H13341

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

DESCRIPTIVE REPORT

Type of Survey:	Basic Hydrographic Survey
Registry Number:	H13341

LOCALITY

State(s):	Virginia
General Locality:	Areas of Mobjack Bay, VA and Choptank River, MD
Sub-locality:	South Mobjack Bay

2020

CHIEF OF PARTY
Erin Markham

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**H13341**

INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

State(s):	**Virginia**
General Locality:	**Areas of Mobjack Bay, VA and Choptank River, MD**
Sub-Locality:	**South Mobjack Bay**
Scale:	**20000**
Dates of Survey:	**09/06/2020 to 11/13/2020**
Instructions Dated:	**08/19/2020**
Project Number:	**OPR-E350-KR-20**
Field Unit:	**Leidos**
Chief of Party:	**Erin Markham**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Multibeam Echo Sounder Backscatter Side Scan Sonar**
Verification by:	**Atlantic Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

Contract: 1305M220DNCNJ0056/TO-0001. Contractor: Leidos, 221 Third Street, Newport, RI 02840 USA. Subcontractors: Divemasters, Inc., 15 Pumpshire Road, Toms River, NJ 08753; OARS, 8705 Shoal Creek Blvd, Suite 109, Austin, TX 78757. Leidos Doc. 21-TR-005. All times were recorded in UTC. Final data are corrected to North American Datum of 1983 (NAD83) 2011 realization 2010 (NAD83(2011)2010.0), UTM Zone 18N.

Any revisions to the Descriptive Report (DR) applied during office processing are shown in red italic text. The DR is maintained as a field unit product, therefore all information and recommendations within this report are considered preliminary unless otherwise noted. The final disposition of survey data is represented in the NOAA nautical chart products. All pertinent records for this survey are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via https://www.ncei.noaa.gov/. Products created during office processing were generated in NAD83 UTM 18N, MLLW. All references to other horizontal or vertical datums in this report are applicable to the processed hydrographic data provided by the field unit.

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Descriptive Report to Accompany Survey H13341

Project: OPR-E350-KR-20

Locality: Areas of Mobjack Bay, VA and Choptank River, MD

Sublocality: South Mobjack Bay

Scale: 1:20000

September 2020 - November 2020

Leidos

Chief of Party: Erin Markham

A. Area Surveyed

The area surveyed was a section of the Chesapeake Bay in South Mobjack Bay (Figure 1).

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
37° 20' 0.43" N 76° 27' 21.85" W	37° 15' 47.48" N 76° 17' 8.12" W

Table 1: Survey Limits

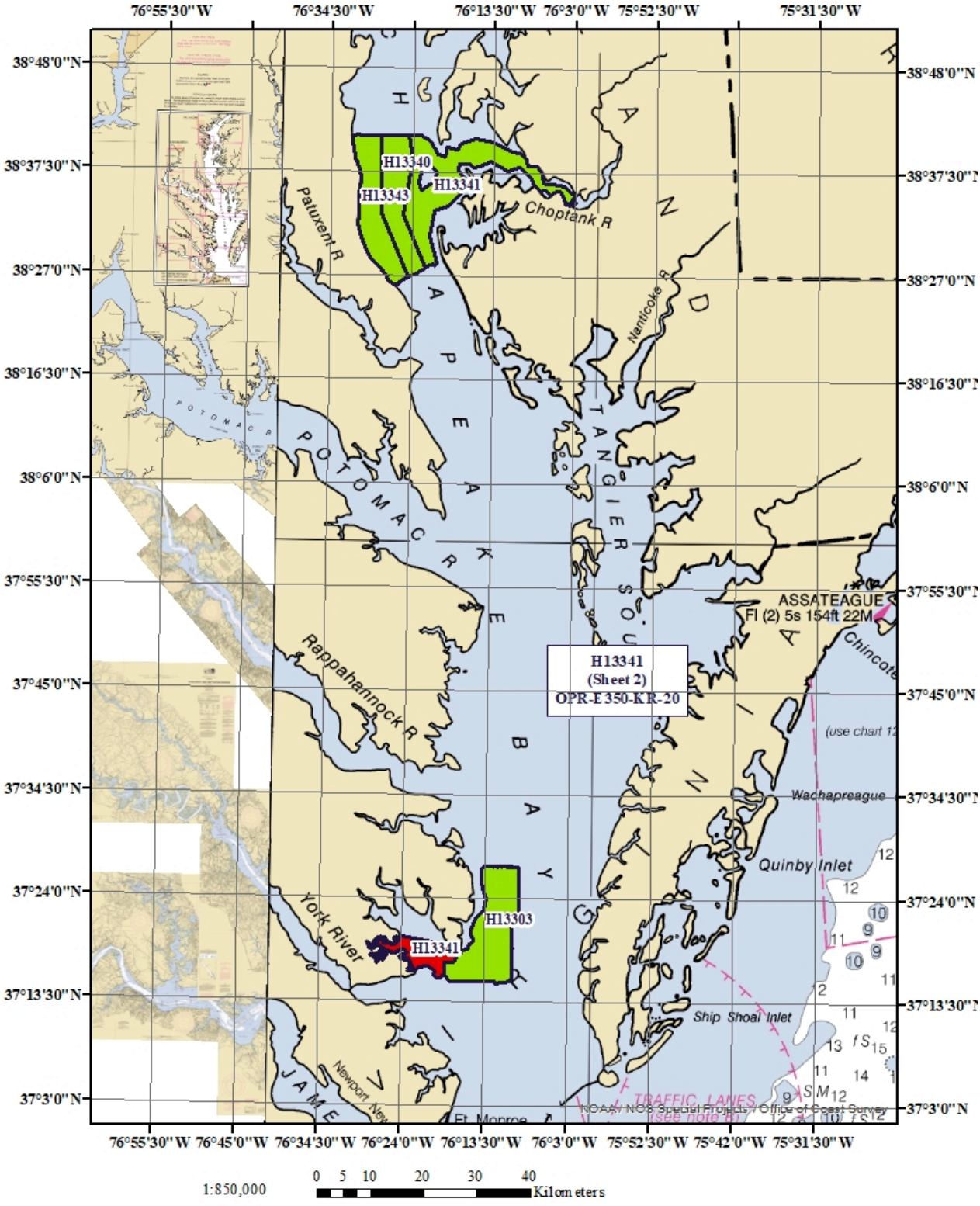

Figure 1: H13341 Survey Bounds

Survey limits were acquired in accordance with the requirements in the Project Instructions and the Hydrographic Surveys Specifications and Deliverables (HSSD), May 2020.

