H10100

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. PE-20-05-83

Registry No. H-10100

LOCALITY

State Wisconsin

General Locality Lake Superior

Sublocality Bear Island Shoal to Eagle Island

19 83

CHIEF OF PARTY
CDR W.S. Simmons

LIBRARY & ARCHIVES

DATE March 21, 1985

DIAGRAM LS-9

Charts

14966
14973
14960
14961

NOAA FORM 77-28 (11-72)

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

HYDROGRAPHIC TITLE SHEET

REGISTER NO.
H-10100

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.
PE 20-5-83

State WISCONSIN

General locality LAKE SUPERIOR

Locality BEAR ISLAND SHOAL TO EAGLE ISLAND

Scale 1:20,000 Date of survey June 25-August 20, 1983

Instructions dated May 11, 1983 Project No. OPR-Z137-PE-83

Vessel NOAA SHIP PEIRCE S328

Chief of party CDR. W. S. SIMMONS, COMMANDING OFFICER

Surveyed by W. S. Simmons, A. A. Armstrong, G. E. Leigh, R. Mandzi, M. P. Conricote, S. I. Andreeva

Soundings taken by echo sounder, hand lead, pole Ross 5000 Fineline

Graphic record scaled by RM, MPC, SIA, IPR, WRM, TRO, LJS, DLB

Graphic record checked by SIA

Protracted by _____ Automated plot by XYNETICS 2001 PLOTTER (AMC)

Verification by D.V. MASON

Soundings in fathoms feet at MLW MLLW LOW WATER DATUM (IGLD 1955: 600.0 FT.)

REMARKS: All times recorded in this survey are coordinated universal time. All soundings need to be reduced to the low water datum of 600 feet for Lake Superior.

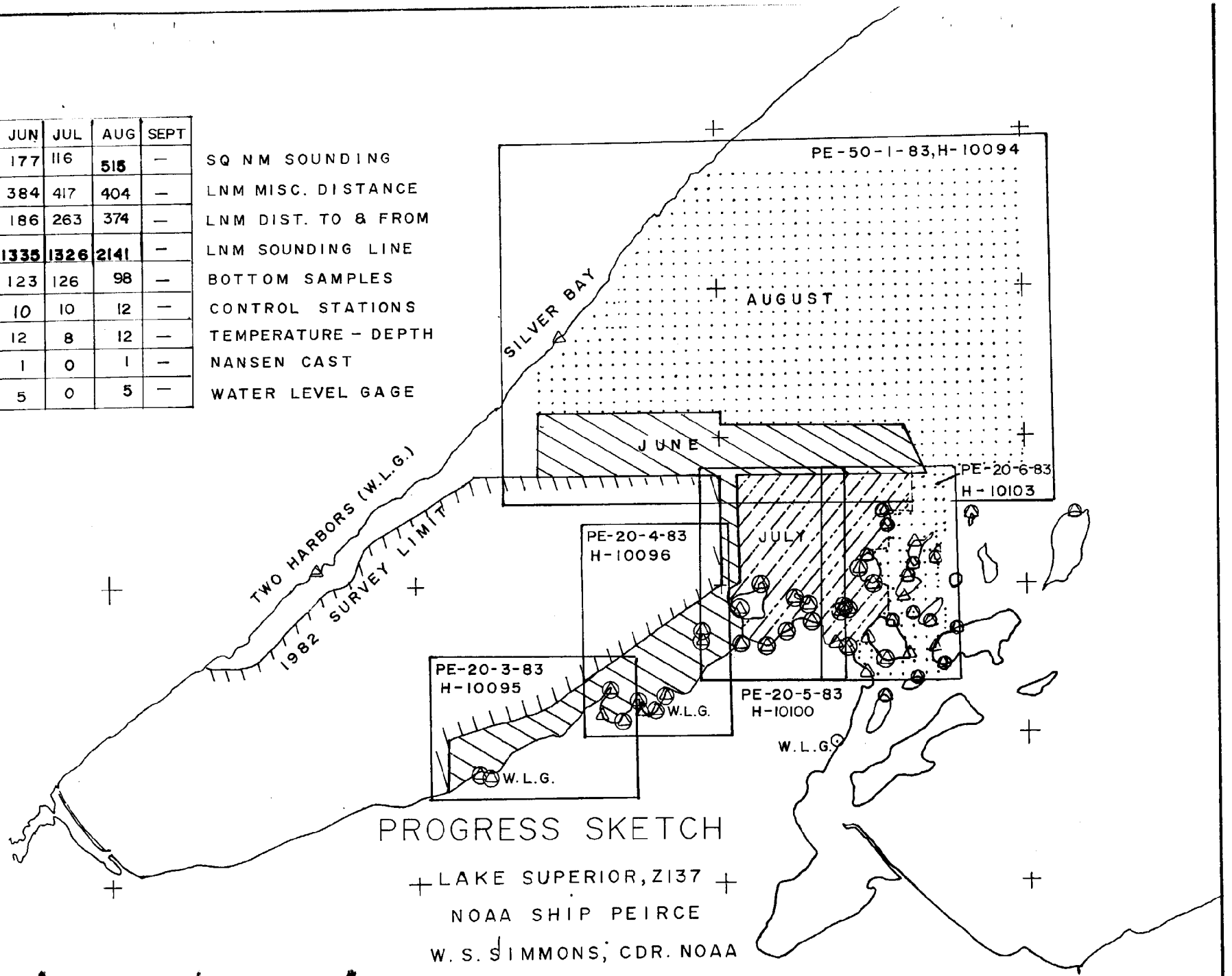
SC 5-6-97 AWOIS and SURF ✓ 5/87 RWD

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

☆ U.S. GPO: 1974-0-768-081/1207

TABLE OF CONTENTS

JUN	JUL	AUG	SEPT	
177	116	515	—	SQ NM SOUNDING
384	417	404	—	LNM MISC. DISTANCE
186	263	374	—	LNM DIST. TO & FROM
1335	1326	2141	—	LNM SOUNDING LINE
123	126	98	—	BOTTOM SAMPLES
10	10	12	—	CONTROL STATIONS
12	8	12	—	TEMPERATURE – DEPTH
1	0	1	—	NANSEN CAST
5	0	5	—	WATER LEVEL GAGE



PROGRESS SKETCH

LAKE SUPERIOR, Z137

NOAA SHIP PEIRCE

W. S. SIMMONS, CDR. NOAA

FROM CHART 14961, SCALE 1:600,000

DESCRIPTIVE REPORT
TO ACCOMPANY
HYDROGRAPHIC SURVEY H-10100
FIELD NUMBER PE 20-5-83
NOAA SHIP PEIRCE

CDR Walter S. Simmons, COMDG

A. PROJECT

Project OPR-Z137-PE-83, Lake Superior, Wisconsin, is a basic hydrographic survey contributing to the formation of a new data base for the maintenance of existing charts and construction of new, reformatted, or reschemed nautical charts. The original project instructions are dated May 11, 1983. Changes No. 1, 2, and 3 are dated May 17, 1983, August 1, 1983, and October 12, 1983, respectively. A letter from the Director, Atlantic Marine Center, dated February 16, 1983, concerning the Pacific Marine Center Mini Ranger OPORDER, and the OPORDER, are contained in the supplemental data folder.

B. AREA SURVEYED

The area surveyed extended westward from Bear Island Shoal to near Eagle Island - Longitudes 90°49'00"W - 91°00'54"W, and northward from the south shore of Lake Superior to Latitude 47°07'24"N. This area encompassed two of the Apostle Islands - Sand Island and York Island.

The shoreline topography varied from sandy beaches in coves and low relief areas, to gravel beaches with rocks offshore, to bluffs with eroding tree-lined banks, to rocky ledges where the water remained deep to the shoreline.

This survey was conducted from June 25, 1983, (JD176) to August 20, 1983, (JD232) inclusively.

C. SOUNDING VESSEL

Soundings were obtained by PEIRCE, EDP NO. ~~3280~~ 2830, and two "Jensen" Type I aluminum survey launches, EDP NO.'s ~~3281~~ 2831 (1009) and 3282 2832 (1017).

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

The following Ross 5000 Fineline echo sounders were used to obtain soundings:

VESNO	ECHO SOUNDER	DATES USED (JD)
~~3280~~ 2830	1079	181-205
~~3281~~ 2831	1078	192-232
~~3282~~ 2832	1087	176-207

Depths ranged from 2-486 feet. On JD 195, VESNO ~~3281~~ 2831 used a Klein Hydroscan Graphic Recorder, S/N 088, and Towfish, S/N 115M, in conjunction with the ROSS echo sounder in approximately 20-40 feet of water to locate the charted wreck "Sevona". The wreck was found; see Section L.

All sounding equipment functioned properly during the survey. The echo sounder initial trace was kept at 0.0 feet. Any drift of the initial and/or phase checks was adjusted either on-line or during scanning.

CTD and XBT data were used to determine velocity correctors. Surface XBT temperature values read 12°C higher than simultaneous CTD, nansen, and bucket thermometer readings between JD 176 and JD 190. Surface temperature values were assigned to the XBT data by linearly interpolating between consecutive CTD casts. Both CTD and XBT data were processed through program RK 530. Casts were grouped such that no sounding would be in error exceeding 0.25% of the depth. Graphs of meaned velocity correctors versus corresponding depths were plotted and the velocity tables scaled at 0.2 foot increments for depths 0-120 feet, and 1.0 foot for depths 120-660 feet.

Bar checks were taken twice daily, weather conditions permitting. Bar check data was grouped in accordance with the velocity cast groupings and the velocity curves compared. Overall, the bar check data confirmed the XBT and CTD data. No significant instrument errors were found.

Settlement and squat (S&S) tests for the ship were conducted on June 6, 1983, at the south breakwater pier in Two Harbors, Minnesota, in approximately 90 feet of water. S&S tests for all other vessels used in this survey were conducted on June 1, 1983, at the Army Corps of Engineers pier in Duluth, Minnesota.

Abstracts of Corrections to Echo Soundings, copies of Velocity and TC/TI Tables are included in Appendix D. Bar check, CTD, XBT, Nansen Cast, S&S, and calibration data are included in the supplemental data folder.

The following two instruments were used for velocity determinations:

INSTRUMENT	S/N	DATE OF CALIBRATION
MARTEK CTD Model 167	177	Feb. 83
XBT Model MK2A-1	781209	Nov. 81

The following table lists the dates and positions of the stations observed for velocity corrections:

JULIAN DAY	POSITION	TYPE OF CAST
157	47°06'24"N 91°21'18"W	NANSEN
176	46°58'48"N 91°02'48"W	XBT #7
179	46°52'06"N 91°06'36"W	XBT #8
180	47°06'48"N 91°00'54"W	XBT #9
181	47°06'48"N 91°00'54"W	XBT #10
187	47°07'18"N 90°59'12"W	XBT #11

JULIAN DAY	POSITION	TYPE OF CAST
190	46°57'12"N 90°58'42"W	CTD #2
194	46°57'18"N 90°53'36"W	CTD #3
195	47°07'30"N 90°52'00"W	XBT #12
199	47°07'00"N 90°50'00"W	XBT #13
204	47°05'00"N 90°49'00"W	CTD #4
205	46°59'36"N 90°58'51"W	XBT #14
207	46°56'00"N 90°47'00"W	CTD #5
216	46°57'42"N 90°42'06"W	CTD #6
218	47°01'48"N 90°43'48"W	CTD #7
221	46°58'12"N 90°41'12"W	CTD #8
227	46°54'00"N 90°39'08"W	XBT #16
230	47°07'12"N 90°38'00"W	CTD #9
232	47°07'00"N 90°38'00"W	CTD #10

The next table summarizes the grouping of the casts:

VESNO	CAST #*	DATES COVERED	VELOCITY TABLE NO.	VEL. CORR. GRAPH
~~3281~~ 2831	M2	192	39	H
~~3281~~ 〃	M3,X12	194-195	40	I
~~3281~~ 〃	X13	200-201	41	AA
~~3281~~ 〃	M4	202-204	42	O
~~3281~~ 〃	M9,M10,X17	229-233	43	U
~~3282~~ 2832	X6,X7,X8	176-179	45	E
~~3282~~ 〃	M2	190-192	46	H
~~3282~~ 〃	M3,X12	194-195	47	I
~~3282~~ 〃	X13	199-201	48	AA
~~3282~~ 〃	M4	202-204	49	O
~~3282~~ 〃	X14	205-206	50	P

VESNO	CAST #*	DATES COVERED	VELOCITY TABLE NO.	VEL. CORR. GRAPH
~~3282~~ 2832	M5	207	51	Q
~~3280~~ 2830	X9,X10	181	52	K
~~3280~~ "	X11	187	53	L
~~3280~~ "	X12	195	54	AB
~~3280~~ "	X13	199-200	55	AC
~~3280~~ "	X14	205	56	W

* M = MARTEK CTD
X = XBT

For some of the XBT launches, the stylus was improperly aligned on the chart paper and the wrong chart paper was used. Both these errors were accounted for when scanning the data.

