H12490

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:	H12490

LOCALITY

State:	New Jersey/New York
General Locality:	North Atlantic Ocean
Sub-locality:	Northwest of Toms Canyon

2012

CHIEF OF PARTY
LCDR Benjamin K. Evans, NOAA

LIBRARY & ARCHIVES

Date:

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET		**H12490**

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:	**Northwest of Toms Canyon**
Scale:	**40000**
Dates of Survey:	**06/21/2012 to 06/22/2012**
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/.

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Descriptive Report to Accompany Survey H12490

Project: S-C919-FH-12

Locality: North Atlantic Ocean

Sublocality: Northwest of Toms 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
39.2002777778 N 72.5269444444 W	38.9386111111 N 72.8952777778 W

Table 1: Survey Limits

In accordance with guidance in correspondence from HSD OPS dated 6/13/2012, the offshore limit of this survey was determined by acceptable overlap with the 2011-12 OKEANOS EXPLORER data.

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 also supports 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

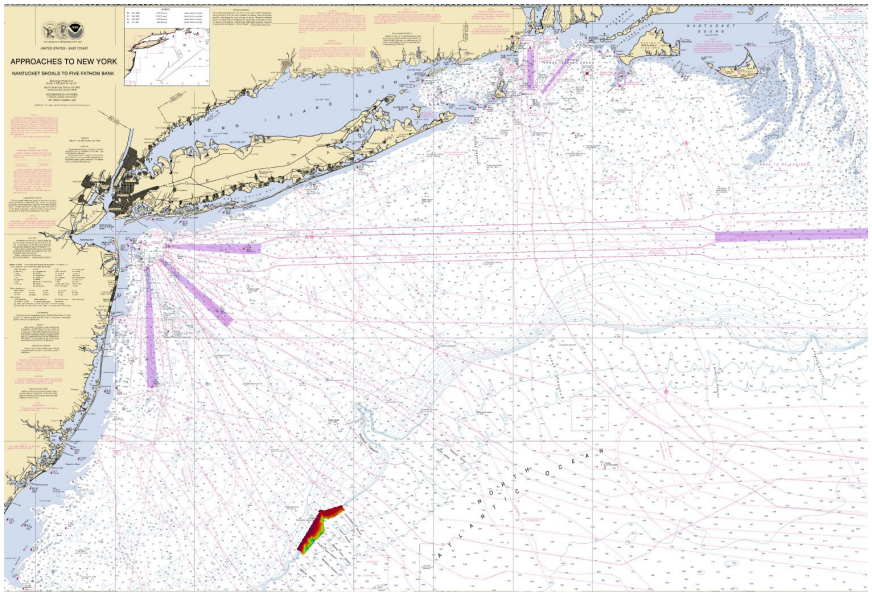


Figure 1: General location image of survey H12490

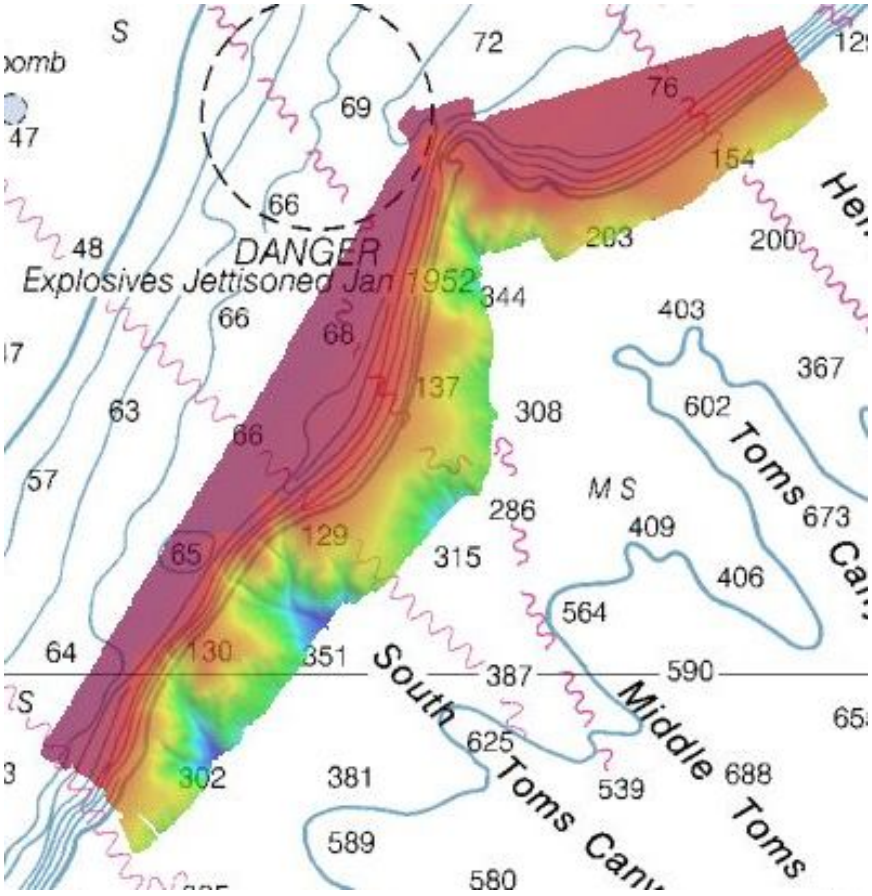


Figure 2: Charted canyons within the limits of H12490

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	*S250*	*Total*
LNM	**SBES Mainscheme**	0.00	0.00
	MBES Mainscheme	206.69	206.69
	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	6.77	6.77
	Lidar Crosslines	0.00	0.00
Number of Bottom Samples			0
Number of DPs			0
Number of Items Items Investigated by Dive Ops			0
Total Number of SNM			71.7

Table 2: Hydrographic Survey Statistics

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

Survey Dates
