F00511

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey: **Basic Hydrography**

Field No.: **NRT4**

Registry Number: **F00511**

LOCALITY

State: Michigan

General Locality: Lake Michigan

Sub-locality: North End of Lake Michigan

2005

CHIEF OF PARTY

Lucy Massimillo, Team Leader

LIBRARY & ARCHIVES

DATE:

NOAA FORM 77-28U.S. DEPARTMENT OF COMMERCE (11-72)NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTRY NUMBER:
HYDROGRAPHIC TITLE SHEET	**F00511**
INSTRUCTIONS: The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.	FIELD NUMBER: N/A

State/Territory: **Michigan**

General Locality: **Lake Michigan**

Sub-Locality: **North End of Lake Michigan**

Scale: **1:5,000** Date of Survey: **July 21 to Aug. 3, 2005**

Instructions Dated: **August 2, 2005** Project Number: **OPR-S-Y916-NRT4-05**

Vessel: **NOAA Launch 3001**

Chief of Party: **Lucy Massimillo**

Surveyed by: **Lucy Massimillo, Sarah Borakove, Jason McDannold (NRT4)**

Soundings by: **ODOM CVX2 Vertical Beam 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**~~ **feet at Low Water Datum (LWD) at 176.00meters IGLD85**

Remarks: ***1) All Times are UTC.***

2) This is a basic Hydrographic Survey under the Navigable Area Concept.

3) Projection is UTM Zone 16N.

TABLE OF CONTENTS

DESCRIPTIVE REPORT

to accompany
HYDROGRAPHIC SURVEY F00511

Scale of Survey 1:5,000 & 1:10,000
Year of Survey: 2005
Navigation Response Team 4
NOAA Launch S3001
Lucy Massimillo, Team Leader

A. AREA SURVEYED

This Basic Hydrographic survey was conducted in accordance with Project Letter Instructions for project S-Y916-NRT4-05, Lake Michigan, Michigan. The instructions are dated August 5, 2005.

This Lake Michigan investigation consists of three survey areas. The Menominee/Marinette area was requested by members of the Western Lakes Pilots Association. It is located on the west side of Green Bay and forms a deep draft harbor at the mouth of the Menominee River. The port handles bulk cargo ships transporting coal, stone, sand, and salt.

The Port Inland area was requested by the Lake Carriers Association. It is located on the north side of Lake Michigan and is a private harbor of the Inland Lime & Stone Company. The port's traffic is bulk freighters transporting limestone.

The Beaver Island area was requested by the United States Coast Guard, who were concerned about the safe passage of their new buoy tender through the area. Located in northern Lake Michigan, Beaver Island is the principal island in the group west of Grays Reef Passage. The port's traffic consists predominantly of recreational and Coast Guard vessels.

The project instructions required 200% side scan sonar coverage. However after telephone conversations with the Great Lakes Project Manager, Brian Link, it was decided that oSingle beam data was collected for all three areas. Side scan data was collected only in the Menominee/Marinette area.

Letter of Instructions Section 2.4 states "Full bottom coverage hydrography or removal documentation will be required to disprove currently charted features within the project limits which are no longer visible." This criteria was not met without the inclusion of side scan coverage or reduced VBES line spacing.

The total area, for the three areas surveyed by NRT4, contained approximately 5.5 SNM.

Survey Limits for F-00511 are as follows:

Menominee/Marinette:

45°05’27.35”N	87°37’38.25”W
45°06’33.19”N	87°33’59.89”W

Port Inland:

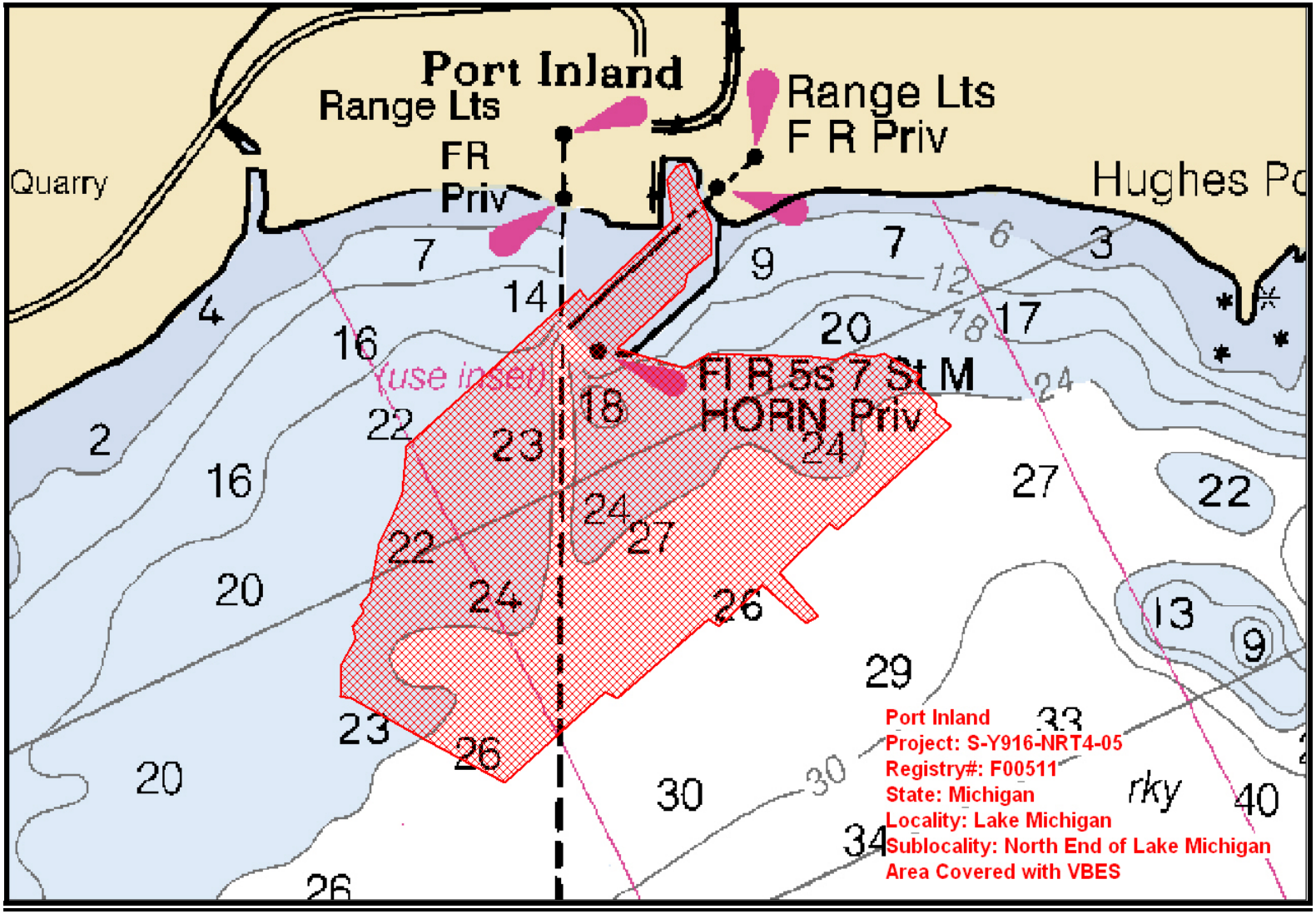
45°56’50.26”N	88°53’30.57”W
45°58’15.81”N	88°51’24.38”W

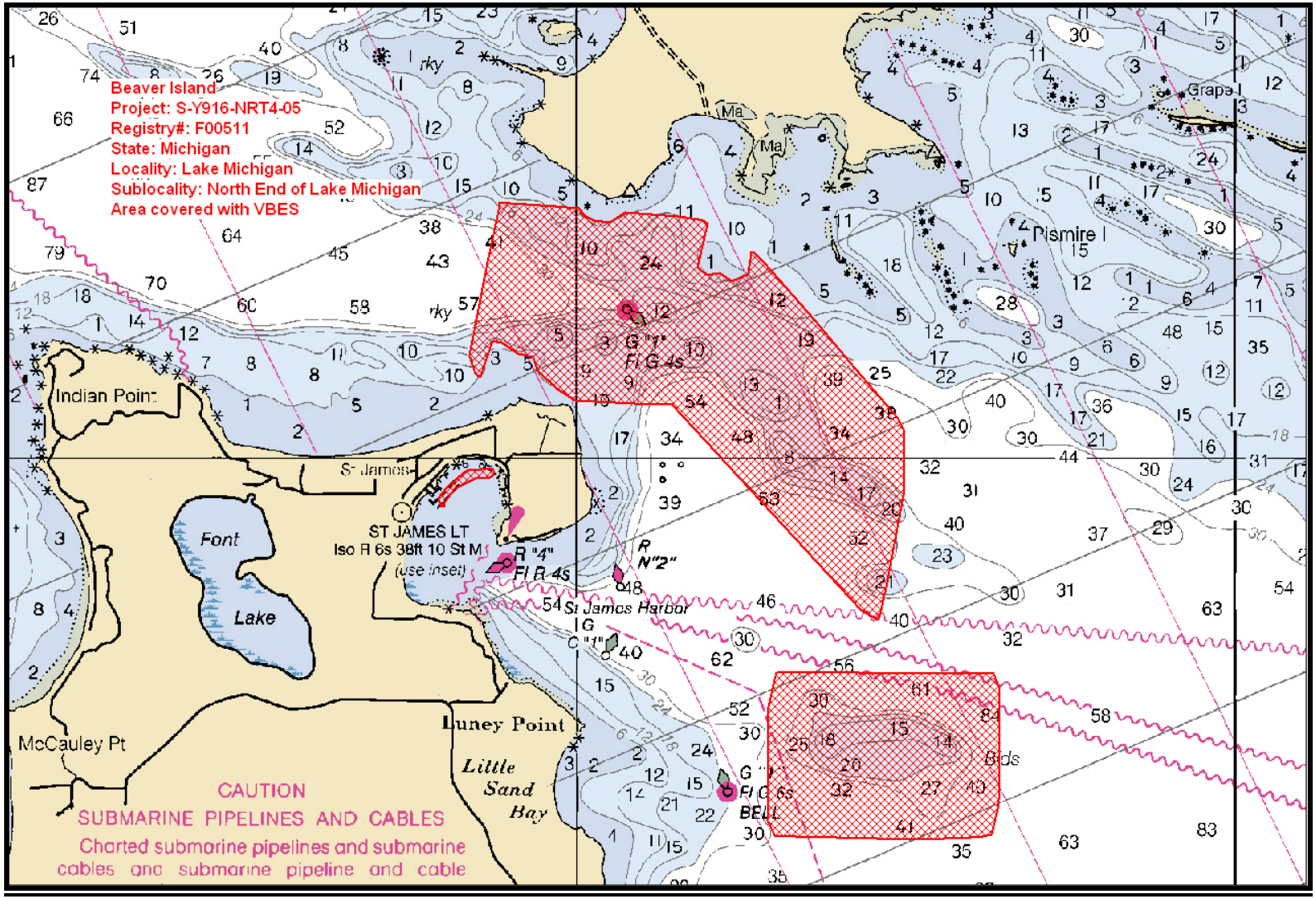
Beaver Island:

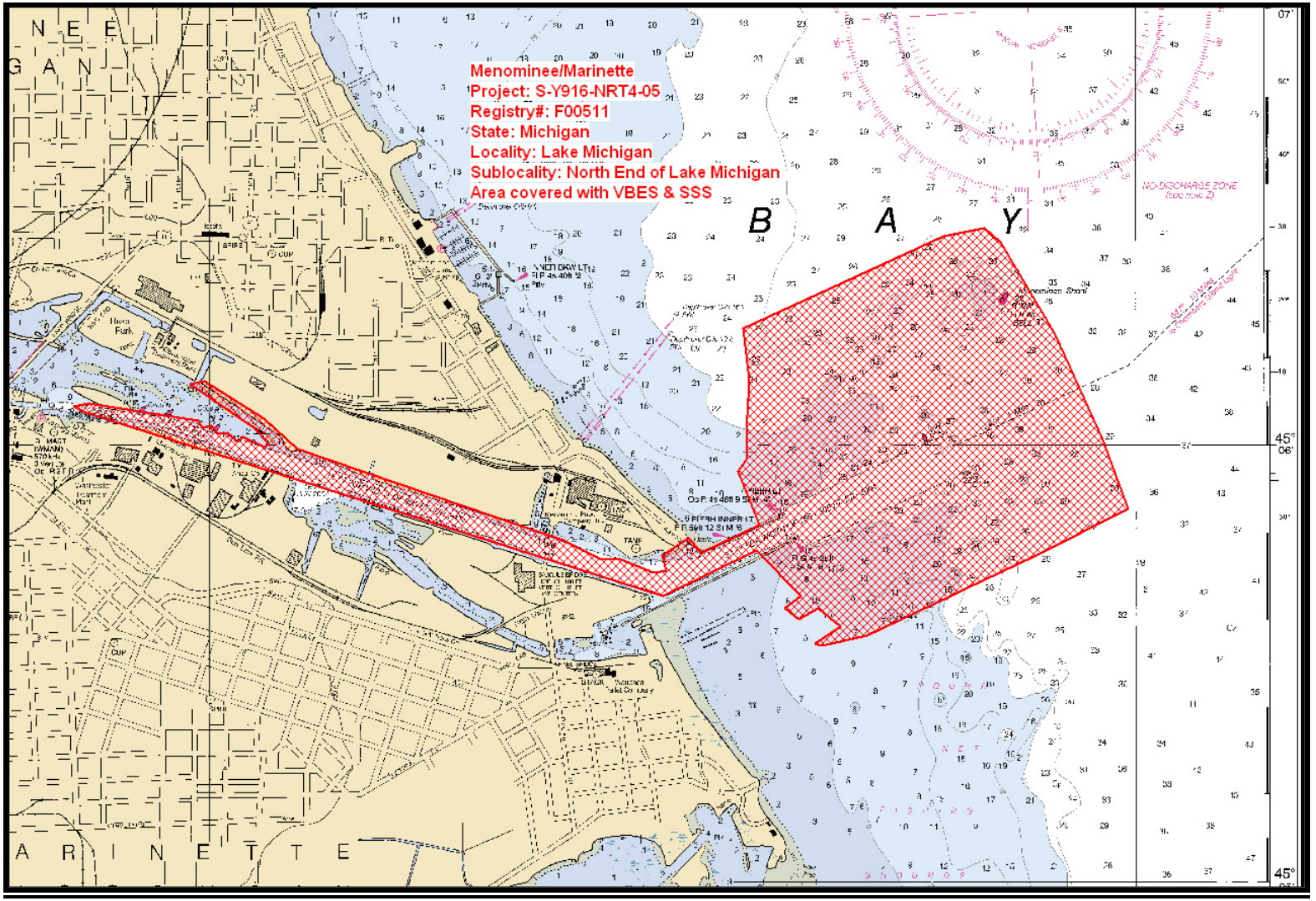
45°42’57.23”N	85°30’54.35”W
45°46’22.61”N	85°26’18.70”W

Survey Dates: July 21, 2005 (DN: 202) to August 3, 2005 (DN: 215).

