

H11914

NOAA FORM 76-35A

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

## DESCRIPTIVE REPORT

*Type of Survey*            Basic Hydrography

*Field No*                    NRT4

*Registry No.*              H11914

### LOCALITY

*State*                        MICHIGAN

*General Locality*        ST. CLAIR RIVER, MI

*Locality*                  MARINE CITY TO ST. CLAIR

TEAM LEADER  
LUCY HICK  
NRT4

DATE

U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  <b>HYDROGRAPHIC TITLE SHEET</b>	<b>REGISTRY No.</b> H11914
	<b>FIELD No.</b> NRT4
<p> <b>State</b> Michigan  <b>General Locality</b> St. Clair River  <b>Sub-Locality</b> Marine City to St. Clair  <b>Scale</b> 1:10,000 <b>Date of Survey</b> June 20 to August 06, 2008  <b>Instructions Dated</b> June 2, 2008 <b>Project No.</b> OPR-W408-NRT4-08  <b>Vessel</b> NOAA Launch S1211  <b>Chief of Party</b> Lucy Hick, Team Leader  <b>Surveyed by</b> Lucy Hick, John Doroba, and Dan Jacobs  <b>Soundings by echo sounder</b> Odom CVX2 Vertical Beam Echosounder  <b>Graphic record scaled by</b> N/A  <b>Graphic record checked by</b> N/A <b>Automated Plot</b> N/A  <b>Verification by</b> Atlantic Hydrographic Branch  <b>Soundings in</b> meters at Great Lakes Low Water Datum (LWD) <i>(H-Cell units are In feet at LWD)</i> </p>	
<p> <b>REMARKS:</b> (1) All times are in UTC.            (2) This is a basic hydrographic survey under the Navigable Area Concept.            (3) Projection is UTM Zone 17N  <i>Bold, Red, Italic notes in the DR were made during office processing.</i> </p>	

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**DESCRIPTIVE REPORT**

to accompany  
Hydrographic Survey H11914  
OPR-W408-NRT4-08

Scale of Survey 1:10,000  
Year of Survey: 2008  
Navigation Response Team 4  
NOAA Launch S1211  
Lucy Hick - Team Leader

**A. AREA SURVEYED** *See also the Evaluation Report.*

This Basic Hydrographic survey was conducted in accordance with the \*Project Letter Instructions for project OPR-W408-NRT4-08, West Lake Erie, Detroit and St. Clair Rivers, MI. The instructions are dated June 2, 2008. *\*Filed with original field records.*

The St. Clair River is about 39 miles long from Lake St. Clair via St. Clair Cutoff Channel and South Channel to the head of the river at Lake Huron. The lower 11 miles of the river is a broad delta through which numerous channels flow into Lake St. Clair. St. Clair Cutoff Channel and South Channel form the main navigation route through the delta and connect with the dredged channel across Lake St. Clair.

The survey area, assigned to NRT4, consisted of 1.74 SNM of the St. Clair River. This included the area from Marine City to St Clair. A total of 58.55 linear nautical miles (LNM) of mainscheme (MS) data and 22.61 LNM of crossline (XL) VBES data were collected in this area.

Both 200% sidescan sonar (SSS) and Vertical Beam Echosounder Data (VBES) were collected in the river and the dredged channel. SSS data were collected at 75 meter range scale, with lines run along the length of the river. XL VBES data were collected across the river with 100 meter line spacing.

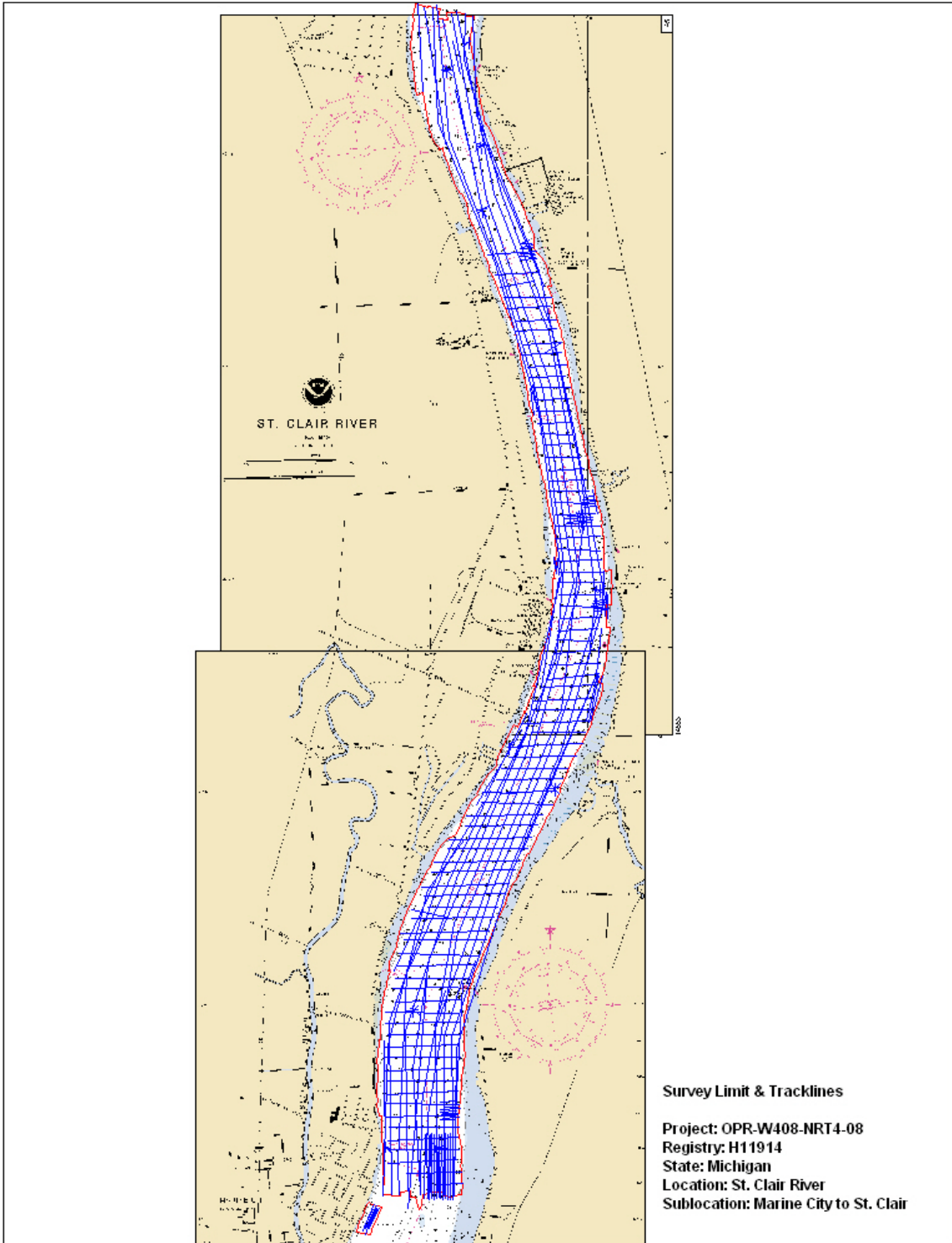
No bottom samples or detached positions were collected for this survey. *Concur.*

\*Survey Limits for Sheet H, H11914 are as follows: *See the Evaluation Report.*

42° 42' 45.49" N	82° 31' 29.96" W
42° 49' 23.46" N	82° 25' 48.13" W

Survey Dates: June 20, 2008 (DN: 172) to August 6, 2008 (DN: 219)

Survey limits and tracklines are displayed graphically on the following page.



## **B. DATA ACQUISITION AND PROCESSING** *See also the Evaluation Report*

### **B.1. EQUIPMENT**

Data were acquired by Navigation Response Team 4 using Survey Launch S1211. The vessel was configured as described in the *\*Data Acquisition and Processing Report (DAPR)* for this project. Major data acquisition systems are summarized below. *\*Submitted with H-Cell Deliverables.*

NOAA Survey Launch S1211 was used to acquire positions, soundings, imagery, and sound velocity data. S1211 was manufactured by SeaArk and has a length overall (LOA) of 9.14 meters (30 feet) and a draft of 0.5 meters. Positions were acquired with a Trimble DSM212L Differential GPS (DGPS) beacon receiver. Soundings were acquired with an ODOM CVX2 VBES system. Imagery was acquired with a stern-towed KLEIN 3000 side scan sonar (SSS) system. Water column sound velocity data was acquired with an ODOM Digibar Pro DB1200 sound velocity profiler.

Data were acquired using Hypack v6.2b and processed using CARIS HIPS & SIPS v6.1 SP1 Hotfix 13.

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

Data integrity for H11914 was insured by following the *\*Field Procedures Manual* and the *NOS Hydrographic Surveys Specifications and Deliverables Manual*, both dated May 2008. *\*Filed at AHB.*

Differential GPS was used for all hydrographic data acquired on this survey.

#### **Crosslines**

As stated in the previous section, SSS data was collected along the river. Therefore MS VBES data were also collected along the river. However, this method did not provide enough soundings to compare with the current charted soundings. To correct for this, crosslines were run across the river at 100 meter line spacing. No crosslines were run in the northern 2200 meters of the survey area.

Eighty-six crosslines, for a total of 22.61 LNM, were acquired by the field party. This is approximately 38.6 percent of MS acquisition (58.55 LNM). A visual inspection of XL data and main scheme data showed good comparison. Select MS-XL intersections were examined using the 3-D subset editor in CARIS. Good MS-XL comparison was also seen at these intersections.

## Uncertainty

Uncertainty values were entered into the **\*\*CARIS HIPS Vessel File (HVF)** as per the **\*FPM**, Appendix 4. Total Propagated Uncertainty values were then calculated in CARIS. Because Tidal Constituent and Residual Interpolation (TCARI) was used and no tidal uncertainty values were provided with the Project Instructions, a value of zero was entered in the both the Measured and Zoning Tide value field. A measured Sound Speed value of 4 m/s was used. This is based on the recommended value for 1 cast/ 4 hours, in the **\*FMP FPM** Appendix 4. However, for VBES a cast is only recommended at a minimum of once per week **\*(FPM Section 3.5.1)**. Since actual cast were acquired more frequently than that, so the 4 m/s value was still considered valid. **\* Filed at AHB. \*\*Submitted with H-Cell Deliverables.**

A 5 meter resolution BASE Surface (H11914\_Uncertainty\_5m) was generated in CARIS using these uncertainty values. Uncertainty values seen ranged between 0.10 and 0.18 meters, with the highest uncertainty values located in the deepest water.

## Junctions

No junctioning surveys were provided for comparison with this project. **Concur.**

## GPS Quality Control

Daily GPS dropouts were observed, however no particular cause for these dropouts could be determined. If the dropout was short, data continued to be collected and the navigation was interpolated in CARIS. If the dropout continued for a significant period of time, the survey line was ended and acquisition was restarted when the GPS signal returned. Portions of lines with significant GPS dropouts were reacquired. GPS dropouts were noted in the Processing Log for this project.

## Timing

During the verification of project H11915, it was discovered that the PC clock time had not been synched to the GPS time. This error was carried though to all sheets of OPR-W408-NRT4-05 and can be seen in H11914. This time offset is around 21 seconds. However the amount of the offset varies on each line, possibly due to PC clock drift.

Correspondence with CARIS and Jack Riley (NOAA, HSTP) has confirmed that all data collected with this error was time stamped from the same source. The PC clock was used to time stamp the digital soundings, the BIN file analog data, and the positions. Therefore, there is no relative offset between any of these data. However there is an offset between the collected data and the water level data, used to reduce the soundings. Downloaded water level data is time stamped, using UTC time. Upon discussion with Jack Riley and Gene Parker (NOAA, AHB), it



was determined that this small offset would not significantly effect the final results. Therefore, NRT4 has decided to not correct for this offset on any of the lines.

E-mails, relating to this timing issue, can be found in \*Appendix V of this report. *\*Submitted with H-Cell Deliverables.*

### **Vertical Beam Echosounder Quality Control**

While collecting VBES data, the least depths were sometimes not accurately digitized by the echosounder. However, the least depth (LD) was visible in the analog trace. NRT4 personnel adjusted the VBES parameters levels to compensate for this. When this was not effective, the least depths were determined from the analog trace and the digital data was manually edited during CARIS post-processing. This was accomplished by determining the time of the LD of the feature in the Pydro Post Acquisition Tool's BIN File Viewer. CARIS's SB Editor was then used to insert the LD at that time. A visual check was used to ensure that the depth and time corresponded to what was seen in the BIN file. This procedure was only used prior to sound velocity (SV) correcting the VBES data. If a depth was required to be inserted after the SV correction, the entire line was reconverted and reprocessed in CARIS.

