

9718

Diag. Cht. No. LS-5

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT
(HYDROGRAPHIC)

Type of Survey HYDROGRAPHIC.....
Field No. MI-50-5-77
Office No..... H-9718

LOCALITY

State Michigan
General Locality Lake Huron
Locality Vicinity Spectacle Reef

19 77

CHIEF OF PARTY
James S. Midgley

LIBRARY & ARCHIVES

DATE November 16, 1978

8
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2
8

Area
Cht
1488
1489
1484
1488
1486

HYDROGRAPHIC TITLE SHEET

H-9718

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.

MI-50-5-77

State MICHIGAN

General locality LAKE HURON

Locality VICINITY SPECTACLE REEF LIGHT

Scale 1:50000

Date of survey 18 September 1977 (JD 261) -
1 October 1977 (JD 274)

Instructions dated 21 April 1977

Project No. OPR-520-MI-77

Vessel NOAA SHIP MT MITCHELL S 222

Chief of party CAPT. JAMES S. MIDGLEY, NOAA CORPS

Surveyed by SEE REMARKS

Soundings taken by echo sounder, hand lead, pole ROSS MODEL 5000 FINELINE ECHO SOUNDER

Graphic record scaled by DAW, DRR, PMD, MEH, TDR, MLM, WGP

Graphic record checked by PWS, FDS, EEM, JTK, RMM

Protracted by N/A

Automated plot by CALCOMP 618-AMC
NOS-HYDROPLOT-SYSTEM

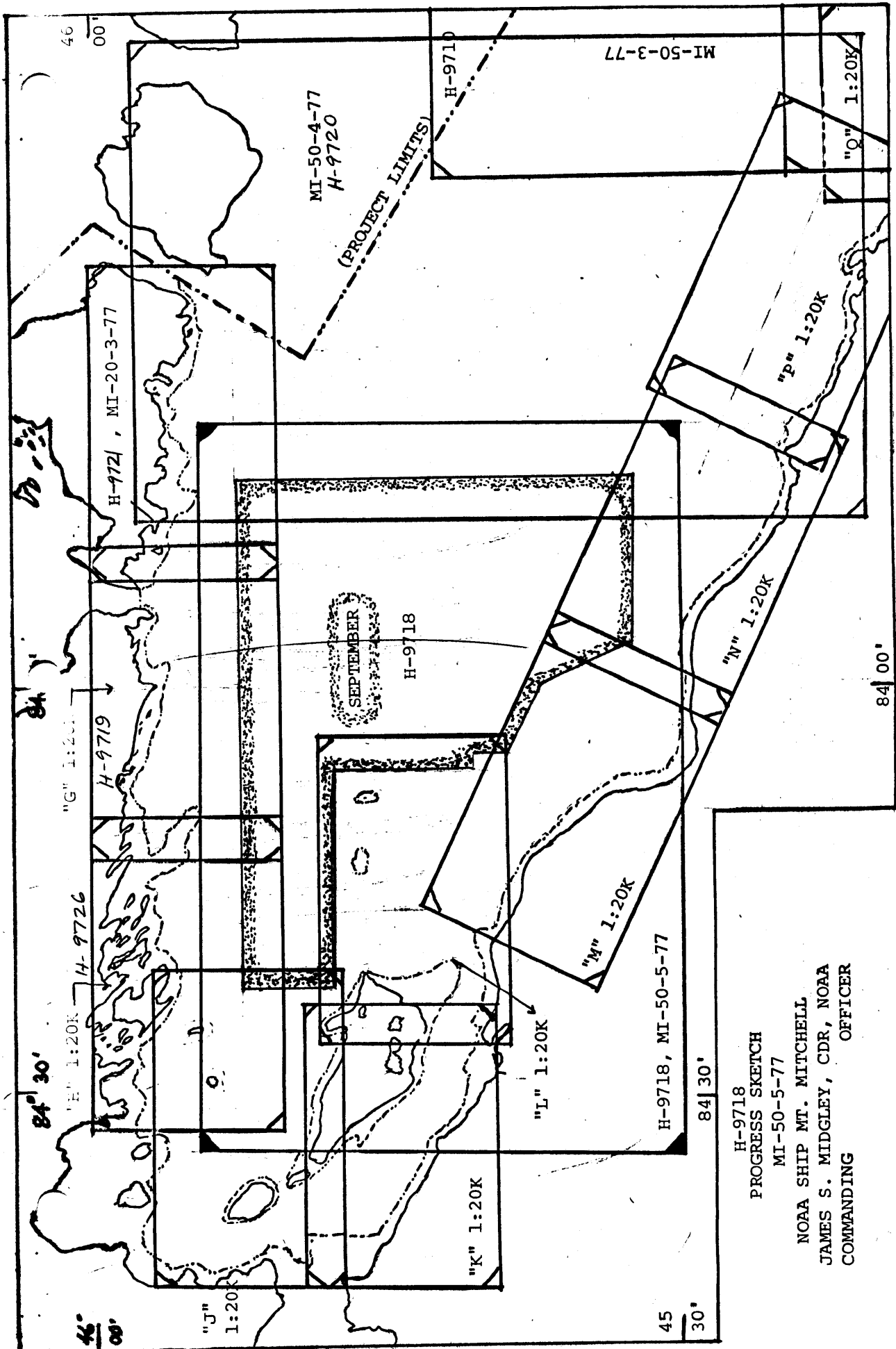
Verification by N/A

Soundings in ~~fathoms~~ feet at MLW MLLW LWD (IGLD 1955: 576.8 FEET)

REMARKS: LT D.A. WALTZ, LTjg D.R. RICE, LTjg M. E. HENDERSON, ENS P. M.

DAUGHERTY, ENS W. G. PRINGLE, ENS M. L. MURPHY, LCDR G. B. MILLS

Applied to atlas 4/5/79
UOS



SCALE OF CHART #14860

H-9718
 PROGRESS SKETCH
 MI-50-5-77
 NOAA SHIP MT. MITCHELL
 JAMES S. MIDGLEY, CDR, NOAA
 COMMANDING OFFICER

46
00'

84' 00"

"G" 1:20K

H-9726

"E" 1:20K

H-9721, MI-20-3-77

H-9719

MI-50-4-77
H-9720

(PROJECT LIMITS)

H-9710

MI-50-3-77

"Q" 1:20K

"P" 1:20K

"N" 1:20K

"M" 1:20K

H-9718, MI-50-5-77

84' 30"

"L" 1:20K

"K" 1:20K

H-9718

SEPTEMBER

46
00'

45
30'

A. PROJECT

This survey was carried out in accordance with Project Instructions OPR-520-MI-77 issued 21 April 1977 and amended by Changes 1 through 3 dated 5 May 1977, 24 May 1977, and 10 June 1977 respectively.

