

9720

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-50-4-77
Office No..... H-9720

LOCALITY

State Michigan
General Locality Lake Huron-Offshore
Locality Presque Isle to Drummond
Island

1977

CHIEF OF PARTY
James S. Midgley

LIBRARY & ARCHIVES

DATE December 1, 1978

9720
9720

Area 7
CHT
14860-5
14860-53
14862-61
14860-6

HYDROGRAPHIC TITLE SHEET

H-9720

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-50-4-77

State MICHIGAN

General locality LAKE HURON - OFFSHORE

Locality PRESQUE ISLE to DRUMMOND ISLAND, ~~MICHIGAN~~

Scale 1:50,000 Date of survey 25 AUGUST 1977 (JD 237) to 11 SEPTEMBER 1977 (JD 254)

Instructions dated APRIL 21, 1977 Project No. OPR-520-MI-77

Vessel NOAA SHIP MT MITCHELL S222

Chief of party CAPT JAMES S. MIDGLEY, NOAA

Surveyed by SEE REMARKS

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

Graphic record scaled by EM/FS/RMM/RW/JTK

Graphic record checked by RW/EM/MLM/RMM/FS/JTK

Protracted by N/A Automated plot by CALCOMP - 618 (AMC) HYDROPLOT SYSTEM

Verification by N/A M.B. Hickson

Soundings in ~~fathoms~~ feet at ~~MLW~~ ~~MLW~~ LWD

REMARKS: LCDR G. MILLS, LT D. WALTZ, LTjg V. NEWELL, LTjg D. RICE,
LTjg M. HENDERSON, ENS P. DAUGHERTY, ENS T. RULON, ENS M. MURPHY
ENS W. PRINGLE

Applied to stbs 2/14/79
OTB

DESCRIPTIVE REPORT

TO

ACCOMPANY

HYDROGRAPHIC SURVEY H-9720

MI-50-4-77

1:50,000 SCALE

LAKE HURON, MICHIGAN

25 AUGUST 1977 to 11 SEPTEMBER 1977

NOAA SHIP MT MITCHELL S222

JAMES S. MIDGLEY

CAPT, NOAA

ACTING COMMANDING OFFICER

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, 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°2 ⁸ 1.1'N 83°44.9'W	(2) 45°52.5'N 83°44.9'W	(3) 45°52.5'N 83°32.0'W	(4) 45°48.0'N 83°32.0'W
(5) 45°41.2'N 83°16.0'W	(6) 45°22.8'N 83°16.0'W	(7) 45°22.8'N 83°26.4'W	

This survey was conducted between 25 August 1977 (JD 237) and 11 September 1977 (JD 254).

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 (Changed to 1050 on 10 Sept)
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 1 Nansen Cast and 6 XBT's at the following locations:

Cast No:	Latitude:	Longitude:	Date:
H-2	45°38'48"N	83°35'00"W	28 Aug 1977 (JD 240)

XBT No:

H-1	45°26'00"N	83°31'00"W	28 Aug 1977 (JD 240)
H-2	45°38'48"N	83°35'00"W	28 Aug 1977 (JD 240)
H-3B	45°50'00"N	83°37'00"W	30 Aug 1977 (JD 242)
H-4	45°50'24"N	83°43'00"W	9 Sep 1977 (JD 252)
H-5	45°40'00"N	83°45'00"W	9 Sep 1977 (JD 252)
H-6	45°31'00"N	83°43'30"W	9 Sep 1977 (JD 252)

Salinities determined by salinometer were found to be 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. An explanation of how the velocities were derived, along with the printouts of the velocity tapes and all tables is included in the 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 12.6 to 14.4 feet during this survey. Settlement and squat corrections for the ship were determined on 25 July 1977 (JD 206) in Lake Huron at St. Ignace, Michigan. A corrector of +0.2 feet is accurate for all survey speeds \pm 0.1 foot. A copy of the data abstract for ship's speed versus the 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/TTI tape included with the survey 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

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

MT MITCHELL Hydroplot System. The skew used was 90,21,54, 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 & Name:	Latitude:	Longitude:
207 H-17-MI-77 Presque Isle "Turcotte"	45°20'56.482"N	83°29'06.080"W
300 H-13A-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 Range-Range mode, was used to provide positioning control for all hydrography on the following days: 25 August 1977 (JD 237) through 10 September 1977 (JD 253).

The following Odum Offshore Hydrotrac Equipment was used:

Type:	Serial No:
Shipboard (JD237-JD253 1200Z) MDU	122
Receiver	328
Power Amplifier	539
Navigation Interface	102
Sawtooth Recorder	8501
Coupler	134

Odum Hydroplot Equipment used: Cont'd

		Serial No:
Station 207:	Receiver	215
	Power Amplifier	540
	Coupler	133
Station 300:	Receiver	216
	Power Amplifier	538
	Coupler	131

Hydrotrac was also used in Hyperbolic mode for bottom sample numbers 17-43 only on September 10, 1977 (JD253) and September 11, 1977 (JD254):

Type:		Serial No:
Shipboard:	Receiver	328
	Parallel Buffer	102
	Coupler	134
Slave 1 207:	SDU	215
	Power Amplifier	539
	Coupler	135
Master 300:	MDU	122
	Power Amplifier	536
	Coupler	133
Slave 2 400:	SDU	216
	Power Amplifier	538
	Coupler	131

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

Del Norte equipment was set up in anticipation of using it to check Hydrotrac values at times of reduced visibility. However, it was not used and no further discussion is presented here.

Whenever it was necessary to establish a check whole lane count, one of the following temporary buoys was circled (both were established by the MT MITCHELL):

Buoy Name:	Latitude:	Longitude:
MM #2	45°25'24"N	83°00'20"W
MM #3	45°33'24"N	83°31'53"W

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 and buoy circlings. 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 6.8% of the regular sounding lines. The crossline soundings generally agree within 1 foot of the main scheme soundings with a few disagreeing by as much as 12 feet in areas of rugged 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:
North	MI-20-3-77	H-9721	1:20,000	1977	Mt Mitchell
East	MI-50-3-77	H-9710	1:50,000	1977	Mt Mitchell
West	MI-50-5-77	H-9718	1:50,000	1977	Mt Mitchell
South	MI-50-2-77	H-9709	1:50,000	1977	Mt Mitchell

Junction soundings with the three 1:50,000 surveys are all excellent with depth contours continuous across junctions. A few soundings in the southeast area of the survey disagree by up to 6 feet, but it is an area of rugged bottom topography.