06/21/2012
06/22/2012

Table 3: Dates of Hydrography

A.6 Shoreline

The survey area is offshore and no shoreline investigation was required in the project instructions.

A.7 Bottom Samples

No bottom samples were acquired in this survey area in accordance with the project instructions.

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	***S250***
LOA	37.7 meters
Draft	3.85 meters

Table 4: Vessels Used

NOAA Ship FERDINAND R. HASSLER, S250 acquired all data submitted as H12490.

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
Hemisphere	MBX-4	Positioning System
Brooke Ocean	MVP-200	Sound Speed System
Sea-Bird	SBE45 Micro TSG	Sound Speed System
Sea-Bird	SeaCat 19+	Sound Speed System

Table 5: Major Systems Used

B.2 Quality Control

B.2.1 Crosslines

Two crosslines were acquired within the limits of H12490. The total length of the crosslines is 3.3% of the mainscheme lines. While this is less than the 4% required by section 5.2.4.3 of the Hydrographic Surveys Specifications and Deliverables (2012 Edition), the hydrographer believes that this is adequate to evaluate the survey quality. These crosslines were filtered to reject all 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 HIPS. The statistical analysis of the differences between the mainscheme and cross line soundings are shown in Figure 3. The average difference between the surfaces is 0.12 meters; 95% of all differences were less than 2.9 meters. The largest differences arise from three sources: a nadir detection artifact of the 7111 (see DAPR for more detail), sound velocity refraction artifacts (see section B.2.6.1 for more detail), and the great depths at the eastern extents of the cross lines. These small areas of large differences also accounts for the long tails of the difference distribution shown in Figure 3.

