

9839

Diagram NO. LS-5

NOAA FORM 76-35A

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

DESCRIPTIVE REPORT

Type of Survey Hydrographic

Field No. PE-20-1-79

Office No. H-9839

LOCALITY

State Michigan

General Locality Lake Huron

Locality Thunder Bay

1979

CHIEF OF PARTY

CDR. D. North

LIBRARY & ARCHIVES

DATE September 16, 1981

☆U.S. GOV. PRINTING OFFICE: 1980-766-230

361 (82)
4864 & inset
4860
4869 applied 10-18-82 rct

HYDROGRAPHIC TITLE SHEET

H-9839

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 20-1-79

State MICHIGANGeneral locality ~~Thunder Bay, Michigan~~ Lake HuronLocality ~~Great Lakes, Lake Huron~~ Thunder BayScale 1: 20,000Date of survey July, 1979 to 1 October, 1979Instructions dated 2 March, 1979Project No. OPR X115-PE/HSB-79Vessel NOAA Ship PEIRCE Launches 1008 & 1009 and Skiff PE-7 (VESNO 2838, 2839, and 2837)
respectivelyChief of party C. Dale North, CDR, NOAA, Commanding OfficerSurveyed by ⁸⁹⁸⁰ LT Chelgren, LTJG McCann, LTJG DaSilva, LTJG RodsteinSoundings taken by echo sounder, hand lead, pole Ross 5000 fine line, Raytheon 719B, and LeadlineGraphic record scaled by Ship's PersonnelGraphic record checked by LTJG Rodstein, RCT MeekinsProtracted by Program RK 201, PDP 8/E Hydroplot Automated plot by DP5 Xynetics 1201 Plotter
(AMC)Verification by ~~LTJG Rodstein, RCT Meekins~~ DVM, RRH, JBW, FLS, RGRSoundings in ~~fathoms~~ feet at ~~MLW~~ ~~MCEW~~ LWD Based on predicted water level
(IGLD 1955, 576.8 feet) ~~correctors~~

REMARKS: All times throughout are Greenwich Mean Time. All ^{field} depths given ^{were} ~~are~~
reduced for predicted water levels, draft, settlement and squat, instrument
and velocity corrections unless otherwise noted with depths.

Notes in red were made by the verifier. App'd. 4-21-82
WJT

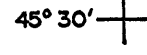
Some pages ~~of~~ of this report were removed from
the report and are included with the survey
records.

Referenced photographs are filed in AWOLIS

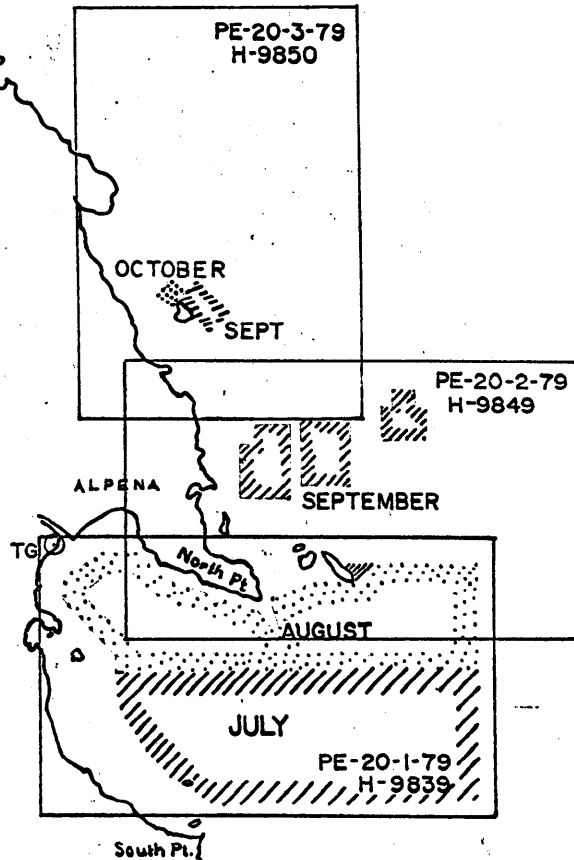
84° 00'



83° 00'



PROGRESS SKETCH
 OPR-X115
 LAKE HURON
 18 JUNE - 7 OCTOBER, 1979
 NOAA Ship PEIRCE
 C. DALE NORTH, CDR, NOAA
 COMD'G.
 From Chart 14860 (formerly LS 5)



LEGEND

JUL	AUG	SEP	OCT
54	52	3.75	.115
455.3	183.6	247.3	57.0
654.7	829.1	420.4	26.4
513.0	687.9	174.5	5.2
93	144	0	0
0	0	0	4
0	0	0	2
1	1	0	1
19	14	14	5
1	1	0	0

- SQ. NM SOUNDING
- LN M MISC. DISTANCE
- LN M DIST. TO AND FROM
- LN M SOUNDING LINE
- BOTTOM SAMPLES (GRAB)
- WATER SAMPLES ANALYZED (‰)
- CONTROL STATIONS
- T D C NANSEN CAST
- EXPENDABLE BT
- WATER LEVEL GAGE

83° 30'

44° 30'



A. PROJECT

This survey is part of OPR-X115-PE/HSB-79, Lake Huron. It was conducted in accordance with Project Instructions dated 2 March 1979 and Change No. 1: Supplement to Instructions dated 18 April 1979.

B. AREA SURVEYED

This survey was conducted in the vicinity of Thunder Bay, Michigan. The western limit of the survey is the five fathom curve of Thunder Bay. The northern limit continues to be the five fathom curve east to Thunder Bay Island. East of the Island the northern limit becomes the 45°02.5' N parallel. The eastern boundary is the 83°05.0' W meridian south to the 44°54.0' N parallel. This southern boundary continues west to the five fathom curve of Thunder Bay.

As the survey limits are jagged due to junctions with prior surveys, the following boundaries are the maximum extensions in their respective directions.

North	45°02.5' N
South	44°54.0' N
East	83°04.8' W
West	83°25.4' W

A sketch of the work area is included with the report. The hydrography was conducted between 4 July 1979 and 1 October 1979 (Julian Days 185-274). Investigations of pre-survey review items were conducted on the following dates:

<u>Item</u>	<u>Date</u>	<u>VesNo.</u>	<u>J.D.</u>
✓ Unnumbered PSR (Dev. "A", 25 ft. shoal)	30 July	2838	211
	29 August	2838	241
✓ Unnumbered PSR (Dev. "B", 22 ft. shoal)	30 July	2838	211
	29 August	2838	241
	19 September	2838	262
✓ PSR #9 (29 ft. wreck)	25 August	2838	237
	19 September	2838	262
✓ PSR #9 (20 ft. wreck)	23 August	2838	235
	24 August	2838	236
	30 August	2838	242
	18 September	2838	261

B. AREA SURVEYED (Cont'd)

<u>Item</u>	<u>Date</u>	<u>VesNo.</u>	<u>J.D.</u>
✓PSR #10 (Obstr. PA)	25 August	2838	237
	30 August	2838	242
	31 August	2838	243
✓Unnumbered PSR (22 ft. shoal)	23 August	2838	235
	24 August	2838	236

C. SOUNDING VESSEL

Hydrography was performed by the ship's type I aluminum survey launches and the Monark, Skiff PE-7. The launches were equipped with Hydroplot Systems.

Launch 1008	VesNo. 2838
Launch 1009	VesNo. 2839
Skiff PE-7	VesNo. 2837

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS

All soundings were acquired using either Ross Digital ^{Echo Sounder} Fathometer, (Model 5000), Raytheon Portable Fathometer (Model 719B) or calibrated leadlines.

Depth ranges, as recorded by each vessel, and sounding equipment S/N were as follows:

<u>VESSEL</u>	<u>VESNO.</u>	<u>FATHO S/N</u>	<u>J.D.</u>	<u>DEPTH(Observed)</u>	
				<u>Min.</u>	<u>Max.</u>
1008	2838	Ross 1078	190-274	7.4	197.9
1009	2839	Ross 1055	185-258	6.0	193.1
PE-7	2837	Raytheon 5441	193-222	28.7	99.7

Corrections to soundings were calculated for the following factors:

1. Corrections for velocity of sound in Lake water were computed graphically for both launches using expendable bathythermographs (XBT's).

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS (Cont'd)

A Nansen Cast, TDC comparisons, and Bar Check data were used to check XBT data. The PEIRCE's XBT system is a Sippican Model 603D, Serial Number 781209, and modified to a 200 meter depth scale. The TDC system used was a Martek, Serial Number 477, borrowed from Launch 1255. A list of dates, positions, and VesNo's for the oceanographic stations is appended to this report.

XBT, TDC, Nansen Cast, and Bar Check data and graphs are included in the survey records. Salinities, as determined by the Beckman Salinometer, Model R57-C, were found to have a negligible effect on sound velocities. This was proven by comparing the output of RK 530 (using data from the Nansen Cast, from which the salinities were determined) with and without observed salinities. Salinity sample results and RK 530 computations are appended to this report.

The two TDC's taken during the survey and the Nansen Cast following it showed excellent agreement with the XBT data. Bar checks were taken as often as possible, but the lack of protected area near the working grounds prohibited sufficient acquisition in the deep water. When compared to XBT data in the same area the bar checks showed good agreement. Bar checks were grouped by vessel, chronology, and known changes in water temperature versus depth.

Sequential XBT velocity corrections varied considerably. Velocity correction tables were derived from these curves in accordance with the criteria specified in the Hydrography Manual, 4th Edition, Section 4.9.5, "for use in correcting echo soundings, the velocity of sound must be known with sufficient accuracy to ensure that no sounding will be in error by as much as 0.25% of the depth from this cause alone." Each sequential XBT composite curve that varied from its predecessor by more than 0.50% at respective depths was assigned a velocity corrector table. Each curve was scaled at 0.2 foot intervals to derive each table.

Differences were observed between inshore and offshore XBT's. A bathythermographic profile of the working area was made and a zoning system was developed to apply velocity corrections to the sounding data. The following is a list of the velocity tables and the applicable days:

<u>Table #</u>	<u>Vessels</u>	<u>XBT's</u>	<u>Days(J.D.)</u>
1	2839	1,4,5,6,8	185 - 187
2	2839	17, 18	191 - 197

D. SOUNDING EQUIPMENT AND CORRECTIONS TO ECHO SOUNDINGS (Cont'd)

<u>Table #</u>	<u>Vessels</u>	<u>XBT's</u>	<u>Days(J.D.)</u>
3	2838	9,14,15,18	190 - 197
4	2837	16,18	193
5	2838 - 2839	16,17,18,21	198 - 201
6	2838 - 2839	18,20,21,23,25	206 - 208
7	2838 - 2839	22,23,24,25	211 - 221
8	2837	28, 29	222
8	2838 - 2839	28, 29	225 - 227
9	2839	26, 27	222
10	2838 - 2839	30, 31	228 - 237
11	2838 - 2839	32, 33, 34	239 - 240
12	2838	35, 36	241 - 243
13	2838 - 2839	37	258 - 262
14	2838	38	266 - 272

2. ^{Echo Sounder} Ross^A and Raytheon ^{Fathometer} Fathometers were maintained at zero initial and routine phase checks were performed. Ross ^{Echo Sounder} Fathometer S/N 1055 used in Launch 1009, was properly adjusted at midscale. However, errors were found at both ends of the scale as great as 0.7 feet. Compensation was made for these errors during scanning and no problems affecting the survey's accuracy were encountered.
3. Settlement and squat corrections were determined for all sounding vessels at Alpena, Michigan on 21 June 1979. Speed changes were noted in the daily sounding records, and settlement and squat correctors were tabulated using Sounding Corrections Abstracts. These abstracts are appended as are the Settlement and Squat calculations, Velocity Tables, and TC/TI tape listings.

E. HYDROGRAPHIC SHEETS

The field sheets were plotted aboard the PEIRCE by the ship's PDP 8/E computer and complot roll-bed plotter. Field data is presented on four plotter sheets (scale 1:20,000; skew 0,21,65); two labeled North

E. HYDROGRAPHIC SHEETS (Cont'd)

Sheet and two labeled South Sheet. One set of overlays contains main-scheme hydrography. The other set includes crosslines, bottom samples, detached positions, and developments. Soundings of 8 developments have been plotted separately at expanded scales for clarity as follows:

<u>Item</u>	<u>Scale</u>	<u>Skew</u>
Unnumbered PSR (25 ft. shoal) Dev. A	1:10,000	0, 7.8, 10.3
Unnumbered PSR (22 ft. shoal) Dev. B		
Development AA	1:10,000	0, 7.8, 10.3
Development FF	1:10,000	0, 7.8, 10.3
PSR #9 (20 ft. wreck)	1:10,000	0, 7.8, 10.3
PSR #9 (29 ft. wreck)	1:10,000	0, 7.8, 10.3
PSR #10 (2 blowups)	1:10,000	45, 7.8, 10.3
Unnumbered PSR (22 ft. shoal)	1:10,000	0, 7.8, 10.3

The North/South and skewed mainscheme and developments, bottom samples, and detached positions were not rotated. Crosslines were rotated 45°. East/West mainscheme and developments were rotated 30°.

The smooth sheet (36" X 60", 1:20,000 scale) will be produced by the Atlantic Marine Center. All field records will be transmitted there for verification. Projection parameters are appended to this report.

F. CONTROL STATIONS

In this survey four electronic and five visual control signals were used. They were as follows:

<u>Station #</u>	<u>Name</u>	<u>Reference</u>	<u>Type</u>
003 ✓	H-2A-MI-77	AMC	Electronic
005 ✓	H-1A-MI-77	AMC	Electronic

F. CONTROL STATIONS (Cont'd)

<u>Station #</u>	<u>Name</u>	<u>Reference</u>	<u>Type</u>
/ 006 ✓	N. Pt. USLS RML, 1956	USLS	Electronic ✓
010	Huron Cement Tank, 1956	USLS	Visual
011	Municipal Water Tank, 1956	USLS	Visual
015	St. Bernard's Spire, 1956	USLS	Visual
016	St. Mary's Spire, 1956	USLS	Visual
018 008	Alpena Light	USLS	Visual
023 ✓	Thunder Lighthouse 1979 (ECC)	AMC	Electronic

Stations 003, 005, and 023 are third order control established by the Atlantic Marine Center, Operations Division. Stations 010, 011, 015, 016, and 018 are third order control established by USLS. Station 006 is a reference mark of a second order USLS station. The geographic position was determined by using information provided on the station description. The direction from PRECORE to RML was added to the geodetic azimuth from N. Pt. USLS to PRECORE. This provided an azimuth to RML. Using this azimuth and the distance (checked by tape) to RML a direct calculation was made with program 407 to obtain a G.P. for RML. These calculations are appended along with station descriptions.

All electronic control stations were erected and maintained by ship's personnel. A list of G.P.'s for each station is included on the appended signal list.

G. HYDROGRAPHIC POSITION CONTROL

Sounding line position control used in this survey was Del Norte, primarily in the Range/Range mode. Range/Azimuth work was performed on J.D. 258. In addition two positions over wrecks were obtained using visual control on J.D. 274. ✓

The following positioning and related equipment was used during this survey:

G. HYDROGRAPHIC POSITION CONTROL (Cont'd)

<u>Equipment</u>	<u>VesNo.</u>	<u>S/N</u>	<u>Julian Day</u>
DMU/Master	2837	173/1068	193 - 222
	2838	173/1068	190 - 262
		190/1066	241
		173/912	264 - 272
	2839	190/1066	185 - 240
		122/912	258
PDP 8/E Digital Computer	2838	0309219	190 - 272
	2839	PR0307704	185 - 258
Hydroplot Controller	2838	0700003	190 - 272
	2839	700023	185 - 258
T-2	2839	75507	258
Sextant	2838	75047	272 - 274

<u>Remote Code</u>	<u>S/N</u>	<u>Station Code</u>	<u>Julian Day</u>
72	1320	003	183 - 199
			205 - 240
74	264	003	200 - 203
	1317	005	183 - 240
	1135	003	261 - 272
76	188	006	183 - 240
		023	258
78	264	006	261 - 272

G. HYDROGRAPHIC POSITION CONTROL (Cont'd)

The DMU's were Model R03C. The Master and remote trisponders were Model 217C. This equipment was used to control all electronic hydrography. The DMU's were calibrated over distances measured by laser geodimeter (AGA-76).

Calibrations were performed on the following dates:

<u>Date</u>	<u>Julian Day</u>	<u>Calibration Distance</u> (meters)
6/18/79	169	2014
7/23/79	204	2014
9/1/79	244	2014
10/7/79	280	2003

These calibrations were accomplished by observing the distance over a known baseline. The DMU units were initially adjusted to compare with the actual range thus yielding a reading with a small corrector at the calibration range. Attenuators were then applied to test the variations as the signal becomes more dispersed.

Daily calibrations of the DMU/Master pairs were made at a calibration pipe with the exception of J.D. 258 when the equipment was calibrated over two geodetic control stations prior to and after conducting range/azimuth hydrography. The calibration pipe was installed by PEIRCE divers at the following position:

Latitude: $44^{\circ}58'32.885''N$
Longitude: $83^{\circ}23'09.722''W$

The pipe was made fast to the bottom in 12 feet of water, using large ballast stones. It was located by ship's personnel using spur point traverse methods. The pipe's position was checked during and after the survey and a 1.8m inverse was calculated between the original position and the check at the close of the survey. These computations are appended to the survey. The 1.8m calculated change of position over the course of the survey was determined to be insignificant (see Hydrographic Manual, 4th Ed., Sec. 4.4.3.3) and calibration rates to the original position were used throughout the survey. Daily calibrations were made in the morning and evening by coming alongside the pipe and comparing DMU readings to pre-calculated ranges.

Pipe was removed at the end of survey and is not plotted on the S.S.

G. HYDROGRAPHIC POSITION CONTROL (Cont'd)

Electronic correctors were then computed and applied. The maximum correctors for each sounding vessel were as follows:

<u>VesNo.</u>	<u>J.D.</u>	<u>Maximum Corrector</u> (meters)
2837	222	-10
2838	220, 236	-11
2839	219	-11

The only exception to the above maximum correctors was observed by VesNo. 2838 between J.D. 243 - 271.

Inordinately large correctors were observed for station 003, when the spare code 74 remote was used. This spare unit was a fifth unit which had not been adjusted to the DMU. These correctors, when compared to the observed readings for the baseline calibrations of 1 October 1979 and 7 October 1979, are in line with expected values and reduce the correctors to ones smaller than the above mentioned maximums.

The Del Norte equipment performed well in most instances. However, a problem was encountered with skip zones. These zones were at irregular intervals and caused skips of thousands (i.e. 20 Km) of meters. Due to the magnitude of these skips, a quirk in the RK 111 program was revealed. Upon contacting OFO's EED, it was found that the computer will not output if there is no solution to a pair of position inputs. This resulted in unequal sounding intervals on several days.

In most cases these intervals meet the requirements of the Hydrographic Manual 4th Ed., Sec. 1.4.6. In the cases where the intervals did not meet the Manual's requirement, inserts were made to concur. The following is a list of the days and position numbers where these unequal intervals occurred.

Time Jumps

VesNo. 2838

<u>J.D.</u>	<u>Position</u>
198	1319 +2, 1342 +4
199	1403 +3, 1404 +3, 1415 - 1418

G. HYDROGRAPHIC POSITION CONTROL (Cont'd)

Time Jumps

VesNo. 2838

<u>J.D.</u>	<u>Position</u>
200	1433 +1
201	1577 +5 - 1594 +4
213	1973, 3055 +2
215	3201 +4
218	3250, 3293, 3381 +2, 3384
220	3444 - 3446, 3453 +3, 3460 +1, 3470
221	3480, 3534, 3550 - 3552, 3590 +2
234	3862 +5, 3886 - 3886 +4
236	4026

VesNo. 2839

185	50 +1
198	173 +3, 177 +2
199	266 - 268
200	293 +4, 304 +1
211	557 +5, 596 +5, 684 +5
212	728 +3
215	831 +3
218	929 +4, 938 +3

G. HYDROGRAPHIC POSITION CONTROL (Cont'd)

VesNo. 2839

<u>J.D.</u>	<u>Position</u>
220	4062 - 4063
221	4171 +1, 4247 +3, 4248, 4262 +1
222	4334 +4
232	4435
234	4638 - 4639

OFO's EED, said a revised RK 111 is forthcoming in which this quirk has been worked out.