For complete survey limits, please see the chartlets on the following pages.


Port Inland
Range Lts
FR
Priv
Range Lts
F R Priv
Quarry
Hughes Pc
Fl R 5s 7 St M
HORN Priv
(use inset)
Port Inland
Project: S-Y916-NRT4-05
Registry#: F00511
State: Michigan
Locality: Lake Michigan
Sublocality: North End of Lake Michigan
Area Covered with VBES


Beaver Island
Project: S-Y916-NRT4-05
Registry#: F00511
State: Michigan
Locality: Lake Michigan
Sublocality: North End of Lake Michigan
Area covered with VBES
Indian Point
St James
ST JAMES LT
Iso R 6s 38ft 10 St M
(use inset)
R "4"
Fl R 4s
R "2"
St James Harbor
Font
Lake
McCauley Pt
Luney Point
Little Sand Bay
Pismire I
Grape I
Bids
CAUTION
SUBMARINE PIPELINES AND CABLES
Charted submarine pipelines and submarine cables and submarine pipeline and cable


Menominee/Marinette
Project: S-Y916-NRT4-05
Registry#: F00511
State: Michigan
Locality: Lake Michigan
Sublocality: North End of Lake Michigan
Area covered with VBES & SSS
B A Y
N E E
G A N
A R I N E T T E
45°

B. DATA ACQUISITION AND PROCESSING

B.1. EQUIPMENT

Data were acquired by Navigation Response Team 4 using survey Launch 3001. The vessel was configured as described in the Data Acquisition and Processing Report (DAPR) for this project. Major data acquisition systems are summarized below.

NOAA Survey Launch 3001 was used to acquire position, soundings, imagery, and sound velocity data. Positions were acquired with a Trimble DSM212L Differential GPS (DGPS) beacon receiver. Soundings were acquired with an ODOM CVX2 single-beam echosounder (SBES) 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. ***OK***

There were no unusual vessel configurations encountered during this project. ***OK***

B.2. QUALITY CONTROL

Following the Field Procedures Manual v2.1 Beta, dated February 3, 2006, and the NOS Hydrographic Surveys Specifications and Deliverables Manual, dated March 2003, has insured the integrity of the survey data for F00511. ***Reference of version is appreciated, good.***

Differential GPS (DGPS) was used for all hydrographic data acquired on this survey. ***OK***

Side Scan Sonar Quality Control

The side scan sonar system frequencies used were 100kHz and 500kHz. The recorder was set to 50 meter range scale. There were no water depths greater than 15 meters in areas where side scan data was collected ***Concur.***

Daily confidence checks were conducted by observing side scan imagery in the vicinity of known contacts, such as buoys or sand waves. Side scan data were considered satisfactory if these contacts 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. Side scan sonar coverage was conducted to the 12-foot depth curve where possible. ***Concur with clarification -- Only in the Menominee Area as previously stated.***

When operating in shoal waters, a short tow is required for the Klein system. When cable-out was approximately 7 meters or less, minor degradation of the side scan imagery were noted due to cross-talk between the Klein and the Odom echosounder. ***Concur. Also affected by boat***

turbulence.

Crosslines

Due to time constraints and mechanical failures, no crosslines were acquired for the Menomimee/Marinette or the Beaver Island areas. Due to time constraints and inclement weather, only one crossline was acquired in the Port Inland area for a length to 0.88 LNM or approximately 3% of the total LNM of the Port Inland main scheme lines. A visual inspection of crossline data and main scheme data showed good comparison. ***Concur.***

Junctions

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

B.3. CORRECTIONS TO ECHO SOUNDING

Corrections to echo soundings did not deviate from the method explained in the Data Acquisition and Processing Report (DAPR). A table detailing all sound velocity casts is located in Separate II. ***Concur.***

C. VERTICAL AND HORIZONTAL CONTROL

C.1. VERTICAL CONTROL

All soundings were reduced to Low Water Datum with verified water levels and preliminary zoning. ***See Below***

The water level datum for this project is Low Water Datum (LWD). The operating National Water Level Observation Network (NWLON) stations at Green Bay, WI (908-7079) and Port Inland, MI (908-7096) served as datum control for the survey area. LWD for Green Bay and Port Inland are at elevation 176.00 meters International Great Lakes Datum of 1985 (IGLD 85).

Verified water levels from the N/OPS1 CO-OPS website were downloaded and applied to all soundings for this sheet. Water level corrections were applied to the soundings using CARIS HIPS & SIPS v5.4.

Zoning was provided on the project CD. Field personnel made no changes to zoning, time correctors, or range ratios.

A Request for Approved Water Levels letter was sent to N/OPS1 on February 3, 2006 and is included in Appendix IV.

Final Zoning was applied at AHB and all lines remerged.

C.2. HORIZONTAL CONTROL

The horizontal datum used for this survey is the North American Datum of 1983 (NAD 83), projected using UTM zone 16. The control reference station used for this survey was the USCG DGPS Beacon in the auto-select mode.

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

Throughout the survey, frequent signal losses in the DGPS data were encountered. It was determined that the antenna connector on the back of the Trimble receiver was faulty. Due to the remote location, it was not possible to find a replacement for this connection. When these signal losses were encountered online, the field party would end the line and address the problem. Once the DGPS signal was recovered, the launch would circle around, and restart the line. On August 3, 2005 (DN215) the connector became irreparable and the survey for Beaver Island was discontinued. ***OK Field Unit's 2005 Horizontal and Vertical Control Report is included.***

D. RESULTS AND RECOMMENDATIONS

D.1. CHART COMPARISON

There are six charts affected by this survey:

Chart	Edition	Print Date	Scale
14901	14th	10/01/2002	1:500,000
14902	29th	01/01/2005	1:240,000
14909	20th	07/01/2005	1:20,000 1:20,000 1:80,000
14911	21th	10/01/2005	1:15,000 1:10,000 1:80,000
14917	24th	03/01/2005	1:15,000
14500	27th	10/01/2002	1:1,500,000

Chart 14902 covers the entire 3-part area but is too small of scale for in –depth comparison. Charts affected are 14909_1 (Menominee only), 14911_1 (Beaver Island and Port Inland), 14911_2 (Part of Port Inland), 14911_3 (Small area of Beaver Island), 14917 (Menominee)

General Agreement with Charted soundings

In general, survey soundings compared favorably with charted depths.

The following is a list of notable sounding discrepancies on the chart:

1.) The charted depth of 10 ft at 45°46’8.48”N, 085°29’54.06”W was found to have an actual least depth of 7 ft. ***Concur.***

2.) 12 ft and 13 ft soundings were found in a charted 18-24 ft depth range, very close to a charted 18 ft contour at 45°45’52.98”N, 085°29’13.16”W. ***Concur.***

3.) Several shoal soundings with depths between 30 ft and 33 ft were found adjacent to a charted 39 ft sounding at 45°45’26.62”N, 085°28’7.08”W. ***Concur.***

4.) The 30 ft contour at 45°45’19.96”N, 085°28’9.1”W has migrated east approximately 45 meters. ***OK***

5.) The charted depth of 41 ft at 45°43’3.87”N, 085°27’26.62”W was found to have an actual least depth of 35 ft. ***Concur with clarification. There are depths in the 35 range near the charted 41 but cannot be known if this is the least depth due to lack of development.***

6.) 15 ft and 16 ft soundings were found in an 18 ft to 24 ft depth range at 45°46’5.66”N, 085°30’11.3”W. ***Concur.***

7.) The charted shoal area between 45°43’30.58”N, 085°28’10.89”W and 45°43’27.70”N, 085°27’6.9”W is deeper than charted by 1 to 20 ft. This charted shoal area has an actual least depth of 16 ft, located at 45°43’28.08”N, 085°27’10.61”W. ***Do not concur with least depth of 16 ft. Not enough development nor full coverage was performed on this area. Recommending retaining the 14 ft charted sounding near the same location.***

8.) A 12 ft sounding was found in an 18 ft to 24 ft depth range at 45°58’1.95”N, 085°52’13.92”W. ***Concur.***

9.) A 3 ft sounding was found on a 24 ft contour at 45°57’51.58”N, 085°52’23.44”W. This item was classified as a DTON. ***Concur. See Appendix I.***

10.) There is shoaling up to 200 ft west of the 24 ft contour between 45°58’1.18”N, 085°52’15.11”W and 45°57’52.83”N, 085°52’24.40”W. There are soundings between 10 ft and 18 ft inside a 24 ft to 36 ft depth range. ***Concur.***

11.) A 13 ft sounding was found inside the channel where the charted controlling depth is 16 ft at 45°6’2.93”N, 087°37’4.89”W. ***Concur with clarification. After final zoning was applied, the depth in question is a 12-ft sounding near the inbound edge of the channel.***

12.) A 16 ft sounding was found on the edge of the channel where the charted controlling depth is 18 ft at 45°5’57.4”N, 087°36’38.89”W ***Concur with clarification. The Controlling depth of the channel is 15 ft.***

13.) A 21 ft sounding was found on a charted 24 ft sounding at 45°6’21.98”N, 087°34’43.74”W. ***Concur.***

14.) A 15 ft sounding was found in an 18 ft to 24 ft depth range at 45°6’20.18”N, 087°34’30.40”W. ***Concur.***

Charted Features

All point features are addressed in the Survey Features Report, Appendix II. ***OK***

Uncharted Features

All charting recommendations are addressed in the Survey Features Report, Appendix II. ***OK***

Charting Recommendations

The Hydrographer recommends that this survey supercede the chart in the common area. Concur with clarification. ***Most of the survey was VBES-only with little development. Charted shoaler soundings were not disproved and will need to be carried over.***

AWOIS Item Investigations

There were five AWOIS items assigned in this project. All assigned AWOIS items were investigated by the field party. Results of these investigations are contained in Appendix II. ***OK***

Dangers to Navigation

One Danger to Navigation (DTON) was identified by the field party in the Port Inland area and was submitted to the Marine Charts Division (MCD) on January 18, 2006. Refer to Appendix I for detailed information on this DTON. ***OK***

This DTON was submitted prior to the receipt of Verified Water Level Zones. This report reflects the current status. ***OK***

D. 2. ADDITIONAL RESULTS

Aids to Navigation and Other Detached Positions

All charted Aids to Navigation in the survey area were found to be on station and serving their intended purpose. The field party has no recommendations on these Aids to Navigation. ***Concur.***

A line of privately maintained green buoys designating a privately maintained channel were identified in the Menominee/Marinette area. Discreet Positions (DPs) were recorded for the upriver and downriver end of these buoys. ***Concur. Two privately maintained buoys were addressed and are included in the compilation.***

Ferry Routes

There are no ferry routes within the survey area. ***Concur.***

Submarine Cables and Pipelines

There was one charted submarine pipeline in the Menominee River and three submarine cables charted in the Beaver Island Area. These items were not addressed duirng this survey. ***Concur.***

Bridges and Overhead Cables

There was one bridge within the survey limits. The Bascule Bridge is charted in the Menominee River, centered at position 45.096° N, 87.598° W. The bridge has a charted horizontal clearance of 100 feet and a vertical clearance of 18 feet at the center. Neither the position nor the clearances were verified by the field party. However, visual investigation found these descriptions to be adequately charted. ***Concur.***

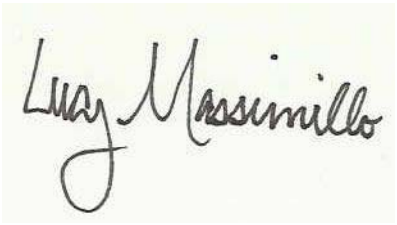
APPROVAL SHEET

S-Y916-NRT4-04
Hydrographic Survey
Lake Michigan
North End of Lake Michigan
Michigan
Field Examination Registry No. F00511

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.

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

Respectfully,
Submitted:



Lucy Massimillo
Team Leader, Navigation Response Team 4

APPENDIX I

F00511_DtoNs

Registry Number: F00511

State: Michigan

Locality: Lake Michigan

Sub-locality: North End of Lake Michigan

Project Number: S-Y916-NRT4-05

Survey Date: 07/30/2005

Charts Affected

Number	Version	Date	Scale
14911	21st Ed.	10/01/2005	1:10000
14902	29th Ed.	01/01/2005	1:240000
14901	15th Ed.	08/01/2006	1:500000
14500	27th Ed.	10/01/2002	1:1500000

Features

No.	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Sounding	0.98 m	45° 57' 51.580" N	085° 52' 23.442" W	---

1 - Danger To Navigation

1.1) Profile/Beam - 1184/1 from f00511 / 3001sb / 2005-211 / 324_1850

DANGER TO NAVIGATION

Survey Summary

Survey Position: 45° 57' 51.580" N, 085° 52' 23.442" W

Least Depth: 0.98 m

Timestamp: 2005-211.18:51:39.481 (07/30/2005)

Survey Line: f00511 / 3001sb / 2005-211 / 324_1850

Profile/Beam: 1184/1

Charts Affected: 14911_2, 14911_1, 14902_1, 14901_1, 14500_1

Remarks:

Echosounder survey discovered shoaling. This survey is corrected to LWD using observed water levels with final zoning.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sb/2005-211/324_1850	1184/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart present survey findings.

Cartographically-Rounded Depth (Affected Charts):

3ft (14911_2, 14911_1, 14902_1)

0 ½fm (14500_1)

3ft (14901_1)

S-57 Data

[None]

Office Notes

Concur.

