

H12193

NOAA FORM 76-35A

U.S. DEPARTMENT OF COMMERCE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
NATIONAL OCEAN SURVEY

**DESCRIPTIVE REPORT**

Type of Survey: Navigable Area

Registry Number: H12193

**LOCALITY**

State: Florida

General Locality: Eastern Gulf of Mexico

Sub-locality: Offshore Approach to Key West, FL

**2010**

CHIEF OF PARTY  
CDR Shepard M. Smith  
NOAA

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:  <p style="text-align: center; font-size: 1.2em;"><b>H12193</b></p>
<p style="font-size: 1.2em;"><b>HYDROGRAPHIC TITLE SHEET</b></p>		

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: **Florida**

General Locality: **Eastern Gulf of Mexico**

Sub-Locality: **Offshore Approach to Key West, FL**

Scale: **1:40,000**      Date of Survey: **09 July to 17 August 2010**

Instructions Dated: **07 June 2010**      Project Number: **OPR-H355-TJ-10**

Vessel: **NOAA Ship *Thomas Jefferson***

Chief of Party: **CDR Shepard M. Smith, NOAA**

Surveyed by: ***Thomas Jefferson Personnel***

Soundings by: **Reson 7125 multibeam echosounder**

Graphic record scaled by: **N/A**

Graphic record checked by: **N/A**

Protracted by: **N/A**      Automated Plot: **N/A**

Verification by: ***Atlantic Hydrographic Branch***

Soundings in: **Meters at MLLW\***

***\*H-Cell units in Feet at MLLW***

Remarks: ***Bold, Italic, Red notes in the Descriptive Report were made during office processing.***  
***1) All Times are in UTC.***  
***2) This is a Navigable Area Hydrographic Survey.***  
***3) Projection is NAD83, UTM Zone 17.***

Table of Contents

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A. AREA SURVEYED.....4

B. DATA ACQUISITION AND PROCESSING.....6

    B.1 EQUIPMENT AND VESSELS.....6

    B.2 QUALITY CONTROL.....6

        Sounding Coverage.....6

        Systematic Errors.....7

    B.3 CORRECTIONS TO ECHO SOUNDINGS.....10

    B.4 DATA PROCESSING.....11

C. HORIZONTAL AND VERTICAL CONTROL.....12

D. RESULTS AND RECOMMENDATIONS.....13

    D.1 CHART COMPARISON.....13

    D.2 ADDITIONAL RESULTS.....14

Appendix I DANGER TO NAVIGATION REPORT

Appendix II SURVEY FEATURES REPORT

Appendix III FINAL PROGRESS SKETCH AND SURVEY OUTLINE

Appendix IV TIDES AND WATER LEVELS

Appendix V SUPPLEMENTAL SURVEY RECORDS AND CORRESPONDENCE

List of Tables

Table 1 Hydrographic Survey Statistics.....4

Table 2 Dates of Multibeam Data Acquisition in Calendar and Julian days.....5

Table 3 Junction Surveys.....7

Table 4 TPE Parameters.....11

Table 5 Fieldsheets.....11

List of Figures

Figure 1 Survey Limits.....5

Figure 2 H12193 Junction Surveys.....7

Figure 3 H12193 Vertical beam latency.....8

Figure 4 Flare up due to Blister.....9

Figure 5 Missing Pings.....9

Figure 6 Final tide Zoning.....10

**Descriptive Report to Accompany Hydrographic Survey H12193**

Project OPR-H355-TJ-10  
 Eastern Gulf of Mexico  
 Offshore Approach to Key West, FL  
 Scale 1:40,000  
 9 July – 17 August 2010  
**NOAA Ship *Thomas Jefferson***

**A. AREA SURVEYED**

This hydrographic survey was completed as specified by Hydrographic Survey Letter Instructions OPR-H355-TJ-10, dated 07 June 2010. *Concur.*

Northern Limit	Southern Limit	Western Limit	Eastern Limit
24°50' 05" N	24° 44' 40" N	082° 00' 17" W	081° 51' 47" W

Data acquisition was conducted from 9 July – 17 August 2010.

This project is being conducted in support of the Office of Coast Survey (OCS) and the Office of National Marine Sanctuary (ONMS) to provide contemporary bathymetric and imagery data of critical benthic habitats within the boundaries of the Florida Keys National Marine Sanctuary (FKNMS) in the Northwest approaches to Key West, FL. Bathymetric and imagery data from this project will be collected utilizing Scan Sonar Sonar (SSS), Vertical Beam Echosounder (VBES), Multibeam sonar (MB) systems and will be further utilized by OCS to update the nautical charts and products in this area.

	<b>Linear Nautical Miles</b>
Single beam mainscheme only	782.89
Multibeam mainscheme only	156.23
Side Scan Sonar mainscheme only	1001.97
Developments	19.42
Crosslines	73.25
Shoreline/nearshore investigations	N/A
Number of Bottom Samples	8
Number of AWOIS items investigated	1
Total number of square nautical miles	39.74

**Table 1: Hydrographic Survey Statistics**

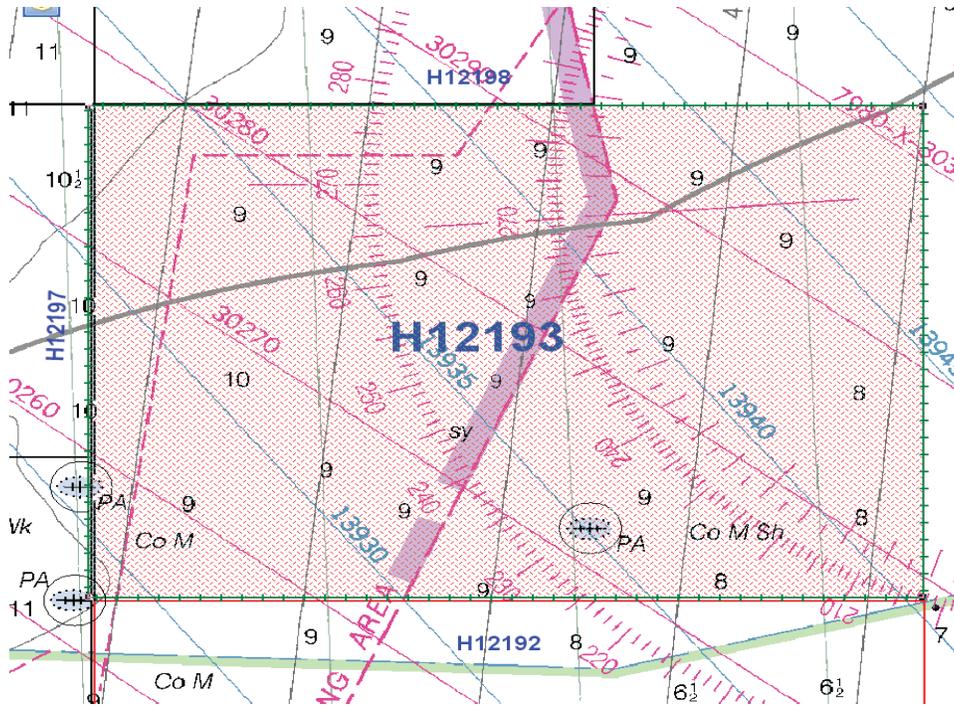


Figure 1: Survey Limits

Calendar Date	Julian Day
9 Jul 2010	190
10 Jul 2010	191
11 Jul 2010	192
12 Jul 2010	193
13 Jul 2010	194
14 Jul 2010	195
15 Jul 2010	196
29 Jul 2010	210
30 Jul 2010	211
31 Jul 2010	212
1 Aug 2010	213
16 Aug 2010	228
17 Aug 2010	229

Table 2: Dates of Acquisition in Calendar and Julian Day

## **B. DATA ACQUISITION AND PROCESSING *See also the H-Cell Report***

Refer to *OPR-H355-TJ-10 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 included in this descriptive report. *Concur.*

### **B.1 EQUIPMENT AND VESSELS**

Data were acquired by NOAA Ship *Thomas Jefferson* and Hydrographic Survey Launch 3101 and 3102. NOAA Ship *Thomas Jefferson* acquired Reson 7125 multibeam echosounder soundings (MBES), side scan sonar (SSS), and sound velocity profiles and bottom samples. Launch 3101 and 3102 acquired vertical beam echosounder (VBES) soundings, side scan sonar (SSS), and sound velocity profiles. Vessel configurations, equipment operation, and data acquisition and processing were consistent with specifications described in the *DAPR*.

### **B.2 QUALITY CONTROL**

#### **B.2.1 System Certification and Calibration**

Refer to NOAA Ship *Thomas Jefferson* DAPR and Hydrographic Systems Readiness Report (HSRR) for a complete description of system integration and initial calibration results for equipment and sensors used for this survey. *Concur.*

#### **B.2.2 Sounding Coverage**

As per the Letter Instructions, this survey was conducted using 200% SSS coverage with concurrent MBES and VBES bathymetry with object detection MBES development over navigationally significant features. Mainscheme MB data collected by S-222 on DN 228 was not included in final surfaces, as this was previously collected using 3101 and 3102 VB.

#### **B.2.3 Crosslines**

Vertical beam echosounder cross-lines totaling 73.25 lineal nautical miles, comprising 7.8% of hydrography, were acquired during the course of the survey. Crossline comparisons were performed in accordance with HSSD 2010 section 5.2.4.3. Quality control checks were done using the standard deviation layer of the survey's uncertainty surface. Areas of unusually high standard deviation were investigated and resolved in processing, except where caused by areas of high bathymetric relief or features. *Concur.*

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### B.2.4 Junctions and Prior Surveys

The following surveys junction with H12193, see table 4.

Registry #	Scale	Date	Field Party	Junction	Agreement
H12198	1:40000	2010	Thomas Jefferson	North	Survey soundings within 1 ft
H12197	1:40000	2010	Thomas Jefferson	West	Survey soundings within 1 ft
H12196	1:40000	2010	Thomas Jefferson	West	Survey soundings within 1 ft
H12192	1:40000	2010	Thomas Jefferson	South	Survey soundings within 1 ft

