

9709

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-50-2-77.....
Office No..... H-9709.....

LOCALITY

State Michigan.....
General Locality Offshore Lake Huron.....
Locality Thunder Bay Island to Presque Isle.....

1977

CHIEF OF PARTY
James S. Midgley

LIBRARY & ARCHIVES

DATE September 26, 1978.....

6026

14560
14561
14562

NOAA FORM 77-28 (11-72)	U.S. DEPARTMENT OF COMMERCE NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION	REGISTER NO.
HYDROGRAPHIC TITLE SHEET		H-9709

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-50-2-77
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State MICHIGAN

General locality OFFSHORE LAKE HURON

Locality THUNDER BAY ISLAND to ~~LAKE~~ PRESQUE ISLE

Scale 1:50,000 Date of survey 30 JULY 1977 (JD 211 to 20 AUGUST 1977 (JD 232))

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 Automated Hydrographic Survey System ROSS MODEL 5000 FINELINE ECHO SOUNDER

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

Graphic record checked by PWS, NGP, FDS, MAW, JTK, RAK, EEM

Protracted by N/A Automated plot by NOS HYDROPLOT SYSTEM
A MC CalcComp 618

Verification by N/A

Soundings in ~~fathoms~~ feet at ~~NEW~~ ^{LWD} ~~MEW~~ ^{LWD} IGLD, 1955: 576.8 FEET

REMARKS: LCDR G. MILLS, LT D. WALTZ, LTjg V. NEWELL, LTjg D. RICE,

LTjg M. HENDERSON, ENS P. DAUGHERTY, ENS T. RULON, ENS W. PRINGLE

ENS M. MURPHY

All notes in red by Verifier

All times GMT.

App'd to ~~std~~
1-9-79. WJT

DESCRIPTIVE REPORT

TO

ACCOMPANY

HYDROGRAPHIC SURVEY H-9709

MI-50-2-77

1:50,000 SCALE

LAKE HURON, MICHIGAN

30 JULY 1977 to 20 AUGUST 1977

NOAA SHIP MT MITCHELL S222

JAMES S. MIDGLEY

CAPTAIN, 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°22.5'N 82°35.8'W	(4) 45°02.8'N 83°03.3'W	(7) 45°16.1'N 83°20.0'W
(2) 45°20.5'N 82°31.3'W	(5) 45°09.2'N 83°03.3'W	(8) 45°22.5'N 83°20.0'W
(3) 45°02.8'N 82°27.6'W	(6) 45°09.2'N 83°14.2'W	

This survey was conducted between 30 July 1977 (JD 211) and 20 August 1977 (JD 232).

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 Number:
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 5 XBT'S on the following locations:

Cast No:	Latitude:	Longitude:	Date:
Nansen C4-5	45°10.1'N	82°28.2'W	10 August 1977 (JD 222)
Nansen F3-1	45°10.8'N	82°30.3'W	16 August 1977 (JD 228)

XBT No:

E1-1	45°06.8'N	83°03.4'W	9 August 1977 (JD 221)
C4-5	45°10.1'N	82°28.4'W	10 August 1977 (JD 222)
C3-6	45°11.1'N	82°30.3'W	10 August 1977 (JD 222)
F2-1	45°14.9'N	82°45.4'W	16 August 1977 (JD 228)
F1-1	45°14.6'N	83°17.5'W	16 August 1977 (JD 228)

Salinities determined by salinometer were found to be less than .2 parts per thousand and were negligible in determining sound velocities. Corrections to 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 appendices.

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 14.2 to 13.8 feet for 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 feet. 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/TI tape included with the survey data. A printout of this tape is included with this report.