APPENDIX II

DR_AWOIS

Registry Number: F00511
State: Michigan
Locality: Lake Michigan
Sub-locality: North End of Lake Michigan
Project Number: S-Y916-NRT4-05
Survey Dates: 07/27/2005 - 05/28/2008

Charts Affected

Number	Version	Date	Scale
14917	24th Ed.	03/01/2005	1:15000
14909	20th Ed.	07/01/2005	1:80000
14902	29th Ed.	01/01/2005	1:240000
14901	15th Ed.	08/01/2006	1:500000
14500	27th Ed.	10/01/2002	1:1500000

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	AWOIS 2327 Slight Position Change	Wreck	[None]	45° 05' 36.245" N	087° 34' 48.520" W	2327
1.2	AWOIS 13303 Slight Change	Obstruction	7.91 m	45° 06' 01.151" N	087° 37' 01.372" W	13303
1.3	AWOIS 13304 Retain	GP	[None]	45° 06' 01.715" N	087° 36' 49.963" W	13304
1.4	AWOIS 13305 Disproval	GP	[None]	45° 05' 54.940" N	087° 35' 54.159" W	13305
1.5	AWOIS 13306 Change to Ruins	GP	[None]	45° 05' 46.601" N	087° 35' 27.186" W	13306

1 - DR_AWOIS

1.1) Contact/Point - 0001/1 from f00511 / 3001sss500k / 2005-202 / p050721194000

Primary Feature for AWOIS Item #2327

Search Position: 45° 05' 35.940" N, 087° 34' 48.380" W

Historical Depth: [None]

Search Radius: 250

Search Technique: S2, ES, VS

Technique Notes: [None]

History Notes:

****SOURCE UNKNOWN-- 26 STMR, WOOD, 150 FT L, 30 FT W, 10.4 FT D, SUNK 1939 ABOUT 1700 FT SE OF MENOMINEE HARBOR, MI, ON AN OFFSHORE BANK, COVERED 2 FT IN 8 FT; COE HAS CONSIDERED REMOVAL UNNECESSARY AND UNJUSTIFIED.

Survey Summary

Survey Position: 45° 05' 36.245" N, 087° 34' 48.520" W

Least Depth: [None]

Timestamp: 2005-208.02:34:55 (07/27/2005)

Survey Line: f00511 / 3001sss500k / 2005-202 / p050721194000

Contact/Point: 0001/1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

AWOIS #2327 was located with SSS. However SB development was not completed d/t rough seas time constraints. A least depth was therefore not obtained on this item.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sss500k/2005-202/p050721194000	0001	0.00	000.0	Primary
Awois	AWOIS # 2327	9.91	342.0	Secondary

Hydrographer Recommendations

Item exists approximately as charted. Hydrographer recommends possibly relocating wreck symbol approximately 140m W SW to surveyed location.

S-57 Data

Geo object 1: Wreck (WRECKS)

Attributes: TECSOU - 13:swept by side-scan sonar

WATLEV - 3:always under water/submerged

Office Notes

Concur with Clarification. Chart Dangerous Wreck at location 45°05'36.245"N , 087°34'48.520"W Retain least depth of 2 ft.

1.2) Profile/Beam - 1037/1 from f00511 / 3001sb / 2005-210 / 002_1425

Primary Feature for AWOIS Item #13303

Search Position: 45° 06' 01.200" N, 087° 37' 00.000" W

Historical Depth: [None]

Search Radius: 50

Search Technique: S2,ES

Technique Notes: [None]

History Notes:

LNM 03/97-- ON THE MENOMINEE RIVER NEAR MARINETTE, WISCONSIN, THERE IS AN UNKNOWN SUBMERGED OBJECT IN APPROXIMATE POSITION 45/06/01.2N - 087/37/00.0W IN 22 FEET OF WATER WITH IN THE CHARTED NAVIGABLE CHANNEL. (ENTERED CEH 6/05)

Survey Summary

Survey Position: 45° 06' 01.151" N, 087° 37' 01.372" W

Least Depth: 7.91 m

Timestamp: 2005-210.14:26:43.814 (07/29/2005)

Survey Line: f00511 / 3001sb / 2005-210 / 002_1425

Profile/Beam: 1037/1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

A submerged object of unknown type and least depth was detected using 200% sidescan sonar and VBES. The height off bottom as determined by SSS is deeper than the controlling depth of the channel. This feature has not been visually identified. This feature is located within the search radius of AWOIS item 13303.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sb/2005-210/002_1425	1037/1	0.00	000.0	Primary
f00511/3001sss500k/2005-209/lm050728172600	0001	2.05	105.5	Secondary
Awois	AWOIS # 13303	30.03	267.1	Secondary

Hydrographer Recommendations

Chart obstruction as per current survey findings.

S-57 Data

Geo object 1:	Obstruction (OBSTRN)
Attributes:	OBJNAM - AWOIS 13303
	QUASOU - 1:depth known
	STATUS - 1:permanent
	TECSOU - 1:found by echo-sounder
	VALSOU - 7.912 m
	VERDAT - 13:Low water
	WATLEV - 3:always under water/submerged

Office Notes

Do not concur. Object was found in the channel to the southwest of charted obstruction. However, the least depth of the item is 26 ft, well below the controlling depth of 15 feet. It is recommended that the obstruction be removed from the chart.

1.3) GP No. - 1 from ChartGPs - Digitized

Primary Feature for AWOIS Item #13304

Search Position: 45° 06' 01.660" N, 087° 36' 49.920" W

Historical Depth: [None]

Search Radius: 50

Search Technique: VS

Technique Notes: [None]

History Notes:

****UNKNOWN SOURCE-- A VISIBLE WRECK WAS CHARTED BEFORE 1972 TO THE LAKE SURVEY CHART. THIS WAS BEFORE NOS TOOK OVER THE LAKE SURVEY CHART. SO NO RECORDS OF SOURCE THAT APPLIED THE WRECK TO THE CHART. (ENTERED CEH 6/05)

Survey Summary

Survey Position: 45° 06' 01.715" N, 087° 36' 49.963" W

Least Depth: [None]

Timestamp: 2008-149.08:53:09 (05/28/2008)

GP Dataset: ChartGPs - Digitized

GP No.: 1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

AWOIS #13304 is located in an extremely shallow area between the main channel a private channel. It was not possible to investigate item w/ SSS d/t the shallow depths. Visual inspection of item revealed no exposed wreck. See photo "AWOIS_#13304".

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	1	0.00	000.0	Primary
Awois	AWOIS # 13304	1.94	330.9	Secondary (grouped)

Hydrographer Recommendations

Hydrographer recommends removing Visible Wreck from chart.

S-57 Data

[None]

Office Notes

Do not concur. Wreck could be visible at Low Water. Retain as charted.

1.4) GP No. - 2 from ChartGPs - Digitized

Primary Feature for AWOIS Item #13305

Search Position: 45° 05' 54.880" N, 087° 35' 54.100" W

Historical Depth: [None]

Search Radius: 50

Search Technique: VS

Technique Notes: VISUALY SEARCH 50 METERS SOUTH OF THE ABOVE GP. FOR THE SEARCH AREA NORTH, EAST AND WEST OF GP, SEARCH LAND TO LAND, IN SAFE NAVIGABLE WATER.

History Notes:

****UNKNOWN SOURCE-- A VISIBLE WRECK WAS CHARTED BEFORE 1972 TO THE LAKE SURVEY CHART. THIS WAS BEFORE NOS TOOK OVER THE LAKE SURVEY CHART. SO NO RECORDS OF SOURCE THAT APPLIED THE WRECK TO THE CHART. (ENTERED CEH 6/05)

Survey Summary

Survey Position: 45° 05' 54.940" N, 087° 35' 54.159" W

Least Depth: [None]

Timestamp: 2008-149.09:40:27 (05/28/2008)

GP Dataset: ChartGPs - Digitized

GP No.: 2

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

AWOIS Item # 13305 was located at the end of a narrow, shallow waterway. Item was investigated as best as possible w/ SSS and item was not able to be located. Also, no wreck was visible at this location. See associated pictures "AWOIS_#13305_1" "AWOIS_#13305_2".

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	2	0.00	000.0	Primary
Awois	AWOIS # 13305	2.25	325.1	Secondary (grouped)

Hydrographer Recommendations

Hydrographer recommends removing Visible Wreck from chart.

S-57 Data

[None]

Office Notes

Concur.

1.5) GP No. - 3 from ChartGPs - Digitized

Primary Feature for AWOIS Item #13306

Search Position: 45° 05' 46.620" N, 087° 35' 27.160" W

Historical Depth: [None]

Search Radius: 50

Search Technique: S2,ES

Technique Notes: SURVEY IN AREA OF SAFE NAVIGABLE WATERS.

History Notes:

****UNKNOWN SOURCE-- BETWEEN 1990 TO 1997, A NOTE LABELED: OBSTN, WITH A ARROW POINTING TO A LOCATION AT 45/05/46.62 - 87/35/27.16 WAS CHARTED. (ENTERED CEH 6/05)

Survey Summary

Survey Position: 45° 05' 46.601" N, 087° 35' 27.186" W

Least Depth: [None]

Timestamp: 2008-149.09:48:53 (05/28/2008)

GP Dataset: ChartGPs - Digitized

GP No.: 3

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

AWOIS #13306 is located in the immediate vicinity of an active boat ramp. 200% SSS investigation was conducted as close to item location as possible. No sonar contacts were seen. However a number of derelict dolphins and piles visible in the area. See associated picture "AWOIS_#13306_1".

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	3	0.00	000.0	Primary
Awois	AWOIS # 13306	0.82	223.7	Secondary (grouped)

Hydrographer Recommendations

Hydrographer recommends removing Obstruction symbol from chart and adding "Ruins" to chart.

S-57 Data

[None]

Office Notes

Concur.

DR_Uncharted

Registry Number: F00511
State: Michigan
Locality: Lake Michigan
Sub-locality: North End of Lake Michigan
Project Number: S-Y916-NRT4-05
Survey Dates: 07/21/2005 - 05/28/2008

Charts Affected

Number	Version	Date	Scale
14911	21st Ed.	10/01/2005	1:10000
14917	24th Ed.	03/01/2005	1:15000
14909	20th Ed.	07/01/2005	1:80000
14902	29th Ed.	01/01/2005	1:240000
14901	15th Ed.	08/01/2006	1:500000
14500	27th Ed.	10/01/2002	1:1500000

Features

No.	Name	Feature Type	Survey Depth	Survey Latitude	Survey Longitude	AWOIS Item
1.1	Shoal Sounding	Shoal	4.50 m	45° 06' 20.140" N	087° 34' 30.402" W	---
1.2	Shoal Sounding	Sounding	3.73 m	45° 58' 01.946" N	085° 52' 13.916" W	---
1.3	1022/1	Shoal	4.13 m	45° 45' 52.980" N	085° 29' 13.164" W	---
1.4	744/1	Shoal	2.27 m	45° 46' 08.477" N	085° 29' 54.064" W	---
1.5	Charted Piles - Retain as Charted	GP	[None]	45° 05' 36.647" N	087° 35' 15.336" W	---
1.6	Priv Gr Marker (Buoy)	Green buoy	[None]	45° 06' 11.127" N	087° 37' 13.689" W	---
1.7	Gr Priv Marker (Buoy)	Green buoy	[None]	45° 05' 59.502" N	087° 36' 45.758" W	---
1.8	Piles	Pile	[None]	45° 05' 45.031" N	087° 35' 29.288" W	---

1 - DR_UnCharted

1.1) Profile/Beam - 1006/1 from f00511 / 3001sb / 2005-202 / 203_2145

Survey Summary

Survey Position: 45° 06' 20.140" N, 087° 34' 30.402" W

Least Depth: 4.50 m

Timestamp: 2005-202.21:46:37.333 (07/21/2005)

Survey Line: f00511 / 3001sb / 2005-202 / 203_2145

Profile/Beam: 1006/1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

Echosounder survey found evidence of shoaling. This data was corrected to LWD by observed water levels.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sb/2005-202/203_2145	1006/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart as per present survey findings.

Cartographically-Rounded Depth (Affected Charts):

15ft (14917_1, 14909_1, 14902_1)

2 ½fm (14500_1)

15ft (14901_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: EXPSOU - 2:shoaler than range of depth of the surrounding depth area

QUASOU - 1:depth known

STATUS - 1:permanent

TECSOU - 1:found by echo-sounder

VERDAT - 13:Low water

Office Notes

Concur.

1.2) Profile/Beam - 457/1 from f00511 / 3001sb / 2005-211 / 326_1827

Survey Summary

Survey Position: 45° 58' 01.946" N, 085° 52' 13.916" W

Least Depth: 3.73 m

Timestamp: 2005-211.18:27:29.654 (07/30/2005)

Survey Line: f00511 / 3001sb / 2005-211 / 326_1827

Profile/Beam: 457/1

Charts Affected: 14911_2, 14911_1, 14902_1, 14901_1, 14500_1

Remarks:

Echosounder survey discovered shoaling. This survey is corrected to LWD using observed water levels with final zoning.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sb/2005-211/326_1827	457/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart present survey findings.

Cartographically-Rounded Depth (Affected Charts):

12ft (14911_2, 14911_1, 14902_1)

2fm (14500_1)

12ft (14901_1)

S-57 Data

[None]

Office Notes

Concur.

1.3) Profile/Beam - 1022/1 from f00511 / 3001sb / 2005-214 / 406a1525

Survey Summary

Survey Position: 45° 45' 52.980" N, 085° 29' 13.164" W

Least Depth: 4.13 m

Timestamp: 2005-214.15:26:20.757 (08/02/2005)

Survey Line: f00511 / 3001sb / 2005-214 / 406a1525

Profile/Beam: 1022/1

Charts Affected: 14911_1, 14902_1, 14901_1, 14500_1

Remarks:

Least depth of 13 ft found between 18 ft countour lines.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sb/2005-214/406a1525	1022/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart present survey findings.

Cartographically-Rounded Depth (Affected Charts):

13ft (14911_1, 14902_1)

2 ¼fm (14500_1)

13ft (14901_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

STATUS - 1:permanent

TECSOU - 1:found by echo-sounder

VERDAT - 13:Low water

Office Notes

Concur.

1.4) Profile/Beam - 744/1 from f00511 / 3001sb / 2005-214 / 425_1954

Survey Summary

Survey Position: 45° 46' 08.477" N, 085° 29' 54.064" W

Least Depth: 2.27 m

Timestamp: 2005-214.19:55:25.526 (08/02/2005)

Survey Line: f00511 / 3001sb / 2005-214 / 425_1954

Profile/Beam: 744/1

Charts Affected: 14911_1, 14902_1, 14901_1, 14500_1

Remarks:

Least depth of 7 ft found in shoal area with charted depth of 10 ft.

Feature Correlation

Address	Feature	Range	Azimuth	Status
f00511/3001sb/2005-214/425_1954	744/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart present survey findings.

