

9726

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-20-5-77**

Office No. .... **H-9726**

**LOCALITY**

State ..... **Michigan**

General Locality ... **Lake Huron**

Locality ... **St. Martin Point to Pomeroy Reef**

1977

**CHIEF OF PARTY**  
**James S. Midgley**

**LIBRARY & ARCHIVES**

DATE ..... **December 4, 1978**

9726

14583  
14580  
14581  
14880

**HYDROGRAPHIC TITLE SHEET**

H-9726

**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-20-5-77

State MICHIGAN

General locality LAKE HURON

Locality ~~LES CHENAUX ISLANDS~~ POINT ST. MARTIN ISLAND TO POMEROY REEF

Scale 1:20,000 Date of survey OCTOBER 6 to 27, 1977

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

Vessel NOAA SHIP MT MITCHELL S222 & Launches 1002 & 1004

Chief of party CAPT JAMES S. MIDGLEY, NOAA

Surveyed by SEE REMARKS

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

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

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

Protracted by N/A Automated plot by ~~MOS HYDROPLOT SYSTEM~~ CalComp 618 (AMC)

Verification by N/A

Soundings in ~~fathoms~~ feet ~~at~~ ~~NEW~~ ~~NEW~~ LWD (IGLD 1955: 576.8 feet)

**REMARKS:** LCDR G. MILLS, LT D. WALTZ, LTjg D. RICE, LTjg M. HENDERSON

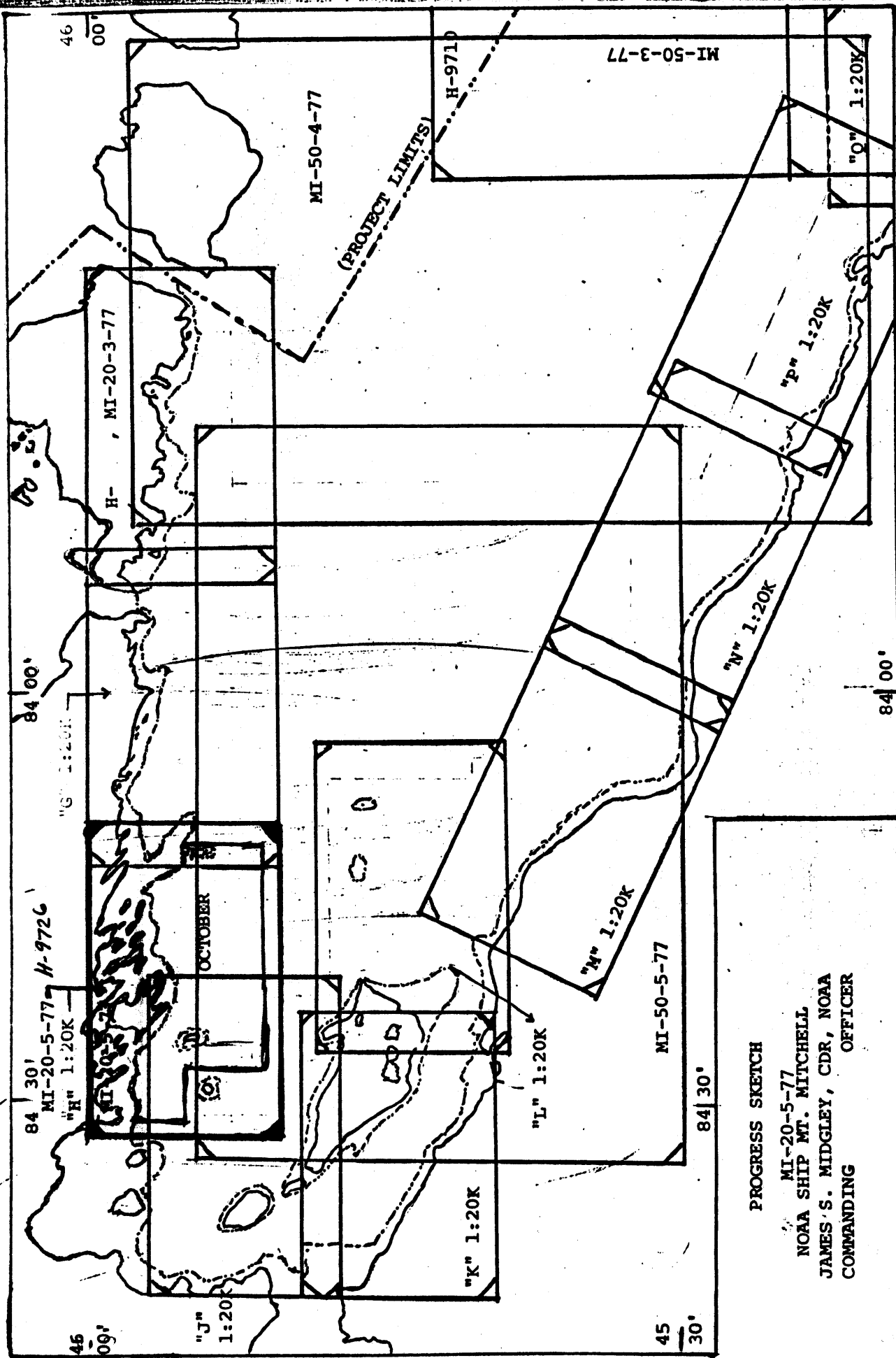
ENS P. DAUGHERTY, ENS T. RULON, ENS W. PRINGLE, ENS M. MURPHY

ENS T. BAINBRIDGE.

All notes in red are by the verifier.

All times are CUT.

App'd to STD 10-14-81 PSM



SCALE OF CHART #14860

PROGRESS SKETCH

MI-20-5-77  
 NOAA SHIP MT. MITCHELL  
 JAMES S. MIDGLEY, CDR, NOAA  
 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, 25 May 1977 and 10 June 1977 respectively.

B. AREA SURVEYED

This survey was conducted just south of Les Cheneaux Islands between Martin Reef and St Martin Point. The limits of the survey are roughly described by lines connecting the following points in a clockwise manner:

(1) 45°52.7'N (2) 45°50.8'N (3) 45°57.5'N (4) 45°57.0'N (5) 45°55.0'N  
84°11.3'W 84°22.0'W 84°32.3'W 84°15.0'W 84°11.3'W

This survey was conducted between 6 October 1977 (JD 279) and 27 October 1977 (JD 300).

C. SOUNDING VESSEL

Soundings for this survey were obtained by the NOAA SHIP MT MITCHELL S222 (Vessel Number 2220) and the following Launches:

1002 (Vessel Number 2225)  
1004 (Vessel Number 2226)

utilizing a fully automated Hydroplot Systems.