A vertical cast was conducted on 18 June 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 Systems. The skew used was 0, 21, 60, 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 No:	Signal Name:	Latitude:	Longitude:
100	Sturgeon Pt. Hydrotrac (H-7A-MI-77)	44°42'46.709"N	83°16'19.031"W
190	Bell (H-9A-MI-77) Del Norte	45°14'37.279"N	83°24'44.529"W
201	North Pt. Hydrotrac (ANTENNA)	45°02'26.767"N	83°16'25.508"W
202	BEACH (North Point Del Norte)	45°02'27.248"N	83°16'24.808"W
207	Presque Isle "TURCOTTE" Hydrotrac (H-17-MI-77)	45°20'56.482"N	83°29'06.080"W

All shore stations except 201 and 202 were located by personnel from the Operations Division, Atlantic Marine Center with assistance from MT MITCHELL officers. A three-leg traverse was run on June 28-29 by ship's personnel to locate station ANTENNA (201) and BEACH-North Point Del Norte (202). Neither station was monumented due to their location in the sand dunes but a third station (WOELK) was established at this time on high ground between the dunes and the woods. A copy of the geodetic abstracts and computations are included in the survey records.

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 on the following days:

30 July 1977 (JD 211) through 20 August 1977 (JD 232), exclusive of 1 August (JD 213). Both Hydrotrac and Del Norte were used on August 2 (JD 214).

The following Odum Offshore Hydrotrac equipment was used:

Type:

Shipboard

Master MDU	122
Master Receiver	328
Power Amplifier	536
Sawtooth	8501
Coupler	134

Shore Station: 100

SDU	216
Transmitter Amplifier	538
Coupler	131

Shore Station: 201

SDU	215
Transmitter Amplifier	537 (Changed to 539 on 1 Aug)
Coupler	133

Shore Station: 207

SDU	214 (Changed to 215 on 9 Aug)
Transmitter Amplifier	537 (Changed to 539 on 9 Aug)
Coupler	135 (Changed to 133 on 9 Aug)

A frequency of 1620.38 Khz was used in the parameters to compensate for the difference in propagation velocity between salt and fresh water.

Del Norte positioning was used on the following days:

August 1-2, 1977 (JD 213-214).

The following Del Norte equipment and stations were used for hydrography:

Station No:	Signal Name:	Position:	Code:	Serial No:
190	Bell (H-9A-MI-77)	45°14'37.279"N 83°24'44.529"W	78	1064
202	North Point (BEACH) Del Norte	45°02'27.248"N 83°16'24.808"W	76	1063

The following Del Norte equipment and stations were used for calibration of Hydrotrac:

Station No:	Signal Name:	Position:	Code:	Serial No:
185	Rockport (H-10A-MI-77)	45°12'11.242"N 83°22'47.977"W	78	1064
		Changed on 8-17-77 to:	72	248
210	Presque Isle Lt House	45°21'23.359"N 83°29'32.378"W	76	1063

Initially the Del Norte was calibrated over a measured baseline. To ensure no drift due to movement to the station location, 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. On JD 191 the North Point Del Norte corrector was determined by comparison with the position determined by Del Norte at South Point and Sturgeon Point Light. The resultant correctors were used for this entire survey. Land path effects on Hydrotrac precluded calibration by sextant fix. Therefore, calibration was accomplished by comparing Hydrotrac values with values computed from Del Norte positioning at 5 sites (see calibration volume).

Whenever it was necessary to establish a whole lane count, one of the following buoys was circled:

Buoy Name:	Latitude:	Longitude:
Mt Mitchell #1	45°05'33.053"N	83°08'54.117"W
Mt Mitchell #2	45°25'23.665"N	83°00'19.169"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 7.3% of the regular sounding lines. The crossline soundings agree within 1 foot of the main scheme soundings.

J. JUNCTIONS

This survey junctions with the following surveys:

Area of Junction:	Field No:	Reg. No:	Scale:	Date:	Ship:
South	MI-50-1-77	H-9690	1:50,000	1977	Mt Mitchell ✓
North	MI-50-3-77	H-9710	1:50,000	1977	Mt Mitchell ✓

Excellent junctions were made with MI-50-1-77 and MI-50-3-77, and contours continued smoothly to these sheets.