In shallow areas, the lake and river bottom was covered with dense vegetation. Usually, the VBES was unable to lock onto the true bottom in these areas. The VBES gains and power levels were adjusted; however it was often impossible to compensate for the vegetation. In these areas, the collected sounding data represented the top of the vegetation, not the actual lake bottom. In general, it was possible to use the analog trace to see where the vegetation had been ensonified. The Pydro Post-Acquisition Tool's BIN Viewer was used to identify areas of vegetation. These erroneous soundings were then rejected in the CARIS SB Editor. Because no SSS data existed to determine if rocks were concealed in these grassy areas, NRT4 was conservative with this editing and only attempted to reject obvious or significantly high grass.

### **\*Side Scan Sonar Quality Control** *\*See also the Evaluation Report*

The SSS data were acquired at frequencies of 100kHz and 500kHz. The recorder was set to 75 meter range scale for all areas of the survey. There were no water depths greater than 20 meters in areas where side scan data were collected *Concur.*

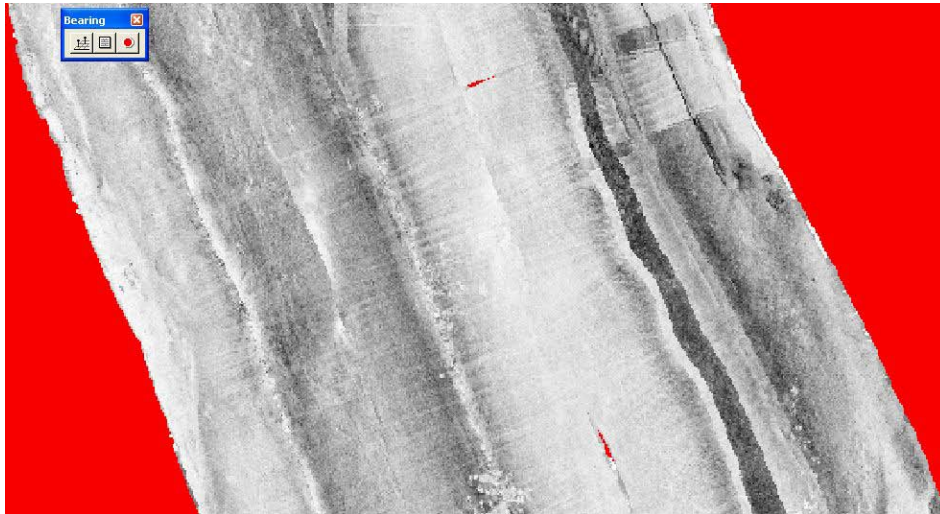
An operational cable out distance of 10m was used under normal circumstances. In a few instances of shallow water depth, the tow cable was shortened.

Daily confidence checks were conducted by observing side scan imagery in the vicinity of known contacts, such as seawalls, breakwaters, and buoys. Side scan data were considered satisfactory if these items could be distinguished throughout the entire range of the side scan trace. The confidence checks were performed daily at both frequencies. Coverage of 200% was obtained

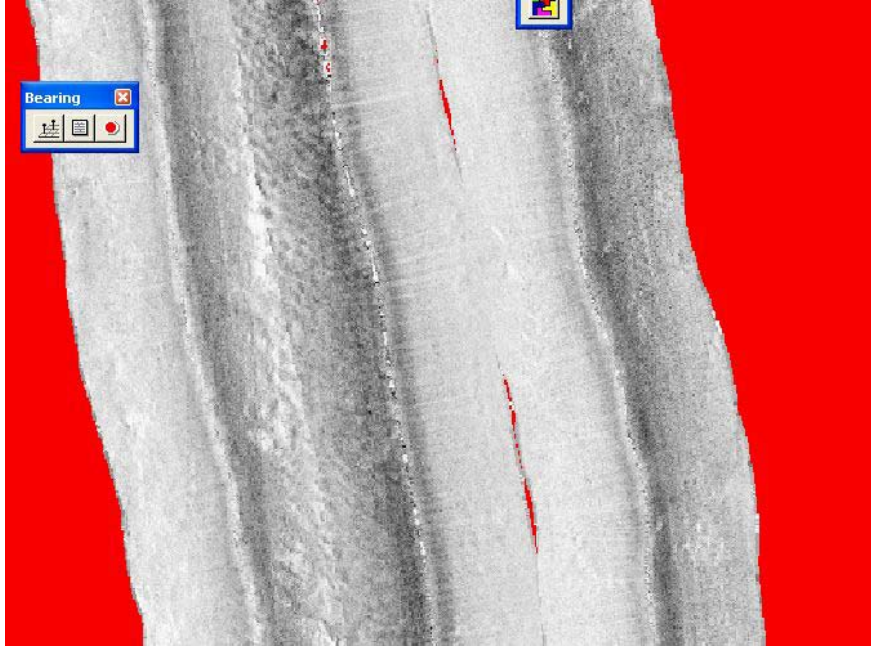
wherever possible in the required survey areas and where water depth and/or hazards permitted. Depending on location, side scan sonar coverage was conducted from shore-to-shore or from edge-of-channel to edge-of-channel.

Gaps in SSS coverage occurred at the following locations:

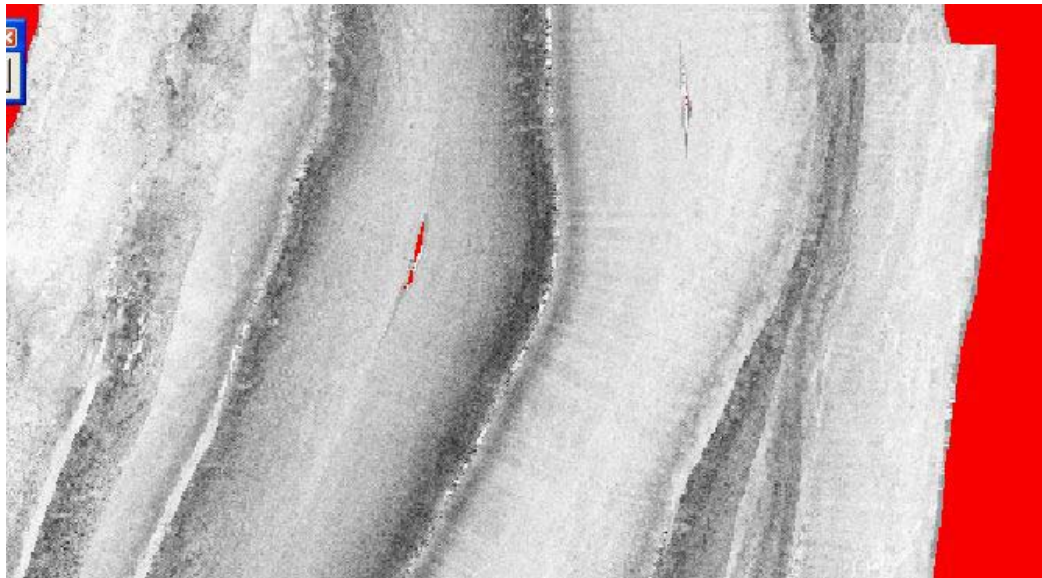
42° 47' 54.834" N, 82° 28' 39.396" W & 42° 47' 46.9104"N, 82° 28' 35.4036" W –  
Approximately 2 meter gaps in 100% SSS data.



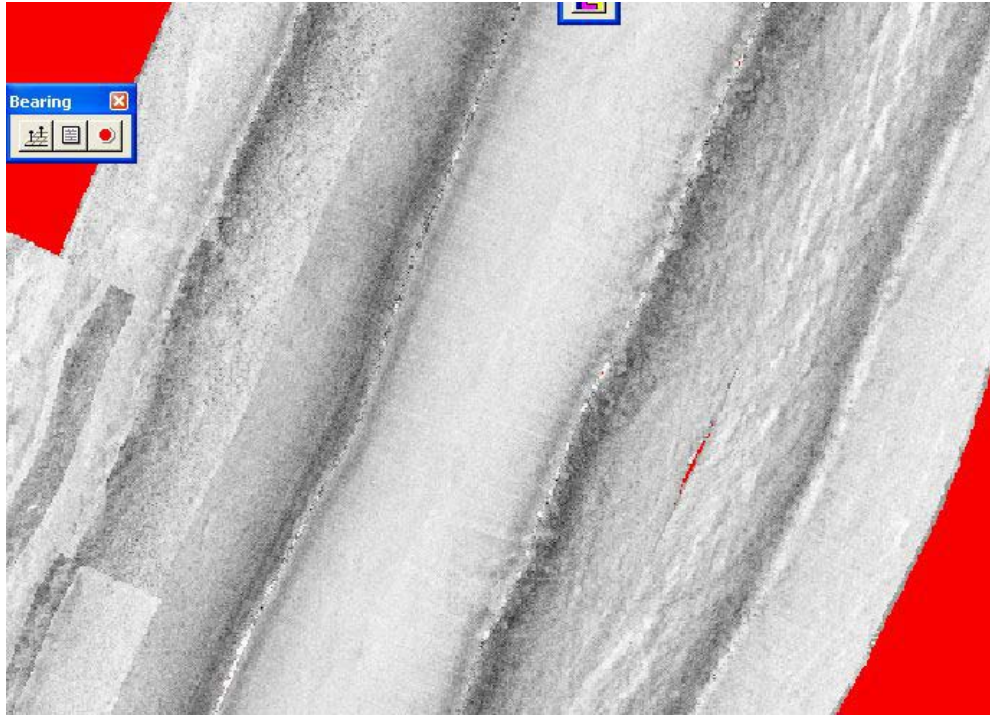
42° 46' 25.5216"N, 82° 28' 4.2276"W & 42° 46' 17.0796"N & 82° 28' 1.6536"W – 2-3 meter gaps  
in 100% SSS data.



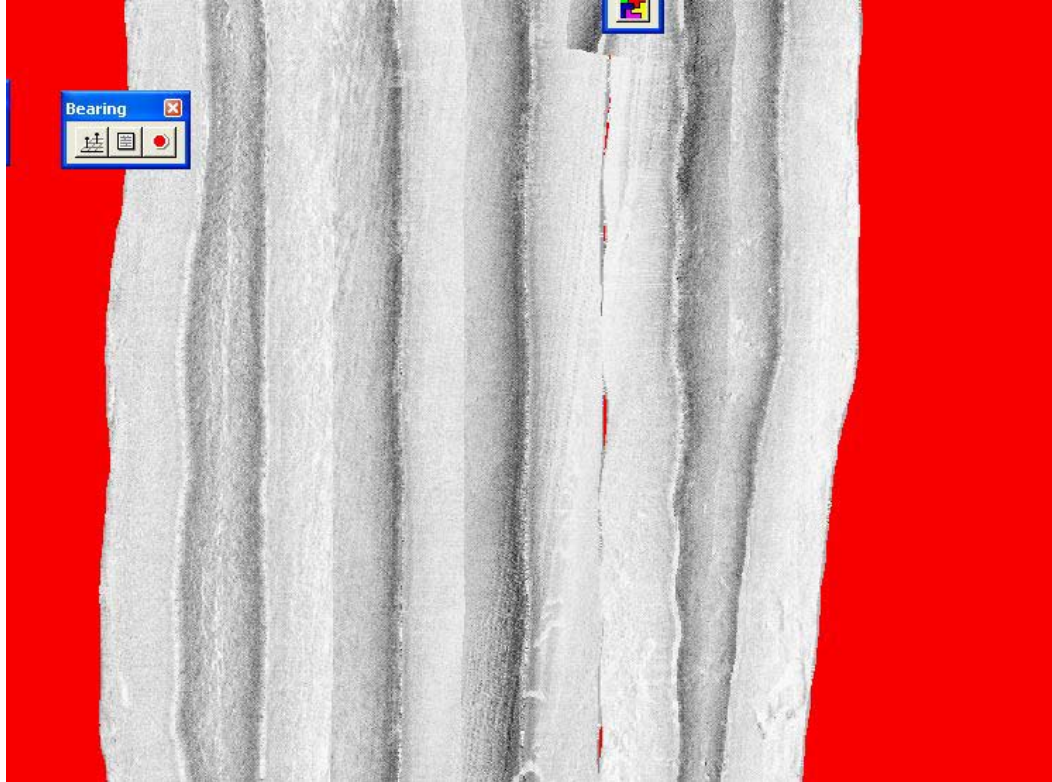
42° 45' 42.6168" N, 82° 28' 6.0348"W – Approximately 2m gap in 100% SSS data.



42° 45' 18.7776" N, 82° 28' 6.6216"W – Approximately 3m gap in 100% SSS data.



42° 43' 53.9436"N, -82° 28' 58.5912"W to 42° 43' 30.9396"N, -82° 28' 58.4544" –  
Approximately 3m gaps in 100% SSS data.



### **B.3. CORRECTIONS TO ECHO SOUNDING**

Corrections to echo soundings did not deviate from the methods explained in the \*DAPR.

*\*Submitted with H-Cell Deliverables.*

## **C. VERTICAL AND HORIZONTAL CONTROL** *\*See also the Evaluation Report*

### **C.1. VERTICAL CONTROL**

All soundings were reduced to Low Water Datum (LWD) with verified water levels and Tidal Constituent and Residual Interpolation (TCARI).