E. HYDROGRAPHIC SHEETS

Mylar field sheets were prepared onboard PEIRCE via program RK201, Grid, Signal, and Lattice Plot. The survey area was divided into the following three sections at a 1:20,000 scale:

SECTION	SKEW	WIDTH	LENGTH
East	90°	21.5"	52"
West	90°	21.5"	52"
South	19°	21.5"	50"

Enlargements were made of shoal developments and of the charted wreck "Sevona" as follows:

TITLE	SKEW	WIDTH	LENGTH	SCALE
Sand I-Sand Bay Shoal	90°	21.5"	32"	1:5000
York East Dev.	43°	21.5"	34"	1:5000
Sevona Dev.	90°	21.5"	60"	1:1250
Detour-York I Dev.	90°	21.5"	25"	1:5000
NE Sand I Shoal & Sevona Dev.	90°	21.5"	34"	1:5000

Field records will be forwarded to Atlantic Marine Center for verification and compilation of the final smooth sheet.

F. CONTROL STATIONS

The following stations were used to control this survey: signal numbers 117, 121, 122, 128, 129, 130, 131, 133, 134, 135, 136, 137, 146, 147, 176, 177, 178, 180, 181, 190.

All stations except for 146 - AGATE BAY ARGO, 1983, and 147 - SILVER BAY ARGO, 1983, are Third order, Class I accuracy or better, and are based on the North American Datum, 1927. The positioning of the ARGO antenna sites was based on a mixture of two ~~datums~~ NETWORKS - NAD and 1982 Doppler NGS stations. The station occupied has a Doppler adjusted position and the station used for the initial has a NAD 27 position. An adjustment of the entire area should be performed by NGS and the results requested. Refer to the PEIRCE 1983 Lake Superior Horizontal Control Report for further information. Additional information regarding geodetic control for this project is available in the PEIRCE Horizontal Control Report, Lake Superior, 1983. A copy of the survey signal list is included in Appendix F. SEE LETTER DATED JULY 18, 1983, SUBJECT: DOPPLER POINT POSITION RESULTS FOR LAKE SUPERIOR DOPPLER PROJECT APPENDED TO THIS DESCRIPTIVE REPORT.

G. HYDROGRAPHIC POSITION CONTROL

VESNO ~~3280~~ 2830: The positional control system used was the DM-54 Automatic Ranging Grid Overlay (ARGO) transmitting on 1646.7 KHz in the Range-Range mode. Time slots used were 2/7/0/0 with a smoothing code of 02. Data were processed using a pseudo frequency of 1647.22 KHz to account for wave propagation over Lake Superior. This pseudo frequency was verified by calibration at short, intermediate, and long ranges in 1982 and again in 1983.

Fixed shore station AGC values and antenna range tune values were recorded frequently while running hydrography and are included in the supplemental data to this report.

The following table lists the electronic control equipment used by PEIRCE:

UNIT	S/N	J.D.
RPU	R047850	192-231
CDU	C047822	192-231
ALU	A0379109	192-231
Power Supply	V0478108	192-231
Gould Strip Chart Recorder	S118086	192-231
Agate Bay ARGO, 1983		
RPU	R047854	192-231
ALU	A0379116	192-231
Power Supply	V0478108	192-231
Silver Bay ARGO, 1983		
RPU	R0379117	192-231
ALU	A0379123	192-231
Power Supply	V0379122	192-231

UNIT	S/N	J.D.
Devil's Island ARGO, 1983		
RPU	C037940	192-231
ALU	A0980310	192-231
Power Supply	V03789110	192-231

Two types of daily calibrations were performed - the three point sextant fix with check angle and the three range method described in PMC OPORDER, Section S, page 3d. On-line partial correctors were based on the opening calibration and entered into the on-line program RK 112 via the "NAV-CAL" feature. The average of the opening and closing partial correctors was used as the final corrector value for hydrography completed between the times of each opening and closing calibration. On JD 181, a closing calibration was not performed because of an electrical storm. Because of the poor geometry of the available signals in the area, there were no closing calibrations, only whole lane count checks (explanation follows) on JD 195 and JD 199.

FALCON USAGE FOR ARGO CALIBRATION

The FALCON system has many internally stored parameters and care must be taken that the correct values are used. For range-range data acquisition, default values were used as shown on Table 3-5 from the MINI-RANGER FALCON 484 POSITIONING SYSTEM USER'S MANUAL. The "CAL. TABLE" was cleared during all system startups to assure that no correctors were applied via the FALCON system rather than by the normal hydroplot method.

The FALCON system proved to be ideal for ARGO on-line lane checks and for calibration throughout the work area. Lane checks could be accomplished on-line whenever 2-4 ranges were being received. Calibrations were performed simply by stopping the ship anywhere in the work area where four ranges could be received and where geometry of the fix was adequate. This calibration capability saved a considerable amount of ship time running to and from calibration areas. The procedures follow:

A. Procedures common to LANE CHECK and CALIBRATION (and parameters different from FALCON default values):

1. Enter baseline correctors for each code to be used.
2. Enter SITE NO; CODE; X, Y, & Z COORDINATES for each reference station location.
3. Require "RANGE WITH X-Y".
4. Require "PLANE" ranges.
5. Enter "INITIAL POSITION ESTIMATE". (Not required but reduces chance of erroneous solution).
6. Require "RANGE WITH X-Y" screen or "POSITION STATISTICS" screen (which contains range residuals and X-Y).

B. Lane Check Procedure:

After watching for consistency (no "fliers"), adequate signal strength (15+, depending on baseline calibration) and low residuals

MINI-RANGER Falcon 484 POSITIONING SYSTEM

TABLE 3-5 FALCON 484 PARAMETER DATA

PARAMETER	MINIMUM VALUE	MAXIMUM VALUE	DEFAULT VALUE	UNITS
* SYSTEM UNITS	-	-	METERS	-
* R/T SELECTION	-	-	R/T 1 ONLY	-
TIME	00:00:00	23:59:59	00:00:00	HR:MN:SS
* ALTITUDE	0	999999	0	SYSTEM
* REFRACTIVE INDEX	0	.600	320	-
* GRID CORRECTION	0.800000	1.099999	1.000000	-
* ACQUIRE TIME	2	35	35	mS
* MAX. RANGE VELOCITY	0	300/99	16	SYSTEM/SEC
* H1	0	99.9999	0.4422	-
* H2	0	99.9999	0.2794	-
* POSITION TOLERANCE	0	9999	14	SYSTEM
* SITE NUMBER	1	16	-	-
* CODE	0	47	-	-
* X COORDINATE	-9999999	9999999	0	SYSTEM
* Y COORDINATE	-9999999	9999999	0	SYSTEM
* Z COORDINATE	-99999	99999	0	SYSTEM
* R/T 1 CAL.	-200/-60	200/60	0.0	SYSTEM (FT/M,Y)
* R/T 2 CAL.	-200/-60	200/60	0.0	SYSTEM (FT/M,Y)
UPDATE TYPE	-	-	AUTO	-
UPDATE RATE	0.2	99.0	1.0	SECONDS
EVENT TYPE	-	-	NONE	-
EVENT NUMBER	0	9999	0	-
EVENT RATIO	1	99	1	UPDATES/EVENT
MODE	-	-	RANGE ONLY	-
SAMPLE	-	-	AVERAGE	-
OUTPUT	-	-	SLANT RANGE	-
INITIAL X	-9999999	9999999	0	SYSTEM
INITIAL Y	-9999999	9999999	0	SYSTEM
RESIDUAL ALARM	1	99999	27/9	SYSTEM (FT/M,Y)
ECR/SSR ALARM	1	99999	27/8	SYSTEM (FT/M,Y)

* These data are stored in non-volatile memory and are retained after power turn-off.

(usually less than 5 meters) simultaneously freeze FALCON screen and key "X" on Hydroplot TTY. This was done frequently on-line. Typical differences were 0-8 meters in X and Y, thus immediately confirming lanes. This was recorded on the master printout.

C. Calibration Procedure:

1. Ship dead in water.
2. Simultaneously freeze FALCON screen and key "X" on TTY, as above.
3. Use program RK300 to convert FALCON least squares X-Y position to ARGO lanes.
4. By substraction of lanes, determine lanes to be set in ARGO via delta lane feature and/or partial lane correctors to be entered on-line as "NAV CAL" values in hydroplot programs. These partial correctors were also the final electronic correctors applied to the corrector tape.

VESNO 2531 ~~3281~~

Range-range control was used, utilizing both the ARGO and FALCON MR systems (the FALCON system was used once, on JD 232, for positional control). The launch was equipped with the following equipment:

UNIT	S/N	DATES USED
RPU	R047859	192-231
CDU	C047821	192-231
ALU	A047859	192-231
Gould Strip Chart Recorder	S097948	192-231
FALCON CONSOLE	D0019	232
RT	D2123	232
Reference Stations		
Code 3	C2075	232
Code 5	C2067	232

ARGO shore station equipment is the same as listed for PEIRCE earlier in this section. Calibrations were performed by the fixed point method. The launch was positioned alongside a station (offsets were determined by steel tape measurements) and ten range readings were recorded from each reference station.

Distances between horizontal control stations had been previously determined by geodetic computations via program RK407, GEODETIC INVERSE/DIRECT COMPUTATION 9/25/78. No calibration was performed on JD 204 because of rough weather in the morning making it impossible to come alongside a station. The afternoon calibration was not possible because of an ARGO breakdown. The launch was positioned as close to the calibration site as possible and whole lanes were set based on the previous day's calibration. Partial corrector values from JD202 were used. On-line and off-line application of partial correctors was the same as for PEIRCE.

VESNO ~~3282~~ 2832

Sounding position control was by Range/Range MiniRanger. In addition, on JD199 and JD202, Range/Azimuth control was used. The survey began using the MiniRanger III system. This was replaced by the new Falcon system starting with JD190.

Baseline correctors were used both on and off-line. Critical system checks by fixed point calibrations (same as for VESNO 3281) were performed daily except on JD's 178 and 200 when the three range method was used. A long run to a daily system check location precluded obtaining a closing check on JD 205 (as allowed per PMC OPORDER Change No. 3-83, page M-6, June 15, 1983).

The following table lists the electronic control equipment used by Launch 3282:

UNIT	S/N	DATES USED
MR III Console	824118	176-179
RT	C2096	176-207
Falcon Console	D0018	190-207
Reference Stations		
Code 1	C2058	176-207
Code 2	C2059	176-207
Code 3	C2075	176-207
Code 4	C2065	176-207
Code 5	C2067	176-207
Code 6	C2091	176-207

BASELINE CALIBRATIONS

MiniRanger baseline calibrations were conducted in accordance with PMC OPORDER, Appendices M & S: MiniRanger III Calibration on the following dates: May 31, June 13, June 17, June 20, July 1, July 5, and September 2, 1983. All calibrations were performed at the Duluth Corps of Engineers Vessel Yard with the exception of the June 13 calibration which was done at Cornucopia, Wisconsin. All data pertaining to the calibration is included in the MiniRanger Electronic Corrector Report.

A copy of the Abstract of Corrections to Electronic Position Control is included in Appendix E.

H. SHORELINE SEE SECTION 2.0 OF THE EVALUATION REPORT

The shoreline was drawn from 1:20,000 scale enlargements of U.S.G.S. 1:24,000 Quadrangles revised with 1980 NANCI source material. The actual shoreline was carefully compared to that drawn on the field sheet and no discrepancies were found. The shoreline depicted on the revised quadrangle enlargements should be used for ~~charting~~ purposes only.
ORIENTATION

I. CROSSLINES

Sixty-two miles of crosslines were run constituting nine percent of the mainscheme sounding line mileage. Agreement with the mainscheme was excellent, as per the criterion for comparison as stated in Section 1.1.2, Part B.11.2 of the Hydrographic Manual.