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

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

Equipment:	Serial Numbers:		
	Vesno 2220:	Vesno 2225:	Vesno 2226:
Ross Model 200C Recorder	--	--	1039
Ross Model 5000 Fineline Depth Sounder	1050	1053	--
Ross Model 4000 Transceiver	1050	1053	1039
Ross Model 6000 Digitizer	1050	1039	1053

Soundings for the Mt Mitchell were taken with a skag transducer (antenna distance +32.0 m). The antenna distance for all launches was 0. 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 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 fath-

gram. 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 5 XBT'S at the following locations:

Cast No:	Latitude	Longitude:	Date:
K4A	45°53.2'N	84°14.3'W	20 October 1977 (JD 293)
XBT No:			
K1	45°56'N	84°28'W	15 October 1977 (JD 288)
K2	45°56'N	84°28'W	16 October 1977 (JD 289)
K3	45°53.2'N	84°08.3'W	17 October 1977 (JD 290)
K4	45°53.7'N	84°14.8'W	20 October 1977 (JD 293)
K5	45°51.6'N	84°24.8'W	27 October 1977 (JD 300)

Due to rough conditions only 2 bar checks were taken. Since most depths were greater than 50 feet the Nansen Cast and XBT'S were used exclusively in determining velocity correctors using RK 530. An explanation of how the velocities were derived along with printouts of the velocity tapes and all tables is included in the appendices. Salinities determined by salinometer were found to be less than .2 parts per thousand and were negligible in determining sound velocities.

A draft of 14.0 feet was applied to all soundings collected by the Mt Mitchell during the on-line process. Not much fuel was used due to the large amount of launch hydro being done. Therefore, by shifting small amounts of fuel the draft aft was kept constant at 14.1 feet for this survey. Settlement and squat corrections for the ship were determined on July 25, 1977 (JD206) in Lake Huron at St. Ignace, Michigan. A corrector of +.2 feet is accurate for all survey speeds  $\pm$  .1 feet. A copy of the data abstract for ship's speed versus settlement and squat correctors is included in the appendices.

A draft of 1.6 feet was applied to all soundings taken by the launches during the on-line process. Changes in draft for both launches were insignificant. Settlement and squat corrections for the launches were determined on 1 September 1977 (JD244) in Lake Huron at St Ignace, Michigan. A copy of the field data and settlement and squat correctors versus launch RPM'S is included in the survey support data.

The change in the ship's draft along with the settlement and squat correctors for all vessels is incorporated into the TC/TI tape which is included in the survey data. A printout of this tape is included in the appendices.

A vertical cast was conducted on June 18, 1977 at Harrisville, Michigan to determine fathometer instrument error for the ship. The results are

included in this report. The error was less than .1 feet and was considered to be zero due to the accuracy of the cast. Numerous bar checks from previous surveys showed an instrument error of less than 0.2 feet for the fathometers in both launches and was considered to be zero. 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 in the appendices.

#### E. HYDROGRAPHIC SHEETS

This survey was plotted on two mylar complot roll plotter sheets by the Mt Mitchell Hydroplot System with a skew of 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

Hydrotrac electronic control stations used for this survey were:

Signal Number & Signal Name:	Latitude:	Longitude:
300 H-13-MI-77 Forty Mile Point Hydrotrac	45°29'11.010"N	83°54'48.836"W
400 H-20-MI-77 Lafayette Point Hydrotrac	45°46'18.807"N	84°21'23.562"W

Del Norte electronic control stations were used as follows:

Signal Number & Signal Name:	Latitude:	Longitude:
420 Spectacle Reef Light	45°46'22.892"N	84°08'16.802"W
443 Little St Martin Island	45°56'46.272"N	84°33'51.715"W
445 Brulee Point	45°58'09.552"N	84°27'44.115"W
446 H-35-MI-77 Point Fuyards	45°55'54.732"N	84°22'39.119"W
449 H-34-MI-77 Boot Offset	45°57'20.997"N	84°15'42.146"W
450 Martin Reef Light	45°54'47.292"N	84°08'54.953"W
447 H-33-MI-77		

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 Odom Offshore Hydrotrac system, operating at a frequency of 1618.650 Khz, in Range-Range mode, was used to provide positioning control for the ship only on the following days:

11 October 1977 (JD 284) and 18 October 1977 (JD 291).

The equipment serial numbers are as follows:

Vessel or Shore Station:	Equipment:	Serial No:
Mt Mitchell	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 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 positioning was used for both launches from 6 October 1977 (JD 279) through 20 October 1977 (JD 293), for ship hydro between 19 October 1977 (JD 292) and 27 October 1977 (JD 300) and to check Hydrotrac lane count for the ship. The equipment serial numbers are as follows:

Station Number & Signal Name:	Equipment:	Serial No:	Code:	Dates:
Mt Mitchell (Vesno 2220)	DMU	173		10/6-10/27/77
	Master	273A	78	
	360° Antenna	056		
	Parallel Buffer	123		
Launch 1002 (Vesno 2225)	DMU	123		10/6-10/20/77
	Master	1060	76	
	360° Antenna	053		
	Parallel Buffer	132		

Equipment Serial Number Cont'd

Station Number & Signal Name:	Equipment:	Serial No:	Code:	Dates:
Launch 1004 (Vesno 2226)	DMU	190		10/5-10/20/77
	Master	159	78	
	360° Antenna	168		
	Parallel Buffer	124		
420 Spectacle Reef Light	Remote	1135	74	9/18-10/20/77
	180° Antenna	88		
443 Little St Martin Island	Remote	248	72	10/15-10/27/77
	360° Antenna	054		
445 Brulee Point	Remote	245	78	10/13-10/27/77
	87° Antenna	068		
446 Point Fuyards	Remote	248	72	10/11-10/16/77
	180° Antenna	125		
449 H-34-MI-77 Boot Offset	Remote	245	78	10/3-10/7/77
	180° Antenna	125		
450 Martin Reef Light	Remote	1063	76	9/18-10/13/77
	180° Antenna	60		

Each Del Norte Master/DMU pair was calibrated with each remote over a measured baseline. In addition, when visibility permitted, the Del Norte was calibrated using three point sextant fixes and comparing observed ranges with computed values by use of Hydroplot Calibration Program RK561. A simultaneous check fix was taken with each calibration. Generally, only those fixes with inverses less than five (5) meters were accepted. Correctors determined during the morning calibration were averaged with others during the day resulting in one corrector per station per day.

Results of these daily calibrations showed changes in correctors of up to 12 meters from day to day and as much as 10 meters from morning to afternoon. It is presumed that this drift is caused by possible atmospheric absorption of the Del Norte signal or some other reduction of signal strength. EED is exploring this possibility at this time. Nevertheless, this data still meets the accuracy requirements for the scale of this survey.