This survey also junctions to the east with a 1977 Canadian Survey³⁹⁵⁸ being conducted by the CSS Bayfield at a scale of 1:200,00. Junctions with this survey were generally poor with most soundings disagreeing by more than 20 feet. The two northernmost lines of the Canadian survey junctioned very poorly. No data was available from the Canadian survey north of latitude 45°11'N. Most of this poor junctioning is attributed to the rugged bottom topography and differing propagation velocities used in the field. Reference is made to a report to be submitted at the end of the field season regarding simultaneous positioning and depth measurements made by the Mt Mitchell and the CSS Bayfield.

K. COMPARISON WITH PRIOR SURVEYS

The following three prior surveys were conducted within the area of this survey:

Survey No:	Date:	Scale:
I-1838	1945	1:120,000
I-1844	1946	1:120,000
I-1845	1946	1:120,000

Comparison between all these prior surveys and the present survey is fair in areas of flat bottom and poor in areas of rugged bottom. Only one third of all prior survey soundings agree within 10 feet of the present survey soundings, but about two thirds are within 200 meters of agreement within one foot. The improved quality of position control for the present survey is the probable cause of these poor comparisons.

There were no pre-survey review items to be investigated within the survey limits of MI-50-2-77 for Project OPR-520-MI-77.

L. COMPARISON WITH CHART

This area is covered by NOAA Charts 14864, 19th Edition, December 4, 1976 at 1:120,000 scale and NOAA Chart 14860, 25th Edition, March 12, 1977 at 1:500,000 scale. As previously stated in comparisons with prior surveys,

depths agree fairly well in areas of flat topography but disagree by as much as 100 feet in areas of rugged bottom. 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	1580.0
Linear Nautical Miles of Crosslines	115.5
Linear Nautical Miles of Development	0
Total Linear Miles of Hydrography	1695.5
Total Miscellaneous Miles	847.0
Total Miles	2542.5
Square Miles of Hydrography	583.5
Total Number of Positions	1779
Nansen Casts	2
XBT'S	5
Bottom Samples	56

P. MISCELLANEOUS

Bottom Sample positions 55-57 (BS #54-56) for JD 212 were inside the 30° intersection of Station 100-201. Therefore, positions were obtained from three radar ranges for each bottom sample site, then converted to Hydrotrac rates for stations 100-207 using RK300 Utility Computation Program. A new Master Data Tape and corresponding Corrector Tape were made; printouts of all conversions and tapes are included with the survey support data.

The southern field sheet was originally plotted with an origin error on the grid of approximately 1.5 mm. To prevent complete replotting of the sheet the grid only was replotted in red ink after approval from Atlantic Marine Center Processing Division.

Six different velocity tables apply to the data on this sheet and are dependent both on area and time. To prevent undue shipboard processing time all data were plotted with velocity table Number 1 after approval from AMC Processing Division. All appropriate velocity tables are included in the TRA Correction Abstract and TC/TT tape.

Q. RECOMMENDATIONS

None

R. AUTOMATED DATA PROCESSING

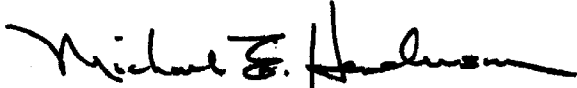
The following Hydroplot Programs were used to acquire and process data for this survey:

	Program Name:	Version:
RK 111	Range-Range Real Time	1-30-76
RK 201	Grid, Signal, and Lattice Plot	4-18-75
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	7-19-75
RK 602	Extended Line Oriented Editor	5-20-75

S. REFERENCE TO REPORTS

Horizontal Control Report and Mt Mitchell-CSS Bayfield Comparisons
(both to be submitted at the end of the field season)

Respectfully Submitted:



