

Core/Profile: FM-1

Location: Gavrioloia - 1st terrace

Legal description: SW ¼ NE ¼ Sec. 27 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Wild parsnip

Slope: 0-2%

Elevation: 880 feet

Topo. Map: Pilot Mound

Remarks: Gavrioloia property; Root River; boring taken on low terrace by river (terrace #1); 9 meters from water's edge; inside bend of river meander; 3-4 feet lower in elevation than FM-2 (on terrace #2)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-42 (0-1.4) | Acum | very dark brown to dark brown (10YR2/2-3/3) silt loam; weak, fine, subangular blocky to platy (fractures along bedding planes); friable; slightly to strongly effervescent; clear lower boundary; rootlets; fresh sand on surface; bedded layers of silts; several thin sand lenses (<1 cm thick). |
| 42-48 (1.4-1.6) | C | dark brown (10YR3/3) silt loam and brown (10YR5/3) fine to medium sand; massive; very friable; strongly to violently effervescent; abrupt lower boundary; laminated; thin sand lenses; sand lens from 46 to 48 cm. |
| 48-54 (1.6-1.8) | 2ACb | very dark brown (10YR2/2) silt loam; mottles are few, faint, fine, dark brown (7.5YR3/4); weak to moderate, fine, subangular blocky to platy; friable; strongly to violently effervescent; abrupt lower boundary; crude bedding visible. |
| 54-78 (1.8-2.6) | 2C | very dark brown (10YR2/2) silt loam and brown (10YR5/3) fine to medium sand; massive; very friable; violently effervescent; clear lower boundary; interbedded silts and fine to medium sands; sand lens from 54-60 cm; horizon disturbed in coring. |
| 78-83 (2.6-2.7) | 3ACb | black to very dark brown (10YR2/1-2/2) silt loam; very weak, fine, subangular blocky; friable; strongly effervescent; clear lower boundary (change in structure); crude bedding. |
| 83-94 (2.7-3.1) | 3C | black to very dark brown (10YR2/1-2/2) silt loam; massive; friable; slightly effervescent; unknown lower boundary (end of tubes); laminated silts; gastropod shell; fractured (appears blocky); very few pebbles. |
| 94-185 (3.1-6.1) | | no recovery; refused. |
| Auger Samples: | | |
| 185-320 (6.1-10.5) | | very dark grayish brown (10YR3/2) loamy sand and gravel; strongly to violently effervescent; approximately 50% rounded pebbles. |
| 435-570 (10.5-18.7) | | yellowish brown (10YR5/4) loamy sand and gravel; violently effervescent; not as gravelly as sample from 185-320 cm; distinct change in color; rounded pebbles/coarse sand. |

Core/Profile: FM-2

Location: Gavrioloia - crest of 2nd terrace

Legal description: SW ¼ NE ¼ Sec. 27 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Wild parsnip

Slope: 0-2%

Elevation: 884 feet

Topo. Map: Pilot Mound

Remarks: Gavrioloia property; Root River; boring is located at crest of 2nd lowest terrace; near slope to lowest terrace; 3-4 feet higher than FM-1

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-22 (0-.7) | Ap | very dark grayish brown (10YR3/2) loam; moderate, coarse, granular to platy; friable; slightly effervescent; clear lower boundary; rootlets. |
| 22-32 (.7-1.1) | A1 | very dark brown (10YR2/2) loam; weak, fine, granular; friable; slightly effervescent; gradual lower boundary; rootlets; sand is fine, bordering on coarse silt. |
| 32-42 (1.1-1.4) | A2 | black (10YR2/1) loam; weak, medium, subangular blocky; friable; strongly effervescent; abrupt lower boundary; sand is fine, bordering on coarse silt; rootlets. |
| 42-54 (1.4-1.8) | AC | very dark brown (10YR2/2) loamy fine sand; single grain; very friable; strongly to violently effervescent; abrupt lower boundary; many shall fragments; several intact gastropod shells (up to 2 cm in diameter); rootlets. |
| 54-71 (1.8-2.3) | 2Ab | black (10YR2/1) loam; weak, fine to medium, subangular blocky; friable; strongly effervescent; clear lower boundary; mollusk shells. |
| 71-75 (2.3-2.5) | 2C1 | brown (10YR5/3) silt loam; massive; very friable; slightly effervescent; clear lower boundary; bedded fine sediments (silt mainly); <1 mm thick. |
| 75-101 (2.5-3.3) | 2C2 | dark brown (10YR3/3) loamy sand; single grain; very friable; strongly effervescent; clear lower boundary; lenses of bedded silt loam; horizon was disturbed in coring; several pebbles; gastropod shells; 7 cm inferred (no recovery). |
| 101-126 (3.3-4.1) | 3ACb | very dark grayish brown (10YR3/2) loam; massive to weak, fine, subangular blocky; friable; strongly effervescent; clear lower boundary; crude bedding evident; 8 cm inferred (no recovery). |
| 126-182 (4.1-6.0) | 3C1 | very dark grayish brown (10YR3/2) loamy sand; massive; friable; violently effervescent; gradual lower boundary; gastropod shells; few rootlets; shell fragments. |
| 182-223 (6.0-7.3) | 3C2 | very dark gray (10YR3/1) loamy sand to fine sand; mottles are common, faint, fine, dark brown (7.5YR3/4); massive; friable; violently effervescent; abrupt lower boundary; gastropod shells, especially numerous from 208-212 cm; wood/root sampled at 222 cm; rootlets. |
| 223-231 (7.3-7.6) | 4C3 | light brownish gray (10YR6/2) coarse sand and gravel; single grain; loose; violently effervescent; unknown lower boundary (end of tubes); large pebbles (up to 4 cm in diameter). |
| 231-244 (7.6-8.0) | | no recovery; refused on coarse sand. |
| Auger Samples: | | |
| 359-494 (11.8-16.2) | | brown to dark brown (10YR4/3) coarse sand and gravel; strongly to violently effervescent; many rounded pebbles, up to 4 cm in diameter; mollusk shells. |
| 564-699 (18.5-22.9) | | dark yellowish brown (10YR4/4) loamy sand and gravel; violently effervescent; many rounded pebbles, several up to 4 cm in diameter. |

Core/Profile: FM-3

Location: Gavrioloia - swale on 2nd terrace

Legal description: SW ¼ NE ¼ Sec. 27 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Wild parsnip

Slope: 0-2%

Elevation: 882 feet

Topo. Map: Pilot Mound

Remarks: Gavrioloia property; Root River; boring in swale on 2nd terrace near 3rd terrace; 1 to 2 feet lower in elevation than FM-2

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|---|
| 0-18 (0-.6) | Ap1 | black (10YR2/1) sandy loam to silt loam; moderate, coarse, granular; friable; strongly effervescent; abrupt lower boundary; rootlets; sand is very fine, bordering on coarse silt. |
| 18-32 (.6-1.1) | Ap2 | black (10YR2/1) sandy loam; massive; friable; violently effervescent; gradual lower boundary; many large pebbles (up to 6 cm); few rootlets; compacted. |
| 32-74 (1.1-2.4) | AC | very dark brown (10YR2/2) sandy loam; massive; friable; violently effervescent; abrupt lower boundary; gastropod and mollusk shells. |
| 74-124 (2.4-4.1) | | no recovery. |
| 124-139 (4.1-4.6) | C1 | very dark grayish brown (10YR3/2) sandy loam; massive; friable; violently effervescent; clear lower boundary; many large pebbles (up to 5 cm), mostly rounded. |
| 139-168 (4.6-5.5) | C2 | very dark grayish brown (10YR3/2) sandy loam; few, medium to fine, faint, dark reddish brown (5YR3/3); massive; friable to firm; violently effervescent; abrupt lower boundary; many gastropod shells; some mollusk shells; bedding evident; few sand lenses (<1 cm thick) near base; few pebbles at top of unit. |
| 168-212 (5.5-7.0) | 2C3 | grayish brown (10YR5/2) fine to medium sand; single grain; loose; slightly effervescent - strong at base; unknown lower boundary (end of tubes); bands with varying degrees of oxidation; few shell fragments; 19 cm inferred (no recovery); refused on sand and gravel. |
| Auger Sample: | | |
| 212-259 (7.0-8.5) | | brown to dark brown (10YR4/3) medium sand and gravel; violently effervescent; mostly sand; some pebbles; many shell fragments. |

Core/Profile: FM-4

Location: Gavrioloia - 3rd terrace

Legal description: SW ¼ NE ¼ Sec. 27 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 888 feet

Topo. Map: Pilot Mound

Remarks: Gavrioloia property; Root River; on 3rd terrace; 5 ½ feet higher in elevation than FM-2

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-9 (0-.3) | Ap1 | black (10YR2/1) sandy loam; weak, coarse, granular to platy; friable; slightly to strongly effervescent; abrupt lower boundary; rootlets; shell fragments. |
| 9-17 (.3-.6) | Ap2 | black (10YR2/1) sandy loam; massive; friable; strongly effervescent; clear lower boundary; many large pebbles (up to 5 cm in diameter). |
| 17-61 (.6-2.0) | AC | black (10YR2/1) sandy loam to loamy sand; massive to single grain; loose; strongly to violently effervescent; clear lower boundary; few rootlets. |
| 61-271 (2.0-8.9) | C1 | very dark gray (10YR3/1) sandy loam; massive; friable; violently effervescent; abrupt lower boundary; bedding evident; several black bands (approx. 1 mm thick); many shell fragments; mollusk shells; large pebbles/small cobbles at 255-267 cm, 61-63 cm; no recovery from 67 to 127 cm, 146 to 254 cm. |
| 271-278 (8.9-9.1) | C2 | brown to dark brown to dark grayish brown (10YR4/3-4/2) fine sand; single grain; loose; violently effervescent; abrupt lower boundary; sand lens. |
| 278-300 (9.1-9.8) | C3 | very dark grayish brown (10YR3/2) sandy loam; massive; friable; violently effervescent; abrupt lower boundary; many shell fragments; mollusk and gastropod shells; few pebbles; sand is medium to coarse. |
| 300-318 (9.8-10.4) | 2C4 | dark grayish brown (10YR4/2) medium sand and gravel; single grain; loose; violently effervescent; unknown lower boundary (end of tubes); several large pebbles/small cobbles (6-7 cm in diameter); crude bedding; 7 cm inferred (no recovery); refused on coarse sand and gravel. |
| Auger Samples: | | |
| 425-560 (13.9-18.4) | | pale brown to brown (10YR6/3-5/3) sand and gravel; violently effervescent; poor recovery; auguring was rough; many pebbles. |
| 592-727 (19.4-23.9) | | brown (10YR5/3) sand and gravel; violently effervescent; sand is fine to coarse; many pebbles; auguring was very rough; refused on large cobbles/boulder. |

Core/Profile: FM-5/FM-6

Location: Gavrioloia - meander scar

Legal description: SW ¼ NE ¼ Sec. 27 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 883 feet

Topo. Map: Pilot Mound

Remarks: Gavrioloia property; Root River; boring in meander scar; FM-5 was refused on a boulder so rig was moved 2 meters away to FM-6; auger samples are from FM-6; 5 feet lower in elevation than FM-4

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-16 (0-.5) | Ap | black (10YR2/1) sandy loam to silt loam; weak, coarse, granular to weak platy; friable; slightly effervescent; clear lower boundary; sand is very fine, bordering on coarse silt; rootlets. |
| 16-45 (.5-1.5) | A | very dark brown (10YR2/2) sandy loam; very weak subangular blocky to massive; friable; slightly effervescent; clear lower boundary; sand is fine, bordering on coarse silt; rootlets; a few silt lenses (lighter brown) near base. |
| 45-60 (1.5-2.0) | AB1 | black to very dark grayish brown (10YR2/4 3/2) sandy loam; weak to moderate, fine, subangular blocky; friable; slightly effervescent; clear lower boundary; sand is fine, bordering on coarse silt; rootlets; very few pebbles. |
| 60-75 (2.0-2.5) | AB2 | black (10YR2/1) sandy loam; weak, fine, subangular blocky; very friable; slightly to strongly effervescent at base; unknown lower boundary (end of tubes); many large pebbles/small cobbles (6-7 cm in diameter) at base; rootlets. |
| 75-94 (2.5-3.1) | | no recovery; refused on boulder. |
| Auger Samples: | | |
| 119-254 (3.9-8.3) | | very dark brown (10YR2/2) sandy loam; friable to firm; slightly to strongly effervescent; many shell fragments; few rounded pebbles. |
| 363-498 (11.9-16.3) | | very dark brown (10YR2/2) loamy sand and gravel; slightly to strongly effervescent; many shell fragments; mollusk shells; many small, rounded pebbles. |
| 567-702 (18.6-23.0) | | light yellowish brown to yellowish brown (10YR6/4-5/4) loamy sand and gravel; strongly effervescent; some pebbles; some fines in matrix; sand is medium to coarse. |

Core/Profile: FM-7

Location: Gavrioloia - meander scar

Legal description: SW ¼ NE ¼ Sec. 27 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 882 feet

Topo. Map: Pilot Mound

Remarks: Gavrioloia property; Root River; boring in meander scar; one foot lower in elevation than FM-5 and FM-6; poor recovery due to large number of boulders/cobbles

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|--|
| 0-13 (0-.4) | Ap | black (10YR2/1) sandy loam; moderate, medium, granular; friable; slightly to strongly effervescent; abrupt lower boundary; rootlets; few pebbles; silt lens near base of horizon; sand is very fine, bordering on coarse silt. |
| 13-30 (.4-1.0) | AC1 | black (10YR2/1) sandy loam; weak, fine, granular; very friable; strongly to violently effervescent; clear lower boundary; very rocky; many pebbles and some small cobbles, rounded and angular; rootlets. |
| 30-145 (1.0-4.8) | AC2 | very dark brown (10YR2/2) sandy loam; massive; friable; violently effervescent; clear lower boundary; very rocky; many pebbles and small cobbles, rounded and angular. |
| 145-152 (4.8-5.0) | C1 | very dark grayish brown (10YR3/2) medium to coarse sand; single grain; loose; violently effervescent; abrupt lower boundary; sand lens. |
| 152-167 (5.0-5.5) | 2C2 | very dark grayish brown (10YR3/2) loam; massive; friable; strongly effervescent; unknown lower boundary (end of tube); many rounded pebbles; mollusk shells. |
| 167-254 (5.5-8.3) | | no recovery. |
| 254-265 (8.3-8.7) | 3CA | very dark grayish brown (10YR3/2) loam to sandy loam; mottles are coarse, few, distinct, dark gray (10YR4/1) bands; massive; clay coatings are distinct, many, coat pebble holes; friable; strongly effervescent; abrupt lower boundary; laminated at base of horizon; rootlets, plant material; gray and black bands (approx. 1 cm thick); cobbles, rounded and angular; sandier near base; may be depositional. |
| 265-273 (8.7-9.0) | 3C | grayish brown to light grayish brown (10YR5/2-6/2) medium sand; single grain; loose; very slightly effervescent; abrupt lower boundary; sand lens; bands of oxidation at base. |
| 273-292 (9.0-9.6) | 4OCb | black (10YR2/1) silt loam; massive; friable; slightly to strongly effervescent; abrupt lower boundary; buried muck; bits of plant matter; sand lenses at 283-284 cm, 287 cm; few small, rounded pebbles; rootlets; shell fragments; plant matter collected from 288-290 cm, 276-284 cm; seeds of cf. <i>Betulaceae</i> , <i>Chamaesyce nutans</i> , <i>Chenopodium sp.</i> , <i>Cyperaceae</i> from 276-284 cm C-14 dated at 3710±50 BP. |
| 292-300 (9.6-9.8) | 5C | dark yellowish brown (10YR3/6) coarse sand and gravel; single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); many rounded pebbles; few cobbles; bands of differing degrees of oxidation. |
| 300-328 (9.8-10.8) | | no recovery; refused on cobbles. |

Core/Profile: FM-8

Location: Danielson - by river

Legal description: SE ¼ NW ¼ Sec. 28 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 879 feet

Topo. Map: Pilot Mound

Remarks: Danielson property; Root River; boring taken 3 meters from river's edge next to a cutbank on outside of a meander; 2 feet lower in elevation than FM-9

| Depth cm(ft) | Horizon or Zone | Description |
|-----------------------|--------------------|--|
| 0-40 (0-1.3) | Ap | black (10YR2/1) silt loam; platy; firm; slightly effervescent; clear lower boundary; top 5 cm - fresh sand, overbank deposit; compacted; roots. |
| 40-95 (1.3-3.1) | A | black (10YR2/1) silt loam; moderate, medium to coarse, granular; friable; slightly effervescent; gradual lower boundary; rootlets. |
| 95-171 (3.1-5.6) | AC | very dark grayish brown (10YR3/2) silt loam; weak, medium, subangular blocky to massive; friable; slightly to strongly effervescent; gradual lower boundary; band of black (10YR2/1) silt loam, 167-171 cm; shell fragments; gastropod shells; 9 cm inferred (no recovery) |
| 171-310 (5.6-10.2) | C | very dark grayish brown (10YR3/2) silt loam to sandy loam; massive; friable; strongly effervescent; gradual lower boundary; shell fragments; gastropod shells; sand concretions(?) from 237-242 cm; crude bedding; rootlets; few sand lenses; sandier with depth; sand is fine; 5 cm inferred (no recovery). |
| 310-365 (10.2-12.0) | Cg | very dark gray (10YR3/1) sandy loam; mottles are common, fine, faint, dark yellowish brown (10YR3/4) near the base of the horizon; massive; friable; slightly effervescent; gradual lower boundary; lenses of loamy sand; shell fragments; gastropod shells. |
| 365-381 (12.0-12.5) | 2C | grayish brown (10YR5/2) fine to medium sand; mottles are few, coarse, distinct, dark brown (7.5YR3/4) bands of oxidation; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); shell fragments; lenses of sandy loam; gastropod shells; rootlets; few small pebbles. |
| 381-409 (12.5-13.4) | | no recovery; driller's notes: "felt like...medium-coarse gravel." |
| Auger Samples: | | |
| 488-623 (16.0-20.4) | | dark grayish brown (10YR4/2) medium sand; slightly effervescent; shell fragments; few small pebbles; similar to 2C horizon. |
| 733-868 (24.1-28.5) | | brown to dark brown (10YR4/3) medium to coarse sand; slightly effervescent; very few shell fragments; many small pebbles. |
| 923-1,058 (30.3-34.7) | | yellowish brown (10YR5/4) medium to coarse sand; slightly effervescent; few shell fragments; small pebbles common. |

Core/Profile: FM-9

Location: Danielson - by field road near river

Legal description: SE ¼ NW ¼ Sec. 28 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses, corn

Slope: 0-2%

Elevation: 881 feet

Topo. Map: Pilot Mound

Remarks: Danielson property; Root River; boring taken along field road near bluff; 60-65 meters from water's edge; 1 foot higher in elevation than FM-8

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-7 (0-.2) | Acum | black (10YR2/1) silt loam; weak, medium, granular to massive; friable; noneffervescent; abrupt lower boundary; bedded; roots common; layer of light-colored silt at base; silt is coarse. |
| 7-32 (.2-1.1) | Ap | black (10YR2/1) silt loam; weak, coarse, subangular blocky to platy; firm; noneffervescent; clear lower boundary; compacted; rootlets. |
| 32-85 (1.1-2.8) | A | black (10YR2/1) sandy loam; weak, fine to medium, granular; friable; noneffervescent; gradual lower boundary; rootlets; several large (2 cm in diameter) roots; sand is very fine; 10 cm inferred (no recovery). |
| 85-178 (2.8-5.8) | AB | black (10YR2/1) silt loam; weak to moderate, medium, subangular blocky; friable to firm; noneffervescent; diffuse lower boundary; rootlets; 13 cm inferred (no recovery). |
| 178-210 (5.8-6.9) | CB | very dark grayish brown to very dark brown (10YR3/2-2/2) silt loam to silty clay loam; massive; friable to firm; noneffervescent; clear lower boundary; rootlets; shell fragments; gastropod shells. |
| 210-220 (6.9-7.2) | 2Ab | black (10YR2/1) silty clay loam; mottles are common, faint, fine, dark brown (10YR3/3); moderate, fine, granular; friable to firm; very slightly effervescent; clear lower boundary; rootlets; horizon disturbed in coring. |
| 220-233 (7.2-7.6) | 2ACb | dark brown (10YR3/3) silt loam to silty clay loam; mottles are common, faint, fine, black (10YR2/1); massive; friable to firm; very slightly effervescent; gradual lower boundary; horizon disturbed in coring; rootlets. |
| 233-313 (7.6-10.3) | 2C | dark yellowish brown (10YR4/4) fine sand; mottles are common, faint, fine to coarse, very dark grayish brown (10YR3/2); massive; very friable; slightly effervescent; abrupt, irregular lower boundary; roots; rootlets; several bands of loamy sand (very dark grayish brown [10YR3/2]); 5 cm inferred (no recovery). |
| 313-349 (10.3-11.5) | 3ACb | very dark grayish brown (10YR3/2) loam; mottles are few, medium, faint, dark yellowish brown (10YR4/4); massive; friable; slightly effervescent; abrupt lower boundary (textural change); shell fragments; sand lens from 324 to 328 cm, slightly blacker below sand lens; gastropod shell; charcoal collected from 344-346 cm. |
| 349-403 (11.5-13.2) | 4C | yellowish brown (10YR5/4) fine sand; single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); few clasts of black silt loam; shell fragments; gastropod shells. |
| 403-427 (13.2-14.0) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 489-624 (16.0-20.5) | | dark grayish brown (10YR4/2) fine sand to loamy sand; slightly effervescent; very few pebbles; few shell fragments. |
| 734-869 (24.1-28.5) | | yellowish brown (10YR5/4-5/6) fine sand; slightly effervescent; shell fragments; no pebbles. |

Core/Profile: FM-10

Location: Danielson - by road

Legal description: SW ¼ NW ¼ Sec. 28 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses, corn

Slope: 0-2%

Elevation: 885 feet

Topo. Map: Pilot Mound

Remarks: Danielson property; Root River; boring taken in ditch between dirt road and cornfield; 1 foot higher in elevation than FM-11

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-51 (0-1.7) | C | very dark grayish brown (10YR3/2) silt loam to sandy loam; massive; very friable; noneffervescent; abrupt lower boundary; recent ditch deposits; bedded; thin (≈1 mm) light and dark laminations - irregular; rootlets; silt is very coarse, bordering on fine sand. |
| 51-72 (1.7-2.4) | 2Acum | black to very dark brown (10YR2/1-2/2) silt loam; massive to weak, coarse, granular; very friable; noneffervescent; abrupt lower boundary; crude bedding, more evident near base. |
| 72-118 (2.4-3.9) | 3Ab | black (10YR2/1) silt loam; mottles are very few, fine, faint, black (10YR2/1), fill root void and worm burrows; weak, medium to coarse granular; very friable; noneffervescent; gradual lower boundary.. |
| 118-176 (3.9-5.8) | 3CBb | dark brown (10YR3/3) sandy loam; massive to weak, medium, subangular blocky; friable; noneffervescent; gradual lower boundary; sand is very fine, bordering on coarse silt; 5 cm inferred (no recovery). |
| 176-314 (5.8-10.3) | 3C1 | dark brown (10YR3/3) sandy loam; mottles are very few, faint, coarse, brown to dark brown (10YR4/3); massive structure (some fracturing); friable; noneffervescent; gradual lower boundary; sand is very fine, bordering on coarse silt; 5 cm inferred (no recovery). |
| 314-406 (10.3-13.3) | 3C2 | dark brown (10YR3/3) sandy loam; mottles are common, medium, distinct, gray (10YR5/1) and yellowish brown (10YR5/4); massive; friable to firm; noneffervescent; clear lower boundary; sand is very fine, bordering on coarse silt; several small (<5 mm) voids lined with sand grains; 9 cm inferred (no recovery). |
| 406-454 (13.3-14.9) | 3C3 | dark brown (10YR3/3) silty clay loam; mottles are common, medium, distinct, gray (10YR5/1) and common, fine, distinct, dark brown (7.5YR3/2); massive; firm; noneffervescent; clear lower boundary; silt is coarse; some fracturing (parallel fractures). |
| 454-515 (14.9-16.9) | 3Cg | dark gray (10YR4/1) sandy loam; mottles are few, coarse, faint, dark brown (7.5YR3/4), and few, distinct, fine, light gray (10YR7/2); massive; firm; very slightly effervescent; clear lower boundary; sand is very fine; few rootlets; 11 cm inferred (no recovery). |
| 515-528 (16.9-17.3) | 4Ob | black (10YR2/1) mucky silt loam; massive; friable to firm; slightly effervescent; clear lower boundary; silt is coarse; plant matter including roots, seeds, and wood throughout; collected from 516 to 522 cm, 526-528 cm; seeds of <i>cf. Betulaceae</i> and <i>Najas sp.</i> From 526-528 cm C-14 dated at 4,960±60 BP.. |
| 528-536 (17.3-17.6) | 4OCb | black (10YR2/1) loam; massive; friable; strongly effervescent; unknown lower boundary (end of tubes); sand is medium; few rootlets. |
| 536-561 (17.6-18.4) | | no recovery; refused on sand and gravel. |

Core/Profile: FM-11

Location: Danielson - along road

Legal description: SW ¼ NW ¼ Sec. 28 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 884 feet

Topo. Map: Pilot Mound

Remarks: Danielson property; Root River; boring taken in ditch between dirt road and bluff; 1 foot lower in elevation than FM-10

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-44 (0-1.4) | C1 | yellowish brown (10YR5/4) and dark brown (10YR3/3) silt loam; massive structure (fractures along bedding planes); very friable; noneffervescent; clear lower boundary; bedded fine sediments (silts); laminations are often ≈1 mm thick and alternate between light and dark - some are sandier than others; recent ditch sediments. |
| 44-66 (1.4-2.2) | C2 | dark brown (10YR3/3) silt loam; massive structure (fractures along bedding planes); very friable; very slightly effervescent; clear lower boundary; less bedded, but still evident; recent ditch sediments. |
| 66-97 (2.2-3.2) | 2Ab | very dark gray (10YR3/1) silt loam to silty clay loam; mottles are common, faint, medium, dark reddish brown (5YR3/2); moderate angular blocky structure (may be fracturing) friable; noneffervescent; abrupt lower boundary; highly fractured, blocky; compacted. |
| 97-117 (3.2-3.8) | 2ACb | dark brown (10YR3/3) silt loam; mottles are many, faint, fine, very dark gray to black (10YR3/1-2/1); weak, medium, subangular blocky structure (may be fracturing); very friable; noneffervescent; clear lower boundary. |
| 117-153 (3.8-5.0) | 2C1 | brown to dark brown (10YR4/3) silt loam; mottles are few, faint, fine, very dark gray (10YR3/1), fill worm burrows and root voids; massive; clay coatings are few, distinct, line root voids; friable; slightly effervescent; gradual lower boundary; 3 cm inferred (no recovery). |
| 153-189 (5.0-6.2) | 2C2 | dark brown (10YR3/3) silt loam; massive; clay coatings are few, faint, line root voids; friable; noneffervescent; abrupt lower boundary; gastropod shells. |
| 189-204 (6.2-6.7) | 3Ab | black (10YR2/1) silty clay loam; moderate, fine to medium, granular; firm; noneffervescent; clear lower boundary; horizon disturbed in coring. |
| 204-219 (6.7-7.2) | 3ACb | dark brown (10YR3/3) loam; massive; friable to firm; noneffervescent; clear lower boundary; horizon disturbed in coring. |
| 219-314 (7.2-10.3) | 4Ab | black (10YR2/1) clay loam to silty clay loam; weak to medium, fine, subangular blocky; clay coatings are few, faint, line root voids; firm; noneffervescent; diffuse lower boundary; 6 cm inferred (no recovery). |
| 314-396 (10.3-13.0) | 4Cg | very dark grayish brown (10YR3/2) silty clay loam; mottles are common, faint, very fine, dark yellowish brown (10YR4/4-4/6); massive; firm; noneffervescent; unknown lower boundary (end of tubes); sandstone pebbles last 20 cm. |
| 396-424 (13.0-13.9) | | no recovery; refused on gravel. |
| Auger Sample: | | |
| 424-470 (13.9-15.4) | | dark yellowish brown (10YR4/6) sandy loam; noneffervescent; few pebbles. |

Core/Profile: FM-12

Location: Danielson - by river near gravel pit

Legal description: NW ¼ SW ¼ Sec. 28 T104N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 880 feet

Topo. Map: Pilot Mound

Remarks: Danielson property; Root River; boring taken 2 meters north of river bank, on inside edge of meander; near gravel pit in higher terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-16 (0-.5) | C | black (10YR2/1) fine sand; single grain; loose; strongly effervescent; abrupt lower boundary; many rounded pebbles ≈1-3 cm in diameter; rootlets; wood; recent deposit. |
| 16-38 (.5-1.3) | 2Ap | black (10YR2/1) silt loam to loam; medium, coarse, platy; friable; very slight to slightly effervescent; abrupt lower boundary; large root at base of horizon; very compacted; rootlets. |
| 38-52 (1.3-1.7) | 2AC1 | black (10YR2/1) sandy loam; weak, fine, subangular blocky to massive; very friable; strongly effervescent; gradual lower boundary; crude bedding; shell fragments; few rootlets. |
| 52-127 (1.7-4.2) | | no recovery. |
| 127-160 (4.2-5.3) | 2AC2 | very dark brown (10YR2/2) sandy loam; weak, medium, subangular blocky; very friable; violently effervescent; diffuse lower boundary; shell fragments; sand is fine to massive; gastropod shells; few small pebbles; few rootlets. |
| 160-227 (5.3-7.5) | 2C1 | very dark grayish brown to dark brown (10YR3/2-3/3) sandy loam; massive to single grain; very friable to loose; violently effervescent; gradual lower boundary; shell fragments; gastropod shells; sand is fine. |
| 227-255 (7.5-8.4) | | no recovery. |
| 255-320 (8.4-10.5) | 2C2 | very dark grayish brown to very dark gray (10YR3/2-3/1) loam; mottles are few, distinct, medium, dark reddish brown (5YR3/3); massive; friable; strongly effervescent; abrupt lower boundary; gastropod and mollusk shells; more mottled near base; charcoal collected at 285 to 286 cm. |
| 320-443 (10.5-14.5) | 3C3 | brown to dark brown (10YR4/3) fine to medium sand; single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); clumps of finer sand/silt mixed into unit - these clumps are very dark grayish brown ((10YR3/2); gastropod and mollusk shells; shell fragments; bedded at base; charcoal collected at 431 cm; layer of shells at 333 cm; 14 cm inferred (no recovery); rounded pebbles. |
| 443-481 (14.5-15.8) | | no recovery; refused on gravel. |

Core/Profile: FM-13
 Location: Horihan - corner of bean field
 Legal description: NE ¼ NE ¼ Sec. 12 T103N R10W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Soybeans
 Slope: 0-2%
 Elevation: 810 feet
 Topo. Map: Lanesboro
 Remarks: Horihan property; Root River; boring taken in corner of soybean field

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|--|
| 0-18 (0-.6) | Ap | very dark grayish brown (10YR3/2) silt loam; moderate, medium to coarse, platy; friable; noneffervescent; clear lower boundary; cumulic horizon; worm burrows; slightly darker brown at top. |
| 18-98 (.6-3.2) | 2A | black (10YR2/1) loam; weak, medium, granular; very friable; noneffervescent; gradual lower boundary; slightly platy - may be related to tractor compaction; structure is more massive near base; rootlets. |
| 98-109 (3.2-3.6) | 2AC | black (10YR2/1) loamy sand; massive to single grain; loose; noneffervescent; abrupt lower boundary (color change); sand is fine to medium. |
| 109-137 (3.6-4.5) | 2C1 | very dark grayish brown (10YR3/2) fine to medium sand; single grain; loose; noneffervescent; abrupt lower boundary (color change); 5 cm inferred (no recovery). |
| 137-194 (4.5-6.4) | 2C2 | brown (10YR5/3) fine to coarse sand; single grain; loose; very slightly effervescent near base; unknown lower boundary (end of tubes); sand coarsens with depth; few small pebbles near base; few shell fragments; 17 cm inferred (no recovery); refused on coarse sand. |
| Auger Sample: | | |
| 194-304 (6.4-10.0) | | pale brown (10YR6/3) fine to coarse sand; strongly effervescent; many rounded pebbles. |

Core/Profile: FM-14

Location: Horihan - low terrace

Legal description: SW ¼ NE ¼ Sec. 12 T103N R10W

County: Fillmore

Parent material: Alluvium/Loess

Vegetation: Grasses

Slope: 0-2%

Elevation: 830 feet

Topo. Map: Lanesboro

Remarks: Horihan property; Root River; possible rock-cored meander; boring taken on low terrace in pasture; 6 feet higher in elevation than FM-15 in swale

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-9 (0-.3) | Ap | very dark brown (10YR2/2) silt loam; weak, fine, granular to moderate platy; friable; noneffervescent; abrupt lower boundary; roots. |
| 9-53 (.3-1.7) | C | dark brown (10YR3/3) silt loam; massive structure (fractures along bedding planes); very friable; noneffervescent; clear lower boundary; laminated; rootlets; worm burrows; recent deposits. |
| 53-110 (1.7-3.6) | 2Ab | black (10YR2/1) silt loam; weak, coarse, granular to weak, medium, platy; friable; noneffervescent; gradual lower boundary; upper surface mixed with base of C horizon for ≈5 cm. |
| 110-143 (3.6-4.7) | 2ABb | black (10YR2/1) silt loam; moderate, fine, subangular blocky to coarse granular; friable; noneffervescent; gradual lower boundary; feels compacted; slightly hard to hard when dry; 5 cm inferred (no recovery). |
| 143-197 (4.7-6.5) | 2Btb1 | very dark brown (10YR2/2) clay-rich silt loam; mottles are very fine, few, faint, dark grayish brown (10YR4/2); weak, coarse, columnar; clay and silt coatings are discontinuous, thin, coat ped faces; friable to firm; noneffervescent; gradual lower boundary; hard when dry. |
| 197-240 (6.5-7.9) | 2Btb2 | dark yellowish brown (10YR4/4) clay-rich silt loam; moderate, medium, columnar; clay and silt coatings are continuous, thick, coat ped faces; friable to firm; noneffervescent; clear lower boundary; oxidized. |
| 240-308 (7.9-10.1) | 2C1 | dark yellowish brown (10YR4/4) silt loam; mottles are slightly lighter and darker shades of brown mixed together; massive; clay coatings are few, distinct, coat root voids; friable; noneffervescent; gradual lower boundary; oxidized; laminated; 6 cm inferred (no recovery). |
| 308-424 (10.1-13.9) | 2C2 | grayish brown (10YR5/2) silt loam; mottles are common, fine to medium, faint to distinct, dark brown to brown (7.5YR4/4) to dark reddish brown (5YR3/3); friable; noneffervescent; clear lower boundary; laminated; 9 cm inferred (no recovery). |
| 424-445 (13.9-14.6) | 2C3 | grayish brown (10YR5/2) silt loam; mottles are few, distinct, medium, yellowish red (5YR4/6); massive; friable to firm; noneffervescent; clear lower boundary; coarse silt; transition layer from 2C2 to 3C4. |
| 445-514 (14.6-16.9) | 3C4 | grayish brown (10YR5/2) silt loam and fine sand; massive; friable; slightly effervescent; abrupt lower boundary; coarse silt with thin (≈1 cm) lenses of fine sand; shell fragments; laminated; few infilled root voids; transition layer from 2C3 to 4C5; 13 cm inferred (no recovery). |
| 514-532 (16.9-17.5) | 4C5 | dark yellowish brown (10YR3/4) medium sand; single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); few angular pebbles near base; several thin (≈3 mm) bands of gray silt loam; 3 cm inferred (no recovery); refused on coarse sand. |

Core/Profile: FM-15

Location: Horihan - swale on low terrace

Legal description: SW ¼ NE ¼ Sec. 12 T103N R10W

County: Fillmore

Parent material: Alluvium/Loess

Vegetation: Grasses

Slope: 2-6%

Elevation: 824 feet

Topo. Map: Lanesboro

Remarks: Horihan property; Root River; possible rock-cored meander; boring taken in swale/channel on low terrace; 6 feet lower in elevation than FM-14

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-10 (0-.3) | Ap1 | black (10YR2/1) silt loam; moderate, coarse, platy; friable; noneffervescent; abrupt lower boundary; rootlets; compacted. |
| 10-32 (.3-1.1) | Ap2 | very dark brown (10YR2/2) silt loam; moderate, fine, subangular blocky; friable; noneffervescent; abrupt lower boundary; rootlets, compacted. |
| 32-80 (1.1-2.6) | BA | very dark grayish brown (10YR3/2) silt loam; mottles are common, fine, faint, light brownish gray (10YR6/2); weak to moderate, medium, columnar; clay and silt coatings are moderately continuous, thin, coat ped faces; friable; noneffervescent; gradual lower boundary; few rootlets. |
| 80-135 (2.6-4.4) | Bt | dark yellowish brown (10YR4/4) silt loam; mottles are common, coarse, faint, light brownish gray (10YR6/2); moderate, medium to coarse, columnar; clay and silt coatings are continuous, moderately thick, coat ped faces; friable; noneffervescent; gradual lower boundary; very few rootlets; 5 cm inferred (no recovery). |
| 135-170 (4.4-5.6) | CB | dark brown to brown (10YR4/3) silt loam; mottles are common, faint, medium, pale brown (10YR6/3); massive to weak, coarse, subangular blocky; clay and silt coatings are discontinuous, thin, coat horizontal planes (ped faces?); very friable; noneffervescent; gradual lower boundary; few vertical rootlets; large (1 cm thick) horizontal root; crude bedding; oxidized. |
| 170-279 (5.6-9.2) | C1 | dark brown to brown (10YR4/3) silt loam to silt; mottles are common, faint, fine, strong brown (7.5YR4/6) to black (10YR2/1); massive; friable; noneffervescent; gradual lower boundary; laminated; silt is coarse; plant fibers in middle of horizon; charcoal, some patches of oxidation, especially in top half of horizon; 12 cm inferred (no recovery). |
| 279-319 (9.2-10.5) | C2 | dark grayish brown to dark gray (10YR4/2-4/1) silt loam; mottles are few, fine, distinct, dark reddish brown (5YR3/4); massive; friable to firm; noneffervescent; gradual lower boundary; laminated - less noticeable than C1; more clay than C1; silt is coarse; some fracturing. |
| 319-360 (10.5-11.8) | 2C3 | grayish brown (10YR5/2) silt loam and fine to medium sand; mottles are few, faint, fine, dark yellowish brown (10YR4/4); massive to single grain; very friable to loose; slightly effervescent; abrupt lower boundary; interbedded lenses of fine sand (dark yellowish brown [10YR4/6]) in a silt loam matrix; shell fragments; bits of oxidized plant matter; gastropod shell collected. |
| 360-381 (11.8-12.5) | 3C4 | dark yellowish brown (10YR4/6) fine to medium sand and gravel; single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); many angular pebbles; sand is oxidized; 13 cm inferred (no recovery); refused on sand and gravel. |
| Auger Sample: | | |
| 410-545 (13.5-17.9) | | light yellowish brown (10YR6/4) loamy sand and gravel; violently effervescent; many angular pebbles; sand is medium to coarse. |

Core/Profile: FM-16

Location: Horihan - swale on low terrace

Legal description: SW ¼ NE ¼ Sec. 12 T103N R10W

County: Fillmore

Parent material: Alluvium/Loess

Vegetation: Grasses

Slope: 2-6%

Elevation: 828 feet

Topo. Map: Lanesboro

Remarks: Horihan property; Root River; possible rock-cored meander; boring taken in wide, shallow trough; 12 feet lower in elevation than FM-17, located on the next highest terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-31 (0-1.0) | Ap | black (10YR2/1) silt loam; moderate, medium, platy; friable; noneffervescent; clear lower boundary; rootlets; compacted; worm burrows infilled with lighter brown sediment. |
| 31-72 (1.0-2.4) | A | black (10YR2/1) silt loam; weak, medium, granular; friable; noneffervescent; clear lower boundary; rootlets. |
| 72-84 (2.4-2.8) | AB | dark brown (10YR3/3) silt loam; mottles are very fine, common, faint, very dark brown (10YR2/2), and very fine, few, faint, brown (10YR5/3); weak, fine, subangular blocky; friable; noneffervescent; clear lower boundary. |
| 84-104 (2.8-3.4) | BE | dark brown (10YR3/3) silt loam; mottles are common, fine, faint to distinct, pale brown (10YR7/2); weak to medium, fine, subangular blocky; clay and silt coatings are thin, discontinuous, coat ped faces; friable; noneffervescent; clear lower boundary. |
| 104-163 (3.4-5.4) | Bt | dark yellowish brown (10YR3/4) silt loam; mottles are common, fine, faint to distinct, black (10YR2/1) and very pale brown (10YR7/2); moderate, medium, prismatic parting to weak, fine, subangular blocky; clay and silt coatings are continuous, distinct, coat ped faces; friable; noneffervescent; diffuse lower boundary (prismatic structure may extend further down, but it is too coarse to detect); voids infilled with sediment (karst-like); surfaces (often vertical) coated with very pale brown (10YR7/2) silt; more clay-rich than other layers; 5 cm inferred (no recovery). |
| 163-264 (5.4-8.7) | C1 | dark yellowish brown (10YR4/4) sandy loam; mottles are common, fine, distinct to faint, very pale brown (10YR7/3) to yellowish brown (10YR5/4) with oxidation mottles near base; massive; clay coatings are few, distinct, coat pebble/root voids; friable; noneffervescent; gradual lower boundary; bedded; lens of black (10YR2/1) loam to silt loam at 156-160 cm - does not resemble buried soil; especially oxidized near base of unit - dark reddish brown (5YR3/3); 4 cm inferred (no recovery); sand is very fine. |
| 264-402 (8.7-13.2) | C2 | grayish brown to dark grayish brown (2.5Y5/2-4/2) loamy sand; mottles are many, fine, distinct, strong brown (7.5YR4/6) and often banded; massive; friable; noneffervescent; clear lower boundary; bedded; manganese (?) nodules; oxidized more in middle of unit; few thin (≈1 mm thick) layers of sand; sand is very fine, almost coarse silt; 22 cm inferred (no recovery). |
| 402-446 (13.2-14.6) | 2C3 | grayish brown (10YR5/2) silt loam; mottles are few, medium, distinct, strong brown (7.5YR4/6); massive; friable; slightly effervescent; abrupt lower boundary; crude bedding; few shell fragments; fractured; silt is very coarse. |
| 446-550 (14.6-18.0) | 3C4 | grayish brown (10YR5/2) fine sand and medium sand; mottles are common, medium, distinct, strong brown (7.5YR4/6) to dark red (5YR 3/6); massive and single grain; friable to loose; slightly effervescent; unknown lower boundary (end of tubes); grasses; many medium sand lenses; lenses are yellowish brown ((10YR5/4) and pale brown (10YR6/3), approximately 1-4 cm thick; gastropod shells; charcoal collected from 511 to 514 cm; 63 cm no recovery; refused on coarse sands. |

Core/Profile: FM-17

Location: Horihan - high terrace

Legal description: SE ¼ NW ¼ Sec. 12 T103N R10W

County: Fillmore

Parent material: Alluvium/Colluvium/Loess

Vegetation: Grasses

Slope: 0-2%

Elevation: 840 feet

Topo. Map: Lanesboro

Remarks: Horihan property; Root River; possible rock-cored meander; boring taken on top of high terrace; 12 feet higher in elevation than FM-16, on the next lower terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-28 (0-.9) | Ap | black (10YR2/1) silt loam; moderate, medium, platy; friable; noneffervescent; abrupt lower boundary; roots; omnidirectional rootlets. |
| 28-44 (.9-1.4) | AE | brown to dark brown (10YR4/3) silt loam; moderate, medium, granular and weak, medium, platy; clay and silt coatings are discontinuous, thin, coat ped faces; friable; noneffervescent; clear lower boundary; omnidirectional rootlets. |
| 44-87 (1.4-2.9) | Bt1 | dark brown to dark yellowish brown (10YR3/3-3/4) silt loam; mottles are many, distinct, fine, pale brown (10YR6/3); strong, medium, prismatic parting to fine angular blocky; clay and silt coatings are moderately continuous, coat ped faces; friable; noneffervescent; clear lower boundary; omnidirectional rootlets, oxidized; infilled root voids. |
| 87-160 (2.9-5.3) | Bt2 | dark yellowish brown (10YR4/4) silt loam; mottles are many, distinct, fine, pale brown (10YR6/3), and few, fine, distinct, very dark brown (10YR2/2); strong, medium, prismatic; clay and silt coatings are continuous, coat ped faces; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; crude bedding; manganese nodules; silts infilling root voids; oxidized; 5 cm inferred (no recovery). |
| 160-214 (5.3-7.0) | CB | dark yellowish brown (10YR4/4-4/6) silt loam; mottles are many, medium, faint to distinct, strong brown (7.5YR4/6) to yellowish brown (10YR5/6); massive structure (fractures along horizontal planes); clay coatings are discontinuous, thin, coat horizontal planes (ped faces?); friable; noneffervescent; clear lower boundary; oxidized; laminated; some manganese nodules; colluvially/alluvially reworked loess. |
| 214-319 (7.0-10.5) | C1 | brown to brown to dark brown (10YR5/3-4/3) silt loam; mottles are few, faint, fine to medium, very dark brown (10YR2/2); massive; friable; noneffervescent; clear lower boundary; laminated; pisolithic; coarse silt; pipestems (oxidized/infilled root voids); 5 cm inferred (no recovery); alluvially/colluvially reworked loess. |
| 319-357 (10.5-11.7) | 2C2 | brown to grayish brown (10YR5/3-5/2) loamy sand and fine sand; mottles are many, coarse, faint to distinct, strong brown (7.5YR4/6) to dark brown (7.5YR3/4); massive to single grain; friable to loose; noneffervescent; unknown lower boundary (end of tube); interbedded sand lenses; lenses are often oxidized (strong brown (7.5YR4/6) to yellowish brown (10YR 5/4); weathered angular pebbles near base; angular bedding; more dense near base; alluvial/colluvial. |
| 357-381 (11.7-12.5) | | no recovery. |
| 381-392 (12.5-12.9) | 3C3 | grayish brown (10YR5/2) very fine sand and gravel; massive to single grain; slightly effervescent; unknown lower boundary (end of tubes); small angular cobbles; many angular pebbles; very rocky; silt bonding many pebbles together; colluvial. |
| 392-404 (12.9-13.3) | | no recovery; refused on sand and small cobbles. |

Core/Profile: FM-18

Location: Kahoun - low terrace (#1)

Legal description: NW ¼ NE ¼ Sec. 10 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 740 feet

Topo. Map: Rushford West

Remarks: Kahoun property; Rush Creek; boring taken on low terrace by Rush Creek; 3 meters from water's edge; 6 feet lower in elevation than FM-19 (on second terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-7 (0-.2) | C | very dark grayish brown (10YR3/2) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; roots; rootlets; stems; recent deposit. |
| 7-32 (.2-1.1) | 2Acum | very dark grayish brown (10YR3/2) silt and fine sand; platy structure (fractures along bedding planes); very friable to loose; noneffervescent; abrupt lower boundary; slightly darker shade at top - resembles buried surface; rootlets; buried stems at top; siltier near base; interbedded silts and sands; laminated. |
| 32-74 (1.1-2.4) | 2C | dark yellowish brown to brown (10YR4/4-5/3) fine to coarse sand and gravel; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); many rounded and angular pebbles, small and large; greater concentration of pebbles near top of horizon. |
| 74-100 (2.4-3.3) | | no recovery; refused on gravel and sand. |
| Auger Samples: | | |
| 146-281 (4.8-9.2) | | yellowish brown (10YR5/4) coarse sand; noneffervescent; few small pebbles. |
| 291-426 (9.5-14.0) | | dark yellowish brown (10YR4/4) medium sand; noneffervescent. |
| 531-666 (17.4-21.9) | | dark yellowish brown (10YR4/4) medium sand; noneffervescent. |

Core/Profile: FM-19

Location: Kahoun - terrace 2

Legal description: NW ¼ NE ¼ Sec. 10 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 746 feet

Topo. Map: Rushford West

Remarks: Kahoun property; Rush Creek; boring taken on second terrace; 34 meters from water's edge (Rush Creek); 6 feet higher in elevation than FM-18 (on low terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-16 (0-.5) | Acum | very dark brown (10YR2/2) loam; weak, medium, granular to massive; friable; noneffervescent; clear lower boundary; roots; laminated; sandier near base; hard when dry. |
| 16-24 (.5-.8) | C1 | dark brown (10YR3/3) fine sand; single grain; loose; noneffervescent; clear lower boundary; few rootlets. |
| 24-44 (.8-1.4) | C2 | dark brown (10YR3/3) fine sand and gravel; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); very rocky; many angular (few rounded) pebbles, small to large; many angular rock fragments <1 cm across, |
| 44-54 (1.4-1.8) | | no recovery; refused on cobbles. |
| Auger Samples: | | |
| 171-306 (5.6-10.0) | | dark yellowish brown (10YR4/4) medium sand; noneffervescent. |
| 416-551 (13.7-18.1) | | dark yellowish brown (10YR4/4) medium sand; noneffervescent. |

Core/Profile: FM-20

Location: Kahoun - alluvial fan

Legal description: NW ¼ NE ¼ Sec. 10 T104N R8W

County: Fillmore

Parent material: Alluvium/Fan Deposits

Vegetation: Grasses

Slope: 0-6%

Elevation: 752 feet

Topo. Map: Rushford West

Remarks: Kahoun property; Rush Creek; boring taken on alluvial fan; approximately 65 meters from edge of Rush Creek; 6 feet higher in elevation than FM-19 (on second terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-12 (0-.4) | A | very dark brown (10YR2/2) silt loam; weak, medium, granular; friable; noneffervescent; clear lower boundary; rootlets; roots; slightly platy. |
| 12-43 (.4-1.4) | Acum | very dark brown (10YR2/2) silt loam; platy structure (fractures along bedding planes); friable; noneffervescent; abrupt lower boundary; laminated; worm burrows. |
| 43-97 (1.4-3.2) | C | very dark gray (10YR3/1) and yellowish brown (10YR5/4) silt loam; mottles are few, fine, faint, dark red (10R3/6) in very dark gray layers; moderate, fine to medium, platy structure (fractures along bedding planes); friable; noneffervescent; clear lower boundary; alternating layers of very dark gray (10YR3/1) silt loam (platy and fractured) and yellowish brown (10YR5/4) silt loam (highly laminated); darker horizons from 43-53 cm, 72-78 cm, 82-89 cm; multiple deposits. |
| 97-136 (3.2-4.5) | 2ACb | black (10YR2/1) silt loam; mottles are common, distinct, fine to medium, dusky red (10R3/4) to dark reddish brown (2.5YR3/4); weak, fine, subangular blocky to massive; friable; noneffervescent; gradual lower boundary. |
| 136-190 (4.5-6.2) | 2C1 | very dark grayish brown to black (10YR3/2 2/1) silt loam; mottles are common, distinct, medium, dusky red (10R3/4) to black (10YR2/1) and few, faint, medium, dark yellowish brown (10YR3/4); massive; silt coatings are few, faint, discontinuous, on horizontal planar surfaces (bedding planes); friable; very slightly effervescent; gradual lower boundary; laminated in places; root voids lined with dusky red (10R3/4) to black (10YR2/1) manganese (?) coatings; few thin (<1 mm) sand lenses; few rootlets; 5 cm inferred (no recovery). |
| 190-229 (6.2-7.5) | 2C2 | very dark gray (10YR3/1) and brown (10YR5/3) silt loam and fine sand; mottles are few, distinct, fine, dark yellowish brown (10YR3/4) to dark reddish brown (2.5YR2.5/4) bands of oxidation near sand lenses; massive; friable; slightly effervescent; abrupt lower boundary; sand lenses up to 4 cm thick every 8 to 10 cm; laminated. |
| 229-254 (7.5-8.3) | 3C3 | yellowish brown (10YR5/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; 9 cm inferred (no recovery). |
| 254-265 (8.3-8.7) | 4C4 | very dark gray (10YR3/1) loamy sand; massive; friable; noneffervescent; abrupt lower boundary; laminated. |
| 265-274 (8.7-9.0) | 5C5 | yellowish brown (10YR5/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary. |
| 274-294 (9.0-9.6) | 6C6 | very dark gray to black (10YR3/4 2/1) sandy loam to silt loam; mottles are few, distinct, medium, dark reddish brown (5YR3/4) bands of oxidation near sand lenses; massive; friable; noneffervescent; abrupt lower boundary; laminated; wood and plant matter; band of oxidized sand near base (288-292 cm). |
| 294-405 (9.6-13.3) | 7C7 | bands of varying degrees of oxidation from dark yellowish brown (10YR4/4) to grayish brown (10YR5/2) fine to medium sand; single grain; loose; noneffervescent; abrupt lower boundary; occasional lenses of laminated loamier sand; one has plant matter at 406 to 408 cm; may be a fining upwards sequence; 77 cm no recovery. |
| 405-464 (13.3-15.2) | 8C8 | dark yellowish brown (10YR4/4) fine to medium sand; mottles are many, coarse, faint to distinct, strong brown (7.5YR4/6) and dark brown (10YR3/3); single grain; loose; noneffervescent; abrupt lower boundary; loamier sand top 6 cm, laminated, contains plant matter; bands of oxidation. |
| 464-468 (15.2-15.4) | 9C9 | dark grayish brown (10YR4/2) and black (10YR2/1) loamy sand to fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); laminated loamy sands top 2 cm, on top of fine sands; band of oxidation (<1 mm thick). |
| 468-498 (15.4-16.3) | | no recovery; refused on sand. |
| Auger Sample: | | |
| 498-540 (16.3-17.7) | | very dark grayish brown (10YR3/2) medium sand; noneffervescent; some rounded pebbles. |

Mn/Model March 30, 1999

Core/Profile: FM-21

Location: Kahoun - terrace #4

Legal description: NW ¼ NE ¼ Sec. 10 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 760 feet

Topo. Map: Rushford West

Remarks: Kahoun property; Rush Creek; boring taken on high terrace of Rush Creek; 8 to 9 feet higher in elevation than FM-20

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-10 (0-.3) | Acum | very dark grayish brown (10YR3/2) silt loam; friable to very friable; noneffervescent; abrupt lower boundary; laminated, especially near base; roots; base is pale brown (10YR6/3). |
| 10-33 (.3-1.1) | Ap | black (10YR2/1) silt loam to loam; mottles are common, medium, distinct, yellowish brown (10YR5/4); weak, medium, granular to medium platy; very friable; noneffervescent; clear lower boundary; platier near base; worm burrows; more mottled in top half of horizon; rootlets. |
| 33-74 (1.1-2.4) | A | black (10YR2/1) silt loam; weak, fine, subangular blocky to weak platy; very friable; noneffervescent; clear lower boundary; rootlets. |
| 74-89 (2.4-2.9) | BA | very dark brown (10YR2/2) silt loam; moderate, medium, subangular blocky; clay and silt coatings are thin, discontinuous, coat some ped faces; friable; noneffervescent; clear lower boundary; rootlets. |
| 89-167 (2.9-5.5) | Bt | dark brown to dark yellowish brown (10YR3/3-3/4); clay-rich silt loam; mottles are common, faint, fine, yellowish brown (10YR5/4); moderate, fine to medium, columnar parting to medium subangular blocky at top; clay and silt coatings are continuous, common, coat ped faces and pore spaces; firm; noneffervescent; gradual lower boundary; few rootlets; oxidized; infilled worm burrows, root voids; 5 cm inferred (no recovery). |
| 167-233 (5.5-7.6) | BC | yellowish brown to dark yellowish brown (10YR5/4-4/4) clay rich silt loam; weak, medium to coarse, columnar; clay coatings are moderate, continuous to discontinuous, few, coat ped faces; few, discontinuous, silt coatings on ped faces; friable; noneffervescent; clear lower boundary; oxidized. |
| 233-326 (7.6-10.7) | C | brown to dark brown (10YR4/3) silt loam; mottles are many, faint, fine, dark yellowish brown (10YR3/4); massive; friable; noneffervescent; gradual lower boundary; faintly laminated; 4 cm inferred (no recovery). |
| 326-405 (10.7-13.3) | Cg | dark grayish brown (2.5Y4/2) silt loam; mottles are few, distinct, fine, dark brown (7.5YR3/4); massive; friable to firm; noneffervescent; abrupt lower boundary; fewer oxidation mottles than C; slightly more clay-rich than C; few gastropod shells; 7 cm inferred (no recovery). |
| 405-444 (13.3-14.6) | 2C | pale brown (10YR6/3) fine to medium sand; mottles are common, coarse, faint, yellowish brown (10YR 5/6) bands of oxidation; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); banded - varying degrees of oxidation; lens of coarse sand 454 to 455 cm. |
| 444-507 (14.7-16.6) | | no recovery; refused in sand. |
| Auger Samples: | | |
| 617-752 (20.2-24.7) | | dark yellowish brown (10YR4/4) medium sand; noneffervescent; sample also contained dark grayish brown (10YR4/2) to very dark gray (10YR3/1) loam; may be lower than sands - sands coated the loam. |
| 857-992 (28.1-32.6) | | dark yellowish brown (10YR4/4) clay-rich loam; very slightly effervescent; very few small pebbles; near the clay loam/sandy clay loam/loam triple junction. |

Core/Profile: FM-22

Location: Schueler - low terrace

Legal description: SE ¼ NE ¼ Sec. 4 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 757 feet

Topo. Map: Rushford West

Remarks: Schueler property; Rush Creek; boring taken on low terrace; 14 meters from edge of Rush Creek; 3 feet lower in elevation than FM-25 (on next higher terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-7 (0-.2) | A | black (10YR2/1) sandy loam; weak, medium, granular; friable; noneffervescent; abrupt lower boundary. |
| 7-18 (.2-.6) | C1 | black (10YR2/1) sandy loam to fine sand; weak, medium, granular at top to massive to single grain at base; friable; slightly effervescent; abrupt lower boundary; finely laminated at top; sandier with depth; fining upwards sequence; grasses/rootlets. |
| 18-41 (.7-1.4) | 2C2 | black to dark brown (10YR2/1-3/3) silt loam to fine sand; platy at top to massive to single grain at base; friable; noneffervescent; abrupt lower boundary; finely laminated silts at top to fine sand at base; fining upwards sequence; rootlets. |
| 41-46 (1.4-1.5) | 3C3 | black (10YR2/1) silt loam; moderate, medium to fine platy (may be fracturing above bedding planes; friable; noneffervescent; abrupt lower boundary; finely laminated; may be top of fining upwards sequence. |
| 46-84 (1.5-2.8) | 3C4 | brown to dark brown (10YR4/3) fine sand; single grain; loose; noneffervescent; gradual lower boundary; 2 thin (<1 cm thick) laminated silt lenses; may be part of fining upwards sequence with 3C3 and 3C5. |
| 84-129 (2.8-4.2) | | no recovery. |
| 129-143 (4.2-4.7) | 3C5 | brown to dark brown (10YR4/3) medium sand; single grain; loose; noneffervescent; clear lower boundary; part of fining upwards sequence with 3C3 and 3C4. |
| 143-176 (4.7-5.8) | 4C6 | dark yellowish brown (10YR3/4) fine sand; single grain; loose; noneffervescent; gradual lower boundary; few silty, more organic-rich lenses, some containing plant matter. |
| 176-346 (5.8-11.4) | 4C7 | brown to dark brown (10YR4/3) medium sand; mottles are few, medium, faint, dark gray (10YR4/1); single grain; loose; noneffervescent; unknown lower boundary (end of tubes); very few pebbles; no recovery from 180-254 cm. |
| 346-371 (11.4-12.2) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 422-557 (13.9-18.3) | | dark yellowish brown (10YR4/6) medium sand; slightly effervescent; oxidized. |
| 557-664 (18.3-21.8) | | yellowish brown (10YR5/6) medium sand; slightly effervescent; oxidized. |

Core/Profile: FM-23

Location: Schueler - meander scar

Legal description: SE ¼ NE ¼ Sec. 4 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses/weeds

Slope: 2-6%

Elevation: 756 feet

Topo. Map: Rushford West

Remarks: Schueler property; Rush Creek; boring taken in meander scar of Rush Creek; 1 foot lower in elevation than FM-22 (on low terrace by creek); 4 feet lower in elevation than FM-25 (on next higher terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-20 (0-.7) | A | black (10YR2/1) silt loam to loam; moderate, medium, platy; friable; noneffervescent; gradual lower boundary; roots; many worm burrows (not filled). |
| 20-39 (.7-1.3) | AC | very dark brown (10YR2/2) silt loam; mottles are few, faint, fine, dark brown (7.5YR3/2); moderate, fine, subangular blocky to platy; friable; noneffervescent; clear lower boundary; lot of worm burrows/root voids; remnants of bedding; rootlets. |
| 39-97 (1.3-3.2) | 2AC | black (10YR2/1) silt loam; mottles are few, faint, fine, dark reddish brown (2.5YR2.5/4); weak, coarse, platy to massive; friable; noneffervescent; gradual lower boundary; abundant plant matter (grass/wood/roots), often along horizontal (bedding?) planes; few lenses of brown to dark brown (10YR4/5) silt/fine sand; rootlets near top; angular fractures. |
| 97-140 (3.2-4.6) | 2C | very dark gray (10YR3/1) silt loam; mottles are few, fine, distinct, yellowish red (5YR4/6); weak, coarse, platy to massive; friable; noneffervescent; abrupt lower boundary; 10 cm inferred (no recovery). |
| 140-155 (4.6-5.1) | 3ACb | black (10YR2/1) silt loam; mottles are few, fine, distinct, yellowish red (5YR4/6); massive structure (highly fractured); friable; noneffervescent; clear lower boundary; highly fractured - concoidal fractures. |
| 155-320 (5.1-10.5) | 3C1 | black (2.5Y2/0) silt loam; mottles are common, distinct to faint, medium, dark reddish brown (5YR3/4); massive; friable; noneffervescent; gradual lower boundary (change in texture); iron oxides coat many surfaces; 22 cm inferred (no recovery). |
| 320-353 (10.5-11.6) | 3C2 | very dark gray (10YR3/1) sandy loam; mottles are few, faint, fine, dark brown (7.5YR3/4); massive; friable; very slightly effervescent; clear lower boundary; plant matter (grasses/roots/reeds/leaves); gastropod shells. |
| 353-370 (11.6-12.1) | 4C3 | dark brown (10YR3/3) medium sand; mottles are few, coarse, faint, dark yellowish brown (10YR3/6); single grain; loose; noneffervescent; unknown lower boundary (end of tubes). |
| 370-405 (12.1-13.3) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 515-650 (16.9-21.3) | | dark yellowish brown (10YR4/4) fine sand; noneffervescent. |
| 745-880 (24.4-28.9) | | dark yellowish brown (10YR3/6) fine sand; noneffervescent. |

Core/Profile: FM-24

Location: Schueler - between terrace 1 and meander scar

Legal description: SE ¼ NE ¼ Sec. 4 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 2-6%

Elevation: 759 feet

Topo. Map: Rushford West

Remarks: Schueler property; Rush Creek; boring taken on a rise between low terrace and meander scar on Rush Creek; rise may represent a remnant of terrace #2 or a levee; 3 feet higher in elevation than FM-23 (in meander scar)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-17 (0-.6) | Acum | black (10YR2/1) sandy loam; weak to moderate, medium, platy; friable; noneffervescent; clear lower boundary; roots; granular structure top 4 cm; crudely laminated. |
| 17-27 (.6-.9) | AC | black (10YR2/1) loamy sand; massive to single grain; friable; noneffervescent; clear lower boundary; laminated; rootlets. |
| 27-145 (.9-4.8) | C1 | dark brown (10YR3/3) fine to medium sand; single grain; loose; noneffervescent; abrupt lower boundary; occasional thin (<1 cm thick) layers of laminated silts; no recovery 69-127 cm. |
| 145-177 (4.8-5.8) | 2C2 | very dark grayish brown (10YR3/2) silt loam; mottles are common, medium, faint, dark brown (7.5YR3/4) to dark red (2.5YR3/6); massive; friable; noneffervescent; abrupt lower boundary; conchoidal fractures. |
| 177-196 (5.8-6.4) | 3C3 | dark brown (10YR3/3) fine sand to loamy sand; single grain; loose; noneffervescent; unknown lower boundary (end of tube); band of black (10YR2/1) loam from 192-193 cm; loam layer has few rootlets. |
| 196-254 (6.4-8.3) | | no recovery. |
| 254-264 (8.3-8.7) | 4C4 | dark yellowish brown (10YR4/4) coarse sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized. |
| 264-273 (8.7-9.0) | 5C5 | very dark grayish brown to very dark gray (10YR3/2-3/1) sandy loam; massive; friable; noneffervescent; unknown lower boundary (end of tube); plant matter; few bands of silt loam; silt loam is slightly more brown ([10YR3/2] rather than [10YR3/1]) than sandy loam; few sand lenses. |
| 273-378 (9.0-12.4) | | no recovery. |
| 378-434 (12.4-14.2) | 6C6 | dark yellowish brown (10YR4/4) coarse sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); few small pebbles, oxidized. |
| 434-498 (14.2-16.3) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 608-743 (20.0-24.4) | | yellowish brown (10YR5/6) medium sand; very slightly effervescent; oxidized. |
| 858-993 (28.2-32.6) | | yellowish brown (10YR5/6) medium sand; very slightly effervescent; oxidized. |

Core/Profile: FM-25
 Location: Schueler - terrace #2
 Legal description: SE ¼ NE ¼ Sec. 4 T104N R8W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Grasses
 Slope: 0-2%
 Elevation: 760 feet
 Topo. Map: Rushford West
 Remarks: Schueler property; Rush Creek; boring taken on second highest terrace along Rush Creek; 3 feet higher in elevation than FM-22 (on lowest terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-17 (0-.6) | A | black (10YR2/1) silt loam; weak, fine, subangular blocky; friable; noneffervescent; clear lower boundary; rootlets. |
| 17-95 (.6-3.1) | C1 | very dark grayish brown (10YR3/2) and light gray (10YR7/2) silt loam; mottles are few, fine, faint, dark brown (7.5YR3/4) in darker layers; massive structure (fractures along bedding planes); friable; noneffervescent; diffuse lower boundary; finely laminated; rootlets. |
| 95-168 (3.1-5.5) | C2 | very dark gray (10YR3/1) silt loam; mottles are common, faint, medium to fine, very dusky red (2.5YR2.5/2); massive structure (highly fractured); friable; noneffervescent; gradual lower boundary; thin (<1 cm) lenses of laminated brown (10YR5/3) silts every 10 to 15 cm; sand lens at base; fractured; scattered silt lenses; 14 cm inferred (no recovery). |
| 168-226 (5.5-7.4) | 2C3 | black (10YR2/1) silt loam; mottles are few, fine, distinct, dusky red (10R3/4); massive; friable; noneffervescent; clear lower boundary. |
| 226-303 (7.4-9.9) | 2C4 | very dark gray (10YR3/1) clay-rich silt loam; mottles are common, fine, distinct, dark red (10R3/6); massive; friable to firm; noneffervescent; clear lower boundary; more clay-rich than 2C3; 6 cm inferred (no recovery). |
| 303-362 (9.9-11.9) | 2C5 | black (2.5Y2/0) to very dark gray (10YR3/1) silt loam to sandy loam; massive; friable to firm; noneffervescent; abrupt lower boundary; sandier near base; wood collected from 350 to 362 cm; lot of plant matter (wood, roots, stems) near base; large root/wood? collected at 362 cm; unidentified hardwood from 362 cm C-14 dated at 2,890±70 BP. |
| 362-381 (11.9-12.5) | 3C6 | brown (10YR5/3) coarse sand; mottles are many, coarse, distinct, yellowish red (5YR4/6); single grain; loose; noneffervescent; unknown lower boundary (end of tubes); bands of oxidation; 5 cm inferred (no recovery). |
| 381-505 (12.5-16.6) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 610-745 (20.0-24.4) | | dark yellowish brown (10YR4/4) fine sand; noneffervescent; oxidized. |

Core/Profile: FM-26
 Location: Schueler - high terrace
 Legal description: NE ¼ NE ¼ Sec. 4 T104N R8W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Hay
 Slope: 0-2%
 Elevation: ≈ 794 feet
 Topo. Map: Rushford West
 Remarks: Schueler property; Rush Creek; boring in slight depression on high terrace; 50 to 100 meters from bluff

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|--|
| 0-25 (0-.8) | Ap | black (10YR2/1) silt loam to loam; weak, fine to medium, platy parting to medium granular; friable; noneffervescent; clear lower boundary; rootlets. |
| 25-38 (.8-1.2) | AB | dark brown (10YR3/3) silt loam; mottles are few, faint, fine, very pale brown (10YR8/3); moderate, medium, platy parting to moderate, fine, angular blocky; clay coatings are thin, discontinuous, coat ped faces; friable; noneffervescent; clear lower boundary; rootlets. |
| 38-73 (1.2-2.4) | Bt1 | dark yellowish brown (10YR3/4) clay-rich silt loam; mottles are few, faint, fine, very pale brown (10YR8/4); strong, medium; angular blocky; clay coatings are continuous, distinct, coat ped faces; friable; noneffervescent; clear lower boundary; few, omnidirectional rootlets. |
| 73-90 (2.4-3.0) | Bt2 | dark yellowish brown (10YR4/4) loam; mottles are common, distinct, medium, very pale brown (10YR7/3) coating ped faces and few, faint, medium, strong brown (10YR4/6); moderate to strong, medium, columnar parting to medium subangular blocky; clay coatings are continuous, distinct, coat ped faces; silt/sand coatings are discontinuous, distinct, coat ped faces; friable; noneffervescent; clear lower boundary; sandier with depth; omnidirectional rootlets. |
| 90-127 (3.0-4.2) | B and C | interbedded dark yellowish brown (10YR4/4) loam to clay-rich silt loam and strong brown (7.5YR4/6) loamy sand; mottles are few, faint, fine, light gray (10YR7/1) in loamy layers; weak to moderate, medium, subangular blocky in loamier layers, single grain in sands; clay coatings are discontinuous, faint, coat ped faces; friable; noneffervescent; unknown lower boundary (end of tube); laminated; interbedded lenses of loamy sand to fine sand (2 to 4 cm thick); few rootlets near top; 4 cm inferred (no recovery). |
| 127-139 (4.2-4.6) | C1 | strong brown (7.5YR4/6) fine sand; single grain; loose; noneffervescent; abrupt lower boundary (color change); thin (<1 cm thick) lens of black (10YR2/1) loam at ≈134 cm; oxidized. |
| 139-155 (4.6-5.1) | C2 | yellowish brown (10YR5/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary (color change); oxidized. |
| 155-175 (5.1-5.7) | C3 | dark yellowish brown (10YR4/4) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); oxidized; refused on sand. |
| Auger Samples: | | |
| 245-380 (8.1-12.5) | | yellowish brown (10YR5/4) fine sand; slightly effervescent; sand is rounded; no pebbles. |

Core/Profile: FM-27
 Location: Schueler - high terrace
 Legal description: NE ¼ NE ¼ Sec. 4 T104N R8W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Hay
 Slope: 0-2%
 Elevation: ≈ 795 feet
 Topo. Map: Rushford West
 Remarks: Schueler property; Rush Creek; boring taken on high terrace, on a slight rise

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-8 (0-.3) | Ap1 | black (10YR2/1) sandy loam; weak, medium, granular; friable; noneffervescent; abrupt lower boundary; rootlets. |
| 8-32 (.3-1.1) | Ap2 | very dark brown (10YR2/2) sandy loam; weak, coarse, platy; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; few infilled worm burrows/root voids; compacted. |
| 32-55 (1.1-1.8) | Bt | dark brown (10YR3/3) loam; weak, coarse, prismatic to massive; clay coatings are thin, discontinuous, faint, coat ped faces; friable; noneffervescent; clear lower boundary; root voids partially infilled with sediment; omnidirectional rootlets; hard when dry; weak Bt. |
| 55-68 (1.8-2.2) | C1 | dark yellowish brown (10YR4/4) loamy sand; single grain; loose; noneffervescent; gradual lower boundary; few rootlets; oxidized. |
| 68-89 (2.2-2.9) | C2 | yellowish brown (10YR5/6) fine sand; single grain; loose; noneffervescent; gradual lower boundary; black (10YR2/1) loam lens at 84 cm; overall, unit is loamier near top; few rootlets; oxidized. |
| 89-160 (2.9-5.3) | C3 | yellowish brown (10YR5/6) fine to medium sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); oxidized; no recovery 99-127 cm. |
| 160-177 (5.3-5.8) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 286-421 (9.4-13.8) | | dark yellowish brown (10YR4/4) fine to medium sand; noneffervescent; oxidized. |
| 531-666 (17.4-21.9) | | dark yellowish brown (10YR4/4) fine sand; very slightly effervescent; oxidized. |

Core/Profile: FM-28
 Location: Schueler - high terrace
 Legal description: NE ¼ NE ¼ Sec. 4 T104N R8W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Hay
 Slope: 0-2%
 Elevation: ≈793 feet
 Topo. Map: Rushford West
 Remarks: Schueler property; Rush Creek; boring taken in linear depression on high terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-24 (0-.8) | Ap | very dark grayish brown (10YR3/2) sandy loam; weak, medium to coarse, platy; friable; noneffervescent; abrupt lower boundary; roots; worm burrows. |
| 24-54 (.8-1.8) | Bt | brown to dark brown (7.5YR4/4) sandy clay loam; mottles are few, faint, fine, very dark grayish brown (10YR3/2) (infilling worm burrows/root voids); weak to moderate, medium, prismatic parting to medium subangular blocky; clay coatings are discontinuous, thin, coat ped faces; firm; noneffervescent; clear lower boundary; omnidirectional rootlets; oxidized; worm burrows infilled with sediment. |
| 54-74 (1.8-2.4) | C1 | light yellowish brown (10YR6/4) fine sand; single grain; loose; noneffervescent; clear lower boundary; rootlets. |
| 74-83 (2.4-2.7) | C2 | strong brown (7.5YR4/6) loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized; few rootlets. |
| 83-164 (2.7-5.4) | C3 | light gray to pale brown (10YR7/2-6/3) fine sand; mottles are few, coarse, distinct, strong brown (7.5YR4/6) single grain; loose; noneffervescent; unknown lower boundary (end of tubes); several lenses of loamy sand (strong brown [7.5YR4/6]) near top of horizon; slight change in color at ≈133 cm (changes to pale brown); no recovery 89-127 cm; refused on sand. |
| Auger Samples: | | |
| 271-406 (8.8-13.3) | | dark yellowish brown (10YR4/4) fine to medium sand; noneffervescent; oxidized. |
| 521-656 (17.1-21.5) | | dark yellowish brown (10YR4/4) fine sand to loamy sand; very slightly effervescent; oxidized. |

Core/Profile: FM-29 through 50

Location:

Legal description:

County:

Parent material:

Vegetation:

Slope:

Elevation:

Topo. Map:

Remarks: Gap in numbering sequence; FM-29 through FM-50 never existed

| Depth cm(ft) | Horizon or Zone | Description |
|-----------------|--------------------|-------------|
|-----------------|--------------------|-------------|

Core/Profile: FM-51
 Location: Schueler - upper terrace
 Legal description: SE ¼ NE ¼ Sec. 4 T104N R8W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Hay
 Slope: 0-2%
 Elevation: ≈ 790 feet
 Topo. Map: Rushford West
 Remarks: Schueler property; Rush Creek; boring taken on south side of road on high terrace

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-25 (0-.8) | Ap | very dark brown (10YR2/2) sandy loam; weak, medium, granular to massive; very friable; noneffervescent; clear lower boundary; rootlets. |
| 25-69 (.8-2.3) | AC | dark yellowish brown (10YR3/4) loamy sand; weak, coarse, granular to massive; very friable; noneffervescent; gradual lower boundary; rootlets. |
| 69-97 (2.3-3.2) | CA | dark yellowish brown (10YR4/4) loamy sand to fine sand; massive to weak, coarse, granular; very friable to loose; noneffervescent; gradual lower boundary; resembles a C horizon with very weak ped development; rootlets. |
| 97-186 (3.2-6.1) | C | yellowish brown (10YR5/6) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); scattered nodules of oxidized sands, brown to dark brown (7.5YR4/4); few rootlets; 7 cm inferred (no recovery). |
| 186-207 (6.1-6.8) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 269-404 (8.8-13.3) | | dark yellowish brown (10YR4/4) fine sand; noneffervescent. |

Core/Profile: FM-52

Location: Norstad - at base of high sand terrace

Legal description: SE ¼ Sec. 15 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: None - manure

Slope: 0-2%

Elevation: 742 feet

Topo. Map: Rushford West

Remarks: Norstad; Root River; ridge in cow pen; high gravel/sand terrace (probable Savanna) approximately 100 meters to north

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-10 (0-.3) | Ap | black (10YR2/1) sandy loam; massive; friable; very slightly effervescent; abrupt lower boundary; manure substrate. |
| 10-21 (.3-.7) | A | very dark gray (10YR3/1) sandy clay loam diamicton; massive; firm; noneffervescent; clear lower boundary; hard when dry; small pebbles common; some manure clumps. |
| 21-43 (.7-1.4) | Bt1 | very dark grayish brown (10YR3/2) clay loam; mottles are few, fine, distinct, reddish brown to dark reddish brown (5YR4/4-3/3); moderate, medium, prismatic parting to coarse subangular blocky; clay coatings are thin, continuous, coat ped faces and line root voids; firm; noneffervescent; gradual lower boundary; hard when dry; few small pebbles; some fracturing near top of unit; clay coatings stronger near base; rootlets. |
| 43-56 (1.4-1.8) | Bt2 | dark grayish brown (10YR4/2) clay loam; mottles are few, fine, faint, strong brown (7.5YR4/6); weak, medium, prismatic parting to medium subangular blocky; clay coatings are moderate, thick, moderately continuous, coat ped faces; firm; noneffervescent; clear lower boundary; hard when dry; few small pebbles; few rootlets. |
| 56-66 (1.8-2.2) | C1 | grayish brown (10YR5/2) coarse sand; single grain; loose; noneffervescent; clear lower boundary; few small pebbles. |
| 66-75 (2.2-2.5) | 2C2 | dark yellowish brown (10YR3/4) sandy loam; massive; friable; noneffervescent; clear lower boundary; oxidized; few small pebbles; few rootlets. |
| 75-87 (2.5-2.9) | 2C3 | grayish brown (2.5Y5/2) sandy clay loam; mottles are few, fine, faint, dark yellowish brown (10YR3/4); massive; clay coatings are thick, coat pebble voids; firm; noneffervescent; clear lower boundary; few small pebbles; few rootlets. |
| 87-186 (2.9-6.1) | 2C4 | pale brown (10YR6/3) fine to medium sand; mottles are few, coarse, distinct, strong brown (7.5YR4/6) bands of oxidation; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); few bands of oxidized sands; few rounded pebbles; 34 cm inferred (no recovery); refused on coarse sand. |
| Auger Sample: | | |
| 303-438 (9.9-14.4) | | yellowish brown (10YR5/4) fine to medium sand; slightly effervescent; oxidized. |

Core/Profile: FM-53
 Location: Root River Trail - Site #1
 Legal description: NE ¼ SE ¼ Sec. 25 T104N R9W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Grasses
 Slope: 2-6%
 Elevation: 752 feet
 Topo. Map: Rushford West
 Remarks: Root River Trail Site 1; on south side of trail, 22 meters from center line; down a field entrance road; approximately 0.7 miles west of mile marker 24; land surface slopes down into a cornfield

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-24 (0-.8) | Ap1 | very dark grayish brown (10YR3/2) silt-rich loam; mottles are few, fine, faint, brown (10YR5/3); moderate, medium, platy to weak, medium, granular; friable; slightly effervescent; abrupt lower boundary; many rootlets; roots; compacted. |
| 24-38 (.8-1.3) | Ap2 | black (10YR2/1) loam; mottles are few, fine, faint, pale brown (10YR6/3); moderate, medium, platy; friable; very slightly effervescent; clear lower boundary; darker, blacker, more organic-rich than Ap1; many omnidirectional rootlets; compacted; many worm burrows filled with lighter colored sediment. |
| 38-96 (1.3-3.2) | A | black (10YR2/1) loam; weak, fine, granular; friable; slightly effervescent; gradual lower boundary; omnidirectional rootlets. |
| 96-136 (3.2-4.5) | AC | dark brown (10YR3/3) loam; weak, fine, granular to massive; friable; strongly to violently effervescent; gradual lower boundary; many worm burrows/root voids, few filled with sediment; sandier near base; few rootlets; 5 cm inferred (no recovery). |
| 136-162 (4.5-5.3) | C | dark brown (10YR3/3) sandy loam; massive; friable; violently effervescent; abrupt lower boundary; hard when dry; few omnidirectional rootlets; very few shell fragments. |
| 162-176 (5.3-5.8) | 2ACb | very dark brown (10YR2/2) loam; weak, medium, granular; friable; violently effervescent; clear lower boundary; few omnidirectional rootlets; few shell fragments; mollusk shell. |
| 176-189 (5.8-6.2) | 2C1 | grayish brown (10YR5/2) medium to coarse sand; single grain; loose; violently effervescent; gradual lower boundary; shell fragments; gastropod shells; few small pebbles. |
| 189-239 (6.2-7.8) | 2C2 | pale brown (10YR6/3) coarse sand and gravel; single grain; loose; violently effervescent; unknown lower boundary (end of tubes); many rounded pebbles, small to large; lens of very dark grayish brown (10YR3/2) sandy loam from 208-211 cm; shell fragments; gastropod and mollusk shells; 16 cm inferred (no recovery); refused on coarse sand. |
| Auger Sample: | | |
| 259-394 (8.5-12.9) | | yellowish brown to brown (10YR5/4-5/3) gravel and loamy sand; violently effervescent; many rounded pebbles, all sizes; sand is fine to coarse; few shell fragments; refused on gravel/boulder. |

Core/Profile: FM-54
 Location: Root River Trail - Site #2
 Legal description: SE ¼ NW ¼ Sec. 25 T104N R9W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Grasses, wild flowers
 Slope: 0-2%
 Elevation: 755 feet
 Topo. Map: Rushford West
 Remarks: Root River Trail Site #2; on a flat surface on south side of trail near closed bridge; approximately ¼ mile west of Site #1

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|--|
| 0-19 (0-.6) | Ap1 | black (10YR2/1) loam to silt loam; moderate, medium, granular; friable; slightly to strongly effervescent; clear lower boundary; more massive near base; rootlets; few medium pebbles. |
| 19-32 (.6-1.1) | Ap2 | black (10YR2/1) loam to silt loam; weak, medium, subangular blocky to moderate, medium, granular; clay coatings are thin, discontinuous, line root voids/worm burrows; friable; strongly effervescent; clear lower boundary; rootlets; few small rounded pebbles; slightly compacted. |
| 32-86 (1.1-2.8) | A | black (10YR2/1) loam; weak to moderate, fine to medium, granular; very friable; violently effervescent; gradual lower boundary; few small pebbles; omnidirectional rootlets; noticeably blacker than Ap1 and Ap2 when dry. |
| 86-138 (2.8-4.5) | AC | black to very dark gray (10YR2/4 3/1) loam; weak, medium, subangular blocky to massive; clay coatings are thin, discontinuous, line root voids; friable; strongly to violently effervescent; gradual lower boundary; few omnidirectional rootlets; few small pebbles; 7 cm inferred (no recovery). |
| 138-267 (4.5-8.8) | C1 | very dark grayish brown (10YR3/2) sandy loam; massive; friable; strongly to violently effervescent; gradual lower boundary; few sand lenses near base; gastropod shells; few small to medium rounded pebbles; few rootlets; 6 cm inferred (no recovery). |
| 267-279 (8.8-9.2) | C2 | very dark grayish brown (10YR3/2) loam; massive; friable; strongly to violently effervescent; unknown lower boundary (end of tubes); many small to large pebbles, mostly rounded with some angular; more dense than C1; few gastropod shells; thin clay coatings line pebble holes; refused on gravel. |
| Auger Sample: | | |
| 279-378 (9.2-13.1) | | dark grayish brown (10YR4/2) sandy loam to sandy clay loam diamicton; strongly to violently effervescent; coarse sand; many small to medium pebbles; very poor recovery; refused on boulder. |

Core/Profile: FM-55

Location: Root River Trail - Site #2

Legal description: SE ¼ NW ¼ Sec. 25 T104N R9W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses; wild flowers

Slope: 0-2%

Elevation: 755 feet

Topo. Map: Rushford West

Remarks: Root River Trail Site #2; on a flat surface on south side of trail near closed bridge; approximately ¼ mil west of Site #1; 27 meters east of FM-54

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-23 (0-.8) | Ap | black (10YR2/1) loam; weak, medium, granular; slightly platy near base; friable; slightly to strongly effervescent; clear lower boundary; roots; many root voids/worm burrows. |
| 23-93 (.8-3.1) | A | black (10YR2/1) loam; weak, medium, granular to massive; friable; strongly to violently effervescent; gradual lower boundary; structure is weaker with depth; many root voids/worm burrows in top half; root voids are discontinuously coated with blacker sediment; rootlets common. |
| 93-171 (3.1-5.6) | AC | very dark brown (10YR2/2) loam; massive; friable; violently effervescent; diffuse lower boundary; few small pebbles; few omnidirectional rootlets; 16 cm inferred (no recovery). |
| 171-210 (5.6-6.9) | C1 | very dark grayish brown (10YR3/2) sandy loam; massive; very friable; violently effervescent; clear lower boundary; few omnidirectional rootlets; few small pebbles; few shell fragments. |
| 210-250 (6.9-8.2) | C2 | dark brown (10YR3/3) loamy sand; single grain; loose; violently effervescent; gradual lower boundary; few small pebbles; few gastropod shells; 6 cm inferred (no recovery). |
| 250-285 (8.2-9.4) | C3 | brown to dark brown (10YR4/3) fine sand; single grain; loose; strongly to violently effervescent; abrupt lower boundary; lens of loamy sand 280-285 cm; shell fragments; gastropod shells; 2 cm inferred (no recovery). |
| 285-291 (9.4-9.6) | 2C4 | brown to dark brown (10YR4/3) medium sand and gravel; single grain; loose; strongly to violently effervescent; unknown lower boundary (end of tubes); many small to medium, rounded pebbles; few angular pebbles; few small cobbles; few shell fragments; refused on gravel. |
| Auger Sample: | | |
| 295-430 (9.7-14.1) | | dark brown (10YR3/3) sandy loam to sandy clay loam; strongly to violently effervescent; many small to large, rounded pebbles; few cobbles; refused on cobbles. |

Core/Profile: FM-56
 Location: Root River Trail - Site #3
 Legal description: SE ¼ Sec. 26 T104N R9W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Grasses
 Slope: 0-2%
 Elevation: 760 feet
 Topo. Map: Rushford West
 Remarks: Root River Trail Site #3; on grassy field in ROW of trail; east side of trail; on a PSA alluvial fan from Big Spring Creek; 70 meters north of Big Spring Creek

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-4 (0-.1) | Ap1 | black (10YR2/1) loam; mottles are few, fine, faint, dark gray (10YR4/1); weak, medium, granular; friable; very slightly effervescent; abrupt lower boundary; roots; some gravel; may be field road surface material; silt lens at base. |
| 4-22 (.1-.7) | Ap2 | black (10YR2/1) loam; moderate, medium, platy; friable; slightly effervescent; clear lower boundary; rootlets. |
| 22-93 (.7-3.1) | A | black (10YR2/1) loam; weak to moderate, medium, granular; clay coatings are thin, discontinuous, line root voids; friable; strongly to violently effervescent; diffuse lower boundary; lower boundary disturbed in coring; many root voids; few gastropod shells; rootlets. |
| 93-138 (3.1-4.5) | AC | very dark brown (10YR2/2) loam; massive to weak, medium, granular; clay coatings are thin, discontinuous, line root voids; friable; violently effervescent; gradual lower boundary; few gastropod shells; many root voids/worm burrows; more clay-rich than surrounding units; 5 cm inferred (no recovery). |
| 138-254 (4.5-8.3) | C1 | very dark grayish brown (10YR3/2) loam to sandy loam; massive; clay coatings are thin, discontinuous, line root voids; friable; violently effervescent; gradual lower boundary; few shell fragments; gastropod shells; 10 cm inferred (no recovery). |
| 254-299 (8.3-9.8) | C2 | dark gray (10YR4/1) loam; mottles are few, fine, distinct, dark yellowish brown (10YR3/4) and few, coarse, distinct, grayish brown (10YR5/2); massive; fractures along bedding planes; friable; violently effervescent; abrupt lower boundary; angular fractures; interbedded lenses of fine sand; some laminations in loam; few oxidized bands; few shell fragments; gastropod shells. |
| 299-374 (9.8-12.3) | 2C3 | grayish brown (10YR5/2) fine sand; single grain; loose; violently effervescent; abrupt lower boundary; few shell fragments; mollusk shells; 37 cm no recovery. |
| 374-392 (12.3-12.9) | 2C4 | dark grayish brown (10YR4/2) loamy sand; mottles are few, fine, distinct, dark yellowish brown (10YR4/4); massive; very friable; strongly effervescent; abrupt lower boundary; sandy loam at base (390-392 cm); thin fine sand lens near top; crude bedding; few oxidized bands. |
| 392-410 (12.9-13.5) | 2C5 | brown to dark brown (10YR4/3) medium sand; mottles are few, medium, distinct, strong brown (7.5YR5/6) at top of horizon; single grain; loose; strongly effervescent; clear lower boundary; shell fragments; oxidized band at top. |
| 410-433 (13.5-14.2) | 2C6 | brown to yellowish brown (10YR5/3-5/4) coarse sand; mottles are few, medium to coarse, distinct, dark gray (10YR4/1) in loamy sand lens; single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); lens of loamy sand at base; several small to medium pebbles at base; sand is rounded; few shell fragments. |
| 433-471 (14.2-15.5) | | no recovery; refused on sand. |
| Auger Sample: | | |
| 615-750 (20.2-24.6) | | dark yellowish brown (10YR4/4) medium sand; strongly effervescent; oxidized; few shell fragments; drilling rough. |

Core/Profile: FM-57

Location: Root River Trail - Site #4

Legal description: SE ¼ SE ¼ Sec. 34 T104N R9W

County: Fillmore

Parent material: Alluvium/colluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 762 feet

Topo. Map: Arendahl

Remarks: Root River Trail Site #4; at base of grassy field entrance road; just south of Raaen Creek; fan deposits on top from Raaen Creek

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-7 (0-.2) | Ap1 | black (10YR2/1) loam; weak, fine, granular; friable; very slightly effervescent; abrupt lower boundary; rootlets; few small pebbles. |
| 7-21 (.2-.7) | Ap2 | black (10YR2/1) loam; mottles are common, medium, distinct, brown (10YR5/3); moderate, fine to medium, platy; friable; slightly effervescent; abrupt lower boundary; hard when dry; angular fracturing along bedding planes and perpendicular to bedding planes; compacted; silt-rich. |
| 21-55 (.7-1.8) | AC | very dark grayish brown (10YR3/2) sandy loam to loamy sand; mottles are common, medium, faint, black to very dark gray (10YR2/1-3/1); single grain; loose; slightly effervescent; gradual lower boundary; few interbedded lenses of loam with fine platy texture; small to large pebbles common; sandier with depth; 10 cm inferred (no recovery). |
| 55-95 (1.8-3.1) | C | dark yellowish brown (10YR4/4) fine sand; single grain; loose; very slightly effervescent; gradual lower boundary; lowest 5-10 cm is a transition zone to next horizon; small rounded pebbles common; piece of tile near base; 15 cm inferred (no recovery). |
| 95-133 (3.1-4.4) | 2Ab1 | very dark gray (10YR3/1) clay-rich loam; mottles are few, fine, faint, dark brown (7.5YR3/2); massive to weak, fine, subangular blocky; friable; slightly effervescent; clear lower boundary; very few shell fragments; not much sand for a loam; few small pebbles; 12 cm inferred (no recovery). |
| 133-165 (4.4-5.4) | 2Ab2 | black (10YR2/1) loam; moderate, fine, granular; very friable; strongly effervescent; abrupt lower boundary; rootlets; much less dense than 2A1b; very few gastropod shells near base. |
| 165-184 (5.4-6.0) | 3C | dark yellowish brown (10YR4/4) sandy loam and gravel; massive; friable; strongly to violently effervescent; unknown lower boundary (end of tubes); many angular cobbles and large pebbles; many small to large carbonate pebbles, mostly angular; few cobbles; oxidized; colluvium. |
| 184-204 (6.0-6.7) | | no recovery; refused on cobbles. |
| Auger Samples: | | |
| 207-342 (6.8-11.2) | | yellowish brown (10YR5/6) fine sandy loam; slightly to strongly effervescent; auguring very rough, through cobbles; sand is very fine; few small pebbles; oxidized. |
| 342-432 (11.2-14.2) | | yellowish brown (10YR5/6) loam to fine sandy loam; slightly effervescent; small pebbles common; sand is very fine; oxidized; refused on cobble. |

Core/Profile: FM-58
 Location: Root River Trail - Site #5
 Legal description: SE ¼ NW ¼ Sec. 18 T103N R9W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Grasses
 Slope: 0-2%
 Elevation: 805 feet
 Topo. Map: Lanesboro
 Remarks: Root River Trail Site #5; South Branch of Root River; on flat area on east side of trail; 155 meters north of milepost 12

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|---|
| 0-21 (0-.7) | Ap | black (10YR2/1) loam; moderate, medium, granular; friable; slightly effervescent; clear lower boundary; few small pebbles; roots. |
| 21-78 (.7-2.6) | A | black (10YR2/1) loam; moderate, fine, granular; very friable; slightly to strongly effervescent; clear lower boundary (color change); omnidirectional rootlets; much of horizon disturbed in coring; not dense. |
| 78-102 (2.6-3.4) | AC | very dark gray (10YR3/1) loam; weak, coarse, granular to massive; friable; strongly to violently effervescent; clear lower boundary (color change); gastropod and mollusk shells (very few); few omnidirectional rootlets. |
| 102-111 (3.4-3.6) | 2Ab | black (10YR2/1) loam; moderate, fine, granular; friable; strongly effervescent; gradual lower boundary; horizon disturbed in coring; few omnidirectional rootlets. |
| 111-153 (3.6-5.0) | 2ACb | very dark grayish brown (10YR3/2) loam; massive; clay coatings are thin, discontinuous, line root voids and a few vertical faces (very weak peds?); friable; strongly to violently effervescent; clear lower boundary; very weakly developed prismatic peds(?); few small pebbles; few mollusk shells; 6 cm inferred (no recovery). |
| 153-175 (5.0-5.7) | 2C1 | very dark grayish brown (10YR3/2) loamy sand to sandy loam; massive; friable; violently effervescent; clear lower boundary; gastropod shells; shell fragments; mollusk shells; 4 cm inferred (no recovery). |
| 175-195 (5.7-6.4) | 3C2 | very dark grayish brown to brown to dark brown (10YR3/2-4/3) medium sand and gravel; single grain; loose; violently effervescent; unknown lower boundary (end of tubes); many rounded pebbles, all sizes; few angular pebbles; 5 cm inferred (no recovery); refused on rock. |
| Auger Sample: | | |
| 195-299 (6.4-9.8) | | very dark brown (10YR2/2) loam diamicton; strongly effervescent; pebbles and cobbles throughout; all sizes of pebbles; many clasts are angular, some are rounded. |

Core/Profile: FM-59

Location: Root River Trail - Site #5

Legal description: SE ¼ NW ¼ Sec. 18 T103N R9W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 805 feet

Topo. Map: Lanesboro

Remarks: Root River Trail Site #5; South Branch of Root River; on flat area on east side of trail; lower in elevation than trail; 34 meters south of milepost 12; near grove of trees; recovery poor - may be old railroad grade (lot of cobbles)

| Depth cm(ft) | Horizon or Zone | Description |
|-----------------|--------------------|---|
| 0-8 (0-.3) | Ap | black (10YR2/1) sandy loam; weak, medium, granular; friable; noneffervescent; clear lower boundary; many small pebbles; roots; stems. |
| 8-42 (.3-1.4) | A | black (10YR2/1) loam; weak, fine, granular; friable; very slightly effervescent; clear lower boundary; small pebbles common; few medium to large pebbles, some angular; rootlets. |
| 42-47 (1.4-1.5) | AC | black (10YR2/1) loam; massive; friable; strongly effervescent; unknown lower boundary (end of tubes); large pebbles/small cobbles common, often angular; small to medium pebbles common, rounded and angular; few rootlets. |
| 47-64 (1.5-2.1) | | no recovery; refused on cobbles; could not auger. |

Core/Profile: FM-60
 Location: Root River Trail - Site #5
 Legal description: SE ¼ NW ¼ Sec. 18 T103N R9W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Grasses
 Slope: 0-2%
 Elevation: 805 feet
 Topo. Map: Lanesboro
 Remarks: Root River Trail Site #5; South Branch of Root River; 20 meters southwest of FM-59; no recovery - may be old railroad grade (lot of cobbles)

| Depth cm(ft) | Horizon or Zone | Description |
|-----------------|--------------------|---|
| 0-47 (0-1.5) | | no recovery; refused on cobbles; could not auger. |

Core/Profile: FM-61

Location: Root River Trail - Site #8

Legal description: SE ¼ SE ¼ Sec. 32 T103N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 920 feet

Topo. Map: Preston

Remarks: Root River Trail Site #8; South Branch of Root River; on south side of trail; slightly lower wooded/shrubby field separates FM-61 from river; 34 meters east of milepost 4

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-19 (0-.6) | Ap | dark brown (10YR3/3) silt loam; mottles are few, fine, faint, pale brown (10YR6/3); moderate, medium, granular to moderate, fine, platy near base; silt coatings and clay coatings are moderately thick, discontinuous, coat platy surfaces; friable; noneffervescent; clear lower boundary; roots; stems. |
| 19-70 (.6-2.3) | Bt1 | brown to dark brown (10YR4/3) silty clay loam; mottles are few, fine, faint, pale brown (10YR6/3); strong, medium, subangular blocky; clay coatings are moderately thick, continuous, coat ped faces; silt coatings are thin, discontinuous, coat ped faces; friable to firm; noneffervescent; gradual lower boundary; rootlets. |
| 70-120 (2.3-3.9) | Bt2 | dark yellowish brown (10YR4/4) silt loam; mottles are few, fine, faint, pale brown (10YR6/3), and few, coarse, faint, very dark grayish brown (10YR3/2); moderate, coarse, prismatic parting to coarse subangular blocky at top; clay coatings are thick, discontinuous, coat ped faces and line root voids; silt coatings are thin, discontinuous, coat ped faces; firm; noneffervescent; gradual lower boundary; few rootlets; more clay-rich than Bt1; oxidized; 8 cm inferred (no recovery). |
| 120-426 (3.9-14.0) | C1 | dark yellowish brown (10YR4/4) silt loam; common, medium, distinct, very dark brown (10YR2/2) near base, and common, coarse, faint, yellowish brown (10YR5/4); massive; friable; slightly effervescent below 300 cm; clear lower boundary; silt is coarse; few sand lenses near base; oxidized; few areas are fractured and have oxidized coatings on horizontal planes; charcoal (collected from 315-330 cm); wood at 315 cm C-14 dated as Modern; 38 cm inferred (no recovery); reworked (?) loess. |
| 426-434 (14.0-14.2) | 2C2 | dark yellowish brown (10YR3/4); fine sand and gravel; single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); few cobbles; oxidized; 4 cm inferred (no recovery); refused on a cobble. |
| Auger Sample: | | |
| 434-501 (14.2-16.4) | | dark yellowish brown (10YR4/4) sandy loam; strongly effervescent; many small pebbles; drilling rough; refused on a boulder; may be near bedrock. |

Core/Profile: FM-62
 Location: Root River Trail - Site #8
 Legal description: SE ¼ SE ¼ Sec. 32 T103N R10W
 County: Fillmore
 Parent material: Loess/colluvium/alluvium
 Vegetation: Grasses
 Slope: 0-2%
 Elevation: 920 feet
 Topo. Map: Preston
 Remarks: Root River Trail Site #8; South Branch of Root River; rock-covered meander sediments; on south side of trail; slightly lower wooded/shrubby field separates FM-62 from river; 130 meters east of milepost 4

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-11 (0-.4) | Ap | brown to dark brown (10YR4/3) clay-rich silt loam; mottles are common, medium, faint, very dark grayish brown (10YR3/2); weak, medium, granular to massive; friable; noneffervescent; clear lower boundary; many rootlets; roots. |
| 11-70 (.4-2.3) | Bt1 | dark yellowish brown (10YR4/4) clay-rich silt loam; mottles are few, coarse, distinct, very dark gray (10YR3/1), and few, fine, distinct, yellowish red (5YR4/6); moderate, coarse, subangular blocky; clay coatings are thin, moderately continuous, coat ped faces and line root voids; silt coatings are thin, discontinuous, coat ped faces; friable; noneffervescent; gradual lower boundary; rootlets; mottles are finer than surrounding sediment; oxidized. |
| 70-112 (2.3-3.4) | Bt2 | dark yellowish brown (10YR4/4) silty clay loam; mottles are common, fine, faint, pale brown (10YR6/3), and few, medium, distinct, yellowish red (5YR4/6); moderate, fine to medium, prismatic parting to medium to coarse subangular blocky; clay coatings are moderately thick, continuous, coat ped faces and line root voids; firm; noneffervescent; gradual lower boundary; rootlets; oxidized; no clay coatings last 10 cm. |
| 112-127 (3.4-4.2) | C1 | brown to dark brown (7.5YR4/4) silt-rich loam; mottles are common, fine, distinct, black (10YR2/1), and few, fine, faint, pale brown (10YR6/3); massive; clay coatings are moderately thick, discontinuous, line some root voids; friable; noneffervescent; unknown lower boundary (end of tube); oxidized; rootlets; faint bedding; 5 cm inferred (no recovery). |
| 127-168 (4.2-5.5) | C2 | dark yellowish brown (10YR4/4) silt-rich loam; mottles are few, fine, distinct, black (10YR2/1), and few, fine, faint, pale brown (10YR6/3); massive (highly fractured); clay coatings are moderately thick, discontinuous, very dark grayish brown (10YR3/2), line some root voids; friable; noneffervescent; clear lower boundary; fractured along horizontal planes; oxidized; few omnidirectional rootlets; very few small pebbles; faint bedding. |
| 168-203 (5.5-6.7) | C3 | brown to dark brown (7.5YR4/4) sandy loam; mottles are few, medium, faint, dark brown (10YR4/3); massive (fractured); friable; noneffervescent; clear lower boundary; fractured along horizontal planes; oxidized; sandier with depth; can see faint bedding. |
| 203-222 (6.7-7.3) | C4 | yellowish brown (10YR5/4) fine sand to loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; several clumps of loamy sand, may be partially cemented; no noticeable pebbles; oxidized. |
| 222-281 (7.3-9.2) | 2C5 | dark brown (7.5YR3/4) sandy clay loam; mottles are common, coarse, faint, dark brown (7.5YR3/2); massive; firm; noneffervescent; clear lower boundary; oxidized; many pebbles, mostly rounded; few cobbles; sand is coarse; several dark bands of heavily oxidized (Mn oxides) sandy clay loam; clasts include carbonates and chert; 9 cm inferred (no recovery). |
| 281-323 (9.2-10.6) | 2C6 | dark brown (7.5YR3/4) sandy clay loam diamicton; mottles are few, coarse, distinct, brown (7.5YR5/4); massive; firm; strongly to violently effervescent; unknown lower boundary (end of tubes); very little matrix, mostly rocks; many pebbles and small cobbles, rounded and angular; sand is coarse; oxidized; clasts include carbonates and granites; 10 cm inferred (no recovery); refused on cobbles; colluvium, near bedrock. |

Core/Profile: FM-63
 Location: Root River Trail - Site #9
 Legal description: NW ¼ NE ¼ Sec. 32 T103N R10W
 County: Fillmore
 Parent material: Alluvium/colluvium
 Vegetation: Grasses, deciduous trees
 Slope: 0-2%
 Elevation: 910 feet
 Topo. Map: Preston
 Remarks: Root River Trail Site #9; South Branch of Root River; on north side of trail in field entrance road; 36 meters east of gully/culvert

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|---|
| 0-13 (0-.4) | C | dark yellowish brown (10YR3/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; rootlets; recent sediment. |
| 13-21 (.4-.7) | 2A | very dark grayish brown (10YR3/2) silt loam; weak, fine, platy to fine granular; friable; noneffervescent; abrupt lower boundary; rootlets. |
| 21-62 (.7-2.0) | 2CA | very dark grayish brown (10YR3/2) silt loam; mottles are common, medium, distinct, black (10YR2/1); massive to weak, fine, granular; very friable; noneffervescent; clear lower boundary; faint laminations; horizontal roots; rootlets. |
| 62-112 (2.0-3.7) | 2C | dark brown to brown (10YR3/3-5/3) silt to silt loam; mottles are few, medium, distinct, black (10YR2/1), and few, fine, distinct, strong brown (10YR4/6); massive; clay coatings are thin, moderately continuous, very dark grayish brown (10YR3/2), coat few vertical surfaces and line root voids; very friable; noneffervescent; gradual lower boundary; laminated; few roots; charcoal collected from 102 cm; lower 15 to 20 cm mottled; recent tributary sediment. |
| 112-151 (3.7-5.0) | 3Ab1 | black (10YR2/1) clay-rich loam; mottles are few, fine, faint, dark red (10R3/6); weak, medium, granular to moderate, medium, subangular blocky; clay coatings are thin, discontinuous, coat subangular blocky peds; friable; slightly effervescent; gradual lower boundary; few small pebbles; rootlets; 5 cm inferred (no recovery). |
| 151-187 (5.0-6.1) | 3Ab2 | black (10YR2/1) clay-rich loam; moderate, medium, granular; friable; slightly to strongly effervescent; gradual lower boundary; horizon disturbed in coring; rootlets; few horizontal roots; few small pebbles; few gastropod shells. |
| 187-206 (6.1-6.8) | 3ACb | very dark grayish brown (10YR3/2) loam; weak, medium, granular to massive; friable; strongly to violently effervescent; clear lower boundary; horizon disturbed in coring; rootlets; small pebbles common, often angular; few gastropod shells. |
| 206-223 (6.8-7.3) | 4C | very dark grayish brown (10YR3/2) loam to sandy clay loam diamicton; massive; friable to firm; violently effervescent; unknown lower boundary (end of tubes); many pebbles, all sizes, rounded and angular; many small angular limestone cobbles; calcite crystals precipitated out; 7 cm inferred (no recovery); refused on cobbles; colluvial. |
| Auger Sample: | | |
| 223-256 (7.3-8.4) | | very dark grayish brown (10YR3/2) sandy clay loam; strongly effervescent; many small to medium pebbles, rounded and angular; dense; refused on cobbles; very poor recovery. |

Core/Profile: FM-64

Location: Root River Trail - Site #10

Legal description: SW ¼ SW ¼ Sec. 28 T103N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 910 feet

Topo. Map: Preston

Remarks: Root River Trail Site #10; South Branch of Root River; on south side of trail; at base of gully below an earthen dam; PSA fan over LH-aged terrace

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|--|
| 0-15 (0-.5) | Ap | very dark grayish brown (10YR3/2) silt loam; weak, medium, granular to platy; friable; noneffervescent; clear lower boundary; roots; few silt lenses near base. |
| 15-42 (.5-1.4) | ACp | very dark grayish brown (10YR3/2) silt loam; mottles are common, fine, distinct, dark reddish brown (5YR3/3), and few, fine, distinct, strong brown (7.5YR5/8); moderate, fine to medium, platy; very friable; noneffervescent; gradual lower boundary; laminated; many thin lenses of brown (10YR5/3) silt loam; rootlets; fractures along bedding planes; recent sediment. |
| 42-78 (1.4-2.6) | AC | very dark grayish brown (10YR3/2) silt loam; mottles are few, fine, distinct, very pale brown (10YR7/4); massive; clay coatings are thin, discontinuous, line root voids; very friable; noneffervescent; clear lower boundary; rootlets; root voids; few lenses of brown (10YR5/3) silts; recent sediment. |
| 78-137 (2.6-4.5) | 2ABb | black (10YR2/1) silt loam; weak, fine, granular to weak, coarse, subangular blocky; clay coatings are thin, discontinuous, coat some subangular blocky peds; friable; noneffervescent; clear lower boundary; rootlets; blocky structure is weak, but clay coatings are noticeable; 3 cm inferred (no recovery). |
| 137-162 (4.5-5.3) | 2BAb | very dark brown (10YR2/2) silt loam; mottles are common, very fine, faint, brown (10YR5/3); weak, coarse, subangular blocky; clay coatings are thick, moderately continuous, coat ped faces; friable; very slightly effervescent; gradual lower boundary; rootlets. |
| 162-223 (5.3-7.3) | 2BCb | dark brown to brown (10YR4/3) silt loam; mottles are common, fine, distinct, very pale brown (10YR7/5), and few, fine, distinct, yellowish red (5YR4/6); weak, medium, subangular blocky; clay coatings are moderately thick, discontinuous, coat ped faces; friable to firm; very slightly effervescent; clear lower boundary; horizon disturbed in coring; more clay-rich than BA horizon; rootlets. |
| 223-262 (7.3-8.6) | 2CBb | dark yellowish brown (10YR4/4) silt loam; mottles are few, fine, distinct, yellowish red (5YR4/6); massive to weak, medium, subangular blocky; clay coatings are thin, discontinuous, brown to dark brown (7.5YR4/2), line root voids and coat few ped faces; friable to firm; very slightly effervescent; clear lower boundary; oxidized. |
| 262-322 (8.6-10.6) | 3C | dark yellowish brown (10YR4/4-3/4) sandy clay loam diamicton; mottles are coarse, faint to distinct, dark brown (7.5YR3/2-3/4), and few, medium, distinct, strong brown (7.5YR5/8); massive; friable to firm; slightly effervescent; unknown lower boundary (end of tubes); many small to medium pebbles, mostly rounded; few large pebbles/small cobbles; oxidized; band of very dark brown to black (10YR2/2-2/1), 294-299 cm; sand is coarse; Mn oxides; 5 cm inferred (no recovery); refused on cobbles. |

Core/Profile: FM-65
 Location: Root River Trail - Site #11
 Legal description: SW ¼ NW ¼ Sec. 28 T103N R10W
 County: Fillmore
 Parent material: Alluvium/colluvium
 Vegetation: Grasses, wild parsnip
 Slope: 0-2%
 Elevation: 915 feet
 Topo. Map: Preston
 Remarks: Root River Trail Site #11; South Branch of Root River; taken on grassy strip on east side of trail

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|--|
| 0-16 (0-.5) | Ap | very dark brown (10YR2/2) loam; mottles are few, fine, faint, strong brown (7.5YR4/6); weak, fine, granular to massive; friable; noneffervescent; clear lower boundary; dense; 2 cm of sand on surface; roots. |
| 16-61 (.5-2.0) | A | dark brown (10YR3/3) loam; mottles are few, fine, faint, brown (10YR5/3) and strong brown (7.5YR5/6); weak to moderate, fine, granular; friable; very slightly effervescent; abrupt lower boundary; massive at top; few silt lenses near base; worm burrows filled with dark yellowish brown (10YR3/4) sediment near base; rootlets; 3 cm inferred (no recovery). |
| 61-82 (2.0-2.7) | C1 | dark brown (7.5YR3/4) loamy sand; single grain; loose; noneffervescent; clear lower boundary; oxidized; few small to large pebbles; rootlets; 5 cm inferred (no recovery). |
| 82-96 (2.7-3.2) | C2 | strong brown (7.5YR5/6) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; few small to large pebbles; rootlets; 5 cm inferred (no recovery). |
| 96-111 (3.2-3.6) | C3 | brown to dark brown (7.5YR4/4) loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized; few pebbles; 5 cm inferred (no recovery). |
| 111-157 (3.6-5.2) | 2C4 | yellowish brown (10YR5/6) gravel; massive; friable; strongly effervescent; clear lower boundary; many pebbles, all sizes; many small cobbles; limestone/dolostone clasts common; matrix is loamy sand to sandy loam (sand is fine); 5 cm inferred (no recovery); colluvium. |
| 157-181 (5.2-5.9) | 3C5 | dark brown (7.5YR3/2) sandy clay loam; mottles are common, coarse, distinct, brown to dark brown (7.5YR4/4); massive; friable to firm; slightly effervescent; unknown lower boundary (end of tubes); oxidized; small to medium pebbles common; many spherical, white grains (ooids?); Mn oxides; 10 cm inferred (no recovery); refused on rock (cobbles); colluvium. |

Core/Profile: FM-66
 Location: Root River Trail - Site #11
 Legal description: SW ¼ NW ¼ Sec. 28 T103N R10W
 County: Fillmore
 Parent material: Alluvium/colluvium
 Vegetation: Grasses, wild parsnip
 Slope: 0-2%
 Elevation: 915 feet
 Topo. Map: Preston
 Remarks: Root River Trail Site #11; South Branch of Root River; on a grassy strip on east side of trail; 82 meters north of FM-65

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|---|
| 0-20 (0-.7) | Ap | very dark grayish brown (10YR3/2) sandy loam; weak, fine, granular to massive; friable; noneffervescent; abrupt lower boundary; rootlets; platy near base. |
| 20-61 (.7-2.0) | C1 | brown to dark brown (7.5YR4/4) loamy sand; massive; very friable; noneffervescent; gradual lower boundary; weakly platy near top; few rootlets; few small pebbles; slightly oxidized; 5 cm inferred (no recovery). |
| 61-84 (2.0-2.8) | C2 | brown to dark brown (7.5YR4/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; few small to medium pebbles; oxidized; few cobbles; few rootlets; 5 cm inferred (no recovery). |
| 84-97 (2.8-3.2) | C3 | strong brown (7.5YR4/6) loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized; 5 cm inferred (no recovery). |
| 97-112 (3.2-3.7) | C4 | light yellowish brown (10YR6/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized; few rootlets; 5 cm inferred (no recovery). |
| 112-131 (3.7-4.3) | C5 | strong brown (7.5YR4/6) loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized; 2 cm inferred (no recovery). |
| 131-147 (4.3-4.8) | 2C6 | dark brown (7.5YR3/2) clay loam; mottles are few, coarse, distinct, strong brown (7.5YR5/6); massive; friable to firm; strongly effervescent; abrupt lower boundary; oxidized; small to large pebbles, few to common. |
| 147-174 (4.8-5.7) | 3C7 | strong brown (7.5YR5/6) gravel; massive; friable; strongly effervescent; unknown lower boundary (end of tubes); matrix is sandy clay loam; mostly medium pebbles, some small and large pebbles; limestone/dolostone clasts common; oxidized; 21 cm no recovery; refused on cobbles. |

Core/Profile: FM-67

Location: Root River Trail - Site #7

Legal description: NE ¼ SE ¼ Sec. 15 T103N R10W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses, corn

Slope: 0-2%

Elevation: 865 feet

Topo. Map: Preston

Remarks: Root River Trail Site #7; South Branch of Root River; on south side of trail in field entrance road; just to east of bridge; PSA fan over LH-aged terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-14 (0-.5) | Ap | very dark gray (10YR3/1) silt loam; moderate, medium, platy; friable; noneffervescent; clear lower boundary; roots; worm burrows; few small pebbles. |
| 14-35 (.5-1.2) | AC | very dark grayish brown (10YR3/2) silt loam; mottles are few, fine, faint, black (10YR2/1) and strong brown (7.5YR4/6); weak, medium to coarse, platy to massive; friable; noneffervescent; clear lower boundary; rootlets; few small pebbles. |
| 35-67 (1.2-2.2) | C1 | very dark grayish brown (10YR3/2) silt loam; mottles are few, coarse, faint, very dark gray (10YR3/1) and dark brown (7.5YR3/2), and few, fine, faint, strong brown (7.5YR4/6); massive (highly fractured); friable; very slightly effervescent; clear lower boundary; fractured along bedding planes; laminated; few root voids; omnidirectional rootlets. |
| 67-91 (2.2-3.0) | C2 | very dark brown (10YR2/2) silt loam to silt; mottles are common, medium, faint, black (10YR2/1), and few, fine, distinct, brown (10YR5/3); massive; friable; slightly effervescent; abrupt lower boundary; few root voids lined with very dark brown (10YR2/2) sediment; few rootlets. |
| 91-210 (3.0-6.9) | 2Ab | black (10YR2/1) silt-rich loam; moderate, fine to medium, granular; friable; strongly effervescent; gradual lower boundary; few gastropod and mollusk shells; omnidirectional rootlets; few small pebbles; 5 cm inferred (no recovery). |
| 210-235 (6.9-7.7) | 2ACb1 | very dark grayish brown (10YR3/2) loam; weak, medium, granular to massive; friable; strongly to violently effervescent; clear lower boundary; few gastropod and mollusk shells; few rootlets. |
| 235-269 (7.7-8.8) | 2ACb2 | very dark grayish brown (10YR3/2) sandy loam; massive; friable; strongly to violently effervescent; abrupt lower boundary; mollusk and gastropod shells; small to medium pebbles common; few large pebbles at top of horizon; 5 cm inferred (no recovery). |
| 269-284 (8.8-9.3) | 2C1 | dark grayish brown (10YR4/2) loamy sand to medium sand; single grain; loose; strongly to violently effervescent; clear lower boundary; mollusk and gastropod shells; many small to medium pebbles. |
| 284-322 (9.3-10.6) | 2C2 | brown (10YR5/3) coarse sand and gravel; mottles are few, coarse, faint, dark grayish brown (10YR4/2) and few, fine, distinct, dark brown (7.5YR3/4); single grain; loose; violently effervescent; unknown lower boundary (end of tubes); many pebbles, all sizes, mostly rounded; few cobbles; clasts are more angular near base; shell fragments; brachiopod fossil; sand is slightly loamy near base. |
| 322-366 (10.6-12.0) | | no recovery; refused on rock (cobbles). |
| Auger Sample: | | |
| 433-568 (14.2-18.6) | | brown to dark brown (10YR4/3) coarse sand and gravel; strongly effervescent; many rounded pebbles, all sizes; few cobbles; few shell fragments; refused on cobbles. |

Core/Profile: FM-68

Location: Root River Trail - Site #6

Legal description: SW ¼ SW ¼ Sec. 14 T103N R10W

County: Fillmore

Parent material: Alluvium/reworked loess

Vegetation: Shrubs, deciduous trees

Slope: 0-2%

Elevation: 865 feet

Topo. Map: Preston

Remarks: Root River Trail Site #6; South Branch of Root River; on north side of trail; eastern side of small valley bounded by bedrock bluffs

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|---|
| 0-17 (0-.6) | A | very dark grayish brown (10YR3/2) silt loam; moderate, fine to medium, granular; friable; slightly effervescent; gradual lower boundary; lower boundary disturbed in coring; rootlets. |
| 17-30 (.6-1.0) | C | brown to dark brown (10YR4/3) silt to silt loam; massive; very friable; very slightly effervescent; clear lower boundary; laminated; rootlets; few laminations are very dark grayish brown (10YR3/2). |
| 30-90 (1.0-3.0) | 2AC | black (10YR2/1) silt loam; mottles are common, fine, faint, brown (10YR5/3); moderate, fine to medium, granular; friable; very slightly effervescent; clear lower boundary; roots; few rootlets. |
| 90-127 (3.0-4.2) | 2C | very dark grayish brown (10YR3/2) silt; massive; very friable; very slightly effervescent; unknown lower boundary (end of tube); few laminations; few rootlets; some laminations are brown (10YR5/3); 5 cm inferred (no recovery). |
| 127-143 (4.2-4.7) | 3ACb | black (10YR2/1) silt loam; mottles are few, fine, faint, dark yellowish brown (10YR4/4); weak, medium, granular; very friable; slightly effervescent; abrupt lower boundary; few rootlets; very few pebbles. |
| 143-151 (4.7-5.0) | 3C | yellowish brown to dark yellowish brown (10YR5/4-4/4) loamy sand; single grain; loose; slightly to strongly effervescent; unknown lower boundary (end of tubes); oxidized; sand is fine; rootlets; small to medium pebbles common; 2 cm inferred (no recovery); refused on cobbles. |
| Auger Sample: | | |
| 151-200 (5.0-6.6) | | dark yellowish brown (10YR4/4) loamy sand; strongly to violently effervescent; many small pebbles; calcite crystals (1-4 mm across) throughout sample; recovery poor; refused on cobbles. |

Core/Profile: FM-69

Location: Norstad - low terrace by river

Legal description: NW ¼ NW ¼ Sec. 23 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Hay

Slope: 0-2%

Elevation: 732 feet

Topo. Map: Rushford West

Remarks: Norstad property; Root River; closest boring to river; 33 meters north of line of trees by river's edge; on low terrace in floodplain; approximately 1 foot lower in elevation than FM-70

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-35 (0-1.2) | Ap | black (10YR2/1) loam; mottles are few, fine, faint, brown (10YR5/3); weak, medium, granular; friable; strongly effervescent; clear lower boundary; few pebbles; several large pieces of red tile (pieces of tile were scattered on ground surface also); rootlets; compacted. |
| 35-127 (1.2-4.2) | A | black (10YR2/1) loam; moderate, fine, granular; friable; strongly to violently effervescent; gradual lower boundary; roots; omnidirectional rootlets; sandier lens 71-76 cm; sandy; few pebbles; much of horizon was disturbed in coring; 8 cm inferred (no recovery). |
| 127-143 (4.2-4.7) | AC | very dark grayish brown (10YR3/2) loam; massive; friable; strongly effervescent; gradual lower boundary; sandy; few small pebbles; few rootlets; few gastropod shells. |
| 143-216 (4.7-7.1) | C | very dark grayish brown (10YR3/2) fine to medium sand; massive to single grain; loose; strongly effervescent; clear lower boundary; 13 cm stick caught in sample; lens of loamy sand 158-164 cm; few rootlets; few small pebbles; slightly loamy; 30 cm not recovered. |
| 216-296 (7.1-9.7) | 2CA | black (10YR2/1) silt loam; mottles are few, fine, faint, dark brown (7.5YR3/4) near base of horizon; massive; friable; strongly effervescent; clear lower boundary; carbon-rich; gastropod shells; 5 cm of gray sandy loam at base; few roots; few small pebbles; top 20 cm has fine sand instead of silt and is more of a sandy loam; blacker than A; 29 cm not recovered. |
| 296-300 (9.7-9.8) | 3C | brown (10YR5/3) medium to coarse sand; mottles are common, medium, distinct, dark yellowish brown (10YR4/6); single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); few small pebbles; some oxidation. |
| 300-336 (9.8-11.0) | | no recovery; refused on sand; driller's note: "sand fell out tube sample." |
| Auger Samples: | | |
| 455-590 (14.9-19.4) | | dark yellowish brown (10YR4/4) coarse sand and gravel; strongly effervescent; many small pebbles; few medium pebbles; few shell fragments; oxidized. |
| 590-844 (19.4-27.7) | | no recovery; wet sand. |
| 851-986 (27.9-32.4) | | yellowish brown (10YR5/4) fine to medium sand; strongly effervescent; driller's note: "sand got dense, seized augers"; some coarse sand; a lot finer than 455-590 sample; oxidized. |

Core/Profile: FM-70

Location: Norstad - middle terrace

Legal description: NW ¼ NW ¼ Sec. 23 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Hay

Slope: 0-2%

Elevation: 733 feet

Topo. Map: Rushford West

Remarks: Norstad property; Root River; boring taken on middle terrace in hayfield; approximately 1 foot higher in elevation than FM-69 (on low terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-29 (0-1.0) | Ap | black (10YR2/1) silty clay loam; massive to weak, fine, granular; friable to firm; slightly to strongly effervescent; clear lower boundary; compacted; roots; rootlets. |
| 29-55 (1.0-1.8) | A | black (10YR2/1) silty clay loam; mottles are few, fine, distinct, brown to yellowish brown (10YR5/3-5/4); moderate, medium, granular; clay coatings are thick, black (10YR2/1), discontinuous, coat few peds and line some root voids; friable to firm; slightly to strongly effervescent; abrupt lower boundary; many worm burrows; few silt lenses; omnidirectional rootlets. |
| 55-64 (1.8-2.1) | C | black (10YR2/1) loam; massive; friable; strongly effervescent; clear lower boundary; many rounded pebbles; very little matrix; compacted fines directly beneath stone line. |
| 64-86 (2.1-2.8) | 2Ab | black (10YR2/1) clay-rich silt loam; mottles are very few, fine, faint, brown (10YR5/3); weak, medium, subangular blocky; clay coatings are thin, discontinuous, line root voids and a few ped faces; friable; strongly effervescent; clear lower boundary; vertical roots; omnidirectional rootlets; many root voids; compacted. |
| 86-99 (2.8-3.3) | 2ACb | black to very dark gray (10YR2/1-3/1) loam; mottles are very few, fine, faint, brown (10YR5/3); massive; friable; strongly effervescent; abrupt lower boundary; omnidirectional rootlets; lighter in color and sandier at base. |
| 99-172 (3.3-5.6) | 3Ab | black (10YR2/1) clay-rich silt loam; moderate to strong, medium, granular; clay coatings are thin, discontinuous, line root voids; friable; strongly to violently effervescent; gradual lower boundary; woody roots; omnidirectional rootlets; few gastropod shells; 5 cm inferred (no recovery). |
| 172-196 (5.6-6.4) | 3ACb | mottled very dark grayish brown (10YR3/2) and black (10YR2/1) clay-rich silt loam to loam; weak to moderate, medium, granular to massive; clay coatings are thin, discontinuous, line root voids; friable; violently effervescent; gradual lower boundary; few gastropod shells. |
| 196-218 (6.4-7.2) | 3C1 | very dark grayish brown (10YR3/2) sandy loam; massive; friable; strongly effervescent; clear lower boundary; gastropod shells; sand is very fine; few worm burrows. |
| 218-231 (7.2-7.6) | 3C2 | very dark grayish brown (10YR3/2) sandy loam to loamy sand; massive; friable; slightly effervescent; unknown lower boundary (end of tube); loamier near base; sandier at top; very few rootlets; few shell fragments. |
| 231-254 (7.6-8.3) | | no recovery. |
| 254-271 (8.3-8.9) | 4C3 | brown to dark brown (10YR4/3) medium to coarse sand; single grain; loose; slightly effervescent; abrupt lower boundary; partly oxidized; shell fragments; few small pebbles. |
| 271-300 (8.9-9.8) | 5C4 | very dark gray (10YR3/1) sandy loam; massive; friable; slightly to strongly effervescent; abrupt lower boundary; unoxidized; sand is generally fine to very fine; layer of rounded, medium-sized pebbles at top of horizon; many rootlets in this layer; soil is more organic; few shell fragments. |
| 300-303 (9.8-9.9) | 6C5 | brown to dark brown (10YR4/3) medium to coarse sand; mottles are common, medium, distinct, dark brown to strong brown (7.5YR3/4-4/6); single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); few shell fragments; similar to 4C3 horizon; some oxidation. |
| 303-374 (9.9-12.3) | | no recovery; refused in sand. |
| Auger Sample: | | |
| 644-779 (21.1-25.6) | | very dark brown (10YR2/2) sandy loam and gravel; strongly effervescent; poor recovery; matrix is clay-rich, almost a sandy clay loam; mostly gravel - small to large, very rounded, pebbles. |

Core/Profile: FM-71

Location: Norstad - on rise on middle terrace

Legal description: NW ¼ NW ¼ Sec. 23 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Hay

Slope: 0-2%

Elevation: 734 feet

Topo. Map: Rushford West

Remarks: Norstad property; Root River; boring taken on a slight rise (approximately 1 foot higher in elevation) on middle terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-19 (0-.6) | Ap | black (10YR2/1) silt loam; weak, medium, platy; granular at top; friable; strongly effervescent; clear lower boundary; roots. |
| 19-43 (.6-1.4) | AC | black (10YR2/1) silt loam; weak, medium, platy to fine subangular blocky; friable; strongly effervescent; clear lower boundary; highly fractured; rootlets; horizon disturbed in coring; worm burrows/root voids filled with sediment. |
| 43-72 (1.4-2.4) | 2ACb | black (10YR2/1) silt-rich loam; mottles are few, fine, faint, brown to dark brown (10YR4/3); weak to moderate, fine, subangular blocky to medium granular; clay coatings are thin, discontinuous, line some root voids; friable; strongly effervescent; clear lower boundary; many rounded, medium-sized pebbles at base of horizon; rounded pebbles common throughout; few vertical roots; omnidirectional rootlets. |
| 72-149 (2.4-4.9) | 3Ab | black (10YR2/1) clay-rich silt loam to loam; moderate, medium, granular; clay coatings are thin, discontinuous, line root voids and coat some peds; friable; violently effervescent; gradual lower boundary; very few shell fragments; omnidirectional rootlets; top 25 cm are platy and fractured; 5 cm inferred (no recovery). |
| 149-167 (4.9-5.5) | 3ACb | very dark grayish brown (10YR3/2) loam; mottles are common, fine, faint, black (10YR2/1); massive; friable; violently effervescent; clear lower boundary; sandier at base; many worm burrows filled with black sediment; few omnidirectional rootlets; few shell fragments. |
| 167-208 (5.5-6.8) | 3C1 | very dark grayish brown (10YR3/2) loamy sand; single grain; loose; violently effervescent; unknown lower boundary (end of tube); few shell fragments; sand is fine; few lenses of sandy loam; few rootlets near top of unit. |
| 208-254 (6.8-8.3) | | no recovery. |
| 254-294 (8.3-9.7) | 3C2 | dark grayish brown (10YR4/2) medium sand; mottles are few, coarse, faint, yellowish brown (10YR5/4-5/6); single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); coarser than 3C1; few lenses of dark gray (10YR4/1) loamy sand; few shell fragments. |
| 294-327 (9.7-10.7) | | no recovery; refused on sand. |
| Auger Sample: | | |
| 368-503 (12.1-16.5) | | brown to dark brown (10YR4/3) medium to coarse sand and gravel; strongly effervescent; many rounded pebbles, all sizes; few shell fragments. |

Core/Profile: FM-72
 Location: Norstad - in depression
 Legal description: NW ¼ NW ¼ Sec. 23 T104N R8W
 County: Fillmore
 Parent material: Alluvium
 Vegetation: Hay
 Slope: 0-2%
 Elevation: 732 feet
 Topo. Map: Rushford West
 Remarks: Norstad property; Root River; boring taken in depression on middle terrace; approximately 1 ½ feet lower in elevation than FM-71

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-23 (0-.8) | Ap | black (10YR2/1) silt loam; weak, medium, granular; medium platy at base; friable; strongly effervescent; clear lower boundary; roots; rootlets; slightly compacted near base. |
| 23-43 (.8-1.4) | AC1 | very dark grayish brown (10YR3/2) silt loam; mottles are few, fine, distinct, yellowish red (5YR5/6); coarse platy to weak, medium, granular; friable; strongly effervescent; clear lower boundary; few laminated silt lenses; vertical roots; omnidirectional rootlets; compacted; recent sediments (PSA). |
| 43-90 (1.4-3.0) | AC2 | black (10YR2/1) silt loam to loam; mottles are few, fine, faint, brown (10YR5/3); weak, medium, granular to massive; friable; strongly effervescent; gradual lower boundary (lower boundary disturbed in coring); many rounded pebbles - small and medium-sized; sandier near base; fractured along horizontal (bedding?) planes at top; compacted at base; few gastropod shells. |
| 90-133 (3.0-4.4) | 2Ab | black (10YR2/1) loam; weak, fine to medium, granular; friable; strongly to violently effervescent; gradual lower boundary; few rounded pebbles at top of horizon; increasing sand content with depth; few gastropod shells near base; many small, vertical root voids; 5 cm inferred (no recovery). |
| 133-157 (4.4-5.2) | 2ACb | black (10YR2/1) sandy loam; massive; friable; strongly to violently effervescent; clear lower boundary; few gastropod shells; few rootlets; few small pebbles. |
| 157-167 (5.2-5.5) | 2C | very dark grayish brown (10YR3/2) loamy sand; massive to single grain; very friable to loose; strongly effervescent; abrupt lower boundary; shell fragments; gastropod shells; many fine rootlets. |
| 167-178 (5.5-5.8) | 3CA | very dark gray (10YR3/1) loam; massive to weak prismatic; clay coatings are thin, discontinuous, coat weak ped surfaces; friable; strongly effervescent; abrupt lower boundary; few gastropod shells; rootlets; peds are very weakly developed. |
| 178-204 (5.8-6.7) | 4C1 | dark grayish brown (10YR4/2) fine to medium sand; single grain; loose; slightly effervescent; clear lower boundary; several lenses of black (10YR2/1) sandy loam approximately 4 cm thick; small rounded pebbles common; few large pebbles; few lenses of coarse sand; few shell fragments. |
| 204-263 (6.7-8.6) | 4C2 | very dark grayish brown (10YR3/2) coarse sand and gravel; single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); many rounded pebbles, small to large; black, slightly loamy lens near base; 46 cm not recovered; refused on sand. |
| Auger Samples: | | |
| 437-572 (14.3-18.8) | | dark grayish brown (10YR4/2) coarse sand and gravel; strongly effervescent; many small pebbles; few medium-sized to large pebbles; few shell fragments. |
| 691-826 (22.7-27.1) | | brown (10YR5/3) medium to coarse sand; strongly effervescent; finer grained than 437-572; very small pebbles common; few small to medium pebbles. |

Core/Profile: FM-73

Location: Norstad - in minor depression on middle terrace

Legal description: SW ¼ SW ¼ Sec. 15 T104N R8W

County: Fillmore

Parent material: Alluvium

Vegetation: Grasses, corn

Slope: 0-2%

Elevation: 731 feet

Topo. Map: Rushford West

Remarks: Norstad property; Root River; boring taken in a slight depression on middle terrace; approximately 1 foot lower in elevation than FM-72; in middle of field road

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-39 (0-1.3) | Ap | black (10YR2/1) loam; weak, fine, granular to massive; friable; strongly to violently effervescent; clear lower boundary; many roots; lot of woody root debris at base of horizon; few small pebbles. |
| 39-48 (1.3-1.6) | AC | very dark grayish brown (10YR3/2) silt loam; mottles are common, medium, distinct, brown (10YR5/3); massive to weak, medium, subangular blocky; clay coatings are thin, moderately continuous, line root voids; friable; strongly effervescent; abrupt lower boundary; brown (10YR5/3) silt lenses; roots; omnidirectional rootlets; laminated; fractured. |
| 48-67 (1.6-2.2) | 2Ab | black (10YR2/1) silt-rich loam; mottles are common, fine to medium, distinct, dark reddish brown (2.5YR3/4); weak to moderate, medium, granular; friable; strongly effervescent; clear lower boundary; large root at top of horizon; many oxidation coatings and mottles; rootlets. |
| 67-104 (2.2-3.4) | 2ACb1 | black (10YR2/1) loam to sandy loam; massive to weak, fine, granular; friable; violently effervescent; gradual lower boundary; many intact gastropod shells; few rootlets; few horizontal roots; sandier lens near top. |
| 104-158 (3.4-5.2) | 2ACb2 | very dark gray (10YR3/1) loam; mottles are few, fine, faint, dark yellowish brown (10YR4/4) near base of horizon; massive to weak, medium, granular; clay coatings are thin, moderately continuous, line root voids; friable; strongly effervescent; gradual lower boundary; many intact gastropod shells; rootlets; 5 cm inferred (no recovery). |
| 158-173 (5.2-5.7) | 2CA | dark gray (10YR4/1) sandy loam; massive; friable; strongly effervescent; abrupt lower boundary; gastropod shells; few very small pebbles; unoxidized. |
| 173-278 (5.7-9.1) | 2C | dark grayish brown (10YR4/2) medium sand; mottles are few, faint, coarse, dark gray (10YR4/1); single grain; loose; strongly effervescent; abrupt lower boundary; shell fragments; few lenses of dark gray (10YR4/1) sandy loam; few small pebbles; some coarse sand; 59 cm not recovered. |
| 278-296 (9.1-9.7) | 3CA | very dark gray (10YR3/1) silt-rich loam; mottles are few, coarse, faint, black to very dark brown (10YR2/1-2/2); massive; friable; strongly effervescent; clear lower boundary; too much sand to be a silt loam, but quite silt-rich; roots; a piece of wood, but it may not be in place; gastropod shells; unoxidized. |
| 296-309 (9.7-10.1) | 3C | very dark grayish brown (10YR3/2) loamy sand; mottles are common, medium, distinct, yellowish red (5YR4/6); single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); some oxidation; few small pebbles; few shell fragments. |
| 309-355 (10.1-11.7) | | no recovery; refused on sand. |
| Auger Sample: | | |
| 474-609 (15.6-20.0) | | dark yellowish brown (10YR4/4) coarse sand; strongly effervescent; few pebbles; driller's notes: cobbles present. |

Core/Profile: HS-1

Location: Paulson - high terrace

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium/reworked loess

Vegetation: Alfalfa, hay

Slope: 0-2%

Elevation: 712 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; southernmost boring in transect; on high terrace (terraces differ in elevation by ≤1 foot)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-18 (0-.6) | Ap | black (10YR2/1) loam; weak, fine, subangular blocky to medium granular; friable to firm; noneffervescent; clear lower boundary; compacted; rootlets. |
| 18-32 (.6-1.1) | A | black (10YR2/1) loam to silt loam; moderate, medium, granular; friable; noneffervescent; clear lower boundary; omnidirectional rootlets. |
| 32-70 (1.1-2.3) | BA | black (10YR2/1) clay-rich silt loam; mottles are common, faint, fine, very dark brown (10YR2/2); moderate, fine, subangular blocky changing to weak, medium, columnar near base; clay coatings are discontinuous, faint, thin, coat ped faces; friable; noneffervescent; gradual lower boundary; omnidirectional rootlets; root voids infilled with sediment. |
| 70-132 (2.3-4.3) | Bt | very dark brown to very dark grayish brown (10YR2/2-3/2) silty clay loam to clay loam; weak, medium to fine, columnar; clay coatings are continuous, moderately thick, coat ped faces; friable to firm; noneffervescent; abrupt lower boundary; few omnidirectional rootlets; on borderline between clay loam and silty clay loam; 5 cm inferred (no recovery). |
| 132-143 (4.3-4.7) | C1 | dark yellowish brown (10YR4/4) loamy sand; single grain; loose; noneffervescent; clear lower boundary; loamier at top of horizon. |
| 143-194 (4.7-6.4) | C2 | brown (10YR5/3) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); lens of very dark grayish brown (10YR3/2) loamy sand/sandy loam from 182-186 cm; lens of lighter, finer sand from 166-167 cm. |
| 194-252 (6.4-8.3) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 366-501 (12.0-16.4) | | dark yellowish brown (10YR4/4) medium to coarse sand; slightly effervescent; few very small pebbles. |

Core/Profile: HS-2

Location: Paulson - depression between high and middle terraces

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Hay, alfalfa

Slope: 0-2%

Elevation: 711 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken in slight depression (½ to 1 foot lower in elevation) between highest of flood plain terraces and next lower floodplain terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-20 (0-.7) | Ap1 | black (10YR2/1) silt loam; weak, medium, granular; friable; noneffervescent; abrupt lower boundary; roots; stems. |
| 20-38 (.7-1.3) | Ap2 | black (10YR2/1) silt loam; mottles are common, medium, distinct, very pale brown (10YR7/4); moderate, medium to coarse, platy; clay coatings are weak, discontinuous, coat horizontal planes and root voids; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; mottles may be incorporating newer sediments into older soil. |
| 38-69 (1.3-2.3) | AB | black (10YR2/1) silt loam; mottles are few, medium, distinct, brown (10YR5/3); weak, coarse, platy; clay coatings are discontinuous, faint, thin, coat horizontal and vertical faces; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; mottles may be incorporating newer sediments into older soil. |
| 69-127 (2.3-4.2) | Bt1 | very dark brown (10YR2/2) clay-rich silt loam; weak, medium, prismatic; clay coatings are continuous, thick, distinct, coat ped faces; friable; noneffervescent; gradual lower boundary; lower boundary disturbed in coring; few omnidirectional rootlets; 5 cm inferred (no recovery). |
| 127-185 (4.2-6.1) | Bt2 | dark brown (10YR3/3) silty clay loam; weak, medium, prismatic; clay coatings and silt coatings are discontinuous, moderately thick, coat ped faces; friable to firm; slightly effervescent; clear lower boundary; worm burrows/root voids filled with sediment; few gastropod shells. |
| 185-282 (6.1-9.3) | C | very dark gray to black (10YR3/4 2.5Y2/0) clay-rich silt loam; massive; friable to firm; very slightly effervescent; unknown lower boundary (end of tubes); gastropod shells; horizon disturbed in coring. |
| 282-314 (9.3-10.3) | | no recovery; refused on sand; driller's notes: "≈25 cm of sand fell out of the tube." |
| Auger Samples: | | |
| 417-552 (13.7-18.1) | | dark yellowish brown (10YR4/4) loamy coarse sand; slightly effervescent; fines present (making sand slightly loamy); small pebbles common. |
| 574-709 (18.8-23.3) | | yellowish brown (10YR5/4) coarse sand; slightly effervescent; small pebbles common; some fines. |

Core/Profile: HS-3

Location: Paulson - middle terrace

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Hay, alfalfa

Slope: 0-2%

Elevation: 711 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken on third terrace ≈275 meters from water's edge; slightly higher (≈ ½ foot) in elevation than HS-2 and slightly lower (≈ ½ foot) than HS-4; may be a meander scar

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-28 (0-.9) | ACp | very dark brown (10YR2/2) silt loam; medium, fine, subangular blocky to medium granular; friable; noneffervescent; abrupt lower boundary; rootlets. |
| 28-49 (.9-1.6) | C | very dark brown (10YR2/2) silt loam; mottles are common, distinct, planar, pale brown (10YR6/3); moderate, fine, platy structure (fractures along bedding planes); friable; noneffervescent; clear lower boundary; laminated; highly fractured; root voids. |
| 49-60 (1.6-2.0) | 2ACb1 | black (10YR2/1) silt loam; mottles are few, faint, fine, pale brown (10YR6/3), and many, faint, medium, very dark brown (10YR2/2); moderate, medium, granular; friable; noneffervescent; clear lower boundary; crude bedding; may be a buried cumulic horizon; many root voids. |
| 60-84 (2.0-2.8) | 2ACb2 | black (10YR2/1) loam; mottles are few, faint, fine, pale brown (10YR6/3); weak, medium, granular to massive; friable; noneffervescent; abrupt lower boundary; lot of root voids/worm burrows; omnidirectional rootlets; few sandy lenses. |
| 84-110 (2.8-3.6) | 3Ab | black (10YR2/1) silt loam; moderate, fine to medium, granular; friable; noneffervescent; clear lower boundary; few rootlets. |
| 110-135 (3.6-4.4) | 3ABb | black (10YR2/1) clay-rich silt loam; moderate, fine to medium, granular; clay coatings are thin, discontinuous, faint, coat vertical faces (weak prismatic peds?); friable to firm; noneffervescent; clear lower boundary; 6 cm inferred (no recovery). |
| 135-153 (4.4-5.0) | 3BAb | black (10YR2/1) clay-rich silt loam; weak, medium, prismatic parting to moderate, coarse, granular; clay coatings are thin, discontinuous, faint, coat prismatic ped faces; friable to firm; noneffervescent; clear lower boundary; easily breaks into granular peds, but weak prismatic peds exist. |
| 153-190 (5.0-6.2) | 3Btb | black (10YR2/1) silty clay loam; moderate, medium, prismatic; clay coatings are thick, continuous, coat ped faces; firm; noneffervescent; clear lower boundary; base of horizon disturbed in coring. |
| 190-280 (6.2-9.2) | 3C1 | very dark gray to black (10YR3/1-2/1) clay rich silt loam; massive; firm; slightly effervescent; clear lower boundary; gastropod shells; many shell fragments; top of horizon disturbed in coring. |
| 280-317 (9.2-10.4) | 3C2 | very dark gray (10YR3/1) silt loam; massive; friable; slightly effervescent; gradual lower boundary; laminated; few shell fragments; few vertical roots. |
| 317-421 (10.4-13.8) | 3C3 | very dark gray to black (10YR3/1 2/1) silt loam; massive; friable; slightly to strongly effervescent; gradual lower boundary; shell fragments common; lot of wood, stems, roots, other plant matter; wood collected 412-417 cm and at 380 cm; <i>Ulmus sp.</i> wood from 380 cm C-14 dated at 2,790±70 BP.. |
| 421-449 (13.8-14.7) | 3C4 | very dark gray (10YR3/1) silt loam; massive; friable; slightly effervescent; abrupt lower boundary; lot of plant fibers; some wood; many shell fragments; gastropod shells; may be a buried O or OC horizon. |
| 449-481 (14.7-15.9) | 4C5 | very dark grayish brown (10YR3/2) coarse loamy sand and gravel; mottles are common, medium, faint, black (10YR2/1) sandy loam; few, medium, distinct, red (2.5YR4/8); and few, fine to medium, distinct, grayish green (5G5/2); single grain; loose; slightly to strongly effervescent; unknown lower boundary (end of tubes); many rounded pebbles - small to large; some sandy loam holding sand and pebbles together in places; layer of fine loamy sand 478-480 cm; many patches of oxidation (up to red [2.5YR4/8]); 2 cm inferred (no recovery); refused on sand and gravel. |

Core/Profile: HS-4

Location: Paulson - rise between middle and low terraces

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Alfalfa, hay

Slope: 0-2%

Elevation: 712 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken on slight rise between middle and low terraces; approximately ½ foot higher in elevation than HS-3 and 1 foot higher than lowest terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-22 (0-.7) | ACp | very dark grayish brown (10YR3/2) loam to silt loam; moderate, medium, granular; friable; noneffervescent; abrupt lower boundary; rootlets. |
| 22-44 (.7-1.4) | 2A1 | black (10YR2/1) loam to silt loam; mottles are many, faint, fine to medium, very dark grayish brown (10YR3/2); moderate, medium, granular; friable; noneffervescent; clear lower boundary; rootlets; few small pebbles. |
| 44-114 (1.4-3.7) | 2A2 | black (10YR2/1) silt loam; moderate, medium, granular to fine subangular blocky; friable; noneffervescent; gradual lower boundary; few rootlets; few root voids coated with dark brown (7.5YR3/4) sediment. |
| 114-139 (3.7-4.6) | 2BA | very dark brown (10YR2/2) loam; weak, medium, columnar parting to medium subangular blocky; clay coatings are faint, thin, discontinuous, coat ped faces (mainly columnar peds); friable; slightly effervescent; clear lower boundary; gastropod shells; may be weakly developed Bt horizon; 5 cm inferred (no recovery). |
| 139-157 (4.6-5.2) | 2C1 | very dark grayish brown (10YR3/2) loamy sand; single grain; loose; slightly to strongly effervescent; clear lower boundary; zone of sandy loam from 154-157 cm. |
| 157-187 (5.2-6.1) | 2C2 | brown to dark brown (10YR4/3) fine sand; single grain; loose; slightly effervescent; abrupt lower boundary; several clasts of loamy sand within fine sand - may be related to coring disturbances; shell fragments. |
| 187-201 (6.1-6.6) | 3C3 | dark grayish brown (10YR4/2) loamy sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tube); may be fining upwards sequence with 3C4. |
| 201-254 (6.6-8.3) | | no recovery. |
| 254-265 (8.3-8.7) | 3C4 | brown (10YR5/3) coarse sand; single grain; loose; slightly effervescent; clear lower boundary; may be fining upwards sequence with 3C3. |
| 265-274 (8.7-9.0) | 4C5 | dark grayish brown (10YR4/2) fine sand; single grain; loose; very slightly effervescent; abrupt lower boundary. |
| 274-277 (9.0-9.1) | 5CA | black (10YR2/1) loam; massive; friable; very slightly effervescent; abrupt lower boundary; stems, grasses, other plant matter in organic seam; some plant matter collected; <i>Brassicaceae</i> and <i>Chenopodium sp.</i> seeds C-14 dated as Modern. |
| 277-290 (9.1-9.5) | 5C | dark yellowish brown (10YR4/4) fine to medium sand; single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); sand coarsens with depth; loamy sand lens at ≈286 cm; possibly a fining upwards sequence with 5CA; few bands of oxidation (strong brown [7.5YR4/6]). |
| 290-319 (9.5-10.5) | | no recovery; refused on fine sands. |
| Auger Samples: | | |
| 336-471 (11.0-15.5) | | dark yellowish brown (10YR4/4) coarse sand and gravel; slightly effervescent; many small, rounded pebbles. |
| 493-628 (16.2-20.8) | | dark yellowish brown (10YR4/4) medium to coarse sand; very slightly effervescent; few small, rounded pebbles. |

Core/Profile: HS-5

Location: Paulson - rise between two lowest terraces

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Hay, alfalfa

Slope: 0-2%

Elevation: 711 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken on a slight rise between the two lowest terraces in hay field; approximately 100 meters from river's edge (cutbank)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-26 (0-.9) | Ap1 | black (10YR2/1) loam; weak, fine, subangular blocky to weak, medium, granular; friable; slightly effervescent; abrupt lower boundary; omnidirectional rootlets. |
| 26-33 (.9-1.1) | Ap2 | black (10YR2/1) loam; mottles are few, distinct, medium, brown (10YR5/3); weak, medium, platy; friable; slightly effervescent; clear lower boundary; omnidirectional rootlets; compacted. |
| 33-46 (1.1-1.5) | AC | black (10YR2/1) sandy loam; massive; friable; slightly to strongly effervescent; abrupt lower boundary; few small pebbles. |
| 46-60 (1.5-2.0) | C1 | brown to dark brown (10YR4/3) medium sand; single grain; loose; slightly effervescent; clear lower boundary; few small, rounded pebbles; few omnidirectional rootlets; few shell fragments. |
| 60-188 (2.0-6.2) | C2 | brown (10YR5/3) coarse sand and gravel; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); many small, rounded pebbles; several medium pebbles, especially from 60-75 cm, 170-188 cm; no recovery 85-127 cm; 9 cm inferred; refused on sand and gravel. |
| Auger Samples: | | |
| 236-371 (7.7-12.2) | | dark yellowish brown (10YR4/4) coarse sand; slightly effervescent; many small pebbles. |
| 417-552 (13.7-18.1) | | dark yellowish brown (10YR4/4) coarse sand and gravel; slightly effervescent; some fines; many small pebbles; some medium pebbles. |

Core/Profile: HS-6

Location: Paulson - on lowest terrace

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Hay, alfalfa

Slope: 0-2%

Elevation: 710 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken on low terrace south of Root River; 56 meters from edge of cutbank

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-18 (0-.6) | Ap | black (10YR2/1) silt loam; weak, fine, granular; friable; slightly effervescent; clear lower boundary; rootlets. |
| 18-49 (.6-1.6) | C | black (10YR2/1) silt loam; mottles are common, distinct, fine to medium, pale brown (10YR6/3); weak, medium, platy; very friable; slightly effervescent; abrupt lower boundary; laminated; rootlets; worm burrows. |
| 49-84 (1.6-2.8) | 2Ab | black (10YR2/1) clay-rich silt loam; moderate, medium, granular; friable; slightly effervescent; clear lower boundary; omnidirectional rootlets; many root voids/worm burrows. |
| 84-127 (2.8-4.2) | 2ABb | very dark grayish brown to very dark brown (10YR3/2-2/2) clay rich silt loam; weak, medium, granular to fine subangular blocky; friable to firm; slightly effervescent; unknown lower boundary (end of tube); root voids; horizon disturbed in coring; 5 cm inferred (no recovery). |
| 127-172 (4.2-5.6) | 2BAb | very dark grayish brown to very dark brown (10YR3/2-2/2) sandy loam; weak, medium, columnar; clay coatings are faint, discontinuous, thin, coat some ped faces; friable; strongly effervescent; clear lower boundary; root voids. |
| 172-204 (5.6-6.7) | 2Bwb | very dark grayish brown (10YR3/2) clay-rich silt loam to loam; mottles are few, fine, distinct, light brownish gray (10YR6/2); weak, medium, columnar; clay coatings are faint, moderately continuous, coat ped faces; friable; strongly effervescent; clear lower boundary; few shall fragments. |
| 204-219 (6.7-7.2) | 3BCb | dark gray (10YR4/1) silty clay loam; mottles are common, fine, distinct, light brownish gray (10YR6/2); massive to weak, coarse, columnar; friable; slightly to strongly effervescent; clear lower boundary; shell fragments. |
| 219-231 (7.2-7.6) | 3C1 | very dark grayish brown (10YR3/2) loamy sand; single grain; loose; slightly effervescent; abrupt lower boundary; shell fragments; mollusk shells. |
| 231-282 (7.6-9.3) | 3C2 | grayish brown (10YR5/2) fine sand; mottles are few, distinct, medium, yellowish brown (10YR5/6); single grain; loose; slightly effervescent; abrupt lower boundary; lens of loamy sand, 239-243 cm; shell fragments; 20 cm inferred (no recovery). |
| 282-294 (9.3-9.7) | 4C3 | brown (10YR5/3) coarse sand and gravel; single grain; loose; slightly to strongly effervescent; abrupt lower boundary; many small, rounded pebbles; few shell fragments; 4 cm inferred (no recovery). |
| 294-307 (9.7-10.1) | 5C4 | dark grayish brown (10YR4/2) medium sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); 4 cm inferred (no recovery); refused on sand. |
| Auger Samples: | | |
| 429-504 (10.1-16.5) | | brown to dark brown (10YR4/3) medium to coarse sand; slightly to strongly effervescent; many small, rounded pebbles. |

Core/Profile: HS-7

Location: Paulson - near river

Legal description: E ½ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 711 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken on slight rise by river's edge; 13 meters south of top of cutbank

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-25 (0-.8) | Ap | black (10YR2/1) loam to silt loam; massive to weak, medium, granular; friable; noneffervescent; abrupt lower boundary; rootlets; sand layer at 10 cm; very compacted 21 to 25 cm; rootlets. |
| 25-45 (.8-1.5) | AB | black (10YR2/1) clay-rich silt loam; mottles are many, faint, fine, very dark brown (10YR2/2); moderate, fine, subangular blocky; clay coatings are discontinuous, thin, coat some ped faces and root voids; friable; noneffervescent; gradual lower boundary; many root voids, often filled or partially filled with sediment; rootlets. |
| 45-98 (1.5-3.2) | BA | very dark brown (10YR2/2) loam; weak, medium, columnar parting to coarse subangular blocky; clay coatings are thin, moderately continuous, coat ped faces; friable to firm; slightly effervescent; clear lower boundary; few vertical rootlets; root voids filled with sediment; few gastropod shells near base of horizon (\approx 80 to 90 cm). |
| 98-107 (3.2-3.5) | C1 | dark brown (10YR3/3) loamy sand; single grain; loose; slightly effervescent; gradual lower boundary. |
| 107-282 (3.5-9.3) | C2 | yellowish brown (10YR5/4) fine to medium sand; mottles are few, faint - distinct, medium, very dark grayish brown (10YR3/2) clumps of loamier sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); lenses of dark brown (10YR3/3) sandy loam to loamy sand at 119 to 121 cm, 166 to 169 cm; shell fragments; gastropod shells; pebble with ooids; no recovery from 184 to 254 cm. |
| 282-355 (9.3-11.7) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 407-542 (13.4-17.8) | | brown (10YR5/3) fine to medium sand; very slightly effervescent; rounded grains; few small, rounded pebbles. |
| 628-763 (20.6-25.0) | | yellowish brown (10YR5/4) fine to medium sand; very slightly effervescent; rounded grains. |
| 810-945 (26.6-31.0) | | yellowish brown (10YR5/4) fine to medium sand; very slightly effervescent; rounded grains; very few small pebbles. |

Core/Profile: HS-8

Location: Paulson - near tributary

Legal description: NW ¼ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 710 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken on a slight rise by tributary; 30 meters from water's edge; 2 feet higher in elevation than HS-9

| Depth cm(ft) | Horizon or Zone | Description |
|----------------------|--------------------|--|
| 0-16 (0-.5) | A | black (10YR2/1) loam; moderate, medium, granular; friable; noneffervescent; abrupt lower boundary; roots. |
| 16-38 (.5-1.3) | AC1 | very dark grayish brown (10YR3/2) sandy loam to silt loam; mottles are common, faint, medium, black (10YR2/1); weak to moderate, medium, platy; clay coatings are thin, discontinuous, coat horizontal faces; friable; noneffervescent; gradual lower boundary; many vertical roots; omnidirectional rootlets. |
| 38-71 (1.3-2.3) | AC2 | black (10YR2/1) silt loam; mottles are common, medium, faint, brown (10YR5/3); weak, medium to coarse, granular to massive; clay coatings are thin, discontinuous, faint, coat pebble holes and a few vertical faces; friable; noneffervescent; gradual lower boundary; many vertical roots; omnidirectional rootlets. |
| 71-106 (2.3-3.5) | C | very dark brown (10YR2/2) loam; mottles are many, coarse to fine, faint to distinct, very dark grayish brown (10YR3/2), dark brown (10YR3/3), and black (10YR2/1); massive; clay coatings are thin, discontinuous, coat few vertical faces; friable; noneffervescent; clear lower boundary; pockets of dark brown (10YR3/3) loamy sand; crudely laminated in a few places; rootlets. |
| 106-134 (3.5-4.4) | 2ACb | black (10YR2/1) loam; mottles are few, faint, fine to medium, brown (10YR3/3); weak, medium, subangular blocky to massive; friable; noneffervescent; clear lower boundary; crudely laminated in a few places; top of horizon disturbed in coring; 5 cm inferred (no recovery). |
| 134-284 (4.4-9.3) | 2C1 | very dark brown (10YR2/2) sandy loam to loam; mottles are many, coarse to fine, faint, dark brown (10YR3/3), dark yellowish brown (10YR4/4), and black (10YR2/1); massive; friable to firm; very slightly effervescent near base; abrupt lower boundary; layers/pockets of fine sand, sandy loam, and loam in varying shades of brown; laminated in places; some color changes abrupt, others are mottled at the transition; occasional silty deposits; omnidirectional rootlets; few clay-rich nodules; may represent multiple deposits; horizon disturbed in coring; 10 cm inferred (no recovery). |
| 284-344 (9.3-11.3) | 3C2 | yellowish brown (10YR5/4) fine sand; single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); 10 cm inferred (no recovery). |
| Auger Samples: | | |
| 423-558 (13.9-18.3) | | dark brown (10YR3/3) loamy sand; very slightly effervescent; few small pebbles. |
| 669-804 (22.0-26.4) | | dark yellowish brown (10YR4/4) coarse sand and gravel; slightly effervescent; many pebbles. |
| 892-1027 (29.3-33.7) | | yellowish brown (10YR5/4) medium sand; slightly effervescent; rounded pebbles common. |

Core/Profile: HS-9

Location: Paulson - near tributary

Legal description: NW ¼ SE ¼ Sec. 33 T104N R7W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 708 feet

Topo. Map: Rushford East

Remarks: Paulson property; Root River; boring taken in a depression near tributary; depression runs perpendicular to tributary; 2 feet lower in elevation than HS-8

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-18 (0-.6) | A | black (10YR2/1) sandy loam; moderate, medium, granular; friable; noneffervescent; abrupt lower boundary; roots. |
| 18-37 (.69-1.2) | C | dark brown (10YR3/3) sandy loam; mottles are common, medium, faint, dark yellowish brown (10YR4/4); massive to weak, coarse, platy; very friable; noneffervescent; clear lower boundary; vertical roots; worm burrows; sand lenses. |
| 37-87 (1.2-2.9) | 2A | black (10YR2/1) loam; weak, fine to medium, granular; friable; noneffervescent; gradual lower boundary; omnidirectional rootlets. |
| 87-127 (2.9-4.2) | 2BA | very dark brown (10YR2/2) loam; weak, medium, prismatic parting to medium to coarse subangular blocky; clay coatings are moderately continuous, faint, coat ped faces; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; 5 cm inferred (no recovery). |
| 127-146 (4.2-4.8) | 2CB | very dark brown (10YR2/2) sandy loam; massive to very weak, medium, prismatic; clay coatings are faint, thin, discontinuous, coat ped faces; friable; noneffervescent; clear lower boundary; few rootlets; clay coatings are darker than surrounding soil. |
| 146-178 (4.8-5.8) | 2C1 | dark brown (10YR3/3) fine to medium sand; single grain; loose; noneffervescent; clear lower boundary; few rootlets. |
| 178-190 (5.8-6.2) | 2C2 | dark brown (10YR3/3) loamy sand to fine sand; single grain; loose; noneffervescent; clear lower boundary; very few rootlets. |
| 190-317 (6.2-10.4) | 2C3 | pale brown to brown (10YR6/3-5/3) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); several lenses of loamy sand (very dark grayish brown [10YR3/2] to dark yellowish brown [10YR3/4]); lenses at 200- 202 cm, 254-256 cm, 309-310 cm; no recovery 202-254 cm. |
| 317-354 (10.4-11.6) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 416-551 (13.7-18.1) | | yellowish brown (10YR5/4) coarse sand; slightly effervescent; small rounded pebbles common. |
| 659-794 (21.6-26.1) | | yellowish brown (10YR5/4) coarse sand; slightly effervescent; small rounded pebbles common. |

Core/Profile: HS-10

Location: Lynch - lowest core

Legal description: NW ¼ SW ¼ Sec. 3 T103N R5W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 760 feet

Topo. Map: Mound Prairie

Remarks: Lynch property; Root River; rock-cored meander; lowest boring on Lynch property; taken on a gentle slope; 2 feet lower in elevation than HS-11

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-27 (0-.9) | Ap | black (10YR2/1) loam; weak, coarse, granular; friable; noneffervescent; clear lower boundary; compacted; roots; many root voids. |
| 27-78 (.9-2.6) | A | black (10YR2/1) sandy loam; weak, coarse, granular to massive; very friable; noneffervescent; abrupt lower boundary; omnidirectional rootlets; last 8 cm are platy and harder than rest of unit; several roots. |
| 78-96 (2.6-3.2) | C1 | brown to dark brown (10YR4/3) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tube); omnidirectional rootlets; slightly loamy. |
| 96-127 (3.2-4.2) | | no recovery. |
| 127-163 (4.2-5.4) | C2 | yellowish brown (10YR5/4) fine sand; single grain; loose; noneffervescent; gradual lower boundary; oxidized, increasing amounts near base. |
| 163-214 (5.4-7.0) | C3 | yellowish brown (10YR5/6) fine sand; mottles are coarse, common, faint, dark yellowish brown (10YR4/4, 4/6, 3/4) bands of oxidation; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); oxidized; crude bedding;; loamy sand lens 163-165 cm; very weathered stem(?) in lens. |
| 214-234 (7.0-7.7) | | no recovery; refused on sands. |
| Auger Samples: | | |
| 245-380 (8.0-12.5) | | dark yellowish brown (10YR4/4) loamy fine sand; noneffervescent; few, fine, more oxidized mottles (strong brown [7.5YR4/6]). |
| 486-621 (15.9-20.4) | | brown to dark brown (10YR4/3) sandy loam; slightly effervescent; sand is very fine, bordering on cocuse silt. |

Core/Profile: HS-11

Location: Lynch - middle core

Legal description: NW ¼ SW ¼ Sec. 3 T103N R5W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 762 feet

Topo. Map: Mound Prairie

Remarks: Lynch property; Root River; rock-cored meander; boring taken in middle of gentle west to east slope; 2 feet lower in elevation than HS-12; 2 feet higher in elevation than HS-10

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|--|
| 0-29 (0-1.0) | Ap | black (10YR2/1) loam to sandy loam; weak, medium, granular; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; compacted; very few pebbles; root voids. |
| 29-85 (1.0-2.8) | A | black (10YR2/1) loam; weak, fine, granular to medium subangular blocky; clay coatings are thin, discontinuous, line root voids; friable; noneffervescent; diffuse lower boundary; omnidirectional rootlets; may be a weak Bt horizon; lower boundary disturbed in coring; many root voids. |
| 85-105 (2.8-3.4) | CB | dark brown (10YR3/3) loam to sandy loam; massive to weak, medium, prismatic; clay coatings are thin, discontinuous, coat ped faces and line root voids; friable; noneffervescent; gradual lower boundary; omnidirectional rootlets; base is massive to single grain. |
| 105-148 (3.4-4.9) | C1 | dark yellowish brown (10YR4/4) loamy fine sand; single grain; loose; noneffervescent; abrupt lower boundary; loamier with depth; crude bedding; 5 cm inferred (no recovery). |
| 148-172 (4.9-5.6) | C2 | light yellowish brown to yellowish brown (10YR 6/4-5/4) fine sand and dark yellowish brown (10YR3/4) loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; interbedded lenses of fine sand and loamy sand; lenses are 1-6 cm thick; oxidized. |
| 172-189 (5.6-6.2) | C3 | light yellowish brown (10YR 6/4) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); oxidized. |
| 189-206 (6.2-6.8) | | no recovery; refused on sands. |
| Auger Sample: | | |
| 206-311 (6.8-10.2) | | yellowish brown (10YR5/4) fine sand; noneffervescent; oxidized. |

Core/Profile: HS-12

Location: Lynch - highest boring

Legal description: NW ¼ SW ¼ Sec. 3 T103N R5W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 764 feet

Topo. Map: Mound Prairie

Remarks: Lynch property; Root River; rock-cored meander; easternmost core in transect across rock-cored meander; highest in elevation; 2 feet higher in elevation than HS-11

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-12 (0-.4) | Ap1 | black (10YR2/1) loam; weak, medium, granular to fine subangular blocky; friable; noneffervescent; clear lower boundary; many roots; compacted. |
| 12-28 (.4-.9) | Ap2 | black (10YR2/1) loam; massive; clay coatings are thin, discontinuous, line few root voids; friable; noneffervescent; clear lower boundary; compacted; rootlets; worm burrows/root voids partially filled with sediment. |
| 28-80 (.9-2.6) | A | black (10YR2/1) loam to sandy loam; massive; clay coatings are thin, discontinuous, line few root voids; friable; noneffervescent; clear lower boundary; omnidirectional rootlets; most root voids not filled with sediment. |
| 80-101 (2.6-3.3) | CB | dark brown (10YR3/3) sandy loam; massive to weak, fine, subangular blocky; clay coatings are thin, discontinuous, line root voids; friable; noneffervescent; abrupt lower boundary; some root voids filled with lighter sand; rootlets. |
| 101-168 (3.3-5.5) | C1 | light yellowish brown (10YR6/4) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; dark yellowish brown (10YR3/6) lenses of loamy sand common, ½ to 2 cm thick; oxidized; 5 cm inferred (no recovery). |
| 168-186 (5.5-6.1) | C2 | dark yellowish brown (10YR3/6) fine sand to loamy sand; single grain; loose; noneffervescent; abrupt lower boundary; oxidized; lens of slightly loamy sand. |
| 186-208 (6.1-6.8) | C3 | light yellowish brown (10YR6/4) fine sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); oxidized; 7 cm inferred (no recovery); refused on sands. |
| Auger Sample: | | |
| 219-354 (7.2-11.6) | | yellowish brown (10YR5/6) fine sand; noneffervescent; very few pebbles (<5%); oxidized. |

Core/Profile: HS-13

Location: Walker - on eastern slope

Legal description: N ½ SE ¼ Sec. 4 T103N R5W

County: Houston

Parent material: Alluvium

Vegetation: Soybeans, grasses

Slope: 0-2%

Elevation: 756 feet

Topo. Map: Mound Prairie

Remarks: Walker property; Root River; rock-cored meander; boring taken on eastern side of valley on a long shallow slope (<2%); 3 feet higher in elevation than HS-14

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-26 (0-.9) | Ap | black (10YR2/1) sandy loam; moderate, medium, platy; friable; noneffervescent; abrupt lower boundary; roots; compacted. |
| 26-74 (.9-2.4) | A | black (10YR2/1) sandy loam; massive; friable; noneffervescent; clear lower boundary; roots. |
| 74-96 (2.4-3.2) | CB | dark yellowish brown (10YR3/6) sandy loam to loam; weak, medium, subangular blocky; clay coatings are very weak, faint, discontinuous, coat few ped faces; friable; noneffervescent; abrupt lower boundary; few rootlets. |
| 96-159 (3.2-5.2) | C1 | yellowish brown (10YR5/4) fine sand; mottles are common, medium to coarse, faint, strong brown (7.5YR5/8-5/6); single grain; loose; noneffervescent; abrupt lower boundary (color change); few rootlets; patches of oxidation; 5 cm inferred (no recovery). |
| 159-255 (5.2-8.4) | C2 | strong brown (7.5YR4/6) fine sand; single grain; loose; noneffervescent; abrupt lower boundary (color change); oxidized; few grayish brown (10YR5/2) silt loam lenses, 201-203 cm, 247-249 cm; lens of medium sand, light yellowish brown (10YR6/4), 203-209 cm; 9 cm inferred (no recovery). |
| 255-328 (8.4-10.8) | C3 | pale brown to light yellowish brown (10YR6/3-6/4) fine to medium sand; mottles are common, coarse, distinct, strong brown (7.5YR5/8) patches of oxidation; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); bands of varying degrees of oxidation; band of unoxidized, light gray (10YR7/2) fine sand from 291-300 cm; silt loam lens at 303 cm; 11 cm inferred (no recovery); refused on bridged sands. |
| Auger Sample: | | |
| 399-534 (13.1-17.5) | | light yellowish brown (10YR6/4) fine sand; very slightly effervescent; oxidized. |

Core/Profile: HS-14

Location: Walker - small terrace

Legal description: N ½ SE ¼ Sec. 4 T103N R5W

County: Houston

Parent material: Alluvium/Lacustrine sediments

Vegetation: Soybeans, grasses

Slope: 0-2%

Elevation: 753 feet

Topo. Map: Mound Prairie

Remarks: Walker property; Root River; rock-cored meander; boring taken on small terrace; 6 feet higher in elevation than HS-15 on lowest terrace

| Depth cm(ft) | Horizon or Zone | Description |
|----------------------|--------------------|--|
| 0-13 (0-.4) | Ap1 | black (10YR2/1) sandy loam; weak, medium, granular; friable; noneffervescent; abrupt lower boundary; roots. |
| 13-37 (.4-1.2) | Ap2 | black (10YR2/1) sandy loam; weak, coarse, platy; friable; noneffervescent; clear lower boundary; compacted; omnidirectional rootlets. |
| 37-52 (1.2-1.7) | A | black (10YR2/1) loam; massive; friable; noneffervescent; clear lower boundary; compacted (less than Ap2); rootlets. |
| 52-73 (1.7-2.4) | AC | very dark brown (10YR2/2) sandy loam; massive; friable; noneffervescent; clear lower boundary; rootlets. |
| 73-82 (2.4-2.7) | CB | yellowish brown (10YR5/4) sandy clay loam to loam; mottles are few, fine, faint, grayish brown (10YR5/2); massive to weak subangular blocky; clay coatings are thin, discontinuous, line root voids; friable; noneffervescent; clear lower boundary; transition between sandier soil on top and clay-rich Bt horizon below; some root voids filled with dark brown sediment or lined with clay; oxidized. |
| 82-114 (2.7-3.7) | 2Btb | dark grayish brown to grayish brown (10YR4/2-5/2) silty clay loam to silty clay; mottles are few, fine, distinct, strong brown (7.5YR4/6); moderate, medium, prismatic parting to strong, medium, angular blocky; clay coatings are thick, continuous, coat ped faces and line pore spaces; firm to very firm; noneffervescent; abrupt lower boundary (change in texture); rootlets; some sand coatings on few ped faces. |
| 114-155 (3.7-5.1) | 2CBb | light brownish gray (10YR6/2) sandy loam to silt loam; mottles are few, fine, distinct, strong brown to dark brown (7.5YR4/6-3/4); massive to weak, medium, subangular blocky; clay coatings are thin, moderately continuous, coat ped faces; friable to firm; noneffervescent; clear lower boundary; sandier (sandy loam to loamy sand) 114-117 cm, 127-141 cm; rootlets; subangular blocky structure is prevalent in silty lower ½ of horizon; many roots; 10 cm inferred (no recovery). |
| 155-245 (5.1-8.0) | 3C1 | grayish brown (2.5Y5/2) silt loam; mottles are common, distinct, medium to coarse, strong brown (7.5YR4/6) to dark yellowish brown (10YR4/6); massive; friable; noneffervescent; abrupt lower boundary; interbedded oxidized sand lenses; crude bedding; sandy loam at top; silt is very coarse; clod of or burrow filled with very dark brown (10YR2/2) sandy loam approximately 217-220 cm, well-cemented. |
| 245-303 (8.0-9.9) | 4C2 | dark yellowish brown to yellowish brown (10YR4/6-5/6) fine sand; mottles are few, distinct, medium to coarse, grayish brown (10YR5/2); single grain; loose; noneffervescent; unknown lower boundary (end of tubes); oxidized; lens of grayish brown (10YR 5/2) silt loam from 299-302 cm; 2 cm inferred (no recovery). |
| 303-320 (9.9-10.5) | | no recovery; refused on sands. |
| Auger Samples: | | |
| 378-513 (12.4-16.8) | | brown (10YR5/3) sandy loam; very slightly effervescent; sand is very fine, bordering on coarse silt; few, fine (<1 mm) nodules of iron oxides. |
| 656-791 (21.5-26.0) | | very dark gray (2.5Y3/0) silt loam; very slightly effervescent; gleyed. |
| 904-1039 (29.7-34.1) | | very dark gray (2.5Y3/0) silt loam; slightly effervescent; gleyed. |

Core/Profile: HS-15

Location: Walker - lowest terrace

Legal description: N ½ SE ¼ Sec. 4 T103N R5W

County: Houston

Parent material: Alluvium/Lacustrine sediments

Vegetation: Soybeans, grasses

Slope: 0-2%

Elevation: 747 feet

Topo. Map: Mound Prairie

Remarks: Walker property; Root River; rock-cored meander; lowest boring (in elevation) in the transect; 6 feet lower in elevation than HS-14 (to east) and 2 feet lower than HS-16 (to west)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-23 (0-.8) | Ap | black (10YR2/1) silt loam; moderate, fine to medium, platy to medium granular; friable; noneffervescent; clear lower boundary; rootlets. |
| 23-50 (.8-1.6) | A1 | black (10YR2/1) silt loam; mottles are common, fine, faint, brown (10YR5/3); moderate, medium, platy; friable; noneffervescent; clear lower boundary; rootlets; darker black than A2. |
| 50-71 (1.6-2.3) | A2 | black (10YR2/1) silt loam; massive to weak, medium, granular; clay coatings are thin, discontinuous, line root voids; friable; noneffervescent; gradual lower boundary; rootlets; lower boundary obscured (disturbed in coring). |
| 71-105 (2.3-3.4) | Bt | brown to dark brown (10YR4/3) silty clay loam; mottles are common, fine, faint, dark yellowish brown (10YR4/6); weak, medium, prismatic; clay coatings are thin, moderate, continuous, coat ped faces; firm; noneffervescent; gradual lower boundary; lower boundary obscured (disturbed in coring); few rootlets. |
| 105-160 (3.4-5.3) | CB | grayish brown (10YR5/2) silt loam; mottles are common, fine to coarse, distinct, strong brown (7.5YR4/6) massive to weak, coarse, prismatic; clay coatings are thin, discontinuous, coat few ped faces; friable; noneffervescent; gradual lower boundary; several lenses of oxidized sand; few omnidirectional rootlets; several nodules of manganese (?) oxides; 5 cm inferred (no recovery). |
| 160-487 (5.3-16.0) | C | mottled yellowish brown (10YR5/4) to dark yellowish brown (10YR4/6) and light brownish gray (10YR6/2) silt loam; massive; friable; slightly effervescent; unknown lower boundary (end of tubes); silt is coarse; partly laminated; pockets of plant matter (grasses/stems) at 403 cm, 424 cm; gleyed around plant matter; several nodules of manganese (?) oxides; no recovery from 317-395 cm; 15 cm inferred (no recovery); wood from 424 cm C-14 dated at 20±50 BP.. |
| 487-510 (16.0-16.7) | | no recovery; refused on silty sand. |
| Auger Samples: | | |
| 608-743 (20.0-24.4) | | very dark gray (2.5Y3/0) silt loam; slightly effervescent; gleyed; almost blue in color. |
| 855-990 (28.1-32.5) | | dark gray (2.5Y4/0) silt loam; slightly effervescent; gleyed. |

Core/Profile: HS-16

Location: Walker - westernmost core

Legal description: N ½ SE ¼ Sec. 4 T103N R5W

County: Houston

Parent material: Alluvium

Vegetation: Soybeans, grasses

Slope: 0-2%

Elevation: 749 feet

Topo. Map: Mound Prairie

Remarks: Walker property; Root River; rock-cored meander; on rise between lowest part of transect and rock core (bluff) of meander; 2 feet higher in elevation than HS-15

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-27 (0-.9) | Ap | black (10YR2/1) silt loam; mottles are few, faint, fine, brown (10YR5/3) silty patches; weak, medium to coarse, platy; friable; noneffervescent; clear lower boundary; rootlets. |
| 27-71 (.9-2.3) | A | black (10YR2/1) silt loam; weak, medium, granular; friable; noneffervescent; clear lower boundary; lower boundary disturbed in coring; rootlets. |
| 71-93 (2.3-3.1) | Bt | very dark brown (10YR2/2) clay-rich silt loam; mottles are few, faint, fine, dark yellowish brown (10YR3/4); moderate, medium, subangular blocky; clay coatings are thin, discontinuous, coat ped faces; friable; noneffervescent; clear lower boundary; horizon disturbed in coring; omnidirectional rootlets; weakly developed. |
| 93-198 (3.1-6.5) | C1 | dark yellowish brown (10YR4/4) silt loam; mottles are common, fine, faint, light yellowish brown (10YR6/4); massive structure (fractures along horizontal planes); clay coatings are thin, discontinuous, coat horizontal surfaces; friable; noneffervescent; gradual lower boundary; oxidized; few bands of more oxidized soil (yellowish red [5YR4/6] to dark reddish brown [2.5YR2.5/4]); more clay-rich at top; rootlets; 15 cm inferred (no recovery). |
| 198-280 (6.5-9.2) | C2 | dark yellowish brown (10YR4/4) silt loam; mottles are few, fine, distinct, dark brown (7.5YR3/2); massive; friable; noneffervescent; gradual lower boundary; oxidized; few nodules of manganese (?) oxides; 8 cm inferred (no recovery). |
| 280-488 (9.2-16.0) | C3 | olive brown (2.5Y4/4) silt loam; mottles are many, medium to coarse, faint, dark yellowish brown (10YR4/6) and grayish brown (10YR5/2); massive; friable; slightly effervescent; unknown lower boundary (end of tubes); few nodules of manganese (?) oxides; gastropod shells; few roots; some laminations; 47 cm inferred (no recovery). |

Core/Profile: HS-17 through HS-50

Location:

Legal description:

County:

Parent material:

Vegetation:

Slope:

Elevation:

Topo. Map:

Remarks: Gap in numbering sequence; HS-17 through HS-50 never existed

| Depth cm(ft) | Horizon or Zone | Description |
|-----------------|--------------------|-------------|
|-----------------|--------------------|-------------|

Core/Profile: HS-51

Location: Peterson - high terrace

Legal description: NE ¼ SE ¼ Sec. 28 T103N R7W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 760 feet

Topo. Map: Yucatan

Remarks: Peterson property; South Branch of Root River; boring taken on high terrace; approximately 20 feet higher in elevation than HS-53 and HS-54 (