A.2 Survey Purpose

The central Chesapeake Bay is a critical shipping corridor for commerce transiting to and from the Port of Baltimore, as well the region supports an important commercial fishery, which includes menhaden, crabs and oysters. The purpose of this project is to provide contemporary surveys to update National Ocean Service nautical charts and products to support navigation safety and monitor the health of the environment.

Survey vintage predates the 1950s for the majority of the project area despite vessels transiting within close proximity to the seafloor. This covers approximately 203 square nautical miles that will close a critical gap in existing modern hydrographic data for the stretch between the entrance to Chesapeake Bay up through Baltimore, MD. This project will provide critical data for the updating of National Ocean Service (NOS) nautical charting products to increase maritime safety in the region. Survey data from this project is intended to supersede all prior survey data in the common area.

A.3 Survey Quality

The entire survey is adequate to supersede previous data.

Leidos warrants only that the survey data acquired by Leidos and delivered to NOAA under Contract 1305M220DNCNJ0056 reflects the state of the sea floor in existence on the day and at the time the survey was conducted.

H13341 was surveyed in accordance with the following documents:
1. 1305M220DNCNJ0056/1305M220FNCNJ0278P21001 dated 19 August 2020
2. Hydrographic Surveys Specifications and Deliverables (HSSD), May 2020
3. OPR-E350-KR-20_PRF.000, received 02 September 2020
4. OPR-E350-KR-20_CSF.000, received 12 August 2020
5. OPR-E350-KR-20 Virtual Meeting with NOAA Responses.pdf, dated 23 March 2021

A.4 Survey Coverage

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

Water Depth	Coverage Required
H13341	Complete Coverage (Refer to HSSD Section 5.2.2.2)
8 meters water depth and shoaler	Sidescan may be acquired at an altitude of 6-20% of the range scale

Table 2: Survey Coverage

Leidos chose to achieve the coverage requirement using Complete Coverage, Option B (100% side scan sonar coverage with concurrent multibeam). Survey coverage achieved was in accordance with the requirements in the Project Instructions and the HSSD (Figure 2 through Figure 4).