J. JUNCTIONS SEE SECTION D OF THE EVALUATION REPORT.

Junctioning was accomplished with the following four surveys:

REGISTRY NO.	SCALE	YEAR SURVEYED
H-10036	1:50,000	1982
H-10094	1:50,000	1983
H-10096	1:20,000	1983
H-10103	1:20,000	1983

The criterion for comparison in Section 1.1.2, Part B.11.1 of the Hydrographic Manual was met for all four surveys.

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K. COMPARISON WITH PRIOR SURVEYS *See also section 6 of the Evaluation Report.*

The following two assigned PSR items from the NOS Automated Wreck and Obstruction Information System printout of May 11, 1983, were investigated:

PSR ITEM NO.	POSITION	LEAST DEPTH	POS. NO.	INVESTIGATING METHOD	RECOMMENDED DISPOSITION
2390	47°00'~~27~~ 29"N 90°54'~~12~~ 07"W	~~17~~ 5 Ft.	9001-9045 3700-3761	Densification of sounding lines; diver search; side scan sonar search	Remove submerged dangerous wreck symbol. Chart a new symbol over which the depth is known at the same position, showing a least depth of ~~17~~ 15 feet ✓ Revise
2998	46°59'00"N 90°56'00"W	-	-	Visual Search	Delete from chart ✓ Delete

PSR ITEM 2390 - SEVONA *See Section 7.a. 2) of the Evaluation Report.*

The Steamer "Sevona" was a 372 foot steel construction ore carrier which went aground on Sand Island Shoal in approximately 30 feet of water. It broke into two sections almost immediately. The source of this charted item is not known but a copy of an article from the July 17, 1909, Duluth News Tribune giving a detailed account of the history of the SEVONA is included in the supplemental data folder. A side scan record copy is included here.

A diver search was also made at the charted location. ~~The least~~ A depth found was 18.4 feet, using a measured line.

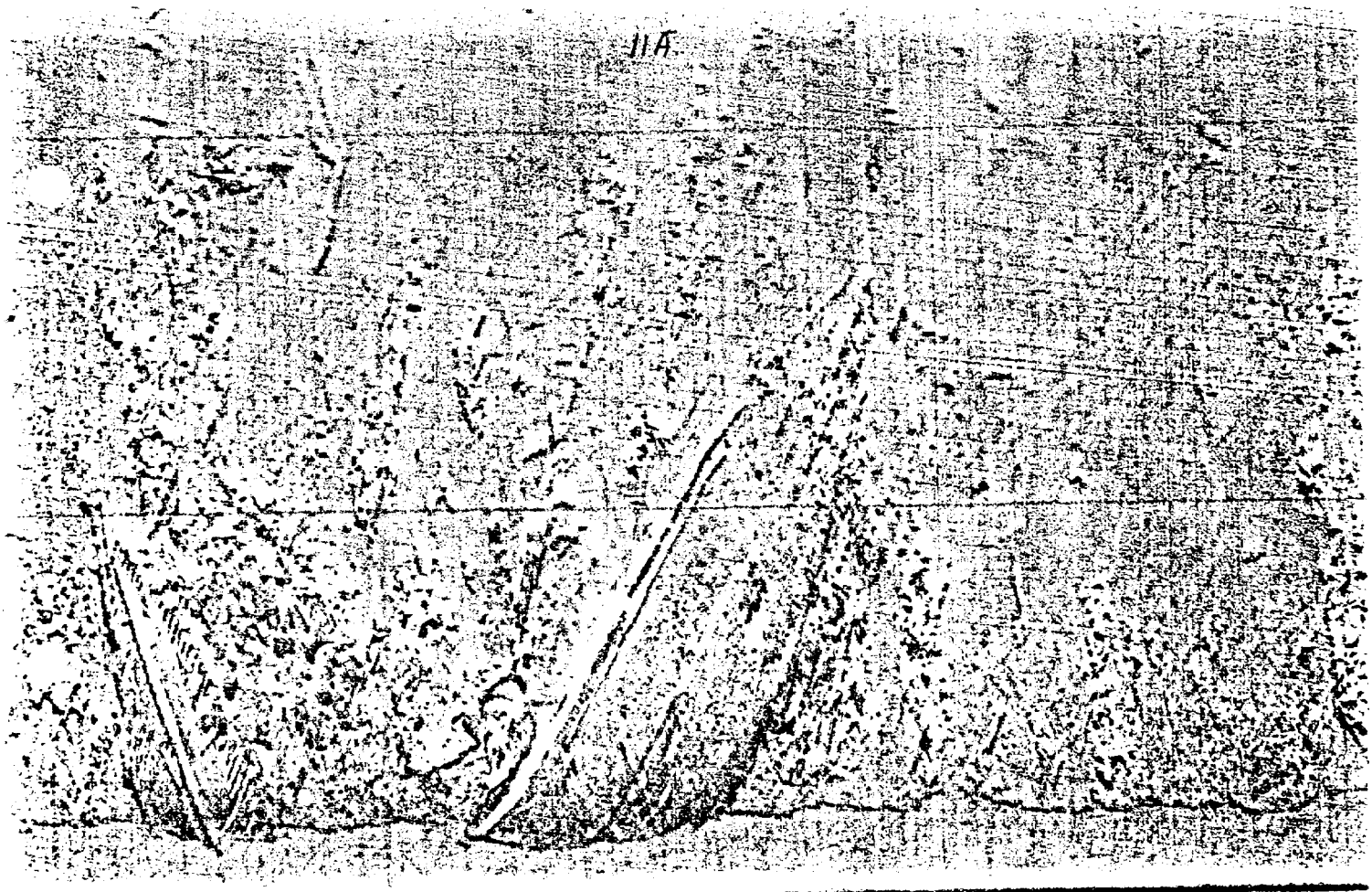
Debris is scattered over a large area some of which was not covered by the divers. This might account for the 1.4 foot discrepancy in the least depth between the measured line depth and echogram depth. A dive report is included in Appendix J.

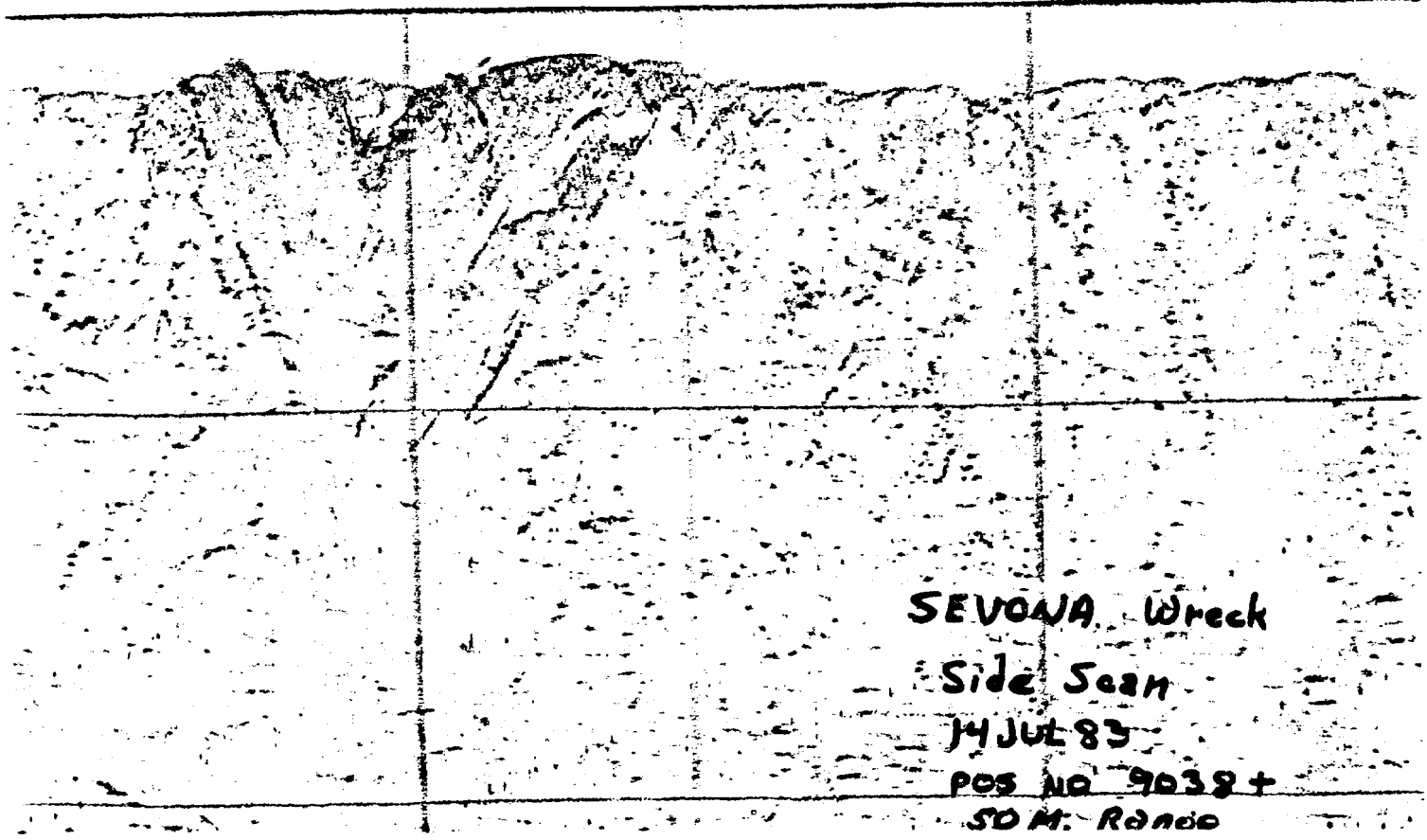
Its present configuration can be clearly seen in the Side Scan Sonargram trace included in the data package and is confirmed by the echogram trace.

Sounding line spacing was reduced to 5m intervals once the wreck was located. Lines were run along the axis of the hull configuration. A least depth of ~~17~~ 15 feet was located at ~~several points along the wreck~~ Latitude 47°00'28.9"N, Longitude 90°54'06.7"W.

PSR ITEM 2998 - UNKNOWN WRECK *See also section 7.a. 3) of Evaluation Report.*

A visual search was made on two separate occasions both by the Captain and the Field Operations Officer for this unknown wreck located in the approximate position 46°59'N, 90°56'W in approximately two feet of water.





SEVONA Wreck
Side Scan
14 JUL 83
POS NO 9038+
50 M. Range

The bottom was clearly visible revealing a sandy bottom and many large rocks in the area. No signs of a wreck were found.

Remove the charted submerged dangerous wreck symbol, PA, at 46°59'00"N, 90°55'57"W, and delete all references to this wreck from all affected charts. Concur

Comparisons were made with the following prior surveys:

REGISTRY NO.	SCALE	YEAR SURVEYED
LS-457	1:120,000	1869
LS-961	1:10,000	1902
961 TA	1:10,000	1902
961 TB	1:10,000	1902
LS-962	1:10,000	1902
LS-963	1:10,000	1902
963 T	1:10,000	1902
LS-1490	1:20,000	1927
LS-1994	1:120,000	1956

LS-457

This old prior survey covered the entire sheet although soundings were not run between the islands. Due to the lack of a coordinate grid only a general comparison was made, with fair results. See Section L. of Evaluation Report.

LS-961

This is the old Chart No. 19 covering York Island Shoals and Bear Island Shoal south to Point Detour and from west of York Island eastward to the western side of Raspberry Island.

Soundings over both shoals are consistently deeper by 2-3 feet in the current survey. There is no evidence of the 13 foot least depth on Bear Island Shoal. The shoalest spot on the current survey is ~~16~~ 15 feet.

The shoal has retained the same shape overall with the shoalest spots being at the same sites.

York Island Shoals has also remained the same but again current soundings are generally 3 feet deeper except between 47°02'N - 47°03'N latitudes where the current soundings are 0-3 feet shoaler.

Approximately 20% of the soundings exceed the criterion for comparison by 1-2 feet. There are no appreciable changes in the depth contours. The shoreline at the narrow section of York Island appears to have receded slightly.

