locality: North Atlantic Ocean

Sub-locality: Vicinity of Block Canyon

2012

CHIEF OF PARTY
LCDR Benjamin K. Evans, NOAA

LIBRARY & ARCHIVES

Date:

HYDROGRAPHIC TITLE SHEET

H12491

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 Jersey/New York**

General Locality: **North Atlantic Ocean**

Sub-Locality: **Vicinity of Block Canyon**

Scale: **40000**

Dates of Survey: **06/23/2012 to 06/24/2012**

Instructions Dated: **06/12/2012**

Project Number: **S-C919-FH-12**

Field Unit: **NOAA Ship *Ferdinand R. Hassler***

Chief of Party: **LCDR Benjamin K. Evans, NOAA**

Soundings by: **Multibeam Echo Sounder**

Imagery by: **Multibeam Echo Sounder Backscatter**

Verification by: **Pacific Hydrographic Branch**

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

H-Cell Compilation Units: ***meters at Mean Lower Low Water***

Remarks:

The primary purpose of this survey is to support habitat research. An additional purpose is to provide a contemporary update to National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Revisions and Rednotes were generated during office processing. The processing branch concurs with all information and recommendations in the DR unless otherwise noted. Page numbering may be interrupted or non-sequential. All pertinent records for this survey, including the Descriptive Report, are archived at the National Geophysical Data Center (NGDC), and can be retrieved via <http://www.ngdc.noaa.gov/>.

Table of Contents

A. Area Surveyed.....	1
A.1 Survey Limits.....	1
A.2 Survey Purpose.....	1
A.3 Survey Quality.....	1
A.4 Survey Coverage.....	2
A.5 Survey Statistics.....	5
A.6 Shoreline.....	6
A.7 Bottom Samples.....	6
B. Data Acquisition and Processing.....	6
B.1 Equipment and Vessels.....	6
B.1.1 Vessels.....	6
B.1.2 Equipment.....	7
B.2 Quality Control.....	7
B.2.1 Crosslines.....	7
B.2.2 Uncertainty.....	9
B.2.3 Junctions.....	9
B.2.4 Sonar QC Checks.....	10
B.2.5 Equipment Effectiveness.....	10
B.2.6 Factors Affecting Soundings.....	10
B.2.7 Sound Speed Methods.....	10
B.2.8 Coverage Equipment and Methods.....	10
B.3 Echo Sounding Corrections.....	11
B.3.1 Corrections to Echo Soundings.....	11
B.3.2 Calibrations.....	11
B.4 Backscatter.....	11
B.5 Data Processing.....	11
B.5.1 Software Updates.....	11
B.5.2 Surfaces.....	11
B.5.3 Total Vertical Uncertainty Analysis.....	12
C. Vertical and Horizontal Control.....	12
C.1 Vertical Control.....	12
C.2 Horizontal Control.....	13
D. Results and Recommendations.....	14
D.1 Chart Comparison.....	14
D.1.1 Raster Charts.....	14
D.1.2 Electronic Navigational Charts.....	15
D.1.3 AWOIS Items.....	15
D.1.4 Charted Features.....	16
D.1.5 Uncharted Features.....	16
D.1.6 Dangers to Navigation.....	16
D.1.7 Shoal and Hazardous Features.....	17
D.1.8 Channels.....	17
D.2 Additional Results.....	17

D.2 Construction and Dredging	19
D.2.1 Shoreline	17
D.2.2 Prior Surveys	17
D.2.3 Aids to Navigation	17
D.2.4 Overhead Features	17
D.2.5 Submarine Features	17
D.2.6 Ferry Routes and Terminals	17
D.2.7 Platforms	17
D.2.8 Significant Features	18
E. Approval Sheet	20
F. Table of Acronyms	21

List of Tables

Table 1: Survey Limits	1
Table 2: Hydrographic Survey Statistics	5
Table 3: Dates of Hydrography	5
Table 4: Vessels Used	6
Table 5: Major Systems Used	7
Table 6: Survey Specific Tide TPU Values	9
Table 7: Survey Specific Sound Speed TPU Values	9
Table 8: CARIS Surfaces	12
Table 9: NWLON Tide Stations	13
Table 10: Water Level Files (.tid)	13
Table 11: Tide Correctors (.zdf or .tc)	13
Table 12: USCG DGPS Stations	13
Table 13: Largest Scale Raster Charts	14
Table 14: Largest Scale ENC's	15
Table 15: Orthometric Imagery	19

List of Figures

Figure 1: General location image of survey H12491 plotted over chart 12300	2
Figure 2: Charted canyons (12300) within the limits of H12491	2
Figure 3: Data extends beyond planned sheet limits at head of Block Canyon. Assigned survey outline is shown in blue	3
Figure 4: Assigned survey outline is shown in blue. Area to SE is covered by the OKEANOS EXPLORER DATA. Full coverage was not achieved to the NW extent for the central portion of the survey area due to engine failure	4
Figure 5: Statistics of Mainscheme/Crossline difference surface	8
Figure 6: A section of the crossline difference surface displayed over chart 12300. Differences at nadir occur from a known Reson 7111 artifact in the data. The larger differences at the outer edges of the main scheme lines are due to slight refraction errors	9
Figure 7: Charted (12300) versus surveyed (H12491) soundings	14

[Figure 8: AWOIS items.....16](#)
[Figure 9: 3D surface showing areas of depressions.....18](#)
[Figure 10: 2D subset of larger depression found within sheet limits of survey H12491 \(approximately 200 meters wide, 15 meters deep\).....19](#)

Descriptive Report to Accompany Survey H12491

Project: S-C919-FH-12

Locality: North Atlantic Ocean

Sublocality: Vicinity of Block Canyon

Scale: 1:40000

June 2012 - June 2012

NOAA Ship *Ferdinand R. Hassler*

Chief of Party: LCDR Benjamin K. Evans, NOAA

A. Area Surveyed

A.1 Survey Limits

Data was acquired within the following survey limits:

Northeast Limit	Southwest Limit
40.0479722222 N	39.7573361111 N
71.1974555556 W	71.8329444444 W

Table 1: Survey Limits

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

According to supplemental correspondence submitted with the survey, the survey is approximately 75% complete. The ship experienced engine failure and hence, the survey came to a premature end. See Figure 4 of this Descriptive Report.