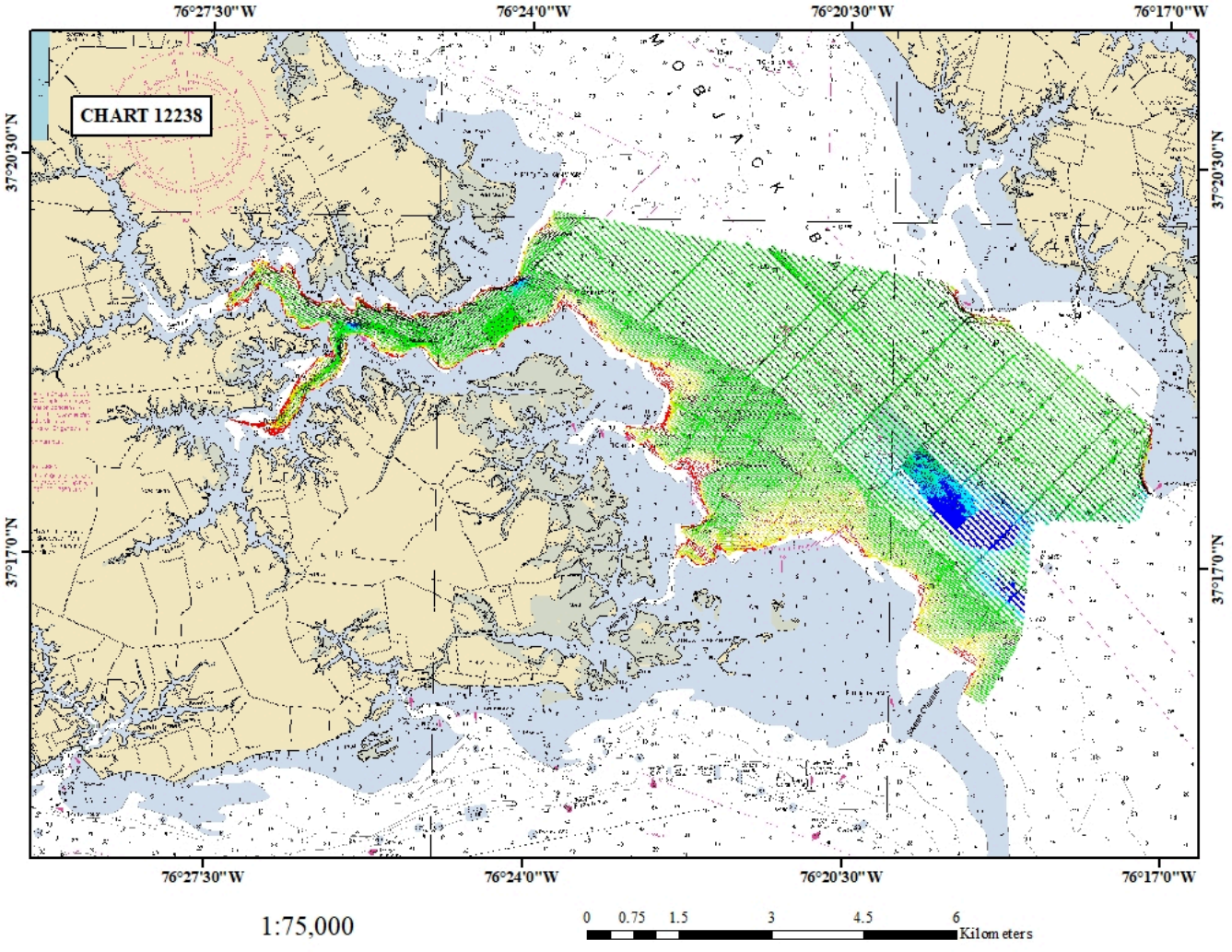

Figure 2: Final Bathymetry Coverage for H13341

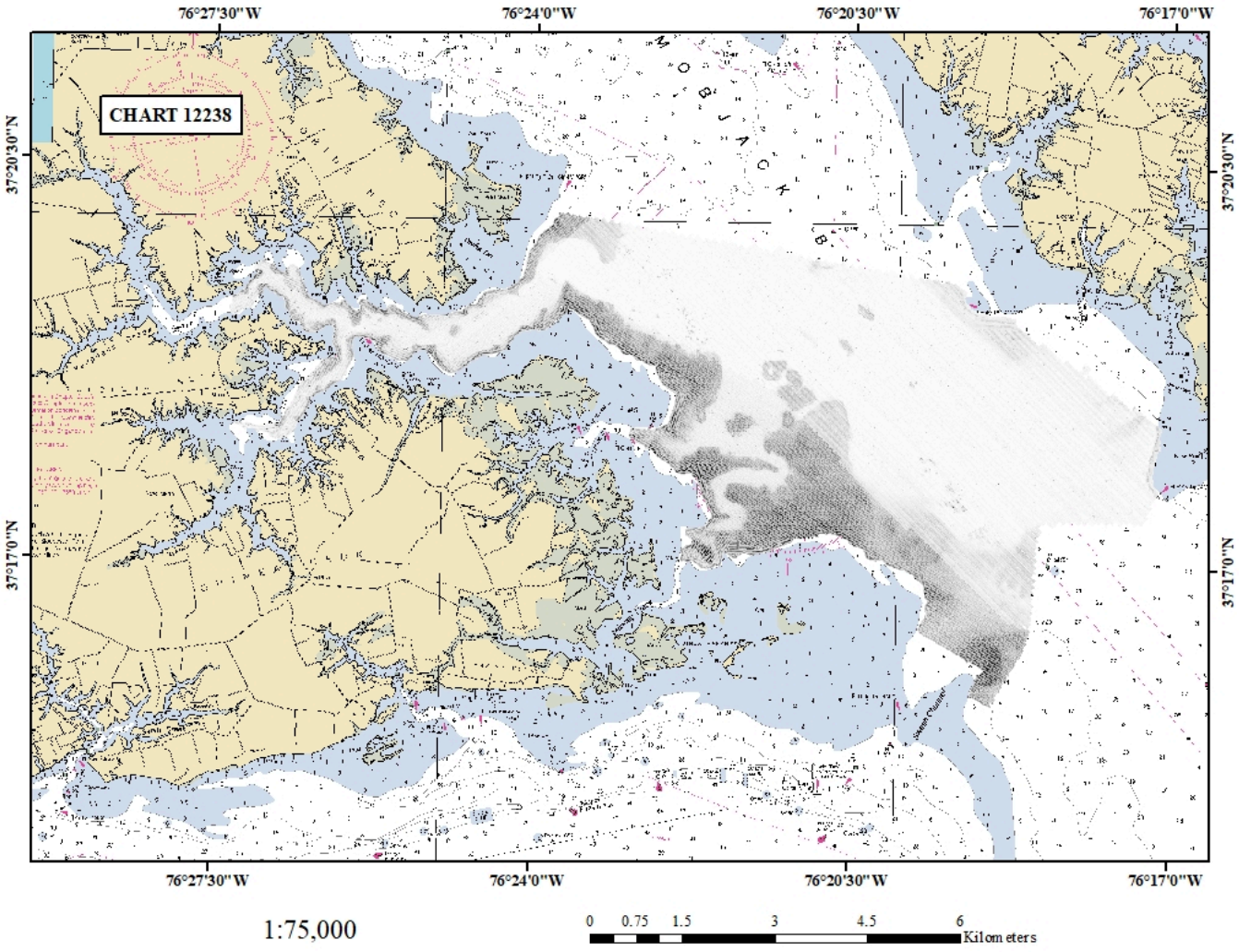

Figure 3: Final Side Scan Coverage for H13341 (First 100% coverage)