The following soundings differed by more than 3 feet:

PRIOR SOUNDING	POSITION	CURRENT SOUNDING	RECOMMENDED CHARTING ACTION
63	47°01'57"N 90°53'09"W	74	DELETE
19	46°57'24"N 90°49'51"W	45	RETAIN
13	46°58'57"N 90°50'54"W	20	RETAIN
60	47°01'54"N 90°53'08"W	70	DELETE

LS-962

This prior survey covers the area between Sand Island and the south shore of the mainland. Prior depths are from 0-5 feet shoaler at all depths. The 4 foot prior shoalest spot between Sand Island and Sand River has disappeared, the current depth at that location being 8 feet. The shoalest depth found overall was 7 feet. A small 4 foot shoal spot at 46°57'39"N, 90°57'W is also gone, the contemporary depth being 10 feet. The most significant change has been in the shoal area between the south tip of Sand Island and Sand Bay. The 3-4 foot shoal spots at 46°57'30"N, 90°56'06"W have deepened to ~~8-10~~ feet. The rest of the contours follow the same general outline.

LS-963

This was originally Chart No. 21 depicting all of Sand Island, except for the southern shore, and Sand Island Shoals. The general trends are the same as for survey LS-962 with the prior depths being from 0-5 feet shoaler at all depths. Approximately 50% of the soundings exceeded the stated criterion for comparison by 1-2 feet. Two soundings near 47°01'33"N, 90°55'45"W were significantly different, the prior depth being 152 feet and 110 feet and the current soundings in the area ranging from 128-136 feet.

LS-963 T

This is a portion of Prior Survey LS-963 covering the Sand Island Shoals area. All soundings are the same.

LS-1490

This prior survey covers the area west and south of Sand Island. Again the current soundings are on the average 3 feet deeper but there is a larger percentage of soundings that are 5 feet deeper than on the other prior

surveys. Two soundings were more than 5 feet different:

PRIOR SOUNDING	POSITION	CURRENT DEPTH
84	46°59'06"N 90°59'48"N	12 ✓
66*	46°56'36"N 90°59'30"W	76 ✓

*The sounding with an asterisk was investigated with two lines of 100m splits, pos 2191-2196, the current depth in the area being 72-78'.

LS-1994

This prior survey covers the area north of Sand Island. Prior soundings are generally 10-15 feet deeper than the current soundings.

The following two soundings exceeded the depth difference by over 10%:

PRIOR SOUNDING	POSITION	CURRENT SOUNDING
86	47°00'54"N 90°54'18"W	56 NOT AT THIS LOCATION
306	47°03'18"N 91°00'36"W	345 ✓

The major features on the sheet have not changed appreciably. Only a few isolated soundings and the shoalest depths on the shoals have changed. Recommend that the current survey soundings supersede all prior survey soundings except where noted otherwise. SEE ALSO SECTION 6 OF THE EVALUATION REPORT

L. COMPARISON WITH THE CHART

The survey area was covered by two NOS charts: Chart 14966, 19th ed., January 15, 1983, 1:120,000 scale and Chart 14973, 24th ed., January 19, 1980. The comparison was made with Chart 14973, it being the larger scale chart. Seventy percent of the charted soundings (310) met the suggested criterion for comparison as stated in Section 1.1.2 Part B.11.1 of the Hydrographic Manual. Twenty-three percent exceeded the criterion by 1-5 feet. The rest (7%) are listed below:

CHARTED DEPTH	POSITION	CURRENT DEPTHS	RECOMMENDED CHARTING ACTION
151	47°01'30"N, 90°55'42"W	124-128	DELETE
97* (The 97 ft. sounding does not appear on Chart 14966)	47°01'12"N, 90°57'34"W	150-165	one 200m split DELETE p 6916-6919
390	47°03'51"N, 91°00'33"W	360-370	DELETE
336	47°03'33"N, 90°59'27"W	305-315	DELETE
223*	47°03'54"N, 90°58'00"W	260-275	two 200m splits DELETE 6923-6928
247	47°03'40"N, 90°56'56"W	225-235	DELETE
372	47°04'38"N, 90°59'00"W	345-355	DELETE
271* (The 271 ft. sounding is on Chart 14966)	47°04'57"N, 90°58'12"W	336-345	one 200m split DELETE 6928-6930
391*	47°05'02"N, 91°00'36"W	413-418	one 200m split DELETE 6891-6893
319*	47°05'02"N, 90°59'21"W	372-382	one 200m split DELETE 6909-6911
384	47°05'54"N, 90°57'36"W	360-370	DELETE
450	47°06'03"N, 91°00'20"W	430-440	DELETE
451*	47°06'48"N, 91°00'33"W	460-465	two 200m splits DELETE 6895-6903
432	47°06'34"N, 90°58'18"W	409-413	DELETE
372	47°06'39"N, 90°56'06"W	346-355	DELETE
462	47°07'15"N, 90°58'48"W	440-450	DELETE
301*	47°07'15"N, 90°55'42"W	360-370	one 200m split DELETE 6934-6936
61*	47°01'57"N, 90°52'51"W	73-75 (62' sndg. 11mm to SSW)	four 200m splits DELETE 6764-6782
109*	47°05'21"N, 90°52'09"W	159-166	one 200m split DELETE 6589-6591
169	47°05'36"N, 90°51'24"W	150-160	DELETE
145	47°05'36"N, 90°49'30"W	130-135	DELETE
205	47°06'27"N, 90°52'06"W	180-190	DELETE
289	47°07'21"N, 90°52'48"W	250-270	DELETE

CONCUR WITH HYDROGRAPHER UNLESS OTHERWISE NOTED

CHARTED DEPTH	POSITION	CURRENT DEPTHS	RECOMMENDED CHARTING ACTION
4	46°56'08"N, 90°55'36"W (This 4 ft. sounding does appear on prior 962)	8-10	RETAIN CONCUR, 3Ft ON LS-962
66	46°56'24"N, 90°59'30"W	74-78	DELETE
7	46°56'18"N, 90°56'21"W	~~12-13~~ 9-10	~~RETAIN~~ DELETE
21¢	46°57'54"N, 90°58'33"W (This 21 ft. sounding does NOT appear on prior 962) SOURCE IS LS-1490 (1927)	30-40	~~RETAIN~~ DELETE
5¢	46°57'39"N, 90°57'00"W	8-10	RETAIN
7	46°57'06"N, 90°56'06"W	10-14	DELETE
20¢	46°57'24"N, 90°49'49"W	30-50	RETAIN
73	46°59'54"N, 90°53'36"W	82-85	DELETE
115*	47°01'21"N, 90°56'18"W (The contours are disproven and 15mm to the SE is a 114 sounding)	125-135	DELETE

¢The isolated sounding may exist but the charted contours are disproven.

*The soundings marked with an asterisk were picked for investigation and and sounding line spacing reduced by half to resolve the significant discrepancies in depths. No trace was found of the prior survey depths and all splits agreed with mainscheme soundings. Prior soundings that were shoaler than the survey soundings were carefully examined as to their location, and the general depths and trends around them and a charting recommendation made.

Next follow some observations of the changes in the depth contours:

The six foot curve along the south shore of Sand Island does not extend southward as much but instead parallels the shoreline. The north-south sand bar, consisting of 5+ sand waves, running between the southeast tip of Sand Island and Sand Bay has deepened.

The charted shoal depths of 3 to 5 feet are now 7-9 feet. The sand waves are clearly visible on aerial photographs as are currents throughout the islands.

The 18 foot curve around the NW side of Sand Island has moved closer inshore to parallel the shoreline.

The least depth on Bear Island shoal is ~~16~~ 15 feet.

The least depth on York Island Shoal is ~~19~~ 15 feet. The 18 foot charted spots on this shoal are now 22 feet or deeper.

The submerged dangerous wreck SEVONA (PSR No. 2390) was investigated by both a side scan search and a diver investigation. See Section K and Appendix J for further information. SEE ALSO SECTION 7 OF THE EVALUATION REPORT.

The following shoals were investigated by reducing the sounding line spacing:

NAME	JD/POSITIONS USED	LEAST DEPTH
SAND I.-SAND BAY SHOAL	190/2250-2319 194/2468-2476 195/2542-2576 195/2621-2624 202/3027-3128 202/3130-3222	~~6~~ 4
DETOUR-YORK I.	200/2822-2836 200/2838-2856 201/2941-3008 203/3234-3264 203/3266-3268 203/3309-3326	~~18~~ 16 feet
NE SAND I. SHOAL	200/2739-2818 201/354-357 374-382 398-401 404-406 424-432 201/501-504 202/531-547	17 ✓
YORK EAST	200/227-336 201/360-492 202/555-590 204/591-605 204/617-650 204/653-659	19 feet ✓

The following table lists the detached positions taken in this survey:

JD	VESNO	POS. NO.	POSITION	DESCRIPTION
192	~~3281~~ 2831	6	46°59'14"N 90°58'37"W	Rock awash Add
192	3281 "	7	46°59'17"N 90°58'21"W	Rocks awash Add
200	3281 "	295	47°01'35"N 90°51'17"W	Buoy #1 NC
179	~~3282~~ 2832	2210	46°58'20"N 90°58'23"W	Boiler (10ft x 4ft) Add
194	3282 "	2492	46°56'38"N 90°54'34"W	Fish Trap SEE SECTION 7.a.5) OF THE EVALUATION REPORT.

JD	VESNO	POS. NO.	POSITION	DESCRIPTION
200	~~3282~~ 2832	2725	46°58'56"N 90°56'03½"W	Crib Inshore End
200	~~3282~~ "	2726	46°58'55.5"N 90°56'01"W	Crib Offshore End
202	~~3282~~ "	3129	46°56'07"N 90°55'49"W	Log - NC
190	~~3283~~ 2833	-	47°00'51"N 90°54'18"W	Buoy #2 - NC

Add

A detached position (#3129/JD202) was taken on a large log which appeared to be attached to the bottom. It was floating at approximately a 70° angle about a foot below the surface. Its position is temporary and will be removed most likely by either wave action or the ice in the winter time. Recommend that no charting action be taken. CONCUR

Position no's 2725-2726 define the inshore and offshore ends of a crib whose least depth is ~~4~~ 2 feet by leadline. This crib consists of 4 rectangular platforms, 2 abreast composed of logs used for the walls with a pile of rocks inside the log boundary. Recommend charting a submerged crib symbol. COVERED BY 2 FT.
CONCUR. SEE SECTION 7.a.4) OF THE EVALUATION REPORT.

Position 2210 is 20 feet offshore from the remains of a boiler whose dimensions are approximately 10 feet in length, 4 feet high, and ~~barring~~ BARES 1 ~~foot~~ FEET. Because of its proximity to shore and surrounding water depth of 1-2 feet, recommend no charting action be taken because of the scale of the resultant chart. DO NOT CONCUR. RECOMMEND obst (Boiler) BE CHARTED AT LATITUDE 46°58'19.6"N, LONGITUDE 90°58'22.7"W.

Position 295 is the York Island Shoals Lighted Bell Buoy 1 (see Section N).

Position 6 marks a large flat rock awash at the waterline approximately 15m north of the position. Chart with appropriate symbol ~~after water level reduction~~. FOR A ROCK AS SHOWN ON THE SMOOTH SHEET AT LATITUDE 46°59'13.4"N, LONGITUDE 90°58'31.8"W.

Position 7 marks a rock, exposed 1 foot, 15 meters SE of the position. Chart a symbol for a rock ~~which does not cover with a height determined after water level adjustment~~. AS SHOWN ON THE SMOOTH SHEET AT LATITUDE 46°59'17.1"N, LONGITUDE 90°58'21.2"W.

Position 2492 was taken 60-70 feet west of a fish trap. Chart as crib with notation of fish trap. DO NOT CONCUR. SEE SECTION 4.f AND 7.a.5) OF THE EVALUATION REPORT.