All Del Norte positions were checked for time and course validity, and suspect position control rejected. A list of signals and an Abstract of Electronic Correctors are appended.

H. SHORELINE *See Verification Report*

Shoreline on the field smooth sheets was traced from prior surveys, I-1903 and I-1836, and is for orientation purposes only. No shoreline was included within the survey limits.

I. CROSSLINES

Crosslines constituted 9.8% of the mainscheme lines of electronic hydrography. In all cases, the soundings on the crosslines compare within one to two feet of the mainscheme hydrography. *CONCUR*

J. JUNCTIONS *See Verification Report*

This survey junctions with five other surveys as follows:

<u>Survey Registry No.</u>	<u>Source</u>	<u>Scale</u>	<u>Date</u>	<u>Position</u>
I-1850	USLS	1:10,000	1947	North
I-1903	USLS	1:20,000	1946-1950	West & South
I-1836	USLS	1:20,000	1945-1946	West
I-1852	USLS	1:10,000	1947	North & West
I-9690	MT MITCHELL	1:50,000	1977	East & South

J. JUNCTIONS (Cont'd)

The U.S. Lake Survey (USLS) Sheets noted above were the inshore hydrographic surveys with which this survey junctioned.

Junctions with the NOAA Ship MT MITCHELL's sheet H-9690 ⁽¹⁹⁷⁷⁾ was accomplished in the offshore deep water regions on the East and South boundaries of this survey.

Junction soundings of this survey agreed to within 4 feet of USLS soundings and to within 2 feet of the MT MITCHELL's soundings. Three discrepancies with this criteria were observed. Developments K, L, and AA can be found in Section L of this report. The results of development L are as follows:

<u>G.P.</u>	<u>Development Positions</u>	<u>Remarks</u>
44°55.3' N ✓ 83°11.6' W ✓	4570-4583	Searching for a 123' shoal sounding from the MT MITCHELL's work. A 122' sounding was observed at pos. #4572 + 4½. ✓
<i>sand ridge running in a NW-S.E. direction - least depth obtained 122 ft.</i>		

Junction with H-9690 (1977) is considered adequate.

K. COMPARISON WITH PRIOR SURVEYS See Verification Report, also.

The following presurvey review items were investigated during the course of this survey. All items were obtained from presurvey review instructions dated 20 March 1978. Appropriate parts of the Thunder Bay Shipwreck Survey (See Section S) and blowups of the three PSR items discussed below are inserted in Section L of this report.

PSR #9 (20 foot least depth over wreck)

Surveyed least depth: 21 feet ✓
 Geographic position: 45°01'33" N, 83°20'51" W
 Position information: J.D. 261, position #7147

A diver's least depth, using a leadline, was obtained on a metal pipe protruding amidships. Surrounding depths were 32 feet. The wreck is of wooden construction with much stone on top and is over 200 feet in length. Some ribs are still protruding. The Thunder Bay Shipwreck Survey (wreck # 10) shows the Steamer JOHNSON to be 225 feet in length, wooden hulled, and carrying limestone boulders. We recommend charting this item as surveyed.

See Verification Report

Concur ✓

K. COMPARISON WITH PRIOR SURVEYS (Cont'd)

logged → PSR #9 (29 foot least depth over wreck)

Surveyed least depth: 29 feet ✓✓
Geographic Position: 45°00'55" N, 83°18'13" W
Position Information: J.D. 262, position #7156

A diver's least depth, using a leadline, was obtained on a wooden fragment protruding from the starboard rail. Surrounding depths are ^{42 to} 43 feet. Many turnbuckles are still attached to the rails. Metal sheathing of the hull was seen around the bow. The wooden hull was over 200 feet in length. The Thunder Bay Shipwreck Survey (wreck #9) calls it a carbide-carrying steamer. However, neither the boiler or lifeboat remains, mentioned in the report were located. We recommend charting this item as surveyed. *Concur ✓*

11 PSR #10 obstruction, PA ... search for anchor

Development of the area was conducted on J.D. 237. An area 0.5 sq. nm. was covered by running lines with 45 meter spacing parallel to the main-scheme, then running 90 meter spaced lines perpendicular to the main-scheme. This was followed by fathogram searches on J.D. 242 and J.D. 243 to isolate the area of strays located during the development. Dives were made on three strays (J.D. 262, 264) following fathogram searches at 5 meter spacing, all were found to be piles of stone rubble extending 2 to 3 feet off the general bottom. An old spade anchor with a wooden stock was discovered while searching around one pile of stone rubble. However, a telephone conversation between LT Chelgren and a representative of the ALLEN's Company indicated that this was not the anchor reported lost by the ALLEN. Detached positions on the spade anchor were obtained on J.D. 262 and J.D. 264 but were rejected when local divers raised it between 22-24 September. It now stands in front of the local dive shop (the "Ski Rack" of Alpena, Michigan).

Robert Massey, the president of Pan Oceanic (an Alpena based salvage company), and the Hydrographic Survey Company of Chicago also attempted to locate the ALLEN's anchor and neither was successful. According to these salvage operations the anchor cannot stick up more than 3 feet from the bottom. A wire drag of the area was not attempted because of the numerous piles of stone rubble in the area. It is recommended that the charted symbol remain as "Obstr PA" because a large number of deep draft cement ships regularly transit the area. *Concur, see Verification Report, also Section 7, 2.3.*

Due to the heavy concentration of soundings in the development of the PSR items, blowups (1:10,000 scale) were produced and are inserted in Section L of this report. Two blowups of PSR #10 are included. One

K. COMPARISON WITH PRIOR SURVEYS (Cont'd)

includes all sounding lines run through the area and the second is comprised of positions acquired during the fathogram searches of the area.

One prior survey of the area was available for comparison. I-1845, a USLS 1:120,000 survey conducted in 1946, covered a portion of the work area. Most soundings agreed well with this survey. Three discrepancies, differing by more than 4 feet, were investigated. Development P is discussed in Section L of this report. Developments N and Q had the following results:

<u>Development</u>	<u>G.P.</u>	<u>Development Pos. #</u>	<u>Remarks</u>
N	$44^{\circ}56.1' N$ $83^{\circ}08.7' W$ <i>Least depth in area 107 ft</i>	4602 - 4610	Searching for a prior 108' sounding. A 108' sounding was located 0.35 nm NE at pos. # 827 +5 in surrounding depth of 115'. <i>107 foot depth found at $44^{\circ}56.98' N$ $83^{\circ}08.16' W$</i>
Q	$44^{\circ}56.6' N$ $83^{\circ}06.4' W$ <i>Least depth on rise in this area 143 ft. from #4690</i>	4623 - 4628	Searching for a prior 151' sounding. A 151' sounding was located 0.25 nm West at pos. #1731 in surrounding depths of 151'. <i>143 foot depth found on H-9690 (1977) 0.6 NM to SE</i>

It is recommended that the data from this survey take precedence over all prior surveys in these investigations. *Chart as shown on the present survey.*

L. COMPARISON WITH THE CHART *See Verification Report*

After a field reduction to LWD, 85% of this survey's soundings agreed within 5 feet of those shown on Chart 14864. Mainscheme soundings which did not meet this criterion were investigated by developments.

Thirty eight developments were run during this survey and were divided among the sheets in the following manner:

<u>Sheet</u>	<u>Developments</u>	<u># of Developments</u>
South	A thru U	20
North	AA thru PP; PSR #9, #10, un#	18

L. COMPARISON WITH THE CHART (Cont'd)

Due to the heavy concentration of soundings on some of the developments, blowups (1:10,000 scale) were plotted to improve legibility. The following items were enlarged and are included in this section:

Development A	PSR #9 (20 Ft. wreck)
Development B	PSR #9 (29 ft. wreck)
Development AA	PSR #10 (2 blowups; see Sec. K)
Development FF	Un# PSR (22 ft. shoal)

The complete list of developments follows:

<u>Development</u>	<u>G.P.</u>	<u>Development Pos'ns.</u>	<u>Remarks</u>
✓ A	44°58.3' N 83°21.6' W 30	1883 - 1894 7050 - 7055	Developing un# PSR item, 25 foot shoal. Least depth of 24' observed at pos. # 1883 + 1½ (M/S). <i>Concur</i>
B	44°57.8' N 83°21.6' W <i>noted on smooth sheet, "23 ft. L.D. acquired on this survey"</i>	1871 - 1882 7056 - 7075 7149, 7154 <i>22' L.D. brought fwd from LS-1228 (1910)</i>	Developing un# PSR item, 22 foot shoal. Least depth of 22' observed at pos. # 7149.
C, D, E, K	From 44°54.0' N 83°17.5' W To 44°56.1' N 83°22.1' W	863 - 887 3615 - 3618 3643 - 3664 4290 - 4345	Developing contours over irregular bottom. ✓
F	44°56.3' N 83°21.5' W	3613 - 3614 <i>L.D. of 25 ft found on rise at lat 44°56.1' N, long 83°20.75' W</i>	Searching for charted 25' sounding. A 25' sounding was located ✓ 0.25 nm SW at pos. #1478 + 4½. <i>Concur</i>
G	44°56.6' N 83°19.8' W	3630 - 3642 <i>L.D. of 29 ft found on shoal at lat. 44°56.9' N, long. 83°19.91' W</i>	Searching for charted 34' sounding. A 33' sounding was located ✓ 0.25 nm NW at pos. #1297 + 1.

L. COMPARISON WITH THE CHART (Cont'd)

<u>Development</u>	<u>G.P.</u>	<u>Development Pos'ns.</u>	<u>Remarks</u>
H	44°57.0' N 83°19.9' W	3619 - 3629	Defining 38' contour. Chart present survey depths. <i>L.D. - 29 ft</i>
I	44°57.5' N 83°16.8' W	4279 - 4289 4560 - 4569 <i>L.D. in area is 198 ft.</i>	Developing bottom and searching for 53' charted sounding. A 50' sounding was observed at 4279 + 2½. Chart present survey depths
J	44°57.8' N 83°22.4' W	3603 - 3612 <i>L.D. of 27 ft found on shoal in lat 44°57.86' N, long. 83°22.03' W</i>	Searching for charted 26' sounding. A 26' 27" sounding was located 0.25 nm SW at pos. # 1156 + 5. - 27' shoal approx 0.4 nm E.
M	44°55.9' N 83°10.7' W	4587 - 4601	Searching for charted 124' sounding. 124' sounding located 0.3 nm N at pos. #1779 +5. Chart present survey depths
P	44°57.7' N 83°06.5' W	4611 - 4622	Searching for charted and prior 152' sounding. Charted was displaced 0.15 nm E. Chart present survey depths
R	44°58.4' N 83°12.5' W	4261 - 4273	Development of a 90' shoal in surrounding 97' depths. A least depth of 90' was obtained at pos. # 1826 + 1½ (M/S). Chart present survey depths
S	44°54.4' N 83°14.8' W	7082 - 7112 <i>N.W. S.E. sand ridge with a L.D. of 82 ft.</i>	Development of irregular bottom.
T	44°54.8' N 83°16.4' W	7076 - 7081	Development of a 70' shoal in surrounding 84' depths. A least depth of 70' was found at pos. #34 +½ (X/L). 69 Foot Sound at 44° 54.72', 83° 16.50'

L. COMPARISON WITH THE CHART (Cont'd)

<u>Development</u>	<u>G.P.</u>	<u>Development Pos'ns.</u>	<u>Remarks</u>
U	44°57.4' N 83°15.3' W	9304 9308 4274 - 4278 <i>undulating - meandering sand ridge</i>	Development of a 73' shoal in surrounding 80 ft. depths. A least depth of 73' was obtained at pos. #1231 + 5 (M/S). <i>71 foot found approx 0.4 nm SSW</i>
AA	45°01.7' N 83°25.0' W	4026 - 4039 7019 - 7036	Search for a 4' charted and junction sounding. Located at pos. #4039 (leadline). Chart present survey depths
BB	45°02.3' N 83°23.7' W	4020 - 4025	Searching for a 17' charted sounding. Located least depth of 23' in surrounding area. See present survey smooth sheet
CC	44°59.8' N 83°23.4' W	3962 - 3966	Search for 27' charted sounding. Located 27' depth 0.2 nm S at pos. #3964. See present survey smooth sheet
FF	45°01.3' N 83°19.8' W	3933 - 3940 4080 - 4107	Search for 32' charted sounding. Located 31' least depth at pos. #1978 + 4 (M/S). Concur
GG	45°00.6' N 83°16.8' W	7166 - 7169	Search for 35' charted located 35' depth 0.2 nm N at pos. #3301 + 3 (M/S). See present survey smooth sheet.
HH	45°00.7' N 83°15.8' W	4723 - 4728	Searching for 17' charted sounding and developing 16' shoal. Located 16' sounding 0.3 nm, NW at pos. #3337 + 1 (M/S). See present survey smooth sheet.

*FF 32' sdg
charted from an
unknown source
cht'd 32 ft sdg is
considered discred-
ited by the pres. survey*

The 31 ft sdg on the pres. survey originates with a questionable trace on the fathogram. Should be investigated on a future survey.

The 35' sdg located on the pres. survey is on a normal slope & does not represent a shoal depth.

Area is inadequately developed to ascertain least depths.

L. COMPARISON WITH THE CHART (Cont'd)

<u>Development</u>	<u>G.P.</u>	<u>Development Pos'ns.</u>	<u>Remarks</u>
II	45°00.1' N 83°15.4' W	4704 - 4722	Developing irregular bottom. ✓
JJ	44°59.8' N 83°14.8' W	4690 - 4693	Search for 35' charted sounding. Located 35' depth 0.15 nm NW at pos. #4716 + 2½ (Dev. II). <i>28-foot depth found in vicinity.</i> ✓
KK	45°01.5' N 83°14.7' W	4696 - 4700	<i>Area is inadequately developed to ascertain least depths.</i> Search for 19' charted sounding. Located 20' least depth at pos. #4699 + 1. <i>19-foot depth from prior survey</i> ✓
LL	45°01.5' N 83°13.6' W	4701 - 4703	<i>28 ft. is the least depth acquired on a feature in this vicinity.</i> Search for 31' charted sounding. Located a 31' sounding 0.4 nm NW at pos. #4431 + 1½ (M/S). <i>See present survey smooth sheet.</i> ✓
MM	45°01.8' N 83°12.1' W	4241 - 4258 7005 - 7018	<i>Nothing here to warrant a special search.</i> Search for charted 41', 26', and 37' soundings. Located a 41' sounding at pos. #3167 + 5 at 0.15 nm N, a 26' sounding was located at pos. #3530 at 0.10 nm N, and a 34' depth was located at pos. #3550 + 5 0.3 nm N. <i>See present survey smooth sheet.</i> ✓
NN	44°59.8' N 83°19.3' W	4108 - 4125	<i>Several rises in vicinity L.D. acquired 42 ft.</i> Developing irregular bottom. ✓
OO	44°59.0' N 83°16.0' W	4126 - 4133	<i>68' sdg on chart</i> Developing 56' shoal sounding in surrounding 66' depths. A least depth of 56' was observed at pos. #3399 + 2½. ✓
			<i>No indication of shoal on chart. 57 ft sdg originates with a questionable fath. trace on the present survey & should be investigated on a future survey.</i>

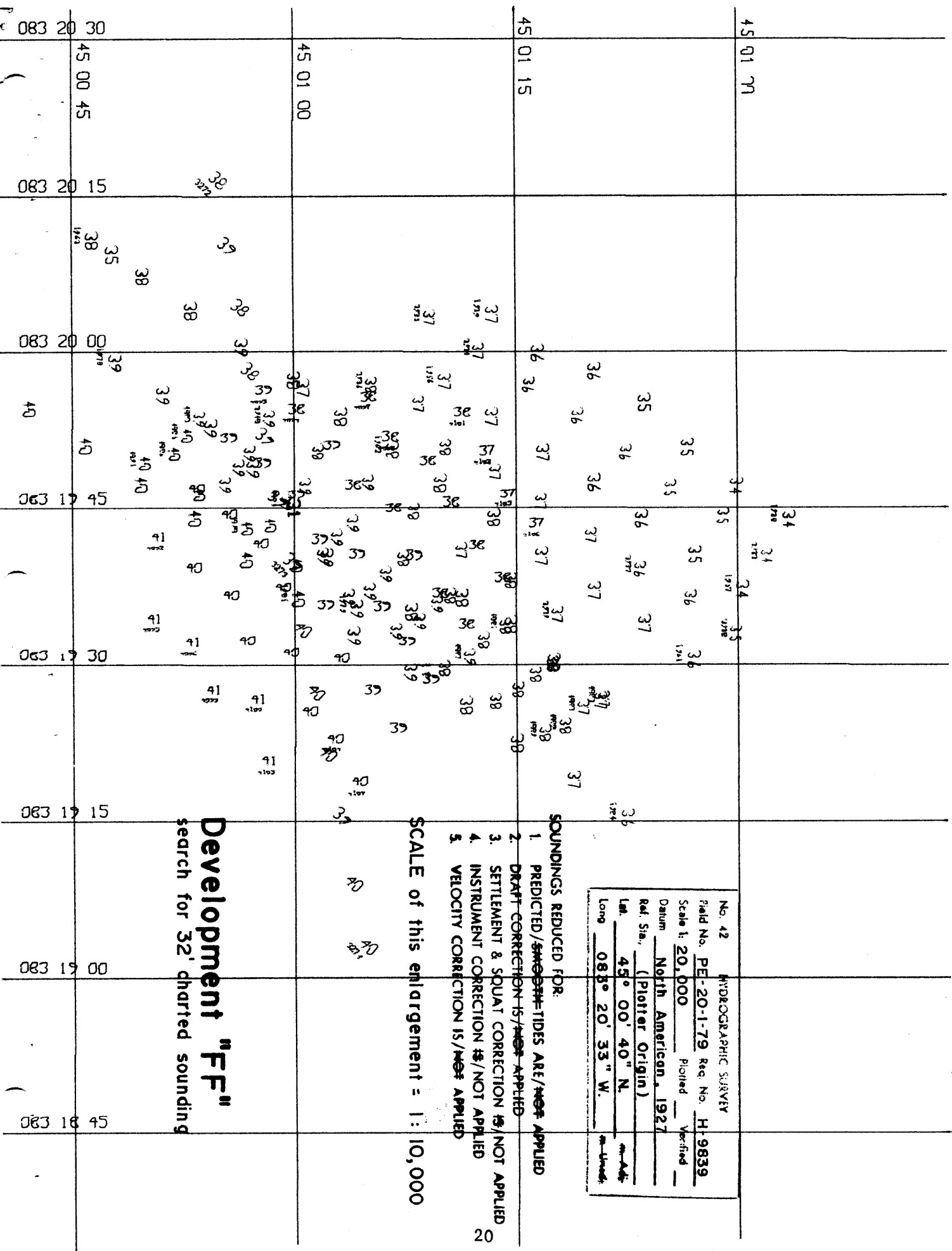
No. 42 HYDROGRAPHIC SURVEY
 Field No. PE-20-1-79 Reg. No. H-9839
 Scale 1: 20,000 Plotted _____ Verified _____
 Datum North American, 1927
 Ref. Sta. (Ploter Origin)
 Lat. 45° 00' 40" N. ~~45° 00' 40" N.~~
 Long. 083° 20' 33" W. ~~083° 20' 33" W.~~

SOUNDINGS REDUCED FOR:

1. PREDICTED/~~MEAN~~ TIDES ARE/~~NOT~~ APPLIED
2. DRAFT CORRECTION IS/~~NOT~~ APPLIED
3. SETTLEMENT & SQUAT CORRECTION IS/~~NOT~~ APPLIED
4. INSTRUMENT CORRECTION IS/~~NOT~~ APPLIED
5. VELOCITY CORRECTION IS/~~NOT~~ APPLIED