A.2 Survey Purpose

The primary purpose of this project is to provide high resolution bathymetry of selected areas of the North East Canyons to support habitat research. The North East Canyons are an important habitat for commercial and recreational fish stocks. This data will be used to inform tow camera targets for the July 3-18 HENRY B. BIGELOW cruise. This project will also support safe navigation through the acquisition and processing of hydrographic data for updating the National Ocean Service's (NOS) nautical charting products.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

A.4 Survey Coverage

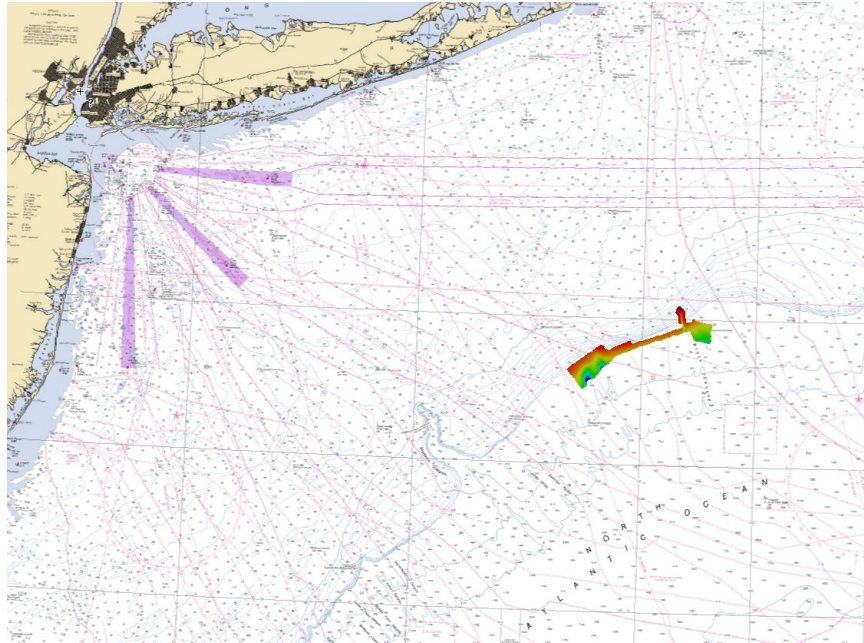


Figure 1: General location image of survey H12491 plotted over chart 12300

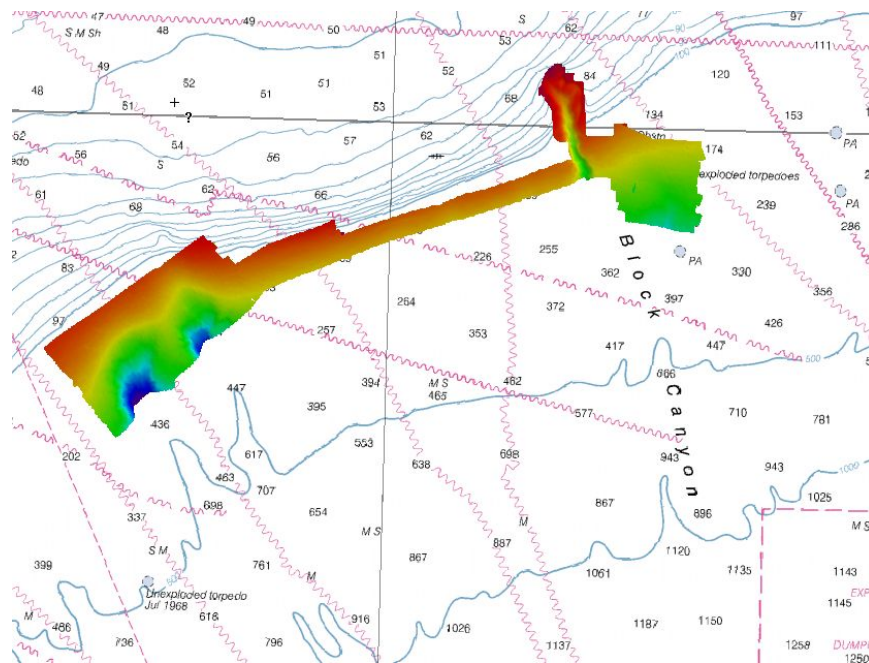


Figure 2: Charted canyons (12300) within the limits of H12491

Multibeam echosounder coverage exceeded the planned sheet limits in the northeast corner in order to develop the head of Block Canyon. The southern extents of the survey coverage junctioned with 2011-2012 OKEANOS EXPLORER data in accordance with correspondence from HSD Operations dated 6/13/2012. The central, shoreward area was not surveyed because a main engine failure caused the project to be shortened. This area was identified as lower priority in a email from Dr. Martha Nizinski dated 6/25/2012.

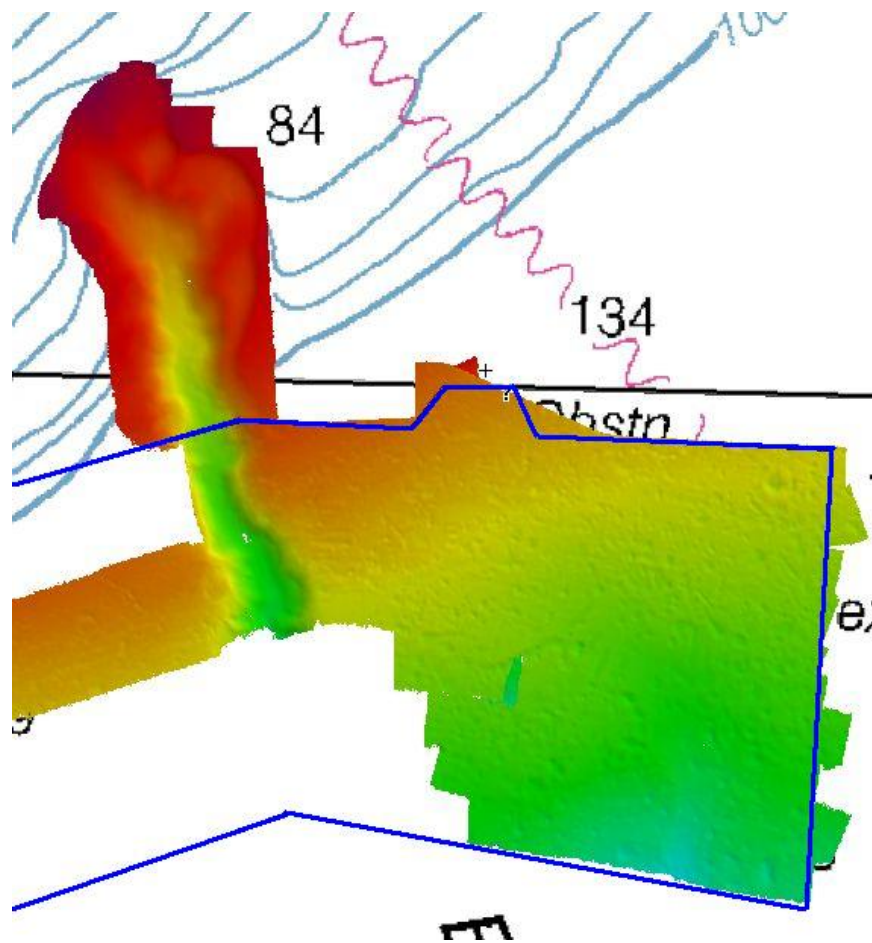


Figure 3: Data extends beyond planned sheet limits at head of Block Canyon. Assigned survey outline is shown in blue.