The following charted features were investigated:

DESCRIPTION	CHARTED POSITION	POS. NO./JD	RECOMMENDATION
Wreck PA (PSR #2998)	46°59'00"N 90°55'57"W	No Pos. No./190	DELETE FROM CHART CONCUR
Dangerous Wreck SEVONA (PSR #2390)	47°00'27"N 90°54'12"W	9001-9045/195 3700-3761/207	Remove submerged dangerous wreck symbol. Chart a new symbol over which depth is known at the same position showing a least depth of 15 feet. SEE SECTION 7.a.2) OF THE EVALUATION REPORT

DANGERS TO NAVIGATION

Negative Report to Dangers to Navigation

DESCRIPTION	CHARTED POSITION	POS. NO./JD	RECOMMENDATION
Buoy 1	47°01'36"N 90°51'21"W	295/200	RETAIN AS CHARTED ✓
Buoy 2	47°00'51"N 90°54'18"W	No Pos. No./190	CHART AT SURVEYED POSITION DO NO CONCUR SEE SECTION 4.E OF THE EVALUATION REPORT
Rock	46°57'42"N 90°56'03"W	-	RETAIN AS CHARTED ✓

See Section K for further information on PSR Items 2998 and 2390. ✓

See Section N for further details on Buoys 1 and 2. ✓

The charted rock awash at 46°57'42"N, 90°56'03"W was visually sighted at this location but it was not possible to approach it with the launch. Recommend retain as charted. CONCUR

There were no bridges or overhead cables, submarine cables, pipelines, ferry routes, or channels in this survey. ✓

M. ADEQUACY OF SURVEY

This survey is considered complete and adequate to supersede all prior surveys, except as noted.

N. AIDS TO NAVIGATION SEE SECTION 4.e. OF THE EVALUATION REPORT.

There were two floating aids to navigation in this survey, neither of which had an exact geographic position listed in the 1983 Edition of the Great Lakes Light List Volume IV. The York Island Shoals Lighted Bell Buoy 1 is listed as being in 30 feet of water on the west side of the shoals. The surveyed position, 47°01'35"N, 90°51'17"W, agreed with the charted position (Chart 14973, 24th Ed., January 1980). The second floating aid - Sand Island Buoy 2 - is listed as being in 20 feet of water. It was located in the survey at 47°00'42"N, 90°53'37"W (JD190), agreeing only fairly with the chart. Chart as surveyed. A copy of NOAA form 76-40 is included in Appendix I.

O. STATISTICS

CATEGORY	VESNO ~~3280~~ 2830	VESNO ~~3281~~ 2831	VESNO ~~3282~~ 2832	TOTAL
Total No. of Positions	949	755	1715	3419
Nautical Miles of Sounding Lines	331	206	398	935
Square Miles of Hydrography	49	19	26	94
Bottom Samples	61	1	27	89
Water Level Stations				4
Velocity Casts	11	3	5	19

P. MISCELLANEOUS

The survey copy "RIDGE DEVELOPMENT" from survey PE-20-6-83 (H-10103) depicts hydrography within the limits of this survey but which was run and submitted with H10103. The several least depths were transferred to the PE-20-5-83 (H-10100) final field sheet. SEE SMOOTH SHEET FOR FINAL DELINEATION

Q. RECOMMENDATIONS

It is recommended that soundings from this survey supersede all existing charted and prior survey soundings for the common area, except where noted otherwise. SEE ALSO THE EVALUATION REPORT.

No additional field work is required.

R. AUTOMATED DATA PROCESSING

The following programs were used for data acquisition and processing:

PROGRAM NO.		VERSION DATE
RK112	Hyperbolic, R/R Hydroplot	05/11/83
RK116	Range-Azimuth Hydroplot	12/15/82
RK201	Grid, Signal, and Lattice Plot	04/18/81
RK211	Range-Range Non-Real Time Plot	02/02/81
RK216	Range-Azimuth Non-Real Time Plot	02/09/81
RK300	Utility Computations	10/21/80
RK330	Reformat and Data Check	05/04/76
PM360	Electronic Corrector Abstract	02/02/76
RK407	Geodetic Inverse/Direct Computation	09/25/78
RK530	Layer Corrections for Velocity	05/10/76
RK561	H/R Geodetic Calibration	12/01/82
AM602	Elinore -- Line Oriented Editor	12/08/82
RK612	Line Printer List	03/22/78

S. REFERRAL TO REPORTS

The following reports have been submitted separately:

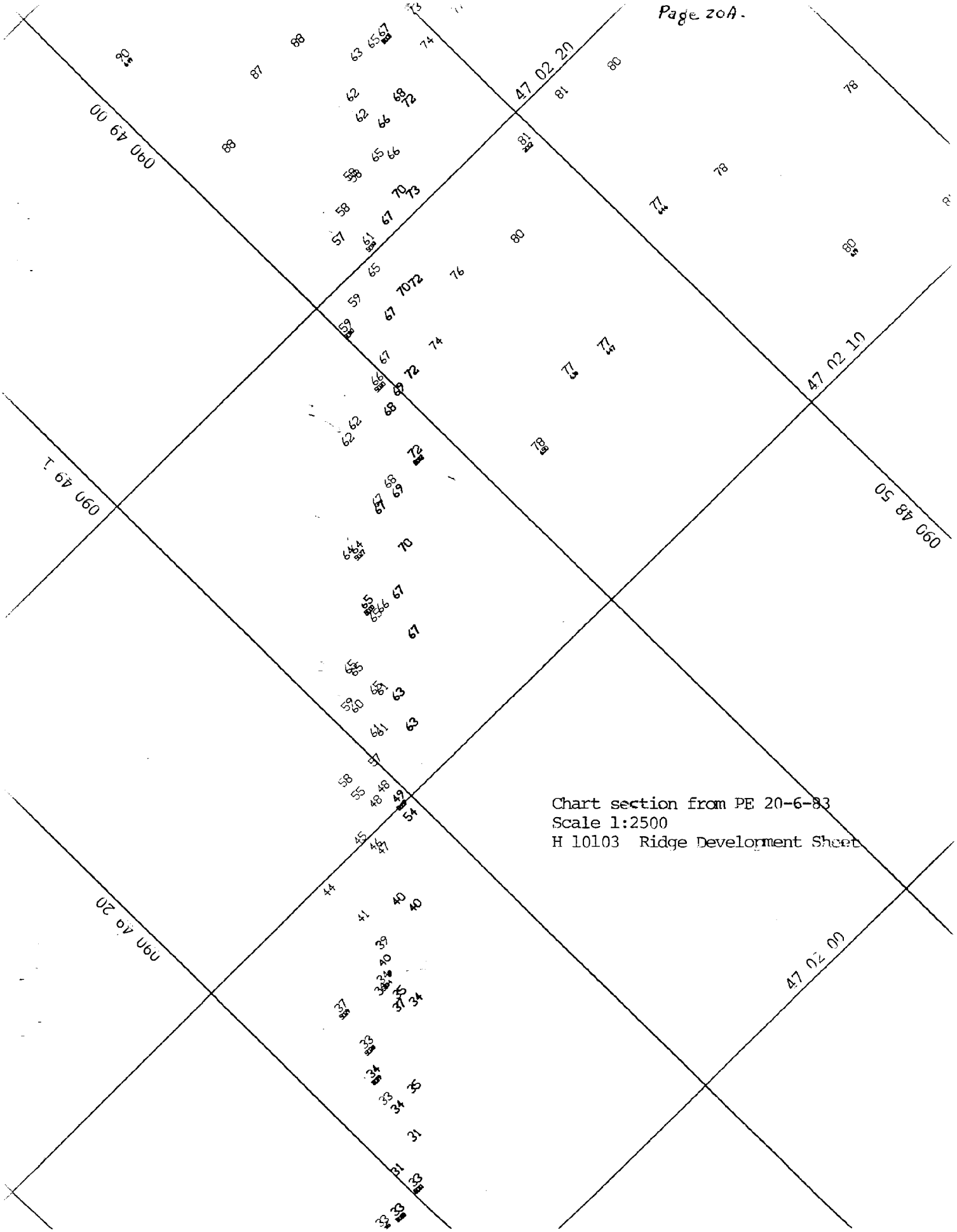


Chart section from PE 20-6-83
Scale 1:2500
H 10103 Ridge Development Sheet

TITLE	SUBMITTED TO	DATE
Coast Pilot Report	Coast Pilot Section Rockville, Maryland	October 1983
Horizontal Control Report	Operations Branch AMC	October 1983
Loran C Comparisons	Operations Branch AMC	July 1983
Geographic Names	Operations Branch AMC	October 1983
MiniRanger Electronic Corrector Report	Operations Branch AMC	October 1983

Respectfully Submitted,

Svetlana I. Andreeva for
ENS, NOAA

APPROVAL SHEET

H-10100

Field work on this survey was conducted under my supervision with frequent personal examination of the field sheet and records. This report and the final sheet have been reviewed and found to represent a complete and adequate survey.

No additional field work is required. This survey should supersede all prior surveys and charted information in the common areas except for the soundings designated as "RETAIN."

Until such time as a new chart is constructed, the geographic position of any information from this survey must be converted to chart datum before application. Horizontal datum for this survey is NAD 1927.

Walter S. Simmons
Commander, NOAA
Commanding Officer
NOAA Ship PEIRCE

APPENDIX F

LIST OF STATIONS

SIGNAL TAPE LISTING

OPR-Z137-PE-83

LAKE SUPERIOR

NAME, YEAR ESTAB./SOURCE

117	5	46	56	28290	091	02	11040	139	0006	000000	GUANO, 1982	AMC[1]
121	7	46	56	34486	090	58	16308	250	0002	000000	SAND POINT, 1982	AMC
122	2	46	58	18795	090	58	19210	250	0009	000000	WEST BAY, 1982	AMC
127	4	47	00	11854	090	56	14738	250	0006	000000	SAND RM 1, 1982	AMC
128	7	47	00	11028	090	56	14810	250	0006	000000	SAND, 1978	NGS[2]
129	0	46	57	45648	090	56	02077	250	0002	000000	SOUTH BAY, 1978	NGS
130	7	46	55	52536	090	55	32552	250	0002	000000	BEACH, 1978	NGS
131	7	46	56	49404	090	53	20123	250	0004	000000	LITTLE, 1978	NGS
133	4	46	59	19918	090	52	42344	250	0003	000000	YORK WEST, 1982	AMC
134	5	46	59	07671	090	51	04158	250	0004	000000	YORK EAST, 1982	AMC
135	4	46	56	45695	091	02	05890	250	0004	000000	EAGLE ISLAND, 1982	AMC
36	5	46	57	30747	090	50	50147	250	0003	000000	ROCK, 1978	NGS
137	4	46	58	13860	090	48	17636	250	0013	000000	RASPBERRY, 1978	NGS
146	0	47	00	48487	091	39	47683	250	0000	164722	AGATE BAY ARGO, 1983	PE[3]
147	0	47	17	08757	091	15	08616	250	0000	164722	SILVER BAY ARGO, 1983	PE
176	6	46	56	34380	090	58	16338	254	0005	000000	SAND POINT MR, 1983	PE
177	7	46	57	34830	090	52	29953	254	0013	000000	CAMP TREE MR, 1983	PE
178	1	46	58	13839	090	48	18026	254	0014	000000	RASPBERRY RM 2, 1978	BOX[4]
180	7	46	58	50449	090	47	43319	250	0002	000000	JENNIFER, 1983	PE
91	6	47	04	46941	090	43	40313	250	0000	164722	DEVILS ISLAND ARGO, 1983	PE
190	2	47	01	25608	090	46	33770	254	0010	000000	BEAR WEST RM 1, 1983	PE

1 AMC: Field position, 1982 AMC Apostle Islands Project Report
2 NGS: Position from NGS Data Base
3 PE ; Field position, 1983 PEIRCE Lake Superior Horizontal Control Report
4 BOX: Position computed from NGS "box score" data

APPENDIX I

LANDMARKS FOR CHARTING

NOAA FORM 76-40 (8-74)

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

NONFLOATING AIDS OR LANDMARKS FOR CHARTS

Replaces C&GS Form 567.

ORIGINATING ACTIVITY
- [X] HYDROGRAPHIC PARTY
- [ ] GEODETIC PARTY
- [ ] PHOTO FIELD PARTY
- [ ] COMPILATION ACTIVITY
- [ ] FINAL REVIEWER
- [ ] QUALITY CONTROL & REVIEW GRP.
- [ ] COAST PILOT BRANCH

(See reverse for responsible personnel)

- [ ] TO BE CHARTED
- [X] TO BE REVISED
- [ ] TO BE DELETED

REPORTING UNIT (Field Party, Ship or Office)	STATE	LOCALITY	DATE
NOAA Ship PEIRCE S-328	Wisconsin	Lake Superior	1 Sep 83

The following objects HAVE [ ] HAVE NOT [ ] been inspected from seaward to determine their value as landmarks.