SCALE of this enlargement = 1: 10,000

Development "FF"
 search for 32' charted sounding



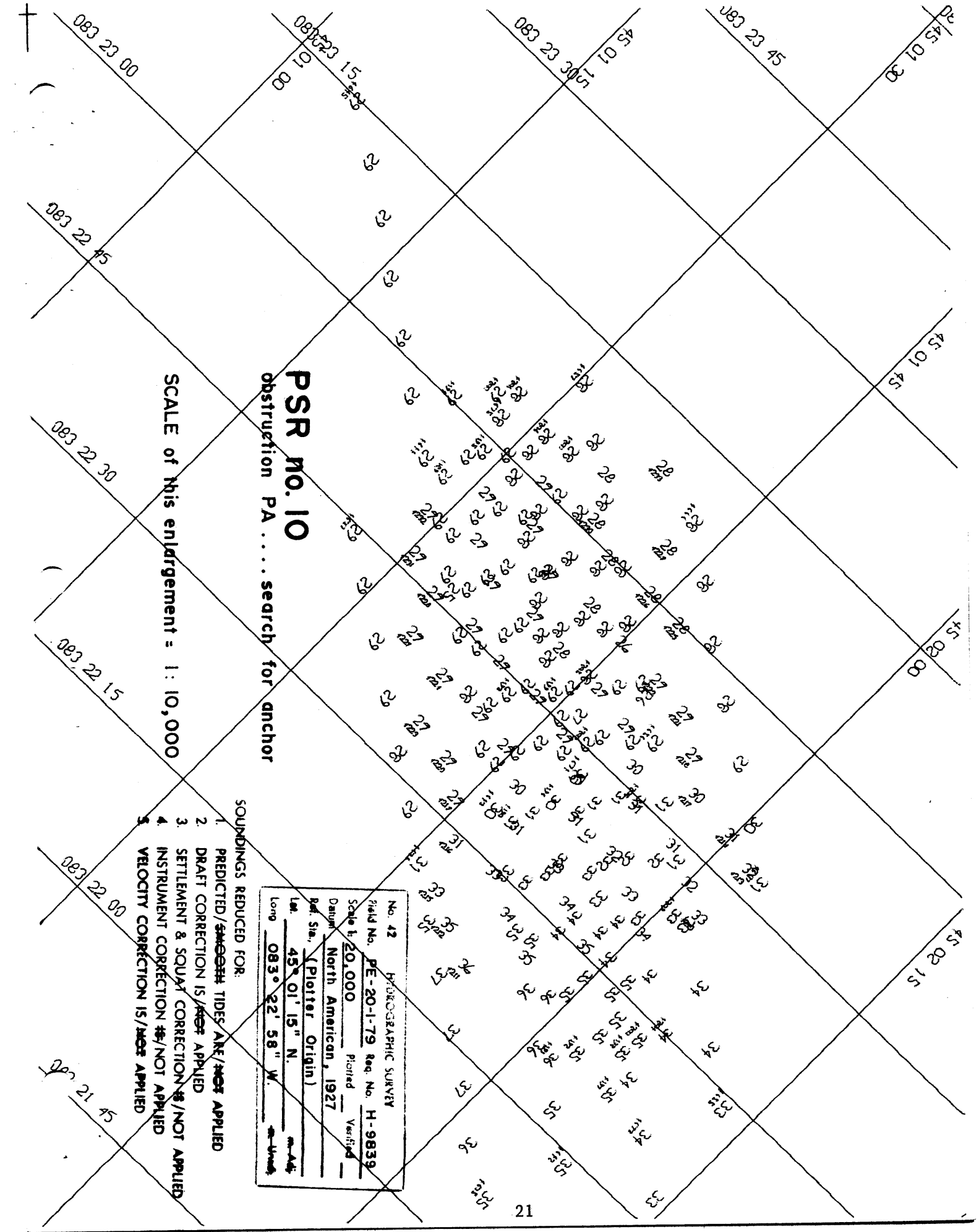
PSR no. 10

Obstruction PA search for anchor

SCALE of this enlargement = 1 : 10,000

- SOUNDINGS REDUCED FOR:
1. PREDICTED/~~SWELL~~ TIDES ARE/~~NOT~~ APPLIED
 2. DRAFT CORRECTION IS/~~NOT~~ APPLIED
 3. SETTLEMENT & SQUAT CORRECTION IS/~~NOT~~ APPLIED
 4. INSTRUMENT CORRECTION IS/~~NOT~~ APPLIED
 5. VELOCITY CORRECTION IS/~~NOT~~ APPLIED

No. 42	HYDROGRAPHIC SURVEY
Field No. PE-20-1-79	Req. No. H-9839
Scale 1:20,000	Plotted _____
Datum North American, 1927	Verified _____
Ref. Sigsbee (Plotter Origin)	
Lat. 45° 01' 15" N	Long. 083° 22' 58" W



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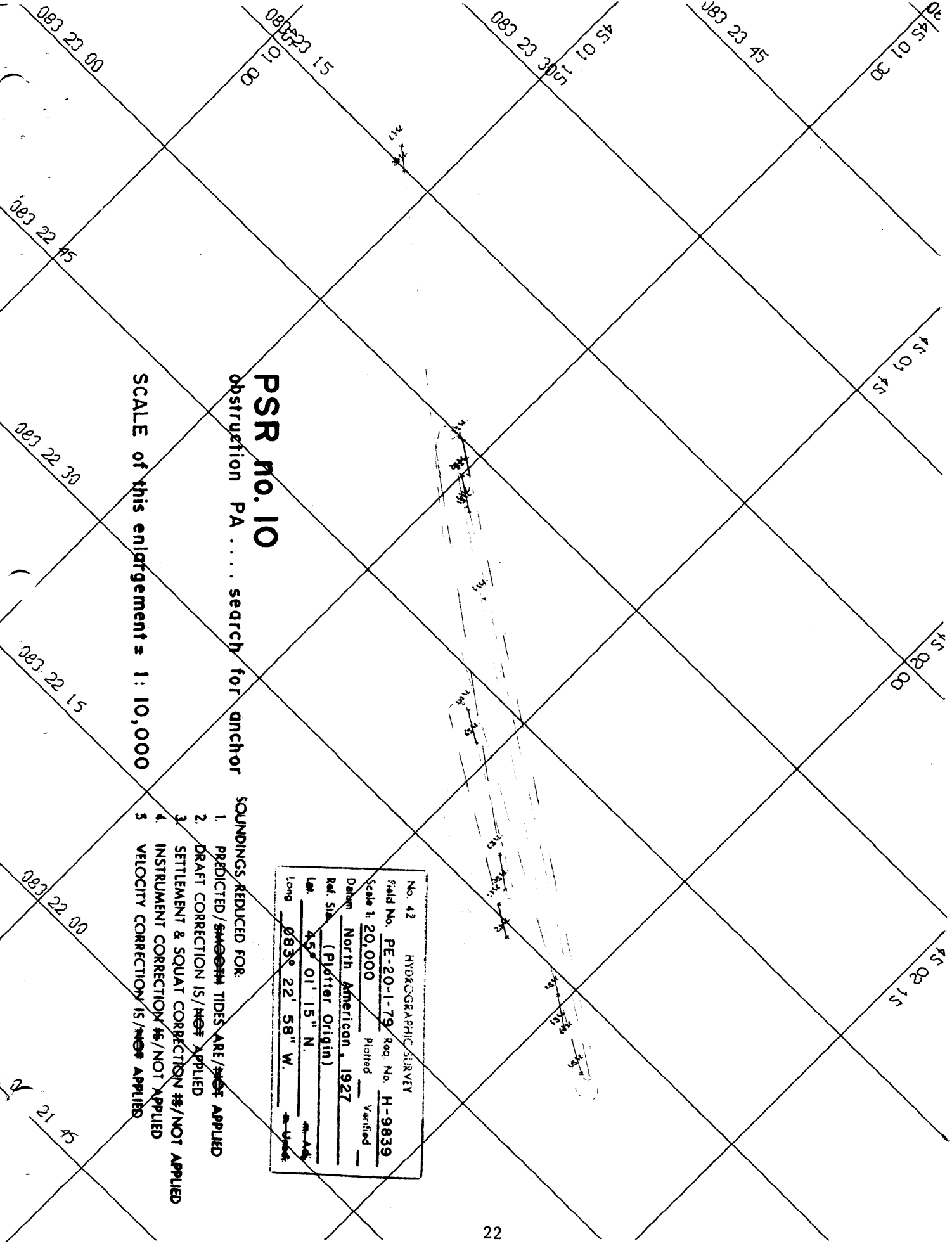
PSR no. 10

Obstruction PA search for anchor

SCALE of this enlargement = 1 : 10,000

- SOUNDINGS REDUCED FOR:
1. PREDICTED/~~SWELL~~ TIDES ARE/~~NOT~~ APPLIED
 2. DRAFT CORRECTION IS/~~NOT~~ APPLIED
 3. SETTLEMENT & SQUAT CORRECTION #/~~NOT~~ APPLIED
 4. INSTRUMENT CORRECTION #/~~NOT~~ APPLIED
 5. VELOCITY CORRECTION IS/~~NOT~~ APPLIED

No. 42	HYDROGRAPHIC SURVEY
Field No. PE-20-1-79	Req. No. H-9839
Scale 1: 20,000	Plotted <input type="checkbox"/> Verified <input type="checkbox"/>
Date: North American, 1927	
Ref. Sta. (Piloter Origin)	
Lat. 45° 01' 15" N.	
Long. 063° 22' 58" W.	



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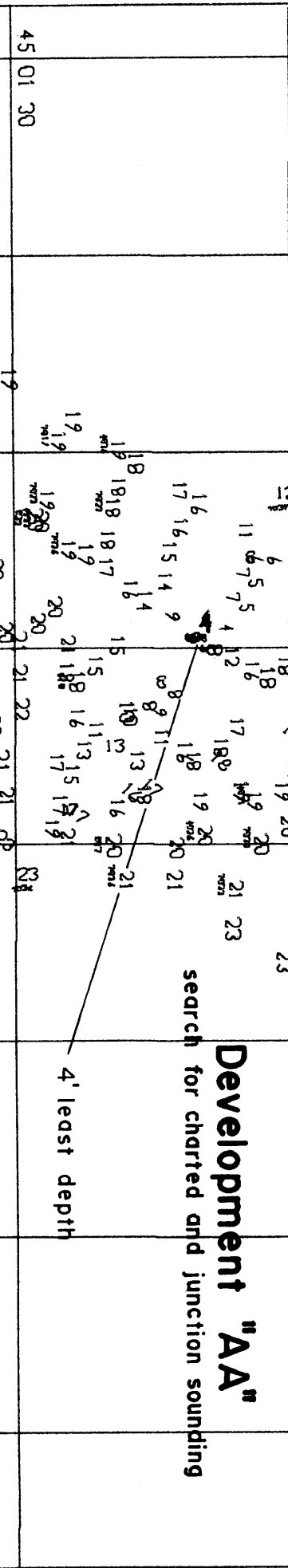
No. 12	HYDROGRAPHIC SURVEY	
Field No. PE-20-1-79	Req. No. H-9839	
Scale 1: 20,000	Plotted	Verified
Datum North American, 1927		
Ref. Sta. (Plotter Origin)		
Lat. 45° 01' 18" N.		
Long. 083° 25' 49" W.		

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- SOUNDINGS REDUCED FOR:
1. PREDICTED/~~SOUND~~ TIDES ARE/~~NOT~~ APPLIED
 2. DRAFT CORRECTION IS/~~NOT~~ APPLIED
 3. SETTLEMENT & SQUAT CORRECTION IS/~~NOT~~ APPLIED
 4. INSTRUMENT CORRECTION IS/~~NOT~~ APPLIED
 5. VELOCITY CORRECTION IS/~~NOT~~ APPLIED

SCALE of this enlargement = 1:10,000

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No. 42	HYDROGRAPHIC SURVEY
Field No. PE-20-1-79	Req. No. H-9639
Scale 1:20,000	Plotted
Datum North American, 1927	Verified
Ref. Sta. (Plotter Origin)	
Lat. 45° 00' 04" N.	
Long. 083° 21' 41" W.	

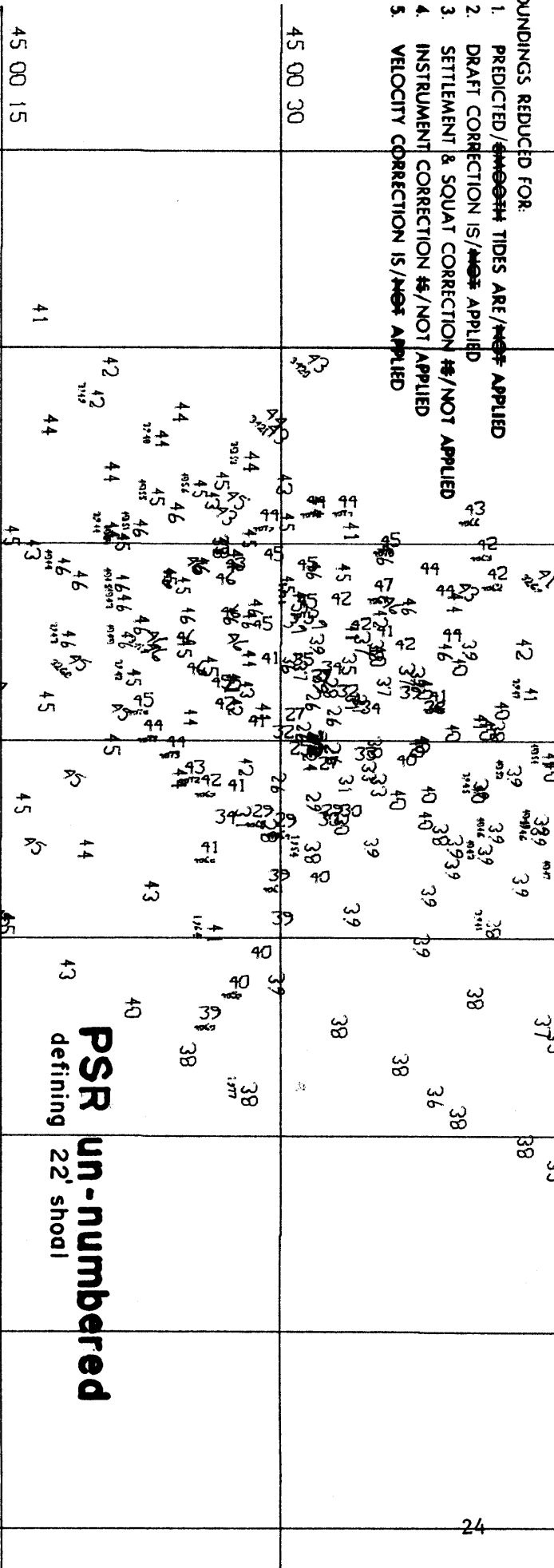
SCALE of this enlargement = 1:10,000

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SOUNDINGS REDUCED FOR:

1. PREDICTED/TIDES ARE/NOT APPLIED
2. DRAFT CORRECTION IS/NOT APPLIED
3. SETTLEMENT & SQUAT CORRECTION #/NOT APPLIED
4. INSTRUMENT CORRECTION #/NOT APPLIED
5. VELOCITY CORRECTION IS/NOT APPLIED

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45 01 15 46 45 44 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24

44 45 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24

PSR no. 9
wreck covered by 20'

No. 42 HYDROGRAPHIC SURVEY
Field No. PE-20-1-79 Rec. No. H-9839
Scale to 20,000 Plotted Verified
Datum North American, 1927
Lat. 45° 01' 05" N
Long. 083° 21' 45" W

- SOUNDINGS REDUCED FOR:
1. PREDICTED/~~MEAN~~ TIDES ARE/~~NOT~~ APPLIED
 2. DRAFT CORRECTION IS/~~NOT~~ APPLIED
 3. SETTLEMENT & SQUAT CORRECTION IS/~~NOT~~ APPLIED
 4. INSTRUMENT CORRECTION IS/~~NOT~~ APPLIED
 5. VELOCITY CORRECTION IS/~~NOT~~ APPLIED

SCALE of this enlargement = 1:10,000

45 01 30

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SCALE of this enlargement = 1 : 10,000

No. 42	HYDROGRAPHIC SURVEY
Field No. PE-20-1-79	Rec. No. HI-9839
Scale 1: 20,000	Plotted
Date: North American, 1927	Verified
Ref. Sta. (Plotter Origin)	
Lat. 45° 00' 33" N.	
Long. 083° 19' 16"	

SOUNDINGS REDUCED FOR:

- 1. PREDICTED/~~MEAN~~ TIDES ARE/~~NOT~~ APPLIED
- 2. DRAFT CORRECTION IS/~~NOT~~ APPLIED
- 3. SETTLEMENT & SQUAT CORRECTION IS/~~NOT~~ APPLIED
- 4. INSTRUMENT CORRECTION IS/~~NOT~~ APPLIED
- 5. VELOCITY CORRECTION IS/~~NOT~~ APPLIED

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PSR no. 9
wreck covered by 29'

L. COMPARISON WITH THE CHART (Cont'd)

<u>Development</u>	<u>G.P.</u>	<u>Development Pos'ns.</u>	<u>Remarks</u>
PP	44°59.6' N 83°07.1' W	4683 - 4689 4135 - 4155	E/W crossing lines were run to show general depths are 5' - 10' deeper than charted, and to assure accuracy of mainscheme lines.
Un #PSR	45°00.52' N 83°20.80' W <i>(noted 23 ft as the L.D. acquired on the pres. survey on the S.S.)</i>	3941 - 3949 4040 - 4079	Developing un# PSR item, 22' shoal. Located 22' least depth at pos. # 1941 + 1/2 (M/S). 22 foot forward from prior survey. 20 foot wreck. See Section K. L.D. 21' (diver) on pres. survey.
PSR #9	45°01.6' N 83°20.9' W	3969 - 3974 3988 - 4019 7147	29 foot wreck. L.D. 29" See Section K. (diver) on pres. survey
PSR #9	45°01.0' N 83°18.2' W	4156 - 4188 7156	See Section K. L.D. of 23 ft on pres. survey is considered questionable - investigate on a future survey.
PSR #10	45°01.7' N 83°22.8' W	4189 - 4233 7113 - 7115 7147 - 7162	See Section K. L.D. of 23 ft on pres. survey is considered questionable - investigate on a future survey.

Investigations conducted to clarify charted versus boatsheet disagreement showed that the charted depths were incorrectly positioned. It is recommended that this survey's data take precedence over earlier surveys in these investigations. *CONCUR OPS*

In addition to the above mentioned developments 5 uncharted wrecks were located during the survey. Local divers and the Thunder Bay Shipwreck Survey were helpful in locating these items:

logged
✓ SCANLON (J.D. 266, pos. #7163, 7164) *Vicinity of* at 45°02.13'N, long. 83°19.62'W

logged
A leadline depth on the barge itself reduced to 15' (pos. #7163) with surrounding depths of 19'. The barge was very broken up, only deck planking remains. The sidewalls, gears, chain, and cable mentioned in the Thunder Bay Shipwreck Survey (wreck #8) were gone. A leadline least depth, reduced to 5' (pos. #7164) was obtained on the metal frame in 18' of water. The reason that the crane is so far from the barge is that salvagers attempted to drag it ashore unsuccessfully.

With final correctors - 16 ft is least depth on wreck.