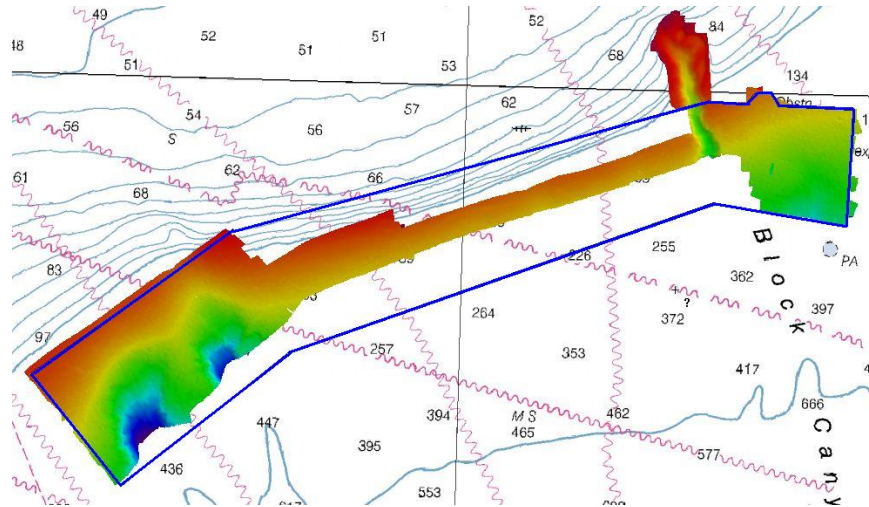


Figure 4: Assigned survey outline is shown in blue. Area to SE is covered by the OKEANOS EXPLORER DATA. Full coverage was not achieved to the NW extent for the central portion of the survey area due to engine failure.

A.5 Survey Statistics

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

	HULL ID	S250	Total
LNM	SBES Mainscheme	0.00	0.00
	MBES Mainscheme	211.64	211.64
	Lidar Mainscheme	0.00	0.00
	SSS Mainscheme	0.00	0.00
	SBES/MBES Combo Mainscheme	0.00	0.00
	SBES/SSS Combo Mainscheme	0.00	0.00
	MBES/SSS Combo Mainscheme	0.00	0.00
	SBES/MBES Combo Crosslines	12.89	12.89
	Lidar Crosslines	0.00	0.00
	Number of Bottom Samples		
Number of DPs			0
Number of Items Items Investigated by Dive Ops			0
Total Number of SNM			105.9

Table 2: Hydrographic Survey Statistics

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

<i>Survey Dates</i>
06/23/2012
06/24/2012

Table 3: Dates of Hydrography

A.6 Shoreline

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

A.7 Bottom Samples

Bottom Samples were acquired in accordance with the Project Instructions or the HSSD.

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	<i>S250</i>
LOA	37.7 meters
Draft	3.85 meters

Table 4: Vessels Used

NOAA Ship FERDINAND R. HASSLER (S250) acquired all data submitted as H12491.

B.1.2 Equipment

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

Manufacturer	Model	Type
Reson	7111	MBES
Reson	7125	MBES
Applanix	POS/MV 320 V4	Vessel Positioning and Attitude System
Brooke Ocean	MVP-200	Sound Speed System
Sea-Bird	45 Micro TSG	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Four crosslines were acquired within the limits of H12491. The total cross line length is 6.1% of total mainscheme length. These crosslines were filtered to reject soundings greater than 45 degrees from nadir.

To evaluate crossline agreement, two 16 meter surfaces were created: one from the cross line soundings, the other from mainscheme soundings. These two surfaces were differenced using CARIS Bathy Database. The statistical analysis of the differences between the mainscheme and cross line surfaces are shown in Figure 5. A geographical plot of two of the four lines is shown in Figure 6. The average difference between the surfaces is 0.10 meters; 95% of all differences were less than 1.8 meters. Errors at nadir are the result of bottom detection artifacts of the 7111 (see DAPR for more detail).