OPR PROJECT NO.	JOB NUMBER	SURVEY NUMBER	DATUM
OPR-Z137-PE-83		H-10094 H-10095 H-10096 H-10100 H-10103	NAD 1927

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	POSITION LATITUDE ° ′	LATITUDE ″ D.M. Meters	POSITION LONGITUDE ° ′	LONGITUDE ″ D.P. Meters	METHOD AND DATE OF LOCATION (See instructions on reverse side) OFFICE	FIELD	CHARTS AFFECTED
E Pier Lt Fl 4sec 30ft 6 St M	(PORT WING EAST PIER LT, 1983)	46 47	34.73	91 23	10.07	10094	F-2-6-L 6-12-83	14960 14961 14966
East Pier Lt Fl G 2.5sec 20ft 4 St M	(CORNUCOPIA EAST PIER LT, 1982)	46 51	35.11	91 06	16.55	10096	F-2-6-L 8-12-82	14960 14961 14966
Fl 6sec 60ft 7 St M	(SAND IS LH NEW, 1982) (SAND ISLAND LIGHT)	47 00	11.91	90 56	14.72	10100	F-2-6-L 8-12-82	14960 14961 14966 14973
Fl 2.5sec 55ft 7 St M	(RASPBERRY IS LT NEW, 1982) (RASPBERRY ISLAND LIGHT)	46 58	13.20	90 48	17.47	10103	F-3-6-L 8-12-82	14960 14961 14966 14973
Fl 4sec 21ft 6 St M	(LITTLE MANITOU IS LT, 1982)	46 57	40.19	90 41	07.36	10103	F-2-6-L 8-12-82	14960 14961 14966 14973
Fl 2.5sec 55ft 7 St M	(GULL IS LT 1982)	46 54	24.85	90 26	35.16	10095	F-3-6-L 8-12-82	14960 14973 14961 14965 14966
E Int G 25ft Priv maintd	(BAYFIELD MUNC BRKW LT, 1982)	46 48	41.69	90 48	39.96		F-2-6-L 8-12-82	14973
Fl R 4sec 25ft 4 St M	(BAYFIELD N BRKW LT, 1982)	46 48	35.98	90 48	39.33		F-2-6-L 8-12-82	14966 14973
Fl 4sec 25ft 10 St M HORN	(BAYFIELD S BRKW LT, 1982)	46 48	34.62	90 48	41.05		F-2-6-L 8-12-82	14960 14973 14961 14966

No use 1-848(83)

RESPONSIBLE PERSONNEL

TYPE OF ACTION	NAME	ORIGINATOR
OBJECTS INSPECTED FROM SEAWARD	Robert M. Mandzi, LT, NOAA NOAA Ship PEIRCE	☐ PHOTO FIELD PARTY ☒ HYDROGRAPHIC PARTY ☐ GEODETIC PARTY ☐ OTHER *(Specify)*
POSITIONS DETERMINED AND/OR VERIFIED	Robert M. Mandzi, LT, NOAA	FIELD ACTIVITY REPRESENTATIVE
		OFFICE ACTIVITY REPRESENTATIVE
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES		☐ REVIEWER ☐ QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE

INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION'

(Consult Photogrammetric Instructions No. 64,

OFFICE

I. OFFICE IDENTIFIED AND LOCATED OBJECTS
Enter the number and date (including month, day, and year) of the photograph used to identify and locate the object.
EXAMPLE: 75E(C)6042
8-12-75

FIELD

I. NEW POSITION DETERMINED OR VERIFIED
Enter the applicable data by symbols as follows:

F - Field	P - Photogrammetric
L - Located	Vis - Visually
V - Verified	
1 - Triangulation	5 - Field identified
2 - Traverse	6 - Theodolite
3 - Intersection	7 - Planetable
4 - Resection	8 - Sextant

A. Field positions* require entry of method of location and date of field work.
EXAMPLE: F-2-6-L
8-12-75

*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.

FIELD (Cont'd)

B. Photogrammetric field positions** require entry of method of location or verification, date of field work and number of the photograph used to locate or identify the object.
EXAMPLE: P-8-V
8-12-75
74L(C)2982

II. TRIANGULATION STATION RECOVERED
When a landmark or aid which is also a triangulation station is recovered, enter 'Triang. Rec.' with date of recovery.
EXAMPLE: Triang. Rec.
8-12-75

III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH
Enter 'V-Vis.' and date.
EXAMPLE: V-Vis.
8-12-75

**PHOTOGRAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1974-665-073/1030 Region 6

APPENDIX J

DIVE REPORT

Attachment A

DIVE REPORT: SEVONA WRECK /DV _____ DIVE DATE: 13 July 1983

I. AREA OF INVESTIGATION

A. LOCATION - description of geographic region and sub-locality. South side of Lake Superior, between Sand and York Islands.

B. POSITION - latitude and longitude of dive site or center of search and method of obtaining fix. Center of search area obtained from "SHIP WRECK GUIDE OF THE WESTERN HALF OF LAKE SUPERIOR" and a fatho search with MR rates.

C. SURVEY SHEET - Registry No. and Field No.
Z - 137 PE 20-5-83 H - 10100

II. PURPOSE

Information as to the reason for diver investigation, i.e., Pre-Survey Review, development, hydro discrepancy, etc. Pre-Survey # 2390

III. SURVEY PROCEDURE

A. Determination of dive site, i.e., wire drag, side scan, development. Fatho search of area in suspect

B. Search procedure, i.e., following ground wire, circle search, sweep along known feature. Sweep in area of suspect, as indicated by fatho search

C. Reference any known features. none

D. Area and depth covered. Area covered - 500' x 500', depth 22'

IV. DIVE DATA

Provide for each dive the following:

A. Divers Dive Master: ST T.R. Owens 2nd Diver: LT JG M. Conricote
B. Time of dive - real and elapsed (all times recorded in GMT) 2052 - 2120 28 min.
C. Depth (Meaning General Bottom depth of area) 22 ft.
D. Current and conditions No current, temp. 40 degrees F.
E. Visibility 10 - 12 ft.
F. Detached Position Number and Method or Type Control No DP, Mini Ranger rates from four (4) stations (see below)

1. Time of detached position (GMT) 2120

2. Least depth, and method of determining (the raw sounding should be recorded the reduced least depth should be plotted on the field sheet)

Least depth determined using measured line - 18.4 ft. 2120 UTC 13 July 1983

STATION NAME	SIGNAL TAPE #	MR CODE #	RATES
BEACH	130	2	8696
YORK WEST	133	3	2831
LITTLE	131	4	6851
SAND RM 1	127	5	2652

LATITUDE: 47 00 28.50790
LONGITUDE: 90 54 11.62932

V. RESULTS

A. Description as to what was found, its nature, dimensions, reduced least depths, and how determined, identifiable marks or features, overall size of area that may be effected. (Wreckage scattered over 30 meter circle or whatever).

B. Sketch if applicable.

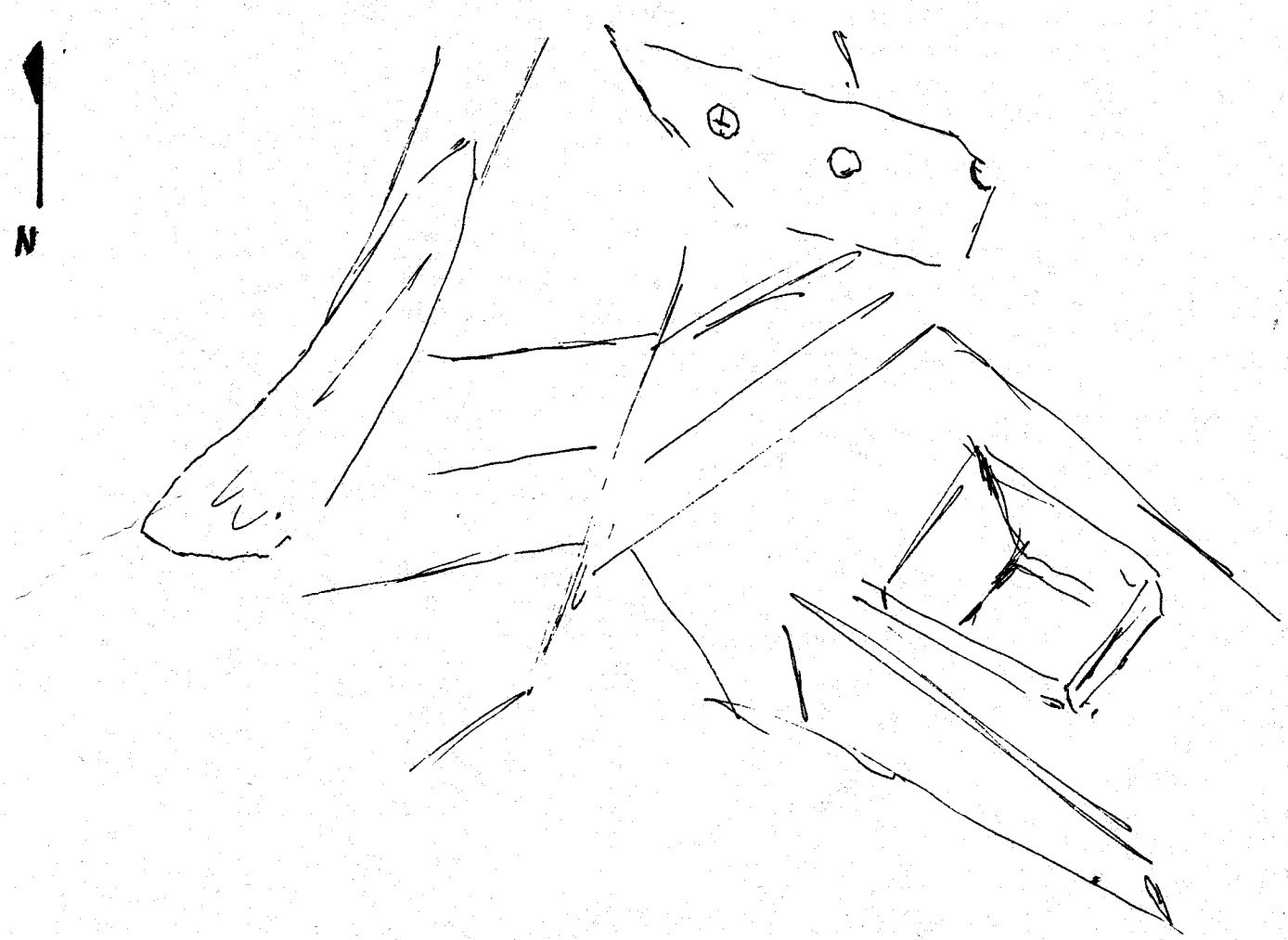
VI. RECOMMENDATIONS

Based on in situ investigation, what appropriate charting action should be recommended to operations officer.

Based on diver investigation it is recommended that the wreck remain on the chart located at the position found during the investigation as center of the wreck area.

It should be noted that the wreck does cover a large area and other parts may be scattered about near by.

A steel hull vessel was found appearing to be broken in several sections and on its side. Steel beams and girders are visible. No identifiable marks or features decernable. The wreck is scattered over an area 500 x 500 feet.



(2)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
~~NATIONAL OCEAN SURVEY~~
Rockville, Md. 20852
NATIONAL OCEAN SERVICE
CHARTING AND GEODETIC SERVICES N/CG142:LDH

July 18, 1983

TO: Cdr. Paul M. Duernberger
Chief, Operations Branch
ATTN: N/MOA11
Atlantic Marine Center
National Ocean Service, NOAA
439 W. York Street
Norfolk, Virginia 23510

FROM: N/CG142 - Larry D. Hothem L.D. Hothem

SUBJECT: Doppler Point Position Results for Lake Superior Doppler Project

Attached are the following information and data for the point position results of the Doppler observations performed by AMC in the Lake Superior region during September 1982:

1. Geodetic Summaries for all Doppler stations of the Lake Superior project and Apostle Island project (performed in 1978).