B. AREA SURVEYED

This survey was conducted in Lake Huron, offshore. The limits of the survey are described by lines connecting the following points in a clockwise manner:

(1) 45°53.0'N (2) 45°53.0'N (3) 45°32.2'N (4) 45°32.2'N
84°21.8'W 83°45.8'W 83°45.8'W 83°57.0'W

(5) 45°41.0'N (6) 45°47.4'N (7) 45°47.4'N
84°07.0'W 84°07.0'W 84°21.8'W

This survey was conducted between 18 September 1977 (JD 261) and 1 October 1977 (JD 278).

C. SOUNDING VESSEL

Soundings for this survey were obtained by the NOAA SHIP MT MITCHELL S222 (Vessel Number 2220 for all survey records) utilizing a fully automated Hydroplot System.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

The following equipment was used to obtain soundings for this survey:

Equipment:	Serial No:
Ross Model 5000 Fineline Depth Sounder	1053
Ross Model 4000 Transceiver	1050
Ross Digitizer	1050

Soundings were taken with a skeg transducer (antenna distance +32.0 m). All survey records were scanned by trained Survey Department personnel and checked by the Officer in Charge. Peaks and deeps considered significant that occurred between soundings were inserted, digitizing errors were corrected, and the effects of the seas were meaned and corrected on the electronic corrector tape.

Phase calibration checks were made at frequent intervals. Any necessary adjustments were made and noted in the sounding volume and on the fathogram. In addition, any departures of the trace from the calibration due to phase differences were corrected during the scanning process.

Velocity corrections were obtained from 2 Nansen Casts and 2 XBT'S on the following locations:

Cast No:	Latitude:	Longitude:	Date:
J5	45°44'12"N	83°53'36"W	21 September 1977 (JD 264)
J7	45°40'36"N	83°47'06"W	27 September 1977 (JD 270)

XBT No:

J6A	45°51'54"N	84°16'00"W	27 September 1977 (JD 270)
J6B	45°50'36"N	84°15'00"W	27 September 1977 (JD 270)

Salinities determined by salinometer were found to less than .2 parts per thousand and were negligible in determining sound velocities. Corrections for velocity were made from the data obtained from these Nansen Casts and XBT'S using RK 530 computer program.

An explanation of how the velocity tables were derived, along with the printouts of the velocity tapes and all tables is included in the appendices and survey support data.

A draft of 14.0 feet was applied to all soundings during the on line process. To determine the actual drafts for the survey, a straight line plot was constructed using the after draft from the beginning and ending dates of each trip. A draft correction was determined for every 0.2 feet. The draft varied from 13.9 to 14.3 feet for this survey. Settlement and squat corrections for the ship were determined on July 25, 1977 (JD 206) in Lake Huron at St. Ignace, Michigan.

A corrector of +.2 feet is accurate for all survey speeds +1 feet. A copy of the data abstract for ship's speed versus settlement and squat correctors is included in the survey support data. The change in the draft along with the settlement and squat is incorporated into the TC/TI tape included with the survey support data. A printout of this tape is included with this report.

A vertical cast was conducted on June 18, 1977 (JD 169) at Harrisville, Michigan to determine fathometer instrument error. The results are included in this report. The error was less than 0.1 feet and was considered to be zero due to the accuracy of the cast.

Water level corrections were not applied at the time of the survey. A copy of the request for the actual water levels for the area surveyed is included with this report.

E. HYDROGRAPHIC SHEETS

(field sheets)

This survey was plotted on two mylar complot roll plotter sheets by the

MT MITCHELL Hydroplot System. The skew used was 0,21,54, for both sheets. The survey was plotted off line using an electronic corrector tape and a velocity corrector tape. Soundings on the field sheets are corrected for draft, initial and digitizing errors, and sound velocity. They are not corrected for water levels, settlement and squat, and instrument error. The final smooth sheet will be plotted at the Atlantic Marine Center, Norfolk, Virginia.

All field records and the following tapes have been forwarded to the Atlantic Marine Center:

Master Range-Range Data Tapes
Electronic Corrector Tapes
Velocity Correction Tape
Parameter Tapes
ASC II Signal Tapes
Transducer Corrector/Table Indicating Tape

F. CONTROL STATIONS

Electronic control stations used for this survey were:

Signal Number and Signal Name:	Latitude:	Longitude:
207 H-17-MI-77 Presque Isle "Turcotte"	45°20'56.482"N	83°29'06.080"W ✓
300 H-13-MI-77 Forty Mile Pt Hydrotrac	45°29'11.010"N	83°54'48.836"W
400 H-20-MI-77 Lafayette Pt Hydrotrac	45°46'18.807"N	84°21'23.562"W

All shore stations were located by personnel from the Operations Division, Atlantic Marine Center with assistance from Mt Mitchell Officers. Stations were erected and maintained by ship's personnel.

G. HYDROGRAPHIC POSITION CONTROL

An Odum Offshore Hydrotrac system, operating at a frequency of 1618.650 Khz, in Hyperbolic mode, was used to provide positioning control on the following day for bottom samples 1-22 only.

18 September 1977 (JD 261)

The equipment serial numbers are as follows:

Vessel or Shore Station:	Equipment:	Serial No:
Mt Mitchell (Vesno 2220)	Receiver	328
	Parallel Buffer	102
Slave 1 (207)	SDU	215
	Power Amplifier	539
	Coupler	135

The equipment serial numbers are as follows: Cont'd

Vessel or Shore Station:	Equipment:	Serial No:
Master (300)	MDU	122
	Power Amplifier	536
	Coupler	133
Slave 2 (400)	SDU	216
	Power Amplifier	538
	Coupler	131

At approximately 1500 GMT on 18 September 1977 (JD 261) the Hydrotrac was switched to Range-Range mode and used until completion of the survey. The equipment serial numbers are as follows:

Vessel or Shore Station:	Equipment:	Serial No:
Mt Mitchell (Vesno 2220)	MDU	121
	Master Receiver	328
	Power Amplifier	537
	Coupler	134
Station 300	SDU	214
	Power Amplifier	536
	Coupler	135
Station 400	SDU	216
	Power Amplifier	538
	Coupler	131

A frequency of 1620.38 Khz was used in the Hydroplot signal tape to compensate for the difference in propagation velocity between salt and fresh water. This frequency corresponds to a propagation velocity of 299350 Km/sec.