Cartographically-Rounded Depth (Affected Charts):

7ft (14911_1, 14902_1)

1 ¼fm (14500_1)

7ft (14901_1)

S-57 Data

Geo object 1: Sounding (SOUNDG)

Attributes: QUASOU - 1:depth known

STATUS - 1:permanent

TECSOU - 1:found by echo-sounder

VERDAT - 13:Low water

Office Notes

Concur.

1.5) GP No. - 6 from ChartGPs - Digitized

Survey Summary

Survey Position: 45° 05' 36.647" N, 087° 35' 15.336" W

Least Depth: [None]

Timestamp: 2008-149.12:37:30 (05/28/2008)

GP Dataset: ChartGPs - Digitized

GP No.: 6

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

Offshore end of a group of visible piles and ruins. SSS inspection was not possible d/t poor weather and proximity to shore/surf zone. Visual inspection indicated no presence of piles or ruins. See photos "GP6_1.jpg" "GP6_2.jpg".

Feature Correlation

Address	Feature	Range	Azimuth	Status
ChartGPs - Digitized	6	0.00	000.0	Primary

Hydrographer Recommendations

Change charted visible piles to Subm piles.

S-57 Data

[None]

Office Notes

Do Not Concur. Not clear whether pictures were taken at Low Water. Retain as charted.

1.6) Profile/Beam - 5/1 from hdcs_data / 3001dp_non_echosounder / 2005-209 / 07282005

Survey Summary

Survey Position: 45° 06' 11.127" N, 087° 37' 13.689" W

Least Depth: [None]

Timestamp: 2005-209.21:20:54.000 (07/28/2005)

DP Dataset: hdcs_data / 3001dp_non_echosounder / 2005-209 / 07282005

Profile/Beam: 5/1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

Priv Gr Marker (buoy) marking privately maintained channel. Upriver end.

Feature Correlation

Address	Feature	Range	Azimuth	Status
hdcs_data/3001dp_non_echosounder/2005-209/07282005	5/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart Green Buoy.

S-57 Data

Geo object 1: Buoy, lateral (BOYLAT)

Attributes: BOYSHP - 2:can (cylindrical)

CATLAM - 2:starboard-hand lateral mark

COLOUR - 4:green

STATUS - 8:private

Office Notes

Concur.

1.7) Profile/Beam - 6/1 from hdcs_data / 3001dp_non_echosounder / 2005-209 / 07282005

Survey Summary

Survey Position: 45° 05' 59.502" N, 087° 36' 45.758" W

Least Depth: [None]

Timestamp: 2005-209.21:27:35.000 (07/28/2005)

DP Dataset: hdcs_data / 3001dp_non_echosounder / 2005-209 / 07282005

Profile/Beam: 6/1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

Gr Priv Buoy. Downriver end of series of buoys denoting privately maintained channel.

Feature Correlation

Address	Feature	Range	Azimuth	Status
hdcs_data/3001dp_non_echosounder/2005-209/07282005	6/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart G Buoy.

S-57 Data

Geo object 1: Buoy, lateral (BOYLAT)

Attributes: BOYSHP - 2:can (cylindrical)

CATLAM - 2:starboard-hand lateral mark

COLOUR - 4:green

STATUS - 8:private

Office Notes

Concur.

1.8) Profile/Beam - 7/1 from hdcs_data / 3001dp_non_echosounder / 2005-209 / 07282005

Survey Summary

Survey Position: 45° 05' 45.031" N, 087° 35' 29.288" W

Least Depth: [None]

Timestamp: 2005-209.21:38:33.000 (07/28/2005)

DP Dataset: hdcs_data / 3001dp_non_echosounder / 2005-209 / 07282005

Profile/Beam: 7/1

Charts Affected: 14917_1, 14909_1, 14902_1, 14901_1, 14500_1

Remarks:

Group of three piles in ruins, exposed 3 m. See Photo "DP6154.jpg"

Feature Correlation

Address	Feature	Range	Azimuth	Status
hdcs_data/3001dp_non_echosounder/2005-209/07282005	7/1	0.00	000.0	Primary

Hydrographer Recommendations

Chart Piles in Ruins.

S-57 Data

Geo object 1: Pile (PILPNT)

Attributes: CATPLE - 3:post

CONDTN - 2:ruined

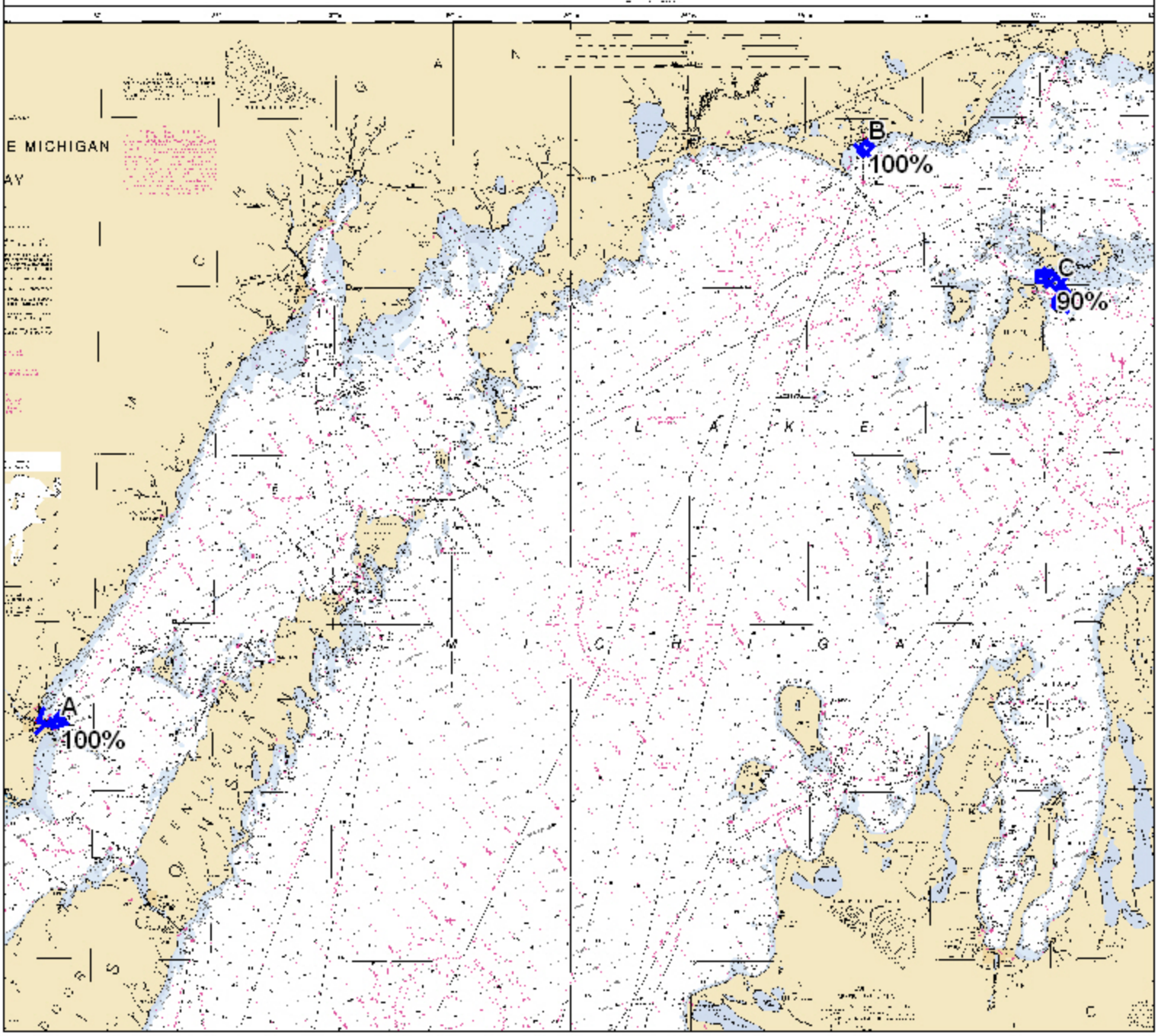
CONVIS - 1:visual conspicuous

HEIGHT - 3 m

Office Notes

Concur with clarification. Recommend MCD reference latest remote sensing imagery.

