F00711

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

DESCRIPTIVE REPORT

Type of Survey:	Navigable Area
Registry Number:	F00711

LOCALITY

State(s):	Florida
General Locality:	Key West
Sub-locality:	Anchorages C,D,F and X

2017

CHIEF OF PARTY
James Kirkpatrick

LIBRARY & ARCHIVES

Date:

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**F00711**

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):	**Florida**
General Locality:	**Key West**
Sub-Locality:	**Anchorages C,D,F and X**
Scale:	**5000**
Dates of Survey:	**11/13/2017 to 11/18/2017**
Instructions Dated:	**11/07/2017**
Project Number:	**S-H929-NRT2-17**
Field Unit:	**NRT2**
Chief of Party:	**James Kirkpatrick**
Soundings by:	**Multibeam Echo Sounder**
Imagery by:	**Side Scan Sonar Multibeam Echo Sounder Backscatter**
Verification by:	**Pacific Hydrographic Branch**
Soundings Acquired in:	**meters at Mean Lower Low Water**

Remarks:

The purpose of this survey is to provide contemporary surveys to update National Ocean Service (NOS) nautical charts. All separates are filed with the hydrographic data. Any revisions to the Descriptive Report (DR) generated during office processing are shown in bold red italic text. The processing branch maintains the DR as a field unit product, therefore, all information and recommendations within the body of the DR are considered preliminary unless otherwise noted. The final disposition of surveyed features is represented in the OCS nautical chart update products. All pertinent records for this survey, including the DR, are archived at the National Centers for Environmental Information (NCEI) and can be retrieved via http://www.ncei.noaa.gov/.

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Descriptive Report to Accompany Survey F00711

Project: S-H929-NRT2-17

Locality: Key West

Sublocality: Anchorages C,D,F and X

Scale: 1:5000

November 2017 - November 2017

NRT2

Chief of Party: James Kirkpatrick

A. Area Surveyed

A.1 Survey Limits

Data were acquired within the following survey limits:

Northwest Limit	Southeast Limit
24° 32' 44" N 81° 51' 49.45" W	24° 30' 19.97" N 81° 49' 2.96" W

Table 1: Survey Limits

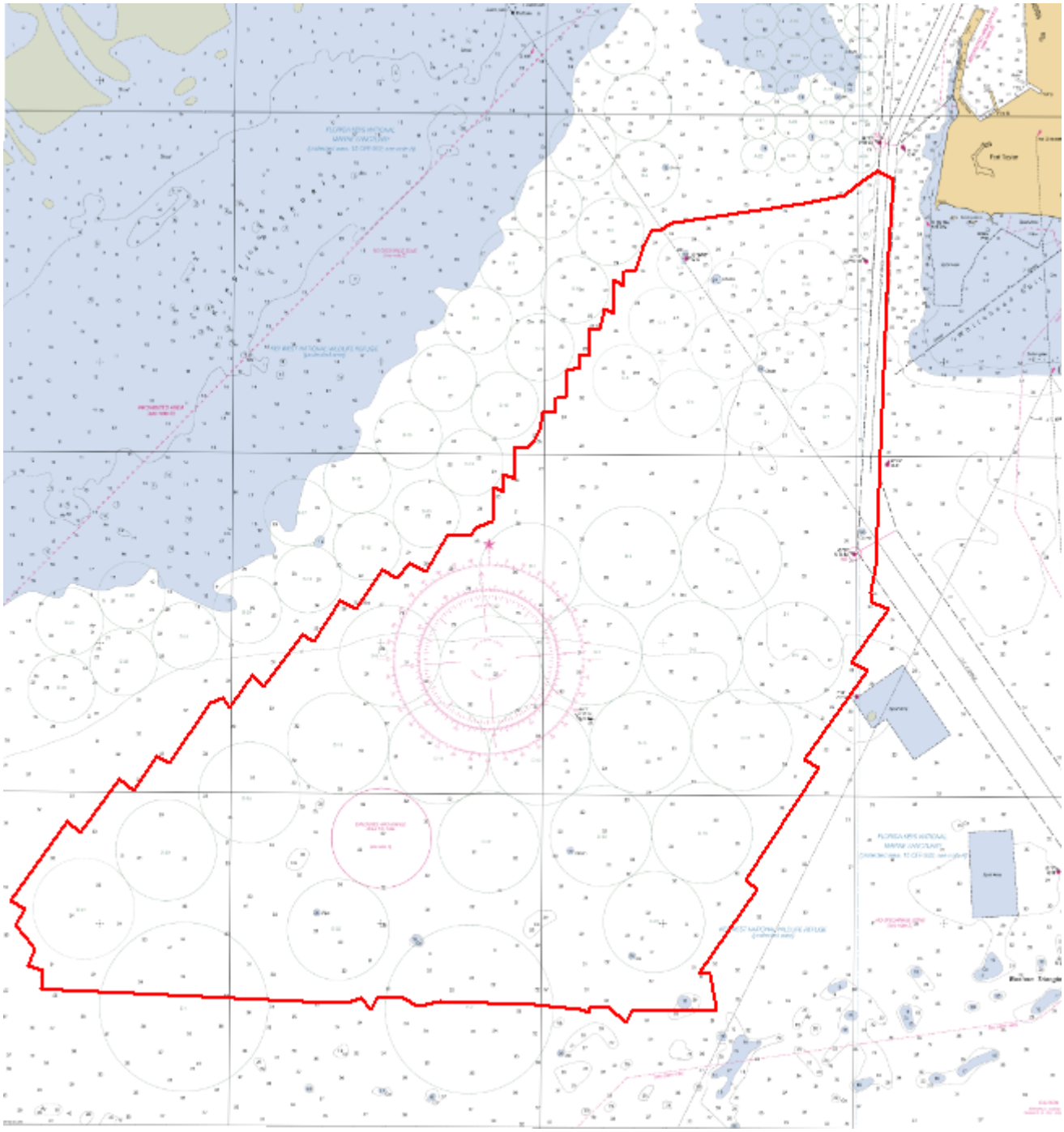

Figure 1: F00711 Survey Outline

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

A.2 Survey Purpose

The Key West Pilots Association requested a hydrographic survey in Anchorages C, D, F and X, west of Main Channel Cut B. There is concern that there may be shoaling in the anchorages from the effects of Hurricane Irma. 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.

A.4 Survey Coverage

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

Water Depth	Coverage Required
All Navigable waters	Object Detection Coverage

Table 2: Survey Coverage

Survey coverage was in accordance with the requirements listed above and in the HSSD.