Junctions with MI-20-4-77 were good with generally less than 3 foot discrepancies, again due to rugged bottom topography. Depth contours were continuous across the junction area.

K. COMPARISON WITH PRIOR SURVEYS

The only prior survey within the limits of this survey was Survey 1-1838 done by the Lake Survey in 1945 at a scale of 1:120,000. The soundings compare well with this survey generally agreeing within 10 feet. This disagreement is attributed to the improved quality of position control for the present survey.

There were no pre-survey review items to be investigated within the survey limits of MI-50-4-77 for Project OPR-520-77.

L. COMPARISON WITH CHARTS

The following NOAA Charts cover the area of this survey:

Chart No:	Scale:	Edition:	Date:
14880 (Formerly L.S.6)	1:120,000	24th	2-5-77
14864 (Formerly L.S.53)	1:120,000	19th	12-4-76

Selected soundings from these charts were transferred to the overlay of this survey for comparison purposes. Charted depths generally agree within 10 feet of depths on this survey. As previously stated, 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 supersede 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	1297.8
Linear Nautical Miles of Crosslines	88.5
Linear Nautical Miles of Development	3.0
Total Linear Miles of Hydrography	1389.3
Total Miscellaneous Miles	486.0
Total Miles	1875.3
Square Miles of Hydrography	499
Total Number of Positions	1526
Nansen Cast	1
Bottom Samples	43
XBT	6

P. MISCELLANEOUS

An obstruction was noted on the fathogram, ^($\phi 45^{\circ}28'57.08''$, $\lambda 83^{\circ}28'28.08''$) between the fifth and sixth soundings after position 468. This obstruction was developed immediately after the original fathogram spike was observed. Because of improper annotation of the fathogram, the development was run in the wrong location, and no depth for this obstruction was obtained.

Five different velocity tables apply to the data on this sheet. To prevent undue shipboard processing all data was plotted using velocity table 1 after approval from AMC, Processing Division. All appropriate velocities tables are included in the TRA Correction Abstract and TC/TTI tape.

Stray on the fathogram at this location is considered the bottom which is probably a side echo of an undetermined feature in the area. However, this feature is not necessarily an obstruction.

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

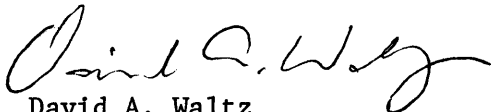
The following Hydroplot Programs were used to acquire and process data for this survey:

	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 Computations	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

Mt Mitchell/CSS Bayfield Field Comparisons - to be submitted at the end of the field season.

Respectfully Submitted:



David A. Waltz
LT, NOAA

APPROVAL SHEET

MI-50-4-77

H-9720

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

for *Gerald D. Mills*
James S. Midgley
Captain, NOAA
Acting Commanding Officer

SIGNAL TAPE PRINTOUT MI-50-4-77 H-9720

207	4	45	20	56482	083	29	06080	250	0000	162038
210	4	45	21	23359	083	29	32378	250	0000	000000
211	4	45	24	51739	083	42	59723	139	0000	000000
212	4	45	25	02997	083	46	22979	139	0000	000000
213	4	45	24	36049	083	47	12012	139	0000	000000
215	4	45	24	50707	083	48	36526	139	0000	000000
220	4	45	24	55069	083	49	11739	139	0000	000000
290	4	45	29	08112	083	54	37319	250	0000	000000
295	4	45	29	10228	083	54	49063	139	0000	000000
300	4	45	29	11010	083	54	48836	250	0000	162038
400	4	45	46	18807	084	21	23562	250	0000	162038

SIGNAL NAMES TAPE PRINTOUT MI-50-4-77 H-9720

207	✓	PRESQUE ISLE 'TURCOTTE' HYDROTRAC (H-17-MI-77)	AMC OPS (1977)
210	✓	PRESQUE ISLE LT. (DEL NORTE) MICHIGAN QUAD 450832 #1019	(1956)
211	✓	ADAMS POINT <i>USLS, 1956</i> MICHIGAN QUAD 450833 #1001	
212	✓	CALCITE BREAKWATER LT. #813 MICHIGAN QUAD 450833 #1033	(1956)
213	✓	CALCITE LIGHT # 816, <i>1956</i> MICHIGAN QUAD 450833 #1034	
215	✓	ROGERS CITY ST. IGNATIUS CATHOLIC CHURCH SPIRE, <i>1956</i>	
		MICHIGAN QUAD 450833 #1038	
220	✓	ROGERS CITY MUN. WATER TANK MICHIGAN QUAD 450833 #1036	(1956)
290	✓	FORTY MILE PT. DEL NORTE (H-19 MI-77)	AMC OPS (1977)
295	✓	FORTY MILE LT., <i>1956</i>	MICHIGAN QUAD 450833 #1018
300	✓	FORTY MILE PT. HYDROTRAC (H-13A-MI-77)	AMC OPS (1977)
400	✓	LAFAYETTE POINT HYDROTRAC (H-20-MI-77)	AMC OPS (1977)

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 all stations, except one, for velocity determinations. Three basic stations roughly spanning the width of the lake were occupied each week in the survey area:

(1) Northern Area:

<u>Station:</u>	<u>Date:</u>	<u>Longitude:</u>	<u>Latitude:</u>
H-3	30 Aug 1977	45°50'00"N	83°37'00"W
H-4	09 Sep 1977	45°50'24"N	83°43'00"W

(2) Central Area:

H-2 (Nansen & XBT)	28 Aug 1977	45°38'48"N	83°35'00"W
H-5	09 Sep 1977	45°40'00"N	83°45'00"W

