U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

LITHOLOGIC DESCRIPTION OF A SEDIMENT CORE FROM ROUND LAKE, KLAMATH COUNTY, OREGON

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Introduction

As part of a series of investigations designed to study the Quaternary climatic histories of the western U.S. and the adjacent northeastern Pacific Ocean, a sediment core was collected from Round Lake, Klamath County, Oregon, in the fall of 1991. This report presents basic data concerning the Round Lake site, as well as lithologic descriptions of the recovered sediments. The drilling methods and core sampling and curation techniques used are described by Adam (1993).

Acknowledgement

Coring at Round Lake was made possible by the gracious cooperation of Mr. Les Northcutt, the owner of the property.

Site description

Round Lake is a broad open valley about 2.5 km wide and 5 km long that lies just west of the southern end of Upper Klamath Lake, Oregon (Figure 1), at an elevation of about 1300 meters. The basin is one of a series of northwest-southeast trending basins that also includes the Klamath graben and Long Lake. Regional bedrock consists of basalt and basaltic andesites of Pliocene and upper Miocene age (Walker and McLeod, 1991; Sherrod and Pickthorn, 1992). The eastern rim of the basin consists of low faulted blocks oriented NNW-SSE; the western side of the basin is formed by steeply-dipping normal fault scarps that extend up to 430 m above the present basin floor. The region is tectonically active; a series of earthquakes with Richter magnitudes up to 5.5 occurred within a few km of Round Lake in the fall of 1993, causing extensive damage in Klamath Falls (Sherrod, 1993; Dewey, 1993).

Portions of the Upper Klamath Lake drainage were heavily glaciated at times during the Pleistocene (Crandell, 1965). The Mountain Lakes Wilderness Area, about 15 km northwest of Round Lake, was glaciated during at least the most recent Pleistocene glacial interval (Carver, 1972), with the glaciers mostly confined to the north side of the peaks. Further north, the crest of the Cascades between Mt. McLaughlin and Mt. Mazama (now Crater Lake) was extensively glaciated. Although glacial runoff from both the Mountain Lakes and southern Cascade glaciers flowed into the Upper Klamath Lake basin, the Round Lake basin remained entirely unglaciated.

The floor of the basin has been modified for agriculture over the past several decades; a series of roads and drainage ditches allow access. According to Mr. Marvin Barrett (oral communication, 1994), a resident of Klamath Falls who was born at Round Lake in 1922 and grew up in the valley, the valley floor was much wetter than today until a 12-inch-diameter hole was drilled through the lacustrine deposits into the underlying permeable volcanics. That hole, together with a series of dikes and drainage ditches, allowed the local ranchers to control water levels in various parts of the valley floor, although the valley bottom is still waterlogged in the spring (Mrs. Les Northcutt, oral communication, 1991). More recently, the southwest quadrant of the valley floor has been diked off from the rest of the valley and used as a wildlife preserve by the State of Oregon (Figure 1).

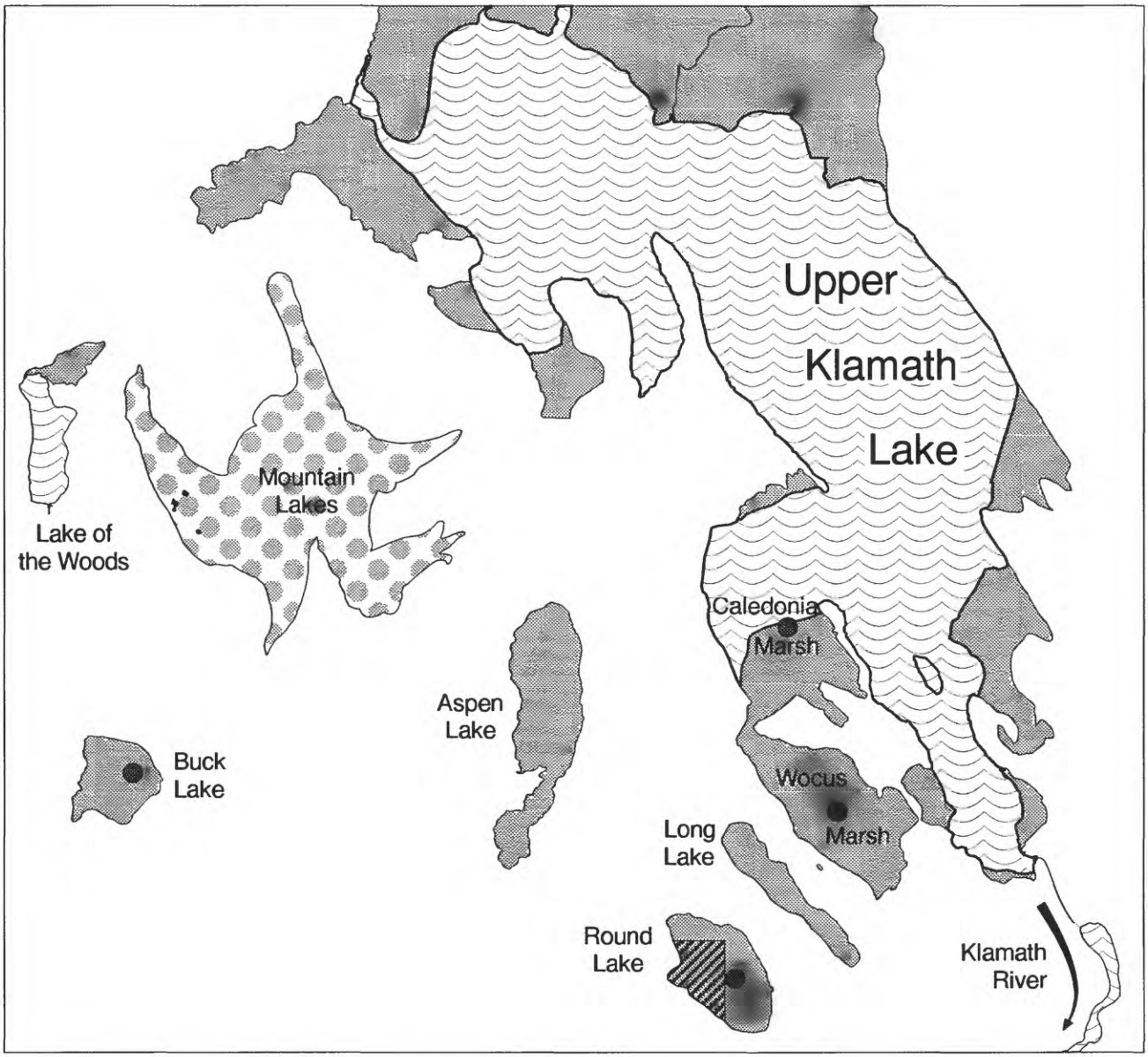

Figure 1.-- Map showing relationship of the Round Lake Valley to Upper Klamath Lake and nearby coring sites. Open-water lakes are shown by wave pattern, lake deposits by dark gray pattern, and extent of glaciation in the Mountain Lakes Wilderness Area by light gray dot pattern. Core sites are shown by dots. Cross-hatching in Round Lake indicates location of wildlife preserve.

The core location (Figure 1) was selected to be as close to the geographical center of the basin as we could safely move the heavy drill rig, well away from any edge effects. The lowest part of the valley floor, however, lies to the west of the drill site, and comprises most of the wildlife preserve; this can be clearly seen on color aerial photographs of Round Lake taken in 1980 (U.S.G.S. Project GS-VEYU-C, Roll 1, negatives 303 and 304).

Core description

A single 50-m core was taken at Round Lake between September 17th and 20th, 1991.

Drives 1 through 9 were taken using Shelby tubes; drives 10 through 41 were taken using conventional rotary drilling with a 3-inch diameter core barrel. Drilling was stopped when circulation of drilling mud was lost and could not be recovered.

Core recovery

The depth interval drilled for each drive and the percent recovery are shown in Figure 2 and in Table 1. The Figure 2 column labeled "Drives" shows an unlabeled, shaded box for each drive recovered (drive 15 had zero recovery). The upper boundary represents the depth at which drilling began for that drive as reported by the driller, plus a possible adjustment to account for >100% recovery. These boxes are offset in an alternating pattern to facilitate comparison of the bottom of one drive with the top of the next drive. Immediately to the right of the "Drives" column, the "Slugs" column displays similar but labeled boxes that identify the drive, the slugs (A, and sometimes B and C) into which the drive was divided for storage, and the thickness of sediment actually recovered. In addition, some drives are plotted using a vertical offset that compensates for apparent overlap between drives (see example below). The data used are shown in Table 1.

As an example, consider drives 31 and 32. Drive 31 extended from a starting depth of 25.25 m to a bottom depth of 28.30 meters, recovering 2.37 meters of sediment from an interval 3.05 m thick, for a recovery of 77.7% (Table 1). Drive 32 extended from 28.30 to 31.35 m and recovered 3.13 m of sediment from a 3.05-m-thick interval, for a recovery of 102.7%. The "extra" recovery for drive 32 is assumed to represent material left in the hole when drive 31 was recovered. Similar overlaps are found between drives 24 and 25, and 39 and 40. However, the total amount of sediment recovered from the hole, as shown in the "Slugs" column, can be accommodated within the total depth drilled if adjustments are made to the top depths of selected drives. The adjustment for drive 32 is -1.29 m, as shown in the column labeled "Offset" (Table 1). The offset is added to the driller's depth for the top of the drive to produce a calculated depth for the top of the drive. The depths shown on the lithologic logs in Appendices B and C are based on the calculated depths for the tops of the drives.

Dating

Age control is derived from tephra layers identified in the core (Table 2). The section is of Pleistocene and Holocene age. The match of Sample 3475 with the Rio Dell ash bed we assume is fortuitous, based on the identification near the base of the Round Lake core of several ash beds known or strongly suspected to be younger than the Rio Dell ash bed. One of these (Sample 3483) matches our Sample 542, which comes from a depth of 125.7 m in the Tulelake core and has an estimated age of 1.36 Ma (Rieck and others, 1992). Bracketing sample 3483 is a group of tephra that appear to correlate with a similar group of tephra found at the base of the Wocus Marsh core, about 7 km to the northeast (Adam and others, 1994). The presence of the Rockland ash bed at a depth of 27-28 meters in the Wocus Marsh core is reasonably consistent with the ~1.3-1.4 Ma age implied for the base of the core by tephra correlations with the Round Lake and Tulelake cores. Why the Rockland ash bed is not found in the Round Lake core is not clear; perhaps it corresponds to one of the gaps in the core.

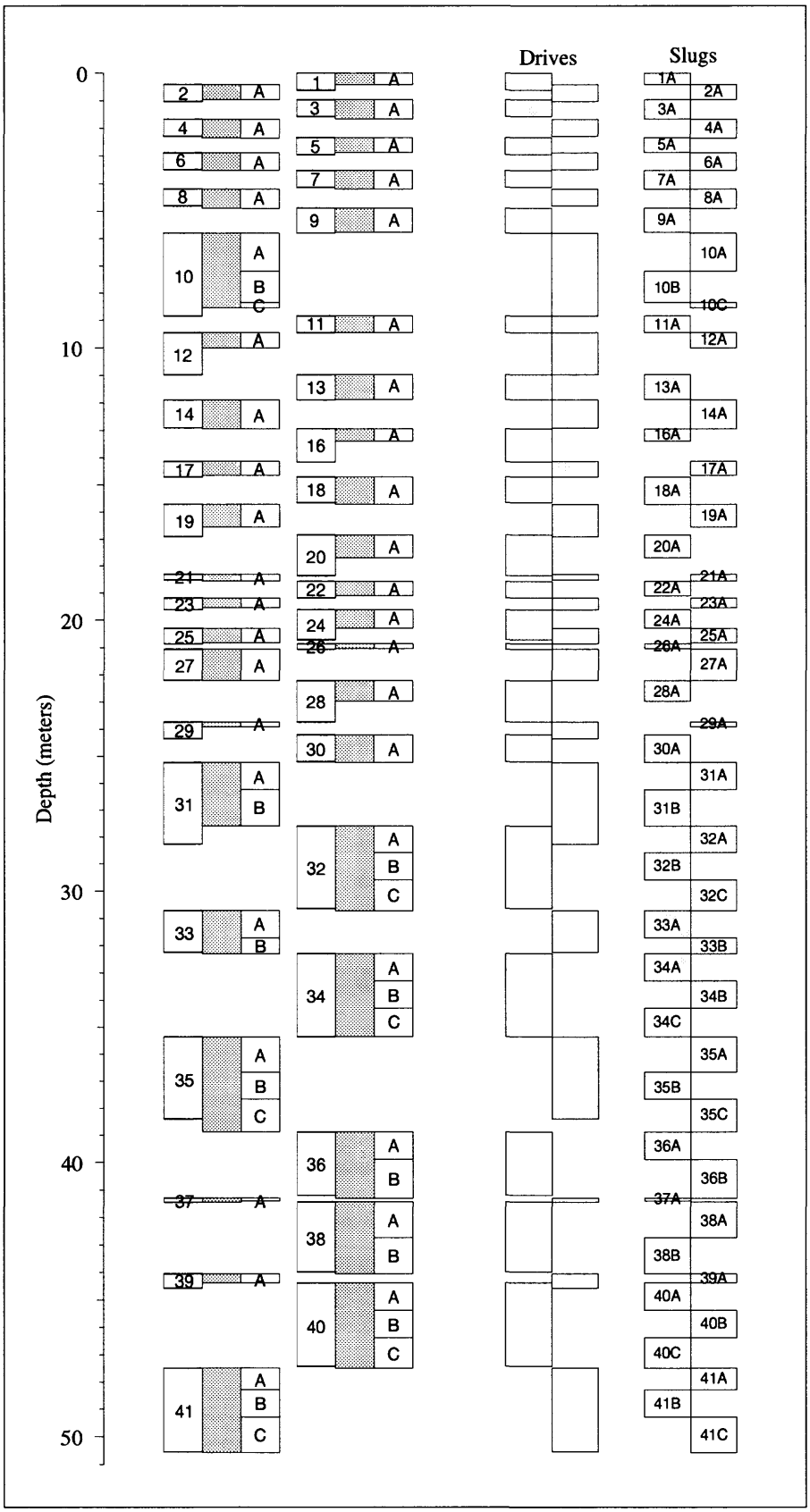

Figure 2.-- Core recovery for Round Lake core.

Lithology

A very generalized lithology of the section is shown in Figure 3; a detailed lithologic log for is shown in Appendix B, using the patterns shown in Appendix A. Depths are shown in meters from the ground surface. Each stratigraphic unit is described to the right of the stratigraphic column. Most descriptions were taken from the fresh cores in the field, but some further descriptions were done in the laboratory. Color codes are taken from the Rock Color Chart distributed by the Geological Society of America (Rock Color Chart Committee, 1948).