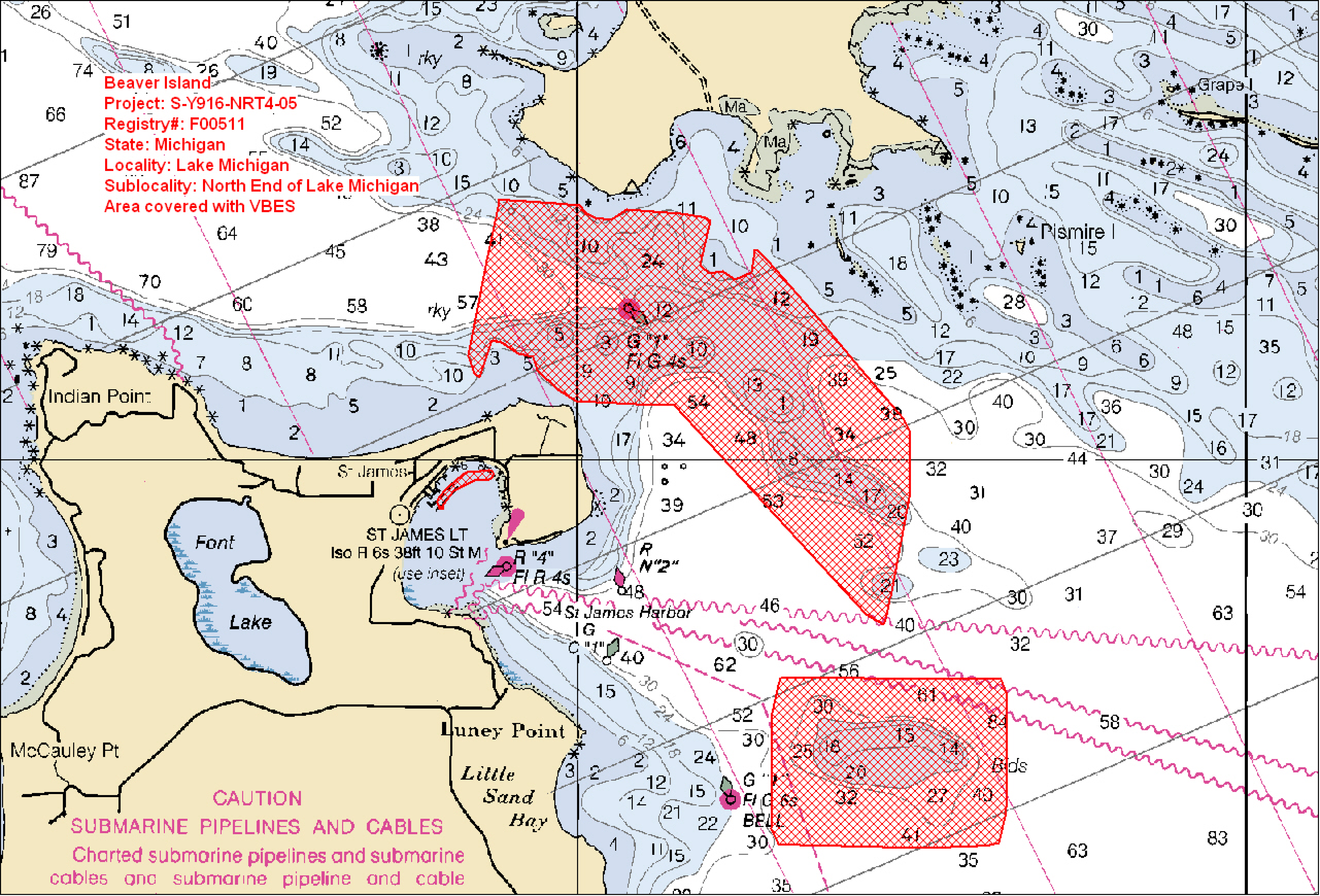
APPENDIX III

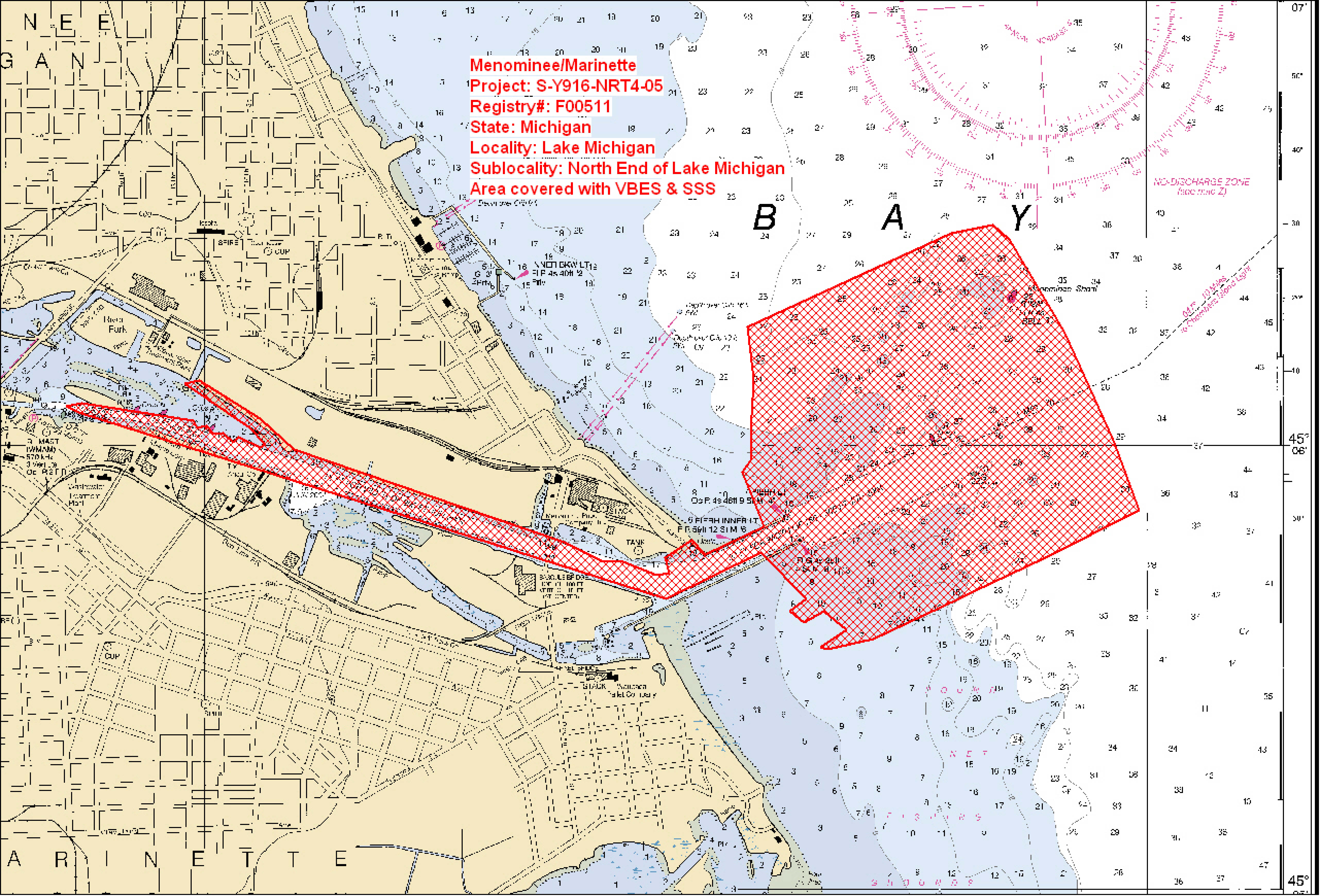


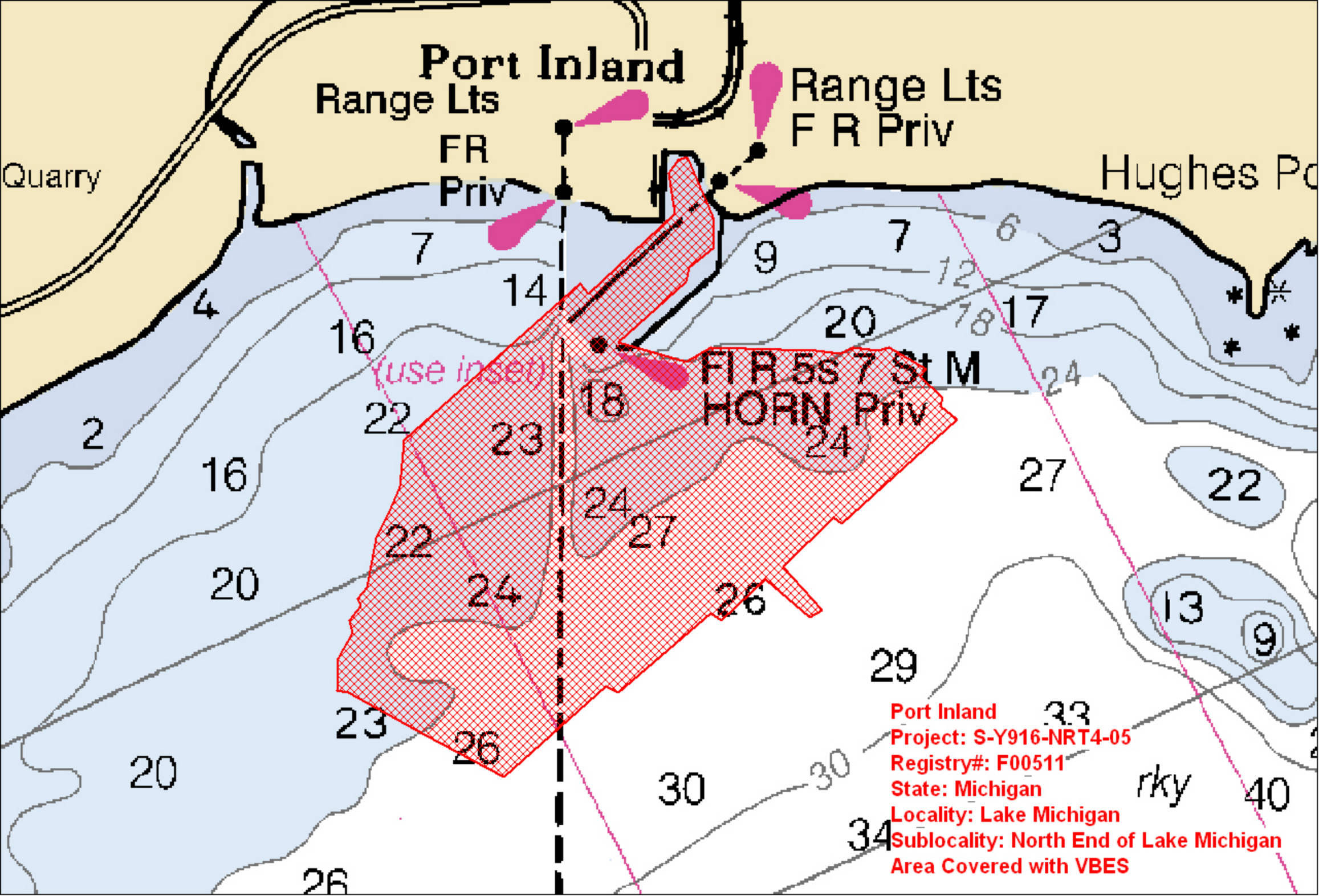
Project	Sheet_Letter	H_num	HQ_Est_SNM	CumlPercCompPre	CumlPercCompCu	SNM_CompCurl	CumSNMcom
S-Y916-NRT	A	F00511	1	100	0	0	1
S-Y916-NRT	B	F00511	1	100	0	0	1
S-Y916-NRT	C	F00511	4	0	90	3	3

Project	Month	LNM_VBE	LNM_MB	LNM_SS	SV_Casts	Bottom_Samp	AWOIS_Items	Tide_Guage_Inst	DAS	DTime_equip_H	DTime_Weather_I
S-Y916-N	July	61.17	0.00	20.16	2.00	0.00	5.00	0.00	4.00	6.00	0.00
S-Y916-N	August	83.86	0.00	0.00	1.00	0.00	0.00	0.00	3.00	0.00	0.00

Progress Sketch S-Y916-NRT4-05
August, 2005


Beaver Island
Project: S-Y916-NRT4-05
Registry#: F00511
State: Michigan
Locality: Lake Michigan
Sublocality: North End of Lake Michigan
Area covered with VBES
Indian Point
St James
ST JAMES LT
Iso R 6s 38ft 10 St M
(use inset)
R "4"
Fl R 4s
G "7"
Fl G 4s
R
N"2"
St James Harbor
G
C "1"
Font
Lake
Luney Point
Little
Sand
Bay
McCauley Pt
Pismire I
Grape I
G
Fl G 6s
BELL
Bkds
CAUTION
SUBMARINE PIPELINES AND CABLES
Charted submarine pipelines and submarine
cables and submarine pipeline and cable


Menominee/Marinette
Project: S-Y916-NRT4-05
Registry#: F00511
State: Michigan
Locality: Lake Michigan
Sublocality: North End of Lake Michigan
Area covered with VBES & SSS
B A Y
NO-DISCHARGE ZONE
A R I N E T T E


Port Inland
Range Lts
FR
Priv
Range Lts
F R Priv
Quarry
Hughes Po
(use inset)
Fl R 5s 7 St M
HORN Priv
Port Inland
Project: S-Y916-NRT4-05
Registry#: F00511
State: Michigan
Locality: Lake Michigan
Sublocality: North End of Lake Michigan
Area Covered with VBES

APPENDIX IV

DATA ACQUISITION AND PROCESSING REPORT

to accompany
HYDROGRAPHIC PROJECT S-Y916-NRT4-05
Registry Number F00511

Scale of Survey 1:5,000 & 1:10,000
Year of Survey: 2005
Navigation Response Team 4
NOAA Launch S3001
Lucy Massimillo, Team Leader

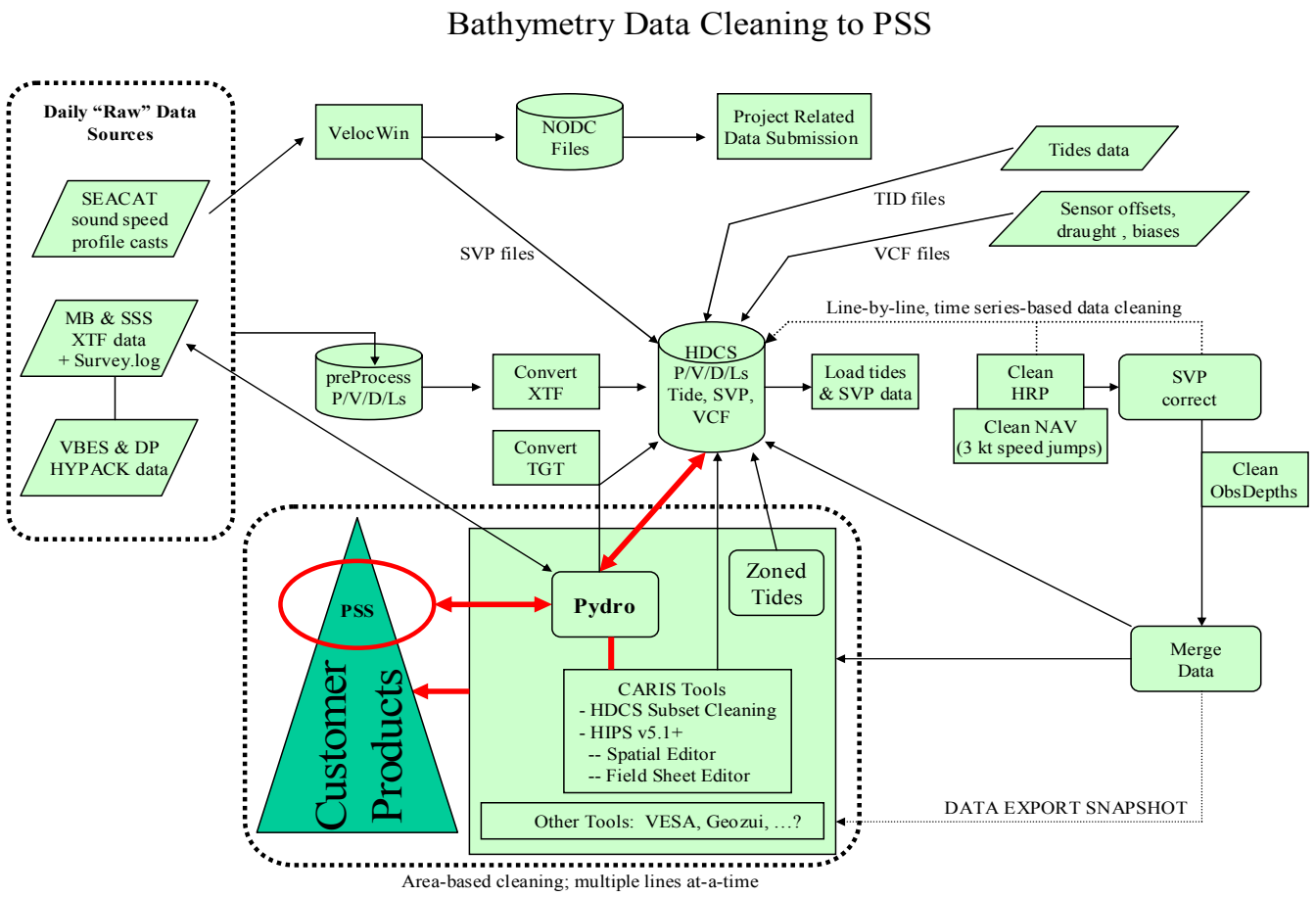
SOFTWARE VERSIONS

Software	Version
Acquisition	
HYPACK MAX	4.3
Sonar Pro	9.6
Trimble TerraSync	2.3
Processing	
KapConv	3.9.1
PYDRO	5.9.4
MapInfo	8.0
Pathfinder Office	2.9
Vertical Mapper	N/A
CARIS HIPS and SIPS	5.4 HF 28
Utilities	
Tides and Currents for Windows	N/A
Irfanview	3.9.1
Fugawi	3.1.0.310
Horizontal Control	
TSIP Talker	2.0
Sound Velocity	
Velocwin	8.77
Digibar Pro Firmware	N/A
Hyperterminal	5.1

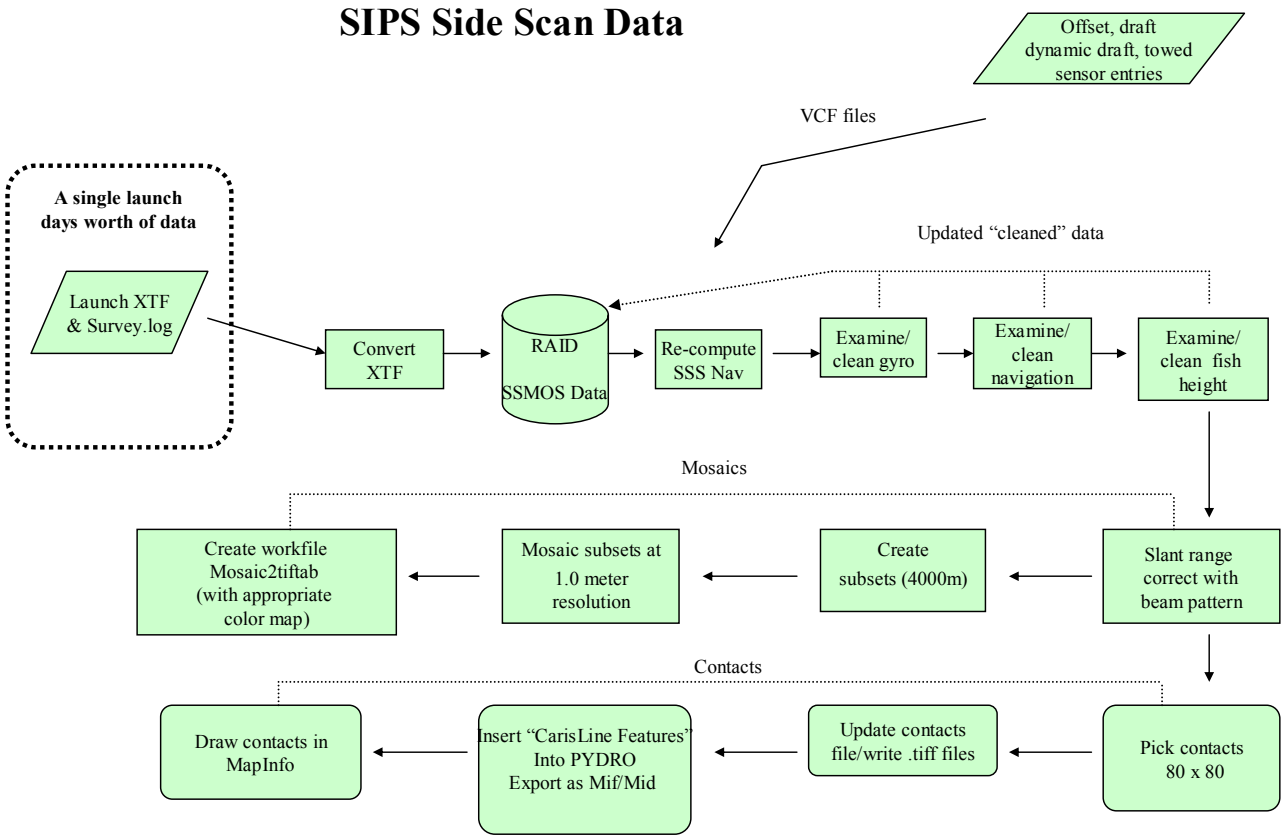
HARDWARE SERIAL NUMBERS

Equipment	Serial Numbers
Installed on Vessel	
ODOM CVX2 Echosounder	23005
Klein 3110 TPU	314
Klein 3210 Towfish	498
Trimble Data Receiver DSM212L	220246329
Trimble Antenna	N/A
Portable	
Diver Least Depth gauges	N/A
Odom Digibar Pro DB1200 Sound Velocity Profiler	98150
Trimble Data Receiver Backpack Unit	0224010134
Trimble Antenna for Backpack Unit	0220361549
Trimble Handheld Unit TSCe	00030965