L. COMPARISON WITH THE CHART (Cont'd)

logged ✓ M/V MONTANA (J.D. 269; pos. #7165) *lat. 44°59.26'N, long. 83°17.22'W*

This wooden hulled steamer is 236' in length with ribs still protruding and the propeller intact. A leadline least depth reduced to 38' in 66' of water. This is in the Thunder Bay Shipwreck Survey (wreck #11). A picture from Mr. George Baker is enclosed.

|| ✓ M/V GRECIAN (J.D. 270, 271; pos. #7162) *lat. 44°58.10'N, long 83°12.00'W*

This steel hulled freighter is 296' in length and is in good shape despite the fact that the pilot house, mainmast, aftermast, jackstaff, flagstaff, and stack have been removed. The landing boom on the bow and some pipes protruding from the engine room (where the stack was) have the same least depth of ~~64~~^{64.5} in 105' of water. This is Thunder Bay Shipwreck #12. A picture from Mr. George Baker is enclosed. *Chart 65 Foot smooth sheet depth*

|| ✓ Tugboat (J.D. 272, 274; pos. #7170) *lat. 45°03.28'N, long. 83°25.92'W*

A 50' wooden tug had a leadline least depth reduced to 5' in ⁵ surrounding depth of 10' on a protruding rib. This wreck is broken up with some ribs and planking remaining as described in Thunder Bay Shipwreck Survey, wreck #4.

|| ✓ Schooner (J.D. 272, 274; pos. #7171) *lat. 45°03.05'N, long 83°26.08'W*

The leadline least depth, reduced to 5' was obtained on the rudder post. An anchor chain and a 4 bladed 10 foot propeller were seen as described in the Thunder Bay Shipwreck Survey, wreck #3.

off limits of survey

Information was also obtained on two other wrecks. A picture of the M/V MONROVIA (charted at 44°59.0' N, 82°55.6' W, least depth 43', PSR #9) is enclosed courtesy of Mr. George Baker. No search was made for this wreck as we were restricted by time, and the MONROVIA was not located on this sheet.

|| ✓ The M/V MONOHANSETT was investigated, but not located by divers. An aerial search confirmed its existence. A description can be found in the Thunder Bay Shipwreck Survey (wreck #14). The description in the report is reported, by local divers, to be accurate. Time, again, restricted us from obtaining a surveyed position. *This wreck should be charted*

*in Lat 45° 01' 58"
Long. 83° 11' 30" per CL574/82*

FPS

L. COMPARISON WITH THE CHART (Cont'd)

All pertinent information from the Thunder Bay Shipwreck Survey is appended to this report. ✓

It is recommended that the above mentioned wrecks, with position data from this survey, be charted at their surveyed positions. The M/V MONOHANSETT should be charted with the symbol "PA" at its reported position (from the "Shipwreck Survey").

M. ADEQUACY OF SURVEY

See Verification Report

Do not concur with "PA" recommendation. Position was described as accurate by local divers, deferred to compilation for resolution.

This survey is complete and adequate to supersede the presently charted soundings and prior surveys, for charting purposes.

N. AIDS TO NAVIGATION

The Thunder Bay Traffic Lighted Bell Buoy and North Point buoy "10" were the only aids located within the survey limits. Various other buoys in the Bay were located in an effort to confirm their charted positions. The descriptions and characteristics of these buoys, as well as those of three fixed lighted structures, agreed very well with Coast Guard Light List, Volume IV, Great Lakes, 1979. In most cases, the charted positions also show excellent agreement with the positions determined in this survey. In the Huron Cement Company Channel differences between charted and surveyed positions of up to 120 meters were observed. A contributing factor to the positional inaccuracy is the difference in datums. While the chart was produced using the 1902 North American Datum, the survey was conducted using the 1927 North American Datum. A memo regarding the charted inaccuracy of these privately maintained buoys has been forwarded to the Ninth Coast Guard District.

The lighted fixed structures all adequately serve their intended purposes, however, surveyed positions were not acquired. *Should Remain as charted* ✓

Calculations of surveyed positions for the navigational aids are appended to this report. A list of all the above structures and their positions follows:

<u>Aid</u>	<u>Light List #</u>	<u>Position #</u>	<u>Charted</u>	<u>Surveyed</u>
Junction Ltd. Buoy, RB 1QKF1 ✓	1307	4229 9339	45°02'57.6" 83°24'03.1"	45°02'58.3" 83°24'04.5" ✓

N. AIDS TO NAVIGATION (Cont'd)

<u>Aid</u>	<u>Light List #</u>	<u>Position #</u>	<u>Charted</u>	<u>Surveyed</u>
R N"2" ✓		4227 9327	45°03'06.4" 83°24'21.7"	45°03'07.1" ✓ 83°24'22.6" ✓
B1 C"1" ✓		4230 9340	45°03'04.9" 83°24'23.4"	45°03'05.2" 83°24'25.6"
R N"4" ✓		4226 9336	45°03'13.1" 83°24'35.4"	45°03'13.5" 83°24'36.3"
B1 C"3" ✓		4231 9341	45°03'11.4" 83°24'36.6"	45°03'11.5" 83°24'38.0"
R N"6" ✓		4225 9335	45°03'18.0" 83°24'45.5"	45°03'18.0" 83°24'45.7"
Thunder Bay Quarries Channel 1308 ✓ Junction Buoy RB 1 QKF1		4224 9334	45°03'24.7" 83°24'59.0"	45°03'25.1" 83°25'00.4"
Huron Cement Channel (priv. maint'd)				
R N"2" ✓ (priv. maint'd)		4228 9338	45°02'58.3" 83°24'00.5"	45°02'59.9" 83°24'02.3"
B1 C"3" ✓		4232 9332	45°03'14.5" 83°24'09.6"	45°03'17.4" 83°24'09.1"
R N"4" ✓		4240 9350	45°03'15.0" 83°24'06.9"	45°03'17.0" 83°24'11.6"
B1 C"5" ✓		4233 9333	45°03'25.9" 83°24'14.2"	45°03'28.0" 83°24'13.2"
R N"6" ✓		4239 9339	45°03'26.4" 83°24'11.3"	45°03'27.2" 83°24'15.7"
B1 C"7" ✓		4234 9334	45°03'35.8" 83°24'18.5"	45°03'38.3" 83°24'17.7"
R N"8" ✓		4238 9338	45°03'36.3" 83°24'15.7"	45°03'37.7" 83°24'19.8"

N. AIDS TO NAVIGATION (Cont'd)

<u>Aid</u>	<u>Light List #</u>	<u>Position #</u>	<u>Charted</u>	<u>Surveyed</u>
M (A) W Buoy Thunder Bay Traffic Lighted Bell Buoy	1304 ✓	4259 9369	44°58.7' 83°15.0'	44°58'44.4" 83°14'52.9"
R N"10" North Pt. Buoy 10	✓	4260 9370	45°01.0' 83°15.0'	45°00'09.7" 83°14'48.8"
Thunder Bay Island Lt., Fl W 15s	1311 ✓		45°02.2' 83°11.7'	
Alpena Light E Int. W, 6s	1305 ✓		45°03.6' 83°25.4'	
Alpena Yacht Club Light F Fl R, 5 ^S (2 ^S F1)	1306			

Att

O. STATISTICS

<u>Category</u>	<u>VesNo.</u> <u>2830</u>	<u>VesNo.</u> <u>2837</u>	<u>VesNo.</u> <u>2838</u>	<u>VesNo.</u> <u>2839</u>	<u>Total</u>
Position Numbers	-	42	1443	1900	3385
Nautical Miles of Sounding Lines	-	-	654.1	509.1	1163.2
Square Nautical Miles of Sounding Lines					106
XBT's	2	-	21	12	35
TDC's	-	-	1	1	2
Nansen Casts	1	-	-	-	1
Bottom Samples*	-	42	78	117	237

*Log Sheet "M" appended to this report.

P. MISCELLANEOUS

Mr. Jerry Stein and Mr. George Baker, two local divers, were particularly helpful to the PEIRCE by aiding ship's personnel in locating wrecks in Thunder Bay. Mr. Baker also provided the appended pictures of the wrecks; GRECIAN, MONTANA, and MONROVIA.

Investigation by ship's divers and affirmation by local sources confirmed that many stray soundings 2-3 feet off the bottom are in fact, stone rubbles. All strays of like characteristic, to those investigated, were considered to be stone rubbles.

Because of an error in laying out the limits of the sheet, a 6.5 square nautical mile area surveyed by the MT MITCHELL in 1977 was resurveyed. *continued*
(overlap with H-9690 (1977))

Several master tapes were found to contain parity errors. Tapes with an excessive number of errors were duplicated with AM 602 to delete all parity errors. The original masters are being submitted, with the survey, in a separate box of "Bad Masters". Those tapes with only a few parity errors have not been changed and are listed below:

<u>VesNo.</u>	<u>Julian Day</u>	<u>Positions</u>
2839	200	280-281, 298-299, 315-316
	207	442-443, 463-464
2838	198	1340
	199	1407
	201	1552
	206	1625
	214	3134, 3443
	218	3278, 3294, 3295, 3334-3335
	221	3511, 3515, 3520, 3587
233	day word	

Q. RECOMMENDATIONS

Specific recommendations regarding junctions with other surveys and regarding the chart are made in Sections J, K, and L of this report.

R. AUTOMATED DATA PROCESSING

The following were used in acquiring and processing data:

<u>Program #</u>	<u>Program Name</u>	<u>Version Date</u>
RK 111	Range/Range Real Time Hydroplot	1/30/76
RK 201	Grid, Signal and Lattice Plot	4/18/75
RK 211	Range/Range Non-Real Time Hydroplot	1/15/76
RK 300	Utility Computations	2/5/76
RK 330	Data Reformat	5/04/76
PM 360	Electronic Corrector Abstract	2/02/76
AM 401	Mercator Conversion	4/01/73
AM 405	Plane Coordinate Utility	7/01/69
AM 406	Intersection Position Computation	4/06/77
RK 407	Geodetic Inverse/Direct Computation	9/25/78
RK 530	Velocity Correction Computation	5/10/76
AM 602	ELINORE - Extended Line Oriented Editor	5/21/75
RK 606	Tape Duplicator	8/22/74
RK 212	Visual Station Table Load	4/1/74
RK 215	Visual Non-Real Time Plot	8/16/74
RK 216	Range/Azimuth Non-Real Time Plot	2/05/76

S. REFERENCE TO REPORTS

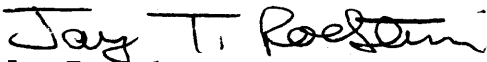
Ship's personnel installed and removed a water level gage at Alpena (907-5065). During the survey, on September 1, 1979, the gage had to be moved and releveled because of the construction of a sewer outfall. Reports have been submitted to the Water Levels Branch in Rockville. A one day gap (27-28 September) exists - during which the gage was not operating. The permanent gage at Harrisville (907-5059) designated for this sheet, was in operation throughout the period. Applicable weather logs have been appended to aid the reconstruction of events.

A magnetic station observation was made by AMC with assistance from ship's personnel. A copy of the report of magnetic observations is included in the survey records.

The report, "Thunder Bay Shipwreck Survey Study Report", written by Brian Bailey was used by the PEIRCE to locate several uncharted wrecks (as reported in Section L of this report). Pertinent information from the report is appended.

A Coast Pilot inspection was performed during the survey. A report was compiled and submitted to the Coast Pilot Branch in Rockville. A copy of the report is included in the survey records.

Respectfully submitted for approval:


Jay T. Rodstein, LTJG, NOAA

FIELD WATER LEVEL NOTE H-~~9839~~

Field water level reductions were based on forecasts issued by the U.S. Army Corps of Engineers. These forecasts were forwarded to the PEIRCE by the Tides and Water Levels Branch for use throughout Lake Huron Survey Area A. (The memo is appended to this report.) These predicted levels were interpolated at 0.2 foot intervals.

The gages listed on the appended request for verified hourly heights were operating during the survey with the exception noted in Section S. of the Descriptive Report.

Water level station reports for the installation and removal of the Alpena gage, and inspection of the Harrisville gage have been forwarded to the Tides and Water Levels Branch, Oceanographic Division, National Ocean Survey.



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY

NOAA Ship PEIRCE
439 W. York St.
Norfolk Va. 23510

5 October 1979

To: Chief, Water Levels Branch (C234)

C. Dale North
From: C. Dale North, CDR, NOAA
Commanding Officer
NOAA Ship PEIRCE

Subject: Request for Verified Hourly Water Levels
Boat Sheet H-9839, PE 20-1-79

Please provide hourly water levels from the water level gage
for the period of hydrography:

Period of hydrography: 135127 GMT 4 July 1979 through
114200 GMT 2 October 1979

Control Station: Alpena, Michigan (907-5065)

Supplementary Station: Harrisville, Michigan (907-5059)

Please forward the requested information directly to the
Atlantic Marine Center, ATTN: CAM 33.

Attachment: Progress Sketch

cc: CAM 1
CAM 3





U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY

8 November 1979

TO: Commander
Ninth Coast Guard District
1240 East 9th Street
Cleveland, Ohio 44199

FROM: Commanding Officer *C. DeWitt*
NOAA Ship PEIRCE
439 West York Street
Norfolk, Va. 23510

SUBJECT: Positioning of navigational aids on Chart 14864, Alpena Harbor inset.

The NOAA Ship PEIRCE conducted a hydrographic survey in and around Thunder Bay, Michigan this past summer. Inaccuracies were found in the charted positions of the Portland-Huron Cement Company Channel, privately maintained buoys. Position information was acquired for buoys "2" through "8" and the errors ranged from 60 to 120 meters. A list of the charted versus surveyed positions follows:

<u>Aid</u>	<u>Charted G.P.</u>	<u>Surveyed G.P.</u>	<u>Position Difference</u>
R"2"	45/02/58.3 83/24/00.5	45/02/59.9 83/24/02.3	63 meters
Bl"3"	45/03/14.5 83/24/09.6	45/03/17.4 83/24/09.1	90 meters
R"4"	45/03/15.0 83/24/06.9	45/03/17.0 83/24/11.6	119 meters
Bl"5"	45/03/25.9 83/24/14.2	45/03/28.0 83/24/13.2	68 meters
R"6"	45/03/26.4 83/24/11.3	45/03/27.2 83/24/15.7	99 meters
Bl"7"	45/03/35.8 83/24/18.5	45/03/38.3 83/24/17.7	79 meters
R"8"	45/03/36.3 83/24/15.7	45/03/37.7 83/24/19.8	100 meters



SIGNAL TAPE LISTING

OPR-X115 H-9839 .. PE-20-1-79

11 OCT , 1979

003	3	44	52	56290	083	18	51414	250	0000	000000	H-2A-MI-77, AMC, 1977 QUAD 440831
004	3	44	55	08797	083	24	17392	250	0000	000000	OSSINEKE (USLS), AMC 1977, QUAD 440831
005	0	44	57	51000	083	26	45384	250	0000	000000	H-1A-MI-77, AMC, 1977 QUAD 440831
006	0	45	01	14318	083	15	54101	250	0000	000000	NORTH PT USLS, ^{RM1} USLS, 1956, QUAD 450832
008	7	45	03	36281	083	25	22450	139	0000	000000	ALPENA MKR RADIO BCN USLS, QUAD 450832, 1956
010	3	45	04	18740	083	24	20757	139	0000	000000	ALPENA PORT HUR CEM TK, USLS, QUAD 450832, 1956
011	3	45	04	14432	083	26	12585	139	0000	000000	ALPENA MUN WTR TANK, USLS, QUAD 450832, 1956
015	3	45	03	53905	083	26	12902	139	0000	000000	ALPENA ST BERN CATH CH SP, USLS, QUAD 450832
016	3	45	03	56059	083	25	39189	139	0000	000000	ALPENA ST MARYS CATH CH SP, USLS, QUAD 450832
023	2	45	02	14214	083	11	39290	250	0018	000000	THUNDER BAY IS LT ECC 1979, AMC, QUAD 450832
028	5	45	02	14167	083	11	39325	139	0018	000000	THUNDER BAY IS LT, ¹⁹⁵⁶ USLS, 1956, USLS, QUAD 450832

Replaces C&GS Form 567.

- TO BE CHARTED
- TO BE REVISED
- TO BE DELETED

REPORTING UNIT
(Field Party, Ship or Office)
NOAA Ship PELIRCE

STATE
Michigan

LOCALITY
Thunder Bay, Lake Huron

DATE
11/13/79

U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NONFLOATING AIDS TO NAVIGATION FOR CHARTS

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

(See reverse for responsible personnel)

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

OPR PROJECT NO.
X-115-PE/HSB-79

JOB NUMBER

SURVEY NUMBER
H-9839

DATUM

1927 North American Datum

METHOD AND DATE OF LOCATION
(See instructions on reverse side)

CHARTS
AFFECTED

CHARTING NAME	DESCRIPTION (Record reason for deletion of landmark or aid to navigation. Show triangulation station names, where applicable, in parentheses)	LATITUDE		LONGITUDE		OFFICE	FIELD	CHARTS AFFECTED
		° / ' "	D.M. Meters	° / ' "	D.P. Meters			
Thunder Bay Island Light	On east shore of Thunder Bay Island. (THUNDER BAY ISLAND LIGHTHOUSE, 1956) *	45-02	12	83-11	42		F-2-6-V 9-22-79	14864 14869 14860
Alpena Light	On Corner of north side entrance of Thunder Bay River. (ALPENA MARKER RADIO BEACON, 1956) **	45-03	36	83-25	24		F-Vis-V 9-29-79	14864+INSET 14860
	* lat. 45° 02' 14.167" } Third Order 6-11571 long. 83° 11' 39.325"							
	** lat. 45° 03' 36.281" } Third Order 6-11571 long. 83° 25' 22.450"							
	L-361 (82) ← Exm. Prev. spd							

RESPONSIBLE PERSONNEL	
TYPE OF ACTION	NAME
OBJECTS INSPECTED FROM SEAWARD	Pamela Chelgren, LT, NOAA Inspected Alpena Marker Radio Beacon on 29 September 1979.
POSITIONS DETERMINED AND/OR VERIFIED	C. Dale North, CDR, NOAA, Commanding Officer
FORMS ORIGINATED BY QUALITY CONTROL AND REVIEW GROUP AND FINAL REVIEW ACTIVITIES	
<p style="text-align: center;">INSTRUCTIONS FOR ENTRIES UNDER 'METHOD AND DATE OF LOCATION' (Consult Photogrammetric Instructions No. 64.)</p>	
<p>OFFICE</p> <p>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</p> <p>FIELD</p> <p>I. NEW POSITION DETERMINED OR VERIFIED Enter the applicable data by symbols as follows: F - Field L - Located V - Verified 1 - Triangulation 2 - Traverse 3 - Intersection 4 - Resection</p> <p>A. Field positions* require entry of method of location and date of field work. EXAMPLE: F-2-6-L 8-12-75</p> <p>*FIELD POSITIONS are determined by field observations based entirely upon ground survey methods.</p>	<p>FIELD (Cont'd)</p> <p>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</p> <p>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</p> <p>III. POSITION VERIFIED VISUALLY ON PHOTOGRAPH Enter 'V-Vis.' and date. EXAMPLE: V-Vis. 8-12-75</p> <p>**PHOTOGAMMETRIC FIELD POSITIONS are dependent entirely, or in part, upon control established by photogrammetric methods.</p>
<p>ORIGINATOR</p> <p><input type="checkbox"/> PHOTO FIELD PARTY</p> <p><input checked="" type="checkbox"/> HYDROGRAPHIC PARTY</p> <p><input type="checkbox"/> GEODETIC PARTY</p> <p><input type="checkbox"/> OTHER (Specify)</p>	<p>FIELD ACTIVITY REPRESENTATIVE</p> <p>OFFICE ACTIVITY REPRESENTATIVE</p> <p><input type="checkbox"/> REVIEWER</p> <p><input type="checkbox"/> QUALITY CONTROL AND REVIEW GROUP REPRESENTATIVE</p>

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 1 VESNO 2839 ... J.D. 185-187

000355 0 0000 0001 000 283000 009839

000636 1 0002

000854 1 0004

001062 1 0006

999999 1 0000-

TABLE NO. 2 VESNO 2839 ... J.D. 191-197

000178 0 0000 0002 000 283000 009839

000462 0 0002

000703 0 0000

000832 1 0002

000950 1 0004

001056 1 0006

001150 1 0008

001236 1 0010

001316 1 0012

001393 1 0014

001467 1 0016

001536 1 0018

001604 1 0020

001672 1 0022

001734 1 0024

999999 1 0000-

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 3 VESNO 2838 ... J.D. 190-197

000610 0 0000 0003 000 283000 009839

000905 1 0002

001086 1 0004

999999 1 0000

TABLE NO. 4 VESNO 2837 ... J.D. 193

000182 0 0000 0004 000 283000 009839

000660 0 0002

000815 0 0000

000956 1 0002

001098 1 0004

999999 1 0000

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 5 VESNO 2838 2839 ... J.D. 198-201