Michael E. Henderson
LTjg, NOAA

APPROVAL SHEET

MI-50-2-77

H-9709

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



James S. Midgley
Captain, NOAA
Acting Commanding Officer

Thunder Bay Island

SIGNAL NAMES PRINTOUT H-9789 MI-58-2-77 LAKE HURON OPR-528-MI-77

100 ✓ H-7A-MI-77 STURGEON POINT HYDROTRAC; AMC OPS
160 THUNDER BAY IS. LTHS.; MICHIGAN QUAD 450832, #1020
165 MISERY MICHIGAN QUAD 450824, #1004
170 H-12A-MI-77 SOUTH-NINE-MILE PT. AMC OPS
175 H-11A-MI-77 MONAGHAN AMC OPS
180 MIDDLE IS. LT. HOUSE MICHIGAN QUAD 450832, #1018
185 H-10A-MI-77 ROCKPORT AMC OPS
190 ✓ H-9A-MI-77 BELL AMC OPS
201 ✓ NORTH POINT "ANTENNA" HYDROTRAC MT. MITCHELL
202 ✓ NORTH POINT "BEACH" DELNORTE MT. MITCHELL
207 ✓ PRESQUE I. "TURCOTTE" H'TRAC; H-17-MI-77; AMC OPS
210 PRESQUE ISLE LT. HOUSE DEL NORTE ;AMC OPS

1956

1956

SIGNAL PRINTOUT

100 ✓/4	44	42	46789	083	16	19031	250	0000	162038
160 ✓/4	45	02	14167	083	11	39325	139	0000	000000
165 ✓/4	45	05	23844	083	17	53719	139	0000	000000
170 ✓/4	45	08	31220	083	18	58489	139	0000	000000
175 ✓/4	45	09	40925	083	20	55022	139	0000	000000
180 ✓/4	45	11	35470	083	19	15701	139	0000	000000
185 ✓/4	45	12	11242	083	22	47977	139	0000	000000
190 ✓/4	45	14	37279	083	24	44529	250	0000	000000
201 ✓/4	45	02	26767	083	16	25508	254	0000	162038
202 ✓/4	45	02	27248	083	16	24808	254	0000	000000
207 ✓/4	45	20	56482	083	29	06080	250	0000	162038
210 ✓/4	45	21	23359	083	29	32378	250	0000	000000

DETERMINATION OF VELOCITY CORRECTIONS

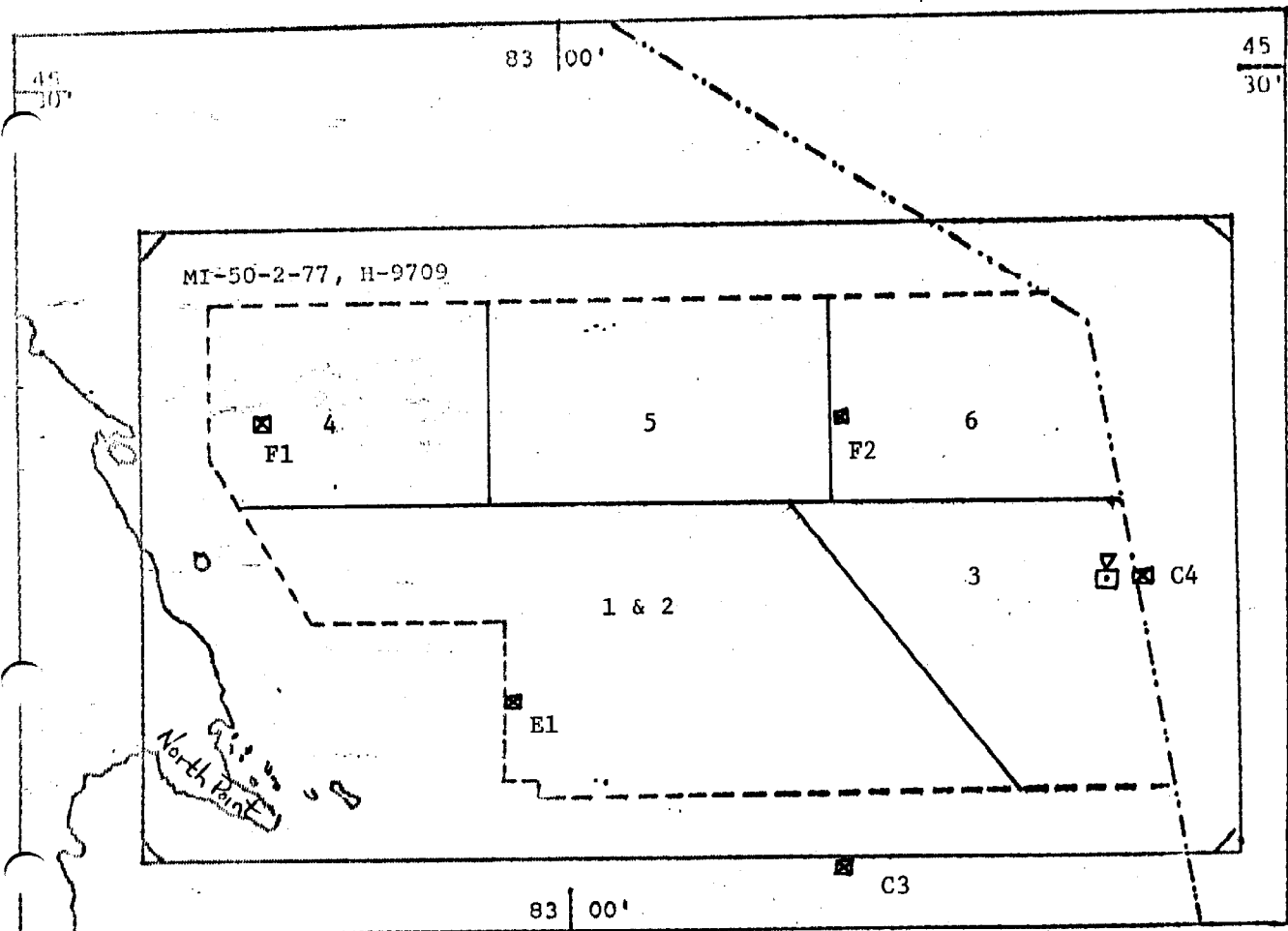
Simultaneous Nansen Casts and XBT'S disagreed from -2.2°C to $+1.2^{\circ}\text{C}$ with 70.0% of all temperatures agreeing within 0.5°C . Since the errors caused by the use of the XBT'S were small, they were used alone at some stations for velocity determinations.