The overall lithology of the section is characterized by open-water lake muds below a depth of about 25 meters, overlain by 25 meters of very tight clays that appear to represent deposits of an intermittent lake or swamp. Coring in the upper half of the section was difficult and core recovery was not as complete as in the lower half of the core.

The record indicates that the Round Lake basin has existed for at least the past one million years. The shift from perennial to ephemeral lake deposits is tentatively attributed to a drop in the regional water table caused by downcutting of the Klamath River across a hydrologic barrier at Long Point. Study of the climatic record preserved in the cores will help to separate the effects of climate on sediment type from possible tectonic effects on the connection between the Round Lake sub-basin and the rest of the Upper Klamath Lake drainage.

Table 1.--Drive data for Round Lake Core 1						
Drive number	Driller's Depth (m)		Recovery		Offset	Calculated depth for top of drive (m)
	Top	Bottom	meters	Percent		
1	0.00	0.61	0.41	67.2	0.00	0.00
2	0.61	1.22	0.55	90.2	-0.20	0.41
3	1.22	1.83	0.71	115.6	-0.26	0.96
4	1.83	2.44	0.68	111.5	-0.16	1.67
5	2.44	3.05	0.53	86.9	-0.10	2.34
6	3.05	3.66	0.64	105.0	-0.17	2.88
7	3.66	4.27	0.67	109.9	-0.14	3.52
8	4.27	4.88	0.70	114.8	-0.08	4.19
9	4.88	5.79	0.89	97.3	0.00	4.88
10	5.79	8.84	2.75	90.2	0.00	5.79
11	8.84	9.45	0.61	100.0	0.00	8.84
12	9.45	10.98	0.54	35.4	0.00	9.45
13	10.98	11.89	0.90	98.4	0.00	10.00
14	11.89	12.91	1.05	103.3	0.00	10.91
15	12.91	14.13	0.00	0.0	0.00	12.91
16	12.91	14.13	0.46	37.7	0.03	12.91
17	14.13	14.71	0.51	87.3	0.00	14.13
18	14.71	15.65	1.00	106.4	0.00	14.71
19	15.65	16.84	0.84	70.3	0.06	15.71
20	16.84	18.37	0.85	55.8	0.00	16.84
21	18.37	18.57	0.25	123.0	-0.05	18.32
22	18.57	19.18	0.53	86.9	0.00	18.57
23	19.18	19.61	0.36	83.3	-0.10	19.08

24	19.61	20.71	0.68	62.2	-0.17	19.44
25	20.30	20.86	0.52	92.9	0.00	20.30
26	20.86	21.06	0.18	90.0	0.00	20.86
27	21.06	22.21	1.16	100.9	-0.01	21.06
28	22.21	23.73	0.76	49.9	0.00	22.21
29	23.73	24.34	0.18	29.5	0.00	23.73
30	24.26	25.25	1.02	103.0	-0.06	24.21
31	25.25	28.30	2.37	77.7	-0.03	25.25
32	28.30	31.35	3.13	102.7	-0.71	27.62
33	31.35	32.88	1.58	103.6	-0.63	30.75
34	32.88	35.92	3.05	100.0	-0.58	32.35
35	35.92	38.97	3.53	115.8	-0.57	35.39
36	38.97	41.29	2.42	104.7	-0.09	38.97
37	41.29	41.44	0.14	93.3	0.01	41.39
38	41.44	43.98	2.61	102.7	0.00	41.53
39	43.98	44.49	0.32	63.0	0.07	44.14
40	44.49	47.54	3.12	102.3	-0.11	44.46
41	47.54	50.58	3.08	101.0	-0.04	47.58

Table 2.--Analyzed tephra from Round Lake			
Sample Number	Tephra layer	Depth (m)	Age
3469	Paoha Island (Mono Lake) ash bed	6.78-6.85	160-180 ka
3475	Rio Dell ash bed lookalike	25.11-25.12	1.5 Ma
3477	previously undescribed	38.69-38.70	?
3479	may match samples 3367 and 3368 in Wocus Marsh core	41.30-41.33	?
3480	may match samples 3368, 3467, and 3468 in Wocus Marsh core	44.22-44.25	?
3483	matches Sample 542 in Tulelake core and samples 61484-45 and 61484-47 at Topsy Reservoir	49.51-49.55	1.36 Ma
3484	may match samples 3367, 3467, and 3468 in Wocus Marsh core	49.94-49.95	<1.45 Ma

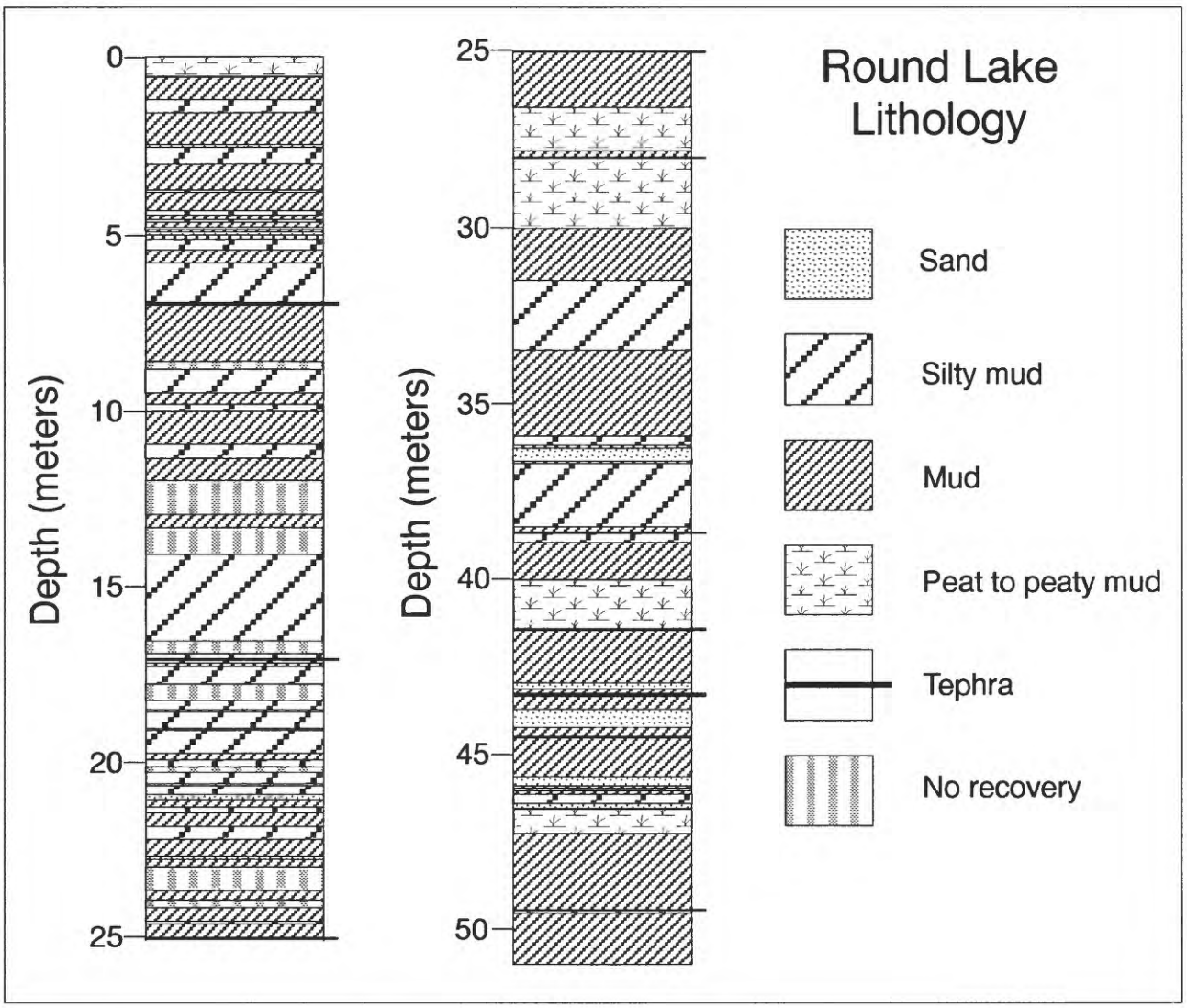

Figure 3.-- Generalized Lithology of the Round Lake core.

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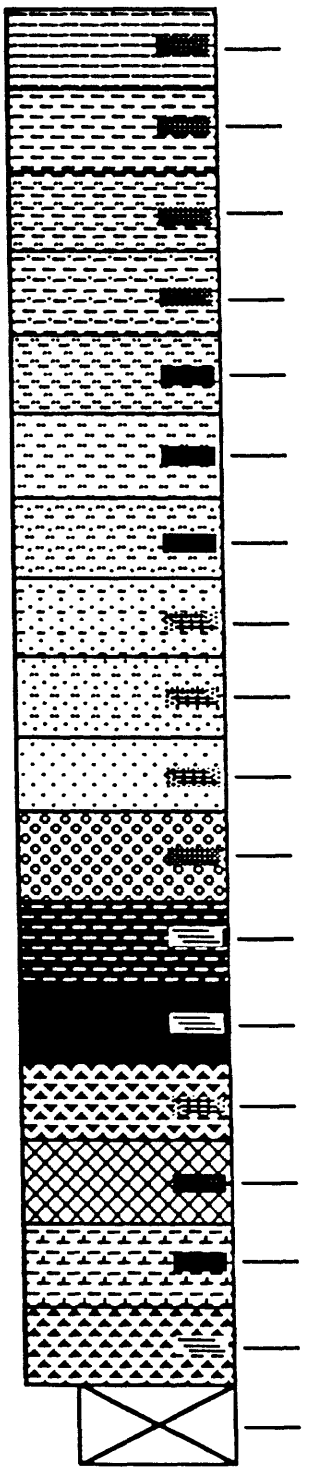
Appendix A
Legend showing patterns used for Lithologic Logs

Small box inset within each pattern is used to indicate laminations within the unit (see written descriptions for more detail).

KEY TO LITHOLOGIES AND LAMINATION SYMBOL



CLAY

SILTY CLAY OR MUD

SILTY MUD

SANDY MUD

MUDDY SILT

SILT

SANDY SILT

MUDDY SAND

SILTY SAND

SAND

GRAVEL OR CINDERS

ORGANIC

TEPHRA

BRECCIA

BASALT

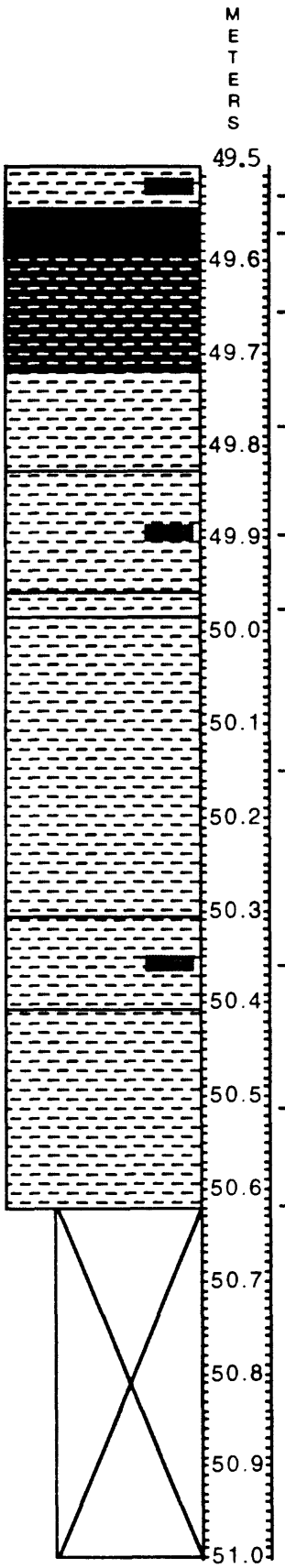
MARL

CHERT

NO CORE RECOVERED

Appendix B
Lithologic Log

Round Lake, Core 1
Klamath County, Oregon



MUD [48.93-49.55 m]; olive gray (5Y3/2) to moderate olive brown (5Y4/4) at bottom of unit; laminations to mm-scale bedding, platy.

TEPHRA [49.55-49.59 m]; light gray (5G4/1); distinct structural break between an upper massive section (49.55-49.57 m) and a lower bioturbated section (49.57-49.59 m).

ORGANIC MUD AND TEPHRA [49.59-49.72 m]; dark greenish gray (5GY4/1); strongly bioturbated with burrows and stringers evident; gradational lower contact.

MUD [49.72-49.83 m]; black and green; burrows; bioturbated; transitional lower boundary.

MUD [49.83-49.96 m]; dark greenish gray (5GY4/1); cm-scale bedding.

MUD [49.96-49.995 m]; two lighter-colored (gray) bedlets from 49.96-49.98 m and 49.98-49.995 m.

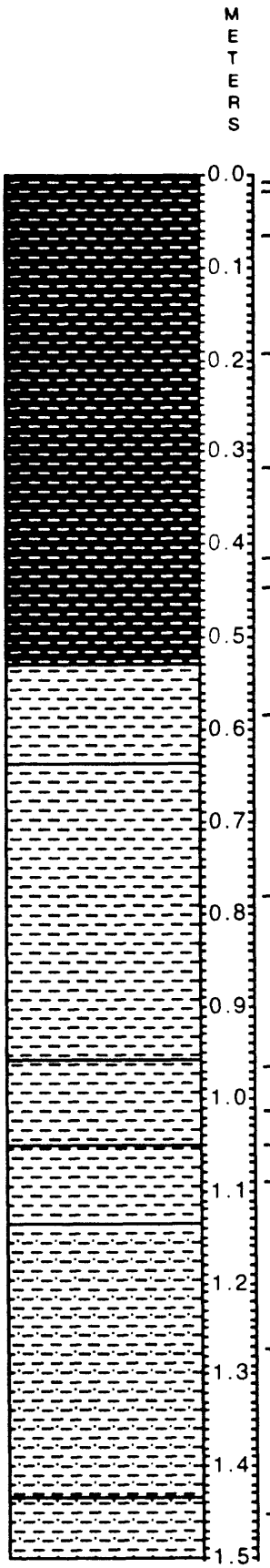
MUD [49.995-50.31 m]; mottled dark greenish gray (5GY4/1); bioturbated; gradational lower contact.

MUD [50.31-50.41 m]; mottled dark greenish gray (5GY4/1); mm-scale bedding; gradational lower contact.

MUD [50.41-50.62 m]; olive gray (5Y3/2).

Base of core at 50.62 m.

Round Lake, Core 1
Klamath County, Oregon



Start of Drive 1 [0.00-0.42 m].

SOIL WITH GRASS AT TOP [0.00-0.03 m]; dusky brown (5YR2/2) to dusky yellowish brown (10YR2/2); consolidated; gradational lower contact.

PEAT WITH ROOTS [0.03-0.09 m]; olive black (5Y2/1); consolidated; gradational lower contact.