Visual calibration of the Hydrotrac was accomplished seven times during the survey. The resultant correctors were used until a new calibration was obtained. During reduced visibility and at night Del Norte was used to check whole lane count on the Hydrotrac. The following Del Norte equipment and stations were used:

Station No:	Signal Name:	Equipment:	Serial No:	Code:
Ship		DMU	173	
		Master	273A	78
		360° Antenna	056	
		Parallel Buffer	123	

Del Norte equipment and stations used: Cont'd

Station No:	Signal Name:	Equipment:	Serial No:	Code:
420	Spectacle Reef Light	Remote 180° Antenna	1135 088	74
450	Martin Reef Light	Remote 180° Antenna	1063 127	76

Initially the Del Norte was calibrated over a measured baseline. To ensure no drift due to movement to the station the Del Norte was calibrated again using three sextant fixes and comparing observed ranges with computed values by use of Hydroplot Calibration Program RK 561. A simultaneous check fix was taken with each calibration. Only those fixes with inverses less than five (5) meters were accepted. The resultant correctors were then used until a new calibration was obtained.

The lane count was constantly monitored by the Survey Department, by comparing the navigation interface readout with a running count on the sawtooth recorder. Lane jumps were thus detected and confirmed at calibrations. Any undetected lane jumps were determined by off line rescanning of the sawtooth record. An abstract of the calibration data is included with the records accompanying this report.

H. SHORELINE

There was no shoreline within the limits of this survey.

I. CROSSLINES

Crosslines were run at least 45° to the main scheme sounding lines. Mileage of crosslines amounted to 7.5% of the regular sounding lines. The crossline soundings generally agree within 1 foot of the main scheme soundings with some greater disagreement in areas of rough bottom topography.

J. JUNCTIONS See Verifier's Report

This survey junctions with the following surveys:

Area of Junction:	Field No:	Reg.No:	Scale:	Date:	Ship:
East	MI 50-4-77	H-9720	1:50,000	1977	2220
North	MI 20-3-77	H-9721	1:20,000	1977	2220
North	MI 20-4-77	H-9719	1:20,000	1977	2220
North West	MI 20-5-77	H-9726	1:20,000	1977	2220

Excellent junctions were made with these surveys and contours continue smoothly to these sheets. MI-20-4-77, ⁴⁻⁵⁻⁷⁷ was not complete at the time of this report. In addition, Survey MI-20-5-77 (Registry No. H-9721) will junction with this survey to the north and west when it is complete.

K. COMPARISON WITH PRIOR SURVEYS

Prior Survey Number 1-1838 at a scale of 1:120,000 was conducted in 1945 within the area of this survey. Comparison between this prior survey and the present survey is fair with most selected soundings agreeing within 10 feet. The improved quality of position control for the present survey is the probable cause of these disagreements.

There were no presurvey review items to be investigated with the survey limits of MI-50-5-77 for Project OPR-520-MI-77.

L. COMPARISON WITH CHART

This area is covered by the following NOAA Charts:

Chart Number:	Edition:	Date:	Scale:
14880	24th	05 Feb 1977	1:120,000
14881	22nd	14 May 1977	1:80,000

As previously stated in comparisons with prior surveys, charted depths generally agree within 10 feet with disagreements as much as 50 feet. Again, this disagreement is attributed to the increased accuracy of this survey's positioning control.

M. ADEQUACY OF THE SURVEY

This survey is considered complete and adequate to super^sede prior surveys for charting.

N. AIDS TO NAVIGATION

There are no aids to navigation within the limits of this survey.

O. STATISTICS

Linear Nautical Miles of Main Scheme Hydrography	919.0
Linear Nautical Miles of Crosslines	69.0
Linear Nautical Miles of Development	9.0
Total Linear Miles of Hydrography	997.0
Total Miscellaneous Miles	434.5
Total Miles	1431.5

STATISTICS Cont'd

Square Miles of Hydrography	336.5
Total Number of Positions	1198.0
Nansen Casts	2
Bottom Samples	28

P. MISCELLANEOUS

(the field sheet)

Three different velocity tables apply to the data on this sheet. To prevent undue shipboard processing time all data on the north sheet was plotted using velocity table 1 and that on the south sheet with velocity table 3. All appropriate velocity tables are included in the TRA Correction Abstract and TC/II tape.

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

The following Hydroplot Programs were used to acquire and process data for this survey:

	Program Name:	Version:
RK 110	Hyperbolic, Real Time Hydroplot	2-02-76
RK 111	Range-Range Real Time	1-30-76
RK 201	Grid, Signal, and Lattice Plot	4-18-75
RK 210	Hyperbolic, Non-Real Time Plot	1-15-76
RK 211	Range-Range Non-Real Time Plot	1-15-76
RK 300	Utility Computations	2-10-76
PM 360	Electronic Tape Abstract	2-02-76
RK 530	Velocity Correction Computation	5-10-76
RK 561	H/R Geodetic Calibration	2-19-75
RK 602	Extended Line Oriented Editor	5-21-75

S. REFERENCE TO REPORTS

Horizontal Control Report - to be submitted at the end of the field season to the National Geodetic Survey.

Respectfully Submitted:

Mary L. Murphy

Mary L. Murphy
Ensign, NOAA

APPROVAL SHEET

MI-50-5-77

H-9718

The field work on this Hydrographic Survey was under my daily supervision. The boat sheet and records have been reviewed and approved by me.

LCDR Gerald B. Mills
for James S. Midgley
Captain, NOAA
Acting Commanding Officer

c. This survey is considered adequate to delineate the bottom configuration and least depths.

4. Condition of Survey

The smooth sheet and accompanying overlays, hydrographic records, and the Descriptive Report are adequate and conform to the requirements and procedures prescribed by the Hydrographic Manual.

5. Junctions

Adequate junctions have been effected with the following surveys:

- H-9720 (1977) to the east ✓
- H-9721 (1977) to the north ✓
- H-9719 (1977) to the north ✓
- H-9726 (1977) to the northwest ✓

There were no contemporary surveys available to the west for junctioning purposes.

6. Comparison With Prior Surveys See *Quality Control Report*.

a. 1-1838 (1945) 1:120,000

This prior survey is the most recent in the area that provides complete coverage. The comparison between the prior survey and the present survey is fair, with most selected soundings agreeing within 1 to 10 feet (shoaler) on present survey, when allowances are made for the control on the prior survey.

b. 1-1498 (1926-27) 1:20,000

The comparison between this prior survey and the present survey was within 8 feet (shoaler) on the present survey.

c. 1-1373 (1916-17) 1:20,000

The comparison between this prior survey and the present survey was within 10 feet (shoaler) on the present survey. Some soundings on this survey were transferred to this prior survey from 1851, 1853, and 1896 surveys, however ^{these} prior soundings are not in the common area of the present survey.

d. 1-1372 (1917) 1:20,000

The comparison between the prior survey and the present survey is good, with most selected soundings agreeing on the present survey.