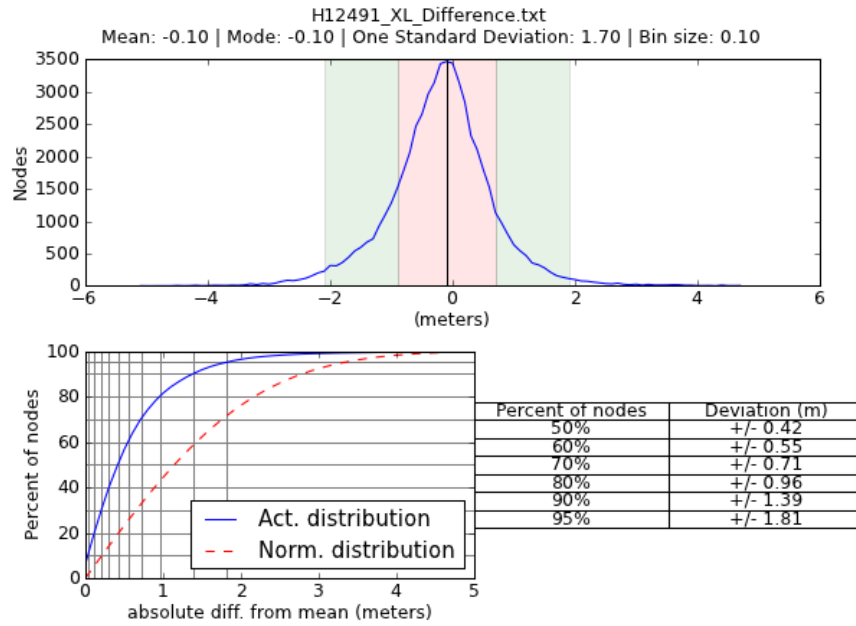


Figure 5: Statistics of Mainscheme/Crossline difference surface

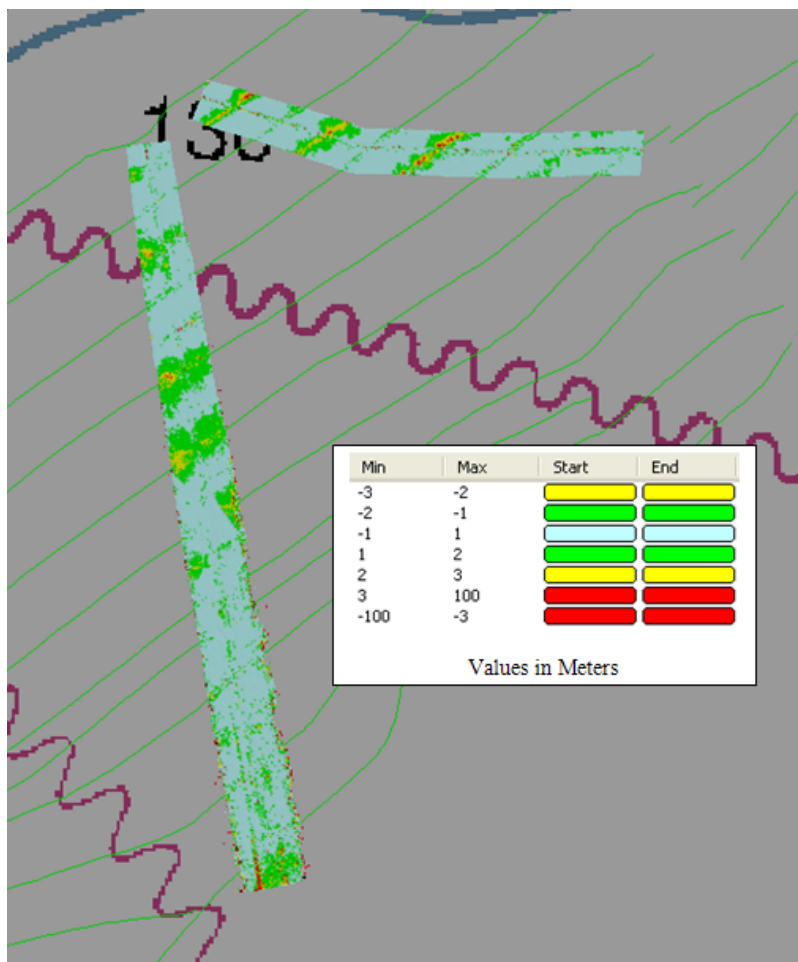


Figure 6: A section of the crossline difference surface displayed over chart 12300. Differences at nadir occur from a known Reson 7111 artifact in the data. The larger differences at the outer edges of the main scheme lines are due to slight refraction errors.

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Measured	Zoning
0.01meters	0.06meters

Table 6: Survey Specific Tide TPU Values

Hull ID	Measured - CTD	Measured - MVP	Surface
S250	2meters/second	2meters/second	1meters/second

Table 7: Survey Specific Sound Speed TPU Values

CO-OPS did not provide a tidal uncertainty in the project instructions because of the lack of available water level time series data. Tide uncertainty values were estimated in the field as follows:

The water level measurement uncertainty at the gauge was estimated at 0.01 meters. A copy of the CO-OPS Sensor Specifications and Measurement Algorithm is included in Appendix I. The values listed in this reference are 2-sigma. The listed accuracy relative to datum of the primary water level stations is 0.02 at a 2-sigma level or 0.01 at the 1-sigma level required by Caris HIPS. Zoning uncertainty was estimated by taking the difference in range correctors for zones SA24 and SA25. These zones are separated by over 100 nautical miles and one tide zone in the provided zone file. This difference was then multiplied by the difference between mean high water and mean sea level at the controlling gauge. The difference in range correctors is 0.1. The difference of mean high water and mean sea level at the controlling gauge is 0.6 meters. The zoning error is thus estimated to be no more than 0.06 meters at a 1-sigma level. Because this estimated error allows for the zoning to be off by 100 miles and is based on the full range of the tide, the error estimate is likely conservative.

Tidal uncertainty values were estimated in the field and reviewed by CO-OPS; see Supplemental Records and Correspondence for more information.

B.2.3 Junctions

This survey junctioned on the southern extents with multibeam sonar data from various 2011-2012 OKEANOS EXPLORER missions. The OKEANOS EXPLORER data will likely not be submitted for charting and is not discussed here.

There are no contemporary surveys that junction with this survey.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

B.2.5.1 None 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: The moving vessel profiler (MVP) was used to collect sound speed data every 20-30 minutes on sheet H12491. The port thermosalinograph (TSG) was used for to provide surface sound speed for all multibeam throughout the project.

During initial deployment of the MVP a depth offset was observed. After two simultaneous casts taken with a Seabird CTD and the MVP, an 4 meter offset for the pressure sensor was calculated and entered into the MVP software.

Spatial and temporal variability in the sound speed profile was low enough to be adequately captured by the sampling interval of the MVP. Minor sound speed refraction errors occur but are negligible for surveyed depths. Both DQA for this project were conducted on Dn173. Both fail, but this is attributed to the very strong thermocline at the test location.

B.2.8 Coverage Equipment and Methods

A few navigationally insignificant holidays exist in depths greater than 200 meters in H12491.

A density analysis was run to calculate number of soundings per surface node. Five or more soundings per node were present in 97% of both the 16 meter and 8 meter surfaces. For additional details, refer to H12491_Standards_Compliance report submitted in Appendix II of this report.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

All data reduction procedures conform to those detailed in the DAPR.

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

The GSF files containing the extracted backscatter are saved in the "Backscatter" folder under the processed data directory in accordance with instruction from HSD Ops dated 6/28/2012. The processed mosaic is saved as a scalar attached to the bathymetric Fledermaus .sd object in the same folder location.

B.5 Data Processing

B.5.1 Software Updates

There were no software configuration changes after the DAPR was submitted.

The following Feature Object Catalog was used: Version 5.2

B.5.2 Surfaces

The following CARIS surfaces were submitted to the Processing Branch:

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H12491_16m	CUBE	16 meters	0 meters - 9999 meters	NOAA_16m	Complete MBES
H12491_8m	CUBE	8 meters	0 meters - 9999 meters	NOAA_8m	Complete MBES
H12491_16m_Final_144plus	CUBE	16 meters	144 meters - 9999 meters	NOAA_16m	Complete MBES
H12491_8m_Final_100to160	CUBE	8 meters	100 meters - 160 meters	NOAA_8m	Complete MBES
H12491_16m_Combined	CUBE	16 meters	126 meters - 674 meters	N/A	Complete MBES

Table 8: CARIS Surfaces

B.5.3 Total Vertical Uncertainty Analysis

A custom layer was created in both finalized surfaces showing the uncertainty of individual nodes in relation to the allowable uncertainty for their depths. This layer was exported and run through a custom Pydro script resulting in statistical analysis. 100% of nodes within survey H12491 met the vertical uncertainty standards of section 5.1.3 of the Hydrographic Surveys Specifications and Deliverables (2012 Edition). See H12491_Standards_Compliance report submitted in appendix V of this report.

C. Vertical and Horizontal Control

There was no horizontal or vertical control work performed for this survey.

C.1 Vertical Control

The vertical datum for this project is Mean Lower Low Water.

Standard Vertical Control Methods Used:

Discrete Zoning

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

Station Name	Station ID
Atlantic City	8534720

Table 9: NWLON Tide Stations

File Name	Status
8534720.tid	Verified Observed

Table 10: Water Level Files (.tid)

File Name	Status
C919FH2012CORP.zdf	Final

Table 11: Tide Correctors (.zdf or .tc)

A request for final approved tides was sent to N/OPS1 on 06/26/2012. The final tide note was received on 07/25/2012.