000156 0 0000 0005 000 283000 009839

000590 0 0002

000750 0 0000

000870 1 0002

000987 1 0004

001094 1 0006

001187 1 0008

001272 1 0010

001352 1 0012

001427 1 0014

001502 1 0016

001570 1 0018

001638 1 0020

001710 1 0022

001774 1 0024

001835 1 0026

001894 1 0028

001953 1 0030

002014 1 0032

999999 1 0000 ✓

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 6 VESNO 2838 2839 ... J.D. 206-208

000090 0 0000 0006 000 283000 009839

000300 0 0002

000620 0 0004

000797 0 0002

000926 0 0000

001037 1 0002

001133 1 0004

001218 1 0006

001300 1 0008

001378 1 0010

001454 1 0012

001532 1 0014

001606 1 0016

001682 1 0018

001757 1 0020

001834 1 0022

001910 1 0024

001984 1 0026

999999 1 0000

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 7 VESNO 2838 2839 ... J.D. 211-221

000083 0 0000 0007 000 283000 009839

000235 0 0002

000435 0 0004

000826 0 0006

000943 0 0004

001035 0 0002

001128 0 0000

001222 1 0002

001314 1 0004

001406 1 0006

001500 1 0008

001592 1 0010

001686 1 0012

001778 1 0014

001872 1 0016

001963 1 0018

999999 1 0000

TABLE NO. 8 VESNO 2837 2838 2839 .. J.D. 222-227

000095 0 0000 0008 000 283000 009839

000280 0 0002

000524 0 0004

000826 0 0006

000930 0 0004

999999 0 0000

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO.9 VESNO 2839 ... J.D. 222

000100 0 0000 0009 000 283000 009839

000292 0 0002

000445 0 0004

000550 0 0002

000640 0 0000

000725 1 0002

000804 1 0004

000884 1 0006

000964 1 0008

001040 1 0010

001118 1 0012

001198 1 0014

001276 1 0016

001354 1 0018

001433 1 0020

999999 1 0000

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 10 VESNO 2838 2839 ... J.D. 228-237

000150 0 0000 0010 000 283000 009839

000640 0 0002

000840 0 0004

001075 0 0002

001178 0 0000

001258 1 0002

001343 1 0004

001424 1 0006

001506 1 0008

001588 1 0010

001673 1 0012

999999 1 0000

TABLE NO. 11 VESNO 2838 2839 ... J.D. 239-240

000130 0 0000 0011 000 283000 009839

001130 0 0002

999999 0 0000

VELOCITY CORRECTION TAPE LISTINGS

TABLE NO. 12VESNO 2838 ... J.D. 241-243

000164 0 0000 0012 000 283000 009839

000656 0 0002

000785 0 0000

000884 1 0002

000976 1 0004

001065 1 0006

001150 1 0008

999999 1 0000 ✓

TABLE NO. 13 VESNO 2838 2839 ... J.D. 258-262

000350 0 0000 0013 000 283000 009839

001050 0 0002

999999 0 0000 ✓

TABLE NO. 14 VESNO 2838 ... J.D. 266-272

000664 0 0000 0014 000 283000 009839
750

~~000750 1 0002~~ PM

999999 1 0000 ✓

This wreck provides habitat for a sizeable black bass population.

▲ Shipwreck #2: Unknown Schooner (spotted by airplane)

Type of Craft: Schooner
Hull Material: Wood

Estimated Location: 045° 02' 40" LAT
083° 26' LONG

South of Campbell Street.

Bottom Depth: 20' Bow/Stern.
Bottom Surface: Sand

Condition of Wreck:
Unknown - Probably broken up since it lies in shallow water.

General Observations for Reserve/Park Use:

Since this schooner was not dived on, it can only be assumed that it's condition and usability in a reserve/park setting would be similar to wreck #3. A shallow water site, with medium visibility depending on weather conditions.

⊙ Shipwreck #3: Unknown Schooner

Type of Craft: Schooner
Hull Material: Wood
Length: 100'+/Broken up
Width: 30' Estimated
Cargo: Unknown
Type of Disaster: Unknown

Location: 045° 02' 55" LAT
086° 26' LONG

Off Campbell St. in downtown Alpena, approximately 2/3 mile off shore.

Bottom Depth: 20' Bow/Stern
Bottom Surface: Sand/Silt

Condition of Wreck:
Broken up - but ribs, sidewalls still visible (6' high) Boiler on board and 4 bladed 10' diameter propeller still at wreck. Anchor chain still on board and mast laid out along side of ship.

General Observations for Reserve/Park Use:

This wreck is typical of shallow water casualties: broken up yet recognizable. Good shallow water dive -

problem with visibility, depending again on the weather and currents.

- Shipwreck #4: Unknown Tug
 - Type of Craft: Tug Boat
 - Hull Material: Wood
 - Length: 50'
 - Width: 20' Estimated
 - Type of Disaster: Fire

Location: 045° 03' 30" LAT
083° 25' 20" LONG

Located off public access site break water - downtown Alpena.

Bottom Depth: 10'
Bottom Surface: Sand/Silt

Condition of Wreck:
Totally broken up - only loose ribs and planking remain. Some gears are intact.

General Observations for Reserve/Park Use:
Because of this wrecks broken up condition and poor visibility owing to the Thunder Bay River, this wreck is of limited value for recreational diving.

- Shipwreck #5: Unknown Barge
 - Type of Craft: Self Propelled Barge
 - Hull Material: Wood
 - Length: 300'
 - Width: 60'
 - Cargo: Limestone Boulders
 - Type of Disaster: Foundered

Location: 045° 03' 55" LAT
083° 23' 30" LONG

This wreck is easily located. Found due east of Huron Portland Cement Company Plant -- marked by "wreck buoy #2". 2/3 mile from shore.

Bottom Depth: 35' Bow/Stern
Bottom Surface: Pitted Limestone

Condition of Wreck:
This wreck is still intact -- with sidewall and ribs in place. Some of the ribs come within 4' of the water surface. Boilers are on board -- 25' rudder-cabin walls have fallen off to side of wreck.

General Observations for Reserve/Park Use:

Although this wreck site suffers from poor visibility, the craft should be included in any reserve established. The size and condition of the vessel makes for a good shallow water dive.

● Shipwreck #6: Unknown Schooner

Type of Craft: Schooner

Hull Material: Wood

Length: 100'

Width: 25'

Cargo: Unknown

Type of Disaster: Unknown

Location: 045° 03' 58" LAT
083° 22' 10" LONG

Located at the extreme south/eastern edge of White Fish Bay. Directly off western edge of white house - approximately 100 yards from shore.

Bottom Depth: 15' Bow/Stern

Bottom Surface: Sand

Condition of wreck:

Ribs and walls partially intact. Most of the wreck buried in sand. Mast present.

General Observations for Reserve/Park Use:

Good wreck for archaeological work. Good visibility for inside the Bay. Shallow water - can be snorkeled.

● Shipwreck #7: Johnson ✓

Type of Craft: Steamer

Hull Material: Wood

Length: 235'

Width: 45'

Cargo: Limestone Boulders

Type of Disaster: Fire

Location: 045° 01' 40" LAT
083° 20' 50" LONG

Approximately 1 mile from shore on southern edge of North Point.

Bottom Depth: 40' Bow/Stern

Bottom Surface: Sand

Condition of Wreck:

This vessel is intact with ribs and sidewall still holding the cargo - flooring gone. Prop cables and pulleys still on board. This wreck is in medium depth water which has protected it from severe ice damage.

General Observations for Reserve/Park Use:

Relatively easy wreck to find - good example of the early steamers that carried area limestone.

⊙ Shipwreck #8: Unknown Barge (Scanlon?)

Type of Craft: Barge
Hull Material: Wood
Length: Originally 200'
Width: 50'
Cargo: Sand
Type of Disaster: Foundered

Location: 045° 02' LAT
 083° 20' 40" LONG

Approximately 1/2 mile from shore inside of North Point - 2 miles west of south east tip of North Point.

Bottom Depth: 20' Bow/Stern
Bottom Surface: Sand

Condition of Wreck:

Broken up -- still able to discern the type of craft. Gears on board -- steel girder sidewalls. Some chain and cables on wreckage.

General Observations on Reserve/Park Use:

This wreck needs further investigation - would be good for an archaeological study. Shallow water dive condition. Could skin dive this wreck.

⊙ Shipwreck #9: Unknown Steamer

Type of Craft: Steamer
Hull Material: Wood
Length: Unknown
Width: Unknown
Cargo: Carbide
Type of Disaster: Fire

Location: 045° 01' LAT
 083° 18' LONG

On NOAA Great Lake Navigation charts. Inside Thunder Bay close to tip of North Point. Wreck is approximately 1 mile from shore.

Bottom Depth: 30'
Bottom Surface: Sand

Condition of Wreck:

Burnt to water line of craft -- additional burning of cargo after craft sank. Prop, 2 life boats and a boiler still on board.

General Observations for Reserve/Park Use:

Visibility in this section of the Bay is good -- shallow water dive.

● Shipwreck #10: Unknown Schooner (Johnson?)

Type of Craft: Schooner

Hull Material: Wood

Length: Unknown

Width: 25'

Cargo: Unknown

Type of Disaster: Ran Aground North Point Reef

Location: 045° 01' 05" LAT
083° 15' 50" LONG

Approximately 150 yards south of the southeast tip of North Point.

Bottom Depth: 15'

Bottom Surface: Medium-Large Rock

Condition of Wreck:

All that was located was a 25' X 35' segment of the craft. Sleding in the area failed to produce more of the wreckage. Apparently salvage operations and/or winter ice have taken most of the craft's wood.

General Observations on Reserve/Park Use:

Since so little is left of the craft, it could only be used by surface tour boat "pass over" on the way out to the islands and the shipwreck "Nordmeer".

● Shipwreck #11: Montana (constructed 1872)

Type of Craft: Steamer

Hull Material: Wood

Length: 236'

Width: 36.5'

Depth: 14'

Gross Tonnage: 1535

Cargo: Stone

Type of Disaster: Fire

Date: September 6, 1914

Location: *044° 59' LAT
083° 16' LONG

* Stray rises 10-12 feet off bottom in this vicinity of greater than 65' depths.

* The wreck was found in lat. 44° 59' 26" N, long 83° 17' 22" W. (See D.R. (See Dis. section L))

Located in the shipping channel 1.1 miles NW of 10 mile buoy at 304° heading.

Bottom Depth: 75' Bow/Stern
Bottom Surface: Sand

Condition of Wreck:

Excellent condition -- bow section broke off 25' away from rest of ship. Motor on board stands 40' high. Engine intact. Anchor chain on board, 12' prop - 10" shaft.

General Observations for Reserve/Park Use:

A large craft with much to see on it. Medium depth dive. Would take multiple dives to get an overall view of craft. Question on safety due to its location in the shipping channel.

● Shipwreck #12: Grecian (constructed 1891)

Type of Craft: Steamer

Hull Material: Steel

Length: 296'

Width: 40'

Depth: 20'

Gross Tonnage: 2348

Cargo: Not listed

Type of Disaster: Foundered

Date: June 15, 1906

Location: 044° 58' 50" LAT
083° 10' 10" LONG

105° 2.48 MILES

Located approximately 4 miles east of 10 mile buoy.

Bottom Depth: 110' (Pick up the deck at 75')

Bottom Surface: Sand

Condition of Wreck:

Excellent -- intact in relatively deep water. Three levels of stairways -- pulleys, siderails, 3 anchors on board.

General Observations for Reserve/Park Use:

An excellent wreck for divers to see. Safety precautions must be considered since the wreck is in deep water. Easy to find with sonar - steel hull.

● Shipwreck #13: Corsican (constructed 1862)

Type of Craft: Schooner

Hull Material: Wood

Length: 112'

Width: 25'

Depth: 10'

Gross Tonnage: 210

Cargo: Not listed
Type of Disaster: Struck Thunder Bay Island Reef
Date: June, 1893

Location: 045° 00' 55" LAT
 083° 08' 45" LONG

Located approximately 2 1/2 miles SE of southern end of Thunder Bay Island at 127° MAG. heading.

Bottom Depth: 110'
Bottom Surface: Sand

Condition of Wreck:
 Almost completely intact, sitting on keel. Railing and flooring still on vessel -- windlass, anchor chains coming down from bow. Masts broken off -- rudder intact.

General Observations for Reserve/Park Use:
 The best wreckage of a schooner class vessel yet found in the area. Because of its depth, it has been spared from both ice and salvagers. An excellent wreck for divers to see.

● Shipwreck #14: Monohansett (constructed 1872)

Type of Craft: Steamer
Hull Material: Wood
Length: 165'
Width: 31'
Depth: 9'
Gross Tonnage: 572
Cargo: Coal
Type of Disaster: Fire
Date: November 23, 1907

Location: 045° 01' 58" LAT
 083° 11' 30" LONG

At southern end of Thunder Bay Island approximately 500' from shore.

Bottom Depth: 25'
Bottom Surface: Solid Limestone

Condition of Wreck:
 Broken into three sections - some sidewalls intact - large prop, boilers.

General Observations for Reserve/Park Use:
 This wreck is easy to find, has excellent visibility, a lot of the wreck is intact - abundant fish population.

APPROVAL SHEET

The field work on this Basic Survey, Register No. H-9839, Field No. PE-20-1-79 was accomplished under my daily supervision. This report and field records have been reviewed by me on a routine basis. The survey is complete and adequate for the area investigated.



C. Dale North Jr.
Commander, NOAA
Commanding Officer
NOAA Ship PEIRCE S-328

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-328)

C. Dale North, CDR, NOAA Comdg.

These corrections are to be used

between 4 June 1979 and 6 July 1979

in the locality LAKE HURON

Thunder Bay

for hydrographic surveys Nos. H-9839

(PE-20-1-79)

(For deep water add a 0 to these figures)

FEET
DEPTHS IN FATHOMS



410

0.0

-1.0

-2.0 95

-3.0

VELOCITY
TABLE
NO. 1

CHECKED DM

U.S. GOV. PRINTING OFFICE: 1

46 1240

K&E 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-328)

C. Dale North CDR NOAA Comdg.

These corrections are to be used

between 10 July 1972 and 16 July 1972

in the locality LAKE HURON

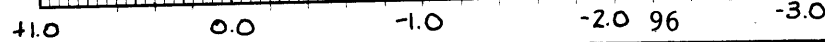
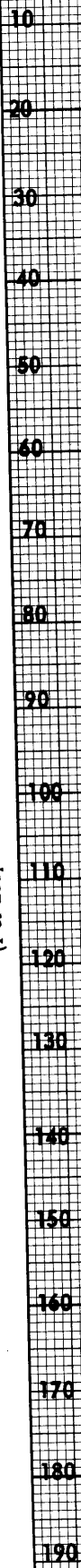
Thunder Bay

for hydrographic surveys Nos. H-9839

(PE-70-1-31)

(For deep water add a 0 to these figures)

FEET
DEPTHS IN FATHOMS



VELOCITY
TABLE
NO. 2

CHECKED, J.M.

U.S. GOV. PRINTING OFFICE

46 1240

K&E 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-378)

C Dale North, CDR, NOAA Comdg.

These corrections are to be used

between 9 June 1970 and 16 June 1970

in the locality LAKE HURON

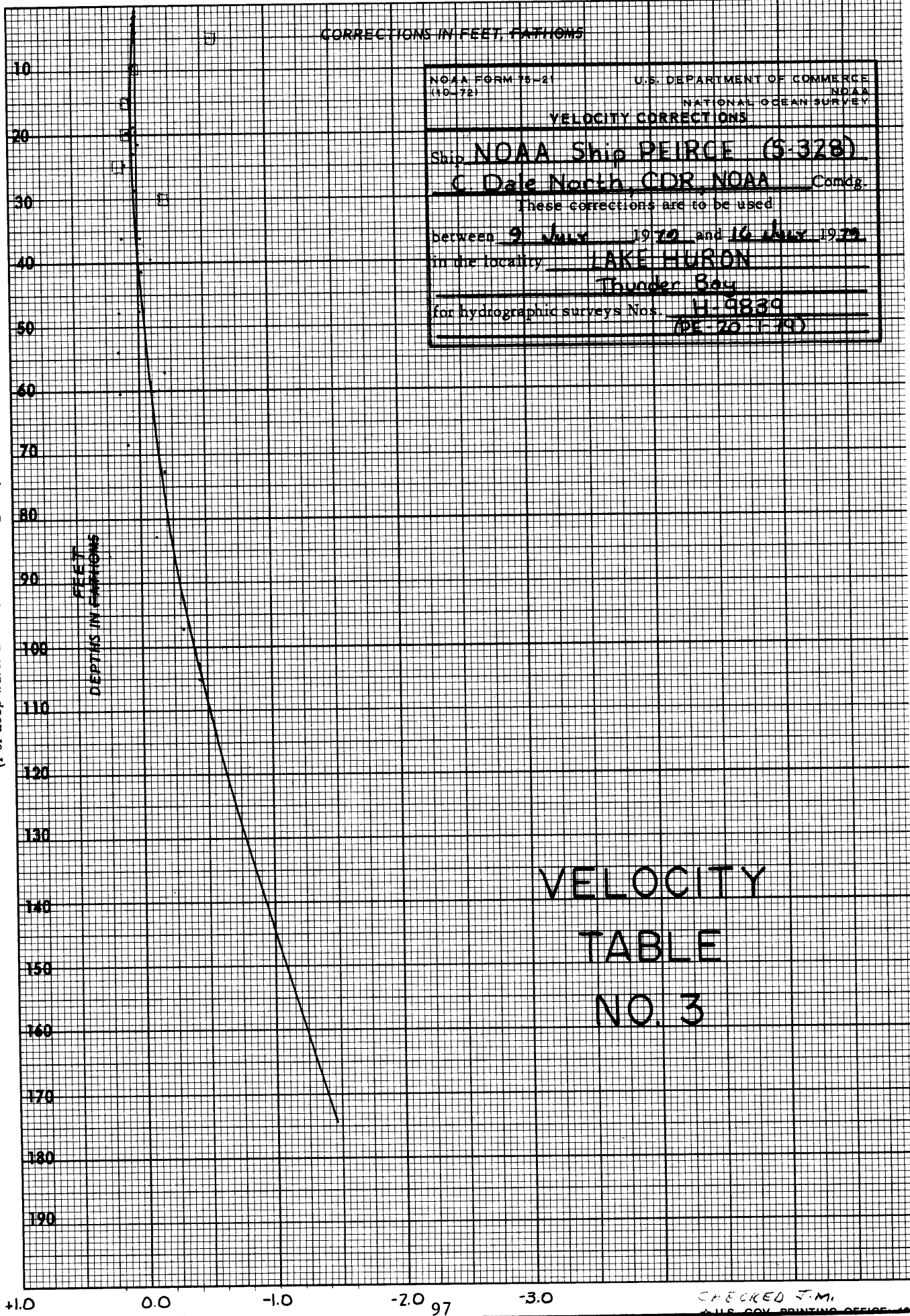
Thunder Bay

for hydrographic surveys Nos. H-9839

06-70-170

(For deep water add a 0 to these figures)

DEPTHS IN FEET
DEPTHS IN FATHOMS



VELOCITY
TABLE
NO. 3

CHECKED J.M.I.

U.S. GOV. PRINTING OFFICE

46 1240

20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.