The above differences can be attributed to some natural change and to the less accurate methods used during the prior surveys. Also, soundings that were transferred from above survey to most recent survey of the area (1-1838) could not be distinguished because the prior surveys were copies.

The present survey is adequate to supersede the prior survey within the common area. No depths were brought forward from prior surveys as the position accuracy of these soundings is suspect and the present survey appears to better delineate the shoal features in the survey area.

7. Comparison With Charts 14880 (24th Edition, Feb. 5, 1977)
14881 (22nd Edition, May 14, 1977)

a. Hydrography

The charted soundings originate primarily with the previously discussed prior surveys. However, numerous charted soundings do not appear to be charted from the most recent prior surveys. Also, the source of numerous charted soundings could not be ascertained. *See Q.C. Report*

Copies of the earlier prior surveys were not available at the time of comparison and the depths not ascertainable probably originate with these surveys.

The present survey is adequate to supersede the charted information within the common area.

b. Aids to Navigation

There are no aids to navigation in the survey area.

8. Compliance With Project Instructions

This survey adequately complies with the Project Instructions.

9. Additional Field Work

This is a good basic survey; no additional field work is recommended.

APPROVAL SHEET
FOR
SURVEY H-9718

- A. All revisions and additions made on the smooth sheet during verification have been entered in the magnetic tape records for this survey. A new final position printout has/~~has not~~ been made. A new final sounding printout has/~~has not~~ been made.
- B. The verified smooth sheet has been inspected, is complete, and meets the requirements of the Provisional Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date: 10/30/78

Signed: 
Title: Chief, Verification Branch

HYDROGRAPHIC SURVEY STATISTICS

H-9718

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS 5 1/2 MYLAR - 4 1/2 Paper		9	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS 1- POS. 1- EXCESS		2	
DESCRIP- TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/ SOURCE DOCUMENTS
ENVELOPES	2		2			1- misc. DATA
CAHIERS			1 with 1 photo.			
VOLUMES	1					
BOXES						
T-SHEET PRINTS (List)			1- notebook of		1- bundle of strip charts	
SPECIAL REPORTS (List)			Calibration data		1- chart # 14851	

OFFICE PROCESSING ACTIVITIES

The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS		
	PRE- VERIFICATION	VERIFICATION	TOTALS
POSITIONS ON SHEET			1198
POSITIONS CHECKED		200	
POSITIONS REVISED		5	
SOUNDINGS REVISED		20	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)			
VERIFICATION OF CONTROL		4	
VERIFICATION OF POSITIONS		50	
VERIFICATION OF SOUNDINGS		88	
COMPILATION OF SMOOTH SHEET		40	
APPLICATION OF TOPOGRAPHY		0	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		10	
COMPARISON WITH PRIOR SURVEYS & CHARTS		22	
VERIFIER'S REPORT		10	
OTHER		1	
TOTALS		225	225
Pre-Verification by M. Holloway	Beginning Date 12/15/77	Ending Date 12/15/77	
Verification by M. Holloway, S. Kelley, F. Saunders	Beginning Date 12/15/77	Ending Date 09/26/78	
Verification Check by C. Trefethen	Time (Hours) 4	Date 10/24/78	
Marine Center Inspection by Hydrographic Inspection Team (AMC)	Time (Hours) 10	Date 10/25/78	
Quality Control Inspection by RW. Dertazarian	Time (Hours) 54	Date Jan 5, 1979	
Requirements Evaluation by D.J. Hall	Time (Hours) 2	Date 2/13/79	

✓ G. W. W. 2/2/79 2 hrs.

The Computer and Excess Sounding cards for this survey have not been corrected to reflect the changes made to the Computer Card and Excess Card Printouts at this time of the review.

When the cards have been updated to reflect the final results of the survey the following shall be completed:

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

Reg. No. _____

The magnetic tape containing the data for this survey has not been corrected to reflect the changes made during evaluation and review.

When the magnetic tape has been updated to reflect the final results of the survey, the following shall be completed:

MAGNETIC TAPE CORRECTED

DATE _____ TIME REQ'D. _____ INITIALS _____

REMARKS:

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

WATER LEVEL NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center: CAM3

Hourly heights are approved for

Water Level Station Used: Cheboygan, Michigan (907-5076)

Period: September 18 - October 1, 1977

HYDROGRAPHIC SHEET: H-9718

OPR-520-MI-77

Locality: Lake Huron

Plane of reference: Low Water Datum (IGLD 1955 : 576.8 Feet)

Remarks:

Presque Isle, Michigan gage (907-5069) was installed by the Hydrographic Field party, but they have been unable to locate any data for the gage for 1977.

DeTour Dock, Michigan gage (907-5098) was inoperative during the survey period.

Data from other gages on Lake Huron indicates no unusual water level movement during the survey period.

Philip C. Marras
Chief, Water Level Section

Don M. Spillman
Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

H-9718

Name on Survey	<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">A ON CHART NO.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">B ON PREVIOUS SURVEY NO.</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">C ON U.S. QUADRANGLE MAPS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">D FROM LOCAL INFORMATION</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">E ON LOCAL MAPS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">F P.O. GUIDE OR MAP</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">G GRAND MCNALLY ATLAS</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">H U.S. LIGHT LIST</div> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">K</div> </div>											
	LAKE HURON											
SPECTACLE REEF												2
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APPROVED

Chas. B. Harrington

CHIEF GEOGRAPHER - C3x5

23 JAN. 1979

SETTLEMENT AND SQUAT

MT MITCHELL 1977 Field Season

The settlement and squat test for the MT MITCHELL (S222) was conducted July 25, 1977 on Lake Huron, approximately one-half mile off the Coast Guard pier at St. Ignace, Michigan, using a Zeiss Ni-2 Level (S/N 142936), positioned at the end of the pier. Wave height was one foot and the wind was from 000° at 14 knots. To determine possible water level changes during the test, the height of water on the lee side of the pier was measured before, during, and after the level sightings; no change was observed.