PEAT WITH ROOTS AND MOTTLED MUD [0.09-0.26 m]; brownish black (5YR2/1) with olive gray (5Y3/2) mottles; massive; gradational lower contact.

MUD WITH RARE ROOTS [0.26-0.42 m]; olive gray (5Y3/2); massive.

Start of Drive 2 [0.42-1.05 m].

SOIL WITH GRASS AT TOP GRADING INTO PEAT WITH ROOTS [0.42-0.53 m]; brownish black (5YR2/1); consolidated; sharp but irregular lower contact.

MUD [0.53-0.64 m]; dark to dusky yellowish brown (10YR3/2); massive; gradational lower contact.

MOTTLED MUD WITH CARBONATE FRAGMENTS [0.64-0.955 m]; moderate brown (5YR3/4) with a little more red, with dark yellowish brown (10YR4/2) mottles and white carbonate fragments; calcareous; massive; sharp lower contact.

TEPHRA (silt-sized grains) [0.955-0.96 m]; dusky yellowish brown (10YR2/2); massive; sharp lower contact.

MOTTLED MUD WITH CARBONATE FRAGMENTS [0.96-1.05 m]; moderate brown (5YR3/4) with a little more red, with dark yellowish brown (10YR4/2) mottles and white carbonate fragments; calcareous; massive.

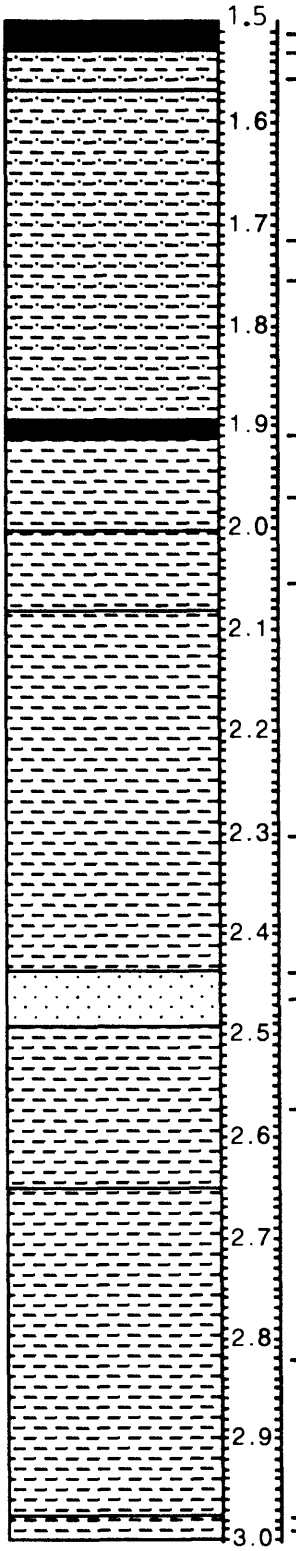
Start of Drive 3 [1.05-1.76 m].

MUD [1.05-1.14 m]; dusky yellowish brown (10YR2/2); massive.

MUD WITH FINE SAND, DISPERSED BLACK TEPHRA AND WHITE CARBONATE FRAGMENTS [1.14-1.44 m]; dark yellowish brown (10YR4/2); dispersed black tephra from 1.17-1.24 m; sand of quartz, olivine, amphibole, and red scoriaceous fragments; calcareous; massive.

MUD WITH FINE TO MEDIUM SAND, DISPERSED BLACK TEPHRA AND WHITE CARBONATE FRAGMENTS [1.44-1.51 m]; see next page for full description.

Round Lake, Core 1
Klamath County, Oregon



MUD WITH FINE TO MEDIUM SAND, DISPERSED BLACK TEPHRA AND WHITE CARBONATE FRAGMENTS [1.44-1.51 m]; dark yellowish brown (10YR4/2) with a bit more green; sand of quartz, olivine, amphibole, and red scoriaceous fragments; calcareous; massive.

TEPHRA [1.51-1.53 m]; black.

MUD WITH FINE TO MEDIUM SAND, DISPERSED BLACK TEPHRA AND WHITE CARBONATE FRAGMENTS [1.53-1.57 m]; dark yellowish brown (10YR4/2) with a bit more green; dispersed black tephra from 1.53-1.54 m; sand of quartz, olivine, amphibole, and red scoriaceous fragments; massive.

MUD WITH FINE TO MEDIUM SAND [1.57-1.90 m]; dark yellowish brown (10YR4/2); sand of quartz, olivine, amphibole, and red scoriaceous fragments; massive.

Start of Drive 4 [1.76-2.44 m].

TEPHRA (1-2 mm wide) [1.90-1.902]; white.

MUD [1.902-2.01 m]; dark yellowish brown (10YR4/2) with a lot more green; massive.

MUD [2.01-2.09 m]; dark yellowish brown (10YR4/2) with a bit more green; massive.

MUD [2.09-2.44 m]; varies from approximately dark yellowish brown (10YR4/2) to moderate brown (5YR3/4) with a touch more red; massive.

Start of Drive 5 [2.44-2.98 m].

MEDIUM SAND [2.44-2.49 m]; dark yellowish brown (10YR4/2); massive; gradational lower contact.

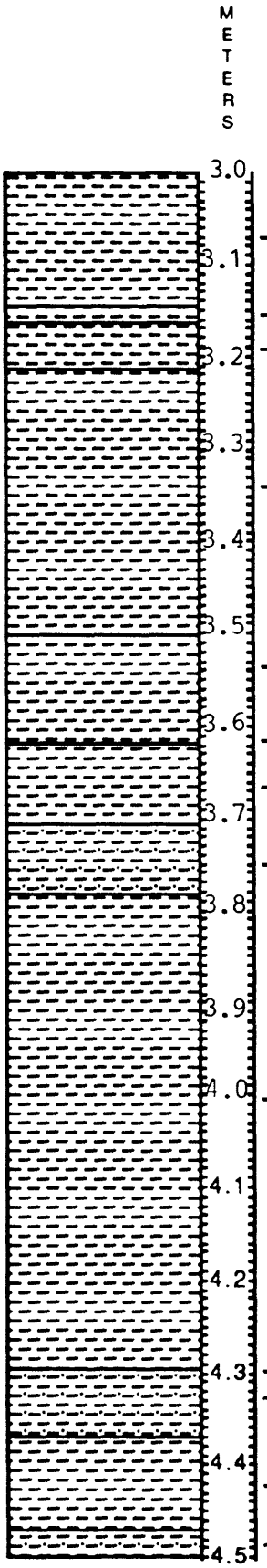
MUD WITH DISPERSED BLACK TEPHRA [2.49-2.65 m]; dark yellowish brown (10YR3/2); massive; gradational lower contact.

MUD WITH DISPERSED BLACK TEPHRA [2.65-2.98 m]; dark yellowish brown (10YR3/2); dispersed black tephra from 2.78-2.855 m and a possible irregular black tephra layer at 2.855 m; massive.

Start of Drive 6 [2.98-3.62 m].

MUD [2.98-3.15 m]; see full description, next page.

Round Lake, Core 1
Klamath County, Oregon



MUD [2.98-3.15 m]; moderate olive brown (5Y5/4); small area of fine to medium sand from 3.02-3.03 m, in area that looks less cohesive (possibly disturbed); massive; gradational lower contact.

MUD [3.15-3.17 m]; dusky yellowish green (10GY3/2); massive; gradational lower contact.

MUD [3.17-3.22]; olive gray (5Y4/2); massive; gradational lower contact.

MUD [3.22-3.51 m]; dusky yellowish green (10GY3/2); massive; gradational lower contact.

MUD [3.51-3.62 m]; grayish olive (10Y4/2); massive.

Start of Drive 7 [3.62-4.30 m].

MUD [3.62-3.71 m]; light olive gray (5Y4/2); massive; gradational lower contact.

MUD WITH FINE SAND [3.71-3.78 m]; dark yellowish brown (10YR4/2); massive; sharp lower contact.

MUD [3.78-4.30 m]; dusky yellowish green (10GY3/2); massive.

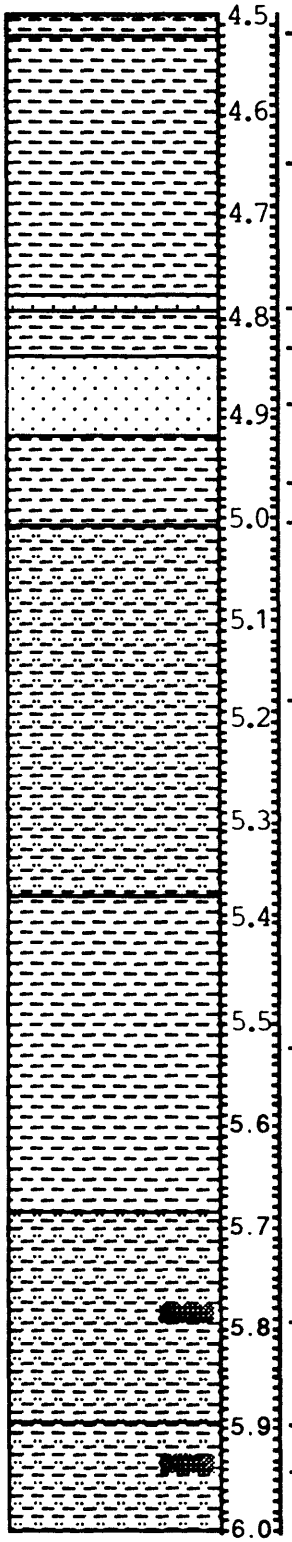
Start of Drive 8 [4.30-5.01 m].

MUD WITH FINE SAND [4.30-4.37 m]; grayish olive (10Y4/2); massive; very firm; gradational lower contact.

MUD [4.37-4.47 m]; light olive gray (5Y5/2); massive; very soft; sharp lower contact.

MUD WITH FINE SAND [4.47-4.52 m]; dark yellowish brown (10YR3/2); massive.

Round Lake, Core 1
Klamath County, California



MUD WITH FINE SAND [4.47-4.52 m]; dark yellowish brown (10YR3/2); massive; sharp lower contact.

MUD [4.52-4.78 m]; grayish olive green (5GY3/2); massive; gradational lower contact.

MEDIUM TO COARSE SAND [4.78-4.80 m]; dark yellowish brown (10YR4/2); massive; gradational lower contact.

MUD [4.80-4.84 m]; dark yellowish brown (10YR3/2); massive; gradational lower contact.

MEDIUM TO COARSE SAND [4.84-4.92 m]; dark yellowish brown (10YR4/2); massive; gradational lower contact.

MUD [4.92-5.01 m]; dark yellowish brown (10YR3/2); crumbly, fractures easily; massive.

Start of Drive 9 [5.01-5.90 m].

SILTY MUD [5.01-5.37 m]; olive gray (5Y3/2), mottled with greenish blebs; platy on scraped surface; gradational lower contact over approximately 1 cm.

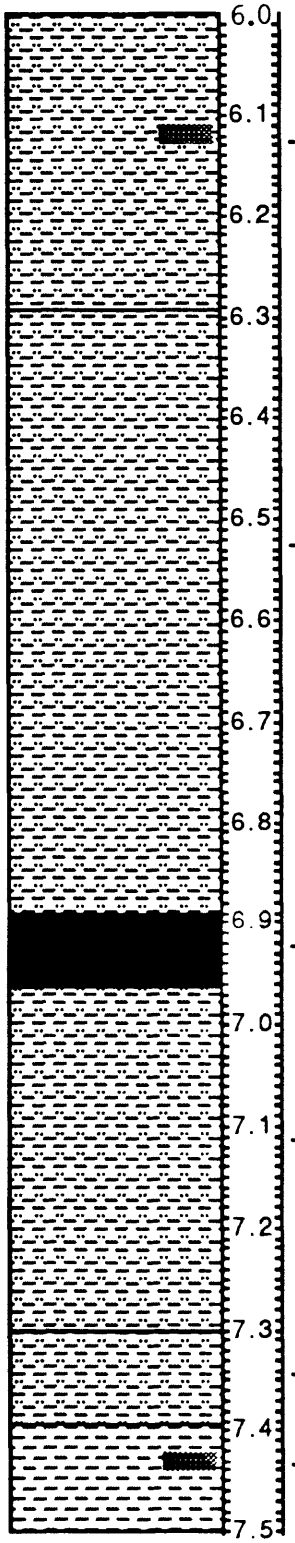
MUD [5.37-5.69 m]; olive gray (5Y3/2); massive; gradational lower contact over approximately 1 cm.

SILTY MUD [5.69-5.90 m]; slightly redder than olive gray (5Y3/2), with mottled reddish blebs; platy lamination.

Start of Drive 10 [5.90-8.65 m].

MUD WITH A LITTLE SILT [5.90-6.30 m]; mottled olive gray (5Y3/2); platy lamination.

Round Lake, Core 1
Klamath County, California



MUD WITH A LITTLE SILT [5.90-6.30 m]; mottled olive gray (5Y3/2); platy lamination down to 6.14 m; gradational contact from 6.14-6.25 m then massive structure to base of unit.

SILTY MUD [6.30-6.89 m]; olive gray (5Y3/2); massive; fractured into crumbs from 6.40-6.50 m.

PUMICEOUS SAND (TEPHRA?) [6.89-6.96 m].

SILTY MUD [6.96-7.30 m]; olive gray (5Y3/2); massive.

SILTY MUD [7.30-7.40 m]; dusky yellowish brown (10YR3/2); massive; gradational lower contact.

MUD [7.40-7.66 m]; greenish black (5GY2/1); platy.

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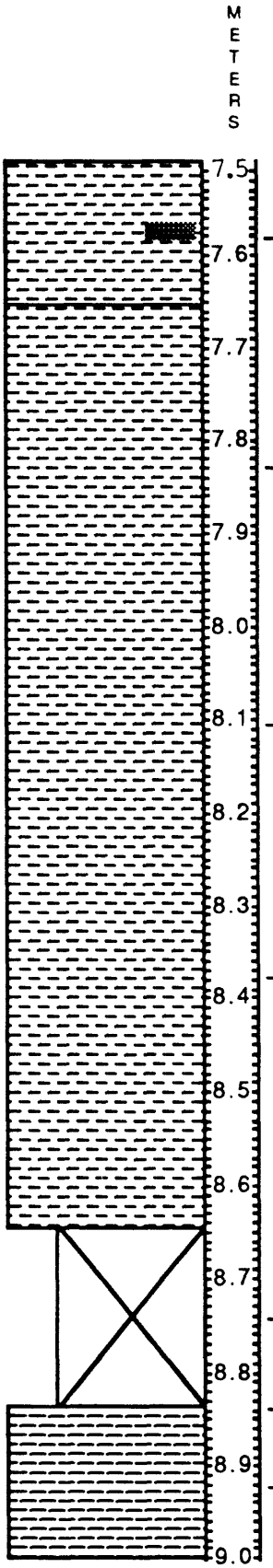

MUD [7.40-7.66 m]; greenish black (5GY2/1); platy.