Preliminary zoning is accepted as the final zoning for project S-C919-FH-2012, H12491, during the time period between June 23 to 24, 2012.

Tide Note is appended.

C.2 Horizontal Control

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

DGPS is the sole method for horizontal positioning used for survey H12491.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Moriches, New York (293kHz)

Table 12: 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
12300	1:400000	48	06/2010	05/08/2012	05/18/2012

Table 13: Largest Scale Raster Charts

12300

The charted soundings agree with the surveyed soundings within one to two fathoms in the flat sections of the survey area. In the base of the canyons, depth from this survey were significantly deeper than charted.

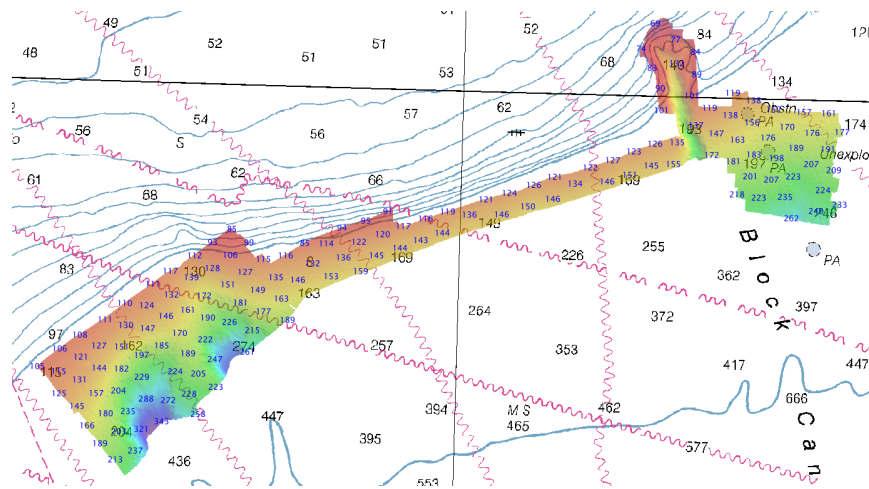


Figure 7: Charted (12300) versus surveyed (H12491) soundings

During processing branch review, charted soundings were found to agree with surveyed soundings within 2 to 7 fathoms in the flat sections of the survey area.

D.1.2 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date	Preliminary?
US3NY01M	1:400000	27	05/26/2011	02/06/2010	NO

Table 14: Largest Scale ENC's

US3NY01M

The charted soundings agree with the surveyed soundings within one to two fathoms.

D.1.3 AWOIS Items

Number of AWOIS Items Addressed: 2

Number of AWOIS Items Not Addressed: 0

Two AWOIS items were assigned to H12491; both are charted (12300) as obstructions with approximate positions. No history was provided with the AWOIS items and the raster charting symbology is somewhat unclear. The southern AWOIS item (#15009) is charted with a dashed line surrounding a blue obstruction circle and is a member of a group of similar items marked as "unexploded torpedoes." The ENC attribution of this feature includes the description "unexploded torpedo." This group of features first appeared on the 27rd edition of chart 12300 in 1979. The northern AWOIS item (#15008) is charted with a dotted line surrounding a blue obstruction circle. This feature first appeared on the 33rd edition of chart 12300 in 1990. The ENC attribution of this feature does not include any mention of unexploded torpedoes.

100% multibeam was accomplished for the full search radius of both items. No evidence of any obstruction or other features was seen in the bathymetry in either location. However, detection of a torpedo would be highly unlikely with the system used for this survey. The hydrographer recommends retaining the southern AWOIS item (#15009) as charted.

The hydrographer recommends additional research to confirm that the northern AWOIS item (#15008) was not intended to mark an additional unexploded torpedo. If this feature denoted a general obstruction and not unexploded ordinance, this survey disproves its existence and the hydrographer recommends removal from the chart. If the obstruction was intended to mark an additional unexploded torpedo, the hydrographer recommends harmonizing the symbology with the other surrounding features.

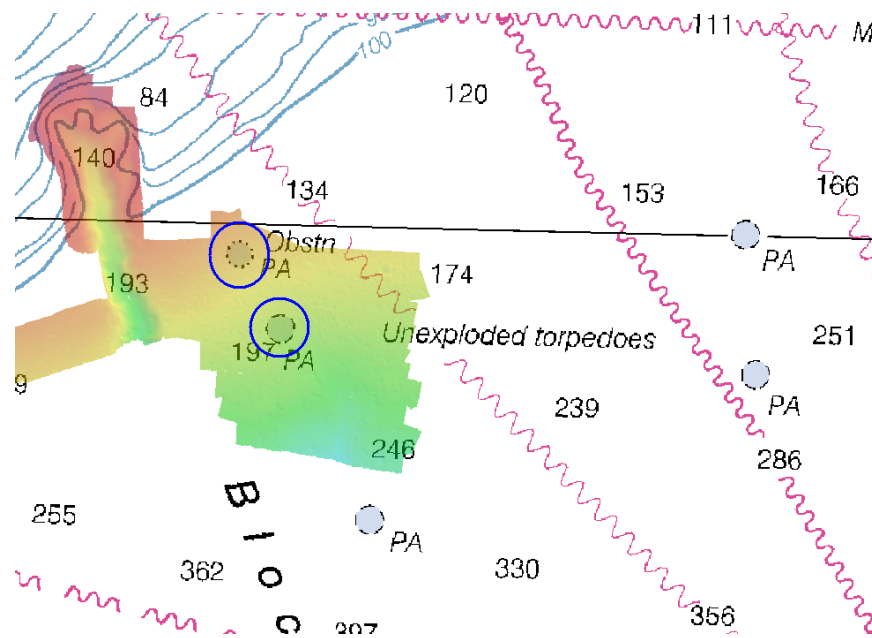


Figure 8: AWOIS items

For the processing branch's chart update product it was recommended that AWOIS #15008 be further researched to determine its source, to ensure that it is not one of the numerous unexploded torpedoes in the vicinity. It was further specified that if it is determined that the feature is not unexploded ordnance, then it may be deleted from the chart. If it is discovered to be an unexploded torpedo, then the feature should be charted as an Obstruction, Position Approximate, INFORM="Unexploded torpedo", to comply with NOAA charting rules.

AWOIS #15009 is improperly charted as DMPGRD on the ENC, and the symbology used on the RNC is incorrect. It has been compiled to the chart update product as an Obstruction, Position Approximate, INFORM="Unexploded torpedo", to comply with NOAA charting rules.

D.1.4 Charted Features

The AWOIS items described above correspond to the two charted features in this survey. Charted submarine cables exist within the limits of sheet H12491 but were not observed in the multibeam data.