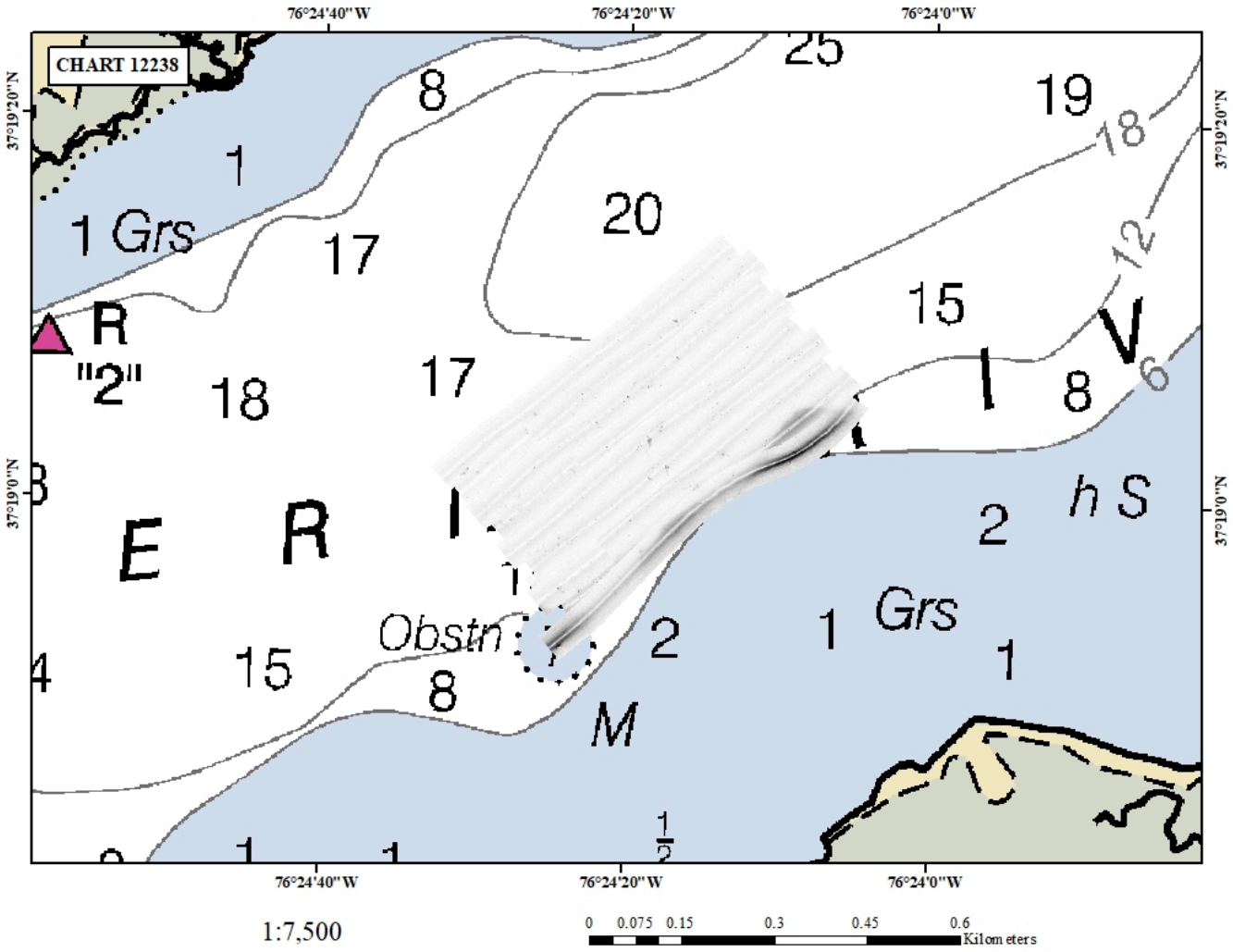

Figure 4: Final Side Scan Coverage for H13341 (Second 100% coverage)

A.6 Survey Statistics

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

	HULL ID	*R/V Oyster Bay II*	*Total*
LNM	**SBES Mainscheme**	0	0
	MBES Mainscheme	0	0
	Lidar Mainscheme	0	0
	SSS Mainscheme	0	0
	SBES/SSS Mainscheme	0	0
	MBES/SSS Mainscheme	541.64	541.64
	SBES/MBES Crosslines	25.52	25.52
	Lidar Crosslines	0	0
Number of Bottom Samples			7
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			12.6

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
09/06/2020	250

Survey Dates	Day of the Year
09/07/2020	251
09/08/2020	252
09/13/2020	257
09/14/2020	258
09/15/2020	259
09/16/2020	260
09/17/2020	261
09/18/2020	262
09/21/2020	265
09/22/2020	266
09/23/2020	267
09/29/2020	273
10/03/2020	277
10/08/2020	282
10/21/2020	295
10/23/2020	297
10/24/2020	298
10/26/2020	300
10/27/2020	301
11/03/2020	308
11/04/2020	309
11/06/2020	311
11/12/2020	317
11/13/2020	318

Table 4: Dates of Hydrography

B. Data Acquisition and Processing

B.1 Equipment and Vessels

Leidos used their ISS-2000 software on a Windows platform to acquire these survey data. Survey planning and data analysis were conducted using the Leidos SABER software on Red Hat Enterprise 7 Linux

platforms. Side scan sonar (SSS) data were collected on a Windows platform using Klein's SonarPro software. Subsequent processing and review of the SSS data, including the generation of coverage mosaics, were accomplished using SABER.

A detailed description of the systems and vessel used to acquire and process these data is included in the Data Acquisition and Processing Report (DAPR) for OPR-E350-KR-20, delivered concurrently with this Descriptive Report (DR). There were no variations from the equipment configuration described in the DAPR.

B.1.1 Vessels

The following vessels were used for data acquisition during this survey:

Hull ID	***R/V Oyster Bay II***
LOA	30 feet
Draft	3 feet

Table 5: Vessels Used

Figure 5: R/V Oyster Bay II

The R/V Oyster Bay II (Figure 5) was used to collected MBES (RESON SeaBat 7125 SV1), SSS (Klein 4900), and sound speed data during twelve hours per day survey operations.

A detailed description of the vessel used is included in the DAPR.

B.1.2 Equipment

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

Manufacturer	Model	Type
Teledyne RESON	SeaBat 7125 SV	MBES
Klein Marine Systems	System 4900	SSS
Applanix	POS MV 320 v5	Positioning and Attitude System
AML Oceanographic	BaseX2	Sound Speed System

Table 6: Major Systems Used

A detailed description of the equipment installed is included in the DAPR.

B.2 Quality Control

B.2.1 Crosslines

Multibeam echo sounder/side scan sonar crosslines acquired for this survey totaled 4.71% of mainscheme acquisition.

Refer to Separates II for details about how the crossing analyses were performed and a complete discussion of each analysis and tabular results. Figure 6 summarizes the crossline comparison results.

Difference Grid	Minimum and Maximum CUBE Depth (meters) of Crossline Grid	IHO Order 1A Maximum Allowable Uncertainty (meters) for the Range of Depths	Percentage of Depth Differences Within IHO Order 1A Maximum Allowable Uncertainty
R/V Oyster Bay Multibeam 1-meter Crossline (Class 1) to 1-meter Mainscheme	2.431 – 8.580	0.501 – 0.512	100.00%

Figure 6: Summary of Crossing Analysis

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Method	Measured	Zoning
ERS via VDATUM	0.090 meters	0.20 meters

Table 7: Survey Specific Tide TPU Values.

Hull ID	Measured - CTD	Measured - MVP	Measured - XBT	Surface
R/V Oyster Bay II	1.0 meters/second	1.0 meters/second	1.0 meters/second	1.0 meters/second

Table 8: Survey Specific Sound Speed TPU Values.

For specific details on the use and application of the SABER Total Propagated Uncertainty (TPU) model, refer to the DAPR. Once the TPU model was applied to the GSF bathymetry data, each beam was attributed with the horizontal uncertainty and the vertical uncertainty at the 95% confidence level. The vertical and horizontal uncertainty values, estimated by the TPU model for individual multibeam soundings, varied little across the dataset, tending to be most affected by beam angle. Individual soundings that had vertical and horizontal uncertainty values above IHO S-44 5th Edition, Order 1a were flagged as invalid during the uncertainty attribution.

As discussed in the DAPR, SABER generates two vertical uncertainty surfaces; the Hypothesis Standard Deviation (Hyp. StdDev) and the Hypothesis Average Total Propagated Uncertainty (Hyp. AvgTPU). A third vertical uncertainty surface is generated from the larger value of these two uncertainties at each node and is referred to as the Hypothesis Final Uncertainty (Hyp. Final Uncertainty).