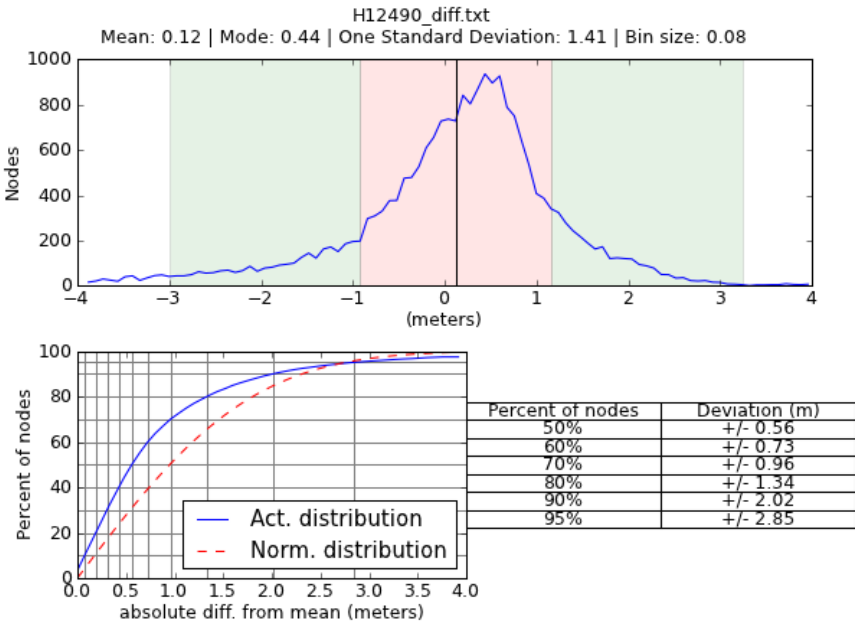


Figure 3: Statistics of Mainscheme/Crossline differenced surface

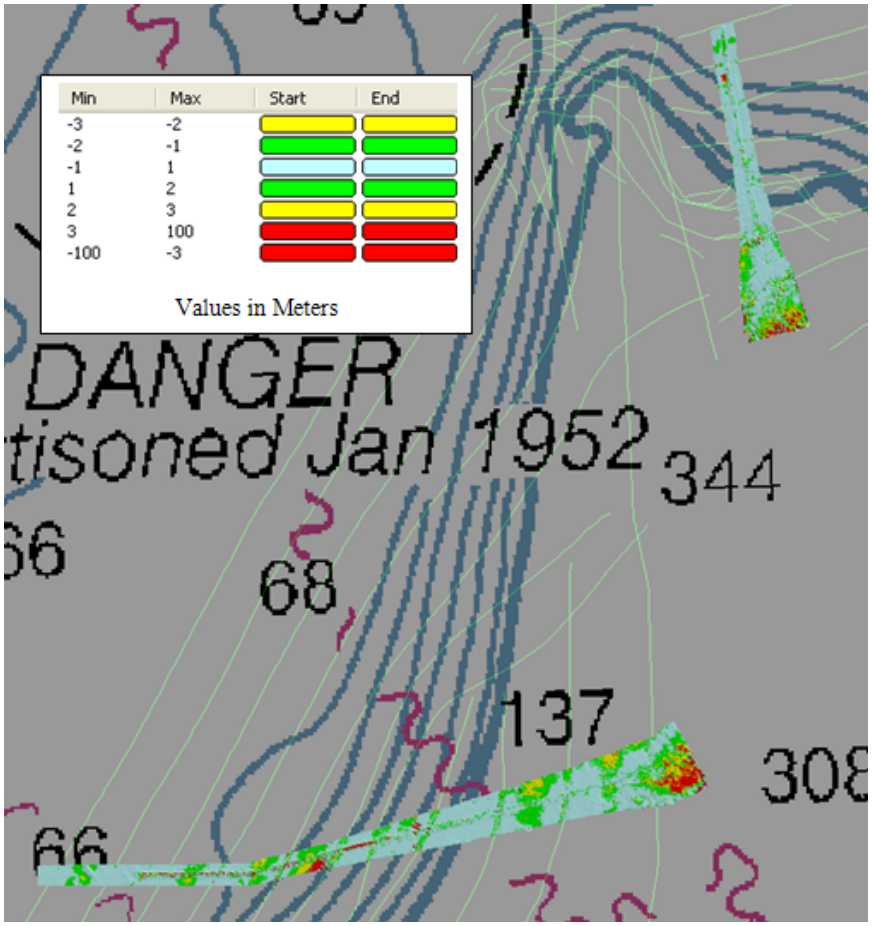


Figure 4: The crossline difference surface with mainscheme lines displyed over chart 12300. Differences at nadir occur from a known Reson 7111 artifact in the data. The larger differences at the outer edges of the main scheme lines are due to refraction errors.

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 guage 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 guage. The difference in range correctors is 0.1. The difference of mean high water and mean sea level at the controlling guage 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.

B.2.3 Junctions

This survey junctioned on the offshore extents with multibeam sonar data from various 2011-2012 OKEANOS EXPLORER missions. The OKEANOS EXPLORER data will likely not be submitted for charting. Accordingly, it is not considered a contemporary hydrographic survey junction and not discussed here.