Table 3: Junctions Surveys

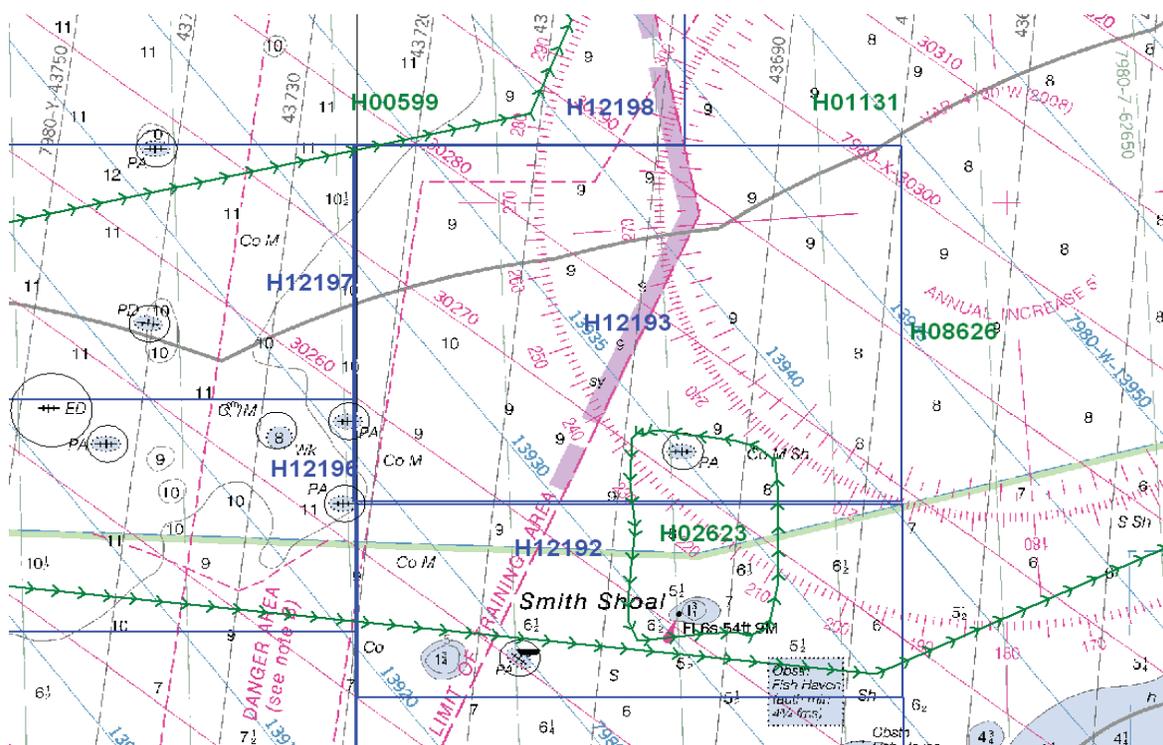


Figure 2: Junction Surveys

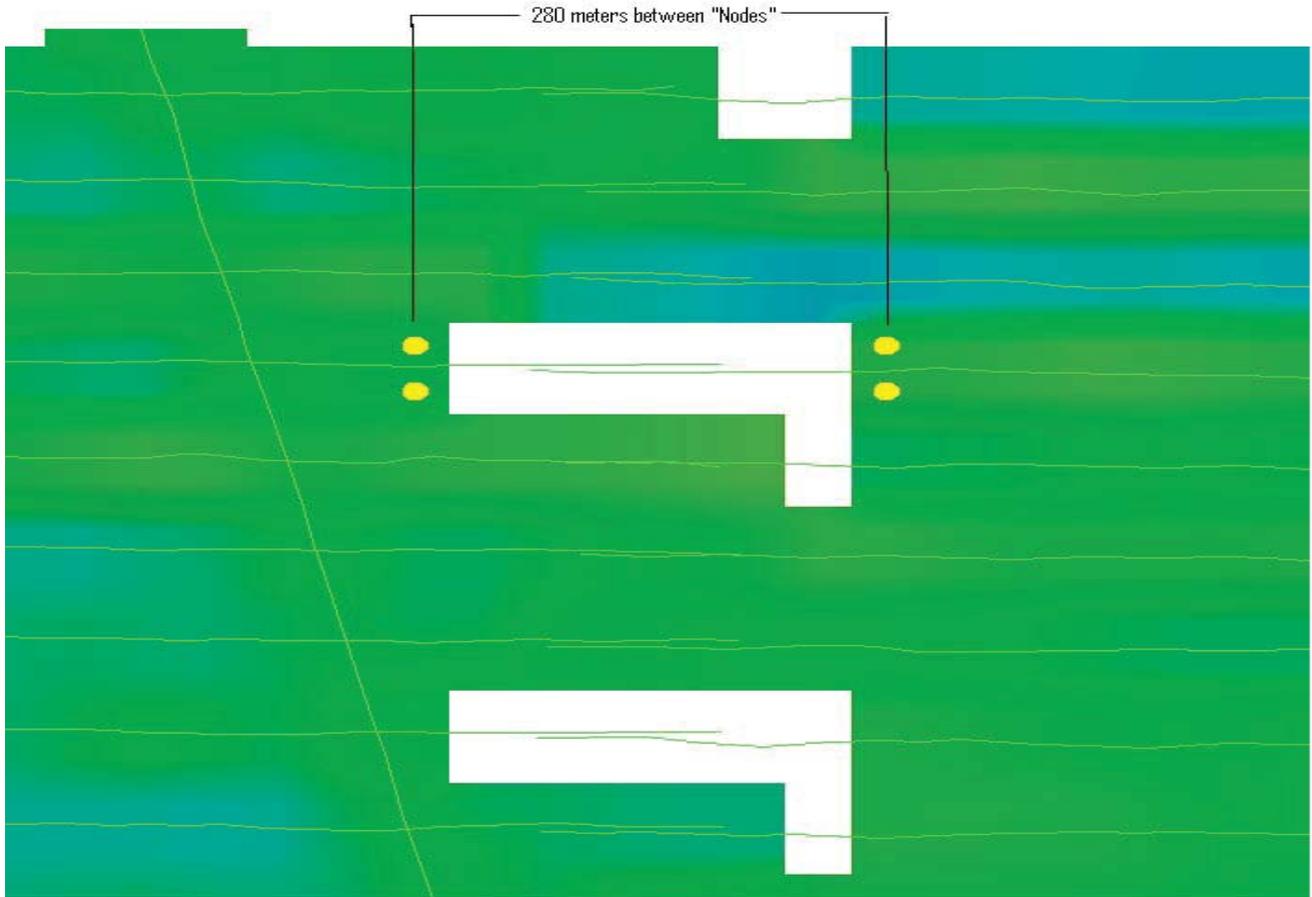
### B.2.5 Systematic Errors.

#### Latency.

Vertical beam data had a varying time offset from the POS navigation data on some days of acquisition. The offset was evaluated in post processing and an average offset value (in seconds) was applied to each affected day or line, using Pydro Post Acquisition Tools. A table detailing offsets for each day or line is attached in Appendix 5 of this report. **Concur.**

This is observable in the image below, where navigation tracks are joined but the grid sounding data is not.

Vertical Beam latency difference between header Time and record time  
 3101/195/420-1356 = 8.68 sec  
 3101/191/421-1334 = 56.0 secs      total = 64.68 sec X 4.5m/sec avg = 291.06 m gap



**Figure 3: VB Latency**

Further latency was covered by adjusting heave time. For additional information on the complete set of lines affected see Appendix 5 of the Descriptive report, H12193\_VB\_latency.xlsx.

**Concur.**

**Roll Error.**

At the beginning of survey it was observed that the ship had a roll error. A new roll bias value of 0.131 was resolved starting on DN 182. **Concur.**

**Transducer Blister.**

On day numbers 197 and 198 a flare up of outside beams was observed. The probable cause was a damaged sensor. On DN 203 a dive was performed on the ship and it was found that there was a blister on the 7125 projector (SN 1908188). On DN 221 the projector was replaced by the fleet

spare (SN 1908203). Data acquired previous to the change was filtered at 24 beams each side equivalent to 12 degrees each side. The data was then examined and re-accepted where the artifact disappeared. *Concur.*

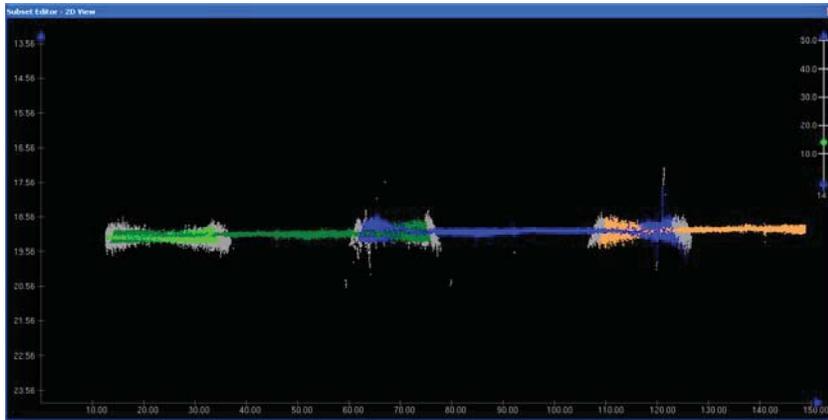


Figure 4: Flare up due to Blister

**Missing Pings.**

Another error that may be attributed to the transducer blister were occasional missing pings. These were observed as not only mis-positioned but also at same depth as the transducer, 4.615 meter.. It appears on the grid as a small sliver of missing data as shown in figure 9 below.

*Concur.*

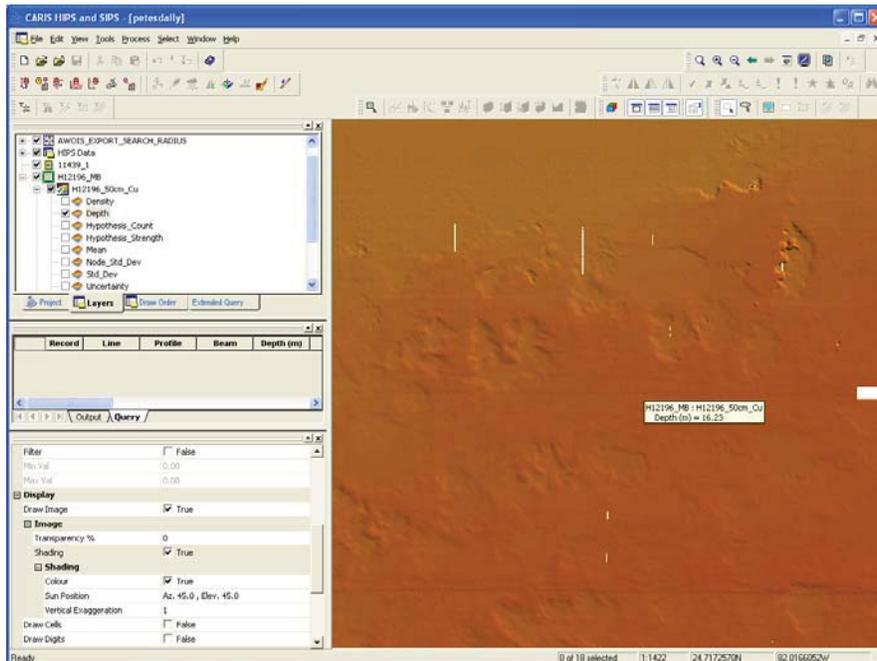


Figure 5: Missing Pings

**True Heave application errors.**

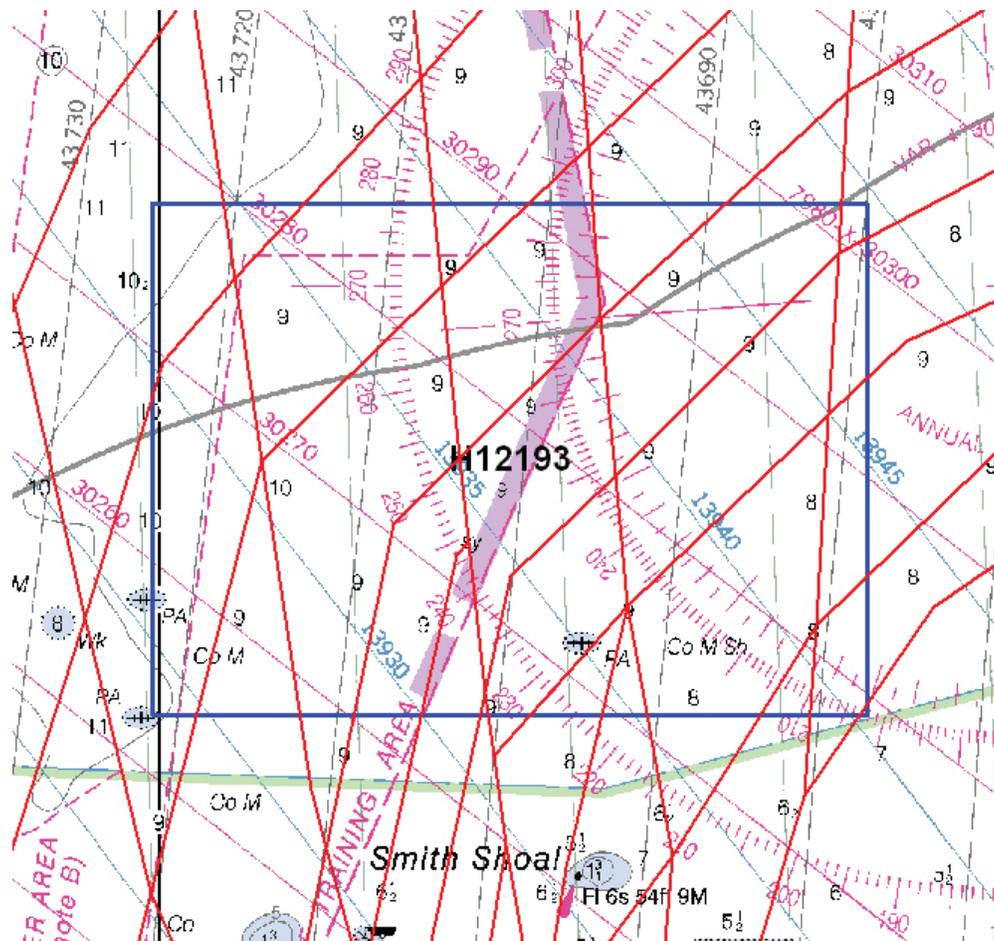
Lines that did not have True Heave applied were as follows:

H12193 TJ\_3102\_Odom\_ETCV200\_VB 2010-194 207\_1313.  
 The True heave file was started later than HYPACK file. H12193

H12193 TJ\_3102\_Odom\_ETCV200\_VB 2010-194 212\_2035.  
 The file failed to load for unknown reasons.

**B 3. CORRECTIONS TO ECHO SOUNDING**

HDGS sounding data were reduced to mean lower-low water (MLLW) using verified water levels from the tide station at Smith Shoal Light (8724671). Tide modeling issues was the modus to have Smith Shoal Light tertiary station switched to a primary station instead of Key West. The data was applied using final approved discreet zoning provided by CO-OPS and illustrated in figure 10.



**Figure 6: Final Tide Zoning**

All other datum reduction procedures conform to those outlined in the DAPR. All methods and instruments used for sound velocity correction were as described in the DAPR. A table detailing all sound velocity casts is located in Separate II of this Descriptive Report.

SVP casts were loaded using nearest in time. The processed files for the extended data point may not match the Master SVP. Each vessel’s master sound velocity file may have been edited for the last extended point. The VELOCWIN program does not always extend the cast at the correct slope. In that case the last point is edited to match the preceding sound velocity.

**B 4. DATA PROCESSING**

**B.4.1 Total Propagated Uncertainty**

For the 2010 field season, Total Propagated Uncertainty (TPU) parameters for sound speed and tides are calculated separately for each project. The project-specific parameters for OPR-H335-TJ-10, Survey H12193 are as follows:

Vessel	Tide Values		Sound Speed Values			
	Measured	Zoning	CTD	MVP	Surface	SSS
S222	0.00	0.125 m	4m/s	1 m/s	0.2	1548.0
3101	0.00	0.125m	4m/s	N/A	0.2	1548.0
3102	0.00	0.125m	4m/s	N/A	0.2	1548.0

**Table 4: TPU Parameters**

These values were used as inputs to the TPE calculation for all MBES data immediately following CARIS Merge.

**B.4.2 BASE Surfaces and Mosaics**

The following table describes all BASE Surfaces submitted as part of Survey H12193:

Name of Surfaces and /or Mosaics	Resolution	Type	Purpose
H12193_VB_Uncert_4m_MLLW_1of1_Final	4m	Uncertainty	Coverage
H12193_MB_Cube2m_MLLW_2_Final	2m	Cube	Coverage
H12193_MB_Cube50cm_MLLW_4_Final	0.5m	Cube	Object Detection
H12193_MB_Cube50cm_MLLW_5_Final	0.5m	Cube	Object Detection
H12193_MB_Cube50cm_MLLW_6_Final	0.5m	Cube	Object Detection
H12193_MB_Cube50cm_MLLW_7_Final	0.5m	Cube	Object Detection
H12193_MB_Cube50cm_MLLW_8_Final	0.5m	Cube	Object Detection
H12193_MB_Cube50cm_MLLW_9_Final	0.5m	Cube	Object Detection

H12193_MB_Cube50cm_MLLW_10_Final	0.5m	Cube	Object Detection
H12193_1m_100mos	1m	Mosaic	Coverage
H12193_1m_200mos	1m	Mosaic	Coverage

**Table 5: BASE Surfaces**

This survey was processed using the Combined Uncertainty and Bathymetry Estimator (CUBE) algorithm. The CUBE configurations were set to NOAA\_0.5m for feature developments. Vertical beam surface was computed using the uncertainty values at 4m resolution. The depth range in this area did not require thresholding. Refer to the 2010 Data Acquisition and Processing Report, 2010 Field Procedures Manual, and CARIS HIPS and SIPS 7.0 manual for further discussion. *Concur.*

**B.4.3 Data Cleaning**

The survey data were cleaned using the swath and subset editor tools in CARIS. All areas of the BASE surface that indicated a high standard deviation were examined and cleaned as required such that no residual errors exist in the surface that exceed the IHO order 1 depth accuracy requirements.