A Request for Approved Water Levels letter was sent to N/OPS1 on November 21, 2008. A Tide Note and final TCARI grid was received on December 9, 2008. Both the request and the Tide Note are included in \*Appendix IV. *\*Data appended to this Report.*

The operating National Water Level Observation Network (NWLON) stations at Algonac (901-4070) and St. Clair Shores (903-4052) served as datum control and provided water level reducers for the survey area.

Verified water levels from the N/OPS1 CO-OPS website were downloaded and applied to all soundings for this sheet.

The TCARI grid, H11914-TCARI.tc was used as the final grid to apply water level data to the soundings.

### **C.2. HORIZONTAL CONTROL**

The horizontal datum used for this survey is the North American Datum of 1983 (NAD 83), projected using UTM zone 17N. The USCG DGPS Beacon, in the auto-select mode control, was used as the reference station used for this survey.

Horizontal dilution of precision (HDOP) was monitored daily on Hypack. At no point did HDOP exceed 4.00. Adequate satellite coverage was maintained throughout most of the survey period.

All positioning equipment was operated in a manner consistent with the manufacturer requirements and as described in the \*DAPR. *\*Submitted with H-Cell Deliverables.*

## **D. RESULTS AND RECOMMENDATIONS**

### **D.1. CHART COMPARISON \*See also the Evaluation Report**

Four raster charts and one ENC are affected by this survey:

Chart	Edition	Edition Date	Issue Date	Update #	Scale
14500	27 <sup>th</sup>	Oct-02	Feb-09	276	1:500,000
14820	21 <sup>st</sup>	Oct-05	Feb-09	133	1:400,000
14852	46 <sup>th</sup>	Jun-06	Feb-09	126	1:15,000 1:40,000
14853	17 <sup>th</sup>	Mar-08	Feb-09	54	1:15,000

Cell Name	Edition	Update Application Date	Issue Date
US5MI33M	15 <sup>th</sup>	Mar-09	Mar-09

### **General Agreement with Charted Soundings**

In general, soundings acquired in the survey area agreed favorably with currently charted soundings, within 1 to 2 feet. The St. Clair River Channel extends into the SE corner of the survey area. All newly acquired soundings in this channel were deeper than the current tabulated depths for the channel.

### **AWOIS Item Investigations**

Five AWOIS items were assigned within the Sheet G. Information about these AWOIS Items can be found in the Survey Features Report, \*Appendix II. *\* Data appended to this Report.*

### **Dangers to Navigation**

No Dangers to Navigation were submitted for this project. *Concur.*

### **Bottom Samples**

No bottom samples were collected for this project. NRT4 does not possess a bottom sampler. *Concur.*

## **D. 2. ADDITIONAL RESULTS**

### **Aids to Navigation and Other Detached Positions**

A list of Aids to Navigation (AToNs) was received from Christopher Hare, of the Office of Coast Survey (OCS), on May 30, 2008. Within Sheet G, this list included 7 fixed AToNs, for which MCD was requesting an accurate position. These AToNs will be addressed in the Field Examination Report, F00556.

All charted floating AToNs were visually inspected by NRT4 and determined to be on station and serving their intended purpose. *Concur.*

### **Ferry Routes**

The Blue Water ferry transits between Marine City & Sombra, south of the survey area. The charted ferry route appears to be accurate. *Concur.*

### **Submarine Cables and Pipelines**

Several intake and sewage pipelines are charted along the river banks. In addition, a pipeline area is charted south of the Ontario-Hydro Lambton Generation Station. These pipelines were not investigated by NRT4. *Concur.*

### **Bridges, Overhead Cables, and Overhead Pipelines**

An overhead cable is charted north of the Detroit Edison Co. The vertical clearance was not verified by NRT4. However upon visual examination the position of the overhead cable seems to be charted accurately. *Concur.*

### **Fish Havens**

No fish havens exist in the hydro survey boundary. *Concur.*



## APPROVAL SHEET

**OPR-W408-NRT4-08  
Basic Hydrographic Survey  
St. Clair River  
Port Huron to South End of Lake Huron  
Michigan  
Registry No. H11914**

Field operations for this basic hydrographic survey were conducted under my daily supervision with frequent checks of progress and adequacy. All deliverable files, this Descriptive Report, digital data, and all accompanying records are approved. This approval constitutes the assumption of responsibility for the stated accuracy and completeness of the hydrographic survey.

This survey is adequate to supersede all prior surveys in common areas, and for application to the relevant NOS nautical charts.

The following survey records have been submitted prior to this report and are not included with this submission:

Hydrographic Systems Readiness Review (submitted by NRT1)	03/01/2008
OPR-W408-NRT4-08 Data Acquisition & Processing Report	11/13/2008
OPR-W408-NRT4-08 Horizontal & Vertical Control Report	11/13/2008

Respectfully,  
Submitted:

Lucy Hick  
Team Leader, Navigation Response Team 4

# H11914\_AWOIS Items Feature Report

**Registry Number:** H11914  
**State:** Michigan  
**Locality:** St. Clair River  
**Sub-locality:** Marine City to St. Clair  
**Project Number:** OPR-W408-NRT4-08  
**Survey Date:** 08/06/2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
14853	17th	03/01/2008	1:15,000 (14853_43)	USCG LNM: None (04/14/2009) CHS NTM: None (03/27/2009) NGA NTM: None (04/18/2009)
14853	17th	03/01/2008	1:15,000 (14853_41)	USCG LNM: None (02/03/2009) CHS NTM: None (01/30/2009) NGA NTM: None (02/07/2009)
14853	17th	03/01/2008	1:15,000 (14853_42)	USCG LNM: 07/15/2003 (02/03/2009) CHS NTM: 11/28/2003 (01/30/2009) NGA NTM: 05/31/2008 (02/07/2009)
14852	46th	06/01/2006	1:40,000 (14852_1)	USCG LNM: 03/24/2009 (04/14/2009) NGA NTM: 11/08/2008 (04/18/2009)
14820	21st	10/01/2005	1:400,000 (14820_1)	[L]NTM: ?
14500	27th	10/01/2002	1:1,500,000 (14500_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	AWOIS #10703 - OBSTRUCTION (Crib)	AWOIS	[no data]	[no data]	[no data]	---
1.2	AWOIS #14210	Wreck	9.30 m	42° 48' 24.0" N	082° 28' 54.0" W	14210
1.3	AWOIS #14208	Wreck	4.51 m	42° 45' 13.3" N	082° 28' 30.5" W	14208
1.4	AWOIS #10705	Obstruction	8.71 m	42° 47' 44.1" N	082° 28' 40.5" W	10705
1.5	AWOIS 10704	Obstruction	10.34 m	42° 45' 57.1" N	082° 27' 55.4" W	10704

**1 - DR\_AWOIS**

**1.1) AWOIS #10703 - AWOIS #10703 - OBSTRUCTION (Crib)****No Primary Survey Feature for this AWOIS Item**

**Search Position:** 42° 43' 00.5" N, 082° 29' 23.6" W  
**Historical Depth:** [None]  
**Search Radius:** 30  
**Search Technique:** S2,ES  
**Technique Notes:** [None]

**History Notes:**

HISTORY ■ \*\*\*\* SOURCE UNKNOWN -- PROBABLE SOURCE LAKE SURVEY SHEET;DEPTH OVER CRIB 35 FT APPEARS ON FIRST EDITION (FEB 1974) OF CHART 14852 IN 42-43-00.5N, 082-29-23.6W NAD 83.

**Survey Summary**

**Charts Affected:** 14853\_41, 14852\_1, 14820\_1, 14500\_1

**Remarks:**

Crib seen in SSS data. SBES Investigation lines run over charted location of crib parallel to shore at 10 m spacing. Lines were run as far in shore as safely possible. Positive indication of crib not seen in SBES data.

**Feature Correlation**

Address	Feature	Range	Azimuth	Status
AWOIS Items	AWOIS # 10703	0.00	000.0	Primary

**Hydrographer Recommendations**

Hydrographer recommends retaining crib as charted.

**S-57 Data**

[None]

**Office Notes**

Concur. Retain crib as charted.

## 1.2) Profile/Beam - 115/1 from h11914 / 1211\_sb / 2008-219 / 007\_1952

### Primary Feature for AWOIS Item #14210

**Search Position:** 42° 48' 24.1" N, 082° 28' 54.1" W  
**Historical Depth:** 9.75 m  
**Search Radius:** 0  
**Search Technique:** [None]  
**Technique Notes:** [None]

#### History Notes:

CL 1062/2006-- NOS, NRT-4; An uncharted wreck was identified by side scan sonar and developed with single beam echosounder. The least depth was found to be 9.95 meters with the surrounding area depth of 13 meters. The least depth was taken at 42°48'24.116"N - 82°28'54.131"W. (Entered CEH 5/2008)

### Survey Summary

**Survey Position:** 42° 48' 24.0" N, 082° 28' 54.0" W  
**Least Depth:** 9.30 m (= 30.50 ft = 5.083 fm = 5 fm 0.50 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.974$  m ; TVU (TPEv)  $\pm 0.128$  m  
**Timestamp:** 2008-219.19:52:36.900 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 007\_1952  
**Profile/Beam:** 115/1  
**Charts Affected:** 14853\_42, 14853\_43, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

AWOIS Item 14210. In 2006, an uncharted wreck was identified by NRT4 by side scan sonar and developed with single beam echosounder. The least depth was found to be 9.95 meters with the surrounding area depth of 13 meters. This wreck was redeveloped during operations for H11915. New LD found to be 9.3 meters.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/007_1952	115/1	0.00	000.0	Primary
h11914/1211_sss500k_200percent/2008-172/h080620172900	0001	2.56	151.1	Secondary
AWOIS Items	AWOIS # 14210	4.42	138.2	Secondary
h11914/1211_sss500k_100percent/2008-171/h080619150400	0001	6.71	029.2	Secondary

## Hydrographer Recommendations

Hydrographer recommends revising LD on charted Subm Wk.

### Cartographically-Rounded Depth (Affected Charts):

30ft (14853\_42, 14853\_43, 14852\_1)

5fm (14500\_1)

9.3m (14820\_1)

## S-57 Data

**Geo object 1:** Wreck (WRECKS)  
**Attributes:** CATWRK - 2:dangerous wreck  
CONVIS - 2:not visual conspicuous  
HEIGHT - 3.65 m  
QUASOU - 6:least depth known  
SORDAT - 20080806  
STATUS - 1:permanent  
TECSOU - 1:found by echo-sounder  
VALSOU - 9.296 m  
VERDAT - 13:Low water  
WATLEV - 3:always under water/submerged

## Office Notes

Concur. Delete the charted 32 foot dangerous sunken wreck. Chart a 30 foot dangerous sunken wreck in the present survey location.

### Feature Images

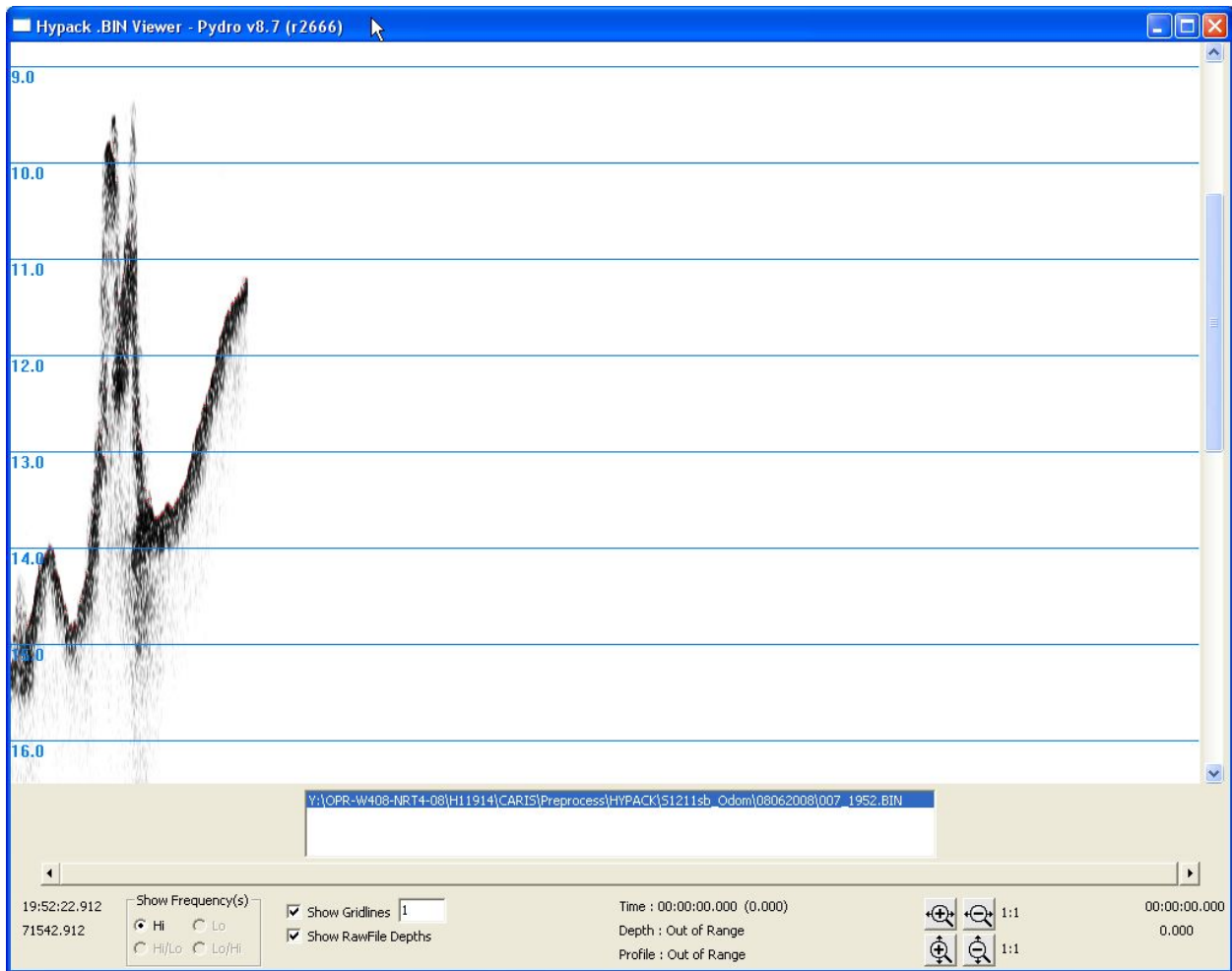


Figure 1.2.1

### 1.3) Profile/Beam - 378/1 from h11914 / 1211\_sb / 2008-219 / 027\_1909

#### Primary Feature for AWOIS Item #14208

**Search Position:** 42° 45' 14.1" N, 082° 28' 30.2" W  
**Historical Depth:** 4.27 m  
**Search Radius:** 75  
**Search Technique:** S2, ES, MB  
**Technique Notes:** [None]