D.1.5 Uncharted Features

No uncharted features were located during completion of this survey.

D.1.6 Dangers to Navigation

No Danger to Navigation Reports were submitted for this survey.

D.1.7 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

D.1.8 Channels

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

D.2 Additional Results**D.2.1 Shoreline**

Shoreline was not assigned in the Hydrographic Survey Project Instructions or Statement of Work.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

Aids to navigation (ATONs) do not exist for this survey.

D.2.4 Overhead Features

Overhead features do not exist for this survey.

D.2.5 Submarine Features

Submarine features do not exist for this survey.

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

This survey encompasses the head of Block Canyon.

A number of large circular depressions are apparent in the southeast corner of the survey sheet. Figures 9 and 10 show one of the large depressions within the sheet limits of survey H12491. A 2010 article published by Shelley Dawicki, NOAA Northeast Marine Fisheries, mentions that similar depressions were found in Hudson Canyon after the collection of high resolution bathymetry and are believed to be the result of methane gas deposits. This article is included in the Appendices of this document.

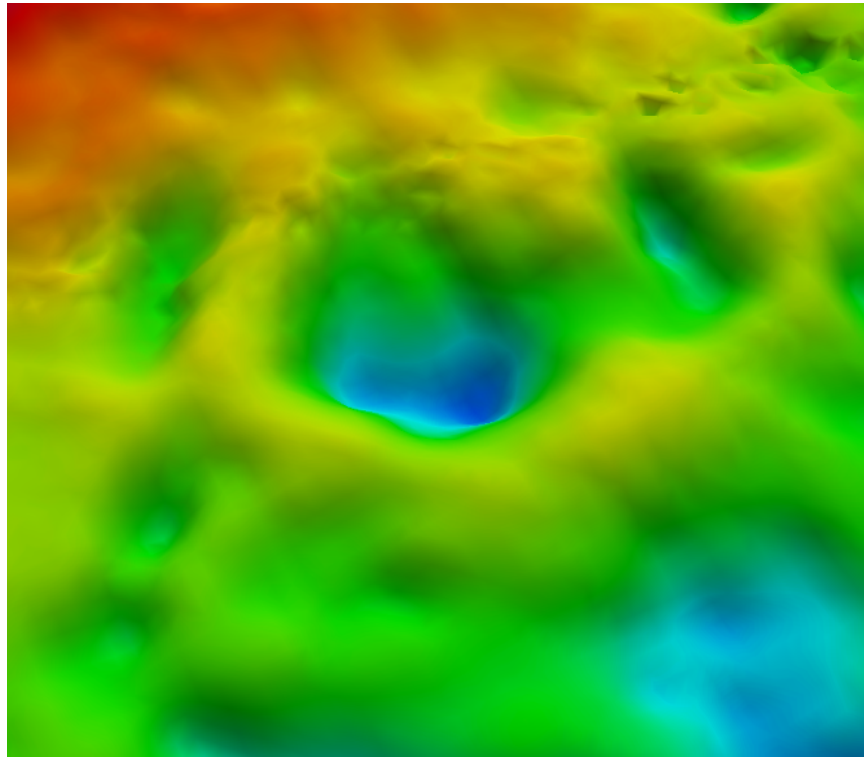


Figure 9: 3D surface showing areas of depressions

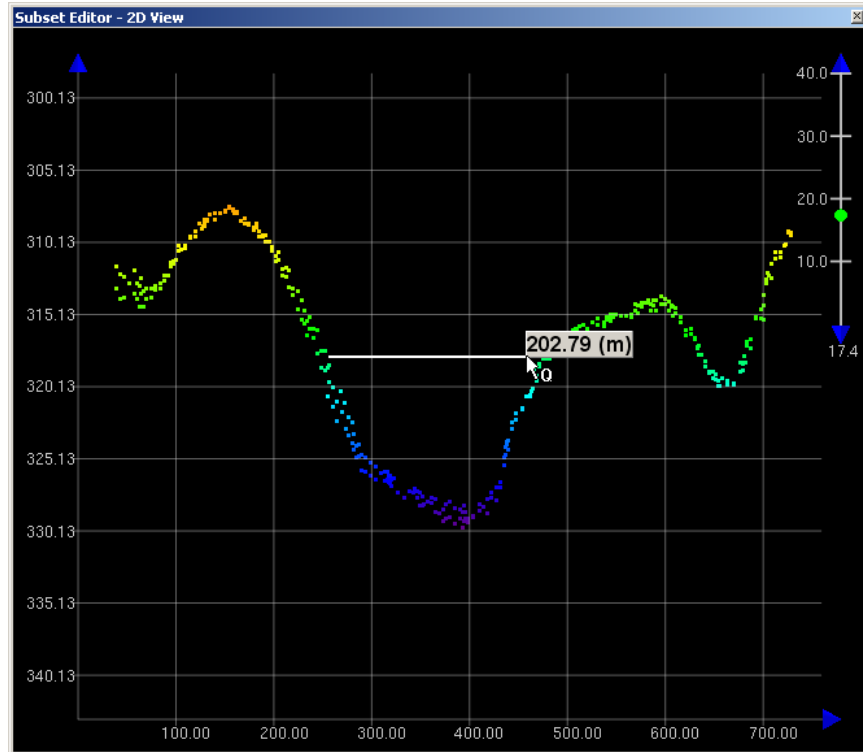


Figure 10: 2D subset of larger depression found within sheet limits of survey H12491 (approximately 200 meters wide, 15 meters deep)

The following special reports were submitted:

Report Title	Author	Date
Hudson Canyon Gives Up Secrets	Shelley Dawicki	2010-02-01

Table 15: Orthometric Imagery

No features were submitted with H12490.

These features have no charting significance.

D.2 Construction and Dredging

There is no present or planned construction or dredging within the survey limits.


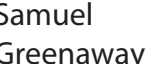

E. Approval Sheet

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 with the exception of discrepancies noted in this report. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required with the exception of deficiencies noted in the Descriptive Report.

Report Name	Report Date Sent
Hydrographic Survey Readiness Review Memo	2012-07-03
Data Acquisition and Processing Report	2012-08-22

Approver Name	Approver Title	Approval Date	Signature
LCDR Benjamin K. Evans, NOAA	Chief of Party	08/22/2012	 Benjamin K. Evans 2012.08.22 17:29:49 -04'00'
LT Samuel F. Greenaway, NOAA	Field Operations Officer	08/22/2012	Samuel Greenaway  Digitally signed by Samuel Greenaway DN: cn=Samuel Greenaway, o=NOAA Office of Marine and Aviation Operations, ou=Ferdinand R. Hassler, email=samuel.greenaway@noaa.gov, c=US Date: 2012.08.22 20:29:01 Z
David T. Moehl	Senior Survey Technician	08/22/2012	 Digitally signed by David Moehl Date: 2012.08.22 12:08:14 Z

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 Station
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 Propagated Error
TPU	Topside Processing Unit
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDA	Global Positioning System timing message
ZDF	Zone Definition File



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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 25, 2012

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: S-C919-FH-2012
HYDROGRAPHIC SHEET: H12491

LOCALITY: Vicinity of Block Canyon, New Jersey
TIME PERIOD: June 23 - 24, 2012

TIDE STATION USED: 853-4720 Atlantic City, NJ
Lat. 39° 21.3'N Long. 74° 25.1' W

PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 1.276 meters

REMARKS: RECOMMENDED ZONING

Preliminary zoning is accepted as the final zoning for project S-C919-FH-2012, H12491, during the time period between June 23 to 24, 2012.