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 Sound Speed Artifacts

Sound speed profiles varied considerably throughout the survey area. In particular, variable thicknesses layers of cold water, presumably a result of upwelling in the canyons, were seen in the upper water column through out the survey area. Despite frequent profiling with the moving vessel profiler (MVP), the sound speed regime was under sampled resulting in refraction errors in the data. Where possible, outer beam data showing refraction errors were rejected. This problem was more acute in shallow waters where the full swath width of the 7111 was achieved. In deeper areas, the swath width of the sonar was range limited resulting in a limited range of beam steering angles. The lower steering angles are much less susceptible to refraction errors.

This sound speed data set has been provided to researchers at the Joint hydrographic Center/ Center for Coastal and Ocean Mapping at the University of New Hampshire for further study.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Sound speed casts were taken with the MVP every 20 to 30 minutes.

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. Even after this correction was applied, the high variability of sound speed from the strong thermocline in the project area did not allow for successfully DQA's with the MVP and CTD.

Surface sound speed is measured by thermosalinographs (TSG) located in the main engine spaces. The TSGs draw intake water from the main engine raw water cooling system. At the beginning of the project the starboard TSG was configured to provide surface sound speed to all multibeam systems. On Dn173 at 1615 UTC the starboard engine and raw water intake were secured because of problems with the heat exchanger and were not run for the rest of the project. Securing the raw water system stopped circulation to the TSG and the the water in the unit began to warm to the ambient temperature of the engine room. As the water warmed, the output sound increased from 1520 m/s to 1527 m/s. At 1745 UTC the sound velocity input removed from the multibeam system and sound speed from the MVP was manually entered. The MVP tows

at the approximately the same depth as the sonar transducers. The port TSG was insulated and brought on line at 1900 UTC. The resultant sound speed error affected 7111 lines 1731553 and 1731710 Dn173 which have an additional 0.1-0.2 meter outer beam refraction error than the rest of the data. For the remainder of the survey the port TSG was used for surface sound speed measurements.

B.2.8 Coverage Equipment and Methods

A few navigationally insignificant holidays exist in depths greater than 120 meters in H12490. The holidays generally resulted from attenuation of the outer beams or rejecting outer beam data which was out of uncertainty and IHO Order 2 specifications. One holiday at nadir (7111 Dn173 line 2012S_1732131) was caused by fish in the water column.

A density analysis was run to calculate number of soundings per surface node. Five or more soundings per node were present in 97% of the 16 meter surface and 99% of the 8 meter surface. For additional detail, refer to H12490_Standards_Compliance report submitted in Appendix II of this report.

B.2.9 Reson 7125 HSX Navigation Offset

On Dn174 from 1330 to 1523 UTC, there was no navigation input to the port Reson 7125. For the six lines run during this period, the Hypack HSX file has been used for bathymetry. The raw navigation in the HSX file is from the starboard rather than the port POS-MV system leading to a 12 meter horizontal offset in the data. Real-time navigation from the port POS-MV was applied to this data using the CARIS HIPS load attitude/navigation tool and is included with the submitted data in the SBET_SMRMSG folder. Applying this real-time navigation from the correct positioning system resolved the positioning offset.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was logged in Reson datagram 7008 snippets record in the raw s7k file. The s7k file also holds the navigation and bottom detections for all lines except six 7125 lines (discussed in section B.2.9) and one 7111 Dn174 line (which was corrupt and did not import correctly). For the six lines discussed in section

B.2.9, the Hypack logged .7k file contains the backscatter. After initial processing of the bathymetric data, GSF files were exported from CARIS and paired with the raw file in the raw data directory. For the lines with backscatter in the Hypack logged .7k file, the HDCS and .7k lines were paired, imported, and processed using Fledermaus Geocoder Toolbox, version 7.3.2b-beta, build 406, 64-bit version.

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
H12490_16m	CUBE	16 meters	0 meters - 9999 meters	NOAA_16m	Complete MBES
H12490_8m	CUBE	8 meters	0 meters - 9999 meters	NOAA_8m	Complete MBES
H12490_16m_Final_144plus	CUBE	16 meters	144 meters - 9999 meters	NOAA_16m	Complete MBES
H12490_8m_Final_100to160	CUBE	8 meters	100 meters - 160 meters	NOAA_8m	Complete MBES
H12490_16m_Combined	CUBE	16 meters	115 meters - 787 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 H12490 met the vertical uncertainty standards of section 5.1.3 of the Hydrographic Surveys Specifications and Deliverables (2012 Edition). See H12490_Standards_Compliance report submitted in appendix II of this report.