BATHYMETRY CLEANING FLOW CHART



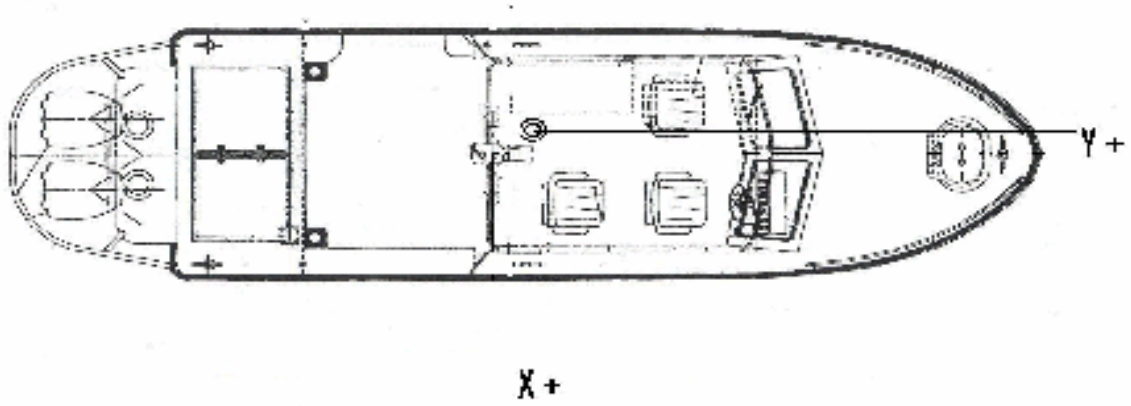
PYDRO DATA INTEGRATION FLOW CHART

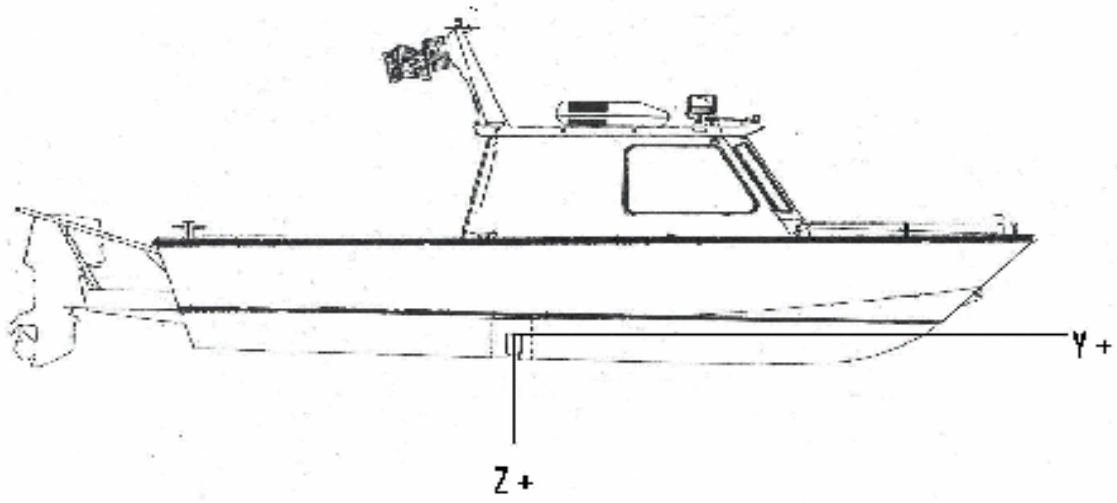


LAUNCH 3001 VESSEL OFFSET MEASUREMENTS

Description: Aluminum SeaArk survey launch

LOA:	32.25 ft (9.8298 m)	Weight:	8,500 lbs
LOW:	27 ft (8.2296 m)	Propulsion:	2@130hp = 260hp
Beam:	8.5 ft (2.5908 m)	Power:	6.5kw min
Draft:	1.640 ft (0.5 m)	Fuel:	100 gal +/-





	Value (Meters)	Date Measured
Antennae offset from VBES transducer *(x-dir)*	0.243	Oct-04
Antennae layback from VBES transducer *(y-dir)*	-0.843	Oct-04
Antennae height from VBES transducer *(z-dir)*	-3.642	Oct-04
J-Arm block offset from VBES transducer *(x-dir)*	2.274	Oct-04
J-Arm block layback from VBES transducer *(y-dir)*	-2.977	Oct-04
J-Arm block height from waterline *(z-dir)*	-2.731	Oct-04

CARIS VESSEL CONFIGURATION FILE PARAMETERS: LAUNCH 3001

Depth Sensor

	Time Error (s)	Delta X (m)	Delta Y (m)	Delta Z (m)	Roll (deg)	Pitch (deg)	Azimuth (deg)	Draft (m)
Transducer	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.50

Ancillary Sensor Offsets

	Time Error (s)	Delta X (m)	Delta Y (m)	Delta Z (m)	Error
Navigation	0.00	0.243	-0.843	-3.642	
Gyro	0.00	0.00	0.00	0.00	
Heave	0.00	0.00	0.00	0.00	
Pitch	0.00	0.00	0.00	0.00	
Roll	0.00	0.00	0.00	0.00	

Towed SSS Entries

Time Error (s)	0.00
Delta X (m)	2.274
Delta Y (m)	-2.977
Delta Z (m)	-2.731
Layback Error (m)	0.00

Dynamic Draft

Speed (knots)	0.00	4.10	6.00	8.40	11.4	15.4	24.5
Draft Correction (m)	0.00	0.01	0.03	0.05	0.00	-0.08	-0.010

SOUND VELOCITY PROFILER CALIBRATION

Date: Feb 02, 2005

Serial #: SN:98150-020205

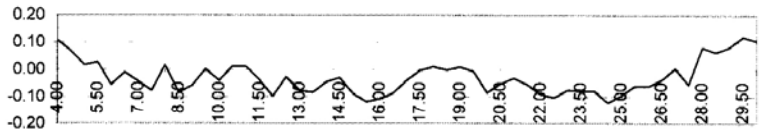
DIGIBAR CALIBRATION REPORT

version 1.0 (c) 2004

ODOM HYDROGRAPHIC SYSTEMS, Inc.

STANDARD DEL GROSSO H^2O

TEMP	VELOCITY	MEASURED FREQUENCY	RES_VEL	OBS-CAL	TEMP	VELOCITY	MEASURED FREQUENCY	RES_VEL	OBS-CAL
4.00	1421.62	5551.52	1421.73	0.11	17.50	1474.38	5752.74	1474.38	0.00
4.50	1423.90	5560.08	1423.97	0.07	18.00	1476.01	5759.02	1476.02	0.01
5.00	1426.15	5568.49	1426.17	0.02	18.50	1477.62	5765.12	1477.62	0.00
5.50	1428.38	5577.04	1428.41	0.03	19.00	1479.21	5771.23	1479.22	0.01
6.00	1430.58	5585.13	1430.52	-0.06	19.50	1480.77	5777.15	1480.76	-0.01
6.50	1432.75	5593.61	1432.74	-0.01	20.00	1482.32	5782.76	1482.23	-0.08
7.00	1434.90	5601.89	1434.86	-0.04	20.50	1483.84	5788.71	1483.79	-0.05
7.50	1437.02	5609.67	1436.94	-0.08	21.00	1485.35	5794.54	1485.31	-0.03
8.00	1439.12	5618.04	1439.13	0.02	21.50	1486.83	5800.12	1486.77	-0.05
8.50	1441.19	5625.57	1441.10	-0.08	22.00	1488.29	5805.58	1488.20	-0.09
9.00	1443.23	5633.49	1443.18	-0.06	22.50	1489.74	5811.05	1489.63	-0.10
9.50	1445.25	5641.44	1445.26	0.00	23.00	1491.16	5816.60	1491.09	-0.07
10.00	1447.25	5648.91	1447.21	-0.04	23.50	1492.56	5821.95	1492.49	-0.08
10.50	1449.22	5656.65	1449.24	0.01	24.00	1493.95	5827.25	1493.87	-0.08
11.00	1451.17	5664.09	1451.18	0.01	24.50	1495.32	5832.30	1495.19	-0.12
11.50	1453.09	5671.25	1453.06	-0.04	25.00	1496.66	5837.55	1496.57	-0.09
12.00	1454.99	5678.29	1454.90	-0.10	25.50	1497.99	5842.75	1497.93	-0.06
12.50	1456.87	5685.73	1456.84	-0.03	26.00	1499.30	5847.75	1499.24	-0.06
13.00	1458.72	5692.62	1458.65	-0.08	26.50	1500.59	5852.77	1500.55	-0.04
13.50	1460.55	5699.59	1460.47	-0.08	27.00	1501.86	5857.79	1501.86	0.01
14.00	1462.36	5706.64	1462.32	-0.05	27.50	1503.11	5862.35	1503.06	-0.05
14.50	1464.14	5713.52	1464.12	-0.03	28.00	1504.35	5867.59	1504.43	0.08
15.00	1465.91	5720.03	1465.82	-0.09	28.50	1505.56	5872.17	1505.63	0.06
15.50	1467.65	5726.56	1467.53	-0.12	29.00	1506.76	5876.82	1506.84	0.08
16.00	1469.36	5733.16	1469.25	-0.11	29.50	1507.94	5881.48	1508.06	0.12
16.50	1471.06	5739.72	1470.97	-0.09	30.00	1509.10	5885.87	1509.21	0.11
17.00	1472.73	5746.29	1472.69	-0.04					



Odom Hydrographic Systems, Inc.
1450 SeaBoard Avenue, Baton Rouge, Louisiana 70810-6261, USA
Telephone: (225)-769-3051, Facsimile: (225)-766-5122
E-mail: email@odomhydrographic.com, HTTP: www.odomhydrographic.com

Date:
Feb 02, 2005

Serial #:
SN:98150-020205

DIGIBAR CALIBRATION REPORT

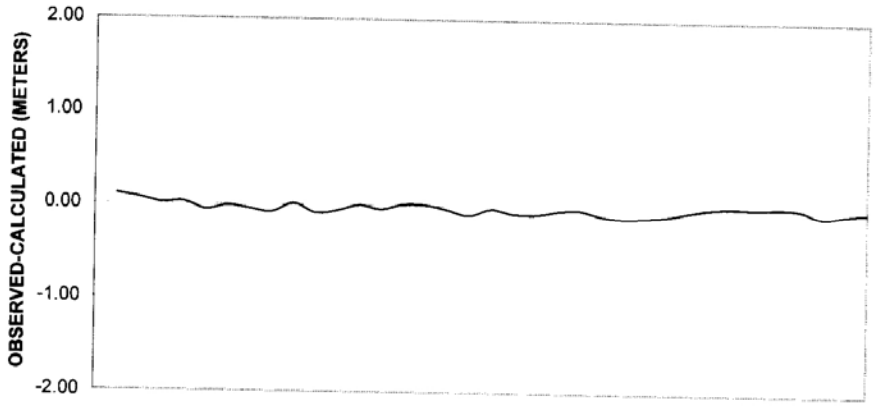
version 1.0 (c) 2004

ODOM HYDROGRAPHIC SYSTEMS, Inc.

Burn these numbers to EPROM:

Gradient	**3350**
Intercept	**309**

Calibration Graph



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NOAA FORM 76-35A

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

HVCR

Type of Survey Basic Hydrography

Field No. NRT4

Registry No. F00511

LOCALITY

State Michigan

General Locality Lake Michigan

Sublocality North End of Lake Michigan

2005

CHIEF OF PARTY

Lucy Massimillo, Team Leader

LIBRARY & ARCHIVES

DATE

NOAA FORM 77-28
(11-72)

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

REGISTRY No F00511

HYDROGRAPHIC TITLE SHEET

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

FIELD No. NRT4

State Michigan

General Locality Lake Michigan

Sub-Locality North End of Lake Michigan

Scale 1:5,000 **Date of Survey** July 21 to August 3, 2005

Instructions dated August 5, 2005 **Project No.** S-Y916-NRT4-05

Vessel NOAA Launch S3001

Chief of party Lucy Massimillo

Surveyed by Lucy Massimillo, Sarah Borakove, & Jason McDannold (NRT4)

Soundings by echo sounder, hand lead, pole Odom CVX2 Vertical Beam Echosounder

Graphic record scaled by N/A

Graphic record checked by N/A **Automated Plot** N/A

Verification by Atlantic Hydrographic Branch

Soundings in fathoms feet at MLW MLLW Low Water Datum (LWD) at176.00 meters IGLD85

REMARKS:

NOAA FORM 77-28 SUPERSEDES FORM C&GS-537

U.S GOVERNMENT PRINTING OFFICE: 1976-665-661/1222 REGION NO.6

VERTICAL AND HORIZONTAL CONTROL REPORT

to accompany
HYDROGRAPHIC PROJECT S-Y916-NRT4-05
Registry Number F00511

Scale of Survey 1:5,000 & 1:10,000
Year of Survey: 2005
Navigation Response Team 4
NOAA Launch S3001
Lucy Massimillo, Team Leader

A. VERTICAL CONTROL

No Water Level Stations were established by NRT4 during the course of this survey.

The time meridian used for this survey was UTC.