Please use the zoning file C919FH2012CORP submitted with the project instructions for S-C919-FH-2012. Zones SA24A and SA25 are the applicable zones for H12491.

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).

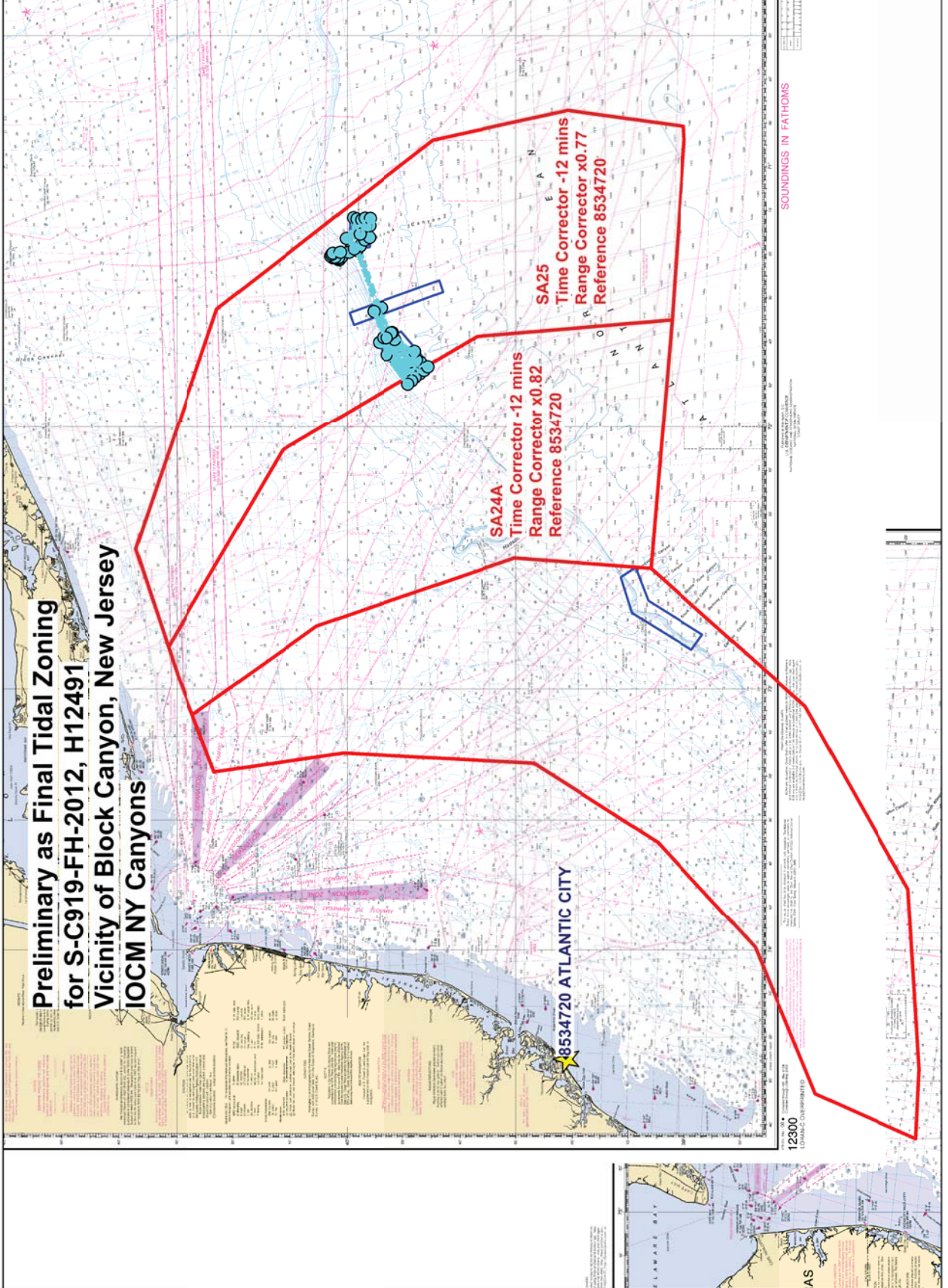
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CHIEF, PRODUCTS AND SERVICES BRANCH



**Preliminary as Final Tidal Zoning
for S-C919-FH-2012, H12491
Vicinity of Block Canyons, New Jersey
IOCM NY Canyons**





NOAA NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION
UNITED STATES DEPARTMENT OF COMMERCE



Contact: Shelley Dawicki
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February 1, 2010
SS10.03

Hudson Canyon Gives Up Secrets

Sonar images reveal possible deepwater corals, methane gas deposits

Scientists studying Hudson Canyon off the coast of New Jersey, one of the largest underwater canyons in the world, have found evidence of deepwater corals and crater-like depressions that may be methane gas blowouts, not seen before on the Northeastern U.S. continental margin. Extensive burrowing by golden tilefish, a commercially valuable fish typically found in submarine canyons, was also observed.

Using an autonomous underwater vehicle (AUV) called *Eagle Ray*, researchers from NOAA's Fisheries Service, Rutgers University and the National Institute for Undersea Science and Technology (NIUST) have produced high resolution sonar maps of the canyon bottom. The maps provide details that other equipment such as sonar mounted on a ship's hull cannot detect, and will be used to direct visual searches for the various bottom features during subsequent work in the area this summer.

The maps reveal crater-like depressions several hundred feet across and tens of feet deep, as well as hard-topped pock marks resembling deepwater coral habitats found elsewhere. The maps also showed steep slopes like those that support sponges and soft corals in New England canyons, and revealed expanses of hummocky terrain created by long-term tilefish burrowing.

"Hudson Canyon is a very large seafloor feature that has not been well documented. Being able to produce high-resolution seafloor maps while we were at sea revealed these new features and enabled us to adapt our sampling efforts during the cruise," said Vince Guida, an ecologist at the J.J. Howard Laboratory of NOAA's Northeast Fisheries Science Center (NEFSC) in Sandy Hook, N.J, and co-chief scientist of the cruise. "For example, we collected water samples near the craters to test for continuing methane release that could support production of chemosynthetic bacteria in the canyons."