The final H13341 1-meter PFM CUBE surface contained final vertical uncertainties that ranged from 0.210 meters to 0.469 meters. The IHO Order 1a maximum allowable vertical uncertainty was calculated to range between 0.500 to 0.516 meters, based on the minimum CUBE depth (0.705 meters) and maximum CUBE depth (9.668 meters). Results from the SABER Check PFM Uncertainty function identified that there were 0 nodes in the final H13341 1-meter PFM CUBE surface with final vertical uncertainties that exceeded IHO Order 1a allowable vertical uncertainty. The SABER Frequency Distribution Tool was also used to review the Hyp. Final Uncertainty surface within the final H13341 1-meter PFM grid. Results showed that 100.00% of all nodes had final uncertainties less than or equal to 0.469 meters.

B.2.3 Junctions

Per the Project Instructions, analysis of the H13341 junction with an adjacent survey was performed between H13341 and the survey listed in Table 9. Figure 7 shows the general locality of H13341 as it relates to the

sheet to which junctions were performed. Analysis of the junctions with sheet H13303 were not conducted as data acquisition and processing for that sheet remain on-going. Refer to Separates II for details about how junction analyses were performed and a complete discussion of each analysis and tabular results.

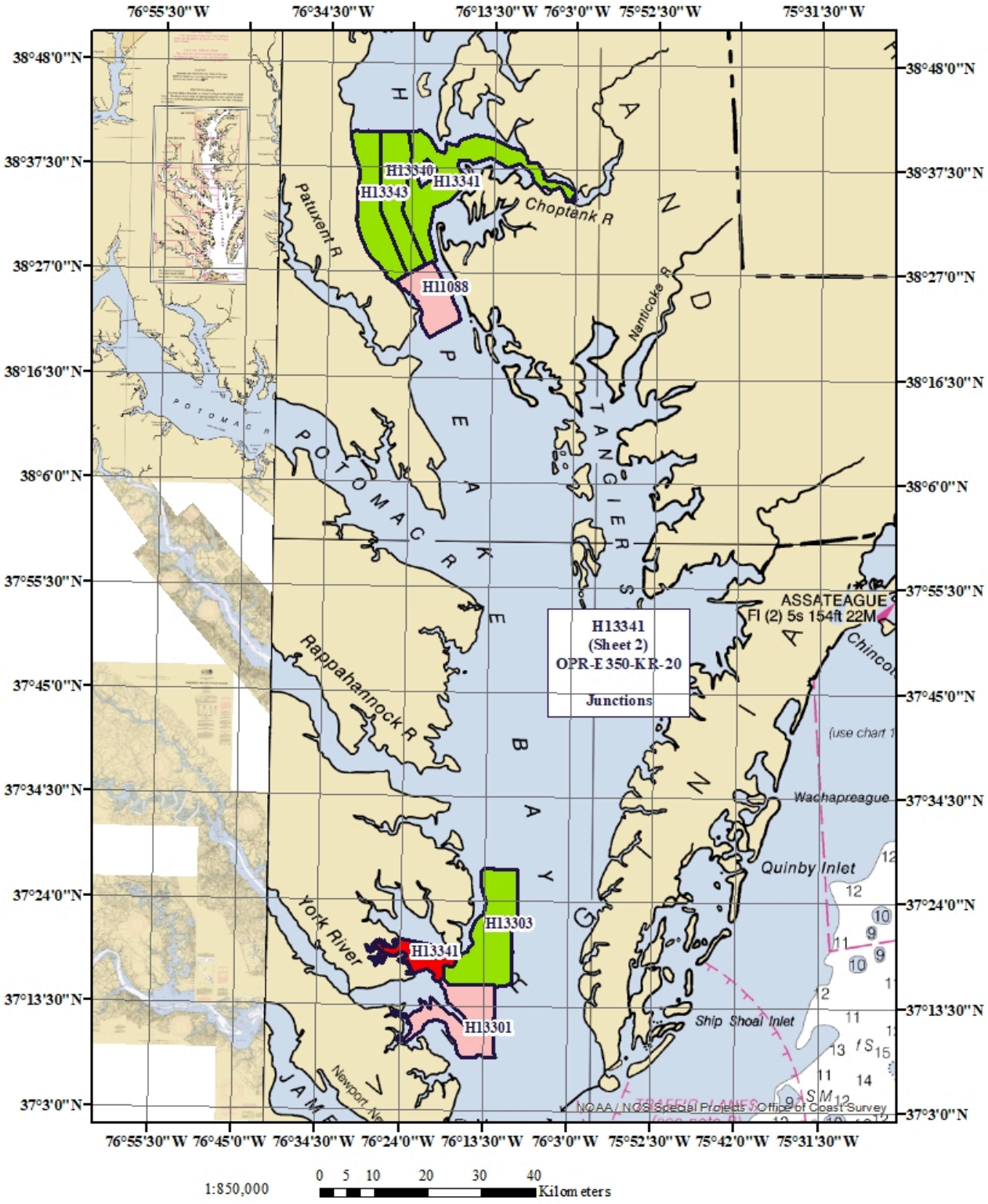

Figure 7: General Locality of H13341 with Junctioning Surveys

The following junctions were made with this survey:

Registry Number	Scale	Year	Field Unit	Relative Location
H13301	1:10000	2020	Leidos, Inc.	SE

Table 9: Junctioning Surveys

H13301

H13341 junctions with H13301 to the southeast; 100% of the comparisons agreed within ±0.128 meters, well below the calculated maximum allowable TVU of 0.504 meters.

B.2.4 Sonar QC Checks

Sonar system quality control checks were conducted as detailed in the DAPR; quality control checks conducted during H13341 are reported in Separates I.

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: On the R/V Oyster Bay II, the BaseX2 was the primary system used to collect sound speed profile (SSP) data, refer to the DAPR for additional details. SSP data were obtained at intervals frequent enough to meet depth accuracy requirements. Section 5.2.3.3 of the HSSD requires that if the sound speed measured at the sonar head differs by more than two meters/second from the commensurate profile data, then another cast shall be acquired.