**C. HORIZONTAL AND VERTICAL CONTROL *See also the H-Cell Report.***

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

**C.1 Horizontal Control**

The horizontal datum for this project is the North American Datum of 1983 (NAD83). Differential GPS (DGPS) was the sole method of positioning. Differential corrections from U.S. Coast Guard beacons at Key West (286 kHz), and Miami (322 kHz), were used during this survey. *Concur.*

No horizontal control stations were established by the field party for this survey.

**C.2. Vertical Control**

The vertical datum for this project is Mean Lower-Low Water (MLLW). The operating National Water Level Observation Network (NWLON) station at Key West (8724580) was not used in determining Final Tides. A tertiary station was installed at Smith Shoal Light (8724671) on May 10, 2010 and was used as datum control as noted in the tide note. A request for delivery of final approved (verified) tides and zoning for this survey was forwarded to N/OPS1 on 25 August 2010 in accordance with the FPM and project letter instructions. Final smooth tide letter was received 15 December 2010, and states the zoning, station and special information for this particular station as it deviates from the project instructions. *Concur.*

## **D. RESULTS AND RECOMMENDATIONS** *See also the H-Cell Report*

### **D.1 Chart Comparisons**

Some areas had charted depths shoal of the surveyed soundings. No splits were done on these as the general trend was deeper in the surrounding areas; in addition the Side Scan and backscatter data revealed no geographic features as evidence of shoaling over those charted depths.

#### **D.1.1 Chart 11439** (1:80000 26<sup>th</sup> Ed 07/01/2004 corrected to NTM 09/25/2010)

Out of eighty-eight soundings, forty-seven were 0-2 feet deeper than charted and forty-one were 3-7 feet deeper than charted. A Charted 45 at 24 44 57.92N 081 53 18.69W had soundings 7 feet deeper<sup>(Note 1)</sup>. No evidence of shoaling was observed in Side Scan. *Concur.*

#### **D.1.2 Chart 11442** (1:80000 35<sup>th</sup> Ed 01/1/2008 corrected to NTM 24 09/25/2010)

Out of thirty three soundings examined, twenty were 0-2 feet deeper than charted, and twelve were 3-4 feet deeper. *Concur.*

#### **D.1.3 Chart 11434** (1:180000 28<sup>th</sup> Ed 06/01/2008 corrected to NTM 09/25/2008)

Out of twenty soundings, eight were one fathom deeper than charted. *Concur.*

#### **D.1.4. ENC US3FL90M** Edition 4 20050711

The ENC covered chart 11439 and 11442 with twenty depths. Fifteen of the twenty ENC depths were 1-4 feet shoal of chart 11439. Three of the seven ENC depths were 4ft shoal of chart 11442. Surveyed soundings were comparable the chart comparisons. This ENC does not have the charted 45 as listed in 11439. *Concur.*

#### **D.1.5 ENC US4FL92M** Edition 5 20091217

The ENC covered about two thirds of charted depth locations in the west as on Chart 11439. Out of the 41 ENC/Chart depths 16 were the same as chart 11439 and 25 were 1 foot shoal of the chart. The 1 foot difference scales the surveyed soundings comparison to 0-4 ft deeper and 5 to 8 feet where applicable. *Concur.*

#### **D.1.6. US4FL97M** Edition 2 20080407

ENC charted depths were the same as Chart 11439 and 11442 except for one depth which was 1 ft shoal. Surveyed soundings were equal to the 11439 and 11442 comparison. See<sup>(Note 1)</sup> *Concur.*

## **D.2 Additional Results**

### **D.2.1 Automated Wreck and Obstruction Information Service (AWOIS) Items**

One AWOIS item was investigated for this survey. The investigated AWOIS item is described in detail in Appendix II of this report. *Concur. See Appendix II – Survey Features Report.*

### **D.2.2 Shoreline**

There is no shoreline within the sheet limits of survey H12193. *Concur.*

### **D.2.3 Charted Features.**

See Appendix 1 and II

### **D.2.4 Charted Pipelines and Cables**

There are no charted cables within survey area. *Concur.*

### **D.2.5 Bridges, Ferry Routes, and Overhead Cables**

There are no ferry routes, bridges, or overhead cable crossings within the limits of the survey. *Concur.*

## **D.3 Dangers to Navigation and Shoals**

### **D.3.1 Dangers to Navigation**

There are no dangers to navigation within the survey limits of H12193. *Concur.*

### **D.3.2 Shoals**

There are no shoals within the survey limits of H12193. *Concur.*

## **D.4 Aids to Navigation**

There are no charted Aids to Navigation (ATON) within the limits of H12193. *Concur.*

## **D.5 Coast Pilot Information**

The relevant Coast Pilot sections were reviewed and no changes were noted. *Concur.*

## **D.6 Bottom Samples**

Bottom samples were collected throughout the survey area. A total of 8 bottom samples were acquired. A list of bottom samples is contained in Appendix V and an associated .hob file is contained in the PSS folder. *Concur with conditions. Only the Bottom Sample \*.xls list in Appendix V was provided.*

**D.7 Environmental Conditions and Notes**

No significant environmental conditions occurred during the survey. *Concur.*

**D.8 Adequacy of Survey**

This survey is considered complete and adequate to supersede charted depths and features within the survey outline area except as noted in this report. *Concur.*

**D.9 Summary and Recommendations for Additional Work**

No additional work is needed to complete this survey. No changes significant to navigation have been noted and it is recommended that this survey receive normal processing priority. *Concur.*

**E. APPROVAL**

As Lead Hydrographer, I have ensured that standard field surveying and processing procedures were followed in producing this examination in accordance with the Office of Coast Survey Hydrographic Surveys Division’s *Field Procedures Manual*, and NOS *Hydrographic Surveys Specifications and Deliverables*. Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy.

All field sheets, this Descriptive Report, and all accompanying records and data are approved. All records are forwarded for final review and processing to N/CS33, Atlantic Hydrographic Branch.

The Data Acquisition and Processing Report for OPR-H355-TJ-10 are submitted separately and contain additional information relevant to this survey.

Approved and Forwarded:

 Mark Blankenship  
2011.03.01  
11:52:44 -05'00'

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 Digitally signed by Shepard  
Smith  
Date: 2011.03.03 08:51:21 -05'00'

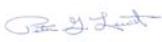
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LT Mark A. Blankenship, NOAA  
Field Operations Officer

CDR Shepard M. Smith, NOAA  
Commanding Officer

In addition, the following individuals were also responsible for overseeing data acquisition and processing of this survey:

Survey Managers:

 Peter Lewit  
2011.03.01  
16:37:24 -05'00'

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SST Peter Lewit  
Senior Survey Technician, NOAA

## **Appendix I**

### **Dangers to Navigation**

**None reported**

# Appendix II \_ Survey Features Report

**Registry Number:** H12193  
**State:** Florida  
**Locality:** Gulf of Mexico  
**Sub-locality:** Offshore Approach to Key west  
**Project Number:** OPR-H355-TJ-10  
**Survey Dates:** 01/01/1981 - 08/17/2010

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
11442	35th	01/01/2008	1:80,000 (11442_1)	[L]NTM: ?
11439	26th	07/01/2004	1:80,000 (11439_1)	USCG LNM: 11/24/2009 (01/19/2010) NGA NTM: 10/02/1999 (01/30/2010)
11434	28th	06/01/2008	1:180,000 (11434_1)	[L]NTM: ?
11460	41st	07/01/2008	1:466,940 (11460_1)	[L]NTM: ?
1113A	28th	07/01/2005	1:470,940 (1113A_1)	[L]NTM: ?
11420	28th	07/01/2005	1:470,940 (11420_1)	[L]NTM: ?
11451	33rd	09/01/2007	1:495,362 (11451_17) 1:495,362 (11451_16)	[L]NTM: ?
11006	32nd	08/01/2005	1:875,000 (11006_1)	[L]NTM: ?
11013	47th	02/01/2008	1:1,200,000 (11013_1)	[L]NTM: ?
411	52nd	09/01/2007	1:2,160,000 (411_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	Delete SBDARE	GP	[None]	24° 45' 17.9" N	081° 59' 39.6" W	---
1.2	Delete SBDARE	GP	[None]	24° 45' 20.9" N	081° 53' 59.9" W	---
2.1	54 ft OBSTRN	Obstruction	16.45 m	24° 49' 13.9" N	081° 55' 58.6" W	---
2.2	50 ft OBSTRN	Obstruction	15.31 m	24° 47' 57.5" N	081° 52' 35.0" W	---
2.3	49 ft OBSTRN	Obstruction	14.91 m	24° 44' 50.2" N	081° 55' 28.7" W	---
3.1	AWOIS 14764 - ft OBSTRN	Wreck	17.56 m	24° 45' 24.6" N	081° 55' 15.5" W	14764

4.1	Bottom Sample	GP	[None]	24° 47' 59.0" N	081° 58' 51.0" W	---
4.2	Bottom Sample	GP	[None]	24° 46' 12.0" N	081° 57' 20.0" W	---
4.3	Bottom Sample	GP	[None]	24° 49' 28.0" N	081° 56' 45.0" W	---
4.4	Bottom Sample	GP	[None]	24° 46' 57.0" N	081° 55' 35.0" W	---
4.5	Bottom Sample	GP	[None]	24° 48' 47.0" N	081° 54' 28.0" W	---
4.6	Bottom Sample	GP	[None]	24° 45' 27.0" N	081° 53' 54.0" W	---
4.7	Bottom Sample	GP	[None]	24° 47' 40.0" N	081° 53' 16.0" W	---

**1 - DR\_Charted**

## 1.1) Delete SBDARE

### Survey Summary

**Survey Position:** 24° 45' 17.9" N, 081° 59' 39.6" 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)  
**GP Dataset:** H12193\_H355\_TJ / AHB\_H12193 / COMPILE / SBDARENOTES.000  
**GP No.:** 0226000260890001  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

### Office Notes

Delete SBDARE.

## 1.2) Delete SBDARE

### Survey Summary

**Survey Position:** 24° 45' 20.9" N, 081° 53' 59.9" 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)  
**GP Dataset:** H12193\_H355\_TJ / AHB\_H12193 / COMPILE / SBDARENOTES.000  
**GP No.:** 02260002608A0001  
**Charts Affected:** 11439\_1, 11442\_1, 11434\_1, 11460\_1, 1113A\_1, 11420\_1, 11451\_16,  
11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Cartographic symbol (\$CSYMB)

### Office Notes

Delete charted SBDARE.

**2 - DR\_UnCharted**

## 2.1) 54 ft OBSTRN

### Survey Summary

**Survey Position:** 24° 49' 13.9" N, 081° 55' 58.6" W  
**Least Depth:** 16.45 m (= 53.97 ft = 8.995 fm = 8 fm 5.97 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.011$  m ; **TVU (TPEv)**  $\pm 0.384$  m  
**Timestamp:** 2010-213.03:44:50.090 (08/01/2010)  
**Survey Line:** h12193 / tj\_s222\_reson7125\_stbd / 2010-213 / 304\_0320  
**Profile/Beam:** 15339/22  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

#### Remarks:

2m high obstruction found with MB and SSS. Possible wreck debris.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12193/tj_s222_reson7125_stbd/2010-213/304_0320	15339/22	0.00	000.0	Primary
h12193/tj_3101_klein5kit_hull_100/2010-192/305_100711194900	0001	6.33	066.1	Secondary (grouped)
h12193/tj_3101_klein5kit_hull_100/2010-196/304_100715165200	0001	9.24	067.8	Secondary (grouped)
h12193/tj_3101_klein5kit_hull_200/2010-195/404_100714184000	0001	22.38	042.3	Secondary (grouped)

### Hydrographer Recommendations

Add obstruction.

SAR NOTE - Feature observed and verified; 54ft OBSTRN (16.041m) located in 24-49-13.851N, 081-55-576W.

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20100917  
 SORIND - US,US,graph,H12193  
 TECSOU - 2,3:found by side scan sonar,found by multi-beam  
 VALSOU - 16.450 m

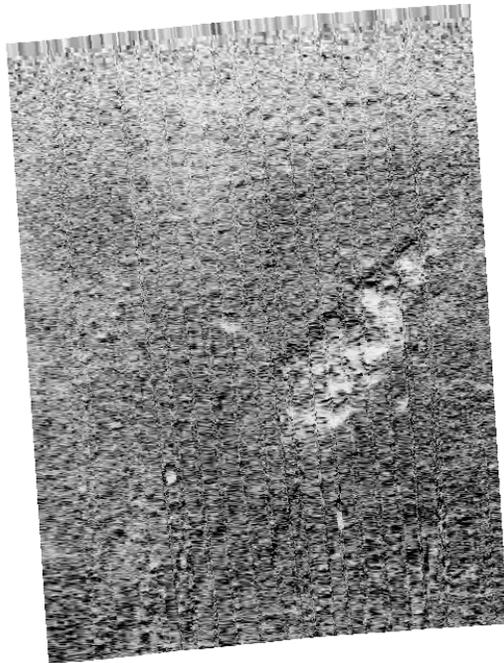
---

WATLEV - 3:always under water/submerged

## **Office Notes**

Concur. Add dangerous obstruction, least depth known 54 ft at current survey position.