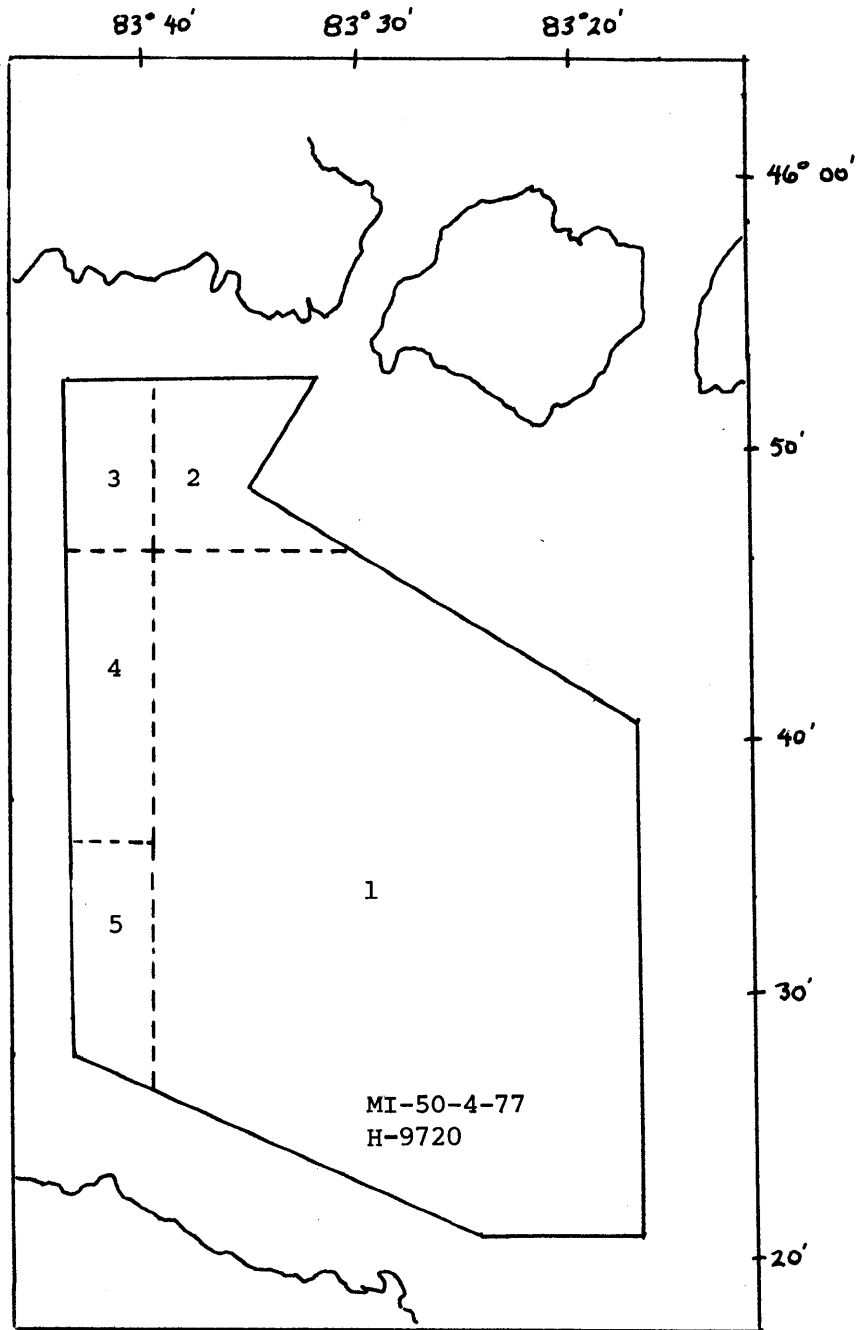
(3) Southern Area:

H-1	28 Aug 1977	45°26'00"N	83°31'00"W
H-6	09 Sep 1977	45°31'00"N	83°43'30"W

Since significant temperature changes were noted with both time and area, corrections were similarly applied. The following table shows how the velocity tables were determined:

<u>Velocity Table:</u>	<u>Survey Dates (JD):</u>	<u>Nansen/XBT Station:</u>
1	237-243	Average of Nansen Cast/XBT H-1 & H-2
2	237-243	XBT H-3
3	251-254	XBT H-4
4	251-254	XBT H-5
5	251-254	XBT H-6

See the accompanying sketch for the approximate boundaries of the area covered by each velocity table.



Scale of chart 14860

Sketch showing the areas covered by the five velocity tables.
 Dashed lines indicate the approximate boundaries between areas.
 Solid lines indicate the survey limits.

VELOCITY TAPE PRINTOUT
MI 50-4-77
TABLE #1

000446	0	0000	0001	000	222000	050477
000676	0	0002				
000911	0	0000				
001036	1	0002				
001131	1	0004				
001216	1	0006				
001423	1	0010				
001609	1	0015				
001794	1	0020				
002000	1	0025				
002200	1	0030				
002390	1	0035				
002570	1	0040				
002740	1	0045				
002950	1	0050				
003130	1	0055				
003320	1	0060				
003500	1	0065				
003700	1	0070				
003880	1	0075				
004080	1	0080				
004270	1	0085				
004460	1	0090				
004640	1	0095				
999999	1	0100				

VELOCITY TAPE PRINTOUT
MI 50-4-77
TABLE #2

000251	0	0000	0002	000	222000	050477
001380	0	0002				
001514	0	0000				
001803	1	0005				
001965	1	0010				
002130	1	0015				
002340	1	0020				
002520	1	0025				
002730	1	0030				
002910	1	0035				
003100	1	0040				
003290	1	0045				
003470	1	0050				
003640	1	0055				
003820	1	0060				
004010	1	0065				
004200	1	0070				
004380	1	0075				
004570	1	0080				
004750	1	0085				
999999	1	0090				

VELOCITY TAPE PRINTOUT
MI 50-4-77
TABLE #3

000315	0	0000	0003	000	222000	050477
000693	0	0002				
000881	0	0000				
000994	1	0002				
001081	1	0004				
001160	1	0006				
001237	1	0008				
001369	1	0010				
001541	1	0015				
001705	1	0020				
001940	1	0025				
002140	1	0030				
002320	1	0035				
002510	1	0040				
002690	1	0045				
002880	1	0050				
003060	1	0055				
003260	1	0060				
003440	1	0065				
003630	1	0070				
003810	1	0075				
004000	1	0080				
004180	1	0085				
004370	1	0090				
004540	1	0095				
999999	1	0100				

VELOCITY TAPE PRINTOUT
MI 50-4-77
TABLE #4

000390	0	0000	0004	000	222000	050477
000993	0	0002				
001097	0	0000				
001176	1	0002				
001258	1	0004				
001352	1	0005				
001551	1	0010				
001745	1	0015				
001940	1	0020				
002180	1	0025				
002370	1	0030				
002570	1	0035				
002760	1	0040				
002940	1	0045				
003140	1	0050				
003320	1	0055				
003510	1	0060				
003700	1	0065				
003900	1	0070				
004100	1	0075				
004310	1	0080				
004490	1	0085				
004690	1	0090				
999999	1	0095				