On JD 279 Del Norte rates for 450 and 420 were checked three times at buoy "2PR" - latitude 45°55'31.5"N and longitude 84°12'33.7"W. Results from this showed agreement with  $\pm$  6 meters which shows no gross changes during that day. Because this was a buoy and not a fixed object these changes were not incorporated into the correctors.



While using Hydrotrac positioning 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. 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.

Shoreline was taken from Chart 14885 and survey 1-1497 and is in brown ink. *Shoreline was taken from Chart 14885 and survey 1-1497 and is in brown ink.*

#### I. CROSSLINES

Crosslines were run at least 45° to the main scheme sounding lines. Mileage of crosslines amounted to 10.7% 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 very rough bottom topography.

#### J. JUNCTIONS ✓ See Veindier's Report

This survey junctions with the following surveys:

Area of Junction:	Field No:	Reg. No:	Scale:	Date:	Ship:
East	MI-20-4-77	H-9719	1:20,000	1977	Mt. Mitchell S222
South	MI-50-5-77	H-9718	1:50,000	1977	Mt. Mitchell S222
North	- -	1-2254	1:15,000	1965-66	US Lake Survey
North	- -	1-2255	1:15,000	1965-66	US Lake Survey
North	- -	1-2256	1:15,000	1965-66	US Lake Survey

An excellent junction was made with MI-20-4-77<sup>H-9719</sup> and contours continue smoothly to this sheet. The junction with MI-50-5-77<sup>H-9718</sup> was good with most depths agreeing within 2 feet.

Since this survey did not have the lake water level applied (predicted levels were approximately 2 feet above Great Lakes Low Water Datum) depths should be approximately 2 feet deeper in areas of junction with the U.S. Lake Survey sheets. This survey junctioned well with 1-2254 with most soundings deeper than those of 1-2254 (70% were within 2 feet after a 2 foot lake level correction was applied). Junctioning with 1-2255 was also good - 62% of the soundings agreed within 2 feet after a 2 foot lake level correction was applied. The junction area with 1-2256 was an area of rough bottom topography. Junctioning was only fair with 45% agreeing within 2 feet and 70% within 5 feet (again after applying a 2 foot lake level correction).

Junctioning between launches was excellent with most soundings agreeing within 1 foot. The junction between the ship and the launches was good with most soundings agreeing within 1 to 2 feet.

K. COMPARISON WITH PRIOR SURVEYS See Verifier's Report.

There were no prior surveys available for comparison within the limits of this survey. There were no pre-survey review items for MI-20-5-77.

H-9726

L. COMPARISON WITH CHART ✓

This area is covered by NOAA Charts 14885, 13th Edition, 5 June 1976 at 1:20,000 scale and 14881, 22nd Edition, 14 May 1977 at 1:80,000 scale. After applying a 2 foot correction for approximate lake water level 50% of this survey's soundings agree within 2 feet of those on 14885 and 90% are within 5 feet. Agreement with Chart 14881 is fair with 65% of the soundings agreeing within 5 feet.

M. ADEQUACY OF THE SURVEY ✓

This survey is considered complete and adequate to supercede prior surveys for charting.

N. AIDS TO NAVIGATION ✓

There are no aids to navigation within the limits of this survey. However, positions were determined for two buoys near the survey area as a means of checking Del Norte readings. These were the Pomeroy Reef Lighted Gong Buoy (L.L. #1360) and Les Cheneaux Islands West Entrance Lighted Buoy #1 (L.L. #1370). A detailed evaluation of these seasonal buoys are not included here since they are outside the survey area.

O. STATISTICS

	Ship:	Launch:	Total:
Linear Nautical Miles of Main Scheme Hydrography	183.7	311.8	495.5
Linear Nautical Miles of Crosslines	22.6	30.3	52.9
Linear Nautical Miles of Development	0	15.2	15.2
Total Linear Miles of Hydrography	206.3	357.3	563.6
Total Miscellaneous Miles	143.6	101.3	244.9
Total Miles	349.9	458.6	808.5
Square Miles of Hydrography	27	24	51
Total Number of Positions	648	1240	1888
Nansen Casts	1	0	1
XBTS	5	0	5
Bottom Samples	32	0	32

P. MISCELLANEOUS

Inshore shoal soundings were not developed for least depths since they were within the area of the junction survey. XBT K-3 and U.S. Lake Survey 1-2256 both also apply to MI-20-4-77 (H-9719) but are included with this survey's records.

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 Pot	1-15-76
RK 300 Utility Computations	2-10-76
RK 330 Data Check and Reformat	5-04-76
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

None

Respectfully Submitted:

  
Paul M. Daugherty  
Ensign, NOAA

APPROVAL SHEET

MI-20-5-77

H-9726

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

### Determination of Velocity Corrections

Simultaneous Nansen Casts and XBT'S disagreed from  $-2.2^{\circ}\text{C}$  to  $+1.2^{\circ}\text{C}$  with 70% of all temperatures agreeing within  $0.5^{\circ}\text{C}$ . Data from the Nansen Cast and the 5 XBT'S were in close agreement and were therefore averaged to create one velocity tape for the whole survey. The station sites and dates are as follows:

Cast No:	Latitude:	Longitude:	Date:
K4A	$45^{\circ}53.2'\text{N}$	$84^{\circ}14.3'\text{W}$	20 October 1977 (JD 293)

XBT No:	Latitude:	Longitude:	Date:
K1	$45^{\circ}56'\text{N}$	$84^{\circ}28'\text{W}$	15 October 1977 (JD 288)
K2	$45^{\circ}56'\text{N}$	$84^{\circ}28'\text{W}$	16 October 1977 (JD 289)
K3	$45^{\circ}53.2'\text{N}$	$84^{\circ}08.3'\text{W}$	17 October 1977 (JD 290)
K4	$45^{\circ}53.7'\text{N}$	$84^{\circ}14.8'\text{W}$	20 October 1977 (JD 293)
K5	$45^{\circ}51.6'\text{N}$	$84^{\circ}24.8'\text{W}$	27 October 1977 (JD 300)

VELOCITY CORRECTION TABLE OPTIONS:

- 0) NO TABLE
- 1) IN FEET
- 2) IN FATHOMS
- 3) IN METERS

1

DRAFT = 14.0

TABLE 1

ACTUAL DEPTH (SURFACE)  
MINUS VELOCITY  
CORRECTION  
(FT)

VELOCITY  
CORRECTION  
(FT)

0016.42	-0000.02
0049.52	-0000.31
0082.63	-0000.61
0132.35	-0001.11
0199.41	-0002.56

VELOCITY CORRECTION TABLE OPTIONS:

- 0) NO TABLE
- 1) IN FEET
- 2) IN FATHOMS
- 3) IN METERS

1

DRAFT = 1.6

TABLE 2

ACTUAL DEPTH (SURFACE)  
MINUS VELOCITY  
CORRECTION  
(FT)