#### History Notes:

\*\*\*Unknown Source-- A 14 foot submerged wreck was charted before 1974 on Lake Survey Chart. (Entered CEH 5/2008)

#### Survey Summary

**Survey Position:** 42° 45' 13.3" N, 082° 28' 30.5" W  
**Least Depth:** 4.51 m (= 14.81 ft = 2.468 fm = 2 fm 2.81 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.963$  m ; TVU (TPEv)  $\pm 0.114$  m  
**Timestamp:** 2008-219.19:09:49.989 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 027\_1909  
**Profile/Beam:** 378/1  
**Charts Affected:** 14853\_41, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

AWOIS #14208. Charted 14ft Subm Wk identified in SSS data. Wk was investigated with SBES and found to be located approximately 27m south of current charted location.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/027_1909	378/1	0.00	000.0	Primary
h11914/1211_sss500k_100percent/2008-184/h080702150300	0001	5.56	330.7	Secondary
h11914/1211_sss500k_200percent/2008-184/h080702135800	0001	7.73	353.4	Secondary
AWOIS Items	AWOIS # 14208	25.90	192.6	Secondary



## Hydrographer Recommendations

Hydrographer recommends relocating position of Subm Wk to current surveyed position.

### Cartographically-Rounded Depth (Affected Charts):

15ft (14853\_41, 14852\_1)

2 ½fm (14500\_1)

4.5m (14820\_1)

## S-57 Data

**Geo object 1:** Wreck (WRECKS)

**Attributes:** CATWRK - 2:dangerous wreck

INFORM - 14 foot dangerous sunken wreck

OBJNAM - AWOIS 14208

QUASOU - 4:unreliable sounding

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VALSOU - 4.513 m

VERDAT - 13:Low water

WATLEV - 3:always under water/submerged

## Office Notes

Concur with conditions. Wreck found about 35m south of charted position with a least depth of 15 feet. Retain the 14 foot dangerous sunken wreck least depth and revise to present survey location. Item not sufficiently investigated to disprove charted depth. Delete charted 14 foot dangerous sunken wreck. Chart dangerous 14 foot sunken wreck in the present survey location.

### Feature Images

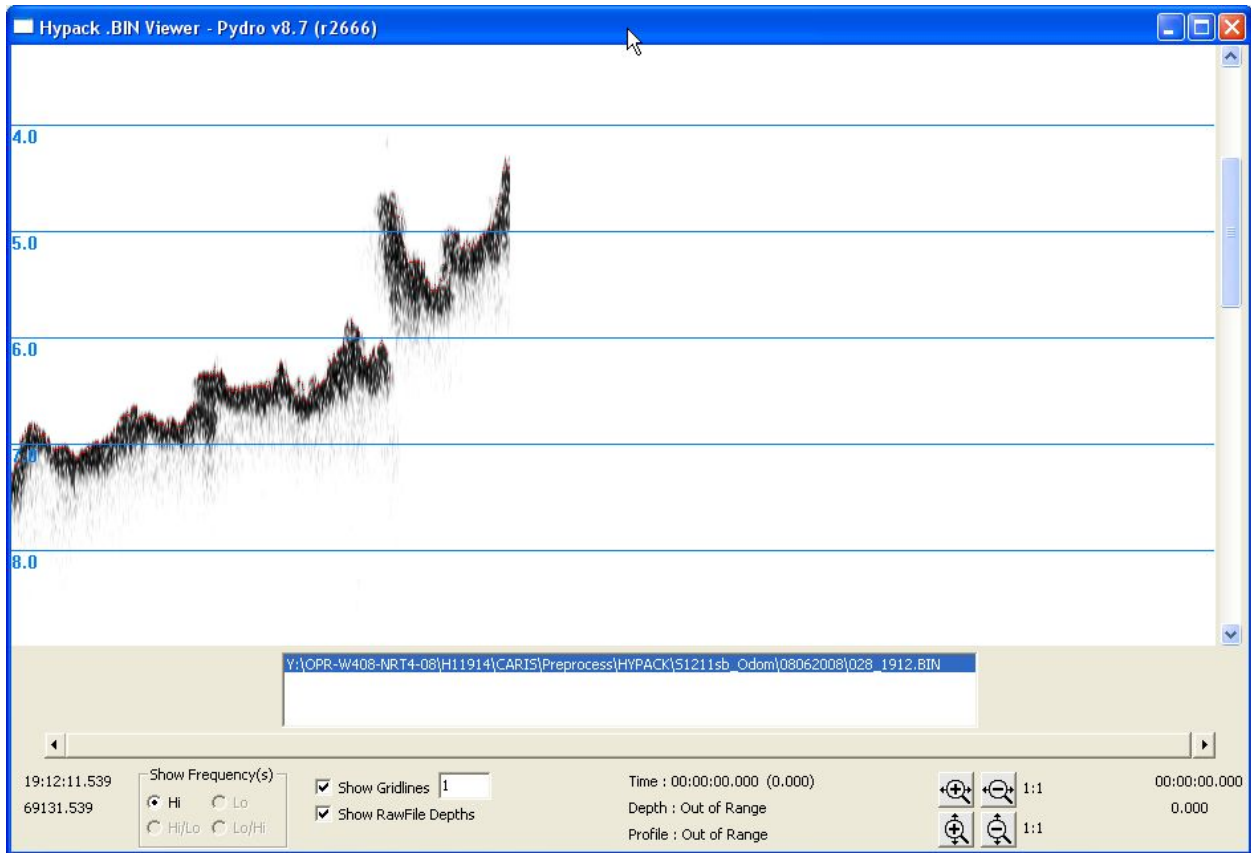


Figure 1.3.1



*Figure 1.3.2*

## 1.4) Profile/Beam - 141/1 from h11914 / 1211\_sb / 2008-219 / 014\_1937

### Primary Feature for AWOIS Item #10705

**Search Position:** 42° 47' 48.1" N, 082° 28' 41.7" W  
**Historical Depth:** [None]  
**Search Radius:** 0  
**Search Technique:** S2,ES  
**Technique Notes:** CONDUCT A SEARCH 75M OUT FROM AN AXIS RUNNING FROM POS.42-47-49.4 N 082-28-44.3 W TO POS.■42-47-40.2N 082-28-39.8 W

#### History Notes:

HISTORY■ LNM27/88--9TH CGD, 9/9/88; USACE HAS LOCATED A SUBMERGED OBJECT APPROX. 175 FT BY 75 FT WITH A CLEAR SWEEP DEPTH OF 27.4 FT REFERRED TO LWD, AND WITHIN THE FEDERAL NAVIGATION CHANNEL. THE OBJECT IS LOCATED ON THE U.S. SIDE OF THE CHANNEL IN APPROX. POS. 42 47 48N, 82 28 42W (NAD 27) OPPOSITE THE ONTARIO-HYDRO LAMBTON GENERATING STATION. ENTERED 7/00 MCR■ CL88/2000--REFERS TO THE APPLICATION OF TOPO COMPILATION GC10406, CRIT LISTING IDENTIFIES THIS AS A SOURCE TO MOVE OBSTRUCTION SYMBOL.■ GC10406/1996--SUBMERGED OBSTRUCTION SHOWN IN POS.42-47-41.52N 082-28-42.77W. CHARTED OBSTRUCTION MOVED, HOWEVER CHARTED POSITION DOES NOT AGREE WITH LNM27/88 POSITION OR THE TOPOGRAPHIC POSITION. ENTERED 8/00 MCR

### Survey Summary

**Survey Position:** 42° 47' 44.1" N, 082° 28' 40.5" W  
**Least Depth:** 8.71 m (= 28.59 ft = 4.764 fm = 4 fm 4.59 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.971$  m ; TVU (TPEv)  $\pm 0.126$  m  
**Timestamp:** 2008-219.19:37:33.600 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 014\_1937  
**Profile/Beam:** 141/1  
**Charts Affected:** 14853\_42, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

Charted 32 ft Subm Obsn identified in SSS data record. Obsn investigated with SBES in a star shaped pattern. LD of 28.6 ft obtained over Obsn. LD is deeper than controlling depths in the maintained channel to the south and thus was not considered shoal enough to be a DToN.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/014_1937	141/1	0.00	000.0	Primary

h11914/1211_sss500k_200percent/2008-172/h080620165200	0007	5.40	122.4	Secondary
h11914/1211_sss500k_200percent/2008-172/h080620172900	0002	7.22	309.9	Secondary
h11914/1211_sss500k_100percent/2008-171/h080619150400	0002	11.73	176.8	Secondary
AWOIS Items	AWOIS # 10705	125.66	167.1	Secondary

## Hydrographer Recommendations

Hydrographer recommends revising charted sounding over Subm Obstrn.

### Cartographically-Rounded Depth (Affected Charts):

28ft (14853\_42, 14852\_1)

4 ¾fm (14500\_1)

8.7m (14820\_1)

## S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** INFORM - Least depth on obstruction

OBJNAM - AWOIS 10705

QUASOU - 6:least depth known

STATUS - 1:permanent

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VALSOU - 8.713 m

VERDAT - 13:Low water

WATLEV - 3:always under water/submerged

## Office Notes

Concur. AWOIS GP is north of the charted 32 foot dangerous submerged obstruction. Revise the charted obstn to a 28 foot dangerous submerged obstruction in the present survey location. Update AWOIS Listing to reflect present survey location.