C. Vertical and Horizontal Control

Additional information discussing the vertical or horizontal control for this survey can be found in the accompanying HVCR.

HVCR Report was not appended.

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, H12490, during the time period between June 21 and 22, 2012.

Tide Note is appended to this document.

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 the entirety of the project.

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

In flat sections of this survey area, the charted soundings agree with the depths from this survey within two fathoms. In areas of the survey with greater slopes, the charted soundings agreed with survey soundings within a radius of 2 millimeters at chart scale. The depth curves generated from this survey are significantly different from the charted curves, particularly in the vicinity of the heads of the canyons (see figure 6). Because this area is frequently visited by commercial and recreational fisherman who fish the canyon heads, the hydrographer recommends redrawing the depth curves and selecting new soundings for this survey.

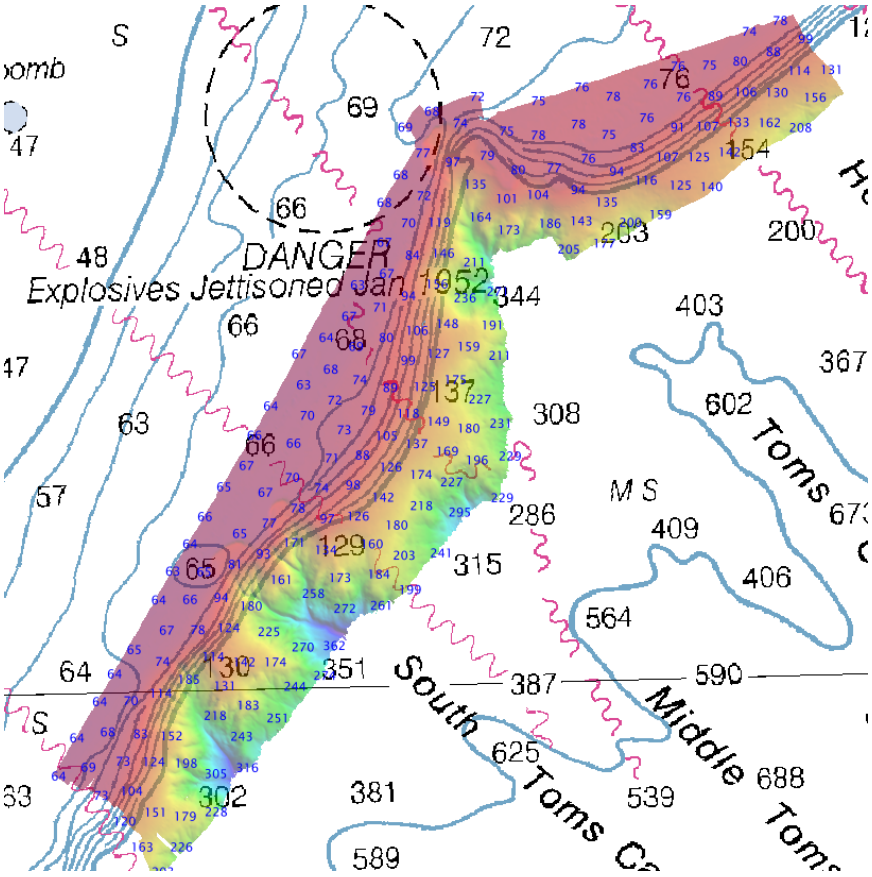


Figure 5: Surveyed soundings displayed over the surface and chart 12300

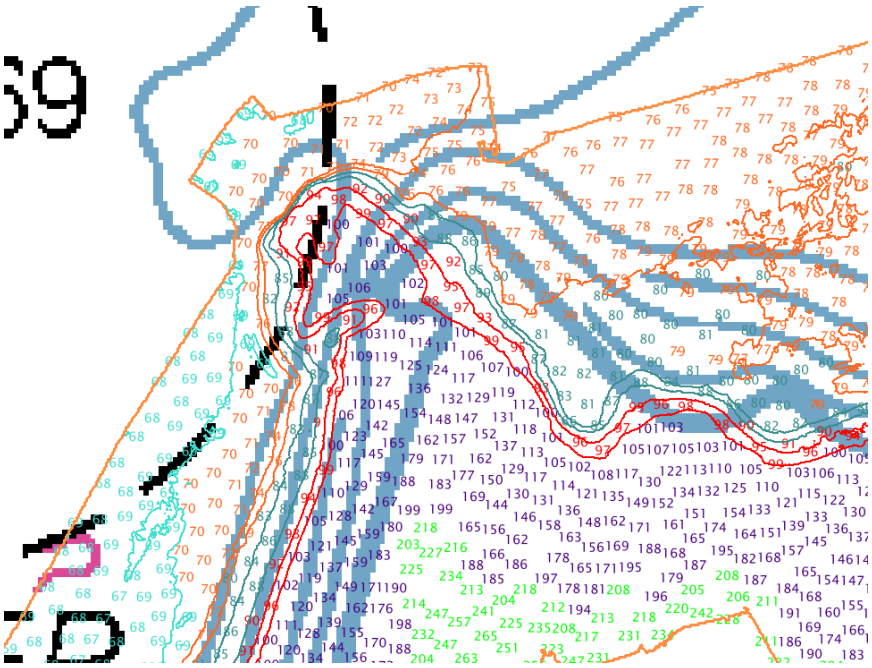


Figure 6: Survey depth curves and soundings over chart 12300 at the head of Toms Canyon. The surveyed shape of the canyon head is significantly different than charted.

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?
US3NY01M	1:400000	27	05/26/2011	02/06/2010	NO
US3DE01M	1:419706	12	10/06/2011	04/25/2012	NO

Table 14: Largest Scale ENCs

US3NY01M

The one charted sounding within this survey area agreed with soundings from this survey within one fathom.

US3DE01M

In flat sections of this survey area, the charted soundings agree with the depths from this survey within two fathoms. In areas of the survey with greater slopes, the charted soundings agreed with a survey sounding within a radius of 2 millimeters at chart scale.