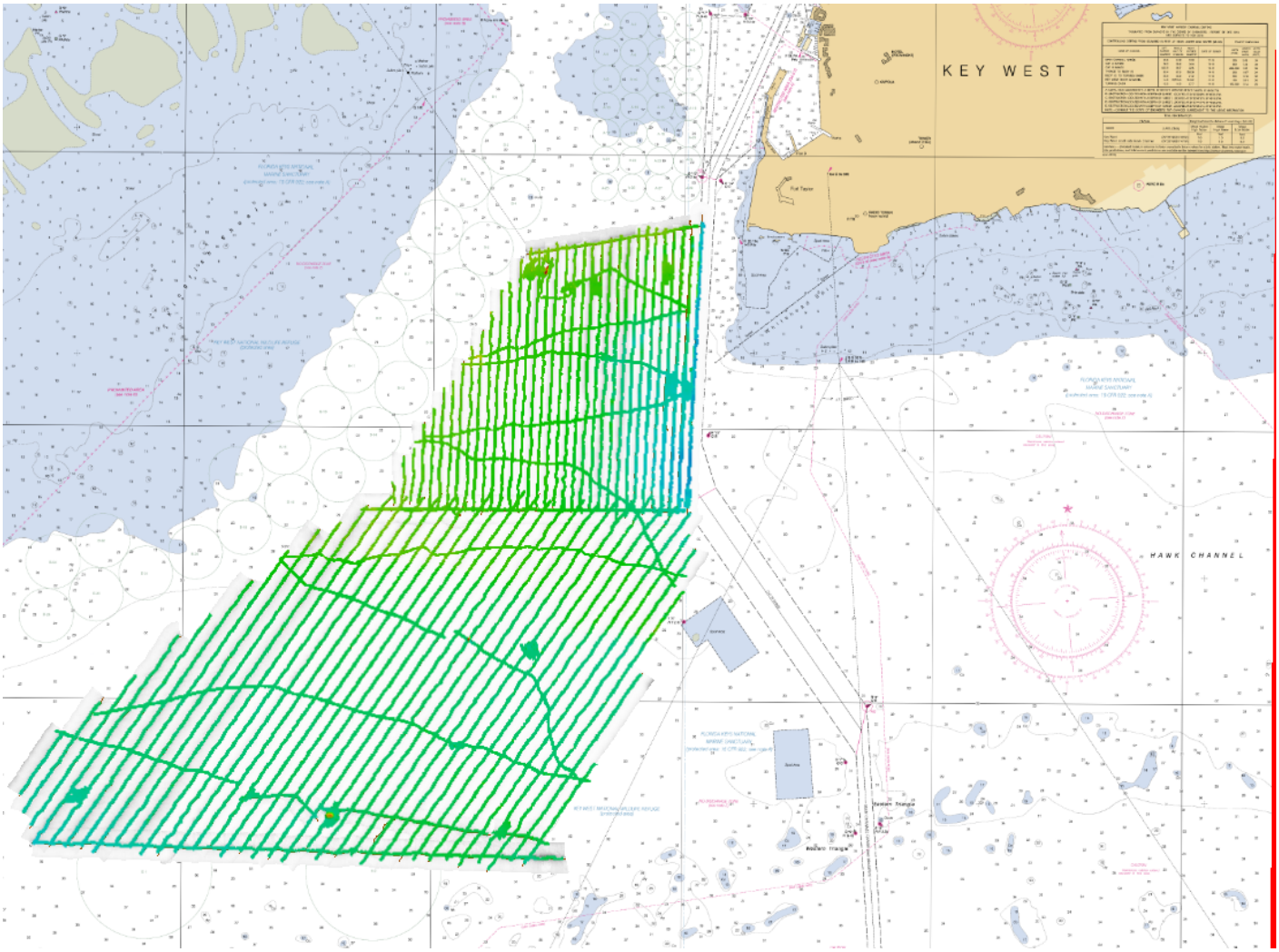

Figure 2: F00711 Survey Coverage

A.6 Survey Statistics

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

	HULL ID	*S3009*	*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	69.587	69.587
	SBES/MBES Crosslines	11.781	11.781
	Lidar Crosslines	0	0
Number of Bottom Samples			0
Number Maritime Boundary Points Investigated			0
Number of DPs			0
Number of Items Investigated by Dive Ops			0
Total SNM			3.37

Table 3: Hydrographic Survey Statistics

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

Survey Dates	Day of the Year
11/18/2017	322
11/17/2017	321

Survey Dates	Day of the Year
11/16/2017	320
11/15/2017	319
11/14/2017	318
11/13/2017	317

Table 4: Dates of Hydrography

F00711 was completed in 6 survey days from 11/13/2017 - 11/18/2017.

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	***S3009***
LOA	31 feet
Draft	1.5 feet

Table 5: Vessels Used

B.1.2 Equipment

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

Manufacturer	Model	Type
Kongsberg Maritime	EM 2040C	MBES
EdgeTech	4125	SSS
AML Oceanographic	MicroX SVS	Sound Speed System
Applanix	POS MV 320 v5	Positioning and Attitude System
YSI	CastAway-CTD	Conductivity, Temperature, and Depth Sensor

Table 6: Major Systems Used

All major systems were utilized as described in the accompanying DAPR.

B.2 Quality Control

B.2.1 Crosslines

Multibeam/single beam echo sounder/side scan sonar crosslines acquired for this survey totaled 16.93% of mainscheme acquisition.

Sounding data compares well between the crosslines and the mainscheme at intersecting areas. Higher standard deviations are attributed to areas of high slope. Crossline statistics were realized by creating a difference surface between the crosslines and mainscheme; then computing statistics.