## Feature Images



*Figure 2.1.1*

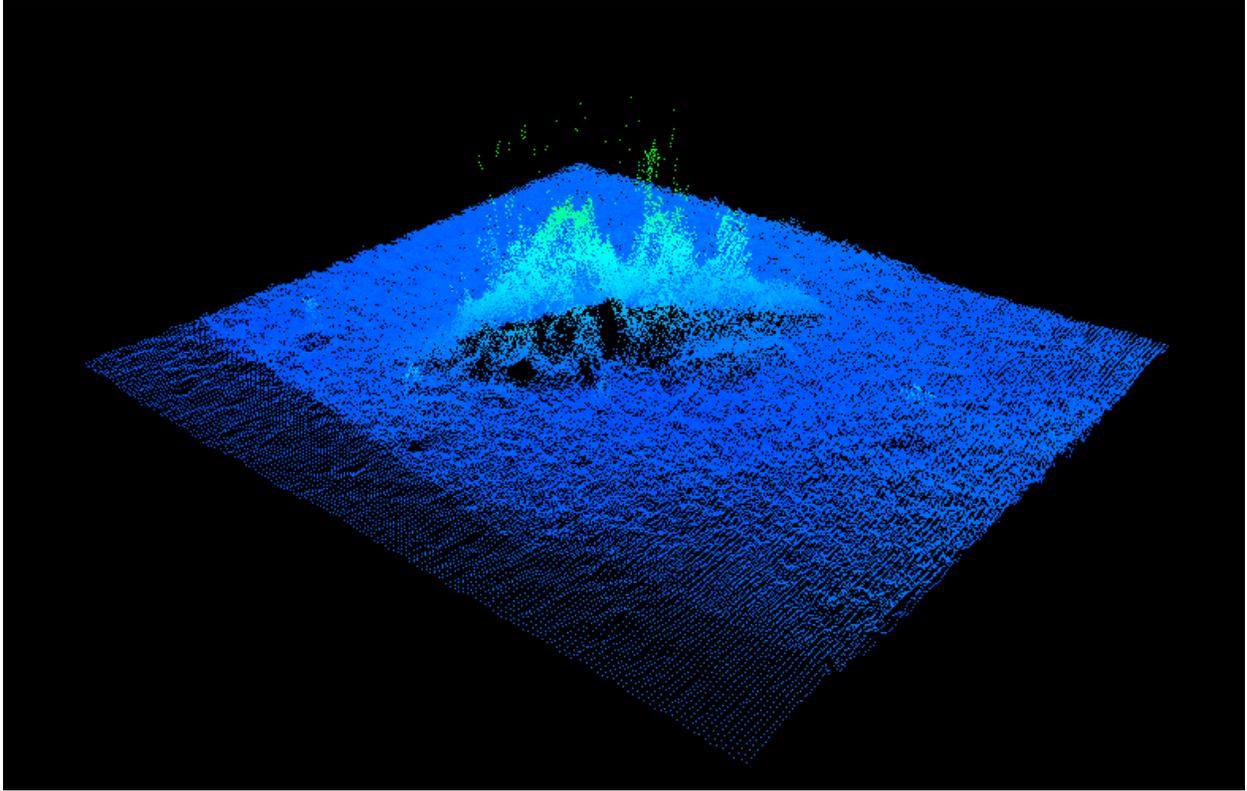


Figure 2.1.2

## 2.2) 50 ft OBSTRN

### Survey Summary

**Survey Position:** 24° 47' 57.5" N, 081° 52' 35.0" W  
**Least Depth:** 15.31 m (= 50.24 ft = 8.373 fm = 8 fm 2.24 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.006$  m ; **TVU (TPEv)**  $\pm 0.373$  m  
**Timestamp:** 2010-228.21:07:48.933 (08/16/2010)  
**Survey Line:** h12193 / tj\_s222\_reson7125\_stbd / 2010-228 / 839\_2107  
**Profile/Beam:** 456/149  
**Charts Affected:** 11439\_1, 11442\_1, 11434\_1, 11460\_1, 1113A\_1, 11420\_1, 11451\_16,  
 11451\_17, 11006\_1, 11013\_1, 411\_1

#### Remarks:

1.4m high obstruction found with MB and SSS.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12193/tj_s222_reson7125_stbd/2010-228/839_2107	456/149	0.00	000.0	Primary
h12193/tj_s222_klein5000_sss200/2010-213/276_100801092300	0001	20.66	091.1	Secondary (grouped)

### Hydrographer Recommendations

Add obstruction.

SARE Note - Feature observed and verified; 50ft OBSTRN

### S-57 Data

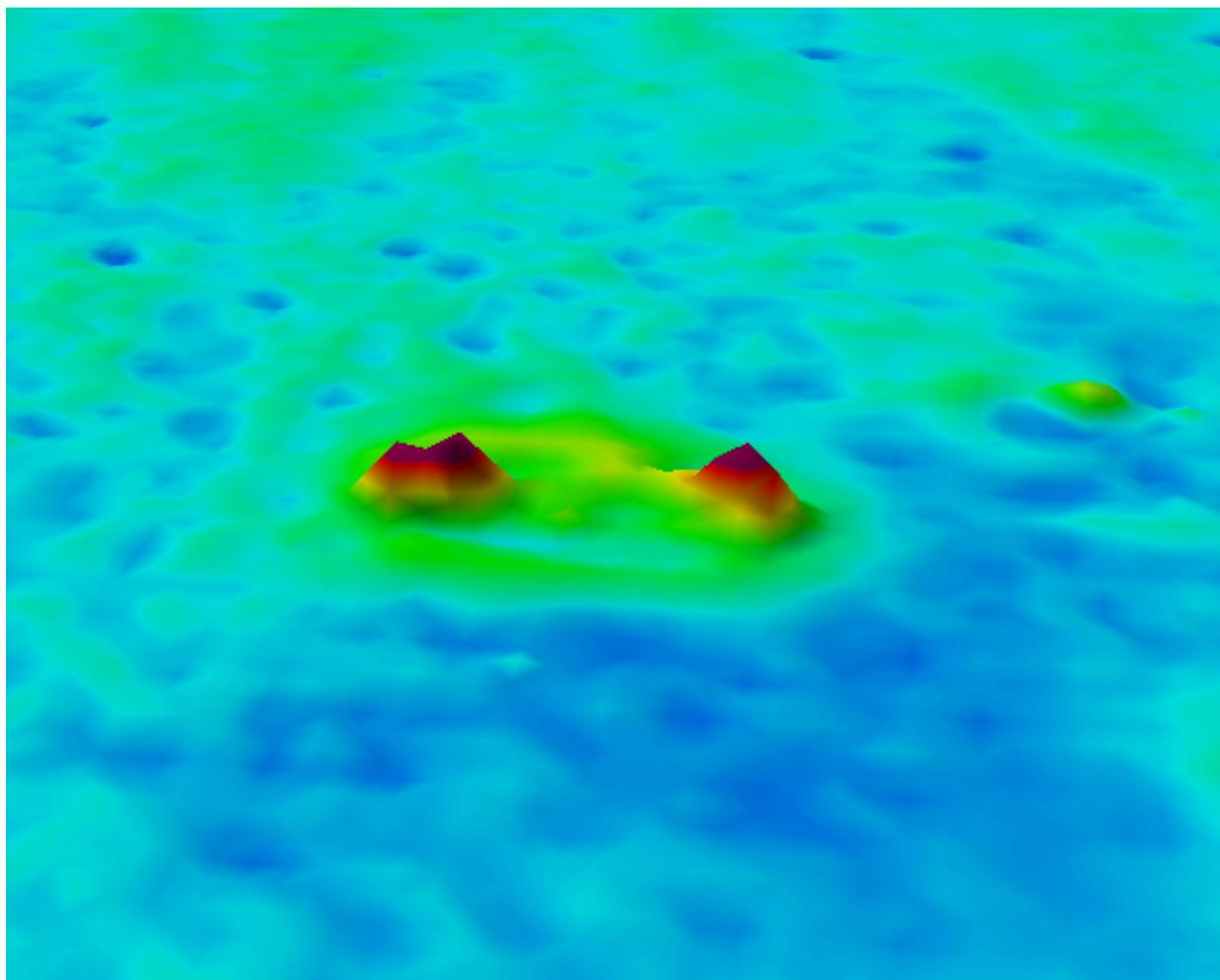
**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** SORDAT - 20100917  
 SORIND - US,US,graph,H12193  
 VALSOU - 15.312 m  
 WATLEV - 3:always under water/submerged

---

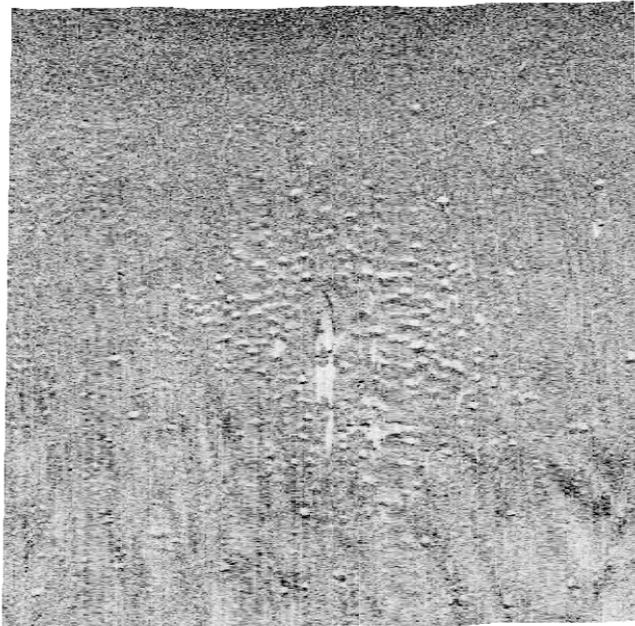
## Office Notes

Concur. Add dangerous obstruction, least depth known 50 ft at current survey position.

## Feature Images



*Figure 2.3.1*



*Figure 2.3.2*

## 2.3) 49 ft OBSTRN

### Survey Summary

**Survey Position:** 24° 44' 50.2" N, 081° 55' 28.7" W  
**Least Depth:** 14.91 m (= 48.91 ft = 8.152 fm = 8 fm 0.91 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.008$  m ; **TVU (TPEv)**  $\pm 0.374$  m  
**Timestamp:** 2010-229.03:03:51.383 (08/17/2010)  
**Survey Line:** h12193 / tj\_s222\_reson7125\_stbd / 2010-229 / 801\_0303  
**Profile/Beam:** 176/420  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

#### Remarks:

2.75m obstruction found with MB and SSS.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12193/tj_s222_reson7125_stbd/2010-229/801_0303	176/420	0.00	000.0	Primary
h12193/tj_3102_klein5klt_hull_200/2010-194/202_100713144200	0001	5.35	346.9	Secondary (grouped)

### Hydrographer Recommendations

Add obstruction.

SARE Note - BC: Upon further evaluation of feature this may be the bow of a wreck in the seafloor, recommend charting a Wreck with a depth of 48 ft. in surveyed location.

Final SAR review does not agree. SS imagery does not indicate the feature is a wreck. Survey located a 49 ft OBSTRN.

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** QUASOU - 6:least depth known  
 SORDAT - 20100917  
 SORIND - US,US,graph,H12193  
 TECSOU - 2,3:found by side scan sonar,found by multi-beam  
 VALSOU - 14.909 m

---

WATLEV - 3:always under water/submerged

## **Office Notes**

Do not concur with hydrographer's findings, significant feature does not appear to be a wreck. Chart dangerous obstruction, least depth 49 feet at the survey position.

## Feature Images

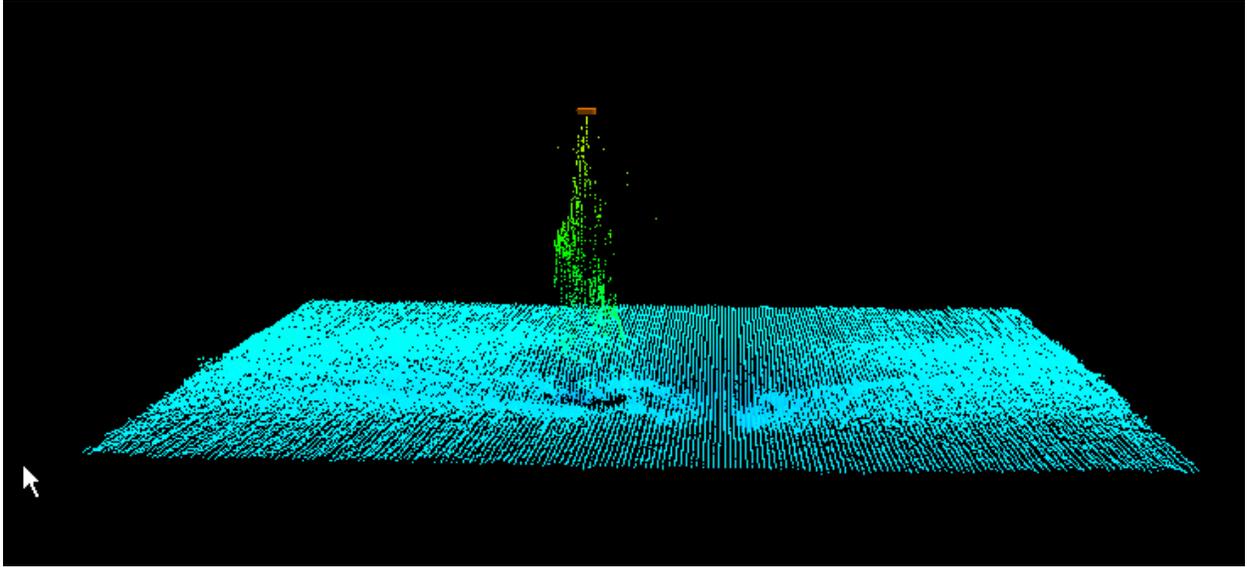


Figure 1.4.1

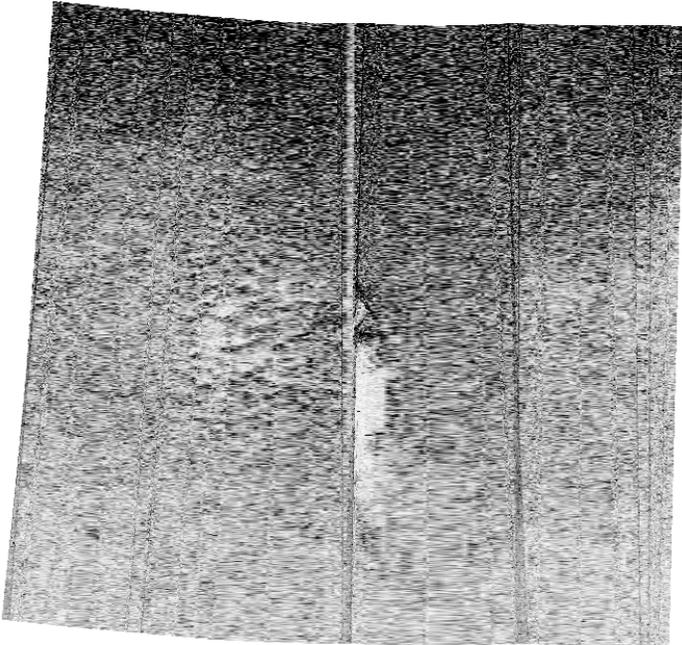


Figure 2.4.2

**3 - DR\_AWOIS**

### 3.1) AWOIS 14764 - ft OBSTRN

#### Primary Feature for AWOIS Item #14764

**Search Position:** 24° 45' 31.0" N, 081° 55' 14.0" W  
**Historical Depth:** 17.68 m  
**Search Radius:** 500  
**Search Technique:** SSS, MB, SB  
**Technique Notes:** [None]

#### History Notes:

LNM-8/78; Unnamed ship was reported to have sank in approximate position: 24° 45' 31 N / 081° 55' 14 W in roughly 58 ft of water. (PTT 3/3/10)

#### Survey Summary

**Survey Position:** 24° 45' 24.6" N, 081° 55' 15.5" W  
**Least Depth:** 17.56 m (= 57.60 ft = 9.600 fm = 9 fm 3.60 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.008$  m ; TVU (TPEv)  $\pm 0.373$  m  
**Timestamp:** 2010-229.02:48:44.771 (08/17/2010)  
**Survey Line:** h12193 / tj\_s222\_reson7125\_stbd / 2010-229 / 867\_0247  
**Profile/Beam:** 902/248  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

#### Remarks:

Remains of Wreck found with MB and SS.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h12193/tj_s222_reson7125_stbd/2010-229/867_0247	902/248	0.00	000.0	Primary
h12193/tj_3102_klein5klt_hull_200/2010-193/214_100712200900	0001	1.05	326.9	Secondary
h12193/tj_3102_klein5klt_hull_200/2010-193/214_100712200900	0002	56.85	276.7	Secondary (grouped)
OPR-H355-TJ-10 AWOIS	AWOIS # 14764	201.82	192.1	Secondary (grouped)
h12193/tj_3102_klein5klt_hull_100/2010-192/114_100711170300	0001	222.77	298.6	Secondary (grouped)
h12193/tj_3102_klein5klt_hull_200/2010-193/218_100712190900	0001	303.11	221.5	Secondary (grouped)
h12193/tj_s222_reson7125_stbd/2010-229/859_0106	1521/15	325.19	233.6	Secondary (grouped)

---

## Hydrographer Recommendations

SAR: Considered as disproved via SSS 200.