The following is a list of Water Level Stations used during this project:

Site	Station Number	Latitude	Longitude	Area Used
Green Bay, WI	908-7078	44.540000° N	88.008333° W	Menominee/Marinette
Port Inland, MI	908-7096	45.970000° N	85.871667° W	Port Inland & Beaver Island

The vertical datum for this project was the low water datum (LWD). LWD for Green Bay, WI (908-7078) and Port Inland, MI (908-7096) are at elevation 176.00 meters International Great Lakes Datum of 1985 (IGLD 85).

Field soundings were corrected by verified actual water levels from NOAA/CO-OPS. Verified/Historical six minute water levels for each station were obtained from the following website:

http://co-ops.nos.noaa.gov/

These values were downloaded in blocks of data, covering the times of hydrography and saved as text (.txt) files. The 176.00 meters was then subtracted in order to reduce these values to the Low Water Datum. The "Create Cowlis from Tides File" function of the MapInfo Hydro MI MBX tool was then used to convert the text file into a CARIS tide (.tid) file. Finally, the preliminary zoning (.zdf) file, provided with the letter instructions, was used to apply the tides in CARIS.

There were no unusual tidal or current conditions noted during this survey.

Ellipsoidal benchmark positioning techniques were not required during this project.

B. HORIZONTAL CONTROL

The horizontal control datum for this project is the North American Datum of 1983 (NAD83). The projection for this project was Universal Transverse Mercator (UTM) zone 16 North.

There were no horizontal control stations established by NRT4 during the course of the survey.

Differential GPS (DGPS) was used for all hydrographic data acquired during this survey. DGPS performance checks were conducted in accordance with the Field Procedures Manual (FPM) and the Hydrographic Survey Specifications and Deliverables (HSSD) document. A quality assurance check was performed by NRT4 by comparing the position produced by the vessel mounted DGPS unit to that of a Trimble Backpack calibration point.

Appendix V

From <Lucy.Massimillo@noaa.gov>
Sent Friday, February 3, 2006 1:00 pm
To Brian.Link@noaa.gov
Cc
Bcc
Subject Lake Michigan Information
Attachments LakeMichigan.zip 817K

Brian,

These following are a list of notable sounding discrepancies that were discovered by NRT4, while processing the data from F00511, S-Y916-NRT4-05, North Lake Michigan.

The information is separated into three areas: Beaver Island, Port Inland, & Menominee/Marinette. Please refer to the JPEGs, included in the ZIP file attached to this e-mail, for illustrations of these discrepancies.

Thanks,
Lucy

Beaver Island

1.) The charted depth of 10 ft at 45°46'8.48"N, 085°29'54.06"W was found to have an actual least depth of 7 ft.

2.) 12 ft and 13 ft soundings were found in a charted 18-24 ft depth range, very close to a charted 18 ft contour at 45°45'52.98"N, 085° 29'13.16"W.

3.) The charted shoal area between 45°43'30.58"N, 085°28'10.89"W and 45°43'27.70"N, 085°27'6.9"W is deeper than charted by 1 to 20 ft. This charted shoal area has an actual least depth of 16 ft, located at 45°43'28.08"N, 085°27'10.61"W.

Port Inland

1.) A 12 ft sounding was found in an 18 ft to 24 ft depth range at 45° 58'1.95"N, 085°52'13.92"W.

2.) A 3 ft sounding was found on a 24 ft contour at 45°57'51.58"N, 085°52'23.44"W. This item was classified as a DTON.

3.) There is shoaling up to 200 ft west of the 24 ft contour between 45°58'1.18"N, 085°52'15.11"W and 45°57'52.83"N, 085°52'24.40"W. There

are soundings between 10 ft and 18 ft inside a 24 ft to 36 ft depth range.

Menominee/Marinette

1.) A 13 ft sounding was found inside the channel where the charted controlling depth is 16 ft at 45°6’2.93”N, 087°37’4.89”W.

2.) A 16 ft sounding was found on the edge of the channel where the charted controlling depth is 18 ft at 45°5’57.4”N, 087°36’38.89”W

3.) A 15 ft sounding was found in an 18 ft to 24 ft depth range at 45° 6’20.18”N, 087°34’30.40”W.

Brian,

USACE should know that it appears to be shoaling. Some districts like to have this as advance info before we chart it as such. Let us know if there is any reason not to chart the 12.

Shep

Brian Link wrote:

Wes,

It looks like the last dredging in the Menominee River was in 2000.
http://www.lre.usace.army.mil/OandM/text/menom.pdf

Brian

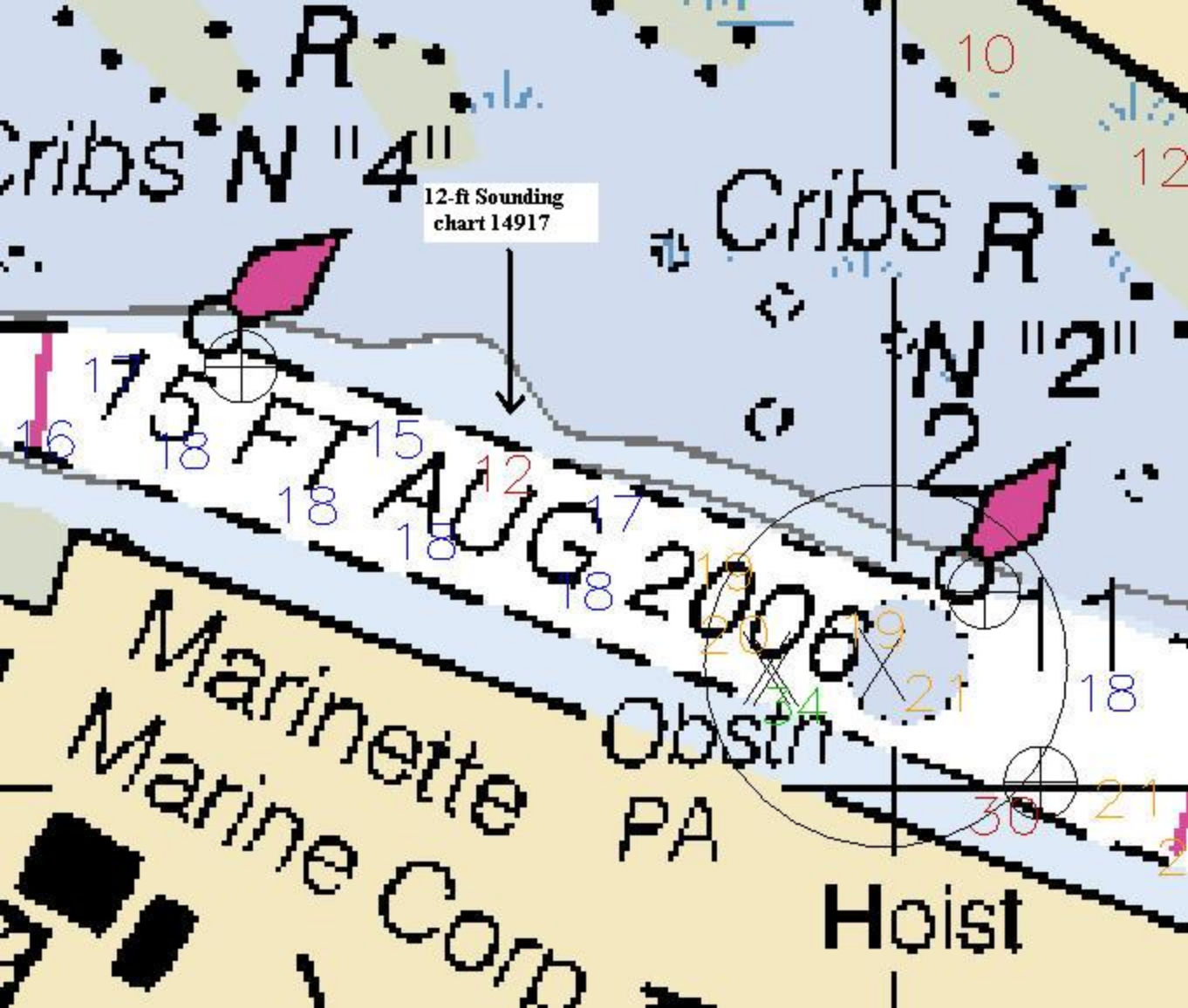
Wesley.Kitt@noaa.gov wrote:

Dear Brian,

While compiling S-Y916-NRT4-05, F00511, shoal soundings were found in the 15-ft controlled depth channel in Menominee, WI., on the order of 12 feet. Attached is a jpeg of the section of chart 14917 that is affected. Since this survey was performed in 2005, this may not be a problem if the channel has been maintained sometime since the survey was run. Do you know if this is the case? We are going to be finishing the compilation today or tomorrow and sending it "up the line." Please do not hesitate to call or email LCDR Smith or myself for further clarification or any questions you may have regarding this survey.

Respectfully,

Wes Kitt, PS, AHB


Cribs "N" "4"
12-ft Sounding
chart 14917
Cribs R
"N" "2"
175 FT AUG 2006
Marinette
Marine Corp
Obstn
PA
Hoist

ATLANTIC HYDROGRAPHIC BRANCH
EVALUATION REPORT to Accompany
Survey F00511 (2005)

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.

B. DATA ACQUISITION AND PROCESSING

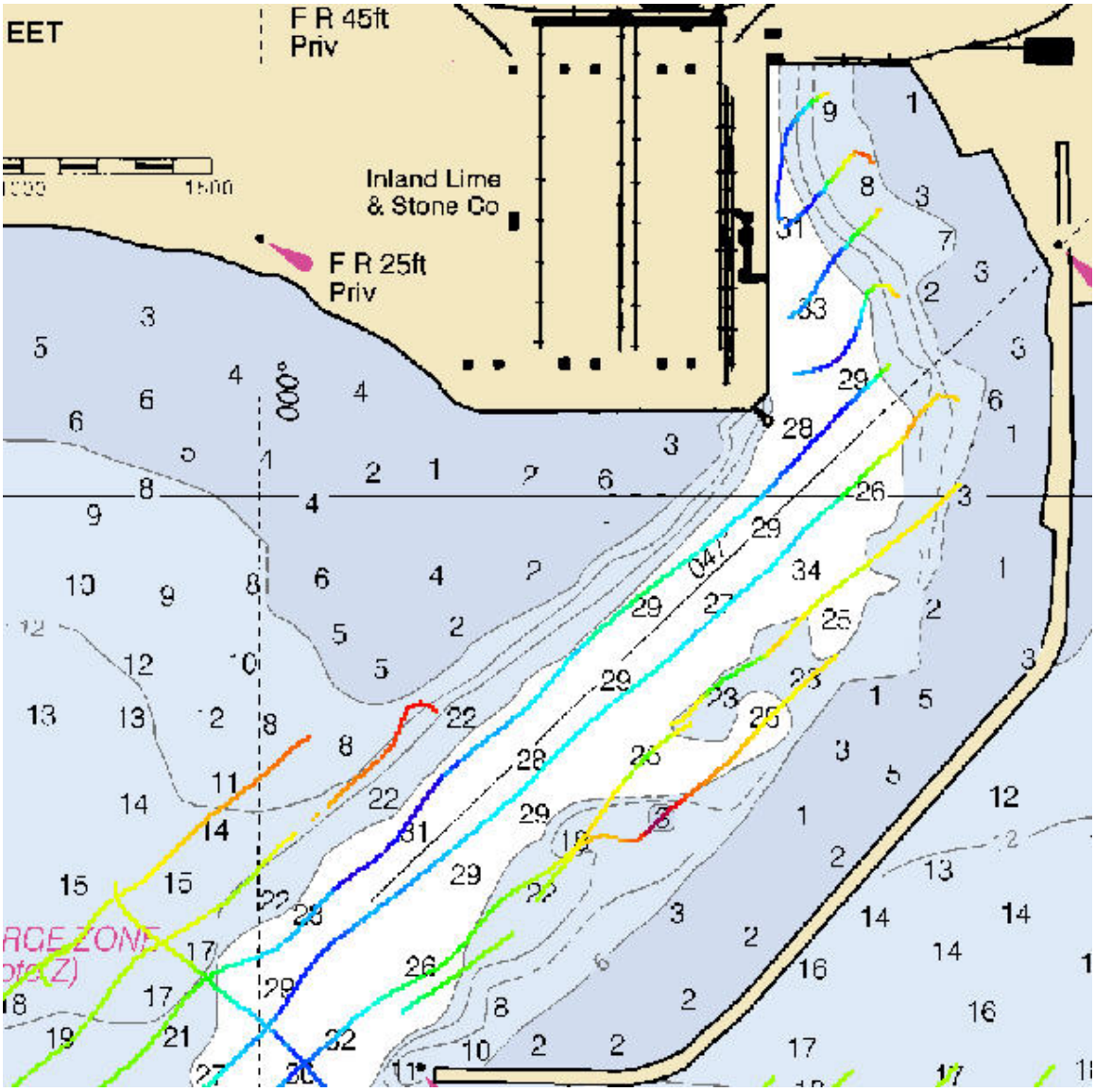
B.1 EQUIPMENT

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

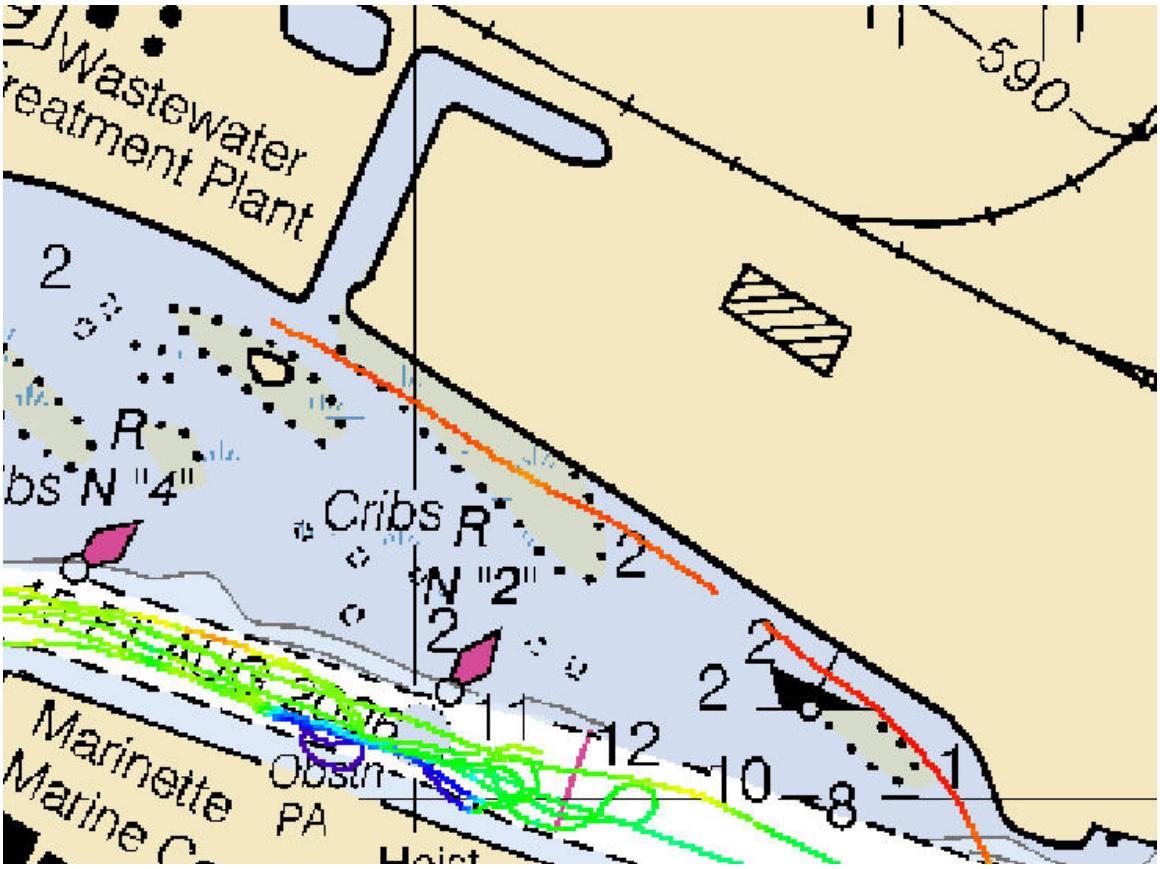
HSTP PYDRO version 7.3 r2252
CARIS HIPS/SIPS version 6.1 SP1 HF 1-13
CARIS Bathy Manager version 2.1 SP1 HF 1-6
DKART INSPECTOR, version 5.0 Build 732 SP1
CARIS HOM version 3.3 SP3 HF 1-8
CARIS S57 Composer version 1.0