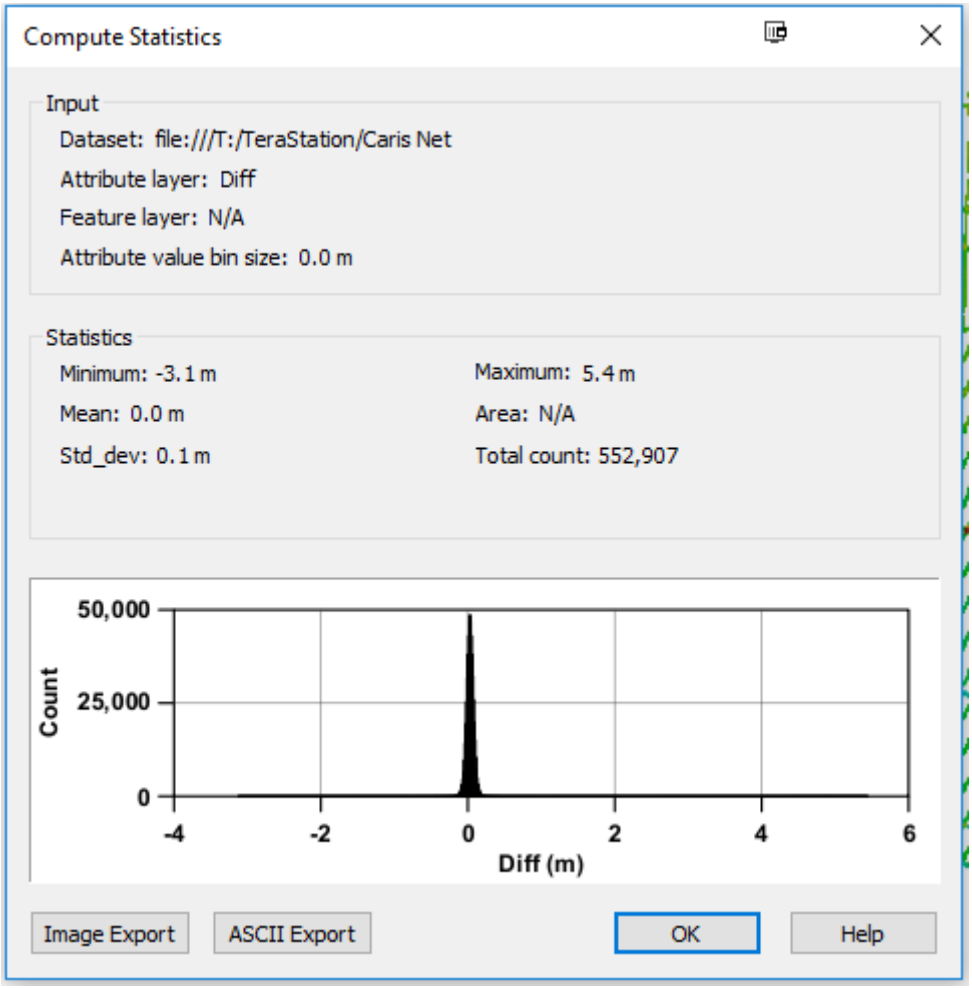

Figure 3: Crossline Statistics

B.2.2 Uncertainty

The following survey specific parameters were used for this survey:

Real time uncertainty values were calculated by TCARI grid

Hull ID	Measured - CTD	Measured - MVP	Surface
S3009	4 meters/second		0.5 meters/second

Table 7: Survey Specific Sound Speed TPU Values.

Tide uncertainty is not applicable for this project. Tidal Constituent And Residual Interpolator (TCARI) automatically calculates the error associated with water level interpolation. This error is incorporated into the residual/harmonic solutions and included in the Total Propagated Error (TPE) for the survey.

B.2.3 Junctions

No junctioning surveys were provided for this project.

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 in the quality control section of the DAPR.

B.2.5 Equipment Effectiveness

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

B.2.6 Factors Affecting Soundings

There were no other factors that affected corrections to soundings.

Office processing found a significant amount of "fliers" in the MBES data. These fliers appeared as noise in the MBES data which may have been the result of turbulent sea state / possibly highly aerated waters.

B.2.7 Sound Speed Methods

Sound Speed Cast Frequency: Normally, a starting daily cast was taken at the beginning of work, and subsequent casts were taken during the survey day, when location, or variances of surface speed were observed to deviate greater than 2m/s, with a closing of day cast performed as well. No greater than 4 hours were allowed to elapse between casts.

B.2.8 Coverage Equipment and Methods

All equipment and survey methods were used as detailed in the DAPR.

B.3 Echo Sounding Corrections

B.3.1 Corrections to Echo Soundings

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

B.3.2 Calibrations

All sounding systems were calibrated as detailed in the DAPR.

B.4 Backscatter

Backscatter was not collected for this survey.

B.5 Data Processing

B.5.1 Primary Data Processing Software

The following Feature Object Catalog was used: Caris_Support_Files_5_6.

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
F00711_MB_50cm_MLLW_Final	CARIS Raster Surface (CUBE)	0.5 meters	3.2 meters - 14.7 meters	NOAA_0.5m	MBES TracklineSBES Set Line Spacing
F00711_SSS_1m_100	SSS Mosaic	1 meters	-	N/A	100% SSS
F00711_SSS_1m_200	SSS Mosaic	1 meters	-	N/A	200% SSS

Surface Name	Surface Type	Resolution	Depth Range	Surface Parameter	Purpose
F00711_MB_50cm_MLLW	CARIS Raster Surface (CUBE)	0.5 meters	3.2 meters - 14.7 meters	NOAA_0.5m	MBES TracklineSBES Set Line Spacing