Mary Scranton, a marine scientist at Stony Brook University in New York, is analyzing the water samples. Chemosynthetic bacteria use chemicals from the earth's interior, rather than sunlight or photosynthesis, to survive and to support other forms of marine life on the ocean floor. The bacteria are often associated with methane seeps or areas where the seafloor is geologically active.

The crater-like depressions on the ocean floor occur when gas hydrates (methane gas frozen in ice crystals below the surface) dissolve and release the methane gas, thereby

collapsing the sediments to form craters. Similar features have been found in the Gulf of Mexico and in other areas on the continental shelf, but would be a new discovery off the Northeast U.S.

“We found evidence of what may be large structural corals down deep in the Hudson Canyon at depths between 350 and 400 meters (1,100 to 1,300 feet) where there is very little sunlight,” Guida said. “Similar types of structures have been found off North Carolina, along the southern U.S. coast, and in Canadian waters farther north, but not off the Northeast coast. We think these corals may be *Lophelia*, a cold-water species that forms large reef structures. Another possibility is that they may be masses of specialized clams, mussels or tube worms fed by chemosynthetic bacteria supported by methane release. Their true nature will remain uncertain until they can be seen visually at close range.”

Marine life in the Hudson Canyon is very diverse. Invertebrates include red crabs, lobsters and squids, while typical fish species encompass blackbelly rosefish, flounder, hakes, monkfish and black sea bass. Some species live only in shallower depths on the shelf while others live deep in the canyon, which starts about 100 miles southeast of New York City on the continental shelf and runs some 300 miles into very deep water. Comparable in size to the Grand Canyon, Hudson Canyon is the largest known ocean canyon on the U.S. East Coast and one of the largest underwater canyons in the world.

Guida, who has been conducting research in the canyon area since 2001, and geologist Peter Rona of Rutgers University’s Institute of Marine and Coastal Sciences served as co-chief scientists on the summer 2009 cruise. Together with colleagues from NIUST, a joint venture of NOAA, the University of Mississippi and the University of Southern Mississippi, they have explored the canyon every year since 2007 aboard NOAA ships, and mapped progressively deeper sections. Another cruise is planned during the summer of 2010 aboard the NOAA Ship *Henry B. Bigelow*.

“We plan to use the NIUST AUVs *MolaMola* to take high quality still images of the features we found this year with multibeam sonar, and will also use the *Eagle Ray* to continue making detailed bottom maps,” Guida said. “We have no idea how extensive the methane seep deposits are, or how large the structural feature we think is a deepwater coral reef is. There may also be soft corals and other marine life in the area that we haven’t yet seen.”

#

Related links:

James J. Howard Marine Sciences Laboratory: <http://sh.nefsc.noaa.gov/>

NOAA Ship *Henry B. Bigelow*: <http://www.nefsc.noaa.gov/Bigelow/>

NOAA Ship Tracker: <http://shiptracker.noaa.gov/>

NIUST: <http://niust.org/>

H12491_SHPO_FeatureReport

Registry Number: H12491
State: New Jersey
Locality: North Atlantic Ocean
Sub-locality: Vicinity of Block Canyon
Project Number: S-C919-FH-12
Survey Dates: 6/23/12 - 6/24/12

Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
12300	47th	05/01/2008	1:400,000 (12300_1)	[L]NTM: ?
13006	34th	05/01/2007	1:675,000 (13006_1)	[L]NTM: ?
5161	13th	10/01/2003	1:1,058,400 (5161_1)	[L]NTM: ?
13003	49th	04/01/2007	1:1,200,000 (13003_1)	[L]NTM: ?

* Correction(s) - source: last correction applied (last correction reviewed--"cleared date")

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	OBSTRUCTION	GP	[None]	39° 59' 25.3" N	071° 16' 16.5" W	---
1.2	OBSTRUCTION	Obstruction	[None]	39° 58' 02.9" N	071° 15' 14.8" W	---

1 - AWOIS Features

1.1) OBSTRUCTION

Survey Summary

Survey Position: 39° 59' 25.3" N, 071° 16' 16.5" W
Least Depth: [None]
TPU ($\pm 1.96\sigma$): **THU (TPEh)** [None] ; **TVU (TPEv)** [None]
Timestamp: 1981-001.00:00:00.000 (01/01/1981)
Dataset: H12491_FFF.000
FOID: US 0000000001 02387(0226000000010953)
Charts Affected: 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

\$CSYMB/remrks: AWOIS #15008 - Obtained 100% MBES coverage in entire search radius. No obstruction was found.

Research of historical charts indicates this obstruction first appeared on the 33rd edition of 12300 in 1990. The four charted unexploded torpedos in the vicinity first appeared on the 27th edition in 1979.

If obstruction is not believed to be related to an unexploded torpedo, the 100% multibeam search is sufficient to disprove this charted obstruction. If this obstruction is believed to be a unexploded torpedo, the MBES system used here is incapable of detecting a torpedo and this search is insufficient to confirm or disprove the existence of this feature.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12491_FFF.000	US 0000000001 02387	0.00	000.0	Primary

Hydrographer Recommendations

Confirm original source is not unexploded torpedo.

If source is not a unexploded torpedo, remove charted obstruction from chart.

If source is an unexploded torpedo, harmonize symbology with other charted unexploded torpedos in vicinity.

S-57 Data

Geo object 1: Cartographic symbol (\$CSYMB)

1.2) OBSTRUCTION

Survey Summary

Survey Position: 39° 58' 02.9" N, 071° 15' 14.8" W
Least Depth: [None]
TPU ($\pm 1.96\sigma$): THU (TPEh) [None] ; TVU (TPEv) [None]
Timestamp: 2003-060.00:00:00.000 (03/01/2003)
Dataset: H12491_FFF.000
FOID: US 0000000002 02387(0226000000020953)
Charts Affected: 12300_1, 13006_1, 5161_1, 13003_1

Remarks:

OBSTRN/remrks: AWOIS #15009 - Obtained 100% MBES coverage in entire search radius. No obstruction was found. However, the MBES system used in this survey is incapable of detecting or disproving a torpedo.

Feature Correlation

Source	Feature	Range	Azimuth	Status
H12491_FFF.000	US 0000000002 02387	0.00	000.0	Primary

Hydrographer Recommendations

Retain as charted.

S-57 Data

Geo object 1: Obstruction (OBSTRN)
Attributes: INFORM - Unexploded torpedo
 QUASOU - 2:depth unknown
 SORDAT - 20030300
 SORIND - US,US,graph 12300
 WATLEV - 3:always under water/submerged

APPROVAL PAGE

H12491

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

- H12491_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12491_GeoImage.pdf

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

Approved: _____

Peter 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 Dave Zezula, NOAA

Chief, Pacific Hydrographic Branch