VELOCITY TAPE PRINTOUT
MI 50-4-77
TABLE #5

000565	0	0000	0005	000	222000	050477
000900	0	0002				
001090	0	0000				
001203	1	0002				
001399	1	0005				
001612	1	0010				
001828	1	0015				
002070	1	0020				
002290	1	0025				
002510	1	0030				
002720	1	0035				
002940	1	0040				
003170	1	0045				
003400	1	0050				
003610	1	0055				
003830	1	0060				
004050	1	0065				
004270	1	0070				
004480	1	0075				
004720	1	0080				
999999	1	0085				

CORRECTIONS IN FEET, FATHOMS

TABLE 1

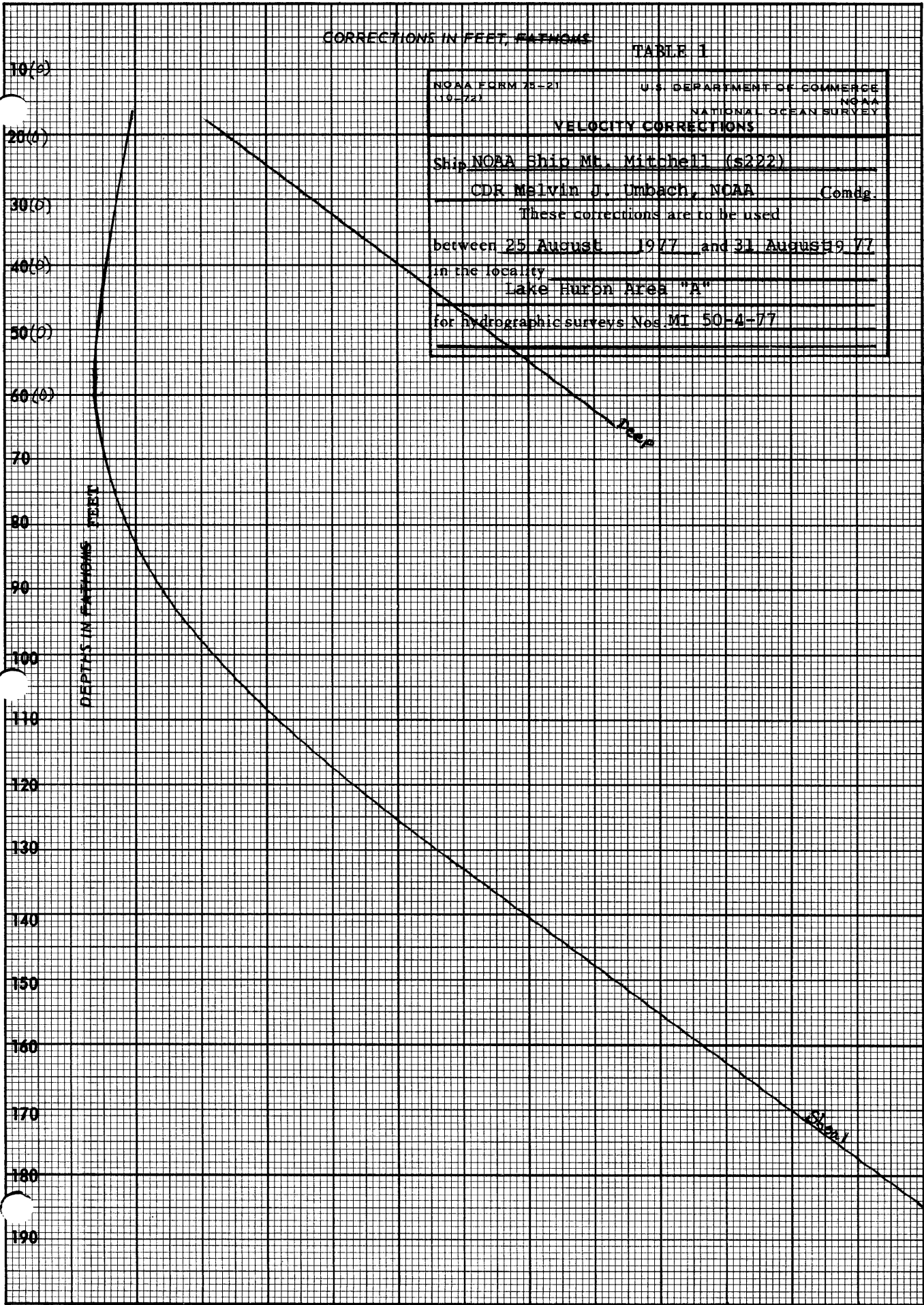
NOAA FORM 25-21
11-9-77

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship Mt. Mitchell (s222)
 Comdg. CDR Melvin J. Umbach, NOAA
 These corrections are to be used
 between 25 August 1977 and 31 August 77
 in the locality Lake Huron Area "A"
 for hydrographic surveys Nos. MI 50-4-77

(For deep water add a 0 to these figures)



NOAA FORM 75-21
(10-72)U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship Mt. Mitchell (s222)Comd. CDR Melvin J. Umbach, NOAA