Table 8: Submitted Surfaces

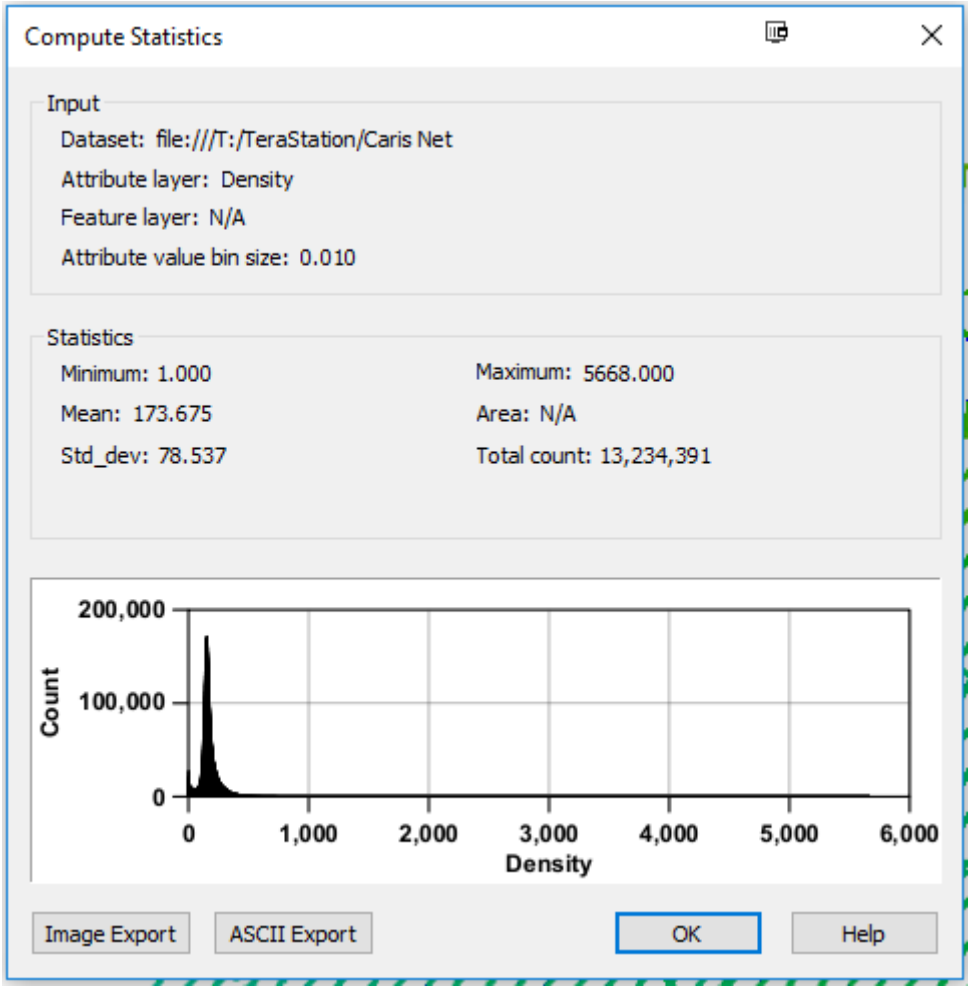

Figure 4: Surface Quality Control

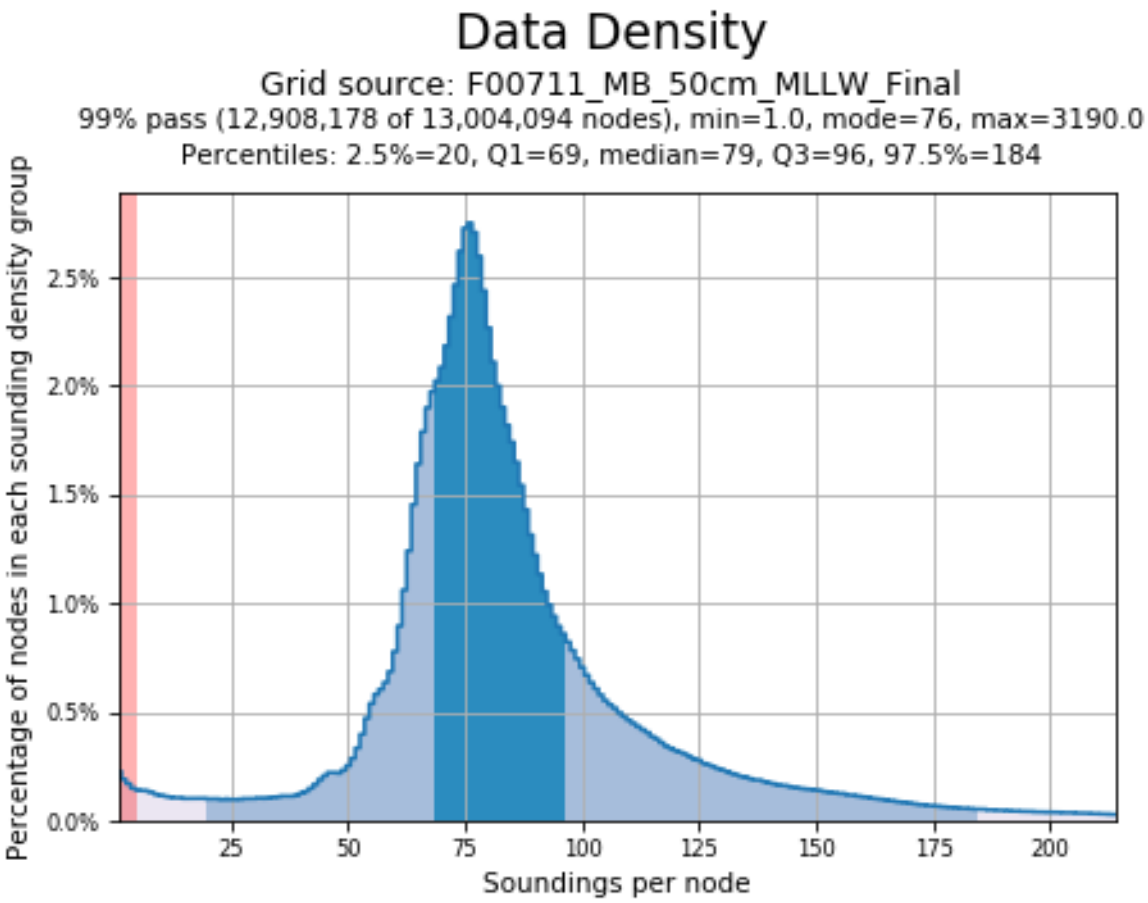

Figure 5: F00711 QA Density

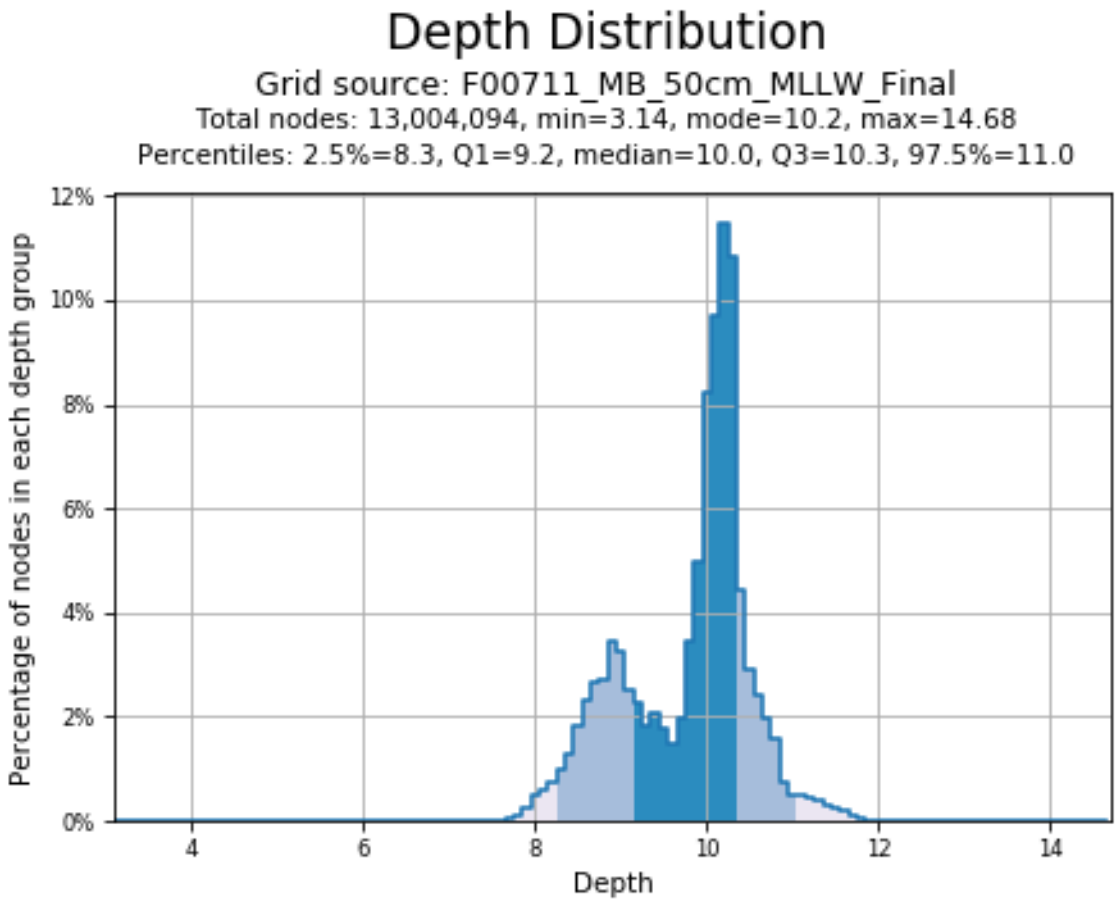

Figure 6: F00711 QA Depth

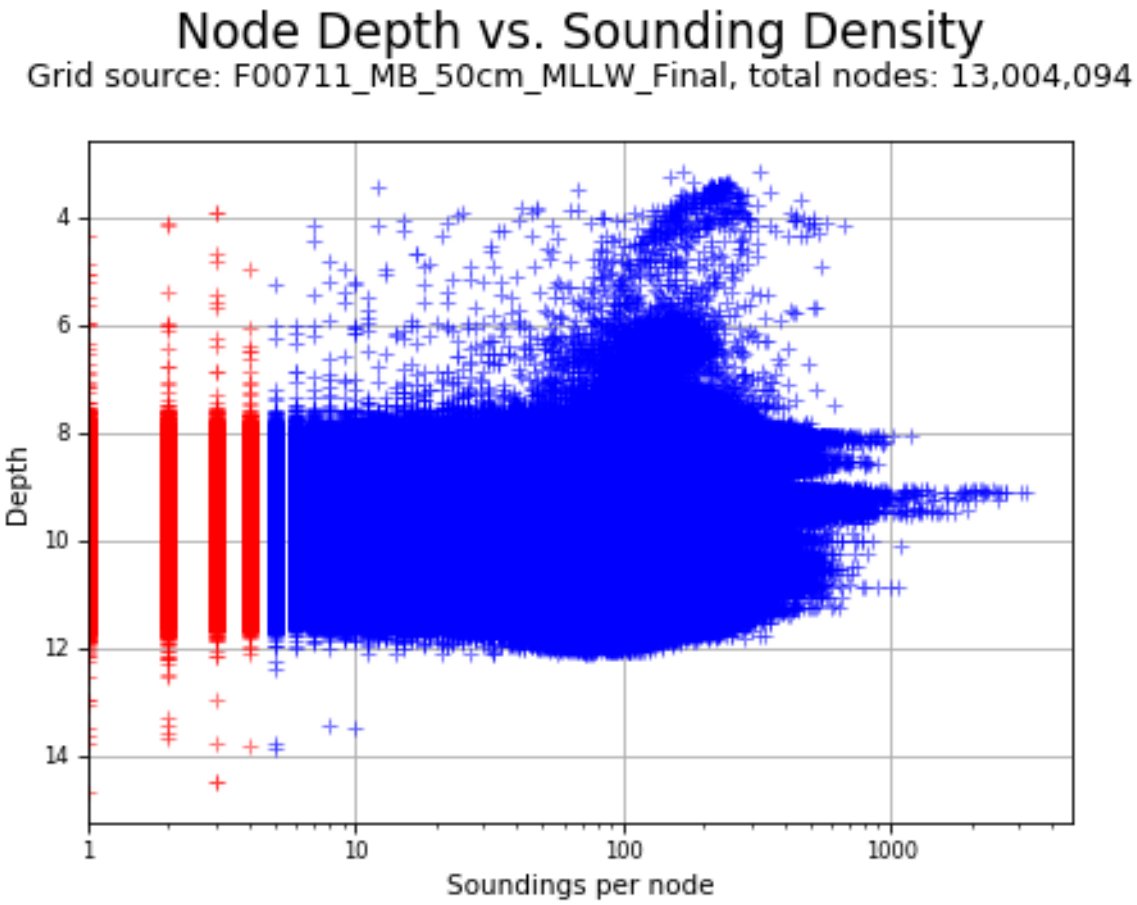

Figure 7: F00711 QA Depth vs. Density

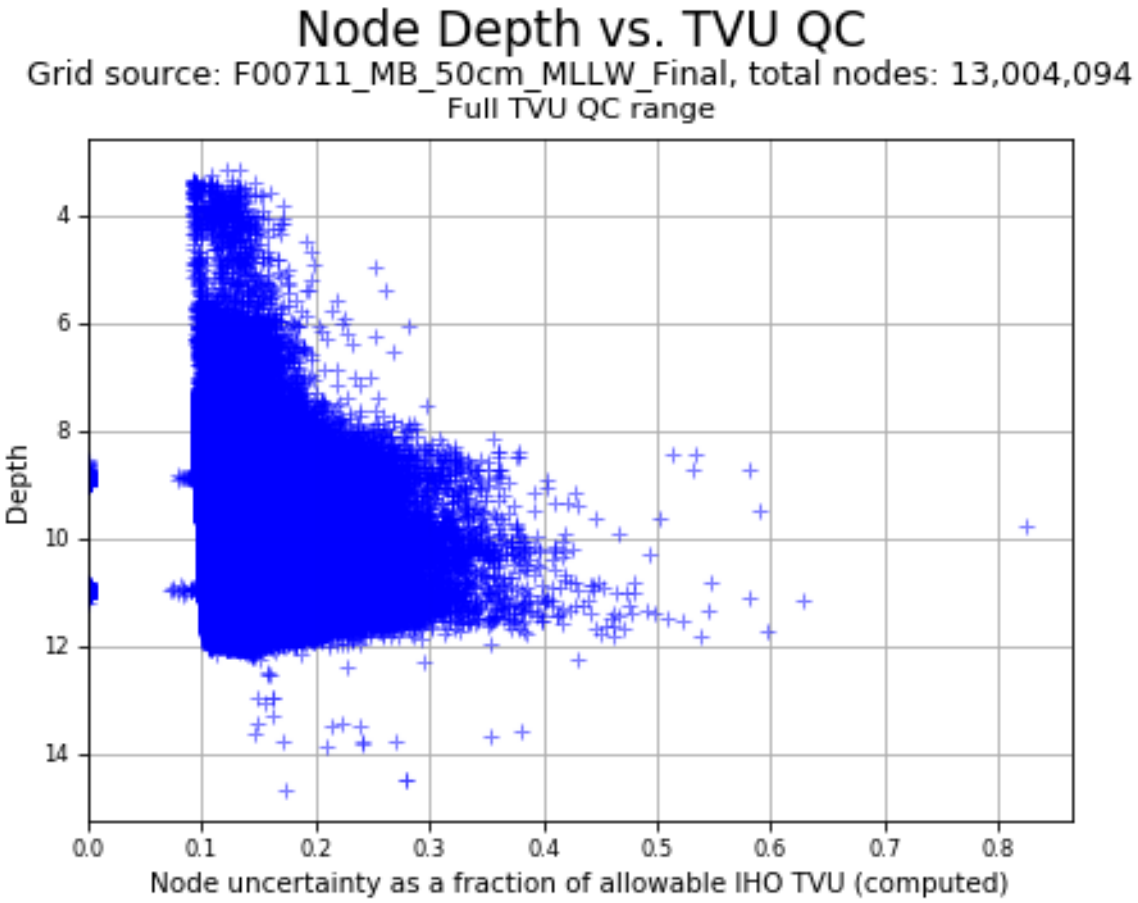

Figure 8: F00711 QA Depth vs. TVU