D.1.3 AWOIS Items

No AWOIS items exist for this survey.

D.1.4 Charted Features

Charted submarine cables exist within the limits of sheet H12490 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.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

Prior survey comparisons were not performed 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 heads of Toms, Middle Toms, South Toms, and Berkeley Canyons.

No features were submitted with survey H12490.

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 discrepencies 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 17:29:15 -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 20:27:59 Z
David T. Moehl	Senior Survey Technician	08/22/2012	Digitally signed by David Moehl Date: 2012.08.22 12:06:16 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 Staiton
CTD	Conductivity Temperature Depth
CEF	Chart Evaluation File
CSF	Composite Source File
CST	Chief Survey Technician
CUBE	Combined Uncertainty and Bathymetry Estimator
DAPR	Data Acquisition and Processing Report
DGPS	Differential Global Positioning System
DP	Detached Position
DR	Descriptive Report
DTON	Danger to Navigation
ENC	Electronic Navigational Chart
ERS	Ellipsoidal Referenced Survey
ERZT	Ellipsoidally Referenced Zoned Tides
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division
HSSDM	Hydrographic Survey Specifications and Deliverables Manual

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

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

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : July 25, 2012

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: S-C919-FH-2012
HYDROGRAPHIC SHEET: H12490

LOCALITY: Northwest of Toms Canyon, New Jersey
TIME PERIOD: June 21 to 22, 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, H12490, during the time period between June 21 and 22, 2012.

Please use the zoning file C919FH2012CORP submitted with the project instructions for S-C919-FH-2012. Zone SA24 is the applicable zone for H12490.