### Feature Images

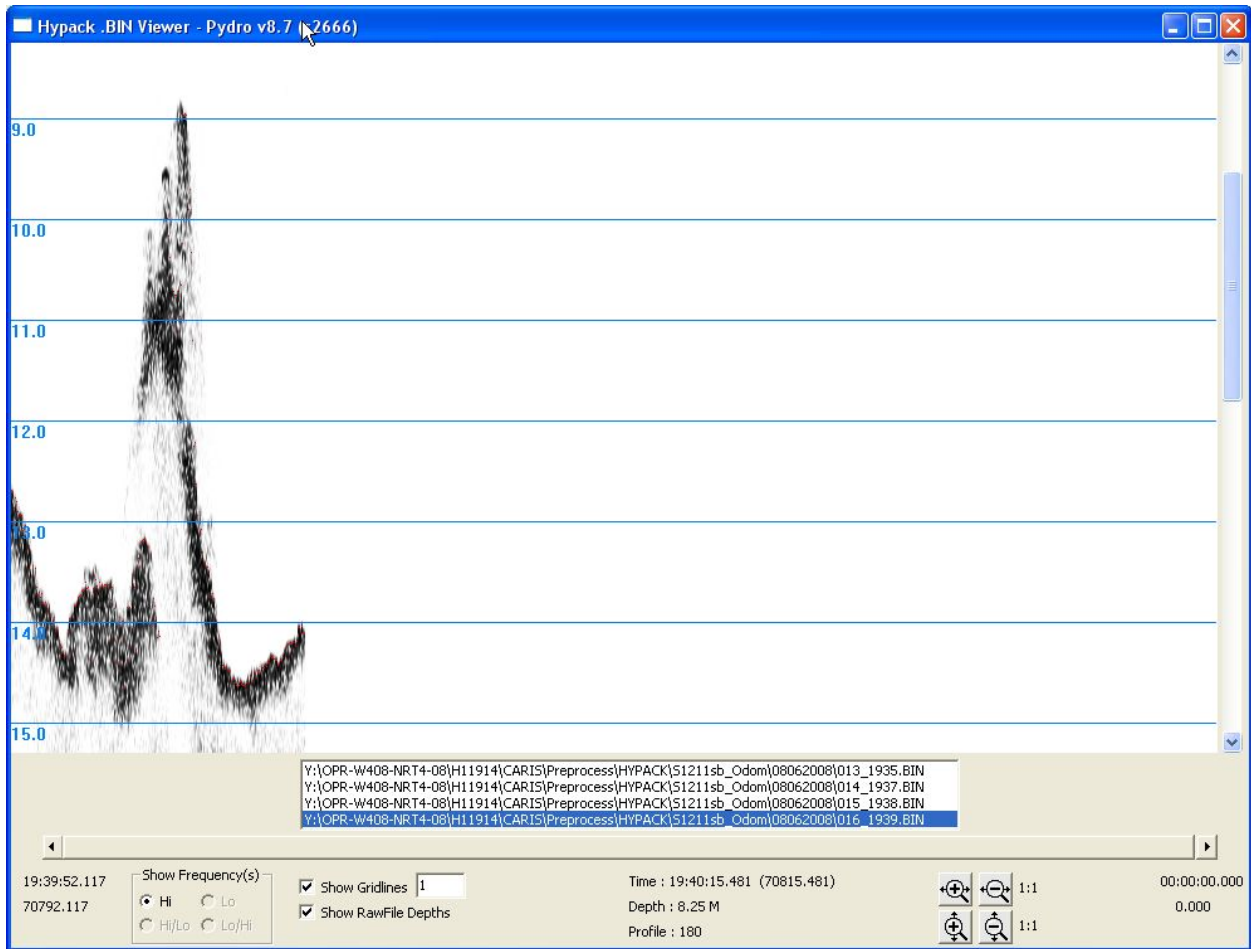
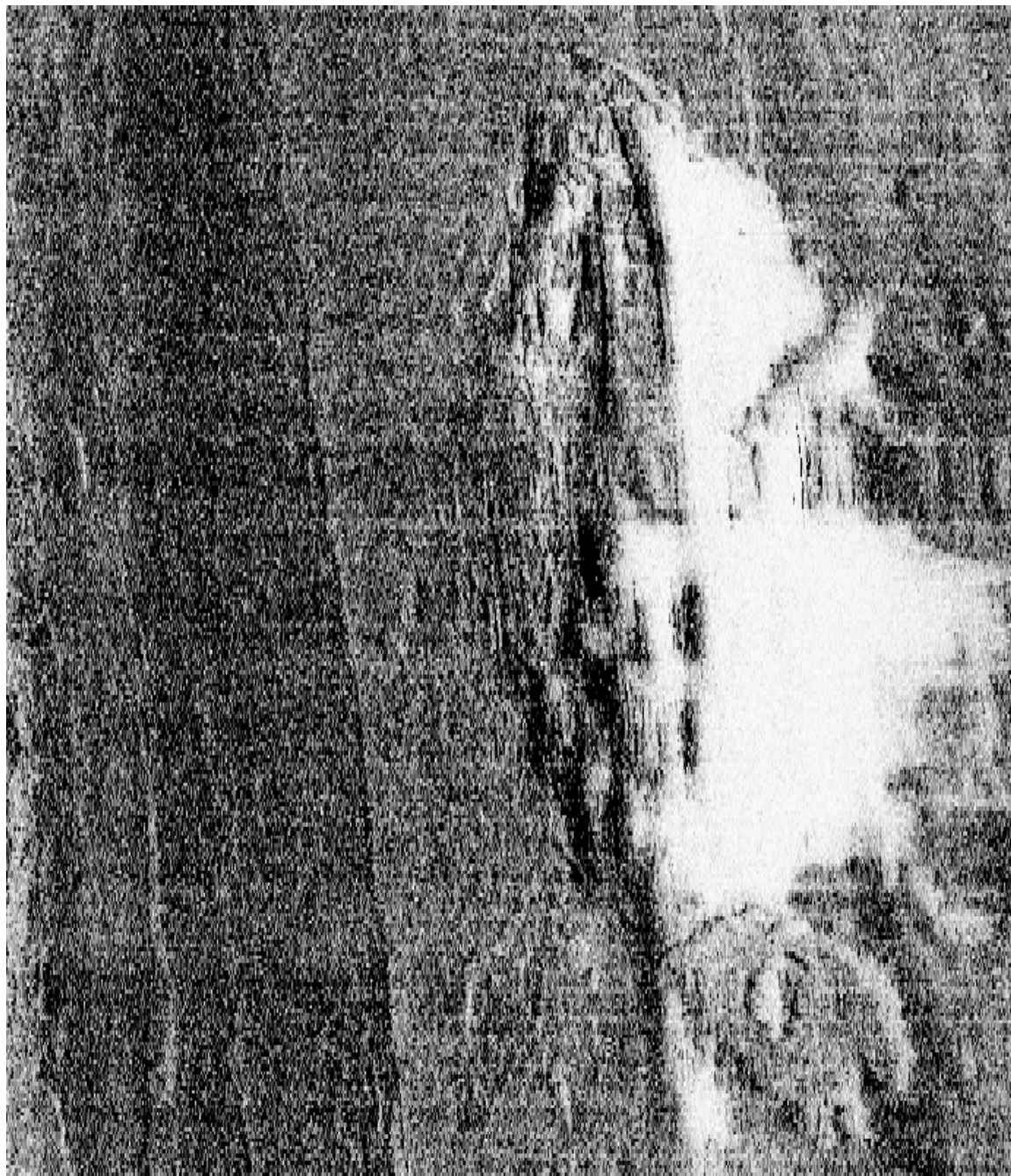


Figure 1.4.1



*Figure 1.4.2*

## 1.5) Profile/Beam - 159/1 from h11914 / 1211\_sb / 2008-219 / 018\_1918

### Primary Feature for AWOIS Item #10704

**Search Position:** 42° 45' 57.4" N, 082° 27' 54.9" W  
**Historical Depth:** [None]  
**Search Radius:** 50  
**Search Technique:** S2,ES  
**Technique Notes:** [None]

#### History Notes:

HISTORY ■ \*\*\*\*SOURCE UNKNOWN -- PROBABLE SOURCE LAKE SURVEY SHEET; DEPTH OVER CRIB 35 FT APPEARS ON FIRST EDITION (FEB 1974) OF CHART 14852 IN 42-45-57.4 N 082-27-54.9 W NAD 83

### Survey Summary

**Survey Position:** 42° 45' 57.1" N, 082° 27' 55.4" W  
**Least Depth:** 10.34 m (= 33.92 ft = 5.653 fm = 5 fm 3.92 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.962$  m ; TVU (TPEv)  $\pm 0.121$  m  
**Timestamp:** 2008-219.19:18:43.000 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 018\_1918  
**Profile/Beam:** 159/1  
**Charts Affected:** 14853\_42, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

[None]

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/018_1918	159/1	0.00	000.0	Primary
h11914/1211_sss500k_200percent/2008-178/h080626154800	0001	2.64	218.0	Secondary
h11914/1211_sss500k_100percent/2008-184/h080702151900	0001	2.87	216.5	Secondary
h11914/1211_sb/2008-219/020_1920	353/1	6.37	293.5	Secondary
h11914/1211_sss500k_100percent/2008-171/h080619162900	0001	13.86	281.2	Secondary
AWOIS Items	AWOIS # 10704	15.52	227.2	Secondary
h11914/1211_sss500k_200percent/2008-184/h080702141100	0001	18.05	341.9	Secondary



## Hydrographer Recommendations

Revise charted crib.

### Cartographically-Rounded Depth (Affected Charts):

34ft (14853\_42, 14852\_1)

5 ½fm (14500\_1)

10.3m (14820\_1)

## S-57 Data

**Geo object 1:** Obstruction (OBSTRN)

**Attributes:** CATOBS - 4:crib

INFORM - Depth over Crib

OBJNAM - AWOIS 10704

QUASOU - 6:least depth known

STATUS - 1:permanent

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VALSOU - 10.338 m

VERDAT - 13:Low water

WATLEV - 3:always under water/submerged

## Office Notes

Crib. Revise Symbol to present survey location. Revise note to Depth over crib 34 ft.

# H11914\_DR\_UnCharted Feature Report

**Registry Number:** H11914  
**State:** Michigan  
**Locality:** St. Clair River  
**Sub-locality:** Marine City to St. Clair  
**Project Number:** OPR-W408-NRT4-08  
**Survey Date:** 08/06/2008

## Charts Affected

Number	Edition	Date	Scale (RNC)	RNC Correction(s)*
14853	17th	03/01/2008	1:15,000 (14853_41)	USCG LNM: None (02/03/2009) CHS NTM: None (01/30/2009) NGA NTM: None (02/07/2009)
14853	17th	03/01/2008	1:15,000 (14853_42)	USCG LNM: 07/15/2003 (02/03/2009) CHS NTM: 11/28/2003 (01/30/2009) NGA NTM: 05/31/2008 (02/07/2009)
14852	46th	06/01/2006	1:40,000 (14852_1)	USCG LNM: 03/24/2009 (04/14/2009) NGA NTM: 11/08/2008 (04/18/2009)
14820	21st	10/01/2005	1:400,000 (14820_1)	[L]NTM: ?
14500	27th	10/01/2002	1:1,500,000 (14500_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	21 foot dangerous submerged obstruction	Obstruction	6.60 m	42° 46' 03.7" N	082° 28' 12.5" W	---
1.2	23 foot rocky area	Shoal	7.23 m	42° 43' 20.3" N	082° 29' 17.6" W	---
1.3	16 foot shoal depth	Shoal	4.81 m	42° 43' 20.0" N	082° 28' 57.2" W	---

## **1 - DR\_UnCharted**

## 1.1) Profile/Beam - 153/1 from h11914 / 1211\_sb / 2008-219 / 024\_1927

### Survey Summary

**Survey Position:** 42° 46' 03.7" N, 082° 28' 12.5" W  
**Least Depth:** 6.60 m (= 21.67 ft = 3.611 fm = 3 fm 3.67 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.967$  m ; TVU (TPEv)  $\pm 0.119$  m  
**Timestamp:** 2008-219.19:27:46.400 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 024\_1927  
**Profile/Beam:** 153/1  
**Charts Affected:** 14853\_42, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

Subm Crib seen in SSS data. SBES investigation lines run perpendicular to length of crib as far inshore as possible. Crib not designated at a DTOn d/t proximity to channel edge.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/024_1927	153/1	0.00	000.0	Primary
h11914/1211_sss500k_200percent/2008-172/h080620165200	0001	14.14	247.6	Secondary
h11914/1211_sss500k_200percent/2008-172/h080620165200	0002	26.45	101.2	Secondary

### Hydrographer Recommendations

Hydrographer recommends charting Subm Crib.

#### Cartographically-Rounded Depth (Affected Charts):

21ft (14853\_42, 14852\_1)

3 ½fm (14500\_1)

6.6m (14820\_1)

### S-57 Data

**Geo object 1:** Obstruction (OBSTRN)  
**Attributes:** CATOBS - 4:crib  
 INFORM - Depth on crib  
 OBJNAM - 21 ft dangerous subm obstruction

QUASOU - 6:least depth known

SORDAT - 20080806

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VALSOU - 6.604 m

VERDAT - 13:Low water

WATLEV - 3:always under water/submerged

## **Office Notes**

Concur. Chart a dangerous subm obstruction (subm crib) with a least depth of 21 feet in the present survey location.