A temporary buoy with a scope of 1.05 was deployed in 105 feet of water one-half mile from the end of the pier, and a series of readings was taken starting and ending no more than a ship's length from the buoy at idle, half, and standard speeds as the ship passed the buoy. Two passes, one port and one starboard, were made perpendicular to the pier at each speed on headings of 240° and 060°, respectively. An initial reading was taken at the beginning of the test with the ship dead in the water alongside the buoy. A portable tide staff (graduated in tenths of feet) was positioned on the center of the fantail cargo hatch cover located amidships to allow a clear line of sight to the onshore observer. The displacement of the staff from the skeg transducer was approximately 3 feet aft. Since all hydrography in Lake Huron was to be recorded using this transducer, the settlement and squat correctors were only determined at one location.

A draft reading of 14.0 feet was taken before the test. The ship was carrying four launches - two Pacific Plastics launches in davits 3 and 4 and two Jensen launches in davits 5 and 6. Settlement and squat was run using both engines and various pitch and rpm combinations as determined from a speed curve established May 1977 offshore Cape Henry, Virginia. The ship carried a full load of fuel and no fuel was transferred during the test.

Included is an abstract of the data obtained, suggested correctors versus ship speed, the graph of ship speed versus settlement and squat correctors, the "C" shot determination of instrument error, and the ship's speed curve.

Respectfully Submitted,

Virginia E. Newell

Virginia E. Newell
LT(jg), NOAA

SETTLEMENT AND SQUAT CORRECTORS

July 25, 1977 - Lake Huron

Speed (kts)

Correction (ft)

1	0
2	0
3	0
4	0
5	0.1
6	0.1
7	0.1
8	0.1
9	0.2
10	0.2
11	0.2
12	0.2
13	0.3

SIGNAL TAPE PRINTOUT
MI-50-5-77 H-9718

207	4	45	20	56482	083	29	06080	250	0000	162038
300	4	45	29	11010	083	54	48836	250	0000	162038
400	4	45	46	18807	084	21	23562	250	0000	162038
420	4	45	46	22892	084	08	16802	250	0000	000000
450	4	45	54	47292	084	08	54953	250	0000	000000
500	4	45	57	46364	083	59	41850	139	0000	000000
510	4	45	56	56791	083	54	11207	139	0000	000000
600	4	45	57	18728	083	54	59656	139	0000	000000
610	4	45	55	58549	083	47	09640	139	0000	000000
615	4	45	55	53493	083	46	07375	139	0000	000000
620	4	45	55	49785	083	42	56286	139	0000	000000
625	4	45	56	07276	083	41	14385	139	0000	000000

SIGNAL NAMES TAPE PRINTOUT
MI-50-5-77 H-9718

207	✓	PRESQUE ISLE "TURCOTTE" HYDTOTRAC	(H-17-MI-77) AMC OPS	*
300	✓	FORTY MILE POINT HYDROTRAC	H-13-MI-77 AMC OPS	*
400	✓	LAFAYETTE POINT HYDTOTRAC	(H-20-MI-77) AMC OPS	*
420	✓	SPECTACLE REEF LIGHT 1957	MICH. QUAD 450841 #1029	adjusted
450	✓	MARTIN REEF LIGHT	MICH. QUAD 450841 #1021	
500		ZAHARA	(H-1-UP-77) AMC OPS	
510		DETOUR REEF LIGHT	MICH. QUAD 450834 #1005	
600		POINT DETOUR	(H-25-MI-77) AMC OPS	
615		GRAVEL ISLAND	(H-27-MI-77) AMC OPS	
620		TRAVERSE POINT	(H-23-MI-77) AMC OPS	
625		SEAMANS POINT	(H-28-MI-77) AMC OPS	

* Field positions pending adjustment.

DETERMINATION OF VELOCITY CORRECTIONS

Simultaneous Nansen Casts and XBT'S disagreed from -2.2°C to $+1.2^{\circ}\text{C}$ with 70% of all temperatures agreeing within 0.5°C . Since the errors caused by the use of XBT'S were small, they were used alone at some stations for velocity determinations.

Station:	Latitude:	Longitude:	Date:
J5 (Nansen)	$45^{\circ}44'12''\text{N}$	$83^{\circ}53'36''\text{W}$	21 September 1977 (JD 264)
J6A (XBT)	$45^{\circ}51'54''\text{N}$	$84^{\circ}16'00''\text{W}$	27 September 1977 (JD 270)
J6B (XBT)	$45^{\circ}50'36''\text{N}$	$84^{\circ}15'00''\text{W}$	27 September 1977 (JD 270)
J7 (Nansen)	$45^{\circ}40'36''\text{N}$	$83^{\circ}47'06''\text{W}$	27 September 1977 (JD 270)