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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (5-328)

C. Dale North, CDR, NOAA Comdg.

These corrections are to be used

between 12 July 1970 and 19

in the locality LAKE HURON

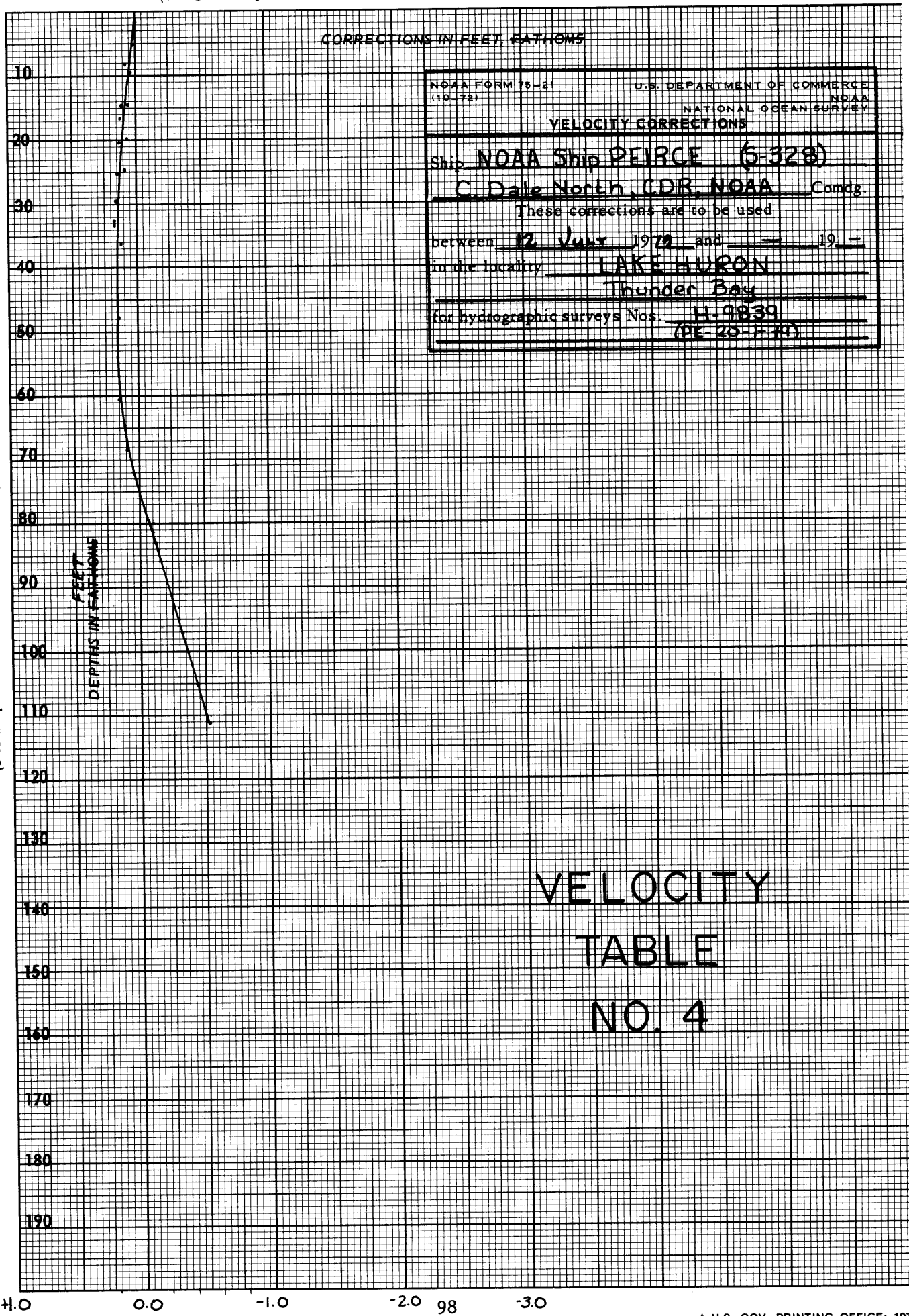
Thunder Bay

for hydrographic surveys Nos. H-9839

(PE-20-F-79)

(For deep water add a 0 to these figures)

FEET
DEPTHS IN FATHOMS



VELOCITY
TABLE
NO. 4

46 1240

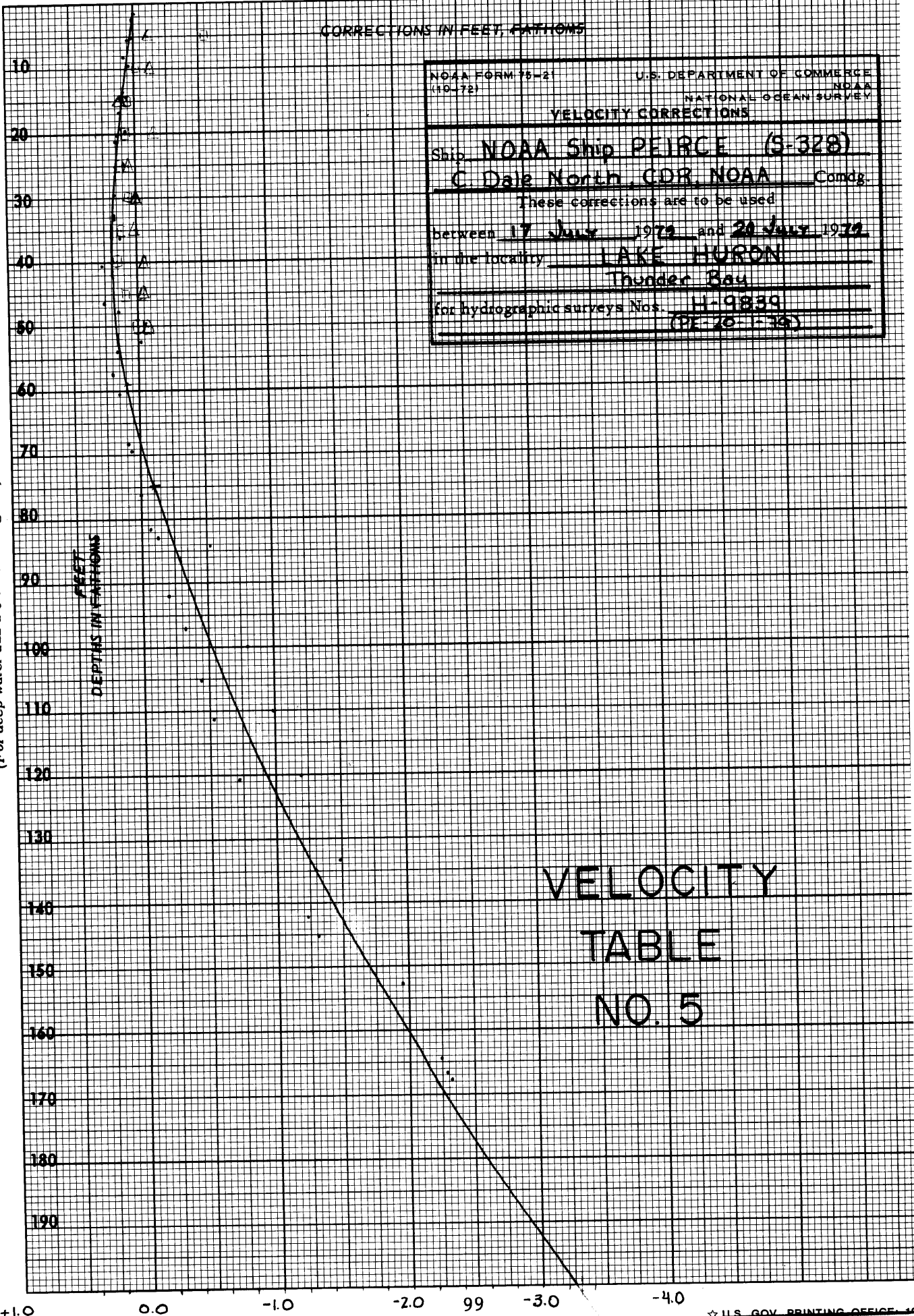
K+E 20 X 20 TO THE INCH 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA Ship PEIRCE (3-328)</u>	
C. Dale North, CDR, NOAA Comdg.	
These corrections are to be used	
between <u>17 July 1979</u> and <u>20 July 1979</u>	
in the locality <u>LAKE HURON</u>	
<u>Thunder Bay</u>	
for hydrographic surveys Nos. <u>H-9839</u>	
<u>(PE-20-1-79)</u>	

(For deep water add a 0 to these figures)



VELOCITY
TABLE
NO. 5

46 1240

K+E 20 X 20 TO THE INCH, 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

+1.0

0.0

-1.0

-2.0

99

-3.0

-4.0

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 15-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-370)

C. Dale North, CDR, NOAA Comdg.

These corrections are to be used

between 25 July 1979 and 27 July 1979

in the locality LAKE HURON
Thunder Bay

for hydrographic surveys Nos. H-9839
(DE-20-1-39)

(For deep water add a 0 to these figures)

DEPTHS IN FEET
DEPTHS IN FATHOMS

VELOCITY
TABLE
NO. 6

46 1240

K+E 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

+1.0 0.0 -1.0 -2.0 100 -3.0

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-328)

C. Dale North, CDR, NOAA Comdg.

These corrections are to be used

between 30 June 1972 and 9 Aug 1972

in the locality LAKE HURON

Thunder Bay

for hydrographic surveys Nos. H-9839

(DT-20-1-70)

(For deep water add a 0 to these figures)

DEPTHS IN FATHOMS
FEET

VELOCITY
TABLE
NO. 7

+1.0 0.0 -1.0 -2.0 101 -3.0

46 1240

20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

K&E

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-378)

C. Dale North, CDR NOAA Comdg.

These corrections are to be used

between 10 August 1979 and 15 Aug. 1979

in the locality LAKE HURON

Thunder Bay

for hydrographic surveys Nos. H 9839

(PE 20 T 78)

(For deep water add a 0 to these figures)

DEPTHS IN FATHOMS
FEET

VELOCITY
TABLE
NO. 8

46 1240

K+E 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

+1.0

0.0

-1.0

-2.0 102

-3.0

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

CORRECTIONS IN FEET, FATHOMS

(For deep water add a 0 to these figures)

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

DEPTHS IN FEET
DEPTHS IN FATHOMS

NOAA FORM 75-2 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA Ship PIERCE (S-328)</u>	
Comdg. <u>C. Dale North, CDR, NOAA</u>	
These corrections are to be used	
between <u>10 August 1979</u> and <u> </u> 19 <u> </u>	
in the locality <u>LAKE HURON</u>	
<u>Thunder Bay</u>	
for hydrographic surveys Nos. <u>H-9839</u>	
<u>(PE-20-1179)</u>	

VELOCITY
TABLE
NO. 9

+1.0 0.0 -1.0 -2.0103 -3.0

(Signature)

46 1240

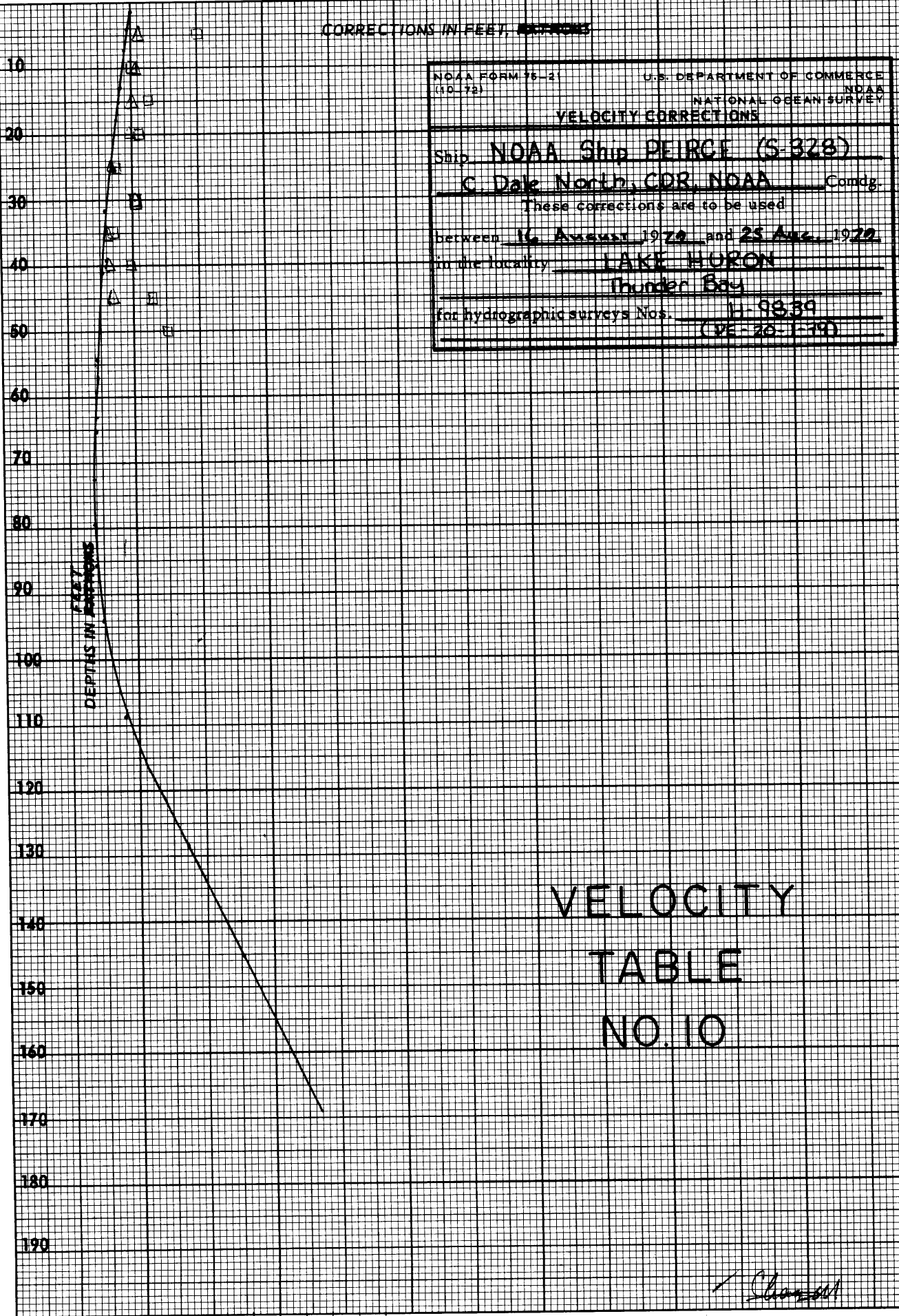
20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.
K&E

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

CORRECTIONS IN FEET, DECIMALS

NOAA FORM 75-21 (10-73)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA Ship PEIRCE (S-328)</u>	
Comdg. <u>C. Dale North, CDR, NOAA</u>	
These corrections are to be used	
between <u>16 August 1970</u> and <u>25 Aug. 1970</u>	
in the locality <u>LAKE HURON</u>	
<u>Thunder Bay</u>	
for hydrographic surveys Nos. <u>H-9939</u>	
<u>(VE-20-F-79)</u>	

(For deep water add a 0 to these figures)



VELOCITY
TABLE
NO. 10

Chambers

46 1240

K&E 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

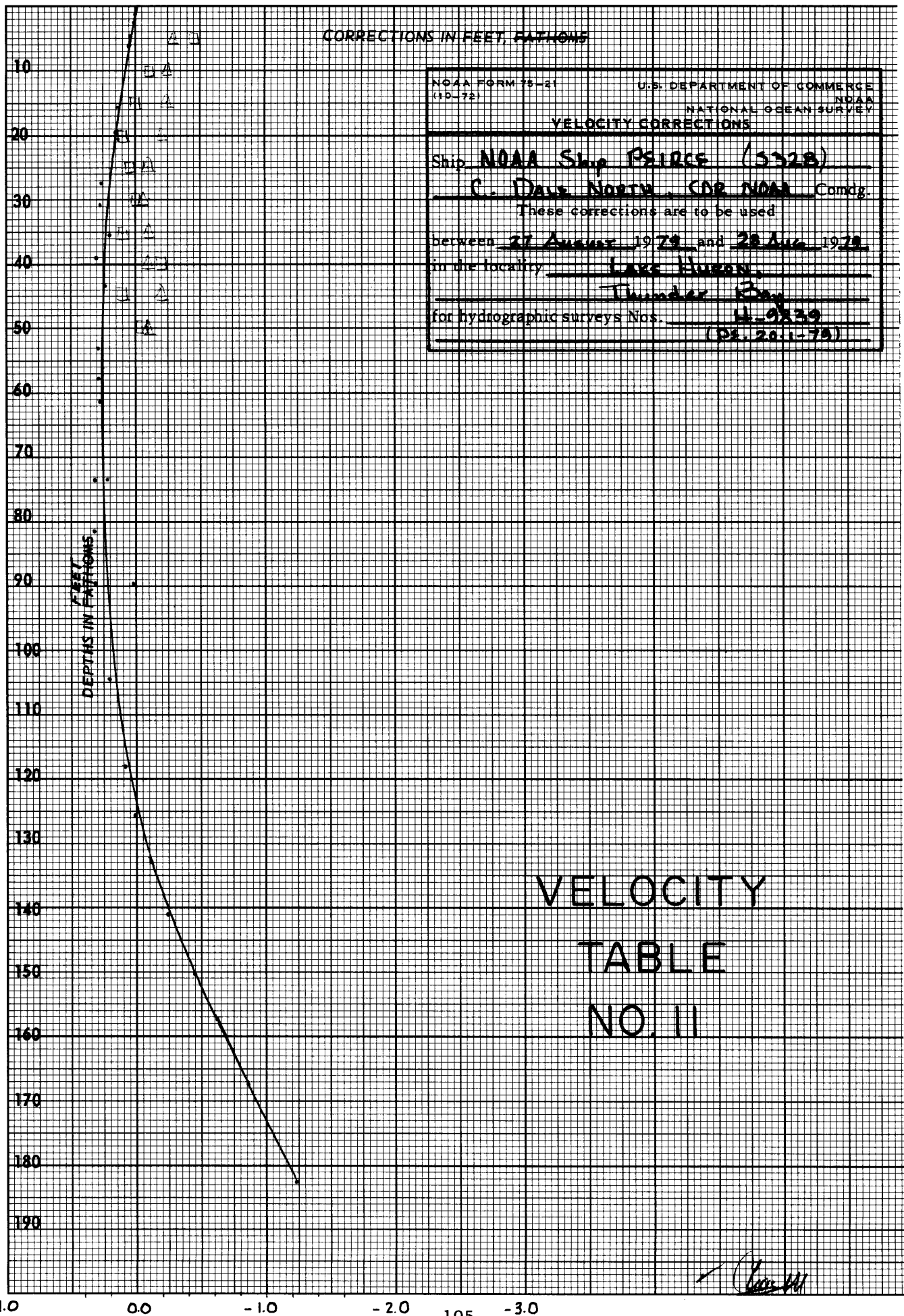
+1.0 0.0 -1.0 -2.0 104 -3.0

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA Ship PSIRCE (5328)</u>	
Comd. <u>C. Dale North, CDR NOAA</u>	
These corrections are to be used	
between <u>27 August 1978</u> and <u>28 Aug 1978</u>	
in the locality <u>Lake Huron,</u>	
<u>Thunder Bay</u>	
for hydrographic surveys Nos. <u>4-9239</u>	
(OK, 26-1-78)	

(For deep water add a 0 to these figures)



VELOCITY TABLE NO. II

Handwritten signature

46 1240

20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

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

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-21
(10-72)