2. Tables of datum shift computations used to transform the Doppler stations to the NAD 1927 datum.

It is apparent from Table 3 there is considerable inconsistencies in the horizontal control between station FINLAND (50281) located on the west side of the lake and project area, and station MCM91 (50299) located on the eastern part of the project area. The differences between the NAD 1927 and transformed Doppler are relative to the two stations ORONTO (50302) and BLACK (50303) located in the central region of the project area. Because of the large spread in latitude of 4 meters and in longitude of 5.4 meters between the 4 stations, the Doppler coordinates were transformed using the datum shift appropriate for each region.

The transformed stations and corresponding datum shift used were:

Datum Shift Computed From	Stations Transformed
50281	50283, 50284, 50285, 50286, 50287
Mean 50302 and 50303	50288, 50289, 50300, 50301, 50290, 50291, 50292
50299	50293, 50294, 50295, 50296, 50297, 50298, 50304, 50305, 50306

The estimated uncertainties for the horizontal coordinates are given for each station in the geodetic summaries.

We are now in the final stages of testing the most updated version of the Doppler short arc program GEODOPV. We expect to begin within a couple of weeks the reduction of the Lake Superior data. The relative position results will be analyzed by comparison with the point position data. It is expected there will be some improvement in the internal consistency of the Doppler derived raw coordinates. However, the improvements will only be in the precision of the unadjusted coordinates since the distortions in the NAD 1927 network will affect the accuracy of the final transformed Doppler coordinates. After the NAD 83 readjustment is completed, the differences between the Doppler derived control and NAD 83 should be under a few decimeters.

Should you have any questions or if you would like additional information, please contact Ms. Madeline White, Lt. David Minkel, or myself. Our telephone number is (FTS) 443-8580.

Attachments

cc:
Mr. Gary Fredericks, AMC

THE LOCAL NETWORK WHICH THE ARGO POSITIONING DATA IS BASED UPON, (STATIONS AGATE BAY ARGO, 1983 AND SILVER BAY ARGO, 1983 WERE LOCATED LOCATED FROM DOPPLER STATIONS) RELATIVE TO THE LOCAL NET IN THE VICINITY OF THE APOSTLE ISLANDS, ARE PROBABLY ACCURATE TO ± 2 METERS. THIS IS INSIGNIFICANT REGARDING THE ARGO POSITIONED HYDROGRAPHIC DATA IN THE SURVEYS AREA. FURTHER INQUIRY, IF DESIRED, MAY BE HAD BY CONTACTING MR. LARRY D. HOTHEM, N.O.S., ROCKVILLE, MARYLAND OR MR GARY FREDERICKS, A.M.C, NORFOLK, VIRGINIA.

R.D. JANOCKI

NOAA FORM 61-29 (12-71)

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

LETTER TRANSMITTING DATA

REFERENCE NO.
MOA23-30-85

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY *(Check)*:

☐ ORDINARY MAIL ☐ AIR MAIL
☒ REGISTERED MAIL ☐ EXPRESS
☐ GBL *(Give number)* _____

TO:

CHIEF, DATA CONTROL SECTION
HYDROGRAPHIC SURVEYS BRANCH, N/CG243
NATIONAL OCEAN SERVICE, NOAA
ROCKVILLE, MD 20852

DATE FORWARDED
3/15/85

NUMBER OF PACKAGES
one tube; two boxes

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

H-10100, OPR-Z137, PE-20-5-83, Wisconsin, Lake Superior, Bear Island Shoal to Eagle Island

Pkg 1 of 3 (tube)
One smooth sheet (mylar)
One smooth position overlay (mylar)
Three smooth excess overlays (mylar)
One original Descriptive Report
Three final field sheets (mylar)
Eight final field sheet overlays (mylar)
Ten preliminary field sheets (mylar)

Pkg 2 of 3 (box)
Four electronic failure logs
Four position calibration records (notebook)
One velocity correction record (notebook)
One envelope with data removed from Descriptive Report
One cahier with mini-ranger baseline calibration
One envelope with side scan sonargram

Pkg 3 of 3 (box)
Two accordian files containing echograms and field data printouts for:
VESNO 2830:for JD 181, 187, 195,199 and 205.
VESNO 2831: for JD 192, 194, 195, 200, 201, 202, 204, 229,230, 231 and 232.
VESNO 8232: for JD 176, 177, 178, 179, 190, 191, 194, 195, 199, 200, 201, 202, 203,

FROM: *(Signature)* R. A. Whitfield for:
D. B. MACFARLAND, JR., LCDR, CHIEF, HYDRO SURVEYS BR

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

HYDROGRAPHIC SURVEYS BRANCH, N/MOA282
ATLANTIC MARINE CENTER
NOAA—NATIONAL OCEAN SERVICE
439 WEST YORK STREET
NORFOLK, VA 23510

NOAA FORM 61-29 (12-71)

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

LETTER TRANSMITTING DATA

REFERENCE NO.
MOA23-30-85

DATA AS LISTED BELOW WERE FORWARDED TO YOU BY *(Check)*:

☐ ORDINARY MAIL ☐ AIR MAIL
☒ REGISTERED MAIL ☐ EXPRESS
☐ GBL *(Give number)* _____

TO:

CHIEF, DATA CONTROL SECTION
HYDROGRAPHIC SURVEYS BRANCH, N/CG243
NATIONAL OCEAN SERVICE, NOAA
ROCKVILLE, MD 20852

DATE FORWARDED
3/15/85

NUMBER OF PACKAGES
one tube; two boxes

NOTE: A separate transmittal letter is to be used for each type of data, as tidal data, seismology, geomagnetism, etc. State the number of packages and include an executed copy of the transmittal letter in each package. In addition the original and one copy of the letter should be sent under separate cover. The copy will be returned as a receipt. This form should not be used for correspondence or transmitting accounting documents.

204, 205, 206, and 207.
One cahier with final control printout and final position printout.
One cahier with final souding printout and L-File (Z-Record) printout.

FROM: *(Signature)* D B Macfarland Jr.
D.B. MACFARLAND, JR.,LCDR, CHIEF, HYDRO SURVEYS BR

RECEIVED THE ABOVE
(Name, Division, Date)

Return receipted copy to:

HYDROGRAPHIC SURVEYS BRANCH, N/MOA252
ATLANTIC MARINE CENTER
NOAA—NATIONAL OCEAN SERVICE
439 WEST YORK STREET
NORFOLK, VA 23510

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

WATER LEVEL NOTE FOR HYDROGRAPHIC SHEET

Processing Division: Atlantic Marine Center: MOA231

Hourly heights are approved for

Water Level Station Used: Cornucopia, Wisconsin (909-9055)

Period: June 25, 1983 - August 20, 1983

HYDROGRAPHIC SHEET: H-10100

OPR- Z137-PE-83

Locality: Lake Superior

Plane of reference: Low Water Datum (IGLD 1955: 600.00 Feet)

Remarks:

Zoning not required. Data from other gages on Lake Superior indicate no unusual water level movement during the survey period.

Philip C. Marra

Chief, Water Levels Section

NOAA FORM 76-155
(11-72)

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

GEOGRAPHIC NAMES

SURVEY NUMBER

H-10100

Name on Survey	A ON CHART NO.	B ON PREVIOUS SURVEY NO.	C ON U.S. QUADRANGLE MAPS	D FROM LOCAL INFORMATION	E ON LOCAL MAPS	F P.O. GUIDE OR MAP	G RAND MCNALLY ATLAS	H U.S. LIGHT LIST	K	
APOSTLE ISLANDS										1
BEAR ISLAND SHOAL										2
EAGLE BAY										3
EAGLE ISLAND (title)										4
EAST BAY										5
JUSTICE BAY										6
LAKE SUPERIOR										7
LIGHTHOUSE BAY										8
LITTLE SAND BAY										9
POINT DETOUR										10
SAND BAY										11
SAND BAY (locality)										12
SAND ISLAND										13
SAND ISLAND SHOALS										14
SAND POINT										15
SAND RIVER										16
SWALLOW POINT										17
WEST BAY										18
WISCONSIN (title)										19
YORK ISLAND										20
YORK ISLAND SHOALS					Approved:					21
										22
					Charles E. Harrington					23
					Chief Geographer-		N/CG2x5			24
						15 JAN.	1985			25

NOAA FORM 76-155 SUPERSEDES C&GS 197

HYDROGRAPHIC SURVEY STATISTICS
REGISTRY NO.: H-10100

Number of positions	3351
Number of soundings	19536
Number of control stations	20

	TIME-HOURS	DATE COMPLETED
Preprocessing Examination	37	12/19/83
Verification of Field Data	366	1/07/85
Quality Control Checks	115	
Evaluation and Analysis	80	2/08/85
Final Inspection	16	2/21/85
TOTAL TIME	614	
Marine Center Approval		2/27/85

Transmittal letter of survey and survey records will be included in the Descriptive Report to identify the records accompanying the survey.

ATLANTIC MARINE CENTER
EVALUATION REPORT

SURVEY NO.: H-10100 FIELD NO.: PE-20-5-83

Wisconsin, Lake Superior, Bear Island Shoal to Eagle Island

SURVEYED: 25 June through 20 August 1983

SCALE: 1:20,000 PROJECT NO.: OPR-Z137-PE-83

SOUNDINGS: Ross Digital Echo Sounder

CONTROL: ARGO DM-54 (Range/Range), Motorola Mini-Ranger III (Range/Range), Mini-Ranger FALCON 484 (Range/Azimuth)

Chief of Party.....W. S. Simmons

Surveyed by.....A. A. Armstrong
.....G. E. Leigh
.....R. Mandzi
.....M. P. Conricote
.....S. I. Andreeva

Automated Plot by.....Xynetics 1201 Plotter (AMC)

1. INTRODUCTION

a. No unusual problems were encountered during verification.

b. Notes in the Descriptive Report were made in red during office processing.

2. CONTROL AND SHORELINE

a. The control is adequately discussed in sections F, G, and S of the Descriptive Report.

b. Shoreline was added in brown from 1:20,000 scale enlargements of 1:24,000 scale U.S. Geological Survey Quadrangles revised with 1980 NANCI source material and is for orientation purposes only.

Shoreline topography along parts of the shoreline was stated in Section B. of the Descriptive Report; however, there was no delineation on the field sheet of such features. No delineation of these features was on the enlargement of the U. S. Geological Quadrangles revised with 1980 NANCI source material.

3. HYDROGRAPHY

a. Soundings at crossing agree within the criteria stated in sections 4.6.1 and 6.3.4.3 of the Hydrographic Manual and section 6.6 of the Project Instructions.

b. Except for the 6-foot curve which could not be completely developed in the alongshore areas, the standard depth curves and the charted twenty-four (24) foot supplemental depth curve were drawn in their entirety. The thirty-six (36) foot supplemental curve, dashed and brown curves were added to better show the bottom topography.

c. Development of the bottom configuration and determination of least depths is considered well done with the following exceptions:

1) Lines of hydrography run normal to the depth curves should have been extended closer to the shore in order to provide a better delineation of the depth curves along the shore. The existing parallel lines of hydrography along the shore do not always provide sufficient data for the accurate drawing of the depth curves.

2) Development of areas where shoal soundings were brought through from prior surveys should have been more extensive.

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports are adequate and conform to the requirements of the Hydrographic Manual with the following exceptions:

a. Scanning of the ship's echograms is of poor quality, requiring considerable rescanning during office processing.

b. Very little speed and course data was recorded.

c. There were no calibration signals listed in the Descriptive Report as required by section 4.4.3.3 of the Hydrographic Manual. As a result, information about calibration stations 106, 107, 108, 109, 166, 168, 169 and 170 could not be found or verified and these stations were not entered into the control file during verification.

d. The wrong EDP numbers for the ship and launches were used throughout the survey.

e. The hydrographer did not submit any data for locating "Sand Island Buoy 2" in the vicinity of Latitude 47°00'51"N, Longitude 90°54'18"W as stated on page 19 of the Descriptive Report.

f. The hydrographer failed to properly locate the fish net/trap in the vicinity of Latitude 46°56'38"N, Longitude 90°54'34"W.

g. Bottom sample spacing over the entire survey is not sufficient as required by section 1.6.3 of the Hydrographic Manual.

h. Ten (10) bottom samples were not put on the field smooth sheet.

i. No vertical cast was taken for vessel number 2830 as required by section 4.9.5.1.2 of the Hydrographic Manual.

j. The hydrographer referred to several uncharted piers on Sand Island and failed to locate them.