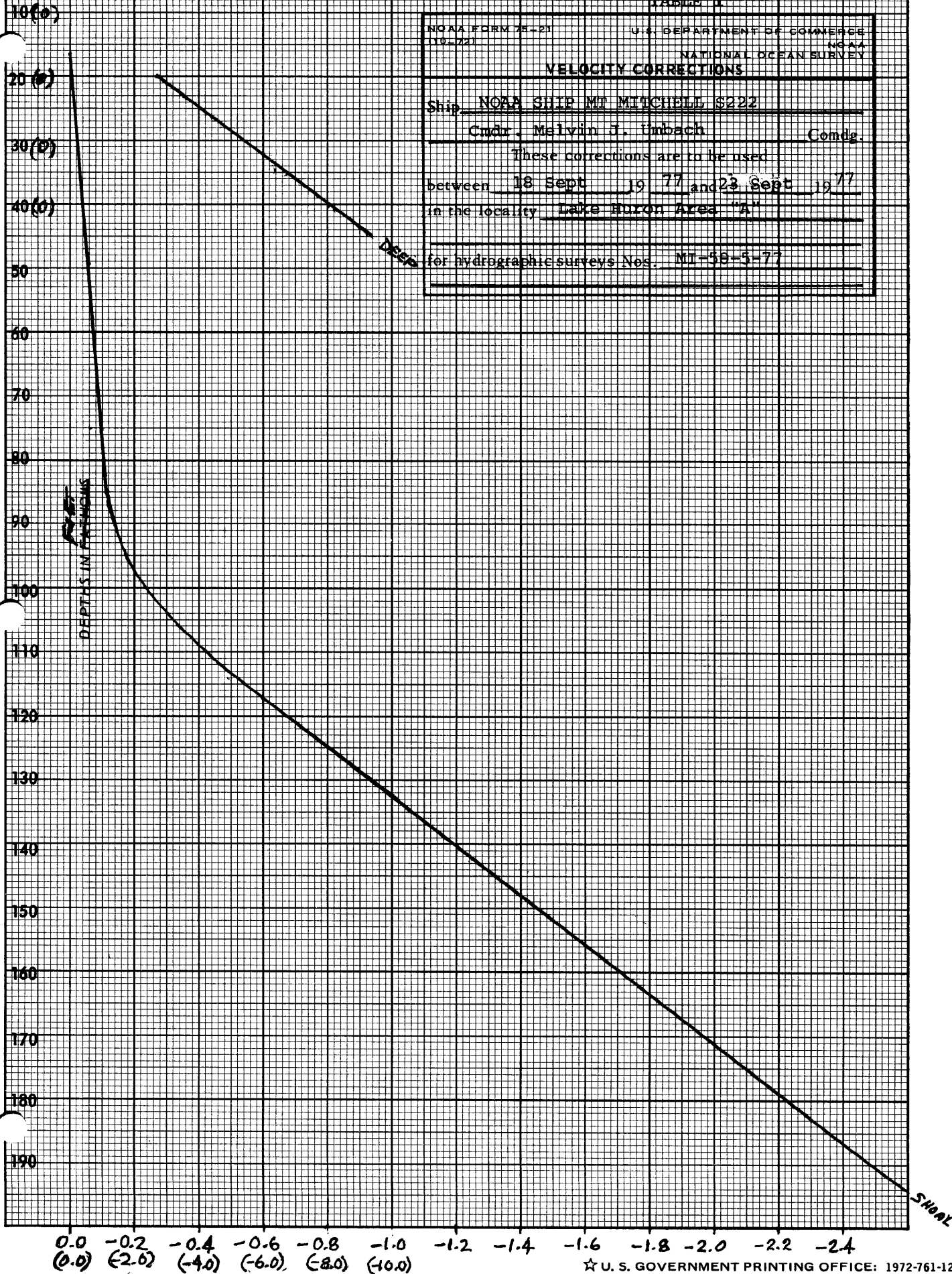
The first Nansen Cast was used to develop velocity Table 1 and applies to all hydro before September 26 (JD 269) and covers the north sheet east of Longitude $84^{\circ}10'\text{W}$. The data from the two XBT'S was averaged to form velocity Table 2 and applies to soundings west of Longitude $84^{\circ}10'\text{W}$. The warm water layer on these 2 XBT'S is much deeper than that of the 2 Nansen Casts. This is probably due to a large wind storm from the west driving warm surface water from Lake Michigan through the Straits of Mackinaw during the weekend of September 24 and 25. For depths deeper than 70 meters average temperatures from Nansen Casts J5 and J7 were used to complete velocity Table 2. Velocity Table 3 applies to all hydrography after 2012 GMT on September 27 (JD 270) and only to data on the south sheet.

CORRECTIONS IN FEET, ~~WATERS~~

TABLE 1

NOAA FORM 75-21 (10-77)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA SHIP MT MITCHELL S222</u>	
Cdr. <u>Malvin J. Umbach</u>	Comdg.
These corrections are to be used between <u>18 Sept 1977</u> and <u>23 Sept 1977</u> in the locality <u>Lake Huron Area "A"</u>	
for hydrographic surveys Nos. <u>MT-58-5-77</u>	

(For deep water add a 0 to these figures)



VELOCITY TAPE PRINTOUT MI-50-5-77 TABLE 1

000760	0	0000	0001	000	222000	050577
001040	1	0002				
001132	1	0004				
001208	1	0006				
001284	1	0008				
001420	1	0010				
001614	1	0015				
001807	1	0020				
002010	1	0025				
002200	1	0030				
002380	1	0035				
002570	1	0040				
002760	1	0045				
002950	1	0050				
003130	1	0055				
003320	1	0060				
003520	1	0065				
003710	1	0070				
003890	1	0075				
004090	1	0080				
004270	1	0085				
999999	1	0090				

VELOCITY TAPE PRINTOUT TABLE II MI-53-5-77 H-9718

*Depth and Correction in
Field Units of Feet*

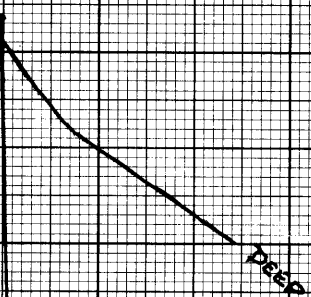
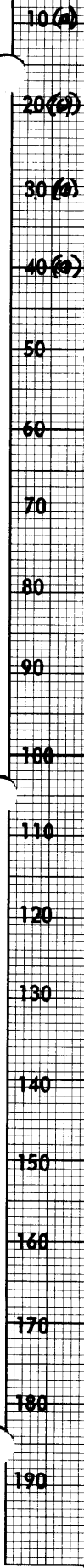
001445	0	0000	0002	000	222000	050577
002120	1	0002				
002250	1	0004				
002370	1	0006				
002500	1	0008				
002550	1	0010ft				
002840	1	0015				
003110	1	0020				
003290	1	0025				
003480	1	0030				
003600	1	0035				
003800	1	0040				
999999	1	0045				

CORRECTIONS IN FEET, FEET/100M

TABLE 2

NOAA FORM 75-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY	
VELOCITY CORRECTIONS		
Ship <u>NOAA SHIP MT MITCHELL S222</u>		
Cdr. <u>Melvin J. Umbach</u>		Comdg.
These corrections are to be used		
between	<u>26 Sept</u> 19 <u>77</u>	and <u>27 SEPT</u> 19 <u>77</u>
in the locality <u>Lake Huron Area "A"</u>		
for hydrographic surveys Nos. <u>MT-50-5-77</u>		

(For deep or add a 0 to these figures)



0.0 -0.2 -0.4 -0.6 -0.8 -1.0 -1.2 -1.4 -1.6 -1.8 -2.0 -2.2 -2.4
 (0.0) (-2.0) (-4.0) (-6.0) (-8.0)

VELOCITY TAPE PRINTOUT MI-50-5-77 TABLE 3

000620	0	0000	0003	000	222000	050577
001398	1	0002				
001631	1	0005				
001810	1	0010				
001970	1	0015				
002160	1	0020				
002340	1	0025				
002550	1	0030				
002740	1	0035				
002960	1	0040				
003140	1	0045				
003330	1	0050				
003510	1	0055				
003710	1	0060				
003890	1	0065				
004080	1	0070				
004260	1	0075				
004460	1	0080				
004630	1	0085				
999999	1	0090				