Badly broken up into crumbs (stuck to liner) from 7.67-8.04 m.

MUD WITH RARE SUSPENDED QUARTZ (?) GRANULES (<1 mm) [7.66-8.65 m]; mottled olive black to dark gray (N3) with approximately 1 cm blotches (clasts?), or maybe greenish black; massive with crumbly brittle fracture throughout.

Badly fractured and crumbly (stuck to liner) from 8.17-8.53 m.

No core recovered [8.65-8.84 m].

Start of Drive 11 [8.84-9.45 m].

CLAY [8.84-9.07 m]; dark greenish gray (5GY4/1); massive.

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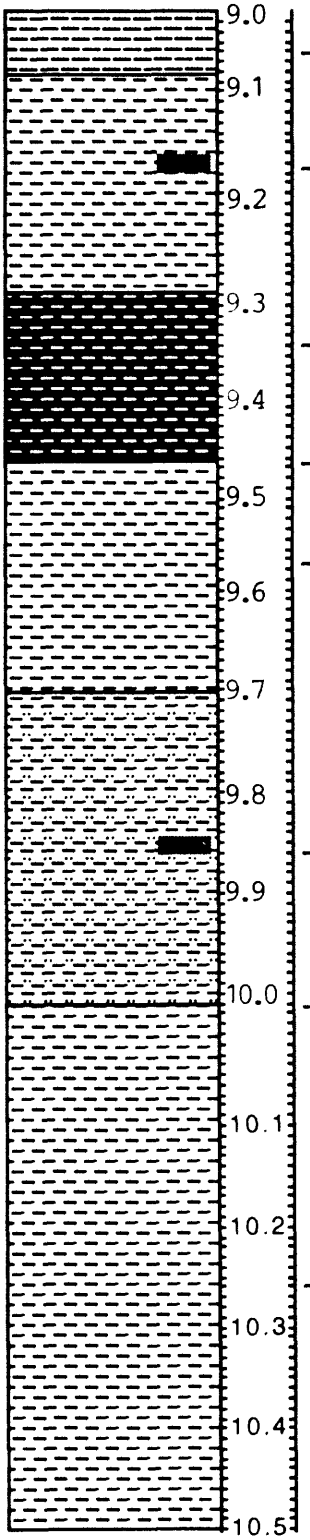

CLAY [8.84-9.07 m]; dark greenish gray (5GY4/1); massive; gradational lower contact.

SLIGHTLY SILTY CLAY WITH RARE WHITE SUSPENDED PUMICEOUS (?) SAND GRAINS [9.07-9.28 m]; olive gray (5Y4/1); very faint cm-scale bedding; gradational lower contact.

SLIGHTLY SILTY CLAY [9.28-9.45 m] with organic flecks, organic stringers, and white suspended pumiceous (?) medium sand-sized grains; massive with approximately 1 mm green mottles.

Start of Drive 12 [9.45-9.99 m].

MUD [9.45-9.68 m]; greenish black (5G2/1); soft, rubbly, mushy, badly fractured and distorted pieces; may be out of place.

SILTY MUD [9.68-9.99 m] with some mica and rare white medium sand-sized pumiceous grains; greenish black (5G2/1); firm, blocky structure; very faint platy laminae; slickensides between pedoids (from repeated swelling?).

No core recovered [9.99-10.00 m].
Start of Drive 13 [10.00-10.90 m].

MUD [10.00-10.90 m]; medium gray to dark greenish gray (5GY4/1); firm, uniform over entire slug; massive except for slickensides and internal shear structures.

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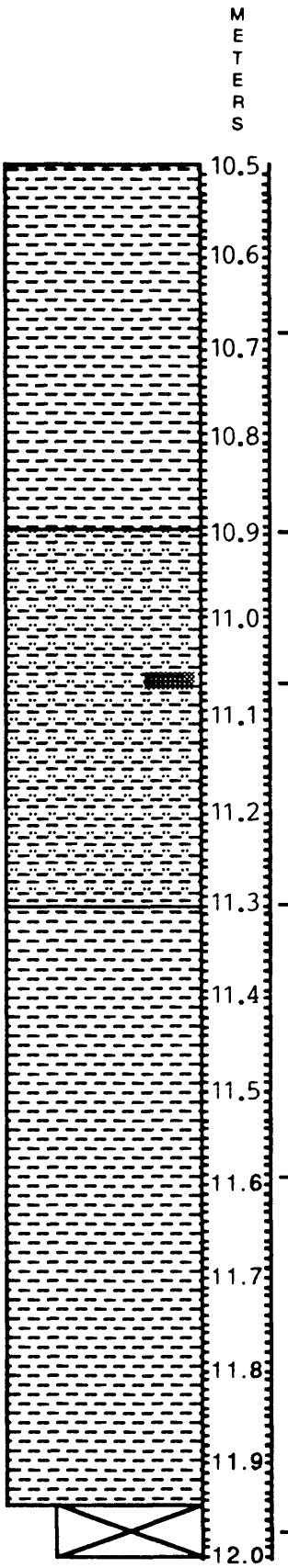

MUD [10.00-10.90 m]; medium gray to dark greenish gray (5GY4/1); firm, uniform over entire slug; massive except for slickensides and internal shear structures.

Start of Drive 14 [10.90-11.95 m].

SILTY MUD [10.90-11.30 m]; dark greenish gray (5G4/1); platy disrupted laminae.

Sediment from 11.28-11.30 m appears to be the same composition as above but is softer.

MUD [11.30-11.95 m]; dark greenish gray (5G4/1); mottled, internally disturbed; vague difference in this unit above and below 11.56 m.

No core recovered [11.95-12.91 m].
Start of Drive 15 [no recovery].

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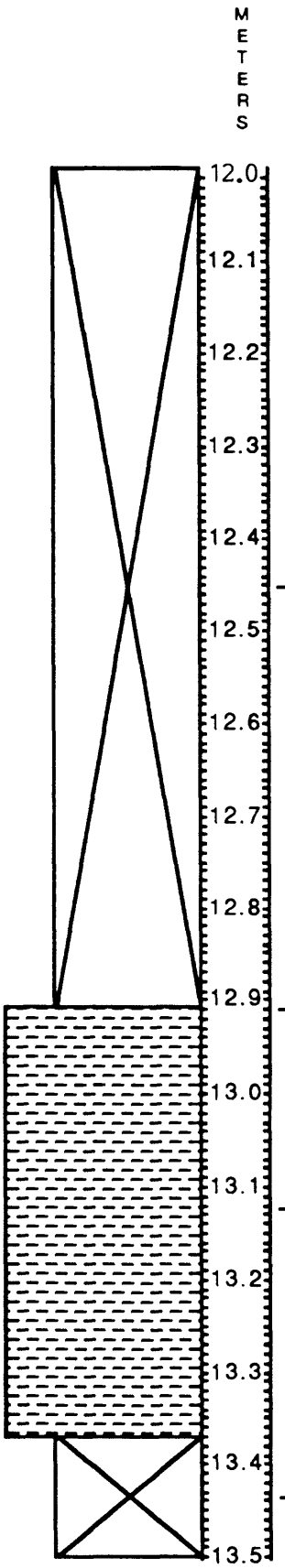

No core recovered [11.95-12.91 m].

Start of Drive 16 [12.91-13.37 m].

MUD [12.91-13.37 m]; mottled dark greenish gray (5GY4/1); internally disturbed, otherwise massive. This unit (Drive 16) is part of material drilled but dropped from Drive 15.

No core recovered [13.37-14.13 m].

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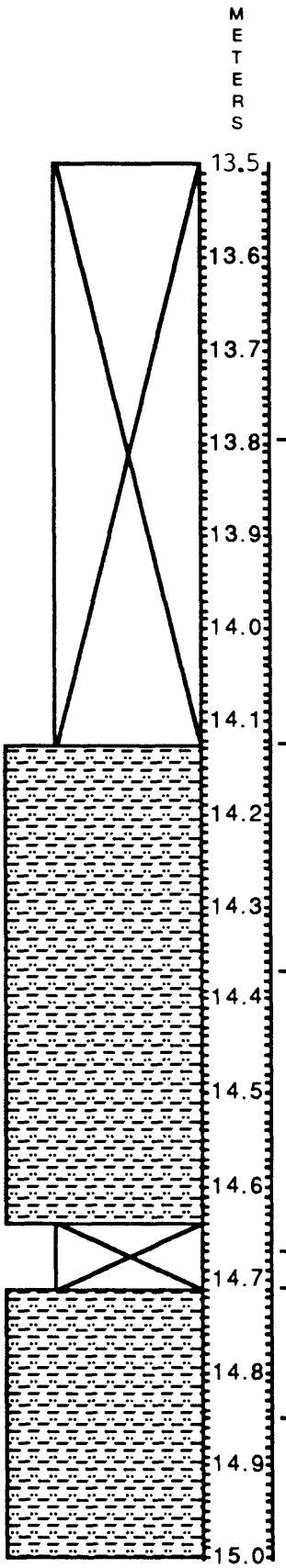

No core recovered [13.37-14.13 m].

Start of Drive 17 [14.13-14.64 m].

SILTY MUD TO FINE SANDY MUD [14.13-14.64 m]; mottled dark greenish gray (5GY4/1); fining upward, gradationally; internally disrupted; crumbly fracture near base of unit.

No core recovered [14.64-14.71 m].

Start of Drive 18 [14.71-15.71 m].

MUD WITH "REWORKED" SILT CLASTS (up to 1 cm) [14.71-15.71 m]; dark greenish gray (5GY4/1); estimated 50% clasts and 50% similar mud matrix; rare fine- to medium- sand-sized pumiceous grains throughout; massive, internally disrupted with "rip-up" clasts present.

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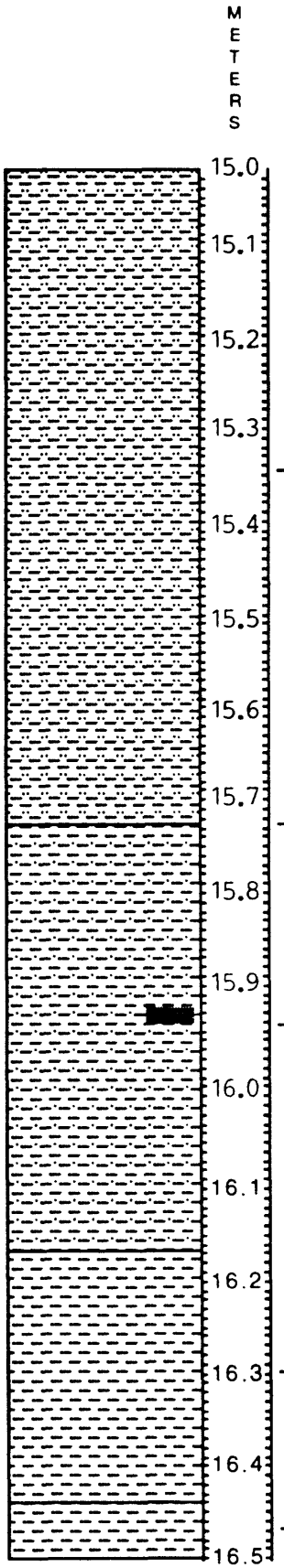

MUD WITH "REWORKED" SILT CLASTS (up to 1 cm) [14.71-15.71 m]; dark greenish gray (5GY4/1); estimated 50% clasts and 50% similar mud matrix; rare fine- to medium- sand-sized pumiceous grains throughout; massive, internally disrupted with "rip-up" clasts present.

Start of Drive 19 [15.71-16.55 m].

VERY FINE SANDY MUD WITH SILT CLASTS IN MUD MATRIX AND SAND-SIZED PUMICEOUS GRAINS (TEPHRA) SUSPENDED THROUGHOUT [15.71-16.17 m]; dark greenish gray/black (5G3/1); non-calcareous; massive with clasts, otherwise only decimeter-scale bedding seen; gradational lower contact.

MUD WITH WHITE SAND-SIZED PUMICEOUS GRAINS (TEPHRA) THROUGHOUT [16.17-16.44 m]; dark greenish gray/black (5G3/1); massive with no silt/mud clasts; gradational lower contact.

MUD WITH MUD CLASTS AND SUSPENDED PUMICEOUS (TEPHRA) GRAINS [16.44-16.55 m]; dark greenish gray/black (5G3/1).

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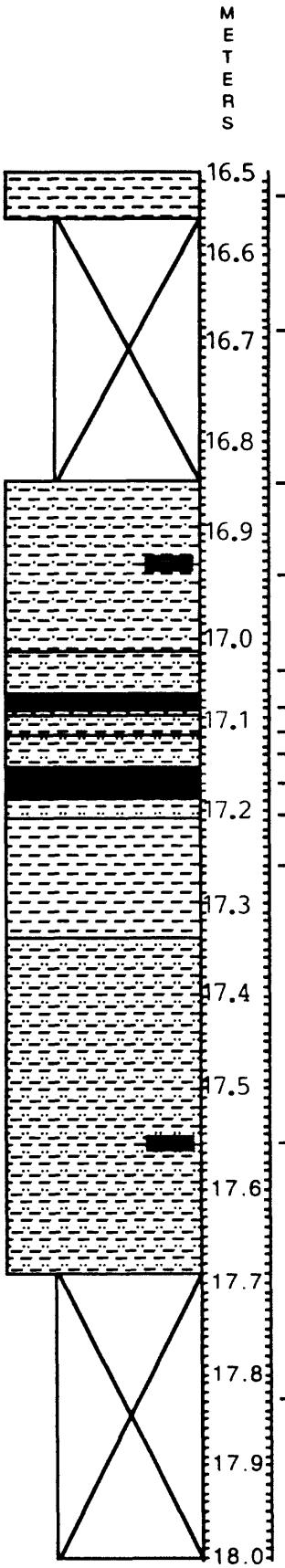

MUD WITH MUD CLASTS AND SUSPENDED PUMICEOUS (TEPHRA) GRAINS [16.44-16.55 m]; dark greenish gray/black (5G3/1).

No core recovered [16.55-16.84 m].

Start of Drive 20 [16.84-17.69 m].

VERY FINE SANDY MUD WITH SUSPENDED PUMICEOUS (TEPHRA) GRAINS [16.84-17.02 m]; dark green gray (5GY4/1); firm with cm-scale bedding; spun fractures at 16.96 m and 17.00 m.

SILTY MUD [17.02-17.07 m]; dark green gray (5GY4/1); firm.

MUDDY TEPHRA [17.07-17.08 m].

SILTY MUD [17.08-17.11 m]; dark green gray (5GY4/1); firm; abrupt contact with vertical veins across it.

SILTY MUD [17.11-17.15 m]; olive gray (5Y3/2); very soft.

MUD WITH PUMICEOUS (TEPHRA) GRAINS (up to 2 mm) [17.15-17.19 m]; olive gray (5Y3/2); very soft.