VELOCITY  
CORRECTION  
(FT)

0016.52

-0000.12

0049.62

-0000.40

0082.73

-0000.71

0132.44

-0001.21

0199.51

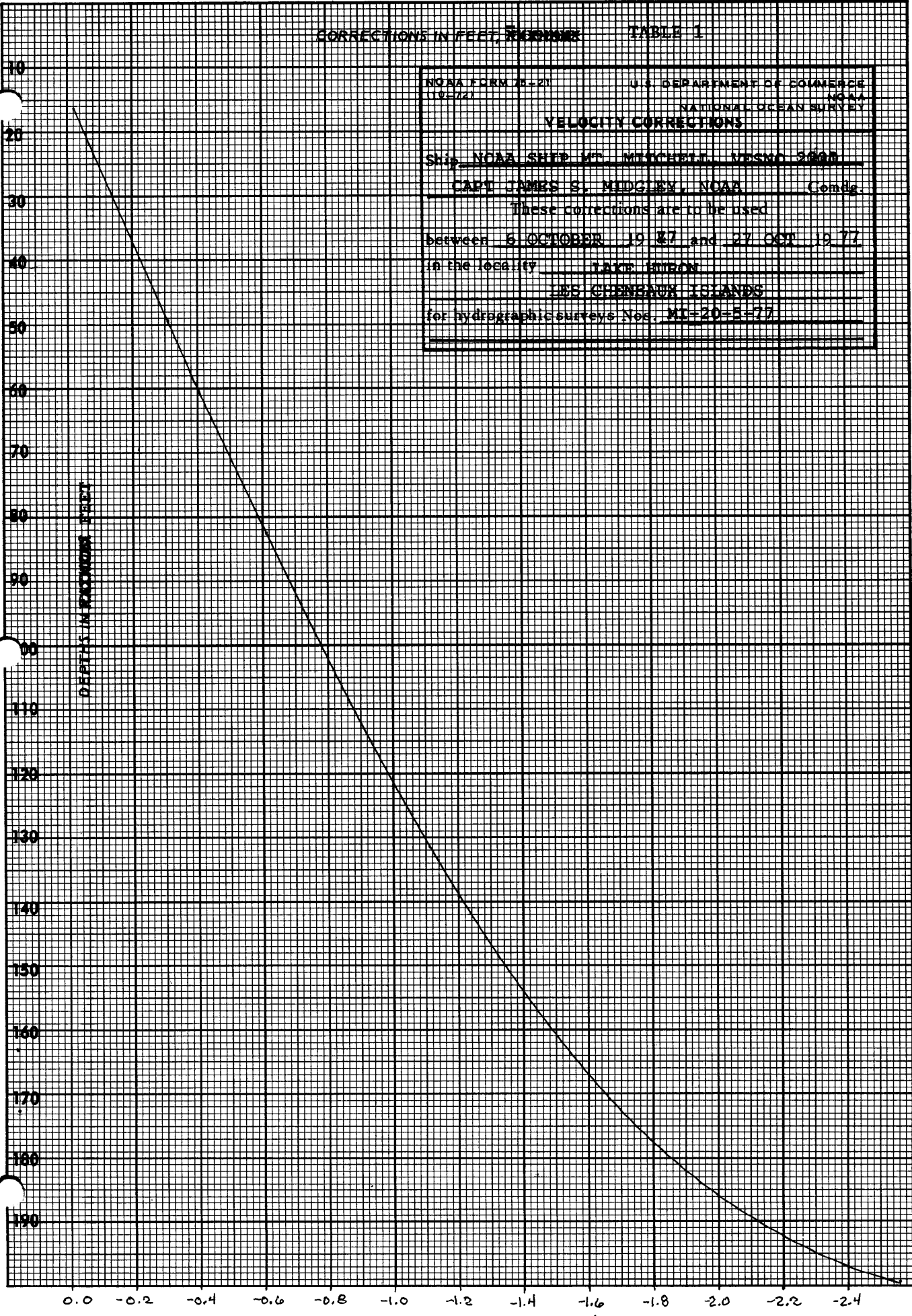
-0002.66

(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

CORRECTIONS IN FEET, TIDE GAUGE TABLE 1

NOAA FORM 11-21 (10-76)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA SHIP MT MITCHELL VESNO 2000</u>	
CAPT <u>JAMES S. MIDDLET, NOAA</u> Comdg.	
These corrections are to be used	
between <u>6 OCTOBER 19 87</u> and <u>27 OCT 19 77</u>	
in the locality <u>TACE SIMON</u>	
<u>LES CHENEBAUX ISLANDS</u>	
for hydrographic surveys No. <u>ML-20-5-77</u>	

(For deep water add a 0 to these figures)





(Let 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal.)

CORRECTIONS IN FEET, FATHOMS

TABLE 2

NOAA FORM 20-21  
(10-72)

U.S. DEPARTMENT OF COMMERCE  
NOAA  
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA MT MITCHELL, VESNO 2225 & 2226

CAPT. JAMES S. MIDDLEY, NOAA Comd.