Station:	Latitude:	Longitude:
C3	45°00.0'N	82°43.8'W
C4	45°10.1'N	82°28.2'W
E1	45°06.8'N	83°03.4'W
F1	45°14.6'N	83°17.5'W
F2	45°14.8'N	82°45.5'W
F3	45°10.8'N	82°30.3'W

Since significant temperature changes were noted with both time and area, corrections were similarly applied. In areas between station sites temperatures were averaged to determine velocity correctors. The following shows how the velocity tables were determined:

Table:	Survey Dates:	Cast/XBT:	Date (JD):
1	212-217, 223, 228-229	C3-5, C3-6, C4-4, C4-5 (Aug)	7/26 (207), 8/10 (222) and 8/10 (222)
2	221-222	E1-1 and C3-6 (Aug)	8/9 (221) & 8/10 (222)
3	216-217, 221-223, 228	C4-5	8/10 (222)
4	228-232	F1-1	8/16 (228)
5	228-232	F2-1	8/16 (228)
6	228-232	F3-1	8/16 (228)

See the accompanying illustration for the approximate boundaries of each table.



SCALE OF CHART 14860

The above illustration shows the areas covered by each velocity table and the stations (C3, C4, E1, F1, F3) occupied with XBT'S and Nansen Casts.

VELOCITY TAPE PRINTOUT

MI 50-2-77

TABLE I

000454	0	0000	0001	000	222000	050277
000621	1	0002				
000742	1	0004				
000842	1	0006				
000929	1	0008				
001003	1	0010				
001079	1	0012				
001154	1	0014				
001230	1	0016				
001436	1	0020				
001660	1	0025				
001860	1	0030				
002040	1	0035				
002240	1	0040				
002410	1	0045				
002600	1	0050				
002790	1	0055				
002990	1	0060				
003170	1	0065				
003360	1	0070				
003540	1	0075				
003730	1	0080				
003920	1	0085				
004110	1	0090				
004300	1	0095				
004490	1	0100				
004670	1	0105				
004860	1	0110				
005040	1	0115				
005220	1	0120				
005400	1	0125				
005620	1	0130				
005790	1	0135				
005870	1	0140				
006170	1	0145				
006350	1	0150				
006530	1	0155				
006720	1	0160				
006910	1	0165				
007110	1	0170				
007300	1	0175				
007500	1	0180				
999999	1	0185				