All sound speed profiles applied for online bathymetry data collection were acquired within 500 meters of the bounds of the survey area as specified in Section 5.2.3.3 of the HSSD.

Confidence checks of the sound speed profile casts were conducted by comparing at least two consecutive casts taken with different SSP sensors. Results for the sound speed confidence checks were conducted during H13341 can be found in Separates II within the “Comparison Cast Log” section.

All individual SSP files are delivered with the H13341 data and are broken out into sub-folders, which correspond to the purpose of each cast. Also, all individual SSP files for H13341 have been concatenated into four separate files based on the purpose of the cast, provided in CARIS format files (.svp), and delivered under (H13341/Processed/SVP/CARIS_SSP) on the delivery drive. In accordance with HSSD Section 8.3.6, SSP files were also converted to NCEI format, as detailed in the DAPR, and provided as a separate delivery to NCEI. Refer to the DAPR and Separates II for additional details.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods are detailed in the DAPR.

B.2.9 Multibeam Coverage Analysis

Leidos chose to achieve the complete coverage requirement using 100% side scan sonar coverage with concurrent multibeam bathymetry. To achieve this coverage, the SSS was set to 25-meter or 50-meter range scale, main scheme survey lines were collected at 40-meter or 80-meter, respectfully, to ensure 100% SSS coverage.

The SABER Gapchecker program was used to flag MBES data gaps within the CUBE surface. Additionally, the entire surface was visually scanned for holidays at various points during the data processing effort. Additional survey lines were run to fill any holidays that were detected. Bathymetric data and side scan sonar imagery were reviewed and bathymetric splits were acquired if deemed necessary per Hydrographer’s discretion, as noted in Section 5.2.2.1 of the HSSD.

A final review conducted on the CUBE Depth surface of the H13341 1-meter PFM grid showed that there were no holidays as defined for complete coverage surveys, HSSD Section 5.2.2.3. Any three by three node gaps were along the outer swath data beyond the side scan nadir coverage.

The final H13341 CUBE PFM grids were examined for the number of soundings contributing to the chosen CUBE hypotheses for each node by running SABER’s Frequency Distribution Tool on the Hypothesis Number of Soundings (Hyp. # Soundings) surface. The Hyp. # Soundings surface reports the number of soundings that were used to compute the chosen hypothesis. Analysis was conducted on the Hyp. # Soundings surfaces from each of the PFM grids to ensure that the requirements for complete coverage

surveys, as specified in HSSD Section 5.2.2.3 were met. Within the final 1-meter PFM grid 99.54% of all nodes contained five or more soundings.

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. Multibeam files associated with calibration are provided within the H13341/Processed/Sonar_Data/H13341_MB/Calibration_Files/ directory.

B.4 Backscatter

Side Scan Sonar (SSS) Coverage Analysis: For all details regarding SSS data processing, see the DAPR. Leidos chose to adhere to the coverage requirements in the Project Instructions using Complete Coverage, Option B (100% side scan sonar coverage with concurrent multibeam). As referenced in Section A.4, the Project Instructions provided a waiver to HSSD Section 6.1.2.3 for towed side scan towfish height. In waters less than 8 meters the towfish height above the bottom could be 6% of the range scale. Mosaics were analyzed for coverage at both 8% and 6% of range based on water depths greater or less than 8 meters.

Leidos generated two separate coverage mosaics at 1-meter cell size resolution as specified in Section 8.2.1 of the HSSD. The first 100% and second 100% coverage mosaics were independently reviewed using tools in SABER to verify data quality and swath coverage. The SABER Gapchecker routine was used to flag data gaps within each of the 100% SSS coverage mosaics. Additionally, the entirety of each SSS surface was visually scanned for holidays at various points during the data processing effort. Additional survey lines were run to fill any holidays that were detected. Both coverage mosaics are determined to be complete and sufficient to meet the requirements contained within the Project Instructions and HSSD . Each 100 percent coverage mosaic is delivered as a single georeferenced raster file (datum of NAD83) in floating point GeoTIFF format, as specified in Sections 8.2.1 and 8.3.3 in the HSSD.

Multibeam Echo Sounder Seafloor Backscatter: Leidos collected MBES backscatter data with all GSF data acquired, in accordance with HSSD Section 6.2. The MBES settings used were checked to ensure acceptable quality standards were met and to mitigate acoustic saturation of the backscatter data. The MBES backscatter data acquired were written to the GSF in real-time by ISS-2000 and are delivered in the final GSF files

for this sheet. Evaluation of backscatter data and processing were not required for OPR-E350-KR-20 and therefore no additional processing was performed by Leidos and no additional products were produced.

B.5 Data Processing

B.5.1 Primary Data Processing Software

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

Manufacturer	Name	Version
Leidos	SABER	5.4.0.35.0

Table 10: Primary bathymetric data processing software

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

Manufacturer	Name	Version
Leidos	SABER	5.4.0.35.0

Table 11: Primary imagery data processing software

The following Feature Object Catalog was used: NOAA Profile Version 2021.

The primary data processing software used for both bathymetry and imagery was SABER.

B.5.2 Surfaces

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

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
H13341_MB_1m_MLLW_Final	BAG	1 meters	0.705 meters - 9.668 meters	N/A	Complete coverage, Option B (100% side scan sonar coverage with

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
					concurrent multibeam)
H13341_SSSAB_1m_900kHz_1of2	SSS Mosaic (.tif)	1 meters	0 meters - 0 meters	N/A	First 100% SSS
H13341_SSSAB_1m_900kHz_2of2	SSS Mosaic (.tif)	1 meters	0 meters - 0 meters	N/A	Second 100% SSS (Disproval)

Table 12: Submitted Surfaces

Complete Coverage Section 5.2.2.3 of the HSSD requires 1-meter node resolution for depths ranging from 0 meters to 20 meters. Leidos generated a CUBE PFM grid for H13341 at 1-meter resolution.

SABER populates the CUBE depth with either the node's chosen hypothesis or the depth of a feature or designated sounding set by the hydrographer, which overrides the chosen hypothesis. The range of CUBE depths of the H13341 1-meter PFM grid were from 0.705 meters (2.313 feet; 0.210 meters Total Vertical Uncertainty [TVU]) to 9.668 meters (31.719 feet; 0.210 meters TVU).

