

Illinois State Geological Survey

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Illinois Department of
Energy and Natural Resources

May 25, 1990

Dr. David W. Folger
Coordinator for Lake Michigan Studies
U.S. Geological Survey
Branch of Atlantic Marine Geology
Woods Hole, MA 02543

Dear Dave:

Enclosed is my log of the R/V NEPTUNE cruise to map the site of the tree stumps. If there are any major discrepancies with your log, let me know and we can discuss and resolve the differences. The log includes NOAA lake-level data to correct the bathy data to Low Water Datum. Thanks again for all of your support to make this cruise a reality.

Best wishes,

Michael J. Chrzastowski
Associate Geologist/Coastal Geology

MJC/ld
Enc.

CC: Ken Parolski ✓
Dave Foster ✓

*Dave - I hope this is useful
for the data processing*

*Cheers
MJC*

LOG OF THE R/V NEPTUNE CRUISE
TO MAP THE SITE OF SUBMERGED TREE STUMPS
IN SOUTHERN LAKE MICHIGAN

Summary by:
Michael J. Chrzastowski

Dates: May 13 - May 16, 1990

Vessel: R/V NEPTUNE
67 ft length, 18.5 ft beam, 6 ft draft, twin screw
Registered at Morgan City, Louisiana
Home port at Chicago, Illinois

Vessel Owner: Mr. Richard T. Race
President
Hydrographic Survey Company
1830 N. Narragansett Avenue
Chicago, Illinois
Home: (312) 637-3535
Boat: (312) 822-9684

Cruise Objectives: To produce a sidescan sonar mosaic of the recently discovered site of submerged tree stumps in 24-26m of water about 25 km southeast of Chicago Harbor. Also produce a bathymetric map of the area and collect subbottom, seismic-profile data.

Survey Equipment:

- 1) Q-MIPS sidescan sonar system.
- 2) 100-500 kHz dual frequency KLEIN sidescan-sonar towfish.
- 3) ORE 3.5 kHz subbottom profiler and EPC recorder.
- 4) ODEM 200 kHz depth recorder system
- 5) KLEIN Model 531-T sonograph recorder.

Navigation: Del Norte system with transponders set at Stations CLARK, (near Chicago's Lincoln Park), GARY (on catwalk of Steele Plant at Gary, Indiana), and HAMMOND (roof of filtration plant at Hammond, Indiana). Supplementary navigation using LORAN-C.

NOTE: log times are local (Central Standard Daylight Saving) and GMT. The log times may be +/- one minute compared to the Q-MIPS clock or the EPC clock.

SUNDAY MAY 13

R/V NEPTUNE tied starboard-side-to at the Chicago Marine Police dock. Ken Parolski installs all electronic survey gear aboard the boat. Dick Tagg completing installation of Del Norte transponder at Station GARY. Station CLARK was installed on Saturday, May 12.

MONDAY MAY 14

NEPTUNE CREW Dick Race
 Tim Cogswell
SURVEY CREW Dave Folger USGS
 Ken Parolski USGS
 Barry Irwin USGS
 Mike Chrzastowski ISGS
 Frank Pranschke Northeastern Illinois University
SHORE PARTY Dick Tagg USGS

WEATHER Partly cloudy; air temp mid 60s; winds S 15 knots;
 waves 1-2 feet.

<u>Local</u>	<u>GMT</u>	
0700	1200	Crew meets at NEPTUNE tied starboard-side- to at Chicago Marine Police dock.
0800	1300	At the dock. Testing Del Norte system. Station GARY comes in OK. Securing gear for heavy seas.
0900	1400	At the dock. Testing Del Norte system. Apparent problem with grid and range measurement being in feet and meters respectively. Wind increasing.
1000	1500	At the dock. Testing Del Norte system.
1100	1600	At the dock. Testing Del Norte system.
1125	1625	Start engines.
1135	1635	Away from dock. Underway to Chicago Lock.
1140	1640	In Chicago Lock.
1150	1650	Out of Chicago Lock. Underway to tree stump site at 13 knots.
1200	1700	Underway to tree stump site.
1300	1800	Underway to tree stump site.

1323	1823	Slow engines. Prepare to lower equipment over the side. Take a velocimeter profile from 0 to 55 ft in 5 ft increments. Uniform velocity profile of 1475 m/sec. Water temp 45° F.
1358	1858	Sidescan towfish lowered for recon survey at 100 m scale (500 kHz).
1400	1900	Approx. 1000 yds from mooring block, speed 3.2 knots, HDG 118°.
1420	1920	Turn to port. On first recon line a "grove" of targets observed 50 m to port.
1435	1935	Radiotelephone call from Ryder Newsservice asking if survey had begun.
1450	1950	Pass across mooring block on HDG 225.
1459	1959	Shut down Q-MIPS and KLEIN to adjust navigation. Transceivers swapped on mast. Now working from starboard-side transceiver.
1523	2023	Radiotelephone call from Channel 5 (TV) News requesting to come aboard. Will call again at 1600.
1600	2100	Another recon pass across mooring block site (fish ht 7 m). Block not found.
1615	2115	Another pass at block site. Going to 50 m scale. No block observed.
1640	2140	Radiotelephone call by Ch 5 News. Will call later this week.
1700	2200	Shut down gear and bring aboard towfish and ODEM transducer.
1708	2208	Underway for port at 13 knots.
1900	2300	Calibration check at Chicago Light.
1918	2318	Enter Chicago Lock.
1920	2320	Leave Chicago Lock.
1924	2324	Tied starboard-side-to at dock.

2000

0000

Frank Pranschke gives a slide show in the crews mess showing the most recent underwater photography of the tree stumps. Photos show the 24-30 inch diameter stump, the stump with roots, and the stumps with the tiered cross-sectional form.

2030

0030

DAY ENDS

TUESDAY MAY 15

Neptune Crew	Dick Race	
	Tim Cogswell	
Survey Crew	Dave Folger	USGS
	Ken Parolski	USGS
	Barry Irwin	USGS
	Mike Chrzastowski	ISGS
	Joel Dexter	ISGS
	Frank Pranschke	Northeastern Illinois University
	Al Olson	A and T Divers
	Don Harrison	SIU
Shore Party	Dick Tagg	USGS

WEATHER Fog; north wind 10-15 knots, waves 2-3 ft, visibility 1/4 mile or less.

<u>Local</u>	<u>GMT</u>	
0700	1200	Crew meets at R/V NEPTUNE tied starboard-side-to at Chicago Marine Police dock.
0755	1255	Start engines
0815	1315	Underway to Chicago Lock.
0825	1325	Out of lock and underway to tree stump site.
0900	1400	Underway to tree stump site at 13 knots.
0957	1457	Slow engines. Concern about navigation. Neither Del Norte nor LORAN providing acceptable position control.
1005	1505	Lower fathometer transducer. Boat is dead in the water. Communicating with Dick Tagg about navigation problems. Lake is essentially calm. Fog. Visibility less than 300 feet.
1035	1535	Sidescan towfish lowered.
1100	1600	Dead in water. Awaiting an ore carrier to pass and clear the project area. Navigation problems continue. Preparing to run survey using LORAN and 1/4 microsecond lines.
1134	1634	Folger and Chrzastowski establish a survey grid for LORAN lines. Survey entered on mooring block. Lines will run NW-SE. Five lines selected to either side of block at 0.3 microsecond line spacing.

1200	1700	Navigation corrected. Del Norte is operational. NEPTUNE heads for start of Line No. 41 according to original survey scheme.
1217	1717	Lower subbottom profiler.
1220	1720	Reduce speed to adjust profiler tow point.
1244	1744	START Line 41. Sidescan still being tuned. Attempting to use 50-m line spacing.
1303	1803	END Line 41. Maintain course and HDG. Q-MIPS still not on line.
1317	1817	Reduce speed. Q-MIPS problem. Too much data being collected at 50- m scale. Insufficient data storage ability. All files from yesterday deleted.
1348	1848	START Line 41. (called Line 2)
1405	1905	END Line 41. Now changing all lines from 2 km to 1 km length. Going to 100 m range on sidescan. NOTE: At either the end of this or previous line, Dick Race brought to our attention that we were ending the line, but his LORAN readings indicated that we were approaching the mooring block. He wanted to inform us of this navigation discrepancy.
1414	1914	START Line 3. HDG 045
1424	1924	END Line 3. Turn right
1427	1927	START Line 4. HDG 225
1430	1930	Adjustment made to port-side sonar signal.
1433	1933	Lower towfish.
1435	1935	END Line 4. Turn left
1442	1942	START Line 5. HDG 045
1450	1950	END Line 5. Turn right.
1456	1956	START Line 6. HDG 045
1504	2004	END Line 6. Turn left
1512	2012	START Line 7. HDG 225
1513	2013	ABORT Line 7. Q-MIPS down

1537	2037	START Line 7. HDG 045
1546	2046	END Line 7. Turn left
1550	2050	Lower towfish
1551	2051	START Line 8. HDG 225 NOTE: Possible tree stumps near start of line.
1607	2107	START Line 9. HDG 045
1611	2111	Station CLARK becoming intermittent. Possibly related to heavy rain now falling.
1627	2127	ABORT Line 9. No signal from CLARK
1630	2130	START Line 9. HDG 225
1636	2136	END Line 9.
1643	2143	START Line 10. HDG 045
1652	2152	END Line 10.
1657	2157	START Line 11. HDG 225
1705	2205	END Line 11.
1722	2222	START Line 12. HDG 045 NOTE: This is a repeat of Line 9.
1731	2231	END Line 12.
1747	2247	START Line 13. This is a cross line running SE to NW across mooring block.
1756	2256	END Line 13.
1758	2258	Reduce to one engine to bring aboard gear.
1800	2300	Towfish aboard.
1804	2304	Subbottom profiler aboard.
1806	2306	Fathometer transducer raised.
1809	2309	Underway for calibration check at Four-Mile Crib.
1900	0000	Underway to Four-Mile Crib.

1930	0030	Calibration check at Four-Mile Crib. X-Y solution from stations CLARK and GARY came up 1500 feet in error of crib position.
1948	0048	Calibration check at Chicago Light.
1957	0057	Enter Chicago Lock.
2005	0105	Leave Chicago Lock.
2011	0111	Tied starboard-to at dock.
2012	0112	Engines shut down.
2013	0113	DAY ENDS

WEDNESDAY MAY 16

NEPTUNE CREW: Dick Race
Tim Cogswell
SURVEY CREW: Dave Folger
Ken Parolski
Barry Irwin
Mike Chrzastowski
Charlie Shabica
Frank Pranschke
Don Harrison
SHORE PARTY Dick Tagg

WEATHER Partly cloudy; winds SW 10 knots; air temp mid 70s; waves calm to 1 foot.

<u>Local</u>	<u>GMT</u>	
0800	1300	Crew meets at NEPTUNE tied starboard-side-to at Chicago Marine Police dock.
0942	1442	Start engines.
0959	1459	Underway to Chicago Lock.
1002		
1006		Leave Chicago Lock. Underway to tree stump site.
1100	1600	Underway to tree stump site.
1200	1700	Slow approach to mooring block using Al Olson's LORAN coordinates.
1203	1703	Buoy lowered at Al Olson's LORAN coordinates of mooring block. Weight of 33 pounds and 90 feet of line (water depth 82 ft).
		Buoy Fix LORAN 1: 33334.38 50179.58
		LORAN 2: 3 3334.36 50179.61
1222	1722	Towfish lowered with depressor fin.
1300	1800	Begin recon survey on lines passing buoy.
1400	1900	Continue recon survey. Dick Tagg will place a Del Norte station at HAMMOND Water Filtration Plant.
1429	1929	Begin recon line at HDG 225, 100-m scale, speed 2 knots.

-87,300 739
41.816633

1432	1932	Del Norte station at GARY comes up.
1442	1942	Position calculation shows that survey of MAY 15 was southwest of desired site. This is consistent with Dick Race's comment on MAY 15 (1905 Z) that we were approaching the mooring fix when we ended Line 2.
1500	2000	Shut down engines. Adrift near buoy. Awaiting Dick Tagg to set up station HAMMOND.
1532	2032	Restart engines.
1544	2044	Navigation is up. Using Stations CLARK and HAMMOND. X-Y solution is consistent with buoy LORAN fix.
1550	2050	Subbottom profiler lowered.
1600	2100	Underway to start of Line 41 (15) to begin a new survey. Weather: partly cloudy, wind SW 5-10 knots, waves 1-2 feet. Survey to be run at 2 knots, using starboard engine only.

SURVEY OF STUMP SITE

File: L15 F1. DAT Tape: 6

1632	2132	START Line 15. HDG 045 Depth 84 ft; Fish alt 5.4 m
1635	2135	Scarp on port side parallel to track line. Featureless bottom above scarp.
1639	2139	A beam buoy.
1642	2142	Extensive field of sand ripples.
1646	2146	END Line 15. Turn left. Depth 85 feet.
1651	2151	START Line 16. HDG 225 Depth 85 ft; fish alt 9.1 m
1657	2157	Abeam buoy; 100 m off port side
1704	2204	END Line 16. Turn right Depth 85 ft
1709	2209	START Line 17. HDG 045 Depth 84 ft; fish alt 8.3 m
1712	2212	Target on port side with 2 m shadow in rippled sand.

1714	2214	Scarp appears on port side at 100 m range. Out of view in about one boat length.
1716	2216	Abeam buoy. Granular (rocky?) bottom.
1719	2219	Possible sonar reflection off lake bottom sonar reflector. Q-MIPS bottom trace jumped up 3 to 5 feet above bottom. Possibly towfish went directly over one of the three, 12-inch diameter reflectors that were placed on the bottom.
1722	2222	END Line 17. Depth 82 ft.
1727	2227	START Line 18. HDG 225 Depth 83 ft.; fish alt 6.9 m Line begins in a generally featureless area.
1730	2230	Entering area of rippled sand.
1734 have	2234	Abeam buoy. Granular (rocky?) bottom. Two targets shadows (stumps?).
1741	2241	END Line 18. Turn to NW. Running to first line NW of buoy.
1751	2251	START Line 19. HDG 045 Depth 84 ft; fish alt 8.7 m Line begins near a scarp and a field of sand ripples.
1753	2253	Scarp on port side.
1757	2257	Abeam buoy. Sand ripples.
1759	2259	Area of smooth sand or clay.
1804	2304	END Line 19. Depth 84 ft NEW FILE FILE: L20F1.OAT TAPE: 7
1812	2312	START Line 20. HDG 225 Depth 85 ft; fish alt 8.2 m Line begins in area of granular bottom.
1816	2316	Featureless bottom interrupted by scarp on port side running 45 deg to track line.
1819	2319	Abeam buoy. Granular (rocky?) bottom.
1824	2324	Near a large scarp.

1826	2326	END Line 20. Depth 81 ft
1833	2333	START Line 21. HDG 045 Depth 82 ft, Fish alt 9.6 m Line begins in a granular area
1839	2339	Abeam buoy.
1840	2340	Crossing a major scarp.
1846	2346	END Line 21.
FINISHED SURVEY OF STUMP SITE		
1849	2349	Underway to buoy.
1852	2352	Towfish brought aboard.
1858	2358	Subbottom profiler brought alongside. This eliminated noise on subbottom record. Theory is that we were getting prop noise.
1901	0001	Subbottom profiler aboard.
1908	0008	Alongside buoy adding weight to total of 50 pounds. Buoy is left behind for Al Olson to check position relative to the mooring block.
1910	0010	Underway at 2 knots toward Chicago. Transducer still over the side. Irwin showing Parolski and Harrison how to run the NAV system.
1956	0056	ODEM transducer raised. Underway Chicago at 13 knots.
2115	0115	Enter Chicago Lock.
2122	0122	Leave Chicago Lock.
2127	0127	Tied starboard-side-to at Chicago Marine Police dock.
2132	0132	Engines shut down.
2133	0133	DAY ENDS STUMP-SITE SURVEY ENDS

On May 18, Al Olson and his divers dove on the buoy. The buoy had been dropped 38 ft south and 17 ft west of the mooring block (i.e. 42 ft south-southwest of the block). High waves of May 17 had caused the weights to drag about 17 ft to the west. The drag scars were evident along the bottom. The buoy, line and weights were recovered and returned to Dick Race.

**SUMMARY OF HOURLY LAKE LEVELS
DURING WEEK OF CRUISE NEPTUNE 90-1**

From NOAA Gage No7044 at Calumet Harbor, Illinois
All times are Central Standard. Add one hour
for Central Daylight Savings. Add six hours
for GMT.

Seven Day Gage Summary

1990 HOURELY ELEVATIONS AND DAILY MEANS IN FEET, IGLD(1955)

Gage No. 7044: Calumet Harbor, Illinois, on Lake Michigan
Gage constant is 587.70 ft.

Hour (CST)	12 May	13 May	14 May	15 May	16 May	17 May	18 May
1	577.74	578.55	578.25	577.99	578.20	578.22	577.97
2	577.94	578.55	578.35	578.08	578.29	578.35	577.75
3	577.74	578.52	578.10	578.19	578.18	578.25	577.84
4	577.74	578.38	578.05	578.09	578.24	578.08	578.06
5	577.86	578.22	578.02	578.45	578.06	578.21	577.92
6	577.83	578.19	578.13	578.39	577.86	577.93	578.14
7	577.96	578.13	577.99	578.18	578.29	577.78	577.98
8	577.82	578.30	577.97	578.26	578.19	577.98	577.90
9	577.94	578.27	578.00	578.13	578.34	577.92	577.84
10	578.15	578.18	577.71	578.19	577.99	577.74	577.73
11	577.91	578.14	578.25	577.99	578.00	577.80	577.80
12	578.14	578.09	578.02	577.97	577.88	577.42	577.76
13	578.13	578.02	578.07	578.26	578.16	577.68	577.86
14	578.22	578.21	578.10	578.05	578.44	577.81	577.89
15	578.28	578.34	578.27	578.17	578.23	578.02	577.76
16	578.58	578.18	578.08	578.36	578.72	577.77	577.95
17	578.23	578.02	577.86	578.30	578.43	577.79	577.92
18	578.41	578.19	578.07	578.10	578.50	577.86	577.79
19	578.26	578.08	577.96	578.17	578.67	578.05	577.87
20	578.28	577.97	578.31	578.13	578.45	578.17	577.59
21	578.11	577.78	578.08	578.11	578.45	578.05	577.85
22	578.45	577.93	578.26	577.97	578.25	577.96	577.89
23	578.33	577.99	578.23	578.11	578.15	577.97	578.10
24	578.51	577.92	578.16	578.35	578.37	577.74	578.05
Mean	578.11	578.17	578.10	578.17	578.26	577.94	577.88

Mean of 24 most recent gage readings : 577.88

* indicates no data value

* indicates a jump of over 0.75 foot in consecutive readings

This print-out contains Provisional Data that may change after review by NOS