CORRECTIONS IN FEET, FATHOMS

TABLE 3

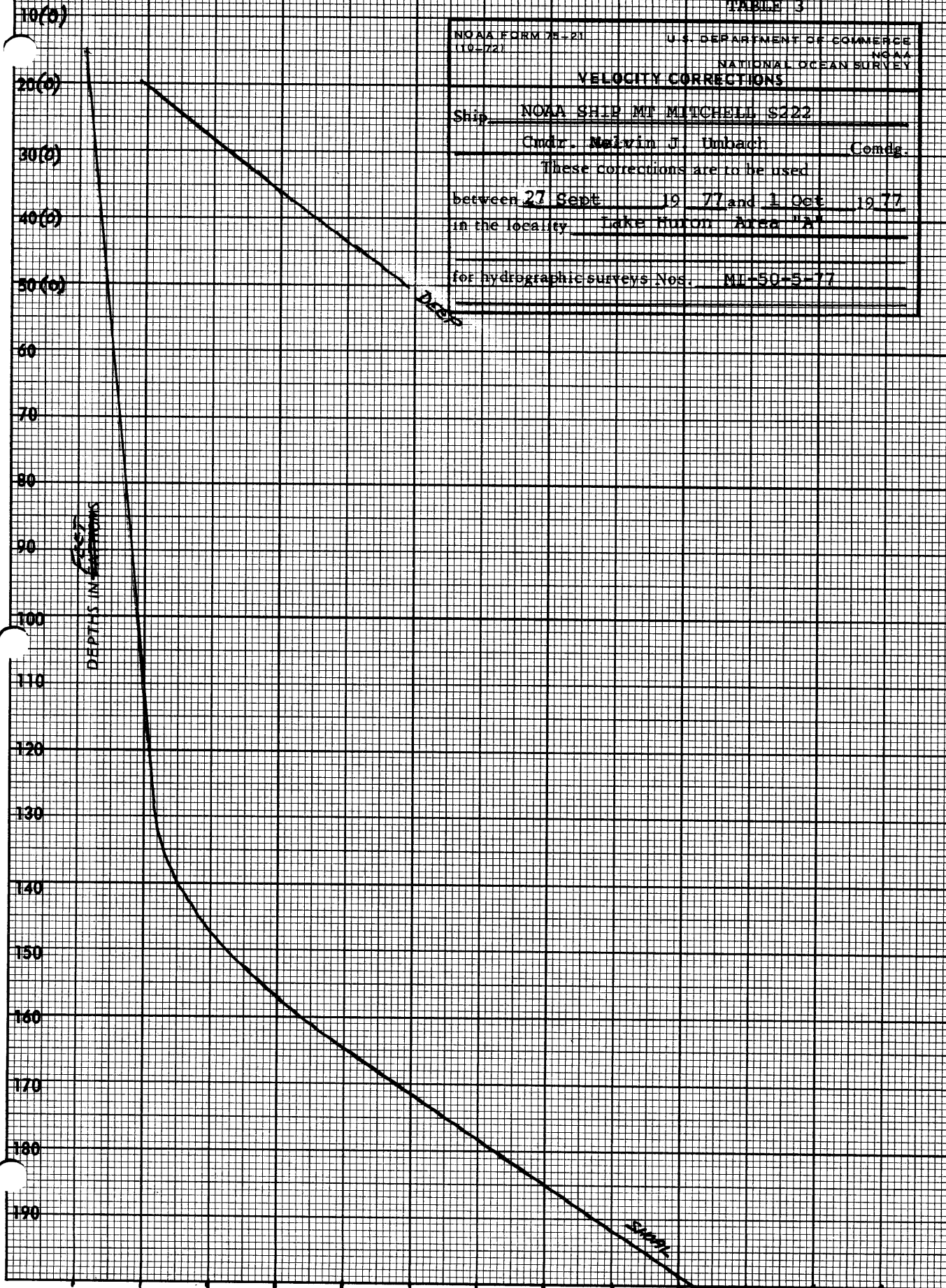
NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA SHIP MT MITCHELL S222
 Cmdr. Malvin J. Umbach Comdg.
 These corrections are to be used
 between 27 Sept 1977 and 1 Oct 1977
 in the locality Lake Huron Area "A"
 for hydrographic surveys Nos. ML-50-5-77

(For deep water add a 0 to these figures)



0.0 -0.2 -0.4 -0.6 -0.8 -1.0 -1.2 -1.4 -1.6 -1.8 -2.0 -2.2 -2.4
 (0.0) (-2.0) (-4.0) (-6.0) (-8.0) (-10.0)



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

OA/C352:RWD

January 5, 1979

TO: *A. J. Patrick*
A. J. Patrick
Chief, Marine Surveys Division

THRU: Chief, Quality Control Branch

FROM: R. W. DerKazarian *RW. DerKazarian*
Quality Evaluator

SUBJECT: Quality Control Report for H-9718 (1977), Vicinity Spectacle Reef, Lake Huron, Michigan

A quality control inspection of H-9718 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, smooth plotting, decisions and actions taken by the verifier, and the cartographic presentation of data. In general, the present survey was found to conform to the National Ocean Survey's standards and requirements except as stated in the Verifier's Report, the HIT Report, and as follows:

1. Section 2-a of the Verifier's Report is supplemented by the following:

The status of the control stations (triangulation stations) could not be substantiated by the National Geodetic Survey (NGS). It is assumed, however, that the necessary records and computations will eventually be submitted to the NGS. Ultimately, therefore, it is expected that the triangulation station status of the control stations will be validated. Accordingly, the control stations are symbolized as triangulation stations pending formal processing and acceptance as such by the NGS.

2. A comparison with the following prior surveys was made during the quality evaluation with the present survey. The following information is in addition to paragraph 6 of the Verifier's Report:

e.	1-67	(1845-51)	1:120,000
	1-214	(1859)	1: 60,000
	1-215	(1859)	1: 60,000

These prior surveys taken together cover the area of the present survey. A comparison between the prior and present surveys reveals no noteworthy changes in the bottom configuration. Differences in depths can partly



be attributed to 1/2- and 1-fathom datum correctors noted in pencil on 1-67 and 1-215, respectively, subsequent to these prior surveys. A comparison between the prior depths shown in whole fathoms with present sounding values plotted in feet also contributes to the causes for change.

f. 1-1531 (1929-31) 1:120,000

This small-scale reconnaissance survey provides only general depths in the area. The lack of development on 1-1531 precludes a detailed comparison with the present survey. Soundings from this prior survey which are shown in whole fathoms were subsequently transferred to 1-1838 (1945) and converted to feet which lends itself to inherent error.