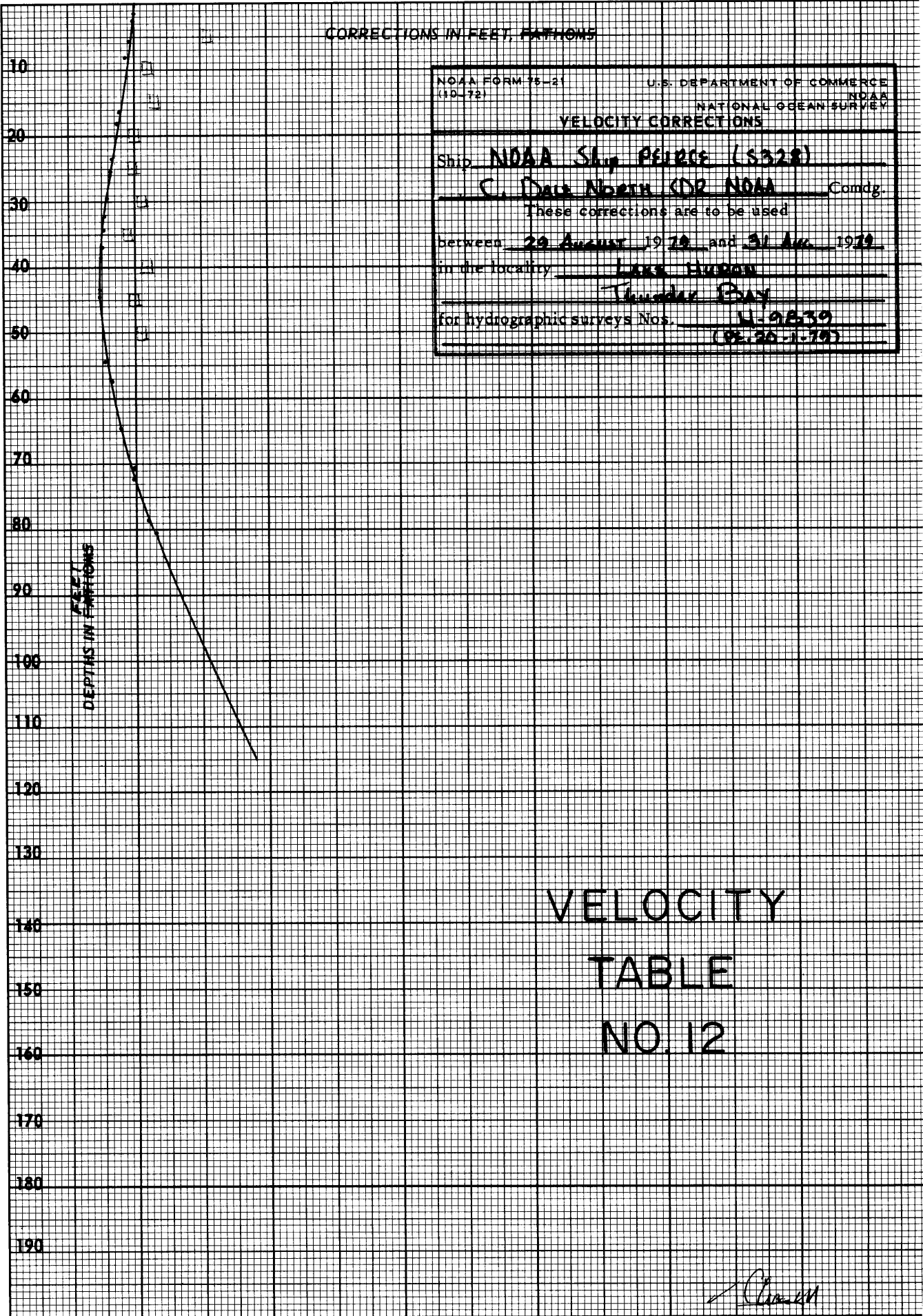
U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PELUCE (S328)
C. Dale North (DR NOAA) Comdg.
 These corrections are to be used
 between 29 August 1979 and 31 Aug 1979
 in the locality Lake Hudson
Thunder Bay
 for hydrographic surveys Nos. U-98539
(8-30-79)

(For deep water add a 0 to these figures)

FEET
DEPTHS IN FATHOMS



VELOCITY
TABLE
NO. 12

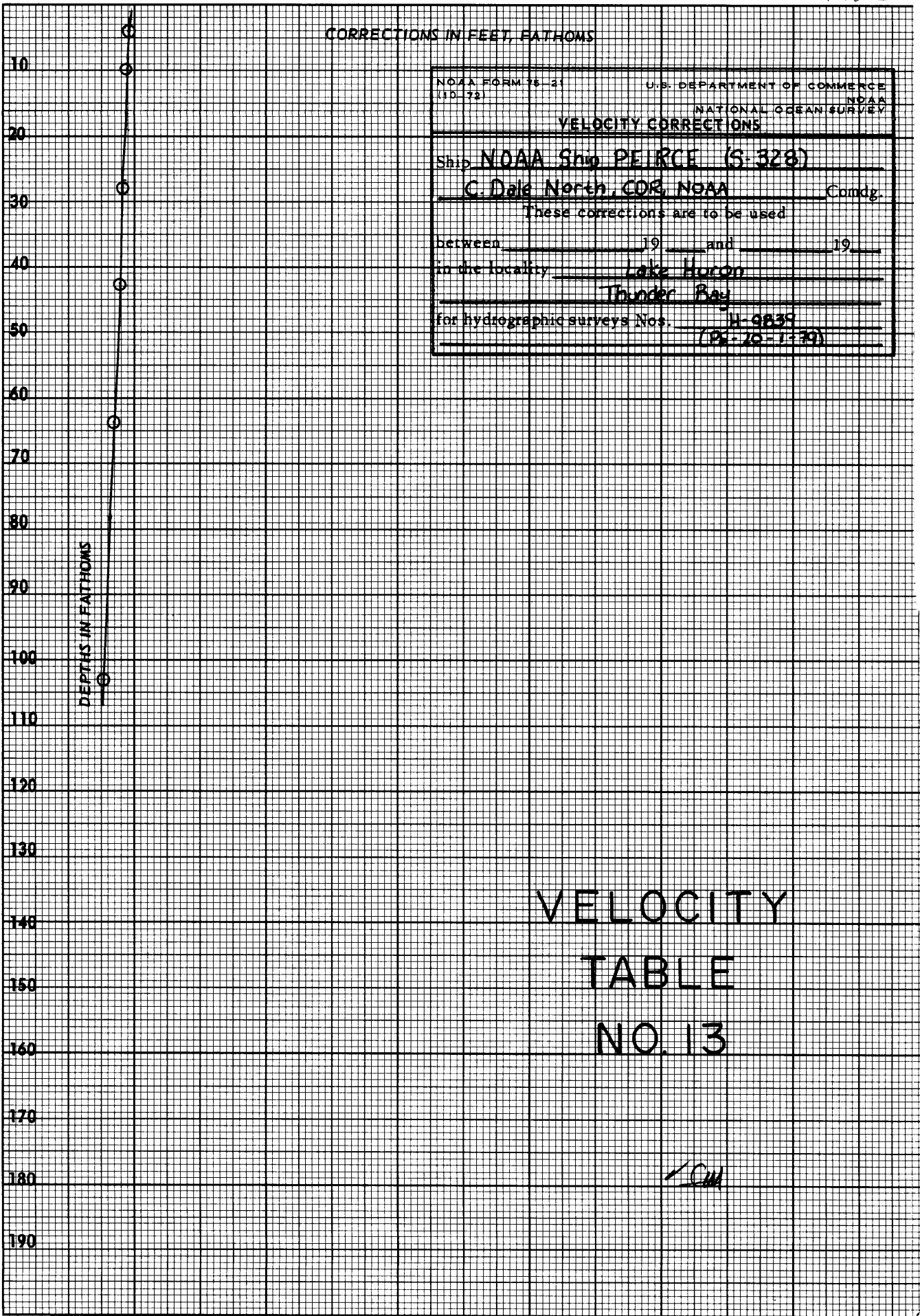
Chen

46 1240

K+S 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 78-21 (10-72)	U.S. DEPARTMENT OF COMMERCE NOAA NATIONAL OCEAN SURVEY
VELOCITY CORRECTIONS	
Ship <u>NOAA Ship PEIRCE (S-328)</u>	
Comdg. <u>C. Dale North, CDR, NOAA</u>	
These corrections are to be used	
between	<u>19</u> and <u>19</u>
in the locality	<u>Lake Huron</u> <u>Thunder Bay</u>
for hydrographic surveys Nos.	<u>H-9839</u> <u>(95-20-1-79)</u>



(For deep water add a 0 to these figures)

VELOCITY
TABLE
NO. 13

1 CM

46 1240

20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

K&E

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

TABLE # 14

CORRECTIONS IN FEET, FATHOMS

NOAA FORM 75-2
(10-72)

U.S. DEPARTMENT OF COMMERCE
NOAA
NATIONAL OCEAN SURVEY

VELOCITY CORRECTIONS

Ship NOAA Ship PEIRCE (S-378)

C. Dale North, CDR, NOAA Comdg.

These corrections are to be used

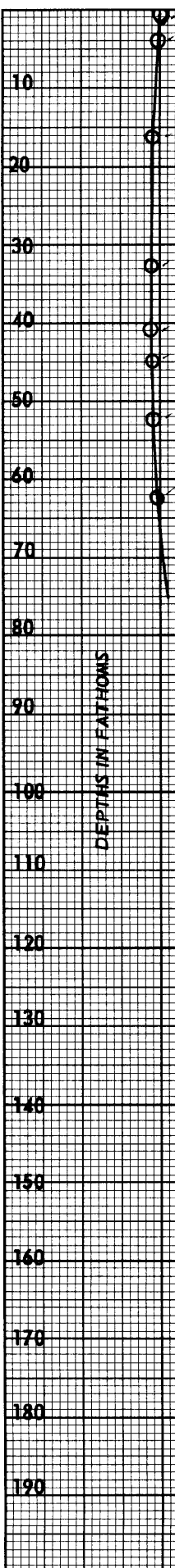
between 19 and 19

in the locality Lake Huron
Thunder Bay

for hydrographic surveys Nos. H-9839
(PE-20-1-39)

(For deep water add a 0 to these figures)

DEPTHS IN FATHOMS



VELOCITY
TABLE
NO. 14

CM

46 1240

K*Σ 20 X 20 TO THE INCH • 7 X 10 INCHES
KEUFFEL & ESSER CO. MADE IN U.S.A.

+1.0 0.0 -1.0 -2.0 108 -3.0

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: Harrisville, Michigan (907-5059)

Period: July 4 - Sep 27, 1979

HYDROGRAPHIC SHEET: H-9839

OPR-X115-PE/HSB-79

Locality: Lake Huron

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

Remarks:

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

Philip C. Morris 3/25/10
Chief, Water Level Branch

APPROVAL SHEET
FOR
SURVEY H- 9839

- 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/~~XXXXXXXX~~ been made. A new final sounding printout has/~~XXXXXXXX~~ 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: March 4, 1981

Signed:

R. D. Surch

Title:

Chief, Verification Branch

GEOGRAPHIC NAMES

H-9839

Name on Survey	Source of Name										K	
	A	B	C	D	E	F	G	H	I	J		
	ON CHART NO.	ON PREVIOUS SURVEY NO.	CON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND McNALLY ATLAS	U.S. LIGHT LIST				
Bird Island	*											1
Gull Island	*											2
Grass Island	*											3
Hardwood Point	*											4
Lake Huron	x											5
Michigan	*											6
North Point	x											7
Partridge Point /	x											8
Scarecrow Island	x											9
Sulphur Island	x											10
Thunder Bay	x											11
Thunder Bay Island	x											12
Whitefish Point	x											13
Sugar Island	x											14
SUGAR ISLAND	x											15
												16
												17
												18
												19
												20
												21
												22
												23
												24
												25

Approved:

Chas. E. Harrington
Chief Geographer - C3x5

15 JUNE 1981

HYDROGRAPHIC SURVEY STATISTICS

H-9839

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

RECORD DESCRIPTION		AMOUNT	RECORD DESCRIPTION		AMOUNT	
SMOOTH SHEET		1	BOAT SHEETS & PRELIMINARY OVERLAYS		4	
DESCRIPTIVE REPORT		1	SMOOTH OVERLAYS: POS. ARC, EXCESS		5	
DESCRIP-TION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES						
CAHIERS	3 with raw P/O					
VOLUMES						4
BOXES			2-smooth pos.	+ sounding P/O		

T-SHEET PRINTS (List)

SPECIAL REPORTS (List) electronic control cal., field notes, misc data, 1-chart 14864

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			
POSITIONS CHECKED		3622	3622
POSITIONS REVISED		360	360
SOUNDINGS REVISED		720	720
SOUNDINGS ERRONEOUSLY SPACED		150	150
SIGNALS (CONTROL) ERRONEOUSLY PLOTTED		0	0
	TIME - HOURS		
CRITIQUE OF FIELD DATA PACKAGE (PRE-VERIFICATION)	11	0	11
VERIFICATION OF CONTROL		2	2
VERIFICATION OF POSITIONS		34	34
VERIFICATION OF SOUNDINGS		134	134
COMPILATION OF SMOOTH SHEET		250	250
APPLICATION OF TOPOGRAPHY		5	5
APPLICATION OF PHOTOBATHYMETRY		0	0
JUNCTIONS		30	30
COMPARISON WITH PRIOR SURVEYS & CHARTS		40	40
VERIFIER'S REPORT		18	18
OTHER		48	48
TOTALS	11	572 561	572
<u>Pre-Verification by</u>	<u>DVM</u>	<u>Beginning Date</u>	<u>Ending Date</u>
		12/12/79	12/13/79
<u>Verification by</u>	<u>JSB, DVM, JBW, SKK, RRH, FLS, RGR</u>	<u>Beginning Date</u>	<u>Ending Date</u>
		3/12/80	2/26/81
<u>Verification Check by</u>	<u>RDS</u>	<u>Time (Hours)</u>	<u>Date</u>
		24	2/13/81
<u>Marine Center Inspection by</u>	<u>HIT</u>	<u>Time (Hours)</u>	<u>Date</u>
		40	9/16/80
<u>Quality Control Inspection by</u>	<u>F. P. SAULSBURY</u>	<u>Time (Hours)</u>	<u>Date</u>
		108	6-12-81
<u>Requirements Evaluation by</u>	<u>[Signature]</u>	<u>Time (Hours)</u>	<u>Date</u>
		6.0	3/26/82

9/2/81 21 hrs
[Signature]

Reg. No. H-9839

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

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

CARDS CORRECTED

DATE _____ TIME REQ'D _____ INITIALS _____

REMARKS:

ATLANTIC MARINE CENTER
VERIFICATION REPORT

REGISTRY NO: H-9839

FIELD NO: PE-20-1-79

Michigan, Lake Huron, Thunder Bay

SURVEYED: July 4, 1979 through October 1, 1979

SCALE: 1:20,000

PROJECT NO: OPR-X115

SOUNDINGS: Ross Digital Echo Sounder,
Raytheon 719 B Fathometer
and Lead Line

CONTROL: Del Norte (Range/
Range), Del Norte (*Range/*
Azimuth), and
Visual (Sextant
fixes on Shore
Signals)

Chief of Party	C. D. North
Surveyed by	P. Chelgren
.....	R. McCann
.....	G. Da Silva
.....	J. Rodstein
Automated Plot By	Xynetics 1201 Plotter (AMC)
Verified and Inked By	R. G. Roberson
Date	September 2, 1980

1. INTRODUCTION

a. A junctional holiday exists between the present survey and H-9690 (1977) to the east above lat. $45^{\circ}00.6'$. This area is planned to be completed and included as a part of H-9849 (1979-81) which junctions to the northeast. ✓

b. Notes in red in the Descriptive Report were made during verification. ✓

2. CONTROL AND SHORELINE

a. The source of the control is adequately described in sections F and G of the hydrographer's Descriptive Report. ✓

b. Contemporary photogrammetric shoreline data was not furnished for this project. Shoreline from LS-1903 (1946-50) and LS-1836 (1945) was added in brown on the smooth sheet for orientation purposes only and should not be considered accurate or authoritative. ✓

3. HYDROGRAPHY

a. Depths at sounding line crossings are in good agreement. ✓

b. The standard depth curves were adequately delineated. Supplemental depth curves were added in green and brown to emphasize additional bottom features. ✓

c. The development of the bottom configuration and investigation of least depths are considered adequate with the following exceptions:

- 1) A shoal to 17 feet located in lat. $45^{\circ}00.64'$, long. $83^{\circ}24.35'$ rising from surrounding depth of 24 to 30 feet was not adequately investigated to assure least depth or to determine its extent. *CONCUR*
- 2) 19 and 21 foot depths in the approach to the channel to Alpena Harbor in the vicinity of lat. $45^{\circ}02.8'$, long. $83^{\circ}23.2'$ should have been developed at a reduced line spacing. The channel has a charted project depth of 21 feet at its entrance. *CONCUR*
- 3) A shoal with a survey depth of 45 feet in lat. $45^{\circ}01.12'$, long. $83^{\circ}12.01'$ rising out of surrounding area of over 60 feet was not developed with a reduced line spacing to insure its least depth. *CONCUR*
- 4) The shoal extending from North Point to depths of 60 feet in the vicinity of lat. $44^{\circ}49.5'$, long. $83^{\circ}14.8'$ has numerous shoaler depths which vary up to 8 feet from adjacent sounding lines in depths less than 60 feet. Additional development is prescribed in Section 1.4.3. of the Hydrographic Manual and would have been desirable. *CONCUR*
- 5) A shoal with a present survey depth of 34 feet in lat. $44^{\circ}59.0'$, long. $83^{\circ}19.41'$, rising from surrounding depths up to 51 feet was not developed beyond minimal line spacing of the main scheme hydrography. *Additional development needed to ascertain least depth*
- 6) A shoal with a present survey depth of 28 feet in lat. $44^{\circ}57.08'$, long. $83^{\circ}21.22'$, which rises from 36-foot surrounding depths was not developed beyond the minimal line spacing of the main scheme hydrography. *CONCUR*
- 7) In general there were numerous other indications of depths up to 8 feet shoaler than surrounding depths on sounding lines which were not investigated. These indications occurred in depths from 35 to 60 feet. *CONCUR*

4. CONDITION OF SURVEY

The smooth sheet and accompanying overlays, hydrographic records and reports comply with the requirements of the Hydrographic Manual with the following exceptions:

(7147 on 243 & 261 JD) (7154, 7156, 7162 on 243 JD)

a. There were several duplicated position numbers in the hydrographic records. *Additional duplication of pos. no's was noted during Q.C.I.*
 The numbers are: 7147 on Julian day 261, 7147, 7154, and 7156 on Julian day 263, and position number 7162 on Julian day 271. These position numbers are detached positions. ~~The character "A" was added to these numbers in the final position and sounding listings for the survey and on the position overlay.~~

b. The hydrographer failed to draw all of the charted depth curves and additional curves to define the bottom configuration on the field sheet. *CONCUR*

5. JUNCTIONS

An adequate junction was effected with H-9690 (1977) to the east and southeast. *Junctional adjustments were accomplished during Q.C.I.*
 Some minor adjustments may be necessary on H-9690 (1977) if a precise coincidence of curves is desirable. H-9849 (1979-80) to the northeast is incomplete and the

junction will be considered when that survey is processed. Attention is directed to section I.a. of this report regarding a holiday in the junction of this survey and H-9690 (1977). Several U.S. Lake Survey surveys adjoin the present survey in the inshore areas. These surveys were conducted between 1945 and 1950. Differences of 1 to 2 feet are generally the case with these surveys with maximum differences of up to 6 feet. These differences occur in depths of 20 to 30 feet generally and in areas of irregular bottom configuration. Apparent control problems on these surveys do not create a situation for effecting junctions. On this basis junctioning was not effected and these surveys were considered prior survey data in common areas. See section 6 of this report.

CONCUR

6. COMPARISON WITH PRIOR SURVEYS

LS-1192	(1910)	1:10,000 ✓
LS-1224	(1910-11)	1:20,000 ✓
LS-1225	(1911)	1:20,000 ✓
LS-1226	(1911)	1:20,000 ✓
LS-1836	(1945)	1:20,000 ✓
LS-1845	(1946)	1:120,000 ✓
LS-1850	(1947)	1:10,000 ✓
LS-1851	(1947)	1:10,000 ✓
LS-1852	(1947)	1:10,000 ✓
LS-1903	(1946-50)	1:20,000 ✓

The above prior surveys taken together comprise the most recent prior survey coverage of the present survey area. Survey LS-1192 (1910) was not available for comparison when this report was written. The area of LS-1192 was covered in part by more recent prior surveys; however, several charted submerged net stakes originate from it. A comparison with the prior surveys reveals the prior surveys to be, in general, 1 to 2 feet shoaler with extreme differences of approximately 9 to 11 feet. These differences can be attributed to position control and sounding methods of the prior surveys. For example, LS-1836 (1945-46) in the vicinity of lat. $44^{\circ}58.35'$, long. $83^{\circ}22.9'$ shows a shoal to 14 feet extending eastward between adjacent depths of 29 to 31 feet. This shoal falls in present survey depths of 26 to 30 feet. The control for the sounding line showing this shoal extension is probably in error, causing this discrepancy.