VELOCITY TAPE PRINTOUT
MI 50-2-77
TABLE 2

000191	0	0000	0002	000	222000	050277
000619	0	0002				
000756	0	0000				
000866	1	0002				
000964	1	0004				
001050	1	0006				
001128	1	0008				
001205	1	0010				
001464	1	0015				
001662	1	0020				
001830	1	0025				
002020	1	0030				
002220	1	0035				
002410	1	0040				
002600	1	0045				
002800	1	0050				
003000	1	0055				
003190	1	0060				
003380	1	0065				
003570	1	0070				
003760	1	0075				
003940	1	0080				
004130	1	0085				
004330	1	0090				
004510	1	0095				
004710	1	0100				
004890	1	0105				
005100	1	0110				
005290	1	0115				
005500	1	0120				
005690	1	0125				
005870	1	0130				
006060	1	0135				
999999	1	0140				

VELOCITY TAPE PRINTOUT
MI 50-2-77
TABLE 3

000550	0	0000	0003	000	222000	050277
000667	1	0002				
000770	1	0004				
000862	1	0006				
000950	1	0008				
001032	1	0010				
001111	1	0012				
001188	1	0014				
001262	1	0016				
001467	1	0020				
001640	1	0025				
001830	1	0030				
002010	1	0035				
002210	1	0040				
002390	1	0045				
002580	1	0050				
002760	1	0055				
002960	1	0060				
003140	1	0065				
003320	1	0070				
003510	1	0075				
003700	1	0080				
003870	1	0085				
004070	1	0090				
004250	1	0095				
004440	1	0100				
004610	1	0105				
004800	1	0110				
004980	1	0115				
005180	1	0120				
005360	1	0125				
005540	1	0130				
005720	1	0135				
005910	1	0140				
006090	1	0145				
006280	1	0150				
006470	1	0155				
006650	1	0160				
006820	1	0165				
009999	1	0170				

VELOCITY TAPE PRINTOUT
MI 50-2-77
TABLE 4

000198	0	0000	0004	000	222000	050277
000546	0	0002				
000670	0	0000				
000759	1	0002				
000837	1	0004				
000911	1	0006				
000981	1	0008				
001052	1	0010				
001122	1	0012				
001191	1	0014				
001261	1	0016				
001450	1	0020				
001610	1	0025				
001790	1	0030				
001960	1	0035				
002140	1	0040				
002310	1	0045				
002490	1	0050				
002660	1	0055				
002840	1	0060				
003020	1	0065				
003190	1	0070				
003360	1	0075				
003530	1	0080				
003710	1	0085				
003890	1	0090				
004070	1	0095				
004240	1	0100				
004410	1	0105				
004580	1	0110				
004770	1	0115				
004940	1	0120				
005120	1	0125				
005300	1	0130				
005470	1	0135				
005650	1	0140				
005810	1	0145				
005990	1	0150				
999999	1	0155				

VELOCITY TAPE PRINTOUT
MI 50-2-77
TABLE 5

000417	0	0000	0005	000	222000	050277
000684	0	0002				
000899	0	0000				
000998	1	0002				
001080	1	0004				
001160	1	0006				
001240	1	0008				
001381	1	0010				
001580	1	0015				
001779	1	0020				
001940	1	0025				
002150	1	0030				
002340	1	0035				
002530	1	0040				
002710	1	0045				
002920	1	0050				
003100	1	0055				
003290	1	0060				
003480	1	0065				
003670	1	0070				
003860	1	0075				
004070	1	0080				
004240	1	0085				
004460	1	0090				
004620	1	0095				
004830	1	0100				
005010	1	0105				
005210	1	0110				
005390	1	0115				
005600	1	0120				
005780	1	0125				
005990	1	0130				
006180	1	0135				
006370	1	0140				
006560	1	0145				
006770	1	0150				
006940	1	0155				
999999	1	0160				