### S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 3:distributed remains of wreck  
QUASOU - 6:least depth known  
SORDAT - 20100917  
SORIND - US,US,graph,H12193  
TECSOU - 2,3:found by side scan sonar,found by multi-beam  
VALSOU - 17.556 m  
WATLEV - 3:always under water/submerged

### Office Notes

Do not concur with hydrographer's findings, insignificant feature does not appear to be a wreck. AWOIS Item #14764 considered disproved. Delete dangerous wreck PA, least depth unknown. Chart 57 ft shoal sounding over insignificant feature. Recommend update AWOIS database with survey results for AWOIS Item #14764.

### Feature Images

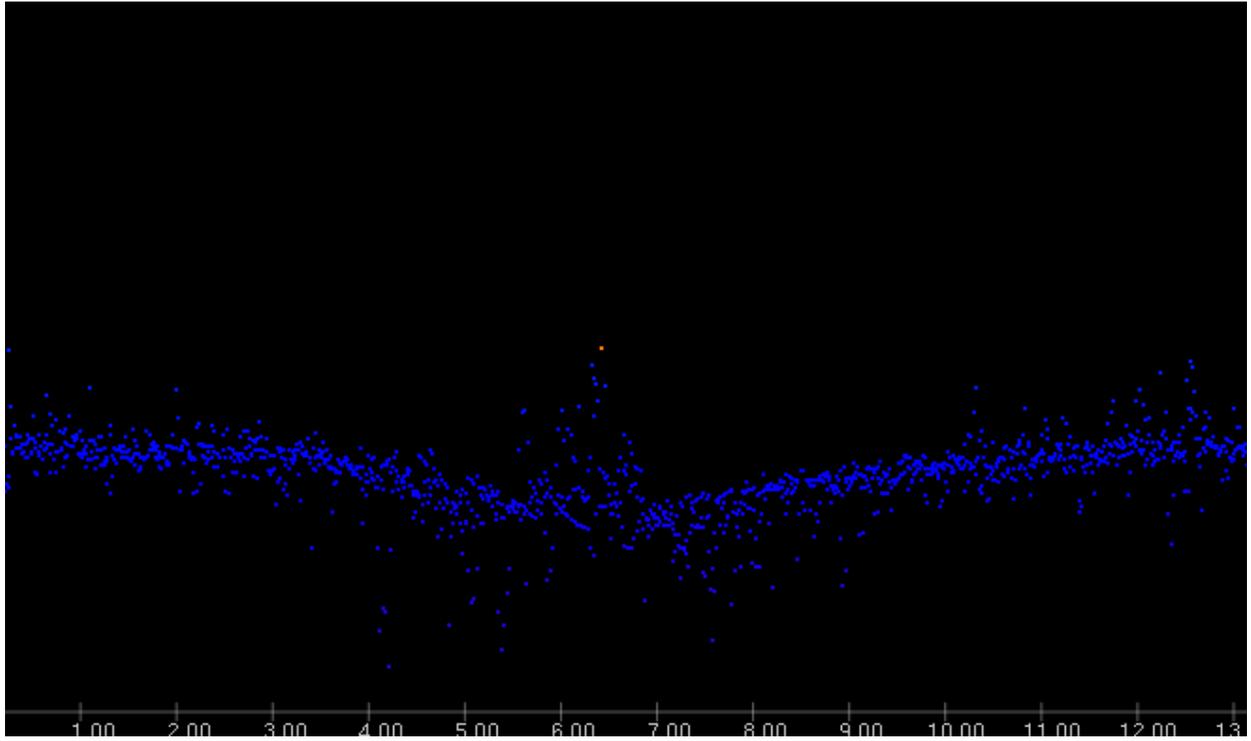
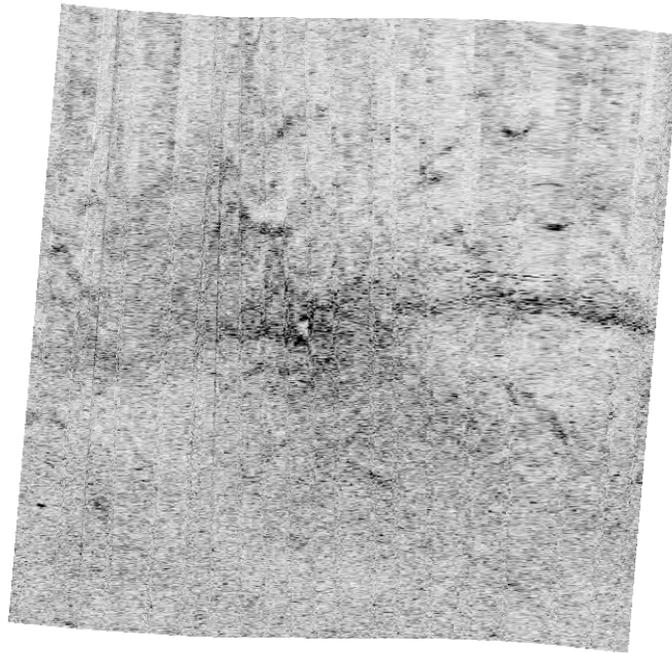


Figure 3.1.1



*Figure 3.1.2*

## **4 - Bottom Samples**

## 4.1) Bottom Sample - fine sand

### Survey Summary

**Survey Position:** 24° 47' 59.0" N, 081° 58' 51.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)[None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE30001  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 1: fine  
NATSUR - 4: sand  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3: always under water/submerged

### Office Notes

Add SBDARE.

## 4.2) Bottom Sample - shells

### Survey Summary

**Survey Position:** 24° 46' 12.0" N, 081° 57' 20.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)[None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE40001  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATSUR - 17:shells  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3:always under water/submerged

### Office Notes

Add SBDARE.

### 4.3) Bottom Sample - fine sand

#### Survey Summary

**Survey Position:** 24° 49' 28.0" N, 081° 56' 45.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)[None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE60001  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

#### Hydrographer Recommendations

[None]

#### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 1: fine  
NATSUR - 4: sand  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3: always under water/submerged

#### Office Notes

Add SBDARE.

## 4.4) Bottom Sample- fine sand

### Survey Summary

**Survey Position:** 24° 46' 57.0" N, 081° 55' 35.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)[None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE50001  
**Charts Affected:** 11439\_1, 11434\_1, 1113A\_1, 11420\_1, 11451\_16, 11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 1: fine  
NATSUR - 4: sand  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3: always under water/submerged

### Office Notes

Add SBDARE.

## 4.5) Bottom Sample - fine sand

### Survey Summary

**Survey Position:** 24° 48' 47.0" N, 081° 54' 28.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)[None] ; TVU (TPEv) [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE20001  
**Charts Affected:** 11439\_1, 11442\_1, 11434\_1, 11460\_1, 1113A\_1, 11420\_1, 11451\_16,  
11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 1: fine  
NATSUR - 4: sand  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3: always under water/submerged

### Office Notes

Add SBDARE.

## 4.6) Bottom Sample- fine sand

### Survey Summary

**Survey Position:** 24° 45' 27.0" N, 081° 53' 54.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**[None] ; **TVU (TPEv)** [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE70001  
**Charts Affected:** 11439\_1, 11442\_1, 11434\_1, 11460\_1, 1113A\_1, 11420\_1, 11451\_16,  
11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 1: fine  
NATSUR - 4: sand  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3: always under water/submerged

### Office Notes

Add SBDARE.

## 4.7) Bottom Sample - broken shells

### Survey Summary

**Survey Position:** 24° 47' 40.0" N, 081° 53' 16.0" W  
**Least Depth:** [None]  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**[None] ; **TVU (TPEv)** [None]  
**Timestamp:** 2010-198.00:00:00.000 (07/17/2010)  
**GP Dataset:** COMPILE / Working / HOB's / H12193\_SBDARE.000  
**GP No.:** 022600008CE10001  
**Charts Affected:** 11439\_1, 11442\_1, 11434\_1, 11460\_1, 1113A\_1, 11420\_1, 11451\_16,  
11451\_17, 11006\_1, 11013\_1, 411\_1

**Remarks:**

[None]

### Hydrographer Recommendations

[None]

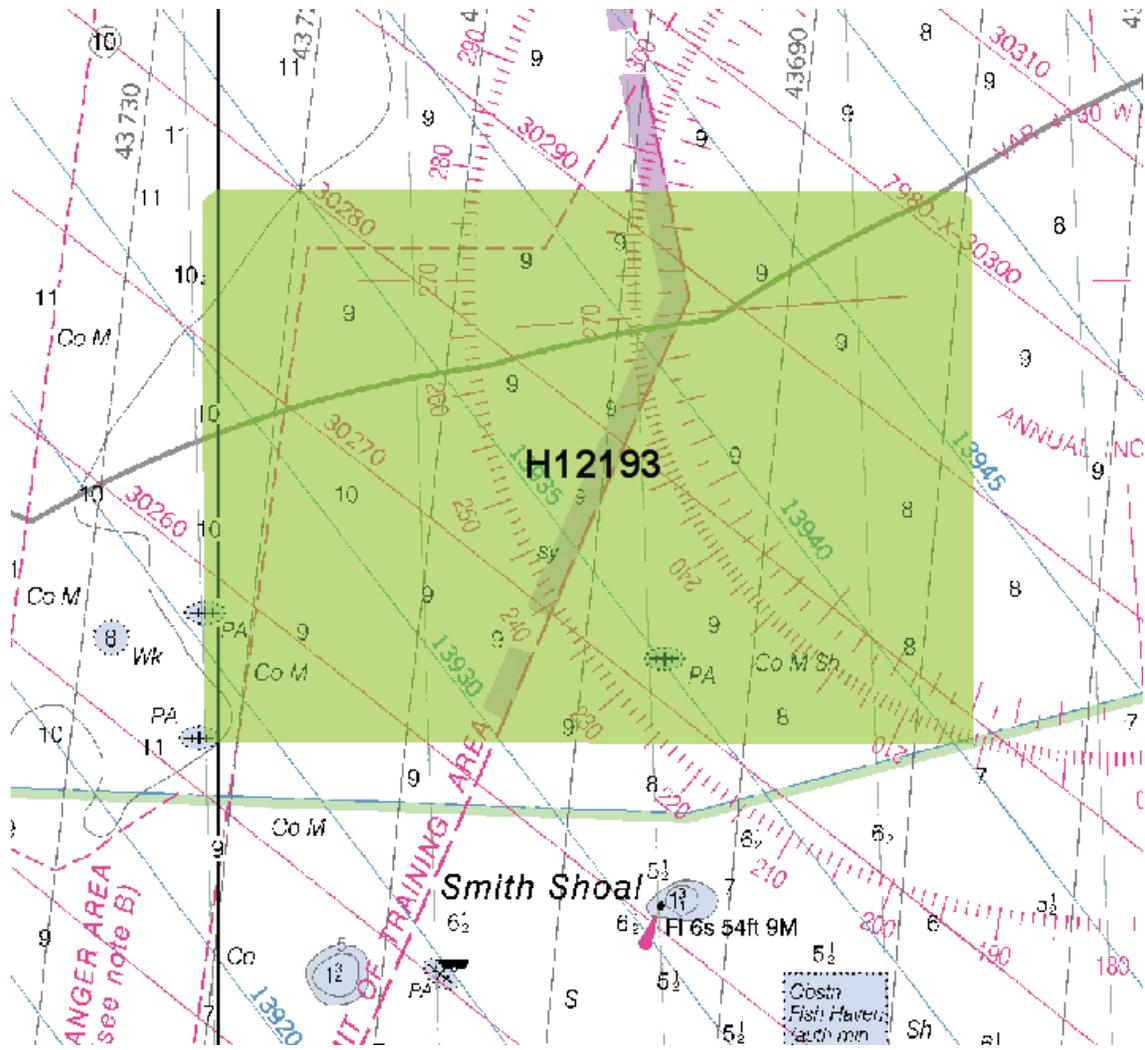
### S-57 Data

**Geo object 1:** Seabed area (SBDARE)  
**Attributes:** NATQUA - 4:broken  
NATSUR - 17:shells  
NINFOM - Add SBDARE  
SORDAT - 20100717  
SORIND - US,US,graph,H12193  
WATLEV - 3:always under water/submerged