Items were brought fwd. from LS-1192 (1910) during verification & were checked during Q.C.I.

CONCUR

Several of the above prior surveys delineate areas which are swept to various effective depths. There are no conflicts with the swept depths and present survey depths. Also, several of the prior surveys show numerous submerged net stakes which are also charted. These net stakes were not investigated by the present survey. U.S. Lake Survey surveys subsequent to earlier prior Lake Survey surveys in the

areas of the net stakes do not address the net stakes. The apparent practice on Lake Survey surveys was not to bring forward to subsequent surveys such data if it was not verified or disproved; however, the data for the most part is charted. The delineation of the submerged net stakes were brought forward to supplement the present survey. Several submerged net stakes shown on some of the prior surveys are not charted. Three stakes in the vicinity of lat. $45^{\circ}02.8'$, long. $83^{\circ}23.0'$ and one net stake in lat. $45^{\circ}01.51'$, long. $83^{\circ}23.86'$ show on LS-1192 of 1910 are not presently charted. It could not be ascertained whether the stakes aforementioned are no longer in existence or were overlooked in compilation. The nautical chart compiler should take appropriate action to ascertain their disposition. Also, on LS-1226 of 1911 net stakes delineated by a dashed line in the vicinity of lat. $44^{\circ}54.6'$, long. $83^{\circ}18.6'$ and 3 of 4 net stakes in the vicinity of lat. $44^{\circ}55.5'$, long. $83^{\circ}20.3'$ are not presently charted. The nautical chart compiler should take appropriate action to ascertain their disposition. Additionally, several soundings were brought forward from the above surveys, particularly in the area of the inshore limits where the bottom configuration is irregular and the development was inconclusive to assure least depths or isolated shoals were determined.

Subm net stakes were brought fwd to the present survey during verification. G.C. considers the existence of these stakes doubtful.

concur

The present survey, supplemented by prior survey data, is adequate to supersede the above prior surveys. *concur*

7. COMPARISON WITH CHARTS NO. 14864, 20th Ed., March 25, 1978

14869, 21st Ed., November 25, 1978

a. Hydrography

The charted hydrography for the most part originates with the previously discussed prior surveys supplemented with information from Local Notice to Mariners and unascertainable sources. The unascertainable sources probably consist of the earliest U.S. Lake Survey surveys and reconnaissance hydrography in the area. The prior surveys listed in section 6 of this report need not be further considered with the following exceptions:

1) Six submerged net stakes, charted in the vicinity of lat. $45^{\circ}02.5'$, long. $83^{\circ}01.7'$, originate with LS-1192 of 1910. The stakes should remain as charted. The area was shown as swept to 18.8 ft. on LS-1192.

be charted as existence doubtful

2) The submerged net stake charted in lat. $45^{\circ}02.25'$, long. $83^{\circ}21.7'$ originates with LS-1192 of 1910. The stakes should remain as charted. The area was shown as swept to 18.8 ft. on LS-1192.

with existence doubtful appended

3) The obstruction, PA, Presurvey Review Item 10, charted in lat. $45^{\circ}01.75'$, long. $83^{\circ}22.7'$ originates with Local Notice to Mariners No. 87 of 1974 which reports the SS HARRY L. ALLEN ~~loping~~ ^{lopped} an anchor with 200 feet of chain at this approximate position. The obstruction is not considered verified or disproved and should remain as charted. *concur*

4) The three submerged net stakes charted in the vicinity of lat. $45^{\circ}01.3'$, long. $83^{\circ}24.0'$, originate with LS-1225 of 1910 and LS-1192 of 1910. The most southerly stake of the three originating with LS-1225 (1910) is in an area swept to 18.5 ft. on that survey and was swept to 18.8 ft. on LS-1192 of 1910. The stakes should remain as charted.

be charted as existence doubtful

5) The three submerged net stakes charted in the vicinity of lat. $45^{\circ}01.2'$, long. $83^{\circ}24.3'$, originate with LS-1225 of 1910. This area is shown as swept to 18.5 feet on LS-1225 (1910). The stakes should ~~remain as charted.~~ *be charted as existence doubtful.*

6) The five submerged net stakes, charted in the vicinity of lat. $45^{\circ}00.85'$, long. $83^{\circ}24.1'$, originate with LS-1225 (1910) which shows seven net stakes in an area swept to 18.5 feet. The stakes should ~~remain as charted.~~ *be charted as existence doubtful.*

7) Numerous submerged net stakes, charted in the vicinity of lat. $45^{\circ}00.3'$, long. $83^{\circ}24.1'$, originate with LS-1225 (1910). One stake charted in lat. $45^{\circ}00.4'$, long. $83^{\circ}23.6'$ is shown as swept to 18.5 feet on LS-1225 (1910). The stakes should ~~remain as charted.~~ *be charted as existence doubtful.*

8) The five net stakes charted in the vicinity of lat. $44^{\circ}59.3'$, long. $83^{\circ}22.7'$, originate with LS-1255 (1910), whereon, the stakes are shown as a "Pond Net". The stakes should be charted as submerged, *existence doubtful.*

9) The wreck with a 20-foot depth over it, charted in lat. $45^{\circ}01.6'$, long. $83^{\circ}20.9'$, Presurvey Review Item 9, originates with LS-1224 (1910) and is identified as the wreck OSCAR FLINT, least depth 19.0 feet. LS-1851 (1947) shows 20-foot depths in the vicinity of lat. $45^{\circ}01.55'$, long. $83^{\circ}20.85'$ and a swept depth of 20 feet. *concur*
The present survey obtained a least depth by leadline by a diver of 21 feet. The present survey depth should be charted.

10) Numerous submerged net stakes charted alongshore from Whitefish Point to North Point in depths of approximately 18 to 35 feet from long. $83^{\circ}20.6'$ to $83^{\circ}16.4'$ originate with LS-1224 (1910). The stakes should ~~remain as charted.~~ *be charted as existence doubtful.*

11) The wreck with a 29-foot depth over it, charted in lat. $45^{\circ}01.0'$, long. $83^{\circ}18.2'$ originates with an unascertainable source. LS-1851 (1947) shows a depth of 29 feet in lat. 45° , long. $83^{\circ}18.25'$ which was also swept to 29 feet. Chart the wreck from the present survey information. *concur*

12) The submerged net stake, charted in lat. $44^{\circ}58.6'$, long. $83^{\circ}22.1'$, originates with LS-1224 (1910) which shows the stake to have a least depth of 22.5 feet. The stake should ~~remain as charted.~~ *be charted as existence doubtful.*

13) The submerged net stake, charted in lat. $44^{\circ}55.3'$, long. $83^{\circ}20.4'$, originates with LS-1226 (1911). The stake should ~~remain as charted.~~ The area is shown to be swept to 17.0 ft. on LS-1226. *be charted as existence doubtful.*

14) The submerged net stake, charted in lat. $44^{\circ}54.6'$, long. $83^{\circ}18.5'$, originates with LS-1226 (1911). The stake should ~~remain as charted.~~ The net stake is shown to have a 18.5 ft. least depth over it on LS-1226. *be charted as existence doubtful.*

With the exceptions noted above and with the additional depths brought forward to the present survey from prior surveys the present survey is adequate to supersede *concur*
the charted data in the common area.

b. Aids to Navigation

The aids to navigation adequately mark the features intended. However, there is a discrepancy concerning "Thunder Bay Island Light". The NOAA Form 76-40 position obtained by the hydrographer using ~~transverse~~ methods in 1979 is not in agreement with the 3rd Order Triangulation Position of 1956. The 1956 position is shown on the smooth sheet. The position shown on the NOAA Form 76-40, dated November 13, 1979 is in error. ✓

8. COMPLIANCE WITH INSTRUCTIONS

This survey adequately complies with instructions except as noted in sections 3 ✓ and 4 of this report.

9. ADDITIONAL FIELD WORK

This is an adequate basic survey and no additional field work is recommended at this time. However, the following items should be considered at an opportune time: *See also C.C. Report*

a. The existing ^{prior} ~~junctional~~ surveys along the inshore areas of Thunder Bay appear to be in conflict with the present survey results from a control and depth standpoint. *concern*

b. The approach area to the Channel to Alpena Harbor described in Section 3.c.2) of this report. *concern*

c. The numerous charted submerged net stakes described in section 7.a. of this report would have to be wire-dragged to be verified or disproved along with the obstruction, PA described in 7.a.3) of this report and section K of the hydrographer's Descriptive Report. *Obstruction, PA, described in 7.a.3. of the report falls in an area of numerous stone rubble piles rising 2 to 3 ft. off the bottom, a wire drag of this area is considered impractical.*

INSPECTION REPORT
H-9839

The completed survey has been inspected by the Hydrographic Inspection Team with regard to survey coverage, delineation of depth contours, development of critical depths, cartographic symbolization, and verification or disproval of charted data. The Verification Report has presented the data accurately and properly, the procedures used were appropriate, and the recommendations are logical and justifiable.

The survey complies with National Ocean Survey requirements with the following exceptions: Numerous shoals and indications of shoaling were not adequately investigated. These were identified in the Verification Report. Only one prior survey was identified in the Project Instructions (Section 4.9) for a comparison with survey data in this area. This condition contributed to not identifying numerous shoals and indications of shoals to be verified or disproved. Nine additional prior surveys were identified in the verification process as necessary to compare with the survey to meet the requirements of Section 5.3.4.K of the Hydrographic Manual. In addition, indications of shoaling were not developed by the hydrographer in the course of the survey as required by Section 4.3.4 of the Hydrographic Manual. Other exceptions are noted in the Verification Report.

*See
4/30
& C.
Report*

The survey records comply with NOS requirements except where noted in the Verification Report. The Hydrographic Inspection Team concurs with the verifier's findings, actions, and recommendations.

Examined and Approved
Hydrographic Inspection Team
Date: September 16, 1980

Karl Wm. Kieninger

Karl Wm. Kieninger, EDR, NOAA
Chief, Processing Division

R. D. Sanocki

R. D. Sanocki
Technical Assistant
Processing Division

Maureen R. Kenny

Maureen R. Kenny, LT, NOAA
Chief, EDP Branch
Processing Division

Approved/Forwarded

Richard H. Houlder

Richard H. Houlder, 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

June 12, 1981

TO: Glen R. Schaefer *g*
Chief, Hydrographic Surveys Division

THRU: Chief, Quality Control Branch *gm*

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

SUBJECT: Quality Control Report for H-9839 (1979), Michigan, Lake Huron, Thunder Bay

A quality control inspection of H-9839 was accomplished to monitor the survey for adequacy with respect to data acquisition, delineation of the bottom, determination of least depths, navigational hazards, junctions, sounding line crossings, shore-line 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. The following soundings were plotted on the smooth sheet from questionable traces on the fathograms. No supporting evidence was found on adjacent hydrographic lines. These soundings should be investigated on a future survey to ascertain their validity.

<u>Sounding</u>	<u>Latitude (N)</u>	<u>Longitude (W)</u>
26 feet	44°55.35'	83°19.82'
31 feet	44°55.35'	83°19.74'
23 feet	45°01.60'	83°22.86'
22 feet	44°55.62'	83°20.71'
23 feet	44°55.62'	83°20.56'
27 feet	44°55.52'	83°20.05'
30 feet	44°55.45'	83°19.56'
31 feet	44°55.43'	83°19.88'
31 feet	44°55.14'	83°18.59'
26 feet	44°54.57'	83°18.55'
30 feet	44°54.57'	83°18.38'
57 feet	44°59.02'	83°16.04'
31 feet	44°55.14'	83°18.58'
31 feet	44°55.82'	83°19.11'
31 feet	45°01.00'	83°19.73'



2. The wreck, reported in the Thunder Bay Shipwreck Report as #14, MONOHANSETT (page 129, Descriptive Report) in latitude 45°01'58"N, longitude 83°11'30"W, is not presently charted. It should be accurately located at an opportune time. Until more definitive information can be obtained, however, the wreck should be charted in its reported position.

3. Bottom samples were not acquired on some outstanding shoals. Bottom characteristics on some of these shoals were brought forward from prior surveys during quality control inspection.

CC:
OA/C351

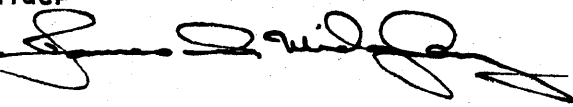


UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL OCEAN SURVEY
Rockville, Md. 20852

MAR 26 1982

OA/C351 :SJV

TO: OA/CAM - Richard H. Houlder

FROM: F/OA/C3 - Roger F. Lanier 

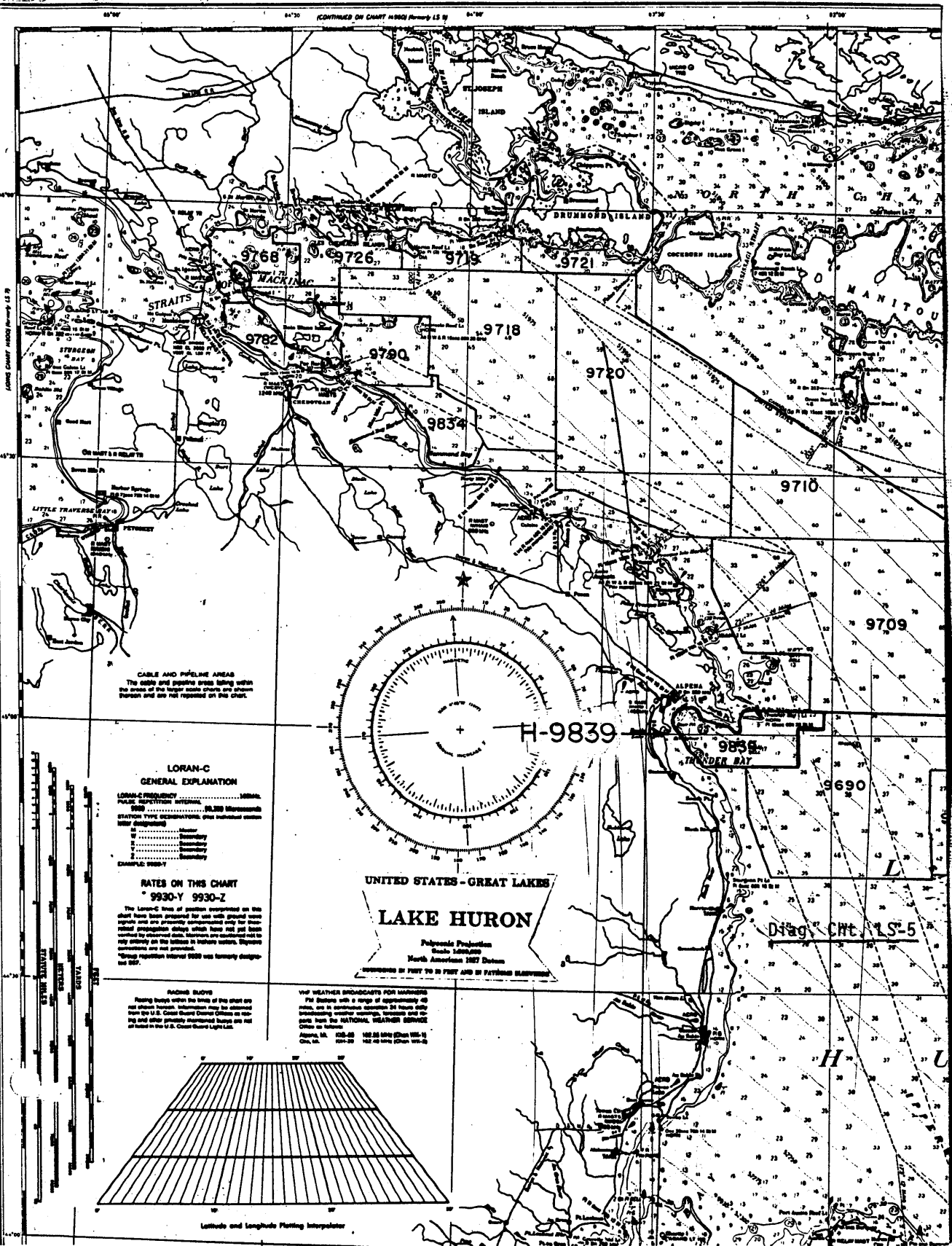
SUBJECT: H-9839 (1979), OPR-X115, Michigan, Lake Huron, Thunder Bay, Report
of Compliance with Project Instructions

The smooth sheet and Descriptive Report for the subject survey have been examined. This survey, except as noted in the Quality Control Report, dated June 12, 1981 (copy attached), and the Hydrographic Survey Inspection Team Report, dated September 16, 1980, is complete and adequate for the purposes intended and is in compliance with Project Instructions OPR-X115-PE/HSB-79, dated March 2, 1979.

Attachment.

cc:
OA/C352 w/o att.





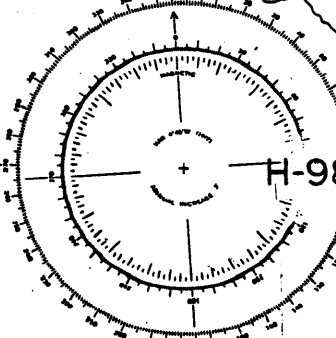
CABLE AND PIPELINE AREAS
The cable and pipeline areas lying within the areas of the larger scale charts are shown therein and are not repeated on this chart.

LORAN-C GENERAL EXPLANATION
LORAN-C FREQUENCY 10000 Kilohertz
PULSE IDENTIFICATION 05.200 Microseconds
STATION TYPE DESIGNATION: One individual station letter designation
L: Station
S: Secondary
T: Tertiary
C: Quaternary
EXAMPLE: 0500T

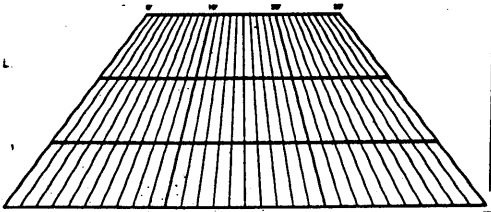
RATES ON THIS CHART
9930-Y 9930-Z
The Loran-C lines of position represented on this chart have been computed for use with ground wave signals and are primarily designed only for short range propagation delays which have not yet been modified by atmospheric ducts. Therefore, any use will be only advisory on the latitude in higher latitudes. Degree corrections are not provided.
*Group repetition interval 1000 was formerly designated 1000.

RACONS BEACONS
Racon beacons within the limits of this chart are not shown hereon. Information may be obtained from the U.S. Coast Guard District Office or from the U.S. Coast Guard Light List.

W/P WEATHER BROADCASTS FOR MARINERS
The Station with a range of approximately 40 miles, and in accordance with the International Radiotelephony Agreement, transmits and receives both the NATIONAL WEATHER SERVICE Office at Sable:
Alcona, IA 100-20 100.20 MHz (Chan 100-1)
On 24 100-20 100.20 MHz (Chan 100-2)



UNITED STATES - GREAT LAKES
LAKE HURON
Hydrographic Publication
Scale 1:60,000
North American 1983 Datum
REVISED BY PLAN TO BE PUBLISHED IN FUTURE EDITIONS



Latitude and Longitude Plotting Interpolator

Diag. Cht. LS-5

RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9839

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
14869	10-20-82	Rich Thomas G-Norris	Full Part Before After Verification Review Inspection Signed Via Drawing No. 4 in full NM'S
14864	5-16-83	Hyun B. Norris	Full Part Before After Verification Review Inspection Signed Via Drawing No. 5 Revised numerous sndgs & 24' curve Added (2) sunken wrecks
14864	5-20-83	Hyun B. Norris	Full Part Before After Verification Review Inspection Signed Via Drawing No. 5 Revised numerous sndgs & depth curves. Added (6) WKS & revised (1) existing Wk.
14860	5-23-83	Hyun B. Norris	Full Part Before After Verification Review Inspection Signed Via Drawing No. 6 Revised (6) sndgs, 24' & 5 fathom curves Added (6) wrecks; revised (3) existing wrecks
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
			Full Part Before After Verification Review Inspection Signed Via Drawing No.
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