These corrections are to be used

between OCTOBER 19 77 and 27 OCT 19 77

in the locality LAKE MURON

LES CHENEBAUX ISLANDS

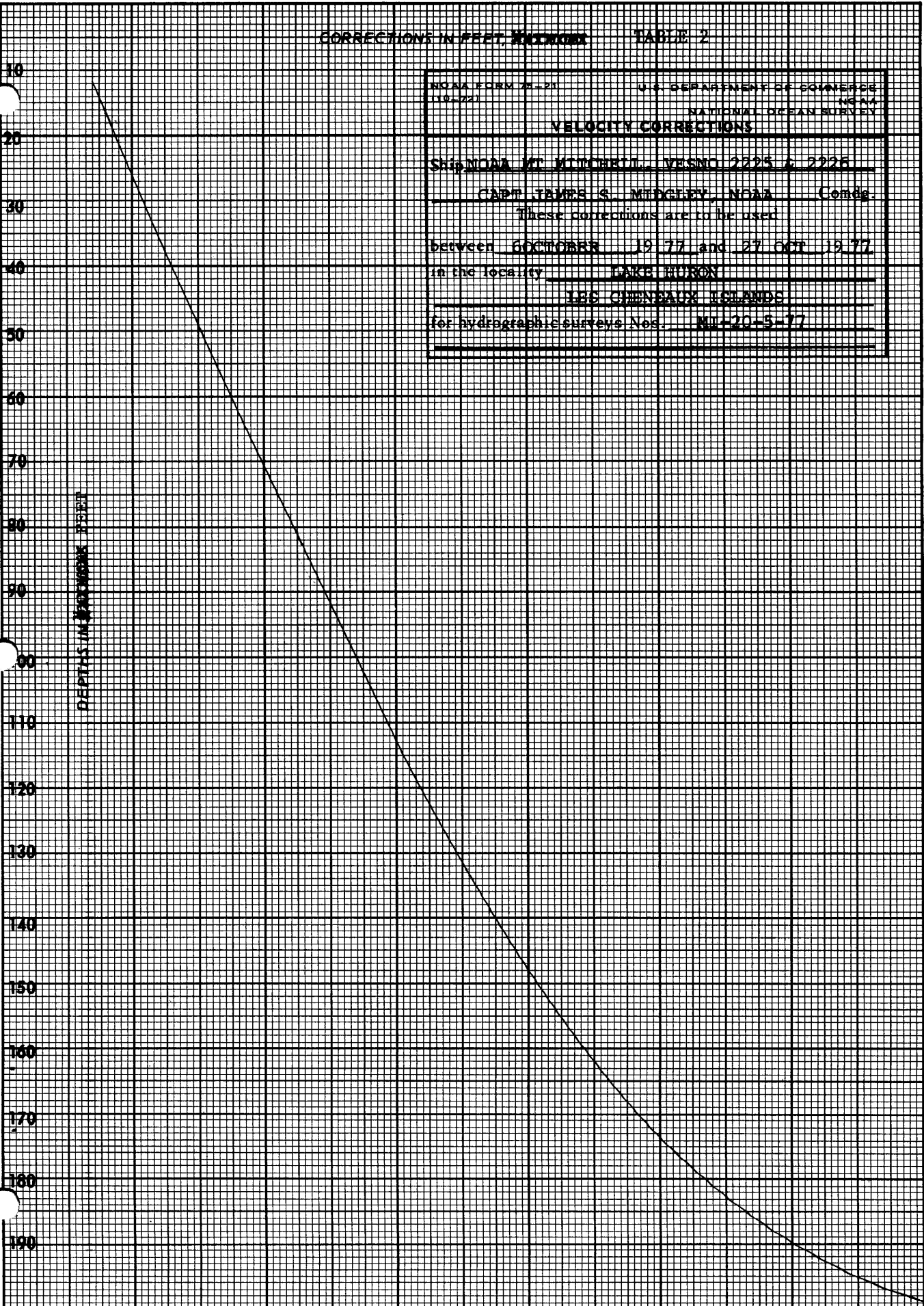
for hydrographic surveys Nos. MU-20-5-77

(For deep water add a 0 to these figures)

DEPTHS IN FATHOMS FEET

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

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



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	+0.08
	± 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	DRP	
						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*

Virginia E. Newell  
LT(jg), NOAA

ORIGINAL

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

SETTLEMENT AND SQUAT  
MT MITCHELL 1977 FIELD SEASON  
JENSEN #1002 and 1004

Settlement and squat tests were run for MT MITCHELL launches 1002 and 1004 (vessel #2225, 2226 respectively) on September 1, 1977 off the St. Ignace Coast Guard pier. Corrections were determined with a Zeiss N12 Level (S/N 142936) positioned at the end of the pier and a Philadelphia leveling rod positioned directly above the transducer on the starboard side of each launch. The water level alongside the pier was measured before, during and after the level sightings - no change was observed. The seas were calm with no wind.

A buoy was placed in 50 feet of water approximately 50 meters off the pier. When the launches were laying to alongside this buoy variations of 0.1 to 0.5 feet were observed due to heave even though the seas were calm. Therefore, 2 sets of 20 measurements were made for each speed. This was done by running the launches from about one quarter mile east of the pier in to the buoy. High and low rod readings were recorded for each run. A "C" shot was done on the level before the tests were run to ensure small errors due to varying distances. C was found to be .01 mm/m or approximately 5 mm for distance differences of one quarter mile.

The leveling runs were made at 600, 1600, 2100 and 2600 rpm for each launch except launch 1002 idled at 500 rpm instead of 600 rpm. Measurements were made laying to beside the buoy both before and after the tests were run. Both launches carried a crew of two and all hydrographic survey equipment. Launch 1002 had full fuel tanks while launch 1004 was three quarters full. Attached is an abstract of the data obtained including a graph for each launch.

Respectfully Submitted:

*William G. Pringle Jr.*

William G. Pringle Jr.  
Ensign, NOAA

SETTLEMENT AND SQUAT CORRECTORS  
MT MITCHELL 1977 FIELD SEASON

RPM	JENSEN #1002 VESNO 2225	JENSEN #1004 VESNO 2226
0	-----	-----
500	+ .01	-----
600	+ .05	+ .02
700	+ .08	+ .05
800	+ .11	+ .08
900	+ .14	+ .11
1000	+ .17	+ .13
1100	+ .19	+ .15
1200	+ .20	+ .17
1300	+ .22	+ .19
1400	+ .23	+ .20
1500	+ .24	+ .21
1600	+ .25	+ .21
1700	+ .24	+ .20
1800	+ .22	+ .19
1900	+ .18	+ .17
2000	+ .15	+ .14
2100	+ .08	+ .09
2200	0.0	+ .03
2300	- .10	- .04
2400	- .22	- .13
2500	- .38	- .23
2600	- .54	- .37

SIGNAL NAMES TAPE  
MI-20-5-77  
H-9726

300	FORTY MILE POINT HYDROTRAC	H-13-MI-77 (AMC OPS)
400	LAFAYETTE POINT HYDROTRAC	H-20-MI-77 (AMC OPS)
420	SPECTACLE REEF LIGHT	MICH QUAD 450841 #1029
425	MACKINAC BRIDGE, SOUTH TOWER	MICH QUAD 450844 #1064
430	MACKINAC BRIDGE, NORTH TOWER	MICH QUAD 450844 #1063
442	MORAN MICROWAVE TOWER	MICH QUAD 450844 #1088
443	LITTLE ST. MARTIN ISLAND	MICH QUAD 450844 #1025
444	ST. MARTIN POINT USLS	MICH QUAD 450844 #1053
445	BRULEE POINT	MICH QUAD 450841 #1011
446	POINT FUYARDS	H-35-MI-77 (AMC OPS)
447	MARQUETTE ISLAND	H-33-MI-77 (AMC OPS)
449	BOOT OFFSET	H-34-MI-77 (AMC OPS)
450	MARTIN REEF LIGHT	MICH QUAD 450841 #1021

SIGNALS TAPE PRINTOUT  
MI-20-5-77  
H-9726

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	0026	000000
425	4	45	48	36493	084	43	44205	139	0000	000000
430	4	45	49	13812	084	43	38651	139	0000	000000
442	4	45	58	05641	084	45	55035	139	0000	000000
443	4	45	56	46272	084	33	51715	250	0000	000000
444	4	45	58	16468	084	30	51801	139	0000	000000
445	4	45	58	09552	084	27	44115	250	0006	000000
446	4	45	55	54732	084	22	39119	250	0000	000000
447	4	45	56	23021	084	21	17902	139	0000	000000
449	4	45	57	20997	084	15	42146	250	0000	000000
450	4	45	54	47292	084	08	54953	250	0020	000000