5. JUNCTIONS

H-10036 (1982) to the northwest
H-10094 (1983) to the north
H-10096 (1983) to the southwest
H-10103 (1983) to the east

Excellent junctions were effected between the present survey and the surveys listed above.

6. COMPARISON WITH PRIOR SURVEYS

LS-457 (1869) 1:120,000
LS-961 (1902) 1:10,000
LS-961TA (1902) 1:10,000
LS-961TB (1902) 1:10,000
LS-962 (1902) 1:10,000
LS-963 (1902) 1:10,000
LS-963T (1902) 1:10,000
LS-1490 (1927) 1:20,000
LS-1990 (1956) 1:120,000

The above surveys taken together cover the entire present survey area.

Prior survey LS-457 (1869) has no grid and a meaningful comparison could not be made. However, more recent surveys cover the same area of the present survey. LS-457 (1869) should serve only as an historical reference document of the area.

LS-961 (1902) is a combination of prior surveys LS-961TA (1902) and LS-961TB (1902). LS-961 (1902) compares favorably with the present soundings agreeing within plus or minus (+/-) one (1) to three (3) feet. Soundings on Bear Island Shoal and York Island Shoals are one (1) to three (3) feet shoaler than the present survey. The shoalest areas of Bear Island Shoal and York Island Shoals have eroded somewhat and now have a least depth of fifteen (15) feet where previously it was thirteen (13) feet and fourteen (14) feet, respectively. Shoreline on the east side of York Island and Point Detour has receded up to thirty meters. Four soundings not considered disproved by the present survey were brought forward to supplement the present survey.

LS-962 (1902) compares favorably with the present survey with soundings agreeing within zero (0) to five (5) feet shoaler. The shoal extending from the southeast end of Sand Island south to the Sand River has remained stationary. Where depths ranged from three (3) to eight

(8) feet, depths are now five (5) to nine (9) feet. The four (4) foot shoal in the vicinity of Latitude 46°57'39"N, Longitude 90°57'00"W has disappeared with present depths now of eight (8) feet. The shoreline along the northeast part of Sand Point has receded approximately thirty (30) meters. The shoreline along the south side of Sand Island was receded up to thirty (30) meters in some areas. A three (3) foot sounding at Latitude 46°56'08"N, Longitude 90°55'37"W was brought forward to supplement the present survey.

LS-963 (1902) compares favorably with the present survey with soundings ranging from plus or minus (+/-) three (3) feet. Two soundings (110 feet and 152 feet) in the vicinity of Latitude 47°01'33"N, Longitude 90°55'45"W are twenty (20) to twenty-five (25) feet deeper than the present survey. The soundings on Sand Island Shoals are one (1) to two (2) feet shoaler than the present survey. The shoreline along the north side of Sand Island has receded up to twenty meters.

LS-963T (1902) is adequately discussed in section K, page 13, of the Descriptive Report.

LS-1490 (1927) compares favorably with the present survey with soundings ranging from one (1) to three (3) feet shoaler than the present survey. Isolated soundings range from ten (10) to eighteen (18) feet shoaler and are discussed on page fourteen (14) of the Descriptive Report. The shoreline southwest of Sand Point has eroded up to twenty meters. Shoreline for LS-1490 was transferred from 1869 survey sheets.

LS-1994 (1956) is adequately discussed on page 14 of the Descriptive Report.

Except as noted above, the present survey is adequate to supersede the prior surveys in the common area.

7. COMPARISON WITH CHARTS

No. 14966 (19th Ed., Jan. 15/83)
No. 14973 (24th Ed., Jan. 19/80)

a. Hydrography

The charted hydrography originates with the previously discussed prior surveys and miscellaneous sources. However, with the exception of the hydrography originating from prior surveys LS-1490 (1927) and LS-1990 (1956), the remaining charted hydrography is one (1) foot to two (2) feet deeper than the soundings from the other prior surveys which may be attributed to a change in the lake water level datum. Specific soundings tabulated and discussed in section L, page 15 and 16 of the Descriptive Report, have charting recommendations on those pages and require no additional comments. Attention is directed to the following:

1) A charted sounding on chart 14973 of 37 feet in Latitude 47°02'01"N, Longitude 90°51'44"W is in present survey depths of 57 feet to 60 feet. These soundings along with adjacent sounding lines show a straight down slope progression of depths with no indication of a shoal

✓ Delete

feature. It is recommended that this sounding be removed from the chart.

2) Presurvey Review Item #2390 (AWOIS 2390) a dangerous submerged wreck charted in Latitude 47°00'27"N, Longitude 90°54'00"W was investigated by the hydrographer using side scan sonar, echo sounder and divers. The hydrographer determined the wreck to be scattered over an area of 500 feet by 500 feet with the center of the wreckage at Latitude 47°00'27.5079"N, Longitude 90°54'11.6293"W. A measured line least depth of 17 feet was found. However, an echo sounder least depth of 15 feet was found in Latitude 47°00'28.9"N, Longitude 90°54'06.7"W while running development lines along the axis of the hull configuration. It is recommended that the submerged wreckage be charted with a least depth of fifteen (15) feet as shown on the smooth sheet. ✓ Revise

3) Presurvey Review Item #2998 (AWOIS 2998) a wreck PA charted in Latitude 46°59'00"N, Longitude 90°55'57"W is a 14 foot aluminum outboard reported capsized in approximately two feet of water and originates with Local Notice to Mariners 18/78. The hydrographer made two visual searches for the wreck with negative results. The hydrographer's recommendation is in section K, page 12, of the Descriptive Report. ✓ Delete

4) A submerged crib in Latitude 46°58'55.9"N, Longitude 90°56'01.2"W was located by the hydrographer. A leadline least depth of two feet was made over the crib. It is recommended that the submerged crib be charted with a Depth over crib 2-ft at the above location. ✓ Add

5) The uncharted fish net located by the hydrographer in Latitude 46°56'38"N, Longitude 90°54'34"W, was drawn on the smooth sheet. It is recommended the charted note FISH NET AREA be retained as charted. ✓ RETAIN

Additional charting recommendations are found in section L of the Descriptive Report.

The present survey is adequate to supersede the charted hydrography except as noted above.

b. Aids to Navigation

There are two (2) fixed and one (1) floating aid to navigation on the survey smooth sheet. These aids appear adequate to serve their intended purpose.

8. COMPLIANCE WITH PROJECT INSTRUCTIONS

This survey adequately complies with the Project Instructions except as noted elsewhere in this report.

9. ADDITIONAL FIELD WORK

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

Douglas V. Mason
Cartographic Technician
Verification of Field Data

Richard H. Whitfield
Cartographic Technician
Evaluation and Analysis

Guy F. Trefethen
Senior Cartographic Technician
Verification Check

Inspection Report
H-10100

The completed survey has been inspected with regard to survey coverage, delineation of depth curves, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The digital data have been completed and all revisions and additions made to the smooth sheet during survey processing have been entered in the magnetic tape record for this survey. Final control, position, and sounding printouts of the survey have been made. The survey complies with National Ocean Service requirements except as noted in the Evaluation Report. The survey records comply with NOS requirements except where noted in the Evaluation Report.

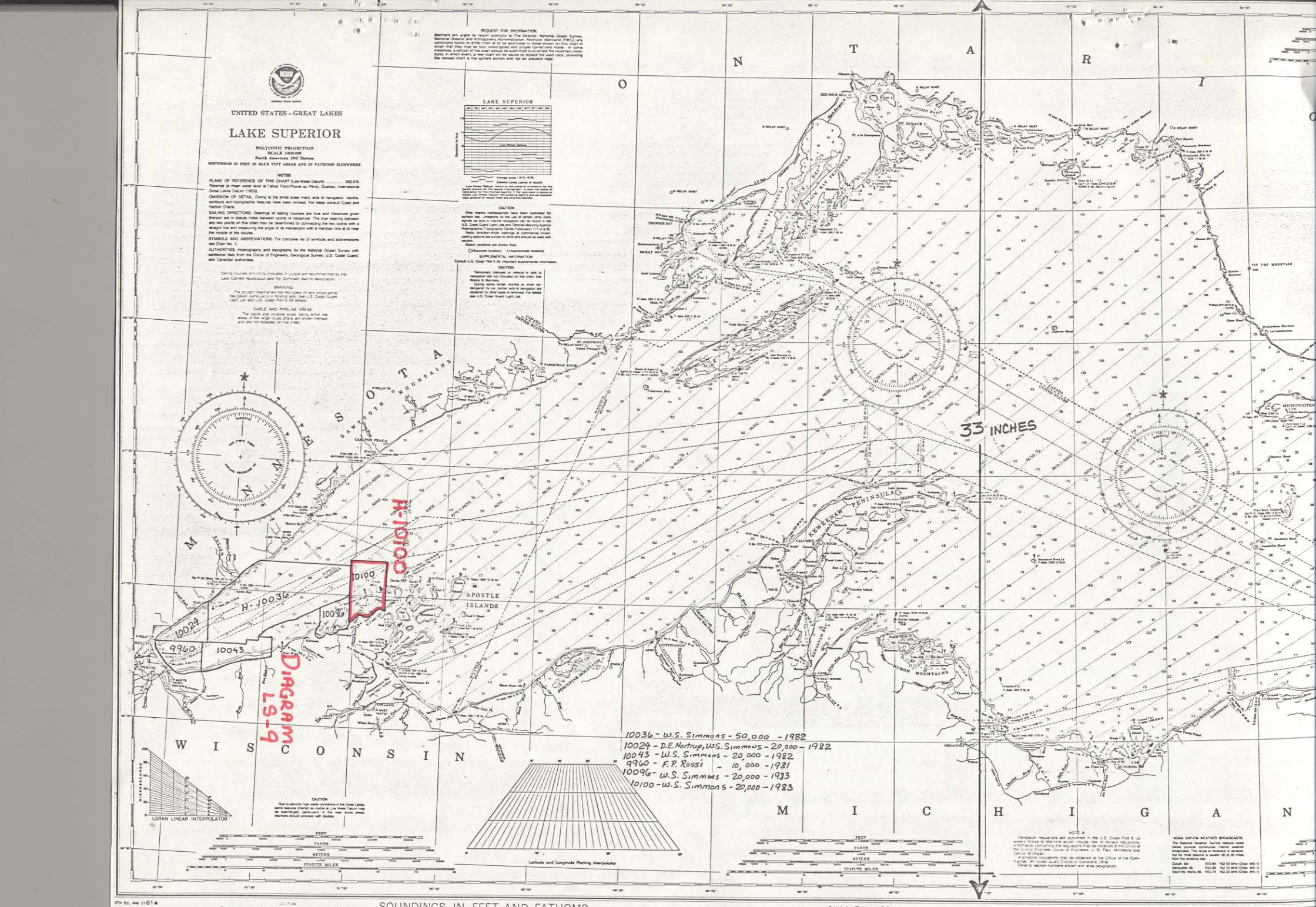
Inspected

R. D. Sanocki
Chief, Hydrographic Surveys
Processing Section
Hydrographic Surveys Branch

David B. MacFarland, Jr., LCDR, NOAA
Chief, Hydrographic Surveys Branch

Approved February 27, 1985

Wesley V. Hull, RADM, NOAA
Director, Atlantic Marine Center



27th Ed., Mar 21/81

14960

LORAN-C OVERPRINTED

SOUNDINGS IN FEET AND FATHOMS

LS-9 Temporary

Published at Washington, D.C.
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY

LS-9

NOAA FORM 75-96
(10-83)

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

MARINE CHART BRANCH

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-10100

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
14973	5-17-85	Stanley B. Morris	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 3 Fully appld
14966	11-14-85	Russell P Kennedy	Full ~~Part Before~~ After Marine Center Approval Signed Via
			Drawing No. 4 Appl'd thru #14973
14960	8.14.87	J Purvis	(Full) Part Before (After) Marine Center Approval Signed Via
			Drawing No. 5 Applied in full thru 14966 -14973
14961	8.14.87	J Purvis	(Full) Part Before (After) Marine Center Approval Signed Via
			Drawing No. 5 Applied in full thru 14966 -14973
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.
			Full Part Before After Marine Center Approval Signed Via
			Drawing No.

SUPERSEDES C&GS FORM 8352 WHICH MAY BE USED. appl'd to ATDs 6-11-85 KBR