### Feature Images

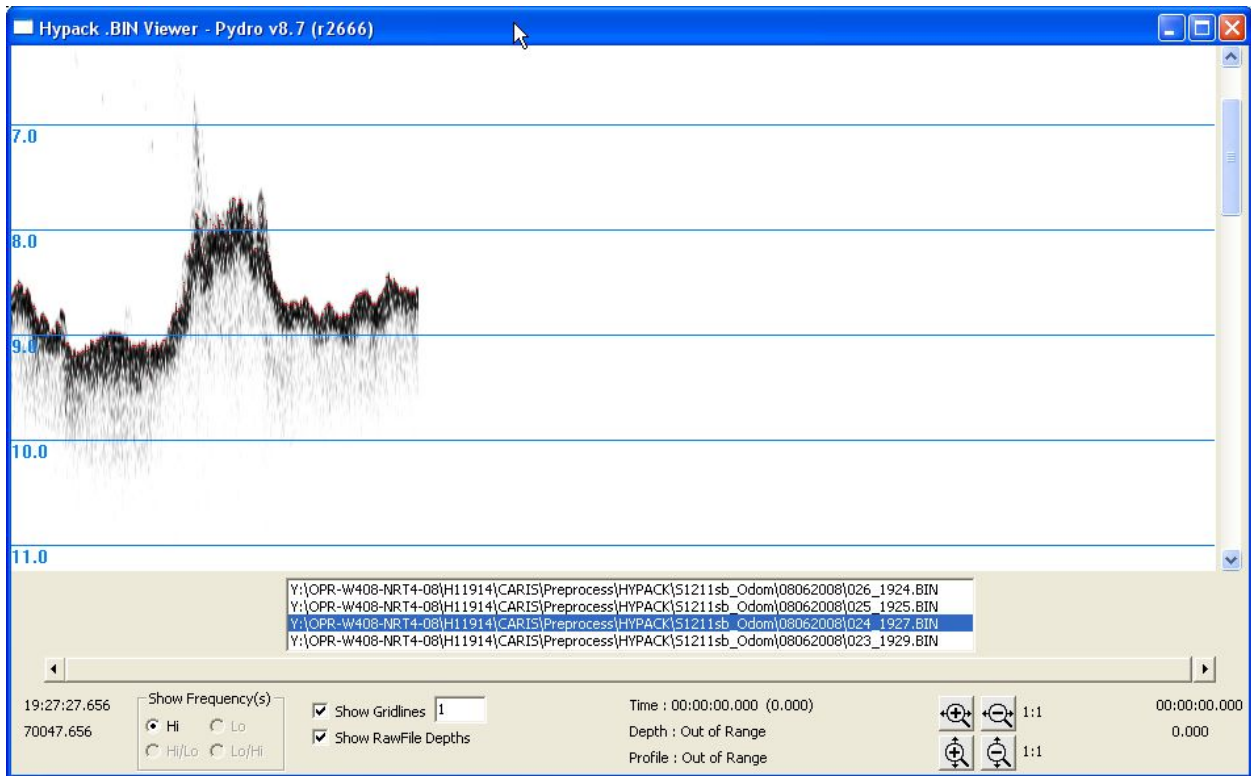
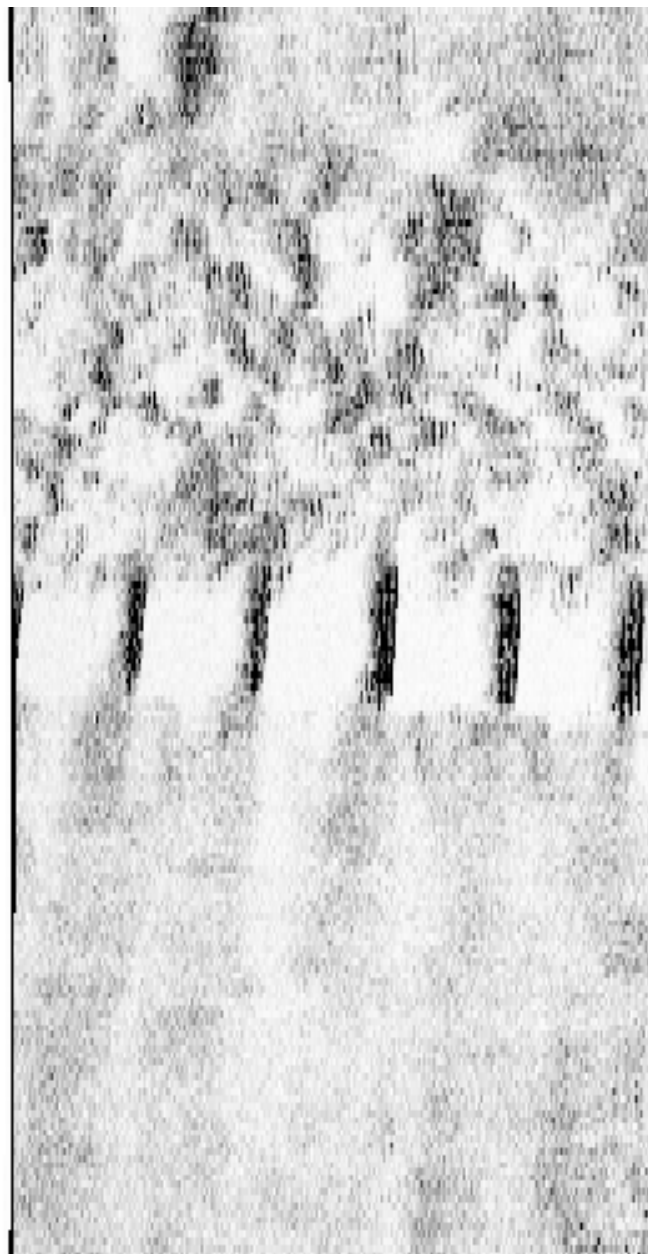


Figure 1.1.1



*Figure 1.1.2*

## 1.2) Profile/Beam - 122/1 from h11914 / 1211\_sb / 2008-219 / 047\_1837

### Survey Summary

**Survey Position:** 42° 43' 20.3" N, 082° 29' 17.6" W  
**Least Depth:** 7.23 m (= 23.71 ft = 3.952 fm = 3 fm 5.71 ft)  
**TPU ( $\pm 1.96\sigma$ ):** **THU (TPEh)**  $\pm 1.968$  m ; **TVU (TPEv)**  $\pm 0.121$  m  
**Timestamp:** 2008-219.18:37:57.900 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 047\_1837  
**Profile/Beam:** 122/1  
**Charts Affected:** 14853\_41, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

Subm Rk seen in SSS data, very close to shore. SBES investigation lines run to determine LD.

### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/047_1837	122/1	0.00	000.0	Primary
h11914/1211_sss500k_200percent/2008-178/h080626172300	0001	14.26	355.0	Secondary

### Hydrographer Recommendations

Hydrographer recommends charting Subm Rk.

#### Cartographically-Rounded Depth (Affected Charts):

23ft (14853\_41, 14852\_1)

4fm (14500\_1)

7.2m (14820\_1)

### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area  
 INFORM - rocky area. Label chart rky  
 OBJNAM - 23 foot depth  
 QUASOU - 6:least depth known  
 TECSOU - 1,2:found by echo-sounder,found by side scan sonar



VERDAT - 13:Low water

## Office Notes

Concur with conditions. Area is rocky. Chart a 23 foot depth and label area rocky.

### Feature Images

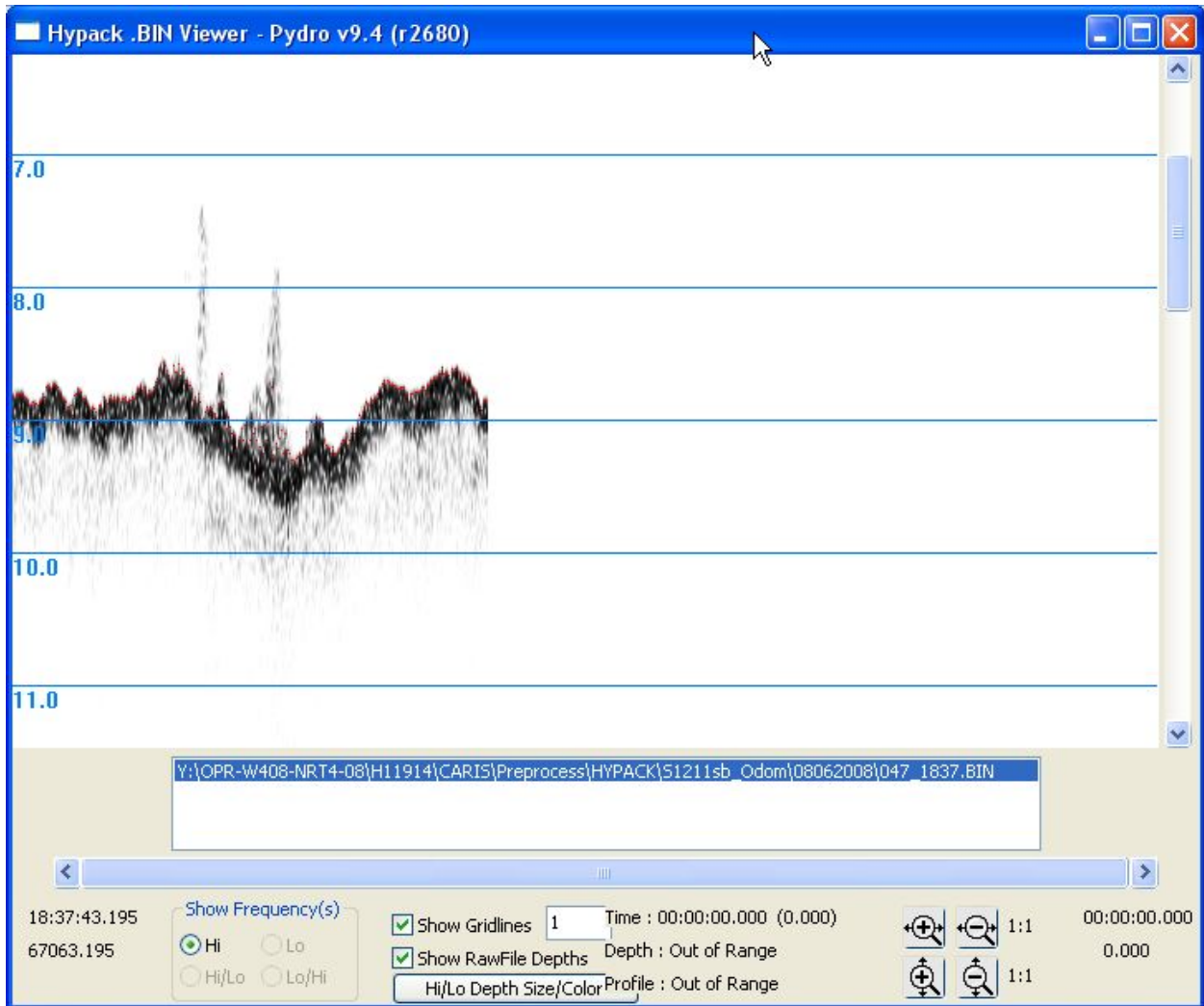


Figure 1.2.1



*Figure 1.2.2*

### 1.3) Profile/Beam - 1108/1 from h11914 / 1211\_sb / 2008-219 / 007\_1740

#### Survey Summary

**Survey Position:** 42° 43' 20.0" N, 082° 28' 57.2" W  
**Least Depth:** 4.81 m (= 15.77 ft = 2.629 fm = 2 fm 3.77 ft)  
**TPU ( $\pm 1.96\sigma$ ):** THU (TPEh)  $\pm 1.964$  m ; TVU (TPEv)  $\pm 0.115$  m  
**Timestamp:** 2008-219.17:42:38.126 (08/06/2008)  
**Survey Line:** h11914 / 1211\_sb / 2008-219 / 007\_1740  
**Profile/Beam:** 1108/1  
**Charts Affected:** 14853\_41, 14852\_1, 14820\_1, 14500\_1

#### Remarks:

Large contact seen at location of charted 18 ft shoal. Contact investigated with SBES in a star shaped pattern. LD of 16.3 ft found.

#### Feature Correlation

Address	Feature	Range	Azimuth	Status
h11914/1211_sb/2008-219/007_1740	1108/1	0.00	000.0	Primary
h11914/1211_sb/2008-219/043_1845	83/1	1.77	154.0	Secondary
h11914/1211_sss500k_200percent/2008-178/h080626144700	0002	8.34	015.7	Secondary
h11914/1211_sb/2008-219/046_1842	127/1	12.77	012.0	Secondary

#### Hydrographer Recommendations

Hydrographer recommends charted Subm Obstn and revising LD.

#### Cartographically-Rounded Depth (Affected Charts):

16ft (14853\_41, 14852\_1)

2 ½fm (14500\_1)

4.8m (14820\_1)

#### S-57 Data

**Geo object 1:** Sounding (SOUNDG)  
**Attributes:** EXPSOU - 2:shoaler than range of depth of the surrounding depth area  
 INFORM - Shoal sounding

OBJNAM - Shoal 16 foot depth

QUASOU - 6:least depth known

STATUS - 1:permanent

TECSOU - 1,2:found by echo-sounder,found by side scan sonar

VERDAT - 13:Low water

## Office Notes

~~Do not concur. Least depth found during office review of 15.77 feet. Add 16 foot shoal depth. Delete 18 foot charted shoal and revise position and least depth to present survey findings.~~

Do not concur. Obstruction found to be a rock during office review. LD 15.77. Chart rock with a LD of 15.77 and revise the 18 ft. shoal.



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

**TIDE NOTE FOR HYDROGRAPHIC SURVEY**

**DATE :** December 1, 2008

**HYDROGRAPHIC BRANCH:** Atlantic  
**HYDROGRAPHIC PROJECT:** OPR-W408-NRT4-2008  
**HYDROGRAPHIC SHEET:** H11914

**LOCALITY:** Marine City to St. Clair, MI  
**TIME PERIOD:** June 20 - August 6, 2008

**TIDE STATION USED:** 901-4070 Algonac  
Lat. 42° 37.2' N Long. 82° 31.6' W  
**PLANE OF REFERENCE (IGLD 1985):** 174.58 meters

**TIDE STATION USED:** 901-4080 St. Clair State Police  
Lat. 42° 48.8' N Long. 82° 29.2' W  
**PLANE OF REFERENCE (IGLD 1985):** 175.08 meters

**REMARKS: RECOMMENDED GRID**

Please use the TCARI grid "H11914-TCARI.tc" as the final grid for project OPR-W408-NRT4-2008, H11914 during the time period between June 20 and August 6, 2008.