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 28, 1977

Reply to Attn. of:

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

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

Subject: Water Level Data for Survey H-9726

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

Gage:		Latitude:	Longitude:
Cheboygan, Michigan	(907-5076)	45°38'50"N	84°28'14"W
Mackinaw City, Michigan	(907-5080)	45°46'48"N	84°43'12"W
De Tour Village, Michigan	(907-5098)	45°59'30"N	83°53'54"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:

(1) 45°52.7'N (2) 45°50.8'N (3) 45°57.5'N (4) 45°57.0'N  
84°11.3'W 84°22.0'W 84°32.3'W 84°15.0'W

(5) 45°55.0'N  
84°11.3'W

This information is requested for the following periods:

5 October 1977 (JD 278) - 27 October 1977 (JD 300)

ATLANTIC MARINE CENTER

TIDE NOTE

1. Project No: OPR-520-MI-77 2. Vessel/~~Field Work~~: NOAA Ship MT MITCHELL (MSS-22)
3. Year: 1977 4. Meridian Time Zone: GMT
5. Tide Station Name: Cheboygan, Michigan (907-5076)
6. Position: Lat. 45° 38' 50" N Long. 84° 28' 14" W
7. Plane of Reference:  LWD  MLLW  MLLW corresponds to \_\_\_\_\_ feet on the tide staff for the period \_\_\_\_\_.
8. Hourly Heights:  Standard Gauge, furnished from Rockville.  
 Scaled and logged from field marigrams.
9. Tidal Zoning:  Not applicable.  
 By two or more gauges automatically zoned.  
 By applying tidal differences and constants for the area(s): a. \_\_\_\_\_

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (IF Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

b. \_\_\_\_\_

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (IF Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

c. Include additional areas on separate sheet(s).

Remarks: All Times and Dates used on the survey are Greenwich Mean Time

ATLANTIC MARINE CENTER

TIDE NOTE

1. Project No: OPR-520-MI-77 2. Vessel/~~Rockville~~: NOAA Ship MT MITCHELL (MSS-22)
3. Year: 1977 4. Meridian Time Zone: GMT
5. Tide Station Name: Mackinaw City, Michigan (907-5080)
6. Position: Lat. 45° 46' 48" N Long. 83° 43' 12" W
7. Plane of Reference:  <sup>LWD</sup>~~MLW~~,  MLLW corresponds to \_\_\_\_\_ feet on the tide staff for the period \_\_\_\_\_.
8. Hourly Heights:  Standard Gauge, furnished from Rockville.  
 Scaled and logged from field marigrams.
9. Tidal Zoning:  Not applicable.  
 By two or more gauges automatically zoned.  
 By applying tidal differences and constants for the area(s): a. \_\_\_\_\_

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

b. \_\_\_\_\_

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

c. Include additional areas on separate sheet(s).

10. Remarks: All Times and Dates used on the survey are Greenwich Mean Time

ATLANTIC MARINE CENTER

TIDE NOTE

1. Project No: OPR-520-MI-77 2. Vessel/Field Station: NOAA Ship MT MITCHELL (MSS-22)
3. Year: 1977 4. Meridian Time Zone: GMT
5. Tide Station Name: DeTour Village, Michigan (907-5098)
6. Position: Lat. 45° 59' 30" N Long. 83° 53' 54" W
7. Plane of Reference:  LWD,  MLLW corresponds to \_\_\_\_\_ feet on the tide staff for the period \_\_\_\_\_.
8. Hourly Heights:  Standard Gauge, furnished from Rockville.  
 Scaled and logged from field marigrams.
9. Tidal Zoning:  Not applicable.  
 By two or more gauges automatically zoned.  
 By applying tidal differences and constants for the area(s): a. \_\_\_\_\_

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

b. \_\_\_\_\_

TIME (Hour, Minute)		HEIGHT (Feet)		HEIGHT RATIO (If Applicable)	
High Water	Low Water	High Water	Low Water	High Water	Low Water

c. Include additional areas on separate sheet(s).

Remarks: All Times and Dates used on the survey are Greenwich Mean Time

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: Mackinaw City, Michigan 907-5080

Period: October 5 - 27, 1977

HYDROGRAPHIC SHEET: H-9726

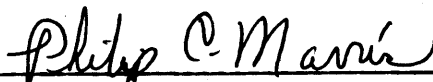
OPR-520-MI-77

Locality: Lake Huron

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

Remarks:

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

  
\_\_\_\_\_  
Chief, Water Level Branch

GEOGRAPHIC NAMES

H 9726

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		
BIRCH ISLAND ✓	14881									1
BOAT ISLAND ✓	14881									2
BRULEE POINT ✓	14881									3
COATS POINT ✓	14881									4
GOOSE ISLAND ✓	14881									5
GOVERNMENT ISLAND ✓	14881									6
GRAVELLY ISLAND ✓	14881									7
LAKE HURON ✓										8
LA SALLE ISLAND ✓										9
LES CHENEaux ISLANDS ✓										10
LITTLE LA SALLE ISLAND ✓										11
MARQUETTE ISLAND ✓										12
MIDDLE ENTRANCE ✓										13
PENNY ISLAND ✓										14
POINT FUYARDS ✓										15
POMEROY REEF ✓										16
ST. MARTIN POINT ✓										17
SEARCH BAY ✓										18
VOIGHT BAY ✓										19
WEST ENTRANCE ✓										20
										21
										22
										23
										24
										25

APPROVED

*Chas. E. Harrington*

CHIEF GEOGRAPHER - C3X5

9 MARCH 1979

APPROVAL SHEET  
FOR  
SURVEY H- 9726

- 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 Hydrographic Manual. Exceptions are listed in the Verifier's Report.