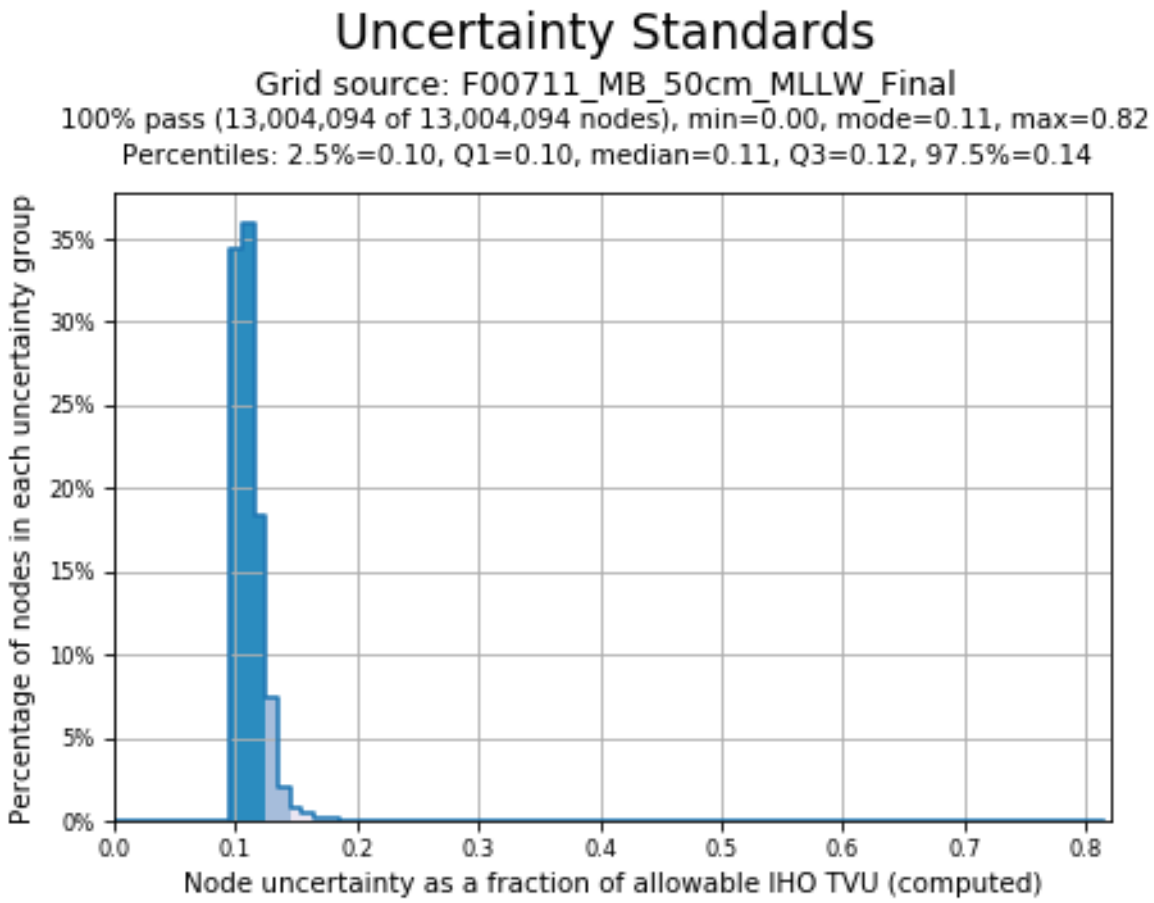

Figure 9: F00711 QA TVU

C. Vertical and Horizontal Control

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

C.1 Vertical Control

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

Traditional Methods Used:

TCARI

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

Station Name	Station ID
Key West, FL	8724580

Table 9: NWLON Tide Stations

File Name	Status
8724580.tid	Final Approved

Table 10: Water Level Files (.tid)

File Name	Status
H929NRT22017.tc	Final

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

A request for final approved tides was sent to N/OPS1 on 01/25/2018. The final tide note was received on 01/30/2018.

C.2 Horizontal Control

The horizontal datum for this project is North American Datum 1983.

The projection used for this project is Projected UTM 17.