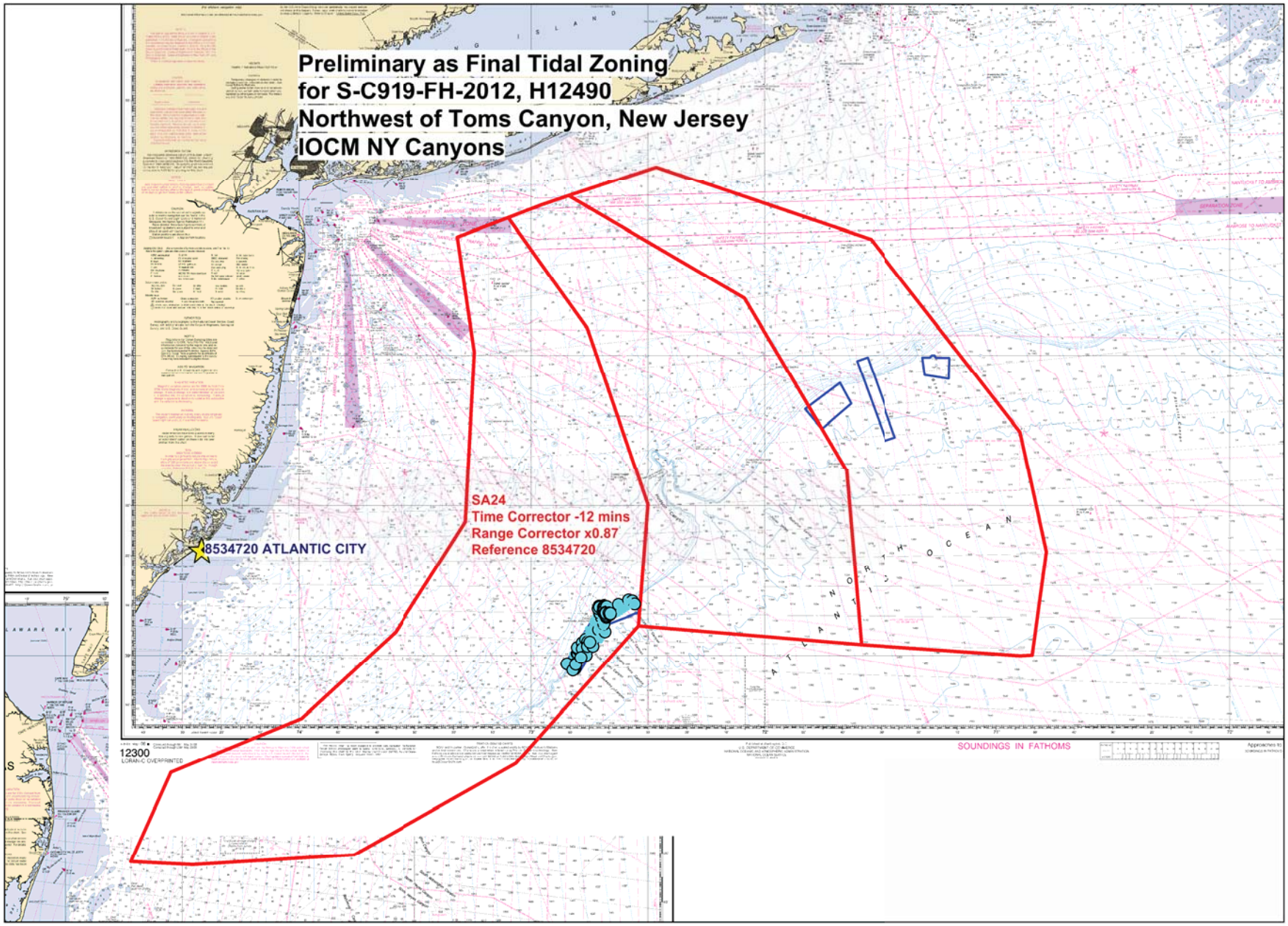
Refer to attachments for zoning information.

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).

HOVIS.GERALD.THOMAS.1365860250

Digitally signed by HOVIS.GERALD.THOMAS.1365860250
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=OTHER, cn=HOVIS.GERALD.THOMAS.1365860250
Date: 2012.07.31 11:36:41 -04'00'

CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final Tidal Zoning
for S-C919-FH-2012, H12490
Northwest of Toms Canyon, New Jersey
IOCM NY Canyons
SA24
Time Corrector -12 mins
Range Corrector x0.87
Reference 8534720
8534720 ATLANTIC CITY
NORTH ATLANTIC OCEAN
SOUNDINGS IN FATHOMS
12300
LORAN-C OVERPRINTED

APPROVAL PAGE

H12490

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

- H12490_DR.pdf
- Collection of depth varied resolution BAGS
- Processed survey data and records
- H12490_GeoImage.pdf

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

Approved: Digitally signed by Peter S. Holmberg
DN: cn=Peter S. Holmberg, o, ou, email=peter.holmberg@noaa.gov, c=US
Date: 2013.02.25 16:13:48 -08'00'

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: David Zezula
2013.02.25 16:49:26 -08'00'

CDR David Zezula, NOAA
Chief, Pacific Hydrographic Branch