The final gridded bathymetry data are delivered as a Bathymetric Attributed Grid (BAG). The BAG file was exported from the CUBE PFM grid as detailed in the DAPR.

C. Vertical and Horizontal Control

Additional information discussing the vertical and horizontal control for this survey can be found in the DAPR.

C.1 Vertical Control

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

ERS Datum Transformation

The following ellipsoid-to-chart vertical datum transformation was used:

Method	Ellipsoid to Chart Datum Separation File
ERS via VDATUM	OPR-E350-KR-20_NAD83_VDatum_MLLW.cov

Table 13: ERS method and SEP file

Refer to the DAPR for details regarding the application of VDatum to the MBES data files. No final tide note was provided nor was it required from NOAA Center for Operational Oceanographic Products and Services (CO-OPS).

C.2 Horizontal Control

The horizontal datum for this project is North American Datum of 1983 (NAD 83).

The projection used for this project is Universal Transverse Mercator (UTM) Zone 18.

PPP

The vessel kinematic data (POS/MV files) were post-processed in Applanix POSPac software using the Applanix PP-RTX solution to generate the Smoothed Best Estimate of Trajectory (SBET) solutions which were applied through SABER to the multibeam data. Refer to the DAPR for additional information and for details regarding all antenna and transducer offsets. Any soundings with total horizontal uncertainties exceeding the maximum allowable IHO S-44 5th Edition Order 1a specifications were flagged as invalid and therefore were not used in the CUBE depth calculations.

D. Results and Recommendations

D.1 Chart Comparison

Chart comparisons were conducted using a combination of SABER and CARIS' HIPS and SIPS. H13341 data met data accuracy standards and bottom coverage requirements. Leidos recommends updating the common areas of all charts using data from this survey. Review showed that the H13341 depth data were generally in good agreement with charted depths on ENC US5VA24M and US5VA26M.

Charting recommendations for new features and updates to charted features, are documented in the H13341 S-57 FFF. Additional charted objects are discussed in later sections.

United States Coast Guard (USCG) District 5 Local Notice to Mariners (LNM) publications were reviewed for changes subsequent to the date of the Project Instructions and before the end of survey (as specified in Section 8.1.4 of the HSSD). The LNM reviewed were from week 33/20 (18 August 2020) until week 16/21 (20 April 2021). LNM 41/20 (13 October 2020) notes Mobjack Bay Channel Daybeacon 6MB as 'DAYMK DMGD'; LNM 43/20 (27 October 2020) subsequently notes the daymark as 'WATCHING PROPERLY'. LNM 06/21 (09 February 2021) lists new obstructions and charted wreck removal which were sourced from H13341 DTON 05 with Anti-DTON and H13341 DTON 06; refer to Section D.1.2 for further information.

D.1.1 Electronic Navigational Charts

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

ENC	Scale	Edition	Update Application Date	Issue Date
US5VA24M	1:40000	29	03/24/2020	03/09/2021
US5VA26M	1:40000	16	04/26/2019	03/23/2021

Table 14: Largest Scale ENCs

D.1.2 Shoal and Hazardous Features

There were no significant shoals or hazardous features within the area covered by this survey other than those referenced in Section D.1.4 and H13341 DTON reports. Leidos submitted nine DTONs for H13341 in S-57 format to the Atlantic Hydrographic Branch (AHB). Details are listed in Figure 8. DTON 01 and DTON 02 were not forwarded by AHB to the Nautical Data Branch (NDB) and Marine Chart Division (MCD) per correspondence from NOAA on 19 October 2020. Features in the H13341 FFF associated with DTON 01 and DTON 02 do not retain the special feature type of DTON. DTON 07 was submitted to the US Coast Guard on 03 March 2021, for an uncharted beacon lateral with daymark signage, in accordance with HSSD Section 1.6.2. Per correspondence with NOAA on 05 March 2021, this feature was also submitted to NOAA as DTON 07, on 17 March 2021.

Copies of the email correspondence for Leidos' submissions of H13341 DTON Report, as well as the DTON recommendation file, are included within Appendix II of this Descriptive Report. Figure 8 details the submitted DTON and the associated Feature number and object class in the S-57 FFF.

DTON Report Name	DTON Number	Date Submitted to AHB	AHB Submitted to NDB and MCD	NDB Registration	Date Submitted to USCG	Feature Number(s)	S-57 Object Class in the S-57 FFF
H13341_DTON_01.000	01	2020-10-16	N/A	N/A	N/A	02	WRECKS
H13341_DTON_02.000	02	2020-10-16	N/A	N/A	N/A	01	WRECKS
H13341_DTON_03_06.000	03	2021-01-15	2021-01-19	DD-33823	N/A	06	WRECKS
H13341_DTON_03_06.000	04	2021-01-15	2021-01-19	DD-33823	N/A	05	OBSTRN
H13341_DTON_03_06.000	05	2021-01-15	2021-01-19	DD-33823	N/A	09	WRECKS
H13341_DTON_03_06.000	06	2021-01-15	2021-01-19	DD-33823	N/A	08	OBSTRN
07_H13341_USCG_ATON_Discrepancy_Report.pdf / H13341_DTON_07_09.000	07	2021-03-17	2021-03-18	DD-34167	2021-03-03	18	BCNLAT
H13341_DTON_07_09.000	08	2021-03-17	2021-03-18	DD-34167	N/A	03	OBSTRN
H13341_DTON_07_09.000	09	2021-03-17	2021-03-18	DD-34167	N/A	16	PILPNT

Figure 8: DTON Reports

D.1.3 Charted Features

There were numerous assigned charted features in the final CSF (OPR-E350-KR-20_CSF.000) within the SOW of H13341; refer to the H13341 S-57 FFF (H13341_FFF.000) for all the details and recommendations regarding these features.

D.1.4 Uncharted Features

See the H13341 S-57 FFF for all the details and recommendations regarding new uncharted features investigated.

During the course of H13341 survey operations, various PVC and bamboo pipe markers were observed within the survey limits (Figure 9). These were determined to be temporary in nature as over the course of survey operations it was observed that several of the markers would either no longer be present or would have been moved. Due to their temporary nature, there are no features associated with these markers within the H13341 S-57 FFF. If the markers were confirmed visually to be above water, the MBES data were invalidated. There were instances where in MBES and SSS submerged markers were identified; no features or significant contacts were set for these as they were not warranted in accordance with HSSD. Data remain valid within the MBES.