Date: 14 Nov 78

Signed: for R. D. Sandoz

Title: Chief, Verification Branch

H-9728

## HYDROGRAPHIC SURVEY STATISTICS

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS (2-Paper, 4-mylar) <sup>15</sup> <del>20</del>		6 <del>3</del>	
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	2					1-misc. data
CAHIERS			1 with cath.			
VOLUMES	3					
BOXES						

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			1920
POSITIONS CHECKED	205	700	
POSITIONS REVISED		10	
SOUNDINGS REVISED		75	
SOUNDINGS ERRONEOUSLY SPACED		0	
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)			
VERIFICATION OF CONTROL		2	
VERIFICATION OF POSITIONS		13	
VERIFICATION OF SOUNDINGS		49	
COMPILATION OF SMOOTH SHEET		60	
APPLICATION OF TOPOGRAPHY		-	
APPLICATION OF PHOTOBATHYMETRY		-	
JUNCTIONS		2	
COMPARISON WITH PRIOR SURVEYS & CHARTS		23	
VERIFIER'S REPORT		5	
OTHER		3	
TOTALS		157	
Pre-Verification by K. Ainsley	Beginning Date 01-25-78	Ending Date 01-25-78	
Verification by J. Wilson, K. Ainsley, R. Roberson	Beginning Date 02-15-78	Ending Date 11-01-78	
Verification Check by M. K. Smith	Time (Hours) 5	Date 11-10-78	
Marine Center Inspection by Hydrographic Inspection Team (AMC)	Time (Hours) 10	Date 11-13-78	
Quality Control Inspection by F.P. Saalsbury	Time (Hours) 77	Date 2-5-79	
Requirements Evaluation by C. B. Klein	Time (Hours) 4	Date 3-23-79	

Insp Carstens chr 3/2/79



Reg. No. H-9726(1977)

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 REQ'D \_\_\_\_\_ INITIALS ~~LG~~

REMARKS:

Reg. No. H-9726(1977)

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 REQ'D \_\_\_\_\_ INITIALS LG

REMARKS:

ATLANTIC MARINE CENTER  
VERIFER'S REPORT

REGISTRY NO. H-9726

FIELD NO. MI-2--5-77

Michigan, Lake Huron, St. Martin <sup>POINT</sup> ~~Island~~ to <sup>Pomeroy</sup> ~~Martin~~ Reef

SURVEYED: October 6 through October 27, 1977

SCALE: 1:20,000

PROJECT NO.: OPR-520

SOUNDINGS: Ross Automated  
Hydrographic Survey System

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

Chief of Party ..... J. S. Midgley  
Surveyed by..... G. B. Mills  
..... D. A. Waltz  
..... M. E. Henderson  
..... D. R. Rice  
..... T. Bainbridge  
..... P. M. Daugherty  
..... M. L. Murphy  
..... W. G. Pringle  
..... T. D. Rulon  
Automated Plot by..... CALCOMP-618 (AMC)  
Verified and Inked by..... R. G. Roberson  
October 31, 1978

1. Introduction

No unusual problems were encountered during verification of the survey.

2. Control and Shoreline

a. Control is adequately discussed in Sections F and G of the Descriptive Report.

b. Brown shoreline was taken from Chart 14885 (14th Edition, August 6/77) and U.S. LS Survey 1-1497; the shoreline is solely for orientation purposes.

3. Hydrography

a. Crosslines are in good agreement. ✓

b. The standard depth curves are adequately delineated. The 36-foot depth curve was added to high light some features. ✓

*in some areas*

c. Development of the bottom configuration and determination of least depths was adequate. However, along the northern edge of the present survey excessive differences between junctional surveys (see Section 5. Junctions of this report) and prior surveys were found. The present survey should have been extended as required by Section 4.3.2 of the Hydrographic Manual and additional development should have been conducted to verify or disprove shoaler prior survey depths in this area. CONCUR  
7B

#### 4. Condition of Survey

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

#### 5. Junctions

H-9718	(1977)	to the south	✓
H-9719	(1977)	to the east	✓
1-2254	(1965-66)	to the north	✓
1-2255	(1965-66)	to the north	✓
1-2256A	(1965-69)	to the north	✓

Excellent junctions were effected with H-9718 (1977) and H-9719 (1977). Depths varied from 1 to 2 feet. Satisfactory junctions were effected with 1-2254, 1-2255, 1-2256A, depths varied as much as 7 to 8 feet. These junctional areas were inshore in an area of irregular bottom. However, the shoal area in the vicinity of latitude 45°54.5', longitude 84°22.5' developed by 1-2255 (1965) is considered to be more effectively delineated by the present survey. A butt junction was effected in this area, superseding that portion of 1-2255 (1965) by the present survey. See  
Q.C.  
Critique

#### 6. Comparison with Prior Surveys

1-1347	(1916)	1:20,000
1-1497	(1927)	1:20,000
1-1498	(1926-27)	1:20,000

Comparison with the prior surveys shows good overall general agreement; depths varied plus or minus (+/-) 0 to 10 feet. A general trend was for the prior surveys to be deeper. An area of depth disagreement of approximately 20 to 25 feet occurs at approximately 45°-54', 84°-21'-30". Again the present survey is the shoaler of the two.

The reason for differences in depth between the surveys can be attributed to natural and technological changes.

The present survey is adequate to supersede the prior surveys in the common areas, with the addition of supplemental depths from the above prior surveys.

7. Comparison with Charts 14885 (13th Edition, June 5/76)  
14881 (22nd Edition, May 14/77)

a. Hydrography

Comparison with the charts shows good agreement. Depths vary from one (1) to ten (10) feet. Most of the charted hydrography originates with the previously mentioned prior and junctional surveys. However, the 60 foot depth charted in latitude  $45^{\circ}56.33'$ , longitude  $84^{\circ}13.9'$  apparently originates with an early prior survey (probably 1-88 of 1851) and was not considered in the Comparison with Prior Surveys in this report. This charted depth and similar supporting charted depths in the vicinity are of questionable ~~160~~ positional accuracy. A positional shift of approximately ~~400~~ meters to the northeast will bring these depths into relative agreement with the present survey and most recent prior surveys. On this basis these charted depths should be considered superseded by the present survey.

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

b. There were no aids to navigation within the actual survey area; however, two buoys in close proximity were located for calibration. The locations were inserted into the survey data.

8. Compliance with Project Instructions

This survey adequately complies with the Project Instructions.

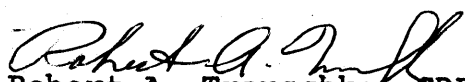
9. Additional Field Work

This is a good basic survey; no additional field work is required. However, attention is directed to Section 3.c of this report.