The following DGPS Stations were used for horizontal control:

DGPS Stations
Card Sound, FL

Table 12: USCG DGPS Stations

D. Results and Recommendations

D.1 Chart Comparison

Charts that overlap F00711 survey area include US5FL94M. A manual chart comparison was conducted by comparing soundings and features. Depths and features are in good agreement.

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	Preliminary?
USFL94M	1:10000	19	11/07/2017	11/07/2017	NO

Table 13: Largest Scale ENCs

USFL94M

Survey data is in good agreement with ENC USFL94M.

During office processing four new OBSTRN features were identified, added to the Final Feature File and recommended for addition to the chart.

D.1.2 Maritime Boundary Points

No Maritime Boundary Points were assigned for this survey.

D.1.3 Charted Features

The wreck PA located at 24-31-13.279N // 081-49-50.809W was investigated and determined to exist approximately 20 meters to the west of the charted position.

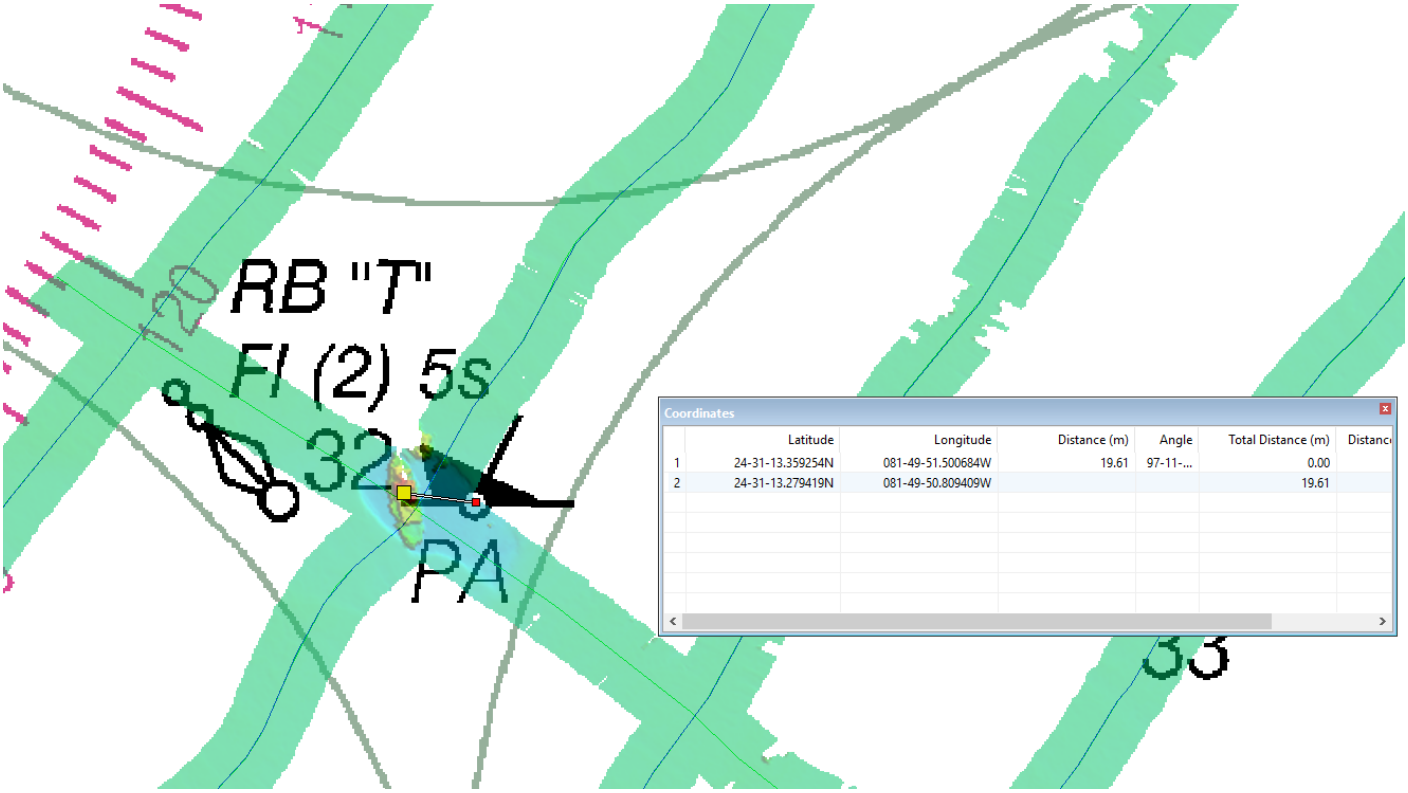

Figure 10: Wreck PA

The field unit recommended "Retain" charted Wreck feature, remove PA and update position. Review did not concur with the field recommendation and recommended the Wreck PA feature as "Delete" and a "New" Wreck feature was added to the Final Feature File in the surveyed position and VALSOU attribute populated with the shoal depth.

D.1.4 Uncharted Features

No uncharted features exist for this survey.

During office processing four new OBSTRN features were identified, added to the Final Feature File and recommended for addition to the chart.

D.1.5 Shoal and Hazardous Features

No shoals or potentially hazardous features exist for this survey.

Two (2) charted potentially hazardous WRECKS features exist for this survey. These were investigated by the field unit and included in the Final Feature File.

D.1.6 Channels

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

One MBES survey transect partially covered the maintained channel running north-south in the northeastern part of the survey area (Cut B Range). During office processing survey depths were compared to the channel controlling depth and survey depths were found to tend deeper (11.0 - 11.8 meters) than the channel controlling depth (10.8 meters).

D.1.7 Bottom Samples

No bottom samples were required for this survey.

D.2 Additional Results

D.2.1 Shoreline

All assigned shoreline features were investigated.

D.2.2 Prior Surveys

No prior survey comparisons exist for this survey.

D.2.3 Aids to Navigation

ATON's in the survey area are properly charted and serve their intended purpose.

D.2.4 Overhead Features

No overhead features exist for this survey.

D.2.5 Submarine Features

No submarine features exist for this survey.

D.2.6 Platforms

No platforms exist for this survey.

D.2.7 Ferry Routes and Terminals

No ferry routes or terminals exist for this survey.

D.2.8 Abnormal Seafloor and/or Environmental Conditions

No abnormal seafloor and/or environmental conditions exist for this survey.

D.2.9 Construction and Dredging

No present or planned construction or dredging exist within the survey limits.

D.2.10 New Survey Recommendation

No new surveys or further investigations are recommended for this area.