VELOCITY TAPE PRINTOUT
MI 50-2-77
TABLE 6

000426 0 0000 0006 000 222000 050277
000549 1 0002
000644 1 0004
000737 1 0006
000826 1 0008
000912 1 0010
000997 1 0012
001081 1 0014
001162 1 0016
001240 1 0018
001372 1 0020
001540 1 0025
001750 1 0030
001920 1 0035
002110 1 0040
002300 1 0045
002490 1 0050
002680 1 0055
002870 1 0060
003050 1 0065
003230 1 0070
003420 1 0075
003610 1 0080
003800 1 0085
003990 1 0090
004170 1 0095
004360 1 0100
004540 1 0105
004730 1 0110
004910 1 0115
005110 1 0120
005290 1 0125
005480 1 0130
005660 1 0135
005850 1 0140
006040 1 0145
006240 1 0150
006420 1 0155
006610 1 0160
006790 1 0165
006990 1 0170
007170 1 0175
007360 1 0180
007540 1 0185
999999 1 0190

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: 'See Remarks'

Period: July 30, 1977 - August 20, 1977

HYDROGRAPHIC SHEET: H-9709

OPR- 520-MI-77

Locality: Lake Huron

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

Remarks:

Harrisville, Michigan (907-5059)

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.

Philip C. Morris

Chief, Water Level Section

Don M. Spillman 11/11/78

Chief, Tides & Water Levels Branch

GEOGRAPHIC NAMES

H-9709

Name on Survey	Source of Name										
	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	RAND McNALLY ATLAS	U.S. LIGHT LIST			
LAKE HURON											1
PRESQUE ISLE (TITLE)											2
											3
											4
											5
											6
											7
											8
											9
											10
											11
											12
											13
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											18
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											20
											21
											22
											23
											24
											25

APPROVED

Chas E. Harrington

CHIEF GEOGRAPHER -c3x8

21 Nov. 1978

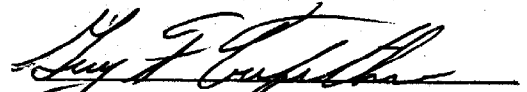
APPROVAL SHEET
FOR
SURVEY H-97079

- 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:

9-6-78

Signed:



Title:

Chief, Verification Branch

REGISTRY NO. H-9909

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 REQUIRED _____ INITIALS _____

REMARKS:

REGISTRY 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 REQUIRED _____ INITIALS _____

REMARKS:

ATLANTIC MARINE CENTER
VERIFIER'S REPORT

REGISTRY NO. H-9709

FIELD NO. MI-50-2-77

Michigan, Lake Huron, Thunder Bay Island to Presque Isle

SURVEYED: July 30 through August 20, 1977

SCALE: 1:50,000

PROJECT NO.: OPR-520

SOUNDINGS: Ross Model 5,000
Fineline Depth Sounder

CONTROL: Odom Offshore
Hydrotrac
(Range-Range),
Del-Norte

Chief of Party J. Midgley
Surveyed by G. Mills
..... D. Waltz
..... M. Henderson
..... V. Newell
..... D. Rice
..... P. Daugherty
..... M. Murphy
..... W. Pringle
..... T. Rulon
Automated Plot by CALCOMP-618 Plotter (AMC)
Verified and Inked by R. Roberson
August 21, 1978

1. Introduction

- a. No unusual problems were encountered during verification.
- b. Projection parameters were revised and inserted in the Descriptive Report during verification.
- c. Water level approval sheets were not received before completion of the survey. It is recommended that this approval be obtained and inserted in the Descriptive Report when going through the Quality Control section. *See Quality Control Report.*

2. Control and Shoreline

- a. Control is adequately discussed in Sections F and G of the Descriptive Report. It should be noted that the frequency used for processing the survey at the marine center was 1620.38 kHz, as required by the Project Instructions.
- b. There is no shoreline within the survey area.