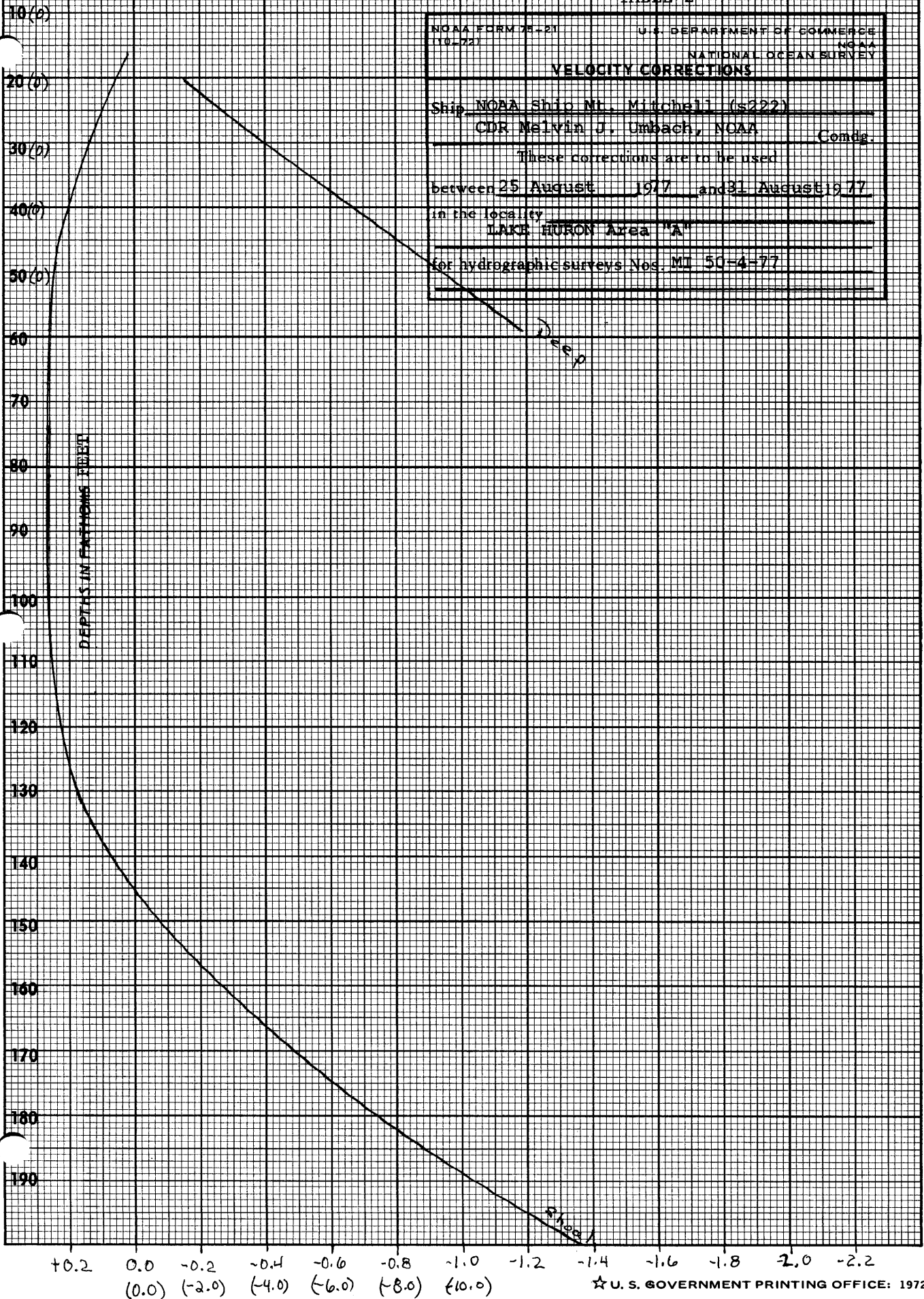
These corrections are to be used

between 25 August 1977 and 31 August 1977

in the locality

LAKE HURON Area "A"for hydrographic surveys Nos. MT 50-4-77

(For deep water add a 0 to these figures)

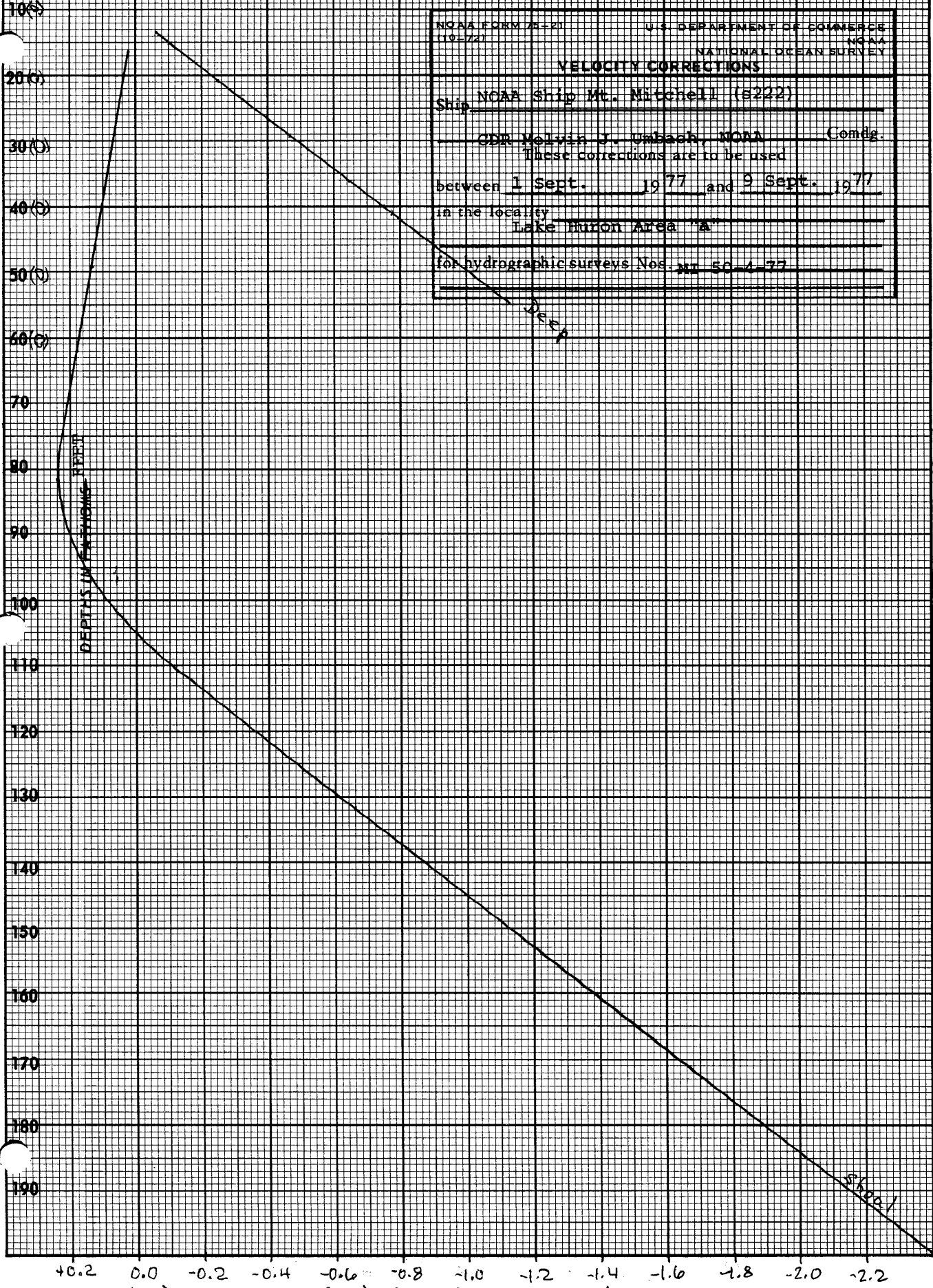


CORRECTIONS IN FEET, FATHOMS

TABLE 4

NOAA FORM 75-211 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship, <u>NOAA Ship Mt. Mitchell (S242)</u>	
CDR <u>Velvin J. Umbach, NOAA</u> Comdg.	
These corrections are to be used	
between <u>1 Sept. 1977</u> and <u>9 Sept. 1977</u>	
in the locality <u>Lake Huron Area "A"</u>	
for hydrographic surveys Nos. <u>55-4-77</u>	