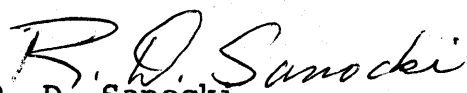
Inspection Report  
H-9726

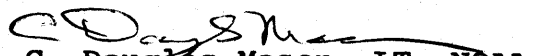
Any verification errors regarding procedures and presentation of survey data detected during inspection by the Hydrographic Inspection Team have been corrected before submission for administrative approval. HIT comments regarding quality of field work, compliance with instructions, and adequacy of the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

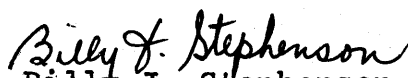
Examined and Approved:  
Hydrographic Inspection Team  
Date:

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

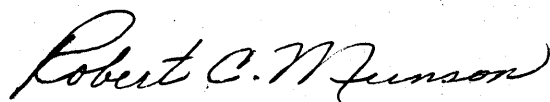
*ABSENT*  
Charles H. Nixon, CAPT, NOAA  
Chief, Operations Division

  
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

OA/C352:FPS

February 5, 1979

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

THRU: Chief, Quality Control Branch

FROM: F. P. Saulsbury *F. P. Saulsbury*  
Quality Evaluator

SUBJECT: Quality Control Report for H-9726 (1977), Michigan, Lake Huron,  
St. Martin Point to Pomeroy Reef

A quality control inspection of H-9726 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, shoreline transfer, smooth plotting, decisions and actions taken by the verifier, and the 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 Verifier's Report, the HIT Report, and as follows:

1. Minor revisions and additions to survey items, made on the smooth sheet during quality control inspection, are indicated on the one-half scale copy of the survey to be furnished the verifier.
2. Spot scanning of the fathograms reveals that many intermediate soundings 1 to 3 feet shoaler or deeper than recorded soundings were ignored. It appears that in scanning the fathograms an arbitrary cutoff point was selected which determined whether a sounding would be read or not read. In this procedure least depths on some features, even though appearing on the fathograms, may not be shown on the smooth sheet.
3. The 40-foot sounding charted from 1-1497 (1927) in latitude  $45^{\circ}54.54'$ , longitude  $84^{\circ}24.40'$  is considered discredited by 58-foot depths on the present survey.  
  
The 32-foot sounding charted from 1-1498 (1926-27) in latitude  $45^{\circ}54.21'$ , longitude  $84^{\circ}23.03'$  is considered discredited by 46- to 48-foot depths on the present survey.
4. The 142-foot sounding charted from an undetermined source in latitude  $45^{\circ}52.86'$ , longitude  $84^{\circ}17.20'$  falls between lines on the present survey



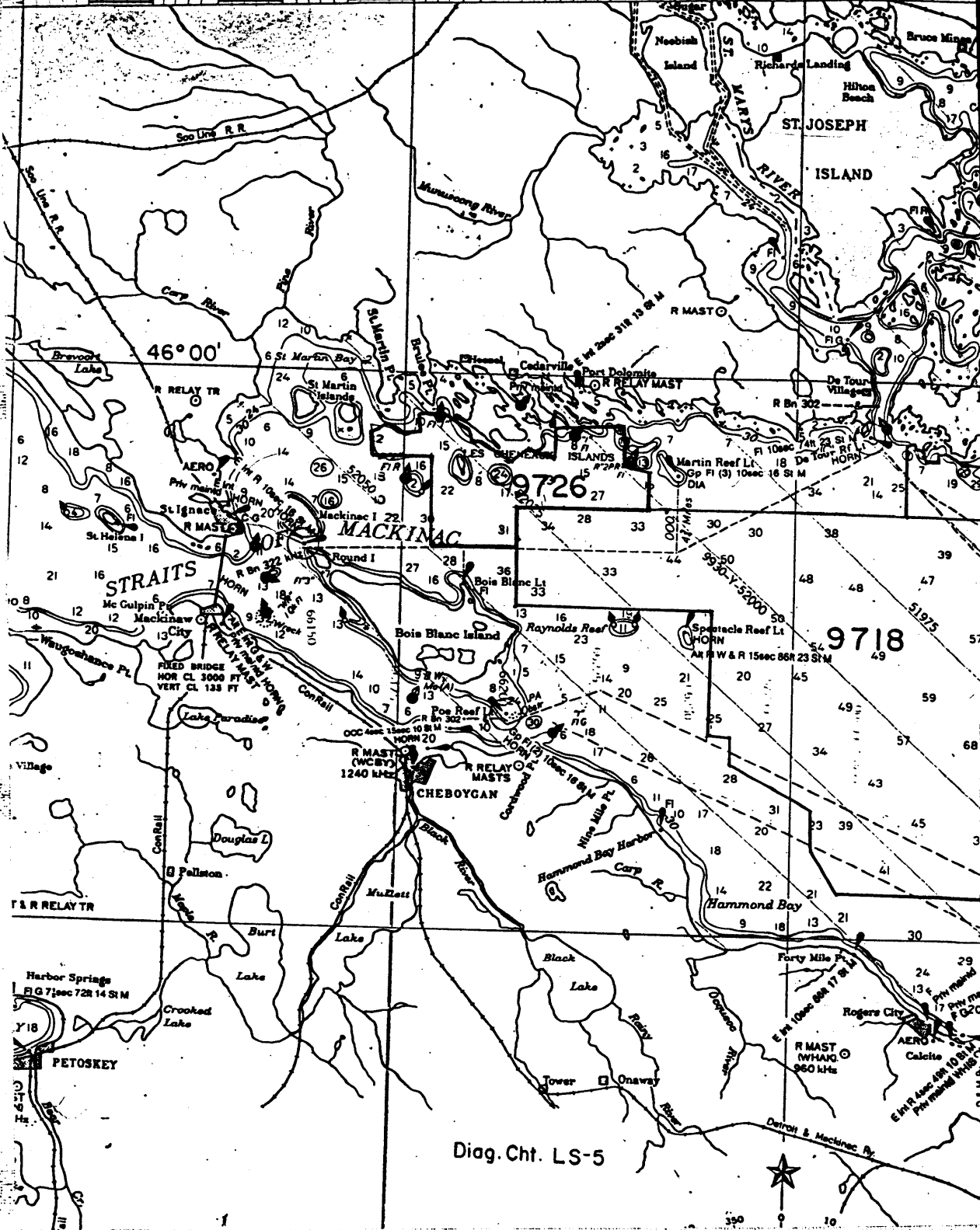
and represents the least depth on a rise trending in a northwest-southeast direction. The 142-foot sounding is recommended to be retained as charted.

5. The junctions on the east with H-9719 (1977) and on the south with H-9718 (1977) are adequate and were addressed in the inspections of those surveys.

The junction on the northeast with 1-2256A (1965-69) is adequate.

Partial butt junctions were effected with 1-2254 (1965-66) on the northwest and 1-2255 (1965-66) in the north central portion of the survey and the area surrounding Goose Island. In the common area the present survey supplemented by several prior soundings supersedes these earlier surveys.

cc:  
C35  
C351



Diag. Cht. LS-5



RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9726

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
<del>14855</del>	8-12-80	J. Briggs	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 4 Quality control survey - Fully applied
14881	10-20-81	E. Bodemann	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 3 Part thru 14885. & part direct
14880	10-20-81	E. Bodemann	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 3 Part applied thru 14881
14860	10-22-81	E. Bodemann	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 5 Part applied thru 14880
<del>14881</del>	10-18-91	J. Church	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 7 thru 14885
<del>14880</del>	10-18-91	J. Church	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 6 thru 14881 and directly from
14860	10-21-91	J. Church	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. 9 thru 14880
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.