An uncharted dock (Feature 10) was observed within the northwest branch of the Severn River, Figure 10 The majority of the dock was inshore of NALL depths and therefore not fully investigated within H13341; SSS data were acquired on the pilings associated with the dock.

One obstruction (Feature 30) was identified in SSS data only. The obstruction was located inshore of NALL depths and thus it was deemed unsafe to obtain MBES data over the object due to water level depths at the time of item investigation.

Figure 9: Example of PVC Marker

Figure 10: Uncharted Dock in Northwest Branch of Severn River

D.1.5 Channels

There were no channels coincident to the H13341 survey limits.

D.2 Additional Results

D.2.1 Aids to Navigation

There were sixteen assigned aids to navigation (ATON) within the SOW of H13341 from the final CSF. Two of the sixteen assigned ATONs were not investigated due to their location being inshore of NALL depths. The remaining fourteen assigned ATONs were observed on station and serving their intended purpose. Per the investigation requirements from the CSF, as they were on station and serving intended purpose, they are included in the H13341 FFF with description of retain.

As discussed in Section D.1.2 an uncharted old beacon lateral with signage (Figure 11) was observed in the Southwest Branch of the Severn River. There was a faded red signage and the post was leaning over in the water. This was reported to USCG by Leidos as an ATON Discrepancy Report and to AHB as a DTON.

See the H13341 S-57 FFF for all the details and recommendations regarding the ATONs.

Figure 11: Uncharted Old Daymark in Southwest Branch of Severn River

D.2.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.2.3 Bottom Samples

In accordance with both the Project Instructions and Section 7.2.3 of the HSSD, bottom characteristics were obtained for H13341. Bottom characteristics were acquired at six of the seven assigned locations assigned from the final PRF (OPR-E350-KR-20_PRF.000). The proposed location of the seventh bottom sample had a position lying well inshore of NALL depths; as such, Leidos modified the position of the seventh sample to a more suitable location. Bottom characteristics are included in the H13341 S-57 FFF. In addition, images of the sediment obtained for each bottom sample are referenced in the H13341 S-57 FFF and are included on the delivery drive under the folder H13341/Processed/Multimedia.

D.2.4 Overhead Features

No overhead features exist within this survey area. Four overhead cables were assigned from the CSF, however, were not investigated as they were inshore of the NALL.

D.2.5 Submarine Features

There were no submarine features (cables, pipelines, or tunnels) charted or identified within this survey area. Refer to the H13341 S-57 FFF for all the details and recommendations regarding features

D.2.6 Platforms

No platforms exist within the limits of this survey area. Three platforms were assigned from the CSF, however, were not investigated as they fell in water depths shoaler than the NALL.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist within this survey area.

D.2.8 Abnormal Seafloor or Environmental Conditions

No abnormal seafloor or environmental conditions, as defined in Section 8.1.3 of the HSSD, exist within this survey area.

D.2.9 Construction and Dredging

No construction or dredging exists for this survey area.

D.2.10 New Survey Recommendations

No new survey recommendations are made for the area surrounding this survey area.

D.2.11 ENC Scale Recommendations

No new ENC recommendations are made for the area surrounding this survey area.

E. Approval Sheet

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

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 Hydrographic Surveys Specifications and Deliverables, Project Instructions, and Statement of Work. These data are adequate to supersede charted data in their common areas. This survey is complete and no additional work is required. Previously, or concurrently, submitted deliverables for OPR-E350-KR-20 are provided in the table below.

Report Name	Report Date Sent
OPR-E350-KR-20_ Marine_Species_Awareness_Training_Record.pdf	2021-04-14
OPR-E350-KR-20_20210419.zip (NCEI Sound Speed Data 2020 data only)	2021-04-19
OPR-E350-KR-20_Coast Pilot Review Report.pdf	2021-04-19
OPR-E350-KR-20_DAPR.pdf	2021-04-27

Approver Name	Approver Title	Approval Date	Signature
Erin Markham	Lead Hydrographer	04/27/2021	Erin E Markham Digitally signed by: Erin E Markham DN: CN = Erin E Markham C = US O = Leidos OU = A01427D0000016533F343A400000935 Date: 2021.04.27 14:19:37 -04'00'

F. Table of Acronyms

Acronym	Definition
AHB	Atlantic Hydrographic Branch
AST	Assistant Survey Technician
ATON	Aid to Navigation
AWOIS	Automated Wreck and Obstruction Information System
BAG	Bathymetric Attributed Grid
BASE	Bathymetry Associated with Statistical Error
CO	Commanding Officer
CO-OPS	Center for Operational Products and Services
CORS	Continuously 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
ERTDM	Ellipsoidally Referenced Tidal Datum Model
ERZT	Ellipsoidally Referenced Zoned Tides
FFF	Final Feature File
FOO	Field Operations Officer
FPM	Field Procedures Manual
GAMS	GPS Azimuth Measurement Subsystem
GC	Geographic Cell
GPS	Global Positioning System
HIPS	Hydrographic Information Processing System
HSD	Hydrographic Surveys Division

Acronym	Definition
HSSD	Hydrographic Survey Specifications and Deliverables
HSTB	Hydrographic Systems Technology Branch
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	Linear Nautical Miles
MBAB	Multibeam Echosounder Acoustic Backscatter
MCD	Marine Chart Division
MHW	Mean High Water
MLLW	Mean Lower Low Water
NAD 83	North American Datum of 1983
NALL	Navigable Area Limit Line
NTM	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
RNC	Raster Navigational Chart
RTK	Real Time Kinematic
RTX	Real Time Extended
SBES	Singlebeam Echosounder
SBET	Smooth Best Estimate and Trajectory
SNM	Square Nautical Miles
SSS	Side Scan Sonar
SSSAB	Side Scan Sonar Acoustic Backscatter
ST	Survey Technician
SVP	Sound Velocity Profiler
TCARI	Tidal Constituent And Residual Interpolation
TPU	Total Propagated Uncertainty
USACE	United States Army Corps of Engineers
USCG	United States Coast Guard
UTM	Universal Transverse Mercator
XO	Executive Officer
ZDF	Zone Definition File