B.2. QUALITY CONTROL

Although information contained in this survey is useable for updating raster charts and ENC's, many charted soundings will need to be retained, particularly in the area of Port Inland, MI, along the Range bearing 047° where sounding density is not sufficient to disprove many of the soundings presently charted as well as the channel leading to the wastewater treatment plant in Menominee (see screen grabs below). The compiler picked a few selected soundings to show where there appear to be major differences.



Port Inland: No soundings were collected along the 047° range or run cross channel.



Menominee Wastewater Treatment Plant: Only one line of VBES was run.

B.2.1. H-Cell

The AHB source depth grid for the survey's nautical chart update product entailed the field's original PVDL VBES soundings in the three sections of the survey, gridded at 2 meter resolution using the shoal layer and creating an uncertainty layer. The survey scale selected soundings were extracted from the 2m product surfaces. The selected sounding set is approximately 10 to 20 times the number of charted depths. The chart scale selected soundings are a subset of the survey scale selected soundings. The surface model was referenced when selecting the chart scale soundings, to ensure that the selected soundings portrayed the bathymetry within the common area.

The Stand-Alone Hob Files (SAHOB) included sounding selections (SOUNDG), features (SBDARE), Meta objects (M_COVR, M_QUAL), and cartographic Blue Notes. The individual SAHOB files were inserted into one BASE Manager feature layer and exported to S57 format in order to create the H-Cell deliverable.

The completed H-Cell was exported as a Base Cell File (ENC.000) in S-57 format with all values in metric units. The metric equivalent ENC.000 file was then converted to NOAA chart units (ENC_CU.000) with all values measured in feet following NOAA sounding rounding rules.

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

The F00511 CARIS H-Cell final deliverables include the following products:

US500511_CU.000	1:10,000 Scale	F00511 H-Cell with Chart Scale Selected Soundings
US500511_SS.000	1:5,000 Scale	F00511 Selected Soundings (Survey Scale)
US500511_Bluenotes.000	1:10,000 Scale	F00511 Cartographic Notes

B.2.2. Junctions

No contemporary surveys exist for junctioning.

C. VERTICAL AND HORIZONTAL CONTROL

Final vertical correction processing was completed by office personnel with no additional correction required by Atlantic Hydrographic Branch. The office personnel applied final tidal zoning for F00511. Sounding and vertical datum is Low Water (LWD) at 176.00 meters IGLD85.

Horizontal control used for this survey during data acquisition is based upon the North American Datum of 1983 (NAD83), UTM projection zone 16.

D. RESULTS AND RECOMMENDATIONS

D.1 CHART COMPARISON

14911_1 (21st Edition, Oct./05)
Corrected through NM 10/15/2005
Corrected through LNM 10/11/2005
Scale 1:80,000

14911_2 (21st Edition, Oct./05)
Corrected through NM 10/15/2005
Corrected through LNM 10/11/2005
Scale 1:10,000

14911_3 (21st Edition, Oct./05)
Corrected through NM 10/15/2005
Corrected through LNM 10/11/2005
Scale 1:15,000

14917 (24th Edition, Mar./05)
Corrected through NM 03/05/2005
Corrected through LNM 03/01/2005
Scale 1:15,000

14909 (20th Edition, Jul./05)
Corrected through NM 07/23/2005
Corrected through LNM 07/19/2005

Scale 1:80,000

14902 (29th Edition, Jan./05)
Corrected through NM 01/01/2005
Corrected through LNM 12/28/2004
Scale 1:240,000

ENC Comparison US4MI52M
Waugoshance Point to Seul Choix Point
Edition 5
Update Application Date 2007-04-16
Issue Date 2008-04-28
References: Chart 14911

US3MI80M
North End of Lake Michigan including Green Bay
Edition 5
Update Application Date 2008-02-26
Issue Date 2008-02-26
References: Chart 14902

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:

1. AWOIS 13303 – Found in a location just to the west of charted location. Depth of 26 ft is well deeper than controlled depth of channel. Recommend removing obstruction symbol from chart. Obstruction deemed insignificant.

2. Submerged wreck at position 45° 44' 55.59" N, 085° 30' 46.36" W was not addressed. No side scan nor bathymetry present. Recommend retain as charted.

3. Charted "Blds" not developed. No sidescan nor bathymetry over feature. Retain as charted at position 45° 43' 24.19" N, 085° 26' 47.98" W (SBDARE carried over.)

4. AWOIS 2327 – Least depth not obtained. However, sidescan position was obtained so it is recommended it be moved to current survey position of 45° 05' 36.24" N, 087° 34' 48.52" W.

5. Two privately maintained buoys are present in survey F00511 in the Menominee area that are not included on ENC US3MI80M. These buoys are included in the US500511_CU file.

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

To summarize the initial survey review submitted August 24, 2007, the following discrepancies are noted:

- Only one cross line was completed
- Two areas were surveyed by VBES only, in contrast to Letter of Instructions which called for combination of VBES and 200% side scan. Therefore, complete coverage was not obtained. The Descriptive Report did clarify this and referred to a phone conversation with the Great Lakes Project Manager. No confirmation from HQ was present in the Supplemental Correspondance Records Appendix V.
- Charted shoals were not investigated fully, eg. reduced VBES line spacing.
- No acquisition logs were present with the data, only a template. This was probably just an oversight.

To improve the quality of future survey submissions the following recommendations are made:

- Any deviation from the Letter of Instructions should be confirmed by a revised set of instructions and written correspondence.
- It may be preferred to finish a section of a survey completely in lieu of having an incomplete survey whenever “time constraints” becomes an issue. The data is useable but many charted soundings and AWOIS items will need to be carried over due to lack of coverage.

The present survey is not adequate to supersede the entire charted bathymetry within the common area particularly in the Port Inland region due to insufficient density of soundings. Any features not specifically addressed either in the H-Cell BASE Cell File should be retained as charted. Refer to the Descriptive Report for further recommendations by the hydrographer.

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

TIDE NOTE FOR HYDROGRAPHIC SURVEY

DATE : October 30, 2006

HYDROGRAPHIC BRANCH: Atlantic
HYDROGRAPHIC PROJECT: S-Y916-NRT4-2005
HYDROGRAPHIC SHEET: F00511

LOCALITY: North End of Lake Michigan, Lake Michigan, MI
TIME PERIOD: July 21 - August 3, 2005

WATER LEVEL STATION: 908-7096 Port Inland, MI
Lat. 45° 58.2’ N Long. 85° 52.3' W

PLANE OF REFERENCE (IGLD 85): 176.00 meters

WATER LEVEL STATION: 908-7078 Green Bay, WI
Lat. 44° 32.4' N Long. 88° 00.5' W

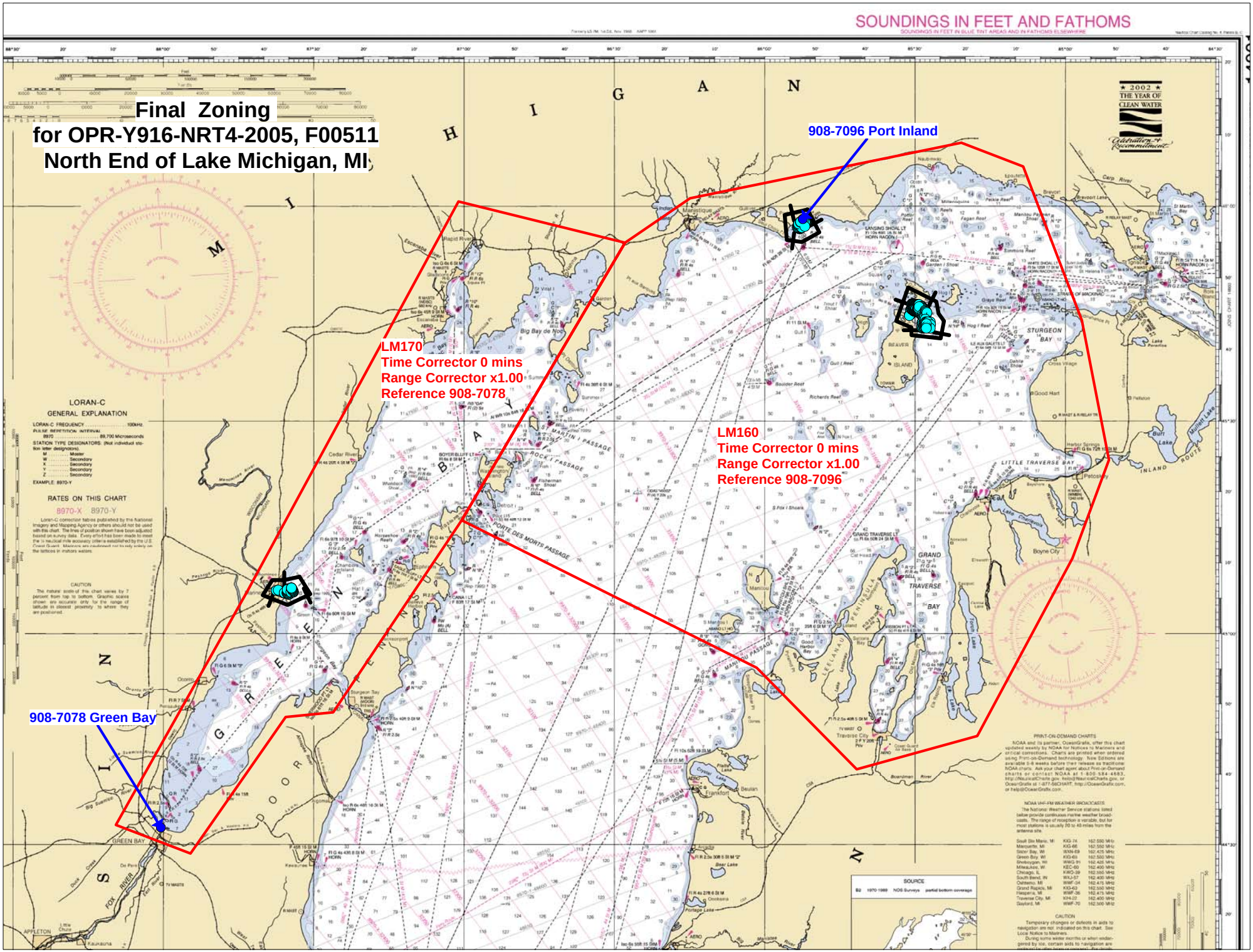
PLANE OF REFERENCE (IGLD 85): 176.00 meters

REMARKS: RECOMMENDED ZONING
Use zone(s) identified as: LM160 & LM170

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).

_____
CHIEF, PRODUCTS AND SERVICES DIVISION


SOUNDINGS IN FEET AND FATHOMS
Final Zoning
for OPR-Y916-NRT4-2005, F00511
North End of Lake Michigan, MI
908-7096 Port Inland
LM170
Time Corrector 0 mins
Range Corrector x1.00
Reference 908-7078
LM160
Time Corrector 0 mins
Range Corrector x1.00
Reference 908-7096
908-7078 Green Bay
LORAN-C
GENERAL EXPLANATION
RATES ON THIS CHART
8970-X 8970-Y
MICHIGAN
GREEN BAY
LITTLE TRAVERSE BAY
GRAND TRAVERSE BAY
STURGEON BAY
PORTE DES MORTS PASSAGE
MANITOU PASSAGE
ROCK PASSAGE
ST MARTIN I PASSAGE
INLAND ROUTE

APPROVAL SHEET
F00511

Initial Approvals:

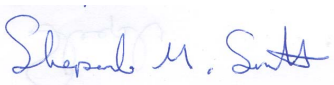
The completed survey has been inspected with regard to survey coverage, delineation of depth curves, representation of critical depths, cartographic symbolization, and verification or disproval of charted data. All revisions and additions made to the H-Cell files during survey processing have been entered 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 review per the Hydrographic surveys Division Office Processing Manual and are verified to be accurate and complete except where noted.

Wesley Kitt
I am the author of this document
2008.06.04 14:57:25 -04'00'

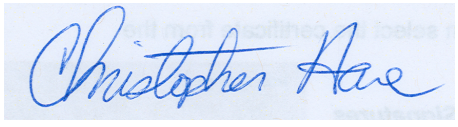
Wesley G. Kitt
Physical Scientist
Atlantic Hydrographic Branch

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: 

Shepard Smith
I am approving this document
2008.06.12 12:01:04 -04'00'

Shepard Smith
Lieutenant Commander, NOAA
Chief, Atlantic Hydrographic Branch



Christopher Hare
AWOIS and SURF Check
2008.06.18 10:18:46 -04'00'