**Refer to attachments for grid information.**

**Note 1:** Download 6-minute water level data in meters, relative to IGLD 1985 and on Greenwich Mean Time (GMT).

**Peter J. Stone**

Digitally signed by Peter J. Stone  
DN: cn=Peter J. Stone, o=CO-OPS, ou=NOAA/  
NOS, email=peter.stone@noaa.gov, c=US  
Date: 2008.12.05 17:18:35 -05'00'

CHIEF, OCEANOGRAPHIC DIVISION



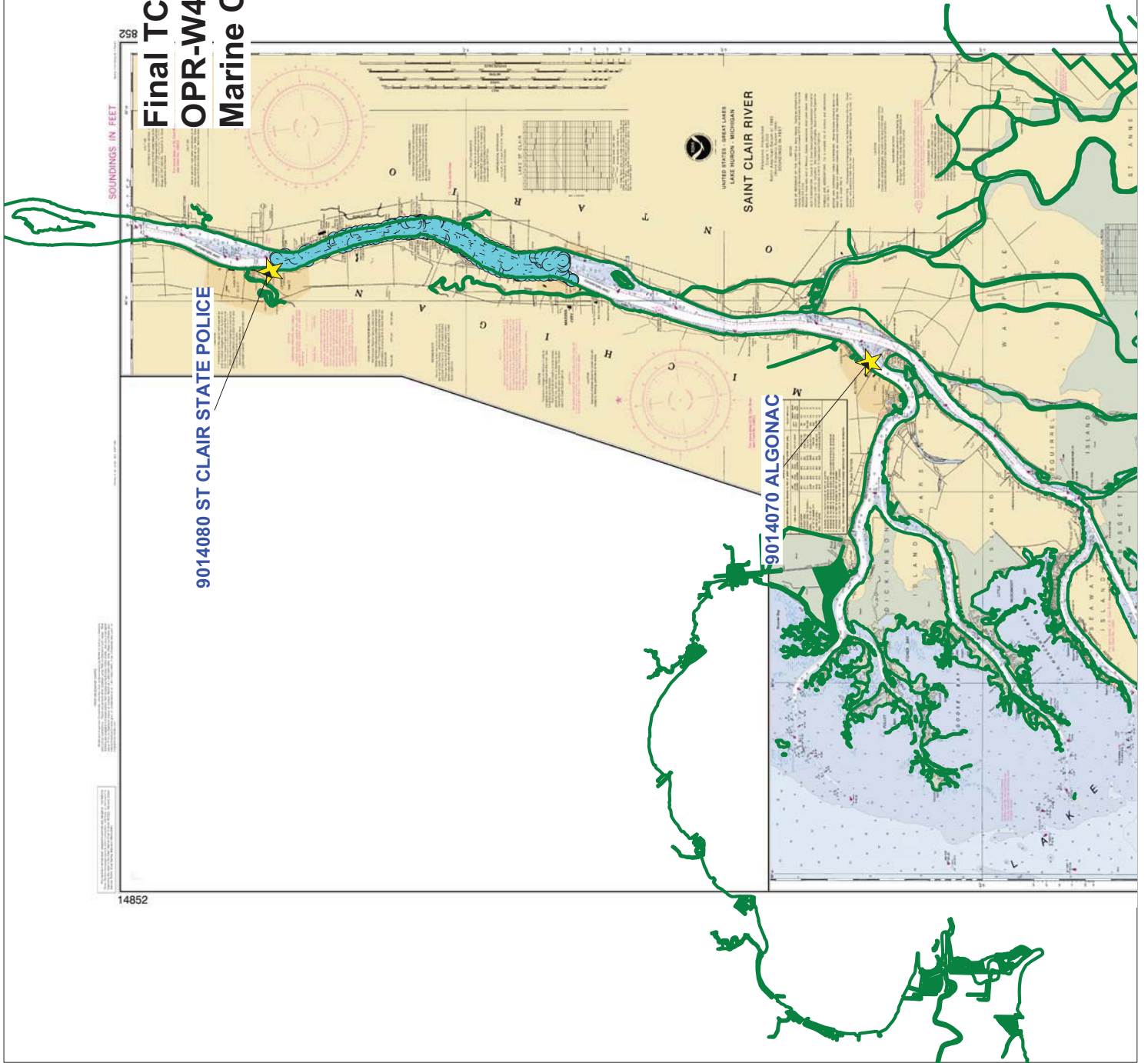
**Final TCARI Grid for  
OPR-W408-NRT4-2008, H11914  
Marine City to ST. CLAIR**

SOUNDINGS IN FEET

9014080 ST CLAIR STATE POLICE

9014070 ALGONAC

14852



## AHB COMPILATION LOG

General Survey Information	
REGISTRY No.	H11914
PROJECT No.	OPR-W408-NRT4-08
FIELD UNIT	NRT-4
DATE OF SURVEY	August 06, 2008
LARGEST SCALE CHART	<i>14853, edition 17, CCYYMMDD, 1:15000 (41-43)</i>
ADDITIONAL CHARTS	<i>14852, edition 46, CCYYMMDD, 1:40000</i>
SOUNDING UNITS	(feet)
COMPILER	SELF

Source Grids	File Name
	H:\Compilation\HXXXXXX_XXXX_XXXX\AHB_HXXXXXX\ <a href="#">E-SAR Final Products\GRIDS\H11914_5m_extract.hns</a>
Surfaces	File Name
	H:\Compilation\HXXXXXX_XXXX-XXXX\AHB_HXXXXXX\COMPILE\Working
<i>Combined</i>	N/A, VBES survey only
<i>Interpolated TIN</i>	<a href="#">\Interpolated TIN\H11914_5m_Interp_TIN.hns</a>
<i>Shifted Interpolated TIN</i>	<a href="#">\Shifted Surface\H11914_20m_InterpTIN_Shifted.hns</a>
<i>Product Surface</i>	N/A, VBES survey only
Final HOBs	File Name
	H:\Compilation\HXXXXXX_XXXX-XXXX\AHB_HXXXXXX\COMPILE\Final_Hobs\
<i>Survey Scale Soundings</i>	<a href="#">H11914_SS_Soundings.hob</a>
<i>Chart Scale Soundings</i>	<a href="#">H11914_CS_Soundings.hob</a>
<i>Contour Layer</i>	<a href="#">H11914_Contours.hob</a>
<i>Feature Layer</i>	<a href="#">H11914_Features.hob</a>
<i>Meta-Objects Layer</i>	<a href="#">H11914_MetaObjects.hob</a>
<i>Blue Notes</i>	<a href="#">H11914_BlueNotes.hob</a>
<i>ENC Retain Soundings</i>	<a href="#">H11914_ENC_Soundings.hob</a>

Meta-Objects Attribution	
Acronym	Value
<b>M_COVR</b>	
CATCOV	Coverage available
SORDAT	20080806
SORIND	US,US,survey,H11914
<b>M_QUAL</b>	
CATZOC	Data not assessed
INFORM	H111914,OPR-W408-NRT-08,NRT-4
POSACC	10
SORDAT	20080806
SORIND	US,US,survey,H11914
SUREND	20080806
SURSTA	20080620
<b>DEPARE</b>	
DRVALV 1	14.28806
DRVALV2	62.669

[Type text]



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

SORDAT	20080806
SORIND	US,US,nsurf,H11914
<b>M_CSCL</b>	
CSCALE	N/A
SORDAT	N/A
SORIND	N/A

**SPECIFICATIONS:**

- I. COMBINED SURFACE:
  - a. Number of ESAR Final Grids:
  - b. Resolution of Combined (m): 4m
  
- II. SURVEY SCALE SOUNDINGS (SS):
  - a. Radius
  - b. Shoal biased
  - c. Use Single-Defined Radius (mm at Map Scale): ; Radius Value = 0.75
  - d. Queried Depth of All Soundings = 8807 Soundings
    - i. Minimum: 4.7900 ft
    - ii. Maximum: 62.0669 ft
  
- III. INTERPOLATED TIN SURFACE:
  - a. Resolution (m): 10 meters
  - b. Linear
  - c. Shifted value: *[-0.229m (feet), ( $\leq 10$  fathoms)]*  
*[-1.372m (fathoms), ( $> 10$  fathoms)]*
  
- IV. CONTOURS:
  - a. Use a Depth List: NOAA\_depth\_curves\_list.txt
  - b. Line Object: DEPCNT
  - c. Value Attribute: VALDCO
  
- V. FEATURES:
  - a. Total Number of Features: 6
  - b. Number of Insignificant Features: N/A
  
- VI. CHART SURVEY SOUNDINGS (CS): CS soundings were extracted from and interpolated triangular irregular network of the survey scale soundings
  - a. Number of ENC CS Soundings: 113 \*ENC soundings were extracted from ENC US5MI33M. ENC US5MI33M is constructed from chart 14852. The ENC extracted sounding set is a representation of the smaller scale chart that encompasses the survey area.
  - b. Radius
  - c. Shoal biased
  - d. Use Single-Defined Radius: m on the ground
    - i. Radius Value (m): 80
    - ii. Or use a Sounding Space Range Table (if applicable): N/A
  - e. Filter: Interpolated != 1
  - f. Number Survey CS Soundings: 575
  
- VII. Notes:
- VIII.

[Type text]

**ATLANTIC HYDROGRAPHIC BRANCH  
EVALUATION REPORT to ACCOMPANY  
SURVEY H11914 (2008)**

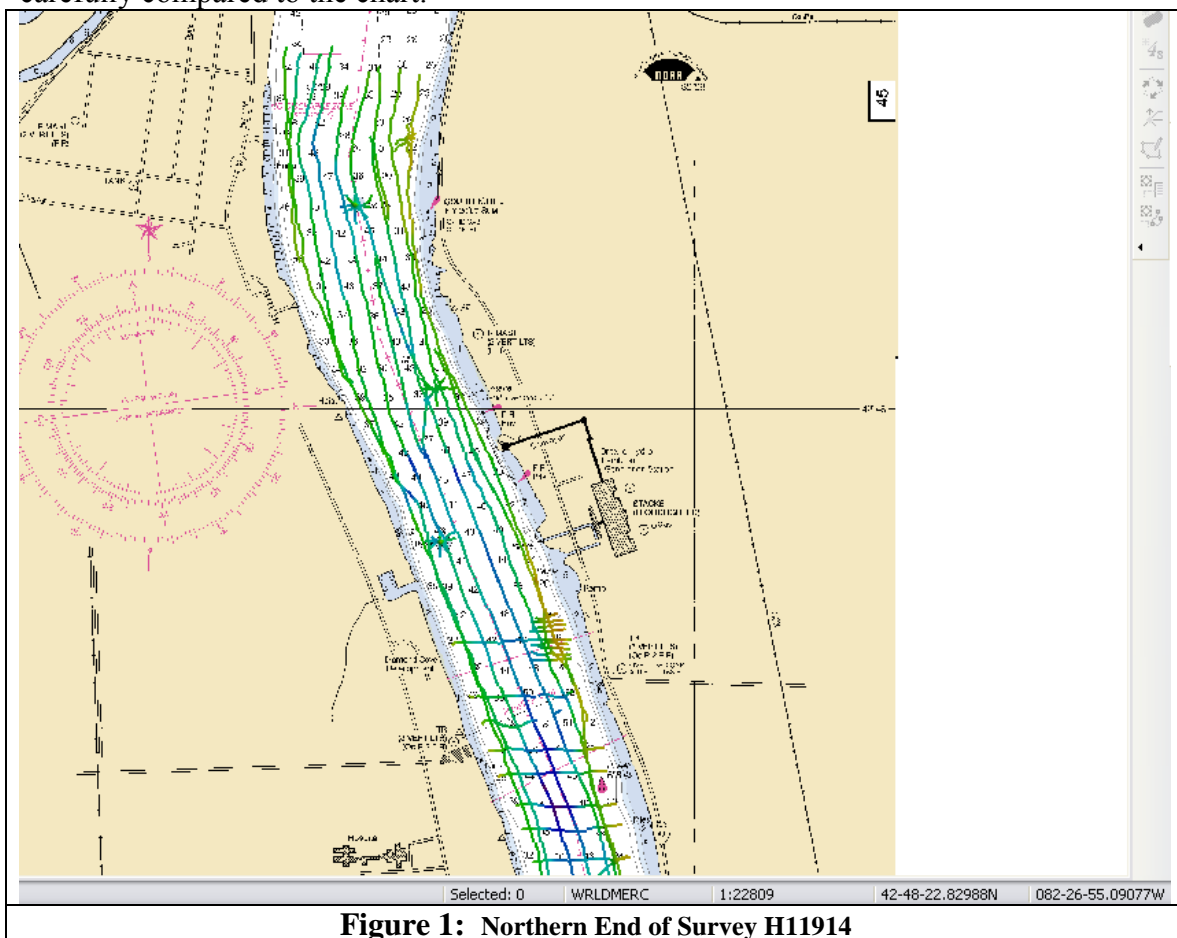
This Evaluation Report has been written to supplement and/or clarify the original Descriptive Report. Sections in this report refer to the corresponding sections of the Descriptive Report.