### Office Notes

Add SBDARE

## Appendix III Progress Sketch



Project Number and Name	Sheet Identifier	Registry Number	HQ Estimated SNM	SNM Completed Survey Outline	Date Field Work Began	Date Field Work Completed	Final Tides Request Date	Final Tides Received Date	Estimated Date of Survey Submission	March Cumulative % Complete	April Cumulative % Complete	May Cumulative % Complete	June Cumulative % Complete	July Cumulative % Complete	August Cumulative % Complete	September Cumulative % Complete
OPR-H355, NW App to Key West, FL	1	H0191	28		7/2/10	8/24/10	8/25/10	12/17/10						48%	100%	
	2	H0192	28		8/9/10	8/24/10	8/28/10	12/17/10						95%	100%	
	3	H0193	28		7/9/10	8/24/10	8/28/10	12/17/10							100%	
	4	H0194	28		8/2/10	8/28/10	8/27/10	12/17/10							100%	
	5	H0195	28												0% (consolidated into H12194)	
	6	H0196	46		7/16/10	8/24/10	8/25/10	12/17/10						5%	100%	
	7	H0197	48		7/8/10	8/24/10	8/10/10	12/17/10	9/17/10					98%	100%	
	8	H0198	46		7/16/10	7/31/10	8/5/10	12/17/10	9/17/10					20% squared off	100%	
	9	H0199	48													
	10	F0095			7/1/10	8/23/10	8/25/10	10/20/10							100%	

# **Appendix IV**

## **Tides and Water Levels**



UNITED STATES DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
NOAA Ship THOMAS JEFFERSON (MOA-TJ)  
439 West York St  
Norfolk, VA 23510-1145

August 25, 2010

MEMORANDUM FOR: Chief, Requirements and Development Division, N/OPS1

FROM: CDR Shepard Smith, NOAA, NOAA Ship THOMAS JEFFERSON (MOA-TJ)

SUBJECT: Request for Approved Tides/Water Levels

Please provide the following data:

1. Tide Note
2. Final zoning in MapInfo and .MIX format
3. Six Minute Water Level data (Co-ops web site)

Transmit data to the following:

NOAA/NOS/Atlantic Hydrographic Branch  
N/CS33, Building #2  
439 West York Street  
Norfolk, VA 23510  
ATTN: Chief AHB

Final.Tides@noaa.gov .

These data are required for the processing of the following hydrographic survey:

Project No.: OPR-H355-TJ-10  
Registry No.: H12193  
State: Florida  
Locality: Gulf of Mexico  
Sublocality: Offshore Approach to Key west

Attachments containing:

- 1) an Abstract of Times of Hydrography,
- 2) digital MID MIF files of the track lines from Pydro

cc: N/CS33



---

Year_DOY	Min Time	Max Time
2010_190	13:19:36	18:55:52
2010_191	12:57:17	21:10:47
2010_192	12:37:49	21:32:01
2010_193	13:34:49	20:58:58
2010_194	13:13:25	21:18:24
2010_195	13:00:08	21:08:17
2010_196	13:06:15	17:11:42
2010_210	12:45:41	21:34:14
2010_211	12:39:23	21:03:36
2010_212	12:57:53	23:54:24
2010_213	00:22:10	18:37:57
2010_228	13:24:35	23:49:59
2010_229	00:10:51	05:04:56



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** December 15, 2010

**HYDROGRAPHIC BRANCH:** Atlantic  
**HYDROGRAPHIC PROJECT:** OPR-H355-TJ-2010  
**HYDROGRAPHIC SHEET:** H12193

**LOCALITY:** Offshore Approach to Key West, FL  
**TIME PERIOD:** July 9 - August 17, 2010

**TIDE STATION USED:** 872-4671 Smith Shoal Light, FL  
Lat. 24° 43.1'N Long. 81° 55.3' W

**PLANE OF REFERENCE (MEAN LOWER LOW WATER):** 0.000 meters  
**HEIGHT OF HIGH WATER ABOVE PLANE OF REFERENCE:** 1.002 meters

**REMARKS: RECOMMENDED ZONING**

**Use zone(s) identified as:** SEG142A, SEG169, SEG170, SEG171, SEG184,  
SEG185, SEG186, SEG188, SEG208, SEG210,  
SEG246, SEG250, SEG300, and SEG301

**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).

**Note 2:** The datum at 8724671 Smith Shoal Light will not be accepted. Accordingly, six-minute data cannot be retrieved from the [opendap.co-ops.nos.noaa.gov](http://opendap.co-ops.nos.noaa.gov) website relative to MLLW. It must be retrieved relative to Station Datum. Please apply a correction of 1.451 meters to account for the STND - MLLW separation when retrieving the data.

**Peter J. Stone**

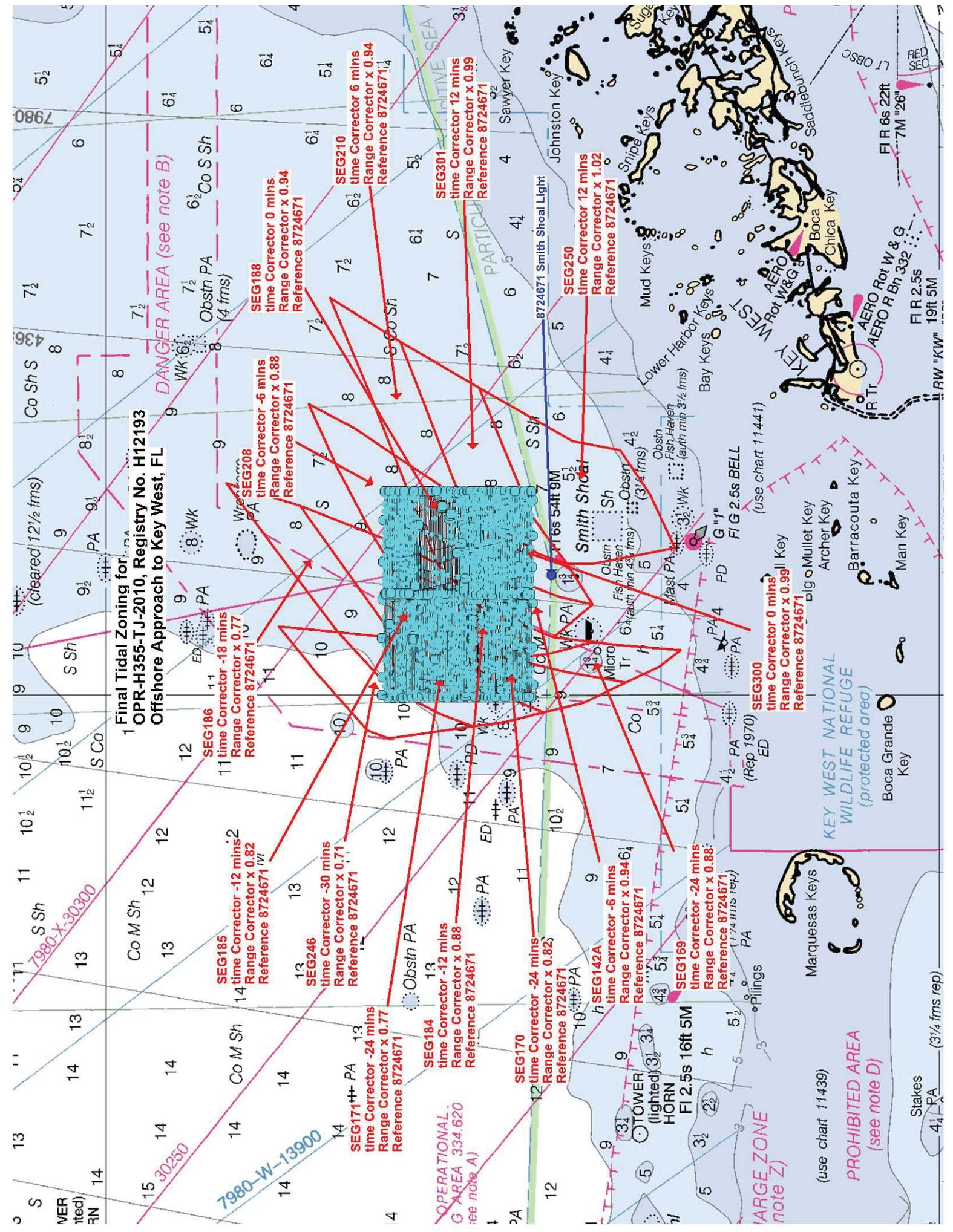
Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=NOAA/NOS/CO-OPS,  
ou=Oceanographic Division,  
email=peter.stone@noaa.gov, c=US  
Date: 2010.12.17 12:44:42 -05'00'

CHIEF, OCEANOGRAPHIC DIVISION



**Final Tidal Zoning for  
OPR-H355-TJ-2010, Registry No. H12193  
Offshore Approach to Key West, FL**

**DANGER AREA (see note B)**



**SEG185**  
time Corrector -12 mins  
Range Corrector x 0.82  
Reference 8724671

**SEG186**  
time Corrector -18 mins  
Range Corrector x 0.77  
Reference 8724671

**SEG188**  
time Corrector 0 mins  
Range Corrector x 0.94  
Reference 8724671

**SEG246**  
time Corrector -30 mins  
Range Corrector x 0.71  
Reference 8724671

**SEG208**  
time Corrector -6 mins  
Range Corrector x 0.88  
Reference 8724671

**SEG210**  
time Corrector 6 mins  
Range Corrector x 0.94  
Reference 8724671

**SEG171**  
time Corrector -24 mins  
Range Corrector x 0.77  
Reference 8724671

**SEG184**  
time Corrector -12 mins  
Range Corrector x 0.88  
Reference 8724671

**SEG301**  
time Corrector 12 mins  
Range Corrector x 0.99  
Reference 8724671

**SEG170**  
time Corrector -24 mins  
Range Corrector x 0.82  
Reference 8724671

**SEG142A**  
time Corrector -6 mins  
Range Corrector x 0.94  
Reference 8724671

**SEG250**  
time Corrector 12 mins  
Range Corrector x 1.02  
Reference 8724671

**SEG169**  
time Corrector -24 mins  
Range Corrector x 0.88  
Reference 8724671

**SEG300**  
time Corrector 0 mins  
Range Corrector x 0.99  
Reference 8724671

**SEG301**  
time Corrector 12 mins  
Range Corrector x 0.99  
Reference 8724671

**SEG170**  
time Corrector -24 mins  
Range Corrector x 0.82  
Reference 8724671

**SEG142A**  
time Corrector -6 mins  
Range Corrector x 0.94  
Reference 8724671

**SEG250**  
time Corrector 12 mins  
Range Corrector x 1.02  
Reference 8724671

**SEG169**  
time Corrector -24 mins  
Range Corrector x 0.88  
Reference 8724671

**SEG300**  
time Corrector 0 mins  
Range Corrector x 0.99  
Reference 8724671

**SEG301**  
time Corrector 12 mins  
Range Corrector x 0.99  
Reference 8724671

**SEG170**  
time Corrector -24 mins  
Range Corrector x 0.82  
Reference 8724671

**SEG142A**  
time Corrector -6 mins  
Range Corrector x 0.94  
Reference 8724671

**SEG250**  
time Corrector 12 mins  
Range Corrector x 1.02  
Reference 8724671

**SEG169**  
time Corrector -24 mins  
Range Corrector x 0.88  
Reference 8724671

**SEG300**  
time Corrector 0 mins  
Range Corrector x 0.99  
Reference 8724671

**SEG301**  
time Corrector 12 mins  
Range Corrector x 0.99  
Reference 8724671

**OPERATIONAL  
AREA 334.620  
(see note A)**

**DANGER AREA (see note B)**

**PROHIBITED AREA  
(see note D)**

**7980-W-13900**

**7980-X-30300**

**7980**

(use chart 11439)

**PROHIBITED AREA  
(see note D)**

**LARGE ZONE  
(note Z)**

**FIG 2.5s BELL**  
(use chart 11441)

**KEY WEST NATIONAL  
WILDLIFE REFUGE  
(protected area)**

**7M "26"**  
FIR 6s 22ft

**19ft 5M**  
FIR 2.5s

**332**  
AERO R Bn

**332**  
AERO Rot W & G

**19ft 5M**  
FIR 2.5s

**7M "26"**  
FIR 6s 22ft

**19ft 5M**  
FIR 2.5s

(use chart 11439)

**PROHIBITED AREA  
(see note D)**

**LARGE ZONE  
(note Z)**

**FIG 2.5s BELL**  
(use chart 11441)

**KEY WEST NATIONAL  
WILDLIFE REFUGE  
(protected area)**

**7M "26"**  
FIR 6s 22ft

**19ft 5M**  
FIR 2.5s

**332**  
AERO R Bn

**332**  
AERO Rot W & G

**19ft 5M**  
FIR 2.5s

**7M "26"**  
FIR 6s 22ft

**19ft 5M**  
FIR 2.5s

**Appendix V**  
**Supplemental Correspondence**

**Subject:** Re: Crossline comparison

**From:** Chris van Westendorp <Christiaan.VanWestendorp@noaa.gov>

**Date:** Thu, 10 Sep 2009 13:00:35 -0400

**To:** "mark.blankenship" <Mark.Blankenship@noaa.gov>

**CC:** LCDR Rick Brennan <Richard.T.Brennan@noaa.gov>, Castle Parker <Castle.E.Parker@noaa.gov>, Edward Owens <Edward.Owens@noaa.gov>, LT Jasper Schaer <jasper.schaer@noaa.gov>, CDR Shep Smith <Shep.Smith@noaa.gov>, Daniel Wright <Daniel.Wright@noaa.gov>

Mark,

Per 5.1.4.3 of the HSSD, AHB authorizes TJ to use the Standard Deviation layer to conduct surface difference comparison and analysis on future survey submissions of multibeam data. This meets the crossline comparison requirement laid out in HSSD.

Please let me know if you have any questions or need for further clarification.

R/

LCDR Chris van Westendorp, NOAA

mark.blankenship wrote:

Chris,

You mentioned in the meeting today that AHB was not going to require the multiple CUBE surface comparison, instead allowing us to use a single surface standard deviation layer to do our checks with. Is there any memo coming out for that?