D.2.11 Inset Recommendation

No new insets are recommended for this area.

E. Approval Sheet

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

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

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

Approver Name	Approver Title	Approval Date	Signature
James Kirkpatrick	Chief of Party	03/12/2018	

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F. Table of Acronyms

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

Acronym	Definition
HSTP	Hydrographic Systems Technology Programs
HSX	Hypack Hysweep File Format
HTD	Hydrographic Surveys Technical Directive
HVCR	Horizontal and Vertical Control Report
HVF	HIPS Vessel File
IHO	International Hydrographic Organization
IMU	Inertial Motion Unit
ITRF	International Terrestrial Reference Frame
LNM	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
PRF	Project Reference File

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

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : January 30, 2018

HYDROGRAPHIC BRANCH: Pacific
HYDROGRAPHIC PROJECT: S-H929-NRT5-2017
HYDROGRAPHIC SHEET: F00711

LOCALITY: KW Anchorages C,F,X,D Key West, Florida
TIME PERIOD: November 13-18, 2017

TIDE STATION USED: 8724580 Key West, FL
Lat. 24° 33.4'N Long. 81° 48.5' W
PLANE OF REFERENCE (MEAN LOWER LOW WATER): 0.000 meters
HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE: 0.463 meters

REMARKS: RECOMMENDED GRID

Please use the TCARI grid "H929NRT22017.tc" as the final grid for project S-H929-NRT2-2017, F00711, during the time period between November 13 and November 18, 2017

Refer to attachments for grid 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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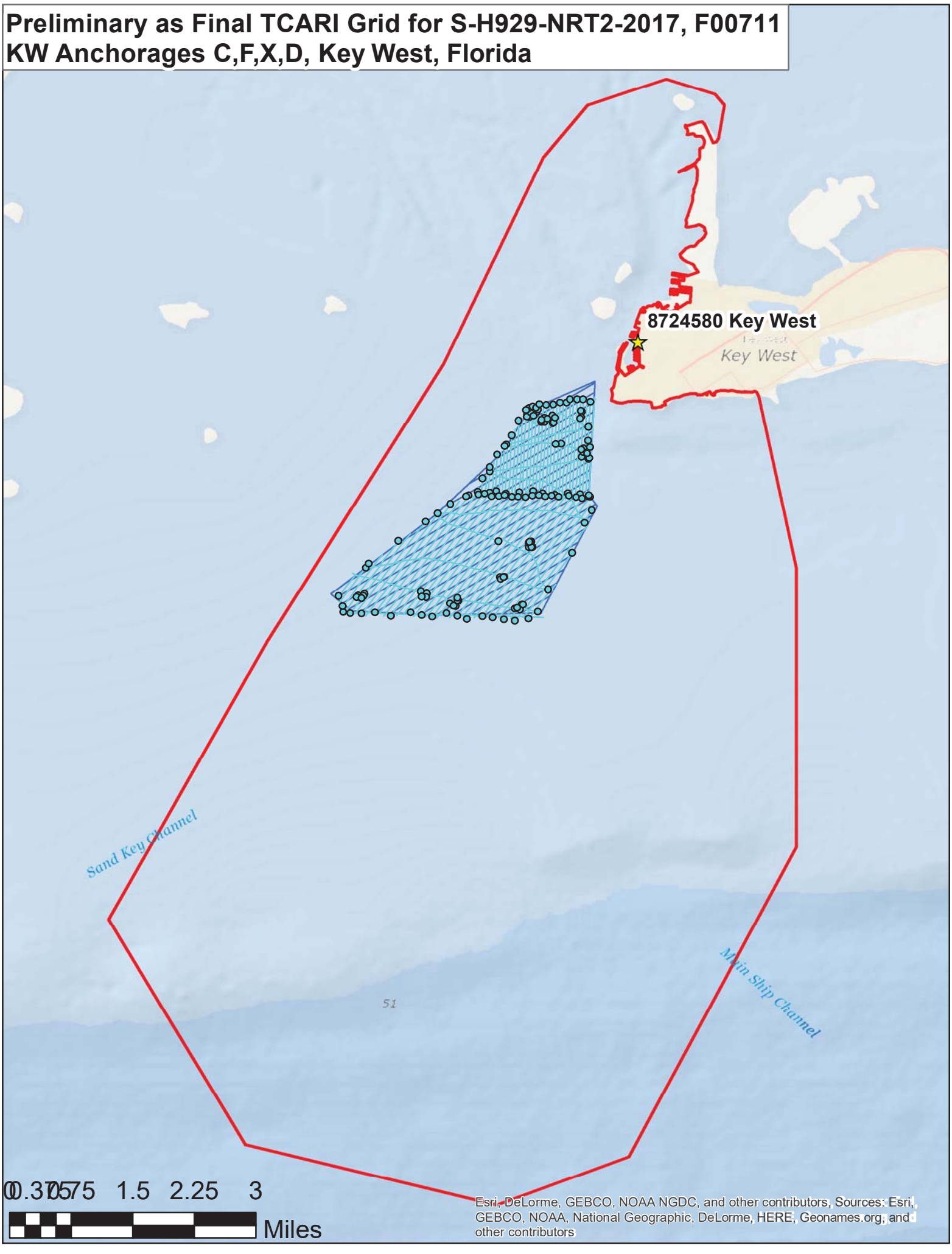
CHIEF, PRODUCTS AND SERVICES BRANCH


Preliminary as Final TCARI Grid for S-H929-NRT2-2017, F00711
KW Anchorages C,F,X,D, Key West, Florida
8724580 Key West
Key West
Sand Key Channel
Main Ship Channel
51
0 0.375 0.75 1.5 2.25 3
Miles
Esri, DeLorme, GEBCO, NOAA NGDC, and other contributors, Sources: Esri, GEBCO, NOAA, National Geographic, DeLorme, HERE, Geonames.org, and other contributors

APPROVAL PAGE

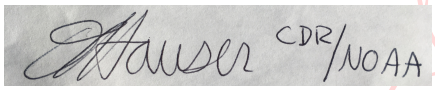
F00711

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 NCEI for archive

- Descriptive Report
- Collection of Bathymetric Attributed Grids (BAGs)
- Collection of backscatter mosaics
- Processed survey data and records
- GeoPDF of survey products

The survey evaluation and verification has been conducted according current OCS Specifications, and the survey has been approved for dissemination and usage of updating NOAA's suite of nautical charts.



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Approved:_____

Commander Olivia Hauser, NOAA
Chief, Pacific Hydrographic Branch