3. Hydrography

- a. Sounding agreement at crossings is good.
- b. The standard depth contours were adequately delineated.
- c. Developments run were adequate to delineate the bottom configuration and least depths.

4. Condition of Survey

The smooth sheet and accompanying overlays, hydrographic records, and reports are adequate to conform to the requirements of the Hydrographic Manual, except as follows:

No velocity graphs or computations for velocity were included with the Descriptive Report.

5. Junctions

Excellent junctions were effected with the following surveys:

H-9690 (1977) to the south

H-9710 (1977) to the north

H-9720 (1977) to the northwest

Junction with H-9720 will be examined during quality control of that survey.

There are no contemporary surveys to the west. The Canadian survey 3958 (1977) joins on the east, but the survey was not available during verification.

6. Comparison With Prior Surveys

1-1838 (1945) 1:120,000

1-1844 (1946) 1:120,000

1-1845 (1946) 1:120,000

Comparison with the prior surveys was fair to poor. Some depths agreed quite well while others varied as much as 100 feet.

It should be noted that Section 4.9 of the Project Instructions states, "Since these surveys do not meet contemporary survey specifications for vessel positioning, it is not expected that a good depth comparison will be achieved with the 1977 surveys."

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

7. Comparison With Charts 14864 (19th Edition, December 4, 1976)
14860 (25th Edition, March 12, 1977)

a. Hydrography

Comparison with the charts is fair. Depths in shoaler water tend to be in better agreement than those in deeper water. The most significant differences are found at the two following locations:

Charted 66-fathom (396 feet) at approximately 45° 10' 45", 82° 33' 00" is surrounded by approximately 640-foot soundings.

Charted 57-fathom (342 feet) at approximately 45° 10' 45", 82° 36' 00" is surrounded by approximately 700-foot soundings.

See Quality Control Report.
See Quality Control Report.
It is recommended that the source of these soundings be ascertained and their validity checked before being placed on a future edition of Chart 14860.

This survey is adequate to supersede the charted hydrography within the common areas.

b. Aids to Navigation

There are no aids to navigation within the survey area.

8. Compliance With Instructions

This survey complies with the Project Instructions.

9. Additional Field Work

This is an excellent basic survey; no additional field work is recommended.


Inspection Report
H-970Z9

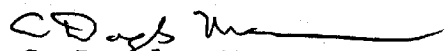
Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the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


Examined and Approved:
Hydrographic Inspection Team
Date: 8-31-78


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

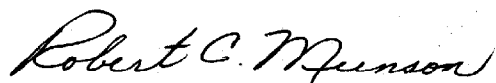
^{ABSENT}
Charles H. Nixon, CAPT, NOAA
Chief, Operations Division


R. D. Sanocki
Technical Assistant
Processing Division


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


Billy J. Stephenson
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

October 20, 1978

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

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

SUBJECT: Quality Control Report for H-9709 (1977), Michigan, Offshore
Lake Huron, Thunder Bay Island to Presque Isle

A quality control inspection of H-9709 was accomplished to monitor the survey for obvious deficiencies with respect to data acquisition, delineation of the bottom, determination of least depths, navigation hazards, junctions, sounding line crossings, smooth plotting, decisions and actions by the verifier, and cartographic presentation of data. In general, it was found to conform to the National Ocean Survey's standards and requirements except as stated in the report by the verifier and Hydrographic Inspection Team and as follows:

1. A few soundings rescanned in error on the fathograms during verification were corrected by the evaluator. These soundings affected the delineation of the depth curves which were revised accordingly during quality control.
2. The charted 66- and 57-fathom soundings mentioned under the heading "Comparison with Charts" in the Verifier's Report originate with prior survey H-1838 (1946). The depths are considered in error and should be disregarded.
3. The Water Level Approval Note mentioned in the Verifier's Report was obtained from the Tides and Water Levels Branch during quality control. This note has been inserted in the Descriptive Report.
4. No contemporary survey junctions with the present survey on the east. However, survey depths in this area are in harmony with charted depths.

cc:
C35
C351