Mark

LCDR Chris van Westendorp <[christiaan.vanwestendorp@noaa.gov](mailto:christiaan.vanwestendorp@noaa.gov)>

Atlantic Hydrographic Branch

NOAA OCS

From	<a href="mailto:David.Wolcott@noaa.gov">David Wolcott &lt;David.Wolcott@noaa.gov&gt;</a>	
Sent	Friday, December 17, 2010 9:20 pm	
To	<a href="mailto:Norris.A.Wike@noaa.gov">Norris A Wike &lt;Norris.A.Wike@noaa.gov&gt;</a> , <a href="mailto:OMAOPMOPSThomasJefferson@noaa.gov">_OMAO MOA OPS Thomas Jefferson &lt;OPS.Thomas.Jefferson@noaa.gov&gt;</a>	
Cc	<a href="mailto:Kyle.Ward@noaa.gov">Kyle Ward &lt;Kyle.Ward@noaa.gov&gt;</a> , " <a href="mailto:NOS.CO-OPS.HTP@noaa.gov">_NOS.CO-OPS.HTP" &lt;NOS.COOPS.HPT@noaa.gov&gt;</a>	
Bcc		
Subject	Final Tide Note for OPR-H355-TJ-2010, Registry No. H12193	
Attachments	<a href="#">H12193.zip</a>	822K

Dear Norris,

Attached is a zipped folder containing all of the final tide files for project OPR-H355-TJ-2010, Registry No. H12193. Below is a description of those files. If you have any problems retrieving any of the information please give me a call. The following files are included in the zipped attachment H12193.zip for project OPR-H355-TJ-2010:

H12193.pdf  
H12193CORF.zdf

There is one (1) final tide note for H12193 in this email. Tide station data for Smith Shoal Light, FL (872-4671) may be retrieved via the Internet from the CO-OPS SOAP web services at <http://opendap.co-ops.nos.noaa.gov/axis/text.html> . [NOTE: The datum at Smith Shoal Light may not be accepted. Accordingly, data can only be retrieved relative to station datum. Please apply a correction of 1.451m to account for the STND-MLLW difference when retrieving the data.] The \*.pdf file is the tide note in Adobe Acrobat format with the graphic.

The following files are the MapInfo zoning files:

H12193CORF.DAT  
H12193CORF.ID  
H12193CORF.MAP  
H12193CORF.TAB  
H12193LABF.DAT  
H12193LABF.MAP  
H12193LABF.TAB  
H12193LABF.ID  
H12193STNF.DAT  
H12193STNF.ID  
H12193STNF.IND  
H12193STNF.MAP  
H12193STNF.TAB

Please e-mail me when you have captured all files successfully. Call me at (301)713-2890 x153, if there are any problems.

--

David Wolcott  
Hydrographic Planning Team  
NOS/CO-OPS  
p: (310) 713-2890 x 153

**Subject:** Re: Bottom Sample submission  
**From:** Gene Parker <Castle.E.Parker@noaa.gov>  
**Date:** Mon, 31 Jan 2011 11:47:48 -0500  
**To:** "ops.thomas.jefferson" <OPS.Thomas.Jefferson@noaa.gov>

Good day Mark,

Submit both. HSSD specifies both in two areas of the document. First one needs to comply with HSSD; if the TJ wants to make the Hob file, then they have gone beyond the minimum requirements. If the TJ doesn't do it, then AHB would have to as long as the BS is within the Pydro PSS. Reference HSSD Section 8.2 S57 Feature File, paragraph 6:

The S-57 feature file contains all the attributed information on specific objects that cannot be portrayed in a simple depth grid. Features to include in the S-57 feature file include; wrecks, obstructions, shoreline, rocks, islets, oil platforms, nature of seabed (bottom samples) and all other objects that may need to be compiled to a navigational product and require additional information that cannot be included in the BAG.

The Pydro PSS is in lieu of the S57 format file.

We could make the hob from the table, but since the TJ has done this, submit both the Hob file and the table contained in DR Appendix 5. Place the Hob file in the PSS directory which has contained all features in NOAA PSS format as in the past. If the TJ is going to submit the hob file, the source would be the table, so HSSD specifies delivery of both. If the TJ only submitted the table, AHB would have to generate the feature objects. If the TJ creates the hob file, then submit it.

gene

ops.thomas.jefferson wrote:

Gene,

We will be submitting .HOB files for the bottom samples in addition to the summary table found in the supplemental survey records and correspondence section of the DR. It is my understanding that the table is only used to create the .HOB anyways. A recommendation will need to be made that either the table either be omitted or be used in place of the .hob file. Only the summary table is mention in the HSSD april 2010 version. If there are any other issues with this idea please let us know.

Mark

Castle Eugene Parker <[castle.e.parker@noaa.gov](mailto:castle.e.parker@noaa.gov)>

Physical Scientist - Hydrographic Team Lead

Atlantic Hydrographic Branch

NOAA Office of Coast Survey

## AHB COMPILATION LOG

<b>General Survey Information</b>	
REGISTRY No.	H12193
PROJECT No.	OPR-H355-TJ-10
FIELD UNIT	NOAA SHIP <i>THOMAS JEFFERSON</i>
DATE OF SURVEY	20100817- 20100709
LARGEST SCALE CHART	<i>11349 1, edition 48, 42332; 35, 1:80,000</i>
ADDITIONAL CHARTS	<i>11442 1, edition 57, 42332; 28, 1:: 2,000</i>
SOUNDING UNITS	<b>FEET</b>
COMPILER	Dinah O. Morris

<b>Source Grids</b>	<b>File Name</b>
	T:\CompileInWork\H12193_H355_TJ\AHB_H12193\SAR Final Products\GRIDS
	H12193_MB_Cube2m_MLLW_2_Final.csar H12193_MB_Cube2m_MLLW_4_Final.csar H12193_MB_Cube2m_MLLW_5_Final.csar H12193_MB_Cube2m_MLLW_6_Final.csar H12193_MB_Cube2m_MLLW_7_Final.csar H12193_MB_Cube2m_MLLW_8_Final.csar H12193_MB_Cube2m_MLLW_9_Final.csar H12193_MB_Cube2m_MLLW_10_Final.csar H12193_VB_Shoal.bag
<b>Surfaces</b>	<b>File Name</b>
	T:\CompileInWork\H12193_H355_TJ\AHB_H12193\COMPILE\Working
<i>Combined</i>	<b>H12193_4m_Combined.csar</b>
<i>Interpolated TIN</i>	\Interpolated TIN\H12193_12m_InterpTIN.csar
<i>Shifted Interpolated TIN</i>	\Shifted Surface\H12193_12m_InterpTIN_Shifted.csar
<b>Final HOBs</b>	<b>File Name</b>
	T:\CompileInWork\H12193_H355_TJ\AHB_H12193\COMPILE\Final Hobs
<i>Survey Scale Soundings</i>	<b>H12193_SS_Soundings.hob</b>
<i>Chart Scale Soundings</i>	<b>H12193_CS_Soundings.hob</b>
<i>Contour Layer</i>	<b>H12193_Contours.hob</b>
<i>Feature Layer</i>	<b>H12193_Features.hob</b>
<i>Meta-Objects Layer</i>	<b>H12193_MetaObjects.hob</b>
<i>Blue Notes</i>	<b>H12193_BlueNotes.hob</b>
<i>ENC Retain Soundings</i>	N/A

<b>Meta-Objects Attribution</b>	
<b>Acronym</b>	<b>Value</b>
<b>M_COVR</b>	
CATCOV	1 – coverage available
SORDAT	20100817
SORIND	US,US,graph,H12193
<b>M_QUAL</b>	
CATZOC	6 – zone of confidence U (data not assessed)
INFORM	NOAA Ship <i>Thomas Jefferson</i>
POSACC	10.0 m
SORDAT	20100817
SORIND	US,US,graph, H12193

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or H-Cell Reports.

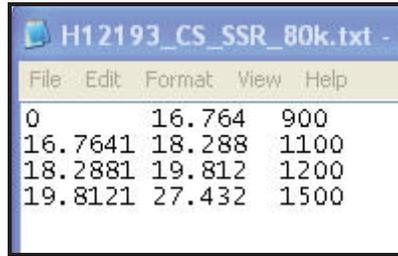
SUREND	20100817
SURSTA	20100709
<b>DEPARE</b>	
DRVALV 1	48.960 ft
DRVALV2	67.031 ft
SORDAT	20100817
SORIND	US,US,graph,H12193
<b>M_CSCL</b>	
CSCALE	
SORDAT	
SORIND	

SPECIFICATIONS:

- I. COMBINED SURFACE:
  - a. Number of SAR Final Grids: 10
  - b. Resolution of Combined (m): 4 m
  
- II. SURVEY SCALE SOUNDINGS (SS):
  - a. Attribute Name: Depth
  - b. Selection criteria: Radius, Shoal bias
  - c. Radius value is: mm at map scale
    - i. Use single-defined radius: 1.1
    - ii. And/Or use radius table file: N /A
  - d. Queried Depth of All Soundings
    - i. Minimum: 48.960 ft
    - ii. Maximum: 67.031 ft
  
- III. INTERPOLATED TIN SURFACE:
  - a. Resolution (m): 12m
  - b. Interpolation method: Natural Neighbor
  - c. Shift value: -0.75ft
  
- IV. CONTOURS:
  - a. Attribute Name: Depth
  - b. Use a Depth List: H12193\_depth\_contours.txt
  - c. Output Options: Create contour lines
    - i. Line Object: DEPCNT
    - ii. Value Attribute: VALDCO
  
- V. FEATURES:
  - a. Number of Chart Features: 3
  - b. Number of Non-Chart Features: 2
  
- VI. CHART SURVEY SOUNDINGS (CS):
  - a. Number of ENC CS Soundings: 80
  - b. Attribute Name: Depth
  - c. Selection criteria: Radius, Shoal bias

This Document is for Office Process use only and is intended to supplement, not supersede or replace, information/recommendations in the Descriptive or H-Cell Reports.

- d. Radius value is: Distance on the ground (m)
  - i. Use single-defined radius: N/A
  - ii. And/Or use radius table file: H12193\_CS\_SSR\_80k.txt



A screenshot of a text editor window titled "H12193\_CS\_SSR\_80k.txt". The window has a menu bar with "File", "Edit", "Format", "View", and "Help". The text content is as follows:

0	16.764	900
16.7641	18.288	1100
18.2881	19.812	1200
19.8121	27.432	1500

- e. Number Survey CS Soundings: 84

VII. NOTES:

**ATLANTIC HYDROGRAPHIC BRANCH  
H-CELL REPORT to ACCOMPANY  
SURVEY H12193 (2010)**

This H-Cell Report has been written to supplement and/or clarify the original Descriptive Report (DR) and pass critical compilation information to the cartographers in the Marine Chart Division. Sections in this report refer to the corresponding sections of the Descriptive Report.

**A. AREA SURVEYED**

**B. DATA ACQUISITION AND PROCESSING**

**B.2 QUALITY CONTROL**

The AHB source depth grid for the survey's nautical chart update consisted of seven 0.5m resolution MBES development BASE surfaces, one 4m resolution vertical beam shoal layer BASE surface, which were combined at 4m resolution. The survey scale soundings were created from the combined surface at a single defined radius of 1.1 mm at the largest scale chart covering the respective area of the survey (Chart 11439\_1 ~ 1:80,000; Chart 11432\_1 ~ 1:80,000). The survey scale soundings were imported into a "point cloud" grid. The chart scale soundings were derived directly from the survey scale soundings point cloud grid to preserve absolute continuity between the charted depths, the survey scale soundings, and the original source grid. The chart scale soundings were selected using a sounding spacing range (SSR) file. The chart scale soundings are a subset of the survey scale soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portray the bathymetry within the common area.

A UTM projected TIN surface was created from the survey scale soundings point cloud grid, from which an interpolated surface of 12m resolution was generated. The interpolated TIN surface of 12m resolution was shifted by the NOAA sounding rounding value of -0.75 feet. The shifted interpolated TIN was used to generate depth contours in feet (60 ft). The depth contours are forwarded to MCD for reference only. The contours were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth contours are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The compilation products (Final \*.HOB files) for this survey are detailed in the H12193 AHB Compilation Log contained within this document. The Final HOB files include depth areas (DEPARE), depth contours (DEPCNT), soundings (SOUNDG), meta-objects (M\_COVR, M\_QUAL), cartographic Blue Notes (\$CSYMB), cartographic lines (\$LINES) and features (OBSTRN).

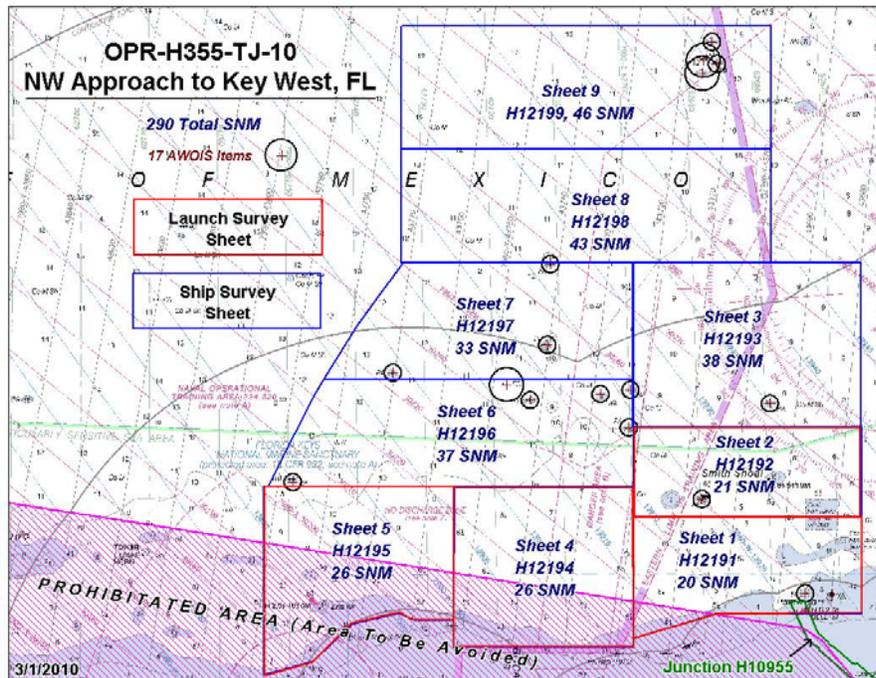
As dictated by Hydrographic Technical Directive 2008-8, the Final HOB files were combined into two separate H-Cell files in S-57 format. Both S-57 files were exported from CARIS S-57 Composer in feet. Quality assurance and topology checks were conducted using CARIS S-57 Composer and DKART Inspector validation tests.