**A. AREA SURVEYED**

Survey Limits for Sheet H, H11914 are as follows:

NW corner:	42°48'45.39"N	82°29'15.75"W
NE corner:	42°42'53.96"N	82°27'49.00"W
SW corner:	42°42'53.96"N	82°29'35.07"W
SE corner:	42°48'45.39"N	82°27'49.00"W

The field unit did not acquire a sufficient density of bathymetric data in the northern end of the survey area. As a result, soundings in the northern end of the survey were carefully compared to the chart.



**B. DATA ACQUISITION AND PROCESSING**

**B.1 DATA PROCESSING**

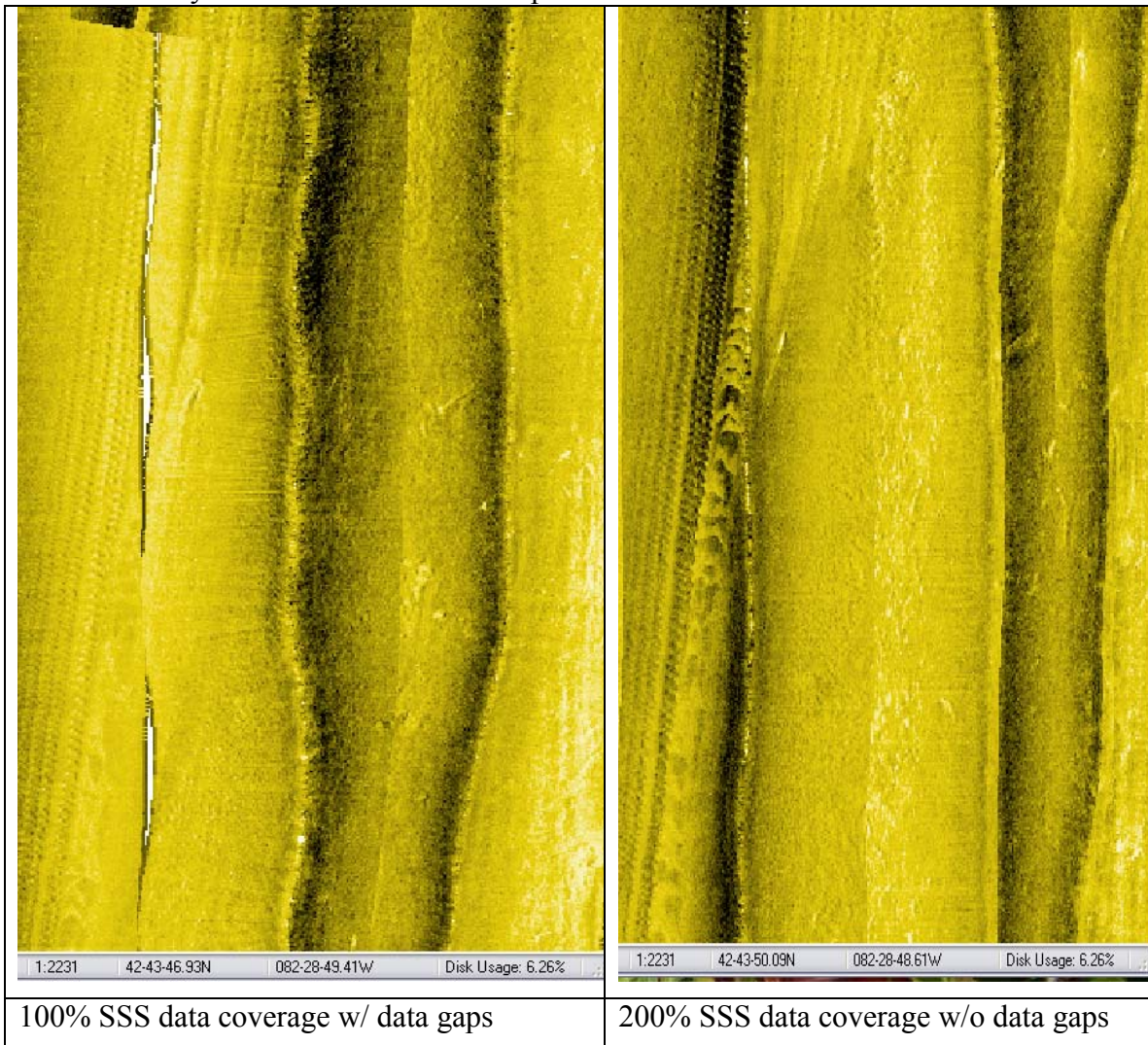
The following software was used to process data at the Atlantic Hydrographic Branch:

- CARIS HIPS/SIPS version 6.1 SP2 HF 7
- CARIS Bathymetry Manager version 2,1,0,0 SP1 HF 1-3
- CARIS Bathymetry Manager version 2,3
- CARIS S-57 Composer version 2.0 HF 3
- DKART INSPECTOR, version 5.0 Build 732 SP1
- CARIS HOM version 3.3 SP3 HF 8
- PYDRO v9.4 (r2691)

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

### **B.2.1. Side Scan Sonar Quality Control**

Gaps in the side scan sonar data were detected in Survey H11914. All data gaps are discussed in detail in the survey's descriptive report. Most data gaps were seen in the 100% SSS data coverage as seen below. No additional data gaps were found during the survey review or the H-Cell compilation.



### **B.2.2. H-Cell**

Survey H11914 was compiled in accordance with the Office of Coast Survey Nautical Chart Manual to furnish bathymetric and hazardous updates to nautical chart 14853. The source depth grid used for the nautical chart update was derived from the field unit's original 5 meter depth grid. Additional feature verification was achieved by correlating the side scan imagery with the source depth grid.

A 5m VBES grid generated at the Atlantic Hydrographic Branch was used for the survey's nautical chart update. The VBES grid was directly derived from the field unit's original bathymetric data. The selected sounding set is approximately 10 to 20 times the number of charted depths. Survey scale soundings were created from the 5 meter shoal extracted surface at 1:10,000. The chart scale selected soundings are a subset of the survey scale selected soundings. The chart scale soundings were selected from an interpolated triangular irregular network of the survey scale soundings. A filter was employed to ensure that no interpolated grid nodes were used for the chart scale sounding selection. The surface model was also referenced when manually selecting chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

Depth curves were created from a shifted interpolated TIN surface of 20m resolution. The depth curves are forwarded to MCD for reference only. The curves were utilized during chart scale sounding selection and quality assurance efforts at AHB. The depth curves are incorporated into the SS H-Cell product as per 2009 H-Cell Specifications.

The pre-compilation products or components (Stand Alone HOB files (SAHOB)) are detailed in the Compile Log attached at the end of this document. The SAHOB files included depth areas (DEPARE), depth contours (DEPCNT), sounding selections (SOUNDG), features (OBSTRN, WRECKS), Meta objects (M\_COVR, M\_QUAL), and cartographic Blue Notes (\$CSYMB).

All of the components with the exception of the sounding selection and depth contours were inserted into one feature layer (including the Bluenotes, as dictated by Hydrographic Technical Directive 2008-8). The feature layer was exported into S-57 format in order to create the H-Cell deliverable. Similarly, the sounding selection and depth contours were exported into S-57 format separately. Both the feature layer and the sounding selection S-57 files were processed in CARIS HOM to convert the metric units to feet. The final products are two S-57 files, in Lat/Lon NAD-83, one that contains the chart soundings, all the features, Meta objects, and Bluenotes (H11914\_CS.000), and one that contains the sounding selection and depth contours (H11914\_SS.000). Finally, quality assurance checks were made utilizing CARIS S-57 Composer version 2.0 validation checks and DKART INSPECTOR, version 5.0, tests

Chart compilation was performed by Atlantic Hydrographic Branch personnel in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, Silver Spring, Maryland.

H11914 CARIS H-Cell final deliverables include the following products:

H11914_CS.000	1:15,000 Scale	H11914 H-Cell with Chart Scale Selected
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		Soundings
H11914_SS.000	1:10,000 Scale	H11914 Selected Soundings (Survey Scale)

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

No Horizontal and Vertical Control Report (HVCR) was submitted for OPR-W408-NRT4-08 or with H11914.

### **D. RESULTS AND RECOMMENDATIONS**

**D.1 CHART COMPARISON**                      **14853 (17th Edition, Mar/08)**  
Corrected through NM 06/09/2009  
Corrected through LNM 06/20/2009  
Scale 1:15,000

**ENC Comparison**                                      **US5MI33M**  
Saint Clair River Michigan B  
Edition 16  
Application Date 2009-05-19  
Issue Date 2009-05-19  
Chart 14852

#### **D.1.1 Hydrography**

The charted hydrography originates with prior surveys and requires no further consideration. The hydrographer makes adequate chart comparisons in section "D" and Appendix 1&2 of the Descriptive Report. The following exceptions are noted: (examples below).

a. The field unit did not obtain bottom samples, therefore all charted seabed areas are to be retained as chart. The highest resolution ENC in the charted area does not contain SEABED feature objects. It is recommended that the SEABED features be carried over from the chart.

b. A submerged rock located in Latitude 42°43'20.3"N, Longitude 082°29'17.6"W was depicted in side scan sonar data, close to shore. The rock was further investigated with SSS to determine a LD of 23.714ft. Surrounding depths are with 1 to 2 feet of the submerged rock thus the chart compiler chose to depict the rock as a sounding in the H-Cell and chart the surrounding area as rocky.

c. A uncharted submerged Crib was identified in SSS data and verified by singlebeam echo sounder data. The Crib is located in Latitude 42°46'03.7"N, Longitude 082°28'12.5"W. The chart compiler recommends adding the feature to NOS chart 14853.

d. **Revise** AWOIS Item #14210 *dangerous sunken wreck, least depth known 32 feet*, at Latitude 42° 48' 24.1" N, Longitude 082°25'54.1"W to *dangerous sunken*

wreck, least depth known 30 feet, at Latitude 42° 48' 24.1" N, Longitude 082°25'54.1"W.

e. AWOIS Item #14208 was not found the charted location in Latitude 42° 45' 14.2" N, Longitude 082°28'30.5"W on NOS chart 14853 17<sup>th</sup> Ed.. The wreck was found about 35 m south of its charted position with at least depth of 14.8 feet.

**DELETE** AWOIS Item #14208 with LD of 14 from Latitude 42° 45' 14.2" N, Longitude 082°28'30.5"W. **ADD** AWOIS Item #14208, LD 14.8 feet, to Latitude 42° 45' 13.28" N, Longitude 082°28'30.45"W on NOS Chart 14853 17<sup>th</sup> Ed.

f. **Revise** AWOIS Item #10705 obstruction, least depth known 32 feet, at Latitude 42° 47' 48.1" N, Longitude 082°28'41.7"W to obstruction, least depth known 28 feet, at Latitude 42° 47' 48.1" N, Longitude 082°28'41.7"W.

g. AWOIS Item #10704 is a Crib with a LD know. The Crib is charted in Latitude 42° 45' 57.4" N, Longitude 082°27'54.9"W. The item was identified by survey H11914 positioned at Latitude 42° 45' 57.06" N, Longitude 082°27'55.40"W. Update the charted location with a surveyed LD of 33.92 ft.

h. A uncharted submerged rock was identified during the H-Cell compilation in Latitude 42-43-32.0923N, Longitude 082-28-51.52548W with a LD of 15.85 ft. **ADD** Rock to chart 14853 with surveyed LD.

i. Bathymetric data was collected in a maintained channel of the St. Clair River from the Light by 37 to Marine City. All bathymetric data collected within these limits are in agreement with tabulated depths. Retain the tabulated depth information as charted.

## **D.2. ADDITIONAL RESULTS**

Ortho photo imagery was downloaded from the USGS seamless website (<http://seamless.usgs.gov>). The ortho photo is at a 1m resolution and contains a publication date of 20070216. This imagery was used as an additional to prove and/or disprove ambiguous features present in survey H11914.

### **D.2.1 Aids to Navigation**

The field unit visually inspected all aids to navigation located within the survey limits. Seven fixed aids to navigation located in the survey area were addressed in the Field Examination Report, F00556. All aids on the current edition of NOS chart 14853 and ENC US5MI33M are determined to be on station and serving their intended purpose. Retain all aids to navigation within the survey extents as charted.

## **D.3. MISCELLANEOUS**

Chart compilation was done by Atlantic Hydrographic Branch personnel, in Norfolk, Virginia. Compilation data will be forwarded to Marine Chart Division, 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.4. 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 BASE Cell File or the Blue Notes should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

**APPROVAL SHEET**  
**H11914**

**Initial Approvals:**

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval 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 Evaluation Report.

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

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**Vanessa Self Miller**  
Physical Scientist  
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: \_\_\_\_\_  
**Richard T. Brennan**  
Lt. Commander, NOAA  
Chief, Atlantic Hydrographic Branch