SILTY MUD [17.19-17.20 m]; olive gray (5Y3/2); very soft; spun fracture at lower contact (17.20 m).

MUD CLASTS (2 mm) IN MUD MATRIX [17.20-17.33 m]; massive, crumbly.

SILTY MUD GRADING DOWN INTO VERY FINE SANDY MUD [17.33-17.69 m]; olive gray (5Y3/2); vertical veins present near top of unit; cm-scale bedding throughout; crumbly from 17.51-17.55 m.

No core recovered [17.69-18.32 m].

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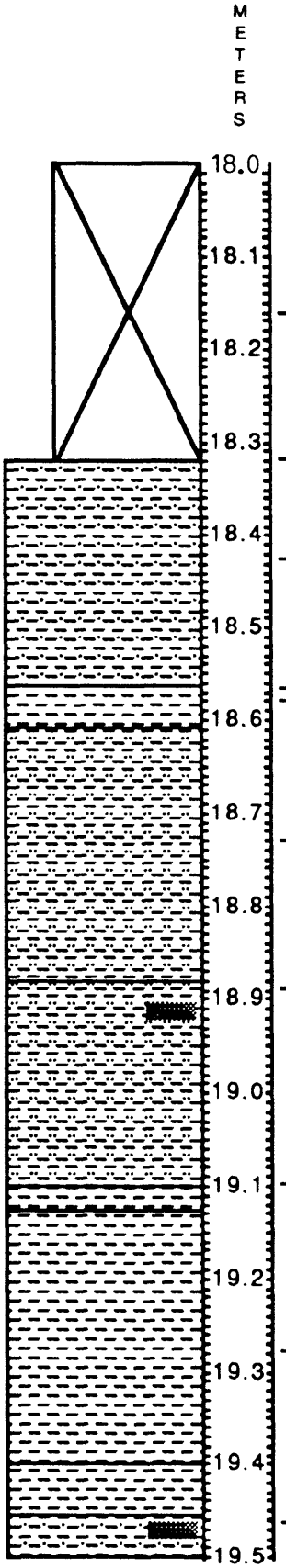

No core recovered [17.69-18.32 m].

Start of Drive 21 [18.32-18.57 m].

VERY FINE SANDY MUD [18.32-18.57 m]; olive gray (5Y3/2); firm, massive and uniform.

Start of Drive 22 [18.57-19.10 m].

MUD [18.57-18.61 m]; medium olive gray (5Y4/2); gradational lower contact.

SILTY MUD WITH RARE SUSPENDED WHITE PUMICEOUS (TEPHRA) GRAINS (sand-sized) [18.61-18.88 m]; olive gray (5Y3/2); non-calcareous; massive; hairline horizon at 18.86 m; sharp, irregular lower contact.

MUD WITH SILT-SIZED PARTICLES, WHITE SUSPENDED (sand-sized) SILICEOUS GRAINS AND TEPHRA [18.88-19.10 m]; med. greenish gray (5GY5/1); calcareous. Regular, well-defined bedding (hairline horizons) (18.94-19.08 m), individual beds massive with 1 mm silt clasts. Hairline bedding horizons very uniform with parallel inclination (not cross bedding), inclined ~5° from horizon, <<1 mm thick, of tan gelatinous-looking sediment. Interbeds (~3 cm-thick) are massive with <1mm mud clasts (50%) in mud matrix and pumiceous grains. Interpretation: dessication cycles with aeolian dust forming hairline bedding.

Start of Drive 23 [19.10-19.46 m].
MUD [19.10-19.13 m]; dark greenish gray (5GY4/1); gradational lower contact.

TWO UNITS: MUD WITH MUD CLASTS (<~1 mm) AND WHITE (sand-sized) PUMICEOUS (TEPHRA) GRAINS SUSPENDED THROUGHOUT [19.13-19.40 m]; no shell fragments seen in this unit, but possible; gradational lower contact. MUD, WHITE PUMICEOUS (TEPHRA) GRAINS AND SHELL FRAGMENTS [19.40-19.46 m]; both units: calcareous cement; dark greenish gray (5GY4/1); massive.

Start of Drive 24 [19.46-20.14 m].
MUD TO V. FINE SANDY MUD [19.46-19.64 m]; see next page.

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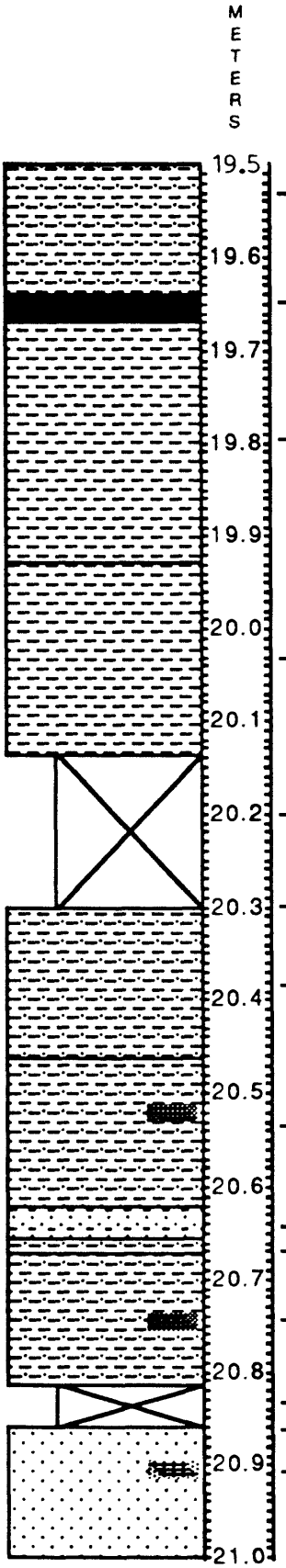

MUD TO VERY FINE SANDY MUD [19.46-19.64 m]; grayish olive (10Y4/2) becoming grayish olive green (5GY3/2) at base of unit; dark vertical stringers up to 3 cm long; 80% mud clasts (<1 mm) in mud matrix (20%); highly calcareous; very faint wavy cm-scale bedding, as revealed by grain size and color; firm matrix.

PUMICE (TEPHRA) GRAINS (?) [19.64-19.67 m]; very calcareous; sharp, wavy lower contact.

MUD CLASTS (<1 mm) IN MUD MATRIX [19.67-19.93 m]; dark greenish gray (5GY4/1); slightly calcareous; massive; soft beds up to 3 cm; gradational lower contact.

MUD CLASTS IN MUD MATRIX WITH SUSPENDED WHITE (sand-sized) PUMICEOUS (TEPHRA) GRAINS [19.93-20.14 m]; grayish olive green (5GY3/2); ~80% mud clasts (<1 mm) in mud matrix; calcareous cement (vigorous reaction to dilute HCl); massive, firm.

No core recovered [20.14-20.30 m].

Start of Drive 25 [20.30-20.82 m].

MUD CLASTS IN VERY FINE SANDY MUD MATRIX WITH PUMICEOUS GRAINS (sand-sized) [20.30-20.46 m]; dark greenish gray (5GY5/1); ~70% mud clasts (coarse sand-sized); moderately calcareous mud; massive; gradational lower contact.

SANDY MUD [20.46-20.62 m]; olive black (5Y2/1); cm-scale bedding based on color; slightly calcareous.

MUDDY BASALTIC (?) SAND [20.62-20.65 m]; dark gray; irregular lower contact.

SANDY MUD (?) [20.65-20.67 m]; greenish black (5GY2/1); irregular, gradational lower contact.

VERY FINE SANDY MUD [20.67-20.82 m]; olive black (5Y2/1); non-calcareous; very faint cm-scale bedding, as revealed by grain size and color.

No core recovered [20.82-20.86 m].

Start of Drive 26 [20.86-21.04 m].

SAND [20.86-21.04 m]; see full description, next page.

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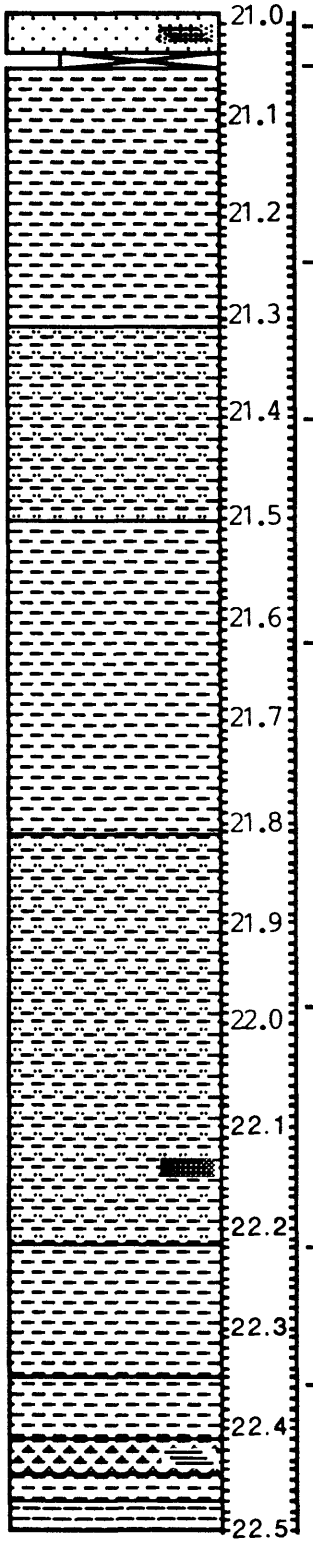

SAND [20.86-21.04 m]; black (N7); muddy in few places, poorly sorted (mud to coarse sand) but dominantly medium sand, basaltic, rare granule-sized lithic fragments near base; soft; cm-scale bedding, as suggested by grain size change and mud admixture; possible TEPHRA?

No core recovered [21.04-21.06 m].
Start of Drive 27 [21.06-22.22 m].

MUD CLASTS (coarse sand-sized) IN MUD MATRIX [21.06-21.31 m]; olive gray (5Y3/2); non-calcareous; massive, granular; gradational lower contact.

SILTY MUD AND MUD CLASTS (coarse sand-sized) IN MUD MATRIX WITH RARE PUMICEOUS (TEPHRA) GRAINS [21.31-21.51 m]; dark greenish gray (5GY4/1); weakly calcareous; massive, granular; gradational lower contact.

MUD CLASTS IN MUD MATRIX [21.51-21.81 m]; 80% mud clasts (coarse sand-sized to granule-sized); medium greenish gray (5G5/1); massive, granular; gradational lower contact.

SILTY MUD AND MUD CLASTS (90%) IN MUD MATRIX WITH RARE DISSEMINATED PUMICEOUS (TEPHRA) GRAINS [21.81-22.22 m]; generally medium greenish gray (5G5/1) with strong mottling; carbonate blebs up to 1 cm; highly calcareous; clay interbeds lack carbonate blebs; massive in upper 1/2 of unit, cm-scale bedding lower (alternating white bleb layers and clayey layers without white blebs).

Start of Drive 28 [22.22-22.98 m].
MUD CLASTS IN CALCAREOUS MUD MATRIX [22.22-22.35 m]; olive gray (5Y3/1); 80% mud clasts (coarse sand-sized); firm, granular, massive; reworked tephra blebs (?); gradational lower contact.

FOUR UNITS: MUD CLASTS (sand-sized) IN MUD MATRIX WITH RARE PUMICEOUS (TEPHRA) GRAINS [22.35-22.41 m]; olive gray (5Y3/1); granular, massive; reworked tephra blebs (?). BANDED CHERT [22.41-22.45 m] with tiny pyrite crystals; dark to light gray. MUD [22.45-22.47 m]; olive gray (5Y3/1); non-calcareous; reworked tephra blebs (?); sharp lower contact. CLAY [22.47-22.53]; see next page.

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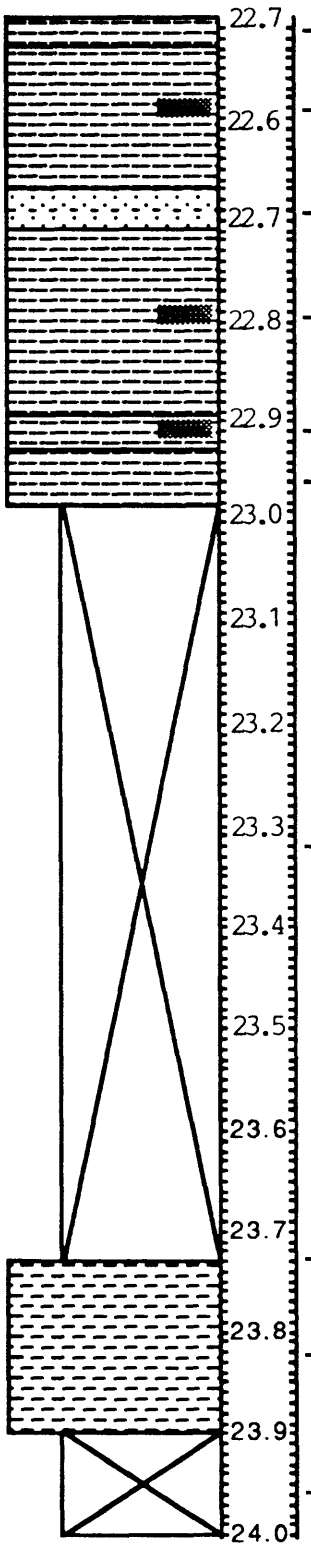

CLAY [22.47-22.53 m]; brownish gray (5YR4/1); reworked tephra blebs?

CLAY [22.53-22.67 m]; dark greenish gray (5G4/1); non-calcareous; firm with platy laminae; reworked tephra blebs?

FINE MUDDY BALSALTIC SAND [22.67-22.71 m]; dark greenish gray (5GY4/1); soft, massive; basaltic tephra?

CLAY [22.71-22.90 m]; dark greenish gray (5G4/1) with bands of greenish gray (5GY6/1); non-calcareous; strongly laminated (paper-thin to approximately 1 mm; irregular), with beds up to 1-3 cm of laminated strata; firm but fissile and brittle; silty clay layer from 22.84-22.85 m (possible tephra?).

CLAY [22.90-22.93 m]; very dusky red (10R2/2); strongly laminated (paper-thin to approximately 1 mm; irregular), with beds up to 1-3 cm of laminated strata; firm but fissile and brittle.

CLAY [22.93-22.98 m]; dark greenish gray (5G4/1); non-calcareous; strongly laminated (paper-thin to approximately 1 mm; irregular), with beds up to 1-3 cm of laminated strata; firm but fissile and brittle.

No core recovered [22.98-23.73 m].

Start of Drive 29 [23.73-23.91 m].

MUD CLASTS IN MUD MATRIX [23.73-23.91 m]; dark greenish gray (5G4/1); 80% mud clasts (<~3 mm); non-calcareous; massive, granular, badly broken up.

No core recovered [23.91-24.21 m].