(For deep water add a 0 to these figures)



+0.2 0.0 -0.2 -0.4 -0.6 -0.8 -1.0 -1.2 -1.4 -1.6 -1.8 -2.0 -2.2

NOAA FORM 78-21
(10-72)U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship NE. Mitchell (#222)Comd. CDR Melvin J. Imbach, NOAA

These corrections are to be used

between 1 Sept. 1977 and 9 Sept. 1977

in the locality

Lake Huron Area "A"for hydrographic surveys Nos. MI 50-4-77

(For deep water add a 0 to these figures)

10 (0)
20 (0)
30 (0)
40 (0)
50 (0)
60 (0)
70
80
90
100
110
120
130
140
150
160
170
180
190

DEPTHS IN FATHOMS, FEET

Deep

Shoal

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

VERTICAL CAST - HARRISVILLE, MI. (June 18, 1977) J.D. 169

Ship
 Launch Mt Mitchell-8222
 Survey No. _____
 OPR No. 520-MI-77
 L.L. No. Ship's Feet

Record of simultaneous leadline
 and echo sounder comparisons

Echo Sounder No. Ross #1053

Julian Day	Date (1977)	L.L. Sndg. (to Rail)	L.L. Corr. (± below)	L.L. Depth	Echo Sndg. Digitized	Echo Sndg. Corr. (* below)	Echo Depth	L.L. Depth - Echo Depth		
169	6/18									
		Port # 1	48.2	+0.11	48.31	24.3	23.6	47.9	+0.41	
		2	48.4	+0.14	48.54	24.2	23.6	47.8	+0.74	
		3	48.3	+0.13	48.43	24.0	23.6	47.6	+0.83	
		4	48.6	+0.16	48.76	24.3	23.6	47.9	+0.86	
		5	48.3	+0.13	48.43	24.3	23.6	47.9	+0.53	
									+0.67	Ave.
		Stbd # 1	47.4	+0.13	47.53	24.3	23.6	47.9	-0.37	
		2	47.3	+0.14	47.44	24.2	23.6	47.8	-0.36	
		3	47.4	+0.13	47.53	24.5	23.6	48.1	-0.57	
		4	47.5	+0.12	47.62	24.7	23.6	48.3	-0.68	
		5	47.5	+0.12	47.62	24.6	23.6	48.2	-0.58	
									-0.51	Ave
							Ave. of Port & stbd		<u>+0.08</u>	
		± L.L. Corr								
		46.81	+0.19							
		47.92	+0.08							
		48.81	+0.19							
		* Distance from rail to transducer				23.7 Ft				
		Velocity Correction				-0.1 Ft				
							Computed by ORR			
							Checked by VEJ			

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
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



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
NOAA SHIP MT MITCHELL S222
439 West York Street
Norfolk, Virginia 23510

Date : December 7, 1977

Reply to Attn. of:

To : Director, National Ocean Survey (Attn: C331)

From : *for* *LCDR Ronald B. Mills*
Commanding Officer, NOAA SHIP MT MITCHELL S222

Subject: Water Level Data For Survey H-9720

It is requested that verified water level stages (using Greenwich Mean Time) from the water level gages listed below be forwarded to the Processing Division (CAM 3), Atlantic Marine Center, Norfolk, Virginia 23510.

Gage:	Latitude:	Longitude:
Presque Isle Harbor (907-5069)	45°20'27"N	83°29'10"W
De Tour (907-5098)	45°59'30"N	83°53'54"W
Cheboygan (907-5076)	45°38'50"N	84°28'14"W

It is requested that the time and height correctors for each gage be zoned as per Project Instructions for the area described within the following corner points:

	Latitude:	Longitude:
(1)	45°29.1'N	83°44.9'W
(2)	45°52.5'N	83°44.9'W
(3)	45°52.5'N	83°32.0'W
(4)	45°41.2'N	83°16.0'W
(5)	45°22.8'N	83°16.0'W

This information is requested for the following periods:

25 August 1977 (JD 237) - 11 September 1977 (JD 254)

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: August 25 to September 11, 1977

HYDROGRAPHIC SHEET: H-9720

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 most of the survey period.

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

Philip C. Morris
Chief, Water Level Section

Don M. Spillman 12/11/78
Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

H-9720

Name on Survey	Source of Information										
	A	B	C	D	E	F	G	H	K		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST			
LAKE HURON											1
DRUMMOND ISLAND (TITLE)											2
PRESQUE ISLE (TITLE)											3
											4
											5
											6
											7
											8
											9
											10
											11
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											23
											24
											25

APPROVED

Chas. E. Harrington

CHIEF GEOGRAPHER - C3xB

21 DEC 1978

HYDROGRAPHIC SURVEY STATISTICS

H-9720

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS 5- 5 , 3 preliminary overlays		8 5	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS		2	
DESCRIP-TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						1- misc. data 2
CAHIERS	2		1 with fathos			
VOLUMES	1					
BOXES						1- bundle of sawtooth

T-SHEET PRINTS (List)

SPECIAL REPORTS (List)

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			1526
POSITIONS CHECKED		234	
POSITIONS REVISED		0	
SOUNDINGS REVISED		42	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	2	0	
VERIFICATION OF CONTROL		2	
VERIFICATION OF POSITIONS		14	
VERIFICATION OF SOUNDINGS	2	106	
COMPILATION OF SMOOTH SHEET		57	
APPLICATION OF TOPOGRAPHY		0	
APPLICATION OF PHOTOBATHYMETRY		0	
JUNCTIONS		13	
COMPARISON WITH PRIOR SURVEYS & CHARTS		16	
VERIFIER'S REPORT		7	
OTHER		20	
TOTALS	4	235	239