The final H-Cell products are two S-57 files, in Lat/Long NAD-83. The contents of these two H-Cell deliverables are listed in the table below:

TABLE 1 - Contents of H-Cell Files			
H12193_CS.000		Scale 1:80,000	
Object Class Types	Geographic	Cartographic	Meta
S-57 Object Acronyms	DEPARE	\$CSYMB	M_COVR
	OBSTRN	\$LINES	M_QUAL
	SBDARE		
	SOUNDG		
H12193_SS.000		Scale 1:40,000	
Object Class Types	Geographic		
S-57 Object Acronyms	DEPCNT		
	SOUNDG		

### B.2.4 Junctions and Prior Surveys

Survey H12193 (2010) compares within 3 feet of the charted hydrography to the west and south. Survey H12193 compares with 2 feet to the north and east. Survey H12193 is the first of nine contiguous surveys to be reviewed and compiled for nautical chart update submission.



## **B.4 DATA PROCESSING**

The following software was used to process data at the Atlantic Hydrographic Branch:

CARIS Bathy DataBASE version 3.2/HF4  
CARIS HIPS/SIPS version 7.1/HF2  
CARIS S-57 Composer version 2.2/SP1/HF4  
DKART Inspector version 5.1  
HSTP Pydro version 11.8 (r3585)

## **C. HORIZONTAL AND VERTICAL CONTROL**

The hydrographer makes adequate mention of horizontal and vertical control used for this survey in section C of the DR. The sounding datum for this survey is Mean Lower Low Water (MLLW), and the vertical datum is Mean High Water (MHW). Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 17 North.

## **D. RESULTS AND RECOMMENDATIONS**

### **D.1 CHART COMPARISON**      **11439 1 (26th Edition, JUL/04)**

Sand Key to Rebecca Shoal  
Corrected through NM 09/10/2011  
Corrected through LNM 09/06/2011  
Scale 1:80,000

### **11442 1 (35th Edition, JAN/08)**

Florida Keys Sombrero Key to Sand Key  
Corrected through NM 9/24/2011  
Corrected through LNM 9/13/2011  
Scale 1:80,000

### **ENC COMPARISON**      **US3FL90M**

Florida Keys Sombrero Key to Dry Tortugas  
Edition 13  
Application Date 2011/03/11  
Issue Date 2011/03/11  
Chart 11439\_1; Chart 11442\_1

**US4FL92M**

Sand Key to Rebecca Shoal

Edition 5

Application Date 2009/12/D17

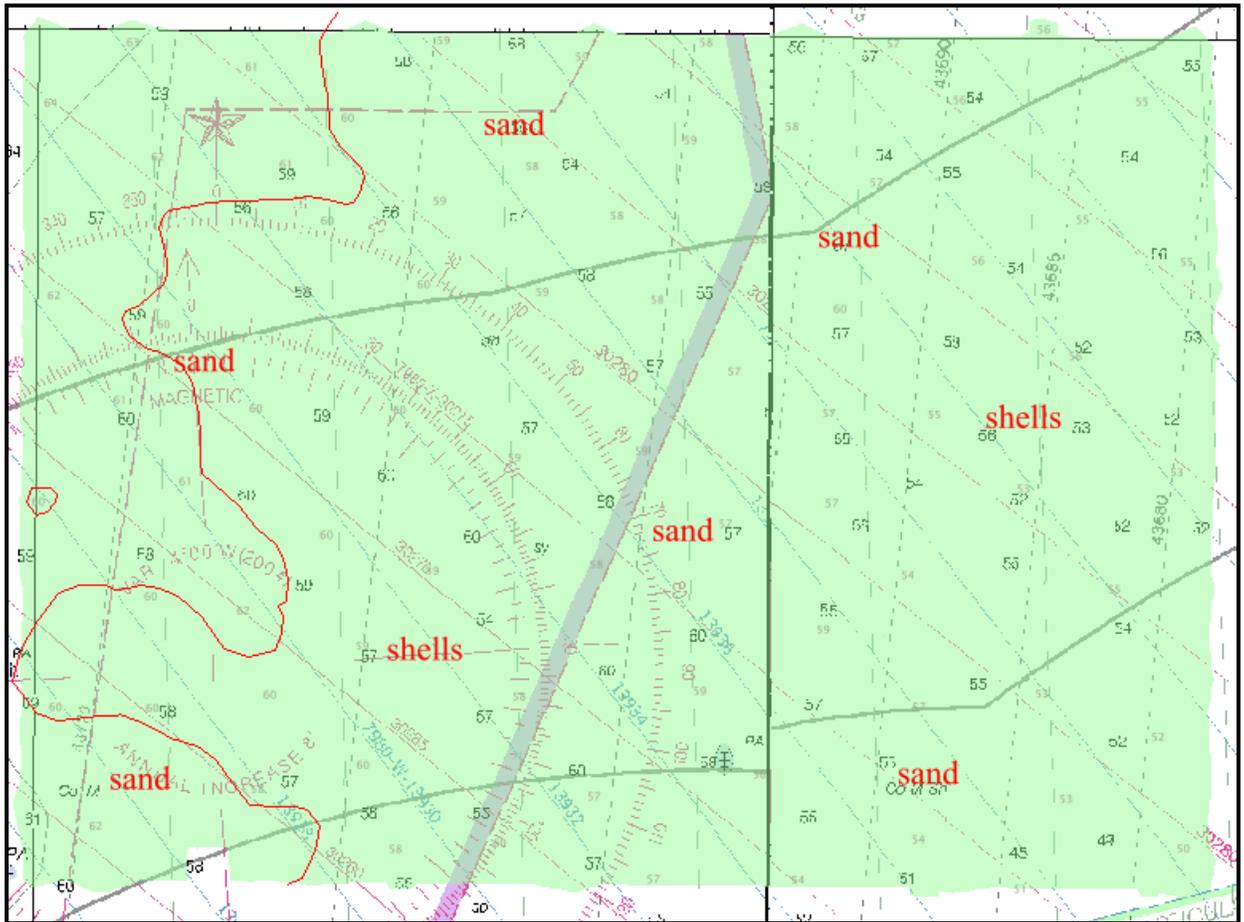
Issue Date 2009/12/17

Chart 11439\_1

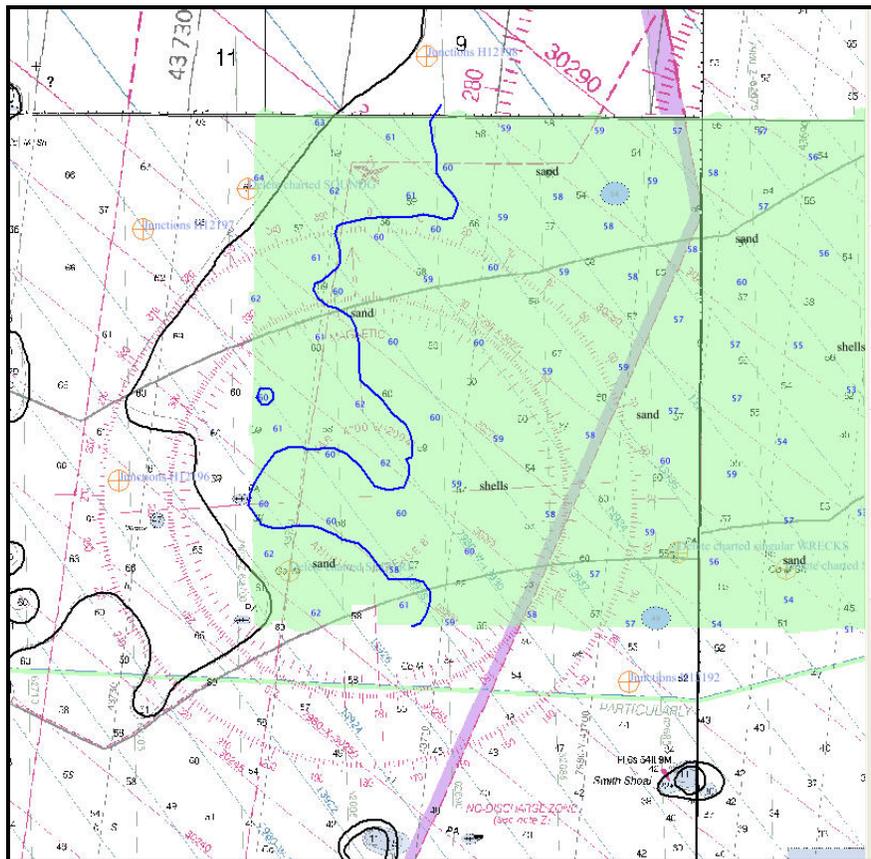
**D.2 ADDITIONAL RESULTS**

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section D and Appendix I and II of the DR. The hydrographer recommends that any charted features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. The following exceptions are noted:

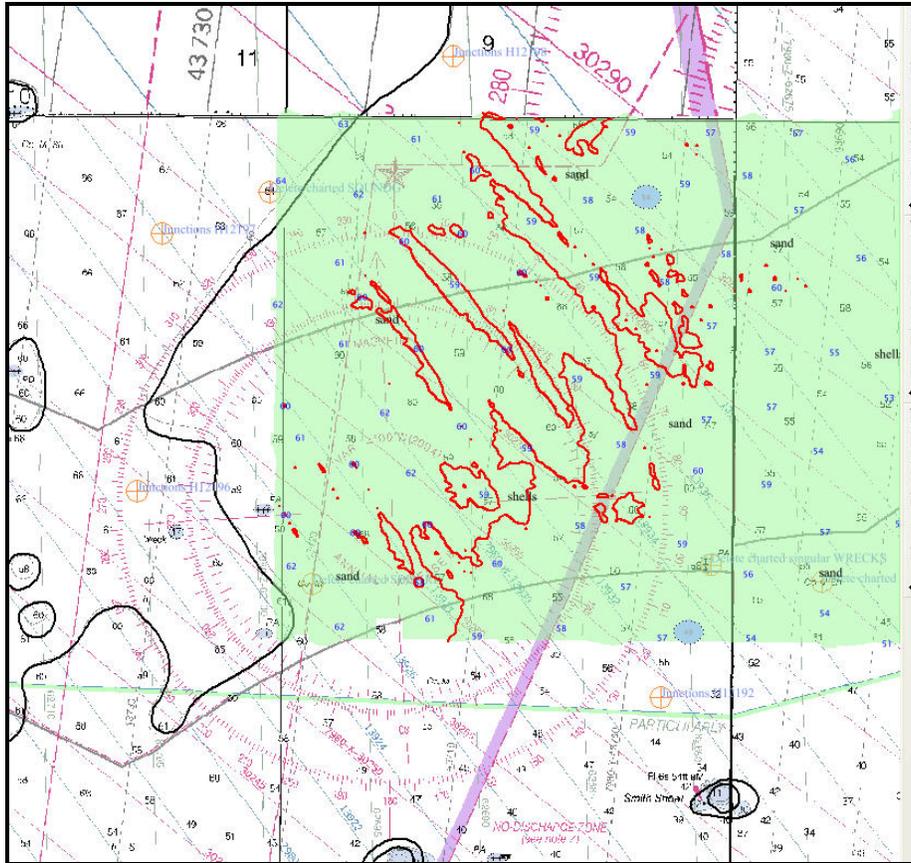
- a. The field unit collected a total of 8 bottom samples. No charted seabed characteristics were retained and all charted seabed characteristics were superseded by the survey findings.



- b. As addressed in figure B.2.4 of the HCell Report Junctions section, nine contiguous surveys in this region are included in project OPR-H355-TJ-10. During HCell compilation it was observed that the charted 60 foot depth curve is included in much of the project area and is significantly generalized on the 1:80,000 scale charts. The survey data, in this area of, very flat seafloor, also includes numerous areas where 60 foot contours are present. The contours exist predominantly in areas of very little relief (minimal depth variance), on the order of less than one foot to two feet, between “shoal” contour areas. It was determined that chart scale sounding selection should not include these insignificantly deeper areas, as it would not benefit the mariner nor portray useful information as to the overall bathymetry of the area. Therefore, AHB deemed it necessary to create a generalized contour area to direct and support shoal sounding selection that would not include the insignificant deep areas and provide an accurate and final product to MCD that would require little if any revision. To avoid confusion with the survey scale contours (which are being submitted as is typical), the generalized contours are included in the CS HCell as \$LINES cartographic bluenotes. Additionally, H12193 is the first of project OPR-H355-TJ-10 to be fully processed; therefore, it is requested by AHB to receive feedback as to the usefulness and correctness of these HCell products at MCD’s earliest convenience and hopefully prior to additional HCell submissions of same.



**Generalized contour shown in blue. ENC contour in black.**



**Non-generalized contour shown in red. ENC contour in black.**

## **D.6 MISCELLANEOUS**

Chart compilation was completed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to the Marine Chart Division in Silver Spring, Maryland. See section D.1 of this report for a list of the Raster Charts and Electronic Navigation Charts (ENC) used for compiling the present survey.

## **D.7 ADEQUACY OF SURVEY**

The present survey is adequate to supersede the charted bathymetry within the common area. Any features not specifically addressed either in the H-Cell files or the Blue Notes should be retained as charted. Refer to section D and Appendix I and II of the DR for further recommendations by the hydrographer.

**APPROVAL SHEET  
H12193**

**Initial Approvals:**

The completed survey has been inspected with regard to survey coverage, delineation of depth contours, disposition of critical depths, cartographic symbolization, and verification or disapproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered in the digital data for this survey. The survey records and digital data comply with National Ocean Service and Office of Coast Survey requirements except where noted in the Descriptive Report and the H-Cell Report.

All final products have undergone a comprehensive review per the Hydrographic Surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

---

**Dinah O. Morris**  
Hydrographic Survey Intern  
Atlantic Hydrographic Branch

I have reviewed the H-Cell files, accompanying data, and reports. This survey and accompanying Marine Chart Division deliverables meet National Ocean Service requirements and standards for products in support of nautical charting except where noted.

Approved for: \_\_\_\_\_  
**CDR Richard T. Brennan, NOAA**  
Chief, Atlantic Hydrographic Branch