3. The Verifier's Report, paragraph 7, indicates that numerous charted soundings could not be ascertained. Many of these soundings originate with the aforementioned surveys. A 162 on chart 14880 in latitude $45^{\circ}50.5'$, longitude $84^{\circ}20.3'$ presently falls in depths of 206 feet. This sounding does not appear on chart 14881 which is the largest scale chart in the area. It probably was charted in error from a 216-foot depth located on 1-1498 (1926-27).


cc:
C35
C351

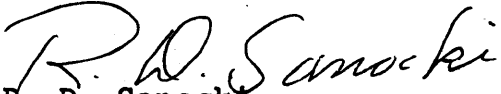
Inspection Report
H-9718

Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the survey have been incorporated within the Verifier's Report.


Examined and Approved:
Hydrographic Inspection Team
Date: *October 30, 1978*


Robert A. Trauschke, CDR, NOAA
Chief, Processing Division

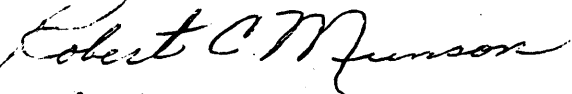

Charles H. Nixon, CAPT, NOAA
Chief, Operations Division


R. D. Sanocki
Technical Assistant
Processing Division

Absent
C. Douglas Mason, LT, NOAA
Chief, Electronic Data
Processing Branch


Billy S. Stephenson
Team Leader
Verification Branch

Approved/Forwarded


Robert C. Munson
RADM, NOAA
Director, Atlantic Marine Center

(CONTINUED ON CHART 14960) (formerly LS 9)

84°00'

83°30'

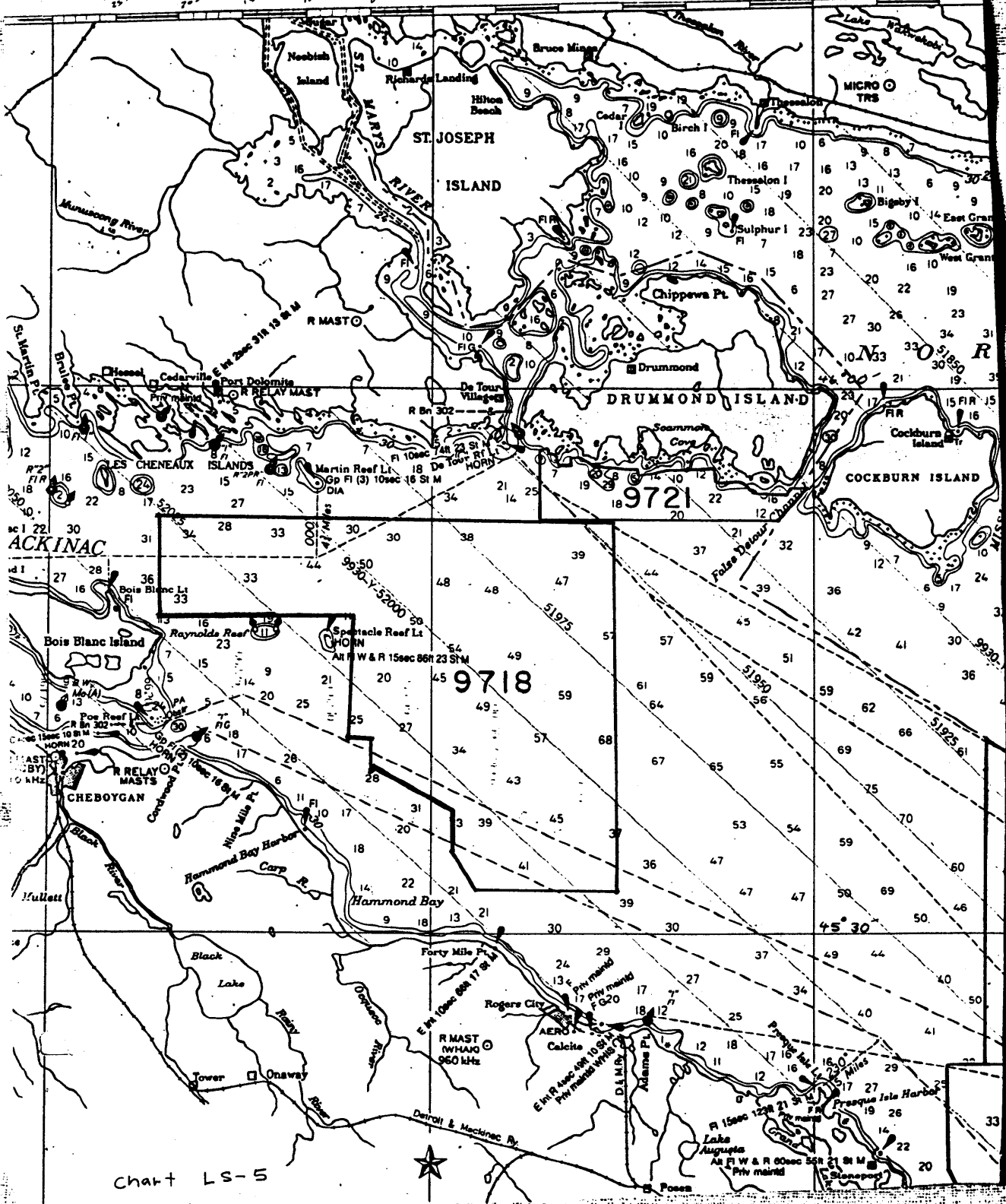


Chart LS-5

RECORD OF APPLICATION TO CHARTS

H-9718

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. _____

INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.
2. In "Remarks" column cross out words that do not apply.
3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
14864	8-1-79	Russell P Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3
14860	10-26-79	Russell P Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. 4 thru 14864
14882	8-10-79	Russell Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3
14881	2-21-80	Ralph B. Rose	Full Part Before After Verification Review Inspection Signed Via Drawing No. 2 Applied in Full
14880	10-22-81	E. Bodouinac	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3 thru 14880
14860	10-23-81	E. Bodouinac	Full Part Before After Verification Review Inspection Signed Via Drawing No. 5 Part thru 14880
14860	5-5-87	Joseph P. Pina	Full Part Before After Verification Review Inspection Signed Via Drawing No. 7 Applied in full thru 14881, 14882 and Hydro sheet
14880	3-1-93	Charles J. Jomiet	Full Part Before After Verification Review Inspection Signed Via Drawing No. 6 Applied in full thru 14881, 14882 14864 and ^{outside those chart limits were applied} attached Hydro sheet directly to chart
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.