Pre-Verification by F. Saunders, J. Bradford	Beginning Date 12/15/77	Ending Date 12/15/77
Verification by S. Kelley, M. Holloway, M. Hickson	Beginning Date 12/27/77	Ending Date 11/07/78
Verification Check by B. Stephenson	Time (Hours) 3	Date 11/08/78
Marine Center Inspection by Hydrographic Inspection Team (AMC)	Time (Hours) 10	Date 11/08/78
Quality Control Inspection by <i>[Signature]</i>	Time (Hours) 35	Date 12/21/78
Requirements Evaluation by <i>[Signature]</i>	Time (Hours) 1	Date 1/5/79

Cardano 1 hr 4/4/79

REGISTRY NO. H-9720

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 4/85 TIME REQUIRED _____ INITIALS Zg

REMARKS:

REGISTRY NO. H-9720

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 4/85 TIME REQUIRED _____ INITIALS Zg

REMARKS:

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9720

FIELD NO. MI-50-4-77

Michigan, Lake Huron, Presque Isle to Drummond Island

SURVEYED: August 25 through September 11, 1977

SCALE: 1:50,000

PROJECT NO.: OPR-520

SOUNDINGS: Ross Automated Hydro-
graphic Survey System

CONTROL: Odum Offshore
Hydrotrac (Range-
Range & Hyperbolic)

Chief of Party J. Midgley
Surveyed by G. Mills
..... D. Waltz
..... V. Newell
..... D. Rice
..... M. Henderson
..... P. Daugherty
..... T. Rulon
..... M. Murphy
..... W. Pringle
Automated Plot by CALCOMP-618 Plotter (AMC)
Verified and Inked by M. Hickson
November 7, 1978

1. Introduction

No unusual problems were encountered. The approved "Water Level Note" is not included with the survey records as this note has not been received by this branch. When this note is obtained it will be forwarded for inclusion in the survey records. Necessary changes made by the verifier to the Descriptive Report are noted in red ink. *Water Level Note received during Quality Control*

2. Control and Shoreline

a. The source of control is adequately described in Section F. of the Descriptive Report.

b. There is no shoreline within the area of the survey.

3. Hydrography

a. Depths at crossings are in good agreement.

b. Depth contours were drawn at the standard intervals of 120, 180, 240, and 300 feet. Brown curves were added to portray

features not apparent from normal contours.

c. Bottom configurations were adequately developed with one exception; the spike (assumed obstruction) noted in Section P. of the Descriptive Report was not developed due to positioning error.

See Descriptive Report, Section P.

4. Condition of Survey

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

5. Junctions

Adequate junctions have been effected with the following surveys:

H-9721 (1977) to the north
H-9710 (1977) to the east
H-9718 (1977) to the west
H-9709 (1977) to the south
Canadian Survey 3962 (1977) to the northwest

Areas to the west, southwest, and south do not junction with any contemporary surveys. Surveys are planned for all of these areas. Canadian survey 3967 (1978) joins to the north but has not been accomplished as this survey has not been received from the Canadian Hydrographic Service. This junction has been deferred and will be completed by Marine Surveys Division, pending receipt of this Canadian survey.

See Quality Control Rep.

The junction of the present survey with the Canadian survey 3962 (1977) is excellent. The Canadian survey added definition to the contours in the adjoining areas. Areas where the contours are defined on the Canadian survey without supporting data on the present survey are shown in dashed contour (examples: 45° 47.4', 83°32.5' and 45°45.0', 83°25.7') as transfer of Canadian data was deemed inappropriate. It is evident that the joint surveying effort and simultaneous comparisons/calibrations of sounding equipment added greatly to effecting this junction.

6. Comparison With Prior Surveys

1-1838 (1945) 1:120,000
1-1372 (1917) 1:20,000

Prior survey 1-1838 covers the entire surveyed area. Comparisons of this prior survey with the present survey reveals similar

general bottom configurations. The present survey shows a generally shoaler trend throughout the entire surveyed area. In the shoaler areas the present survey varies an average of 5 to 10 feet shoaler and in the deeper areas varies an average of 10 to 15 feet shoaler. The bottom configuration is of an irregular/rugged nature and the prior survey has an unusually wide line spacing (approximately 2500 to 5000 meters) which prevent adequate delineation of bottom features and prohibit meaningful contouring. The prior survey displays no contours and has no crosslines.

Prior survey 1-1372 (1917) covers a small portion in the northern area of the present survey. Comparisons of the prior survey with the present survey reveals dissimilar bottom configurations with the only agreement being that both portray an extremely irregular relief. The present survey generally is shoaler by an average of 10 to 30 feet with differences exceeding 50 feet. This prior survey displays no contours within the common area. This prior survey was used for comparison even though it is not source material for charted data within the common area.

The differences between the present survey and the prior surveys are attributed to a more detailed and sophisticated present survey (particularly in horizontal control).

Prior surveys 1-1531 (1929-31), 1-215 (1859), 1-214 (1859), and 1-213 (1859) are also common to the surveyed area. These prior surveys were not available for comparison but are considered significant as they may be source data for charted information.

See Quality Control Rep.

The present survey is considered adequate to supersede all prior surveys within the common areas.

7. Comparison With Charts 14864 (19th Edition, December 4, 1976)
14880 (24th Edition, February 5, 1977)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and soundings from sources not readily ascertainable. The previously discussed prior surveys require no further consideration.

There are varying differences between the present survey and the charted hydrography. Generally in the shoaler areas agreement is much better than in the deeper areas where differences may be as much as 30 to 40 feet. In general, the chart displays a deeper trend throughout the common area than found on the present survey. There is a degree of harmony between the charted bottom topography and the configurations defined by the present survey.

No contours past the ³⁰⁰30-foot contour are charted.

The present survey is considered adequate to supersede the charted hydrography, both of known and unknown sources, within the common area.

b. Aids to Navigation

There are no aids to navigation within the area of the present survey.

8. Compliance With Instructions

This survey adequately complies with the Project Instructions.


9. Additional Field Work

This is a good basic hydrographic survey. Additional field work is not recommended.


Inspection Report
H-9720


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:


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

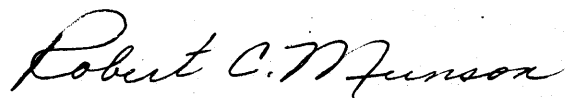
ABSENCE
Charles H. Nixon, CAPT, NOAA
Chief, Operations Division


R. D. Sanocki
Technical Assistant
Processing Division


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


Guy F. Trefethen
Team Leader
Verification Branch

Approved/Forwarded


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



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

C352/GKM

December 21, 1978

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

FROM: *G. K. Myers*
G. K. Myers
Chief, Quality Control Branch

SUBJECT: Quality Control Report for H-9720 (1977), Michigan, Lake
Huron--Offshore, Presque Isle to Drummond Island

A quality control inspection of H-9720 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths and navigation hazards, decisions and actions by the verifier, and cartographic presentation of data.

In general, the present survey was found to conform to National Ocean Survey standards and requirements except as discussed in the Verifier's Report, the HIT Report, and as follows:

1. Some soundings between junctional surveys were transferred in areas of overlap in order to show a least depth on the adjoining sheet.
2. Canadian survey 3967 (1978) mentioned in the Verifier's Report was not available at the time of quality control. An examination of the junction should be made by the Marine Chart Division at an opportune time.
3. A comparison with the following prior surveys was made during quality control as mentioned in the Verifier's Report.

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

This small reconnaissance survey provides only general depths in the area. The lack of development on 1-1531 precludes a detailed comparison with the present survey. However, the general bottom configuration has remained the same.

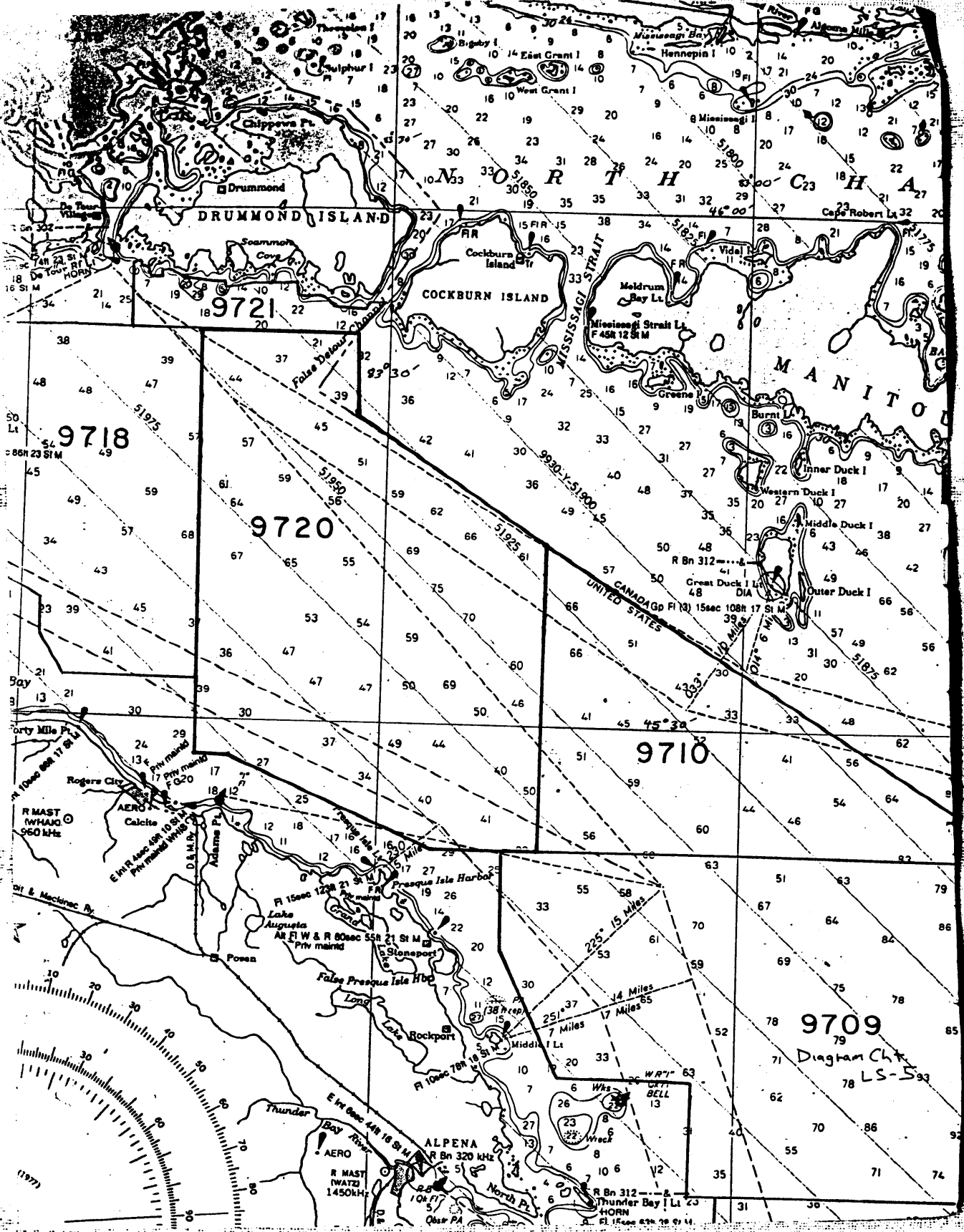
The present survey is adequate to supersede the prior survey within the common area.



b.	1-213	(1859)	1:60,000
	1-214	(1859)	1:60,000
	1-215	(1859)	1:60,000

The prior surveys taken together cover a portion of the present survey. A comparison between the prior and present surveys reveals no noteworthy changes in the bottom configuration. However, hydrography in the area of the prior survey in conflict with the present survey can be attributed to differences in survey methods and should be disregarded in favor of the development on the present survey. The present survey is more comprehensive and portrays the bottom in much greater detail. The present survey is adequate to supersede the prior surveys in the common area.

cc:
C35
C351



RECORD OF APPLICATION TO CHARTS

H-9720

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
14880	3-30-79	E. Clark	Full Part Before After Verification Review Inspection Signed Via Drawing No. 2 FORWARDED
14869	8-1-79	Russell P Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. #3
14864	8-1-79	Russell P Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. #3
14860	10-23-79	Russell P Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. 4 thru 14864
14860	4-11-79	Ralph B. Ross	Full Part Before After Verification Review Inspection Signed Via Drawing No. #4 Critical Only
14882	8-10-79	Russell Kennedy	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3
14860	12-17-81	Barbara Moore	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3
14860	5-11-87	John P. Moore	Full Part Before After Verification Review Inspection Signed Via Drawing No. forwarded #7
14860	12-18-81	BJ MOORE P. WARDEN	Full Part Before After Verification Review Inspection Signed Via Drawing No. 3
14860	10-17-91	H. Churchill	Full Part Before After Verification Review Inspection Signed Via Drawing No. 9 thru 14880 + 14864
			14880 12/18/81 BJ Moore BJ Moore written off as fully app'd