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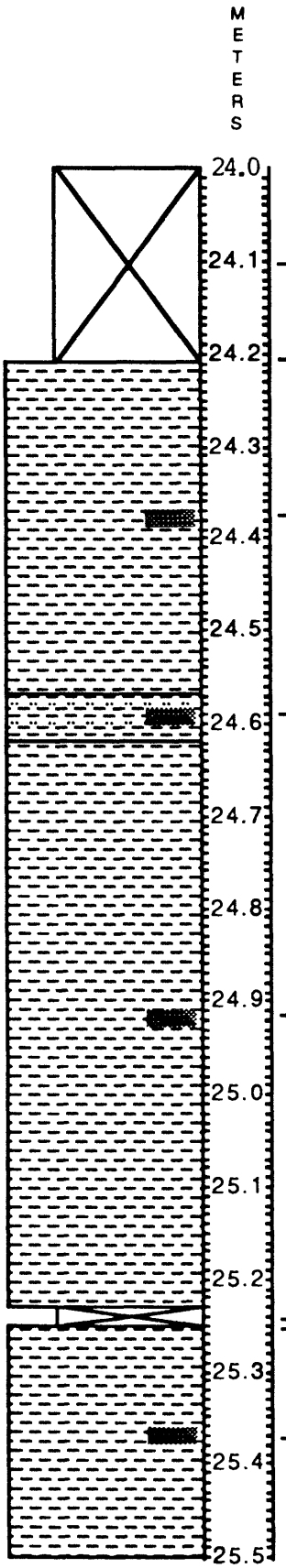

No core recovered [23.91-24.21 m].

Start of Drive 30 [24.21-25.23 m].

MUD AND MUD CLASTS [24.21-24.57 m]; "olive gray"; massive (?), granular; possible cm-scale bedding; highly disturbed by drilling and may be out of place.

SILTY MUD [24.57-24.62 m]; gray dark; mm-scale color banding.

MUD [24.62-25.23 m]; blotchy streaked "olive gray" with dark gray veins; faint irregular cm-scale bedding; discontinuous blob of TEPHRA (< 1 cm thick) at 25.17 m.

No core recovered [25.23-25.25 m].

Start of Drive 31 [25.25-27.62 m].

MUD [25.25-25.90]; olive gray (5Y4/1); "inorganic", non-calcareous; faint cm-scale bedding suggested by color and texture.

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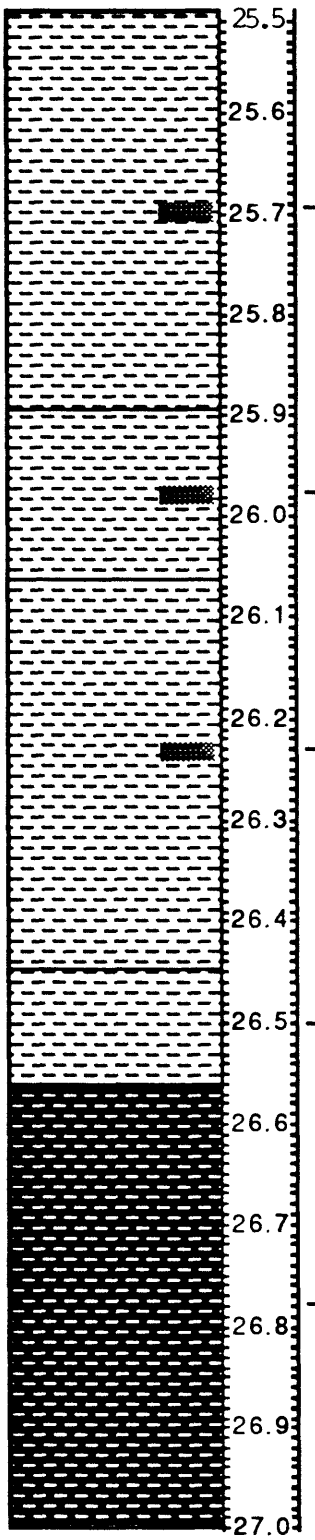

MUD [25.25-25.90]; olive gray (5Y4/1); "inorganic", non-calcareous; faint cm-scale bedding suggested by color and texture.

MUD [25.90-26.07 m]; non-calcareous; drilling fractured; wavy laminae; gradational lower contact.

MUD [26.07-26.45 m]; dusky yellowish brown (10YR2/2); wavy laminae, platy, cm-scale bedding; lower contact is irregular, wavy and sharp.

MUD [26.45-26.56 m]; olive black (5Y2/1); irregular, gradational lower contact.

ORGANIC MUD [26.56-27.26 m]; olive gray (5Y3/2); non-calcareous; very faint, but regular, mm-scale bedding.

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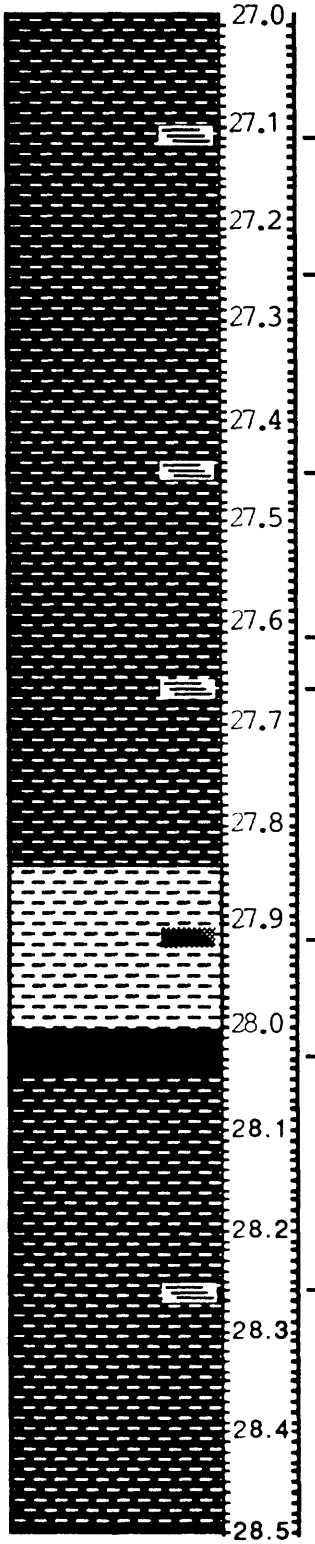

ORGANIC MUD [26.56-27.26 m]; olive gray (5Y3/2); non-calcareous; very faint, but regular, mm-scale bedding.

BLACK BLEBS (1-2 cm) IN ORGANIC MUD [27.26-27.27 m].

ORGANIC MUD [27.27-27.62 m]; olive gray (5Y3/2); non-calcareous; very faint but very regular 3-5 mm-scale bedding suggested by grain-size and subtle color.

Start of Drive 32 [27.62-30.75 m].

ORGANIC MUD [27.62-27.84 m]; olive gray (5Y3/2); very faint cm-scale bedding; penetrometer reading at 27.82 m = 1.0.

MUD [27.84-28.00 m]; olive gray (5Y3/2) gradually becoming darker towards the bottom of the unit; "inorganic"-looking; very faint cm-scale bedding.

SANDY MUD (TEPHRA) [28.00-28.05 m]; olive black (5Y2/1).

ORGANIC MUD [28.05-28.91 m]; olive gray (5Y3/2); faint but very regular 0.5 cm-scale bedding based on grain size, texture, and subtle color; penetrometer reading at 28.32 m = 1.2.

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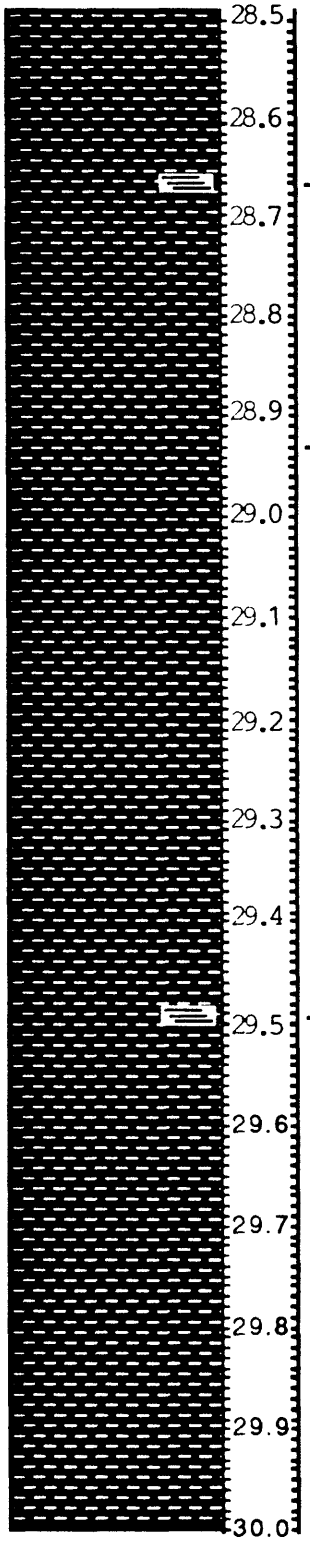

ORGANIC MUD [28.05-28.91 m]; olive gray (5Y3/2); faint but very regular 0.5 cm-scale bedding based on grain size, texture, and subtle color; penetrometer reading at 28.82 m = 2.7.

ORGANIC MUD [28.91-28.94 m]; olive gray (5Y3/2); more massive than unit above; gradational lower contact.

ORGANIC MUD [28.94-30.00 m]; olive gray (5Y3/2); faint but very regular 2-5 mm-scale bedding; penetrometer readings: 29.52 m = 2.1 and 29.92 = 3.5.

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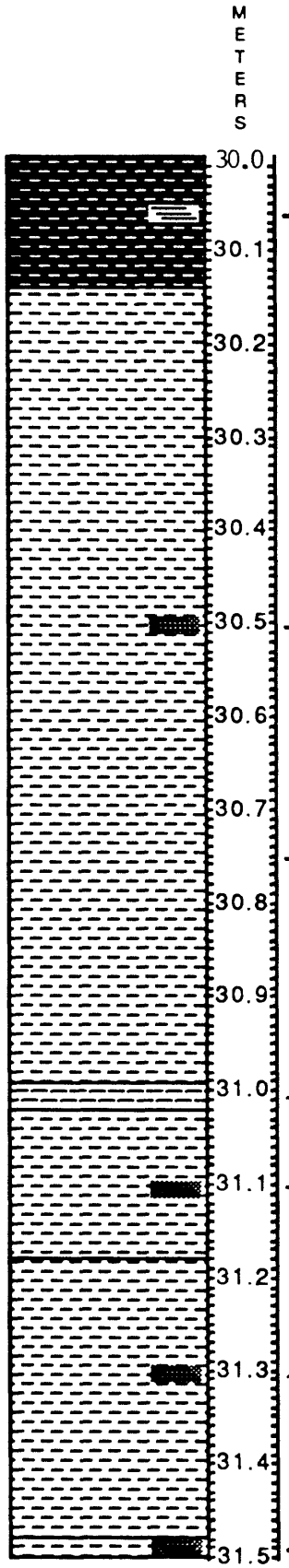

ORGANIC MUD [30.00-30.14 m]; olive gray (5Y3/2); moderately-well defined 1-2 mm-scale bedding.

MUD [30.14-30.99 m]; olive gray (5Y3/2); non-calcareous; looks massive at first glance but exhibits very faint 1 mm platy laminations; irregular sharp lower contact; penetrometer reading at 30.52 = 1.5.

Start of Drive 33 [30.75-32.33 m].

CLAY [30.99-31.02 m]; olive gray (5Y3/2); massive; irregular lower contact.

MUD [31.02-31.18 m]; olive gray (5Y3/2); non-calcareous; platy laminations; gradational lower contact.

MUD [31.18-31.48 m]; olive gray (5Y4/1); non-calcareous; extremely faint laminations and cm-scale bedding; gradational lower contact.

SILTY CLAY [31.48-32.33 m]; olive gray (5Y3/2); very faint <1 mm laminations within very faint cm- to dm-scale bedding.

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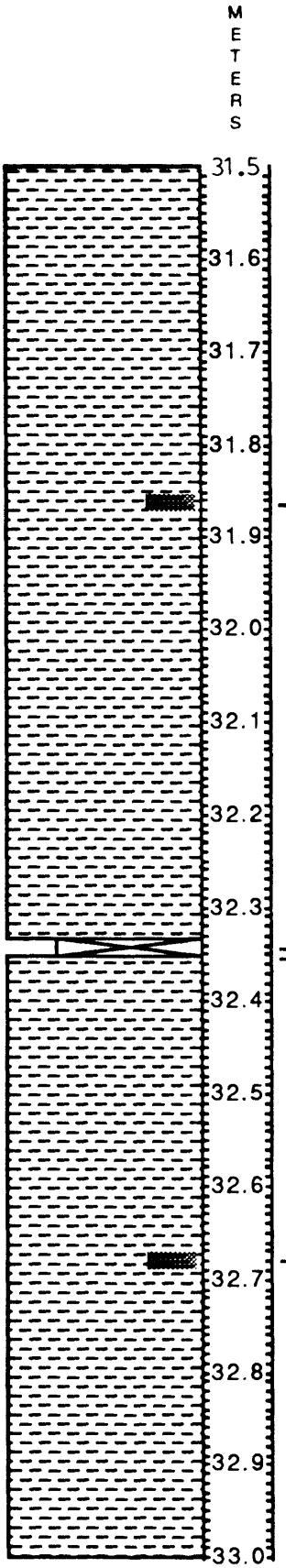


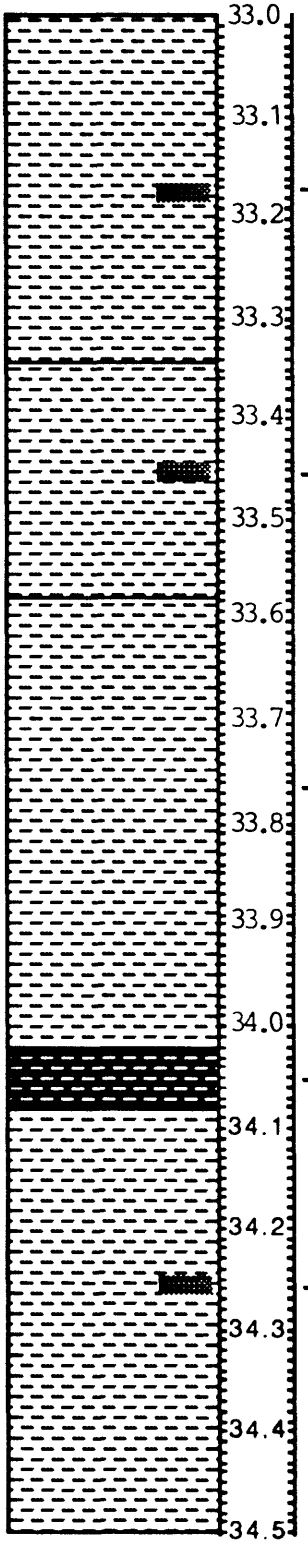
SILTY CLAY [31.48-32.33 m]; olive gray (5Y3/2); very faint <1 mm laminations within very faint cm- to dm-scale bedding.

No core recovered [32.33-32.35 m].

Start of Drive 34 [32.35-35.40 m].

SLIGHTLY SILTY CLAY [32.35-33.35 m]; olive black (5Y2/1); non-calcareous; generally massive from 32.52-32.70 m; remainder of unit has 3 mm to 2 cm scale regular bedding; penetrometer reading at 32.55 m = 3.8 (fractured the sediment).

Round Lake, Core 1
Klamath County, Oregon



SLIGHTLY SILTY CLAY [32.35-33.35 m]; olive black (5Y2/1); non-calcareous; generally massive from 32.52-32.70 m; remainder of unit has 3 mm to 2 cm scale regular bedding; penetrometer reading at 33.15 m = 2.5.

SLIGHTLY SILTY CLAY [33.35-33.58 m]; olive gray (5Y3/2); non-calcareous; 3 mm to 2 cm scale regular bedding; gradational lower contact.

MUD [33.58-34.02 m]; olive gray (5Y3/2); gradational lower contact; penetrometer reading at 33.85 m = 1.5.

ORGANIC (?) MUD [34.02-34.08 m]; olive black (5Y2/1); gradational lower contact.

MUD [34.08-35.40 m]; olive gray (5Y3/2); non-calcareous; platy laminae in faint, but very regular 0.5 cm bedding; penetrometer reading at 34.25 m = 3.4.

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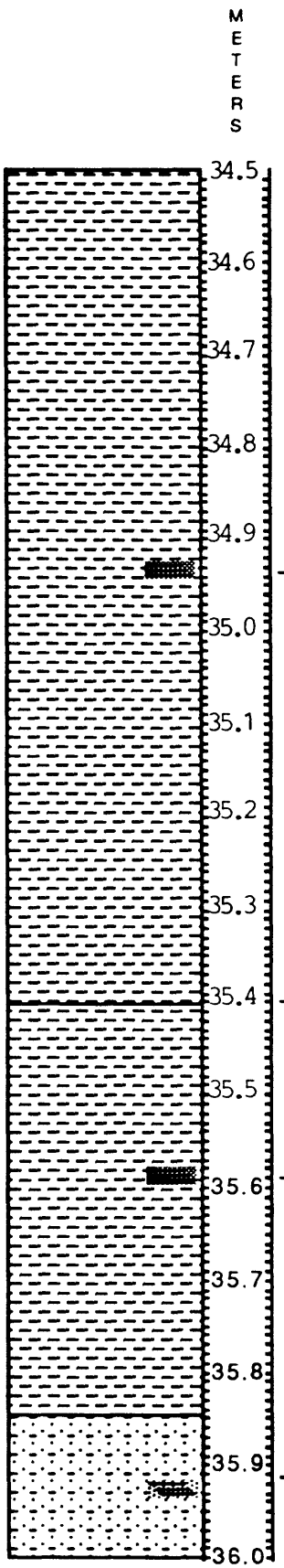

MUD [34.08-35.40 m]; olive gray (5Y3/2); non-calcareous; platy laminae in faint, but very regular 0.5 cm bedding; penetrometer readings: 34.55 m = 2.2, 34.96 m = 2.0, 35.25 m = 1.6.

Start of Drive 35 [35.40-38.93 m].

MUD [35.40-35.85 m]; olive gray (5Y3/2); regular, faint 1 cm bedding (which is not visually apparent but becomes so when the core is scraped) and platy laminae within beds; gradational lower contact.

SLIGHTLY MUDDY MEDIUM TO COARSE SAND [35.85-36.20 m]; black (N1); cm-scale wavy bedding; wavy, irregular lower contact.

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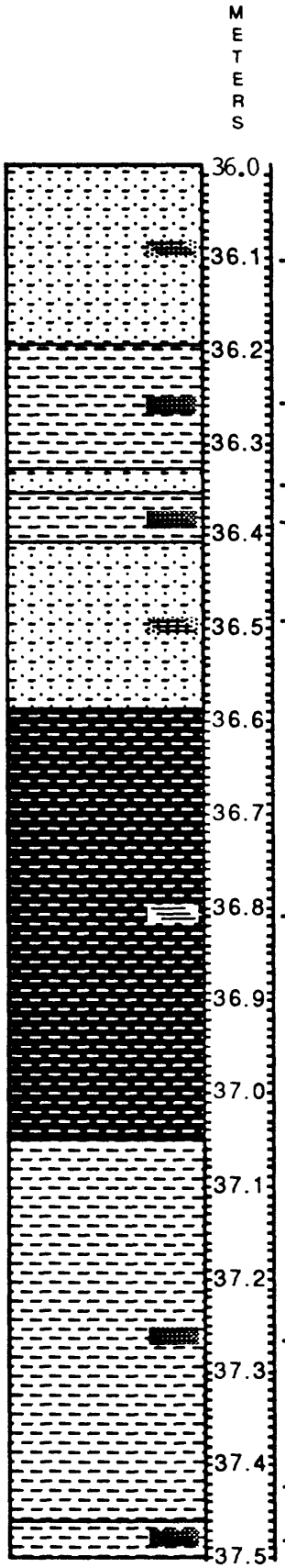

SLIGHTLY MUDDY MEDIUM TO COARSE SAND [35.85-36.20 m]; black (N1); cm-scale wavy bedding; wavy, irregular lower contact.

MUD [36.20-36.33 m]; olive gray (5Y3/2); faint platy laminations

MUDDY SAND [36.33-36.36 m]; black (N1).

MUD [36.36-36.41 m]; olive gray (5Y3/2); faint platy laminations; gradational lower contact.

MUDDY SAND [36.41-36.59 m]; black (N1); cm-scale bedding which varies in the mud content; gradational lower contact.

ORGANIC (?) CLAY [36.59-37.06 m]; moderate light olive gray (5Y4/2) at top of unit which darkens downward through the entire unit becoming dark olive brown (5Y4/3); faint regular 0.5 cm bedding with internal platy laminations; gradational lower contact.

SLIGHTLY SILTY CLAY [37.06-37.46 m]; olive gray (5Y3/2); platy laminations.

Transitional from 37.40-37.50 m.

SLIGHTLY TO VERY SLIGHTLY SILTY CLAY [37.46-38.40 m]; see full description, next page.

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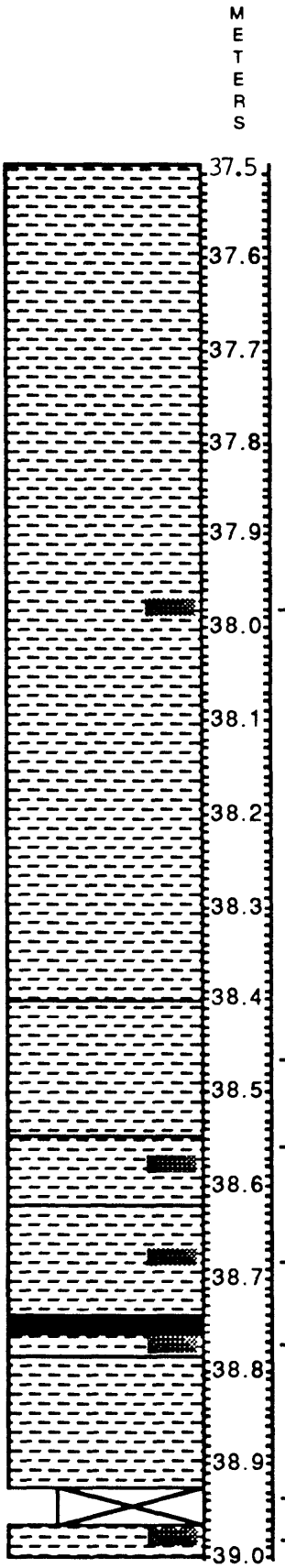

SLIGHTLY TO VERY SLIGHTLY SILTY CLAY [37.46-38.40 m]; dark gray at top of unit and then darkening downward to black (N1); decimeter-scale sets of very regular 0.5 cm bedding (definitely not drilling marks) based on slight grain size variation and hardness change.

GRADUAL TRANSITION FROM VERY SLIGHTLY SILTY CLAY TO MUD [38.40-38.55 m]; olive gray (5Y3/2); gradational lower contact.

MUD [38.55-38.63 m]; moderate grayish olive (10Y3/2); almost massive but exhibits very faint platy laminations; sequence of lithologic packages (38.55-38.93 m) appear to be one transitional unit with a tephra layer.

TWO UNITS: REWORKED PUMICEOUS (TEPHRA) GRAINS IN MUD [38.63-38.74 m]; moderate grayish olive (10Y3/2); almost massive but exhibits very faint platy laminations. TEPHRA [38.74-38.75 m].

TWO UNITS: MUD [38.75-38.79 m]; moderate grayish olive (10Y3/2); almost massive but exhibits very faint platy laminations; gradational lower contact. MUD [38.79-38.93 m], slightly less silt than above; moderate grayish olive (10Y3/2).

No core recovered [38.93-38.97 m].
Start of Drive 36 [38.97-41.39 m].

MUD [38.97-39.19 m]; see full description, next page.

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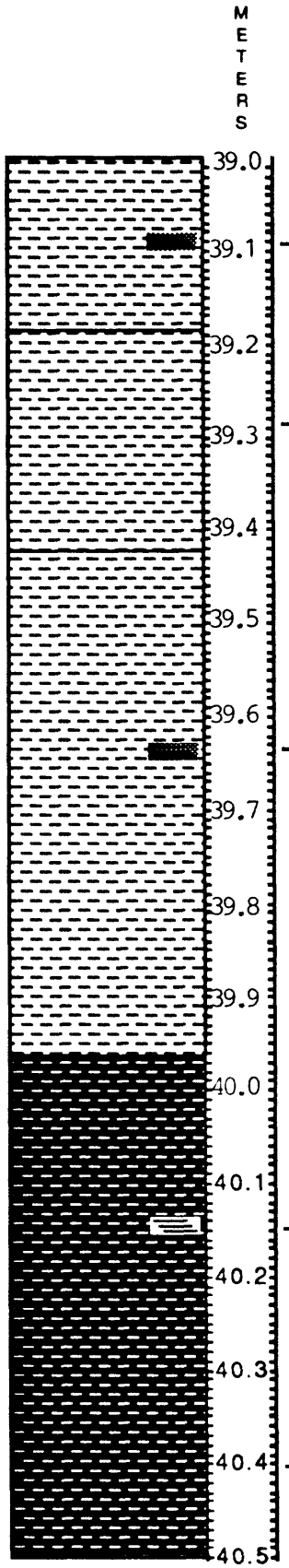

MUD [38.97-39.19 m]; light olive gray (5Y3/2?); cm-scale bedding; penetrometer reading at 39.07 m = 1.6.

MUD [39.19-39.43 m]; light olive gray (5Y3/2?); massive; penetrometer reading at 39.37 m = 2.3.

MUD [39.43-39.97 m]; light olive gray (5Y3/2?); platy lamination (?); penetrometer reading at 39.87 m = 1.7.

ORGANIC MUD [39.97-40.34 m]; olive gray (5Y3/2); scattered plant fragments; platy laminations (?).

ORGANIC MUD [40.34-40.63 m]; olive gray (5Y3/2); rare scattered pumiceous grains and scattered plant fragments; penetrometer reading at 40.47 m = 3.7.

Round Lake, Core 1
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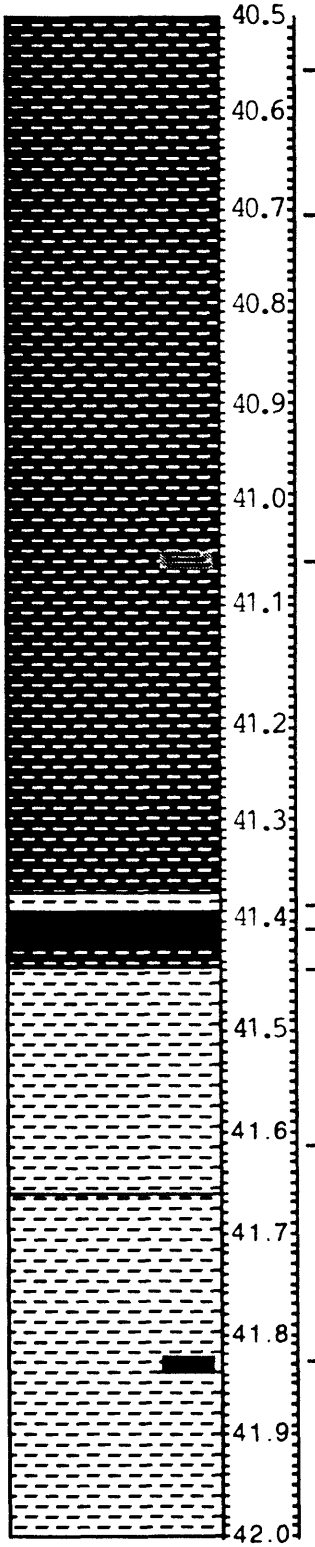

ORGANIC MUD [40.34-40.63 m]; olive gray (5Y3/2); rare scattered pumiceous grains and scattered plant fragments.

ORGANIC MUD [40.63-40.75 m]; olive gray (5Y3/2); with scattered plant fragments; massive.

ORGANIC MUD [40.75-41.37 m]; light olive brown (5Y3/4); very faint cm-scale bedding to massive; sharp wavy lower contact; penetrometer reading at 40.97 m = 0.8.

MUD [41.37-41.38 m]; lighter colored zone; sharp lower contact.

TEPHRA [41.38-41.41 m], including basal airfall tephra (41.39-41.41 m).

Start of Drive 37 [41.39-41.44 m].

ORGANIC MUD [41.41-41.44 m].

Start of Drive 38 [41.44-44.05 m].

MUD [41.44-41.66 m]; massive; gradational lower contact; penetrometer reading at 41.54 m = 2.3 (fractured).

MUD [41.66-42.34 m]; 0.5 to 1 cm regular bedding.

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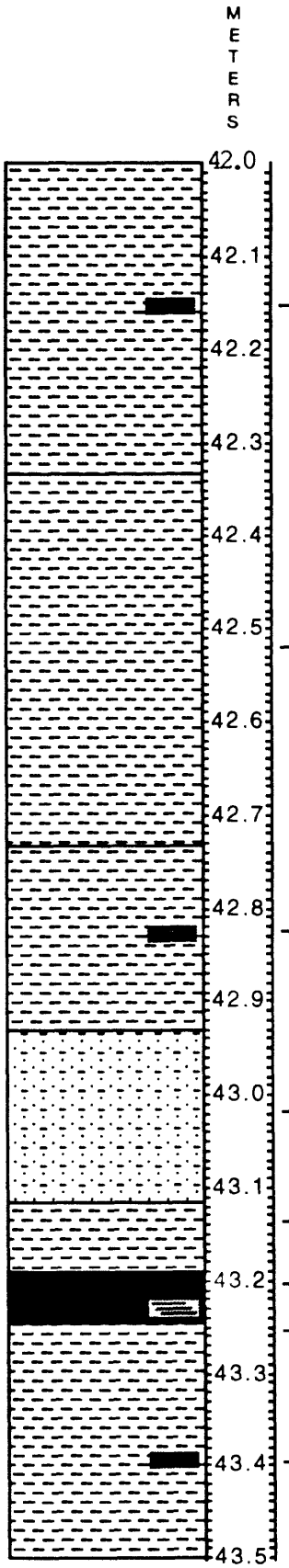

MUD [41.66-42.34 m]; 0.5 to 1 cm bedding, regular; transitional lower contact from approximately 42.27-42.41 m.

MUD [42.34-42.74 m]; olive gray (5Y3/2); massive; penetrometer reading at 42.44 m = 2.6.

MUD [42.74-42.93 m]; olive gray (5Y3/2); 5-10 cm faint bedding, otherwise massive; gradational lower contact.

MUDDY MEDIUM TO COARSE SAND [42.93-43.12 m]; black (N1); sharp lower contact.

MUD [43.12-43.19 m]; olive black (5Y2/1); sharp, wavy lower contact.

REWORKED MUDDY TEPHRA [43.19-43.22 m]; olive black (5Y2/1).

TEPHRA [43.22-43.25 m]; very light gray (N8); irregular bedding.

MUD [43.25-43.79 m]; olive black (5Y2/1); hardness variations suggest very faint 0.5 cm bedding; penetrometer reading at 43.34 m = 4.0 (fractured).

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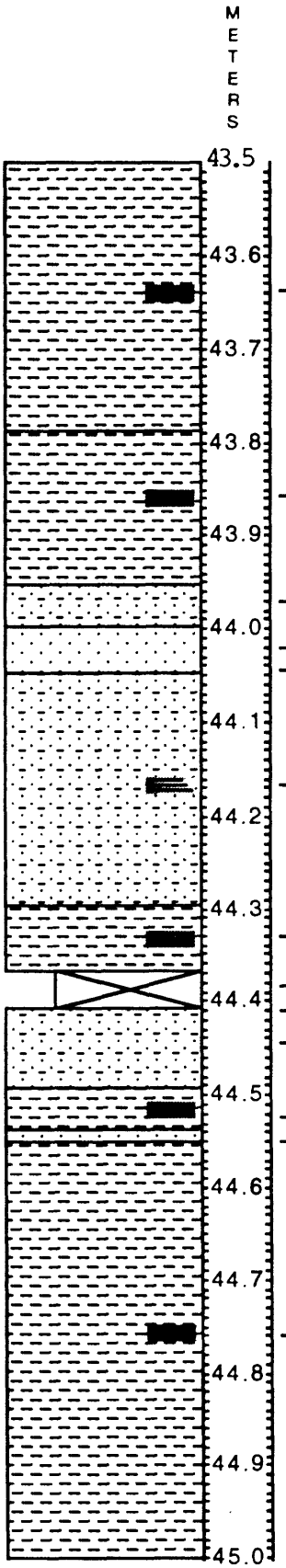

MUD [43.25-43.79 m]; olive black (5Y2/1); hardness variations suggest very faint 0.5 cm bedding.

MUD [43.79-43.96 m]; dusky yellowish brown (10YR2/2); hardness variations suggest very faint 0.5 cm bedding; gradational lower contact; penetrometer reading at 43.84 m = 3.5.

MUDDY BASALTIC SAND [43.96-44.00 m]; dusky yellowish brown (10YR2/2).

MEDIUM TO FINE SAND (NO MUD) [44.00-44.05 m]; black (N7).

Start of Drive 39 [44.05-44.37 m].

MUDDY SAND [44.05-44.30 m]; black (N1); unit fines upward with maximum coarse sand-sized grains at base and fine muddy sand at top; cm-scale bedding; sharp lower contact which is inclined approximately 10°.

MUD [44.30-44.37 m]; grayish olive (10Y4/2); platy, otherwise massive.

No core recovered [44.37-44.41 m].

Start of Drive 40 [44.41-47.53 m].

MUDDY COARSE TO MEDIUM SAND WITH MUD CLASTS [44.41-44.49 m]; olive gray (5Y3/2); massive; very mushy, out of place?

MUD [44.49-44.54 m]; olive gray (5Y3/2); mm-scale laminae in sets of 3-10 cm bedding.

MUDDY SAND [44.54-44.55 m]; black (N1); possible tephra (?).

MUD [44.55-45.62 m]; olive gray (5Y3/2); mm-scale laminae in sets of 3-10 cm bedding.

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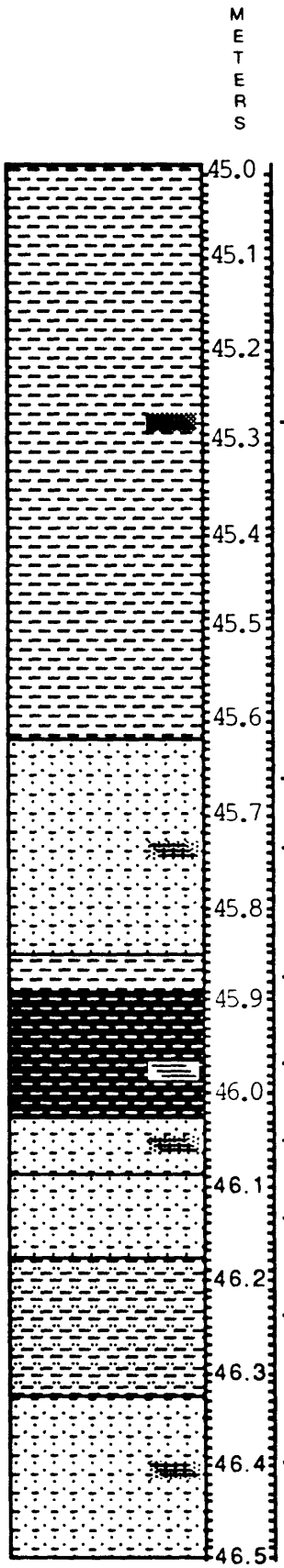

MUD [44.55-45.62 m]; olive gray (5Y3/2) with some mottling near base of unit; mm-scale laminae in sets of 3-10 cm bedding.

MUD interbed from 45.66-45.67 m.

MUDDY MEDIUM TO COARSE SAND [45.62-45.85 m]; black (N1); cm-scale bedding based on mud content variation; lower contact sharp and inclined approximately 10°.

MUD [45.85-45.89 m]; olive gray (5Y3/2).

ORGANIC MUD [45.89-46.03 m]; dusky brown (5YR2/2); platy laminations in cm-scale bed sets; gradational contact inclined at 10°; this unit grades into unit below.

MUDDY SAND [46.03-46.09 m]; black (N1); cm-scale bedding; sharp lower contact inclined approximately 10° in same inclination direction as above contact (tilted hole?).

MUDDY SAND GRADING UP INTO MUD [46.09-46.18 m]; black (N1) muddy sand underlies olive gray (5Y3/2) mud; gradational contact at 46.16 m and sharp lower contact at 46.18 m which is tilted 10° as above contacts.

SILTY MUD [46.18-46.33 m]; olive gray (5Y3/2); gradational lower contact; unit grades into the one below.

MUDDY MEDIUM TO COARSE SAND FINING UPWARD INTO SANDY MUD [46.33-46.60 m]; black (N1); cm-scale bedding based on mud contact.

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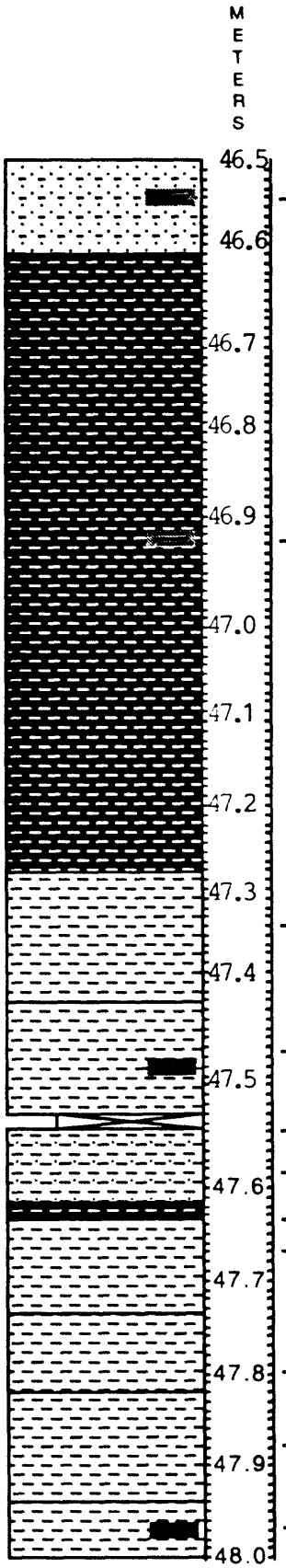

MUDDY MEDIUM TO COARSE SAND FINING UPWARD INTO SANDY MUD [46.33-46.60 m]; black (N1); cm-scale bedding on the basis of mud contact.

ORGANIC (?) MUD [46.60-47.26 m]; olive gray (5Y3/2); platy, mm-scale bedding; gradational lower contact.

MUD [47.26-47.40 m]; mottled in color and structure; massive; sharp, irregular lower contact tilted 10°.

MUD [47.40-47.53 m]; "gray"; massive; intercalated piece of laminated, brownish black underlying bed from 47.46-47.53 m.

No core recovered [47.53-47.54 m].
Start of Drive 41 [47.54-50.62 m].

DISTURBED MUDDY SAND [47.54-47.62 m]; probably out of place; massive.

ORGANIC MUD BLOB [47.62-47.64 m]; blackish red (5R2/2).

MUD [47.64-47.74 m]; olive gray (5Y3/2); gradational lower contact.

MUD [47.74-47.82 m]; black (N1); massive; gradational lower contact.

MUD [47.82-47.94 m]; mottled; massive.

MUD [47.94-48.19 m]; 5-10 cm beds.

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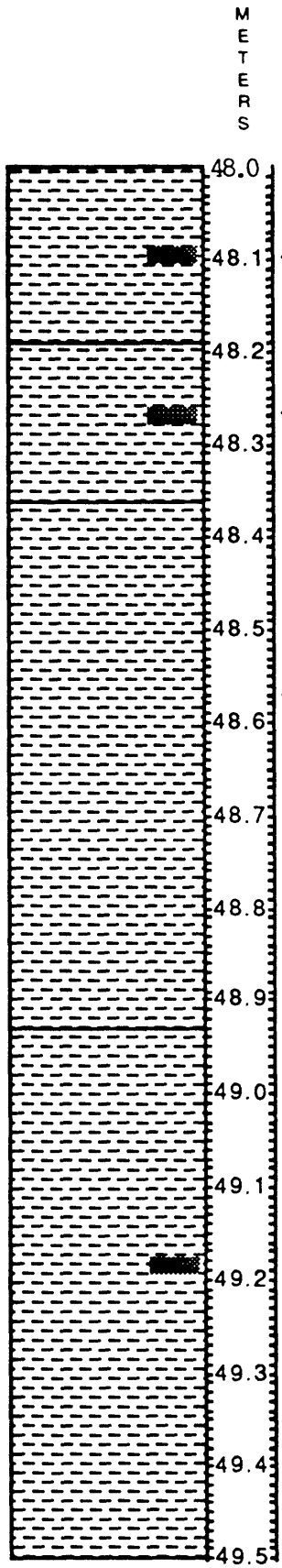

MUD [47.94-48.19 m]; 5-10 cm beds; gradational lower contact.

MUD [48.19-48.37 m]; 0.5 cm bedding.

MUD [48.37-49.93 m]; massive, bioturbated.

MUD [48.93-49.55 m]; olive gray (5Y3/2) to moderate olive brown (5Y4/4) at bottom of unit; laminations to mm-scale bedding, platy.

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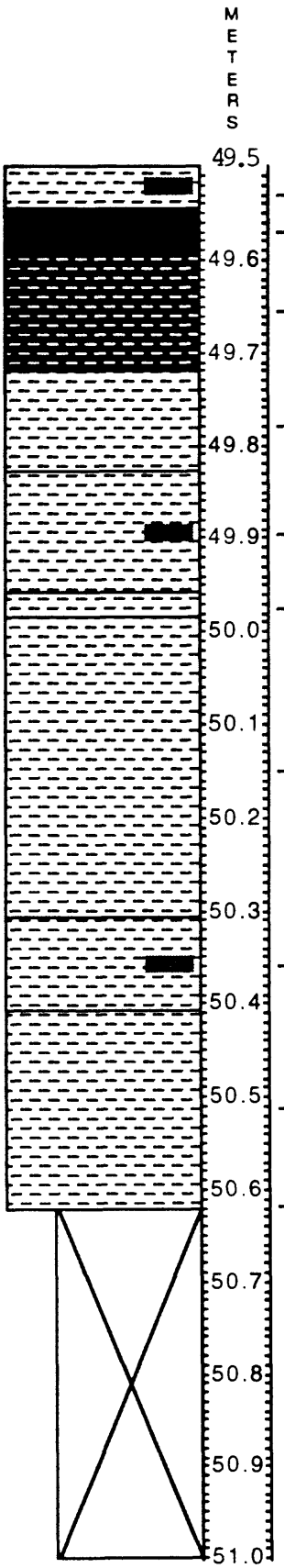

MUD [48.93-49.55 m]; olive gray (5Y3/2) to moderate olive brown (5Y4/4) at bottom of unit; laminations to mm-scale bedding, platy.

TEPHRA [49.55-49.59 m]; light gray (5G4/1); distinct structural break between an upper massive section (49.55-49.57 m) and a lower bioturbated section (49.57-49.59 m).

ORGANIC MUD AND TEPHRA [49.59-49.72 m]; dark greenish gray (5GY4/1); strongly bioturbated with burrows and stringers evident; gradational lower contact.

MUD [49.72-49.83 m]; black and green; burrows; bioturbated; transitional lower boundary.

MUD [49.83-49.96 m]; dark greenish gray (5GY4/1); cm-scale bedding.

MUD [49.96-49.995 m]; two lighter-colored (gray) bedlets from 49.96-49.98 m and 49.98-49.995 m.

MUD [49.995-50.31 m]; mottled dark greenish gray (5GY4/1); bioturbated; gradational lower contact.

MUD [50.31-50.41 m]; mottled dark greenish gray (5GY4/1); mm-scale bedding; gradational lower contact.

MUD [50.41-50.62 m]; olive gray (5Y3/2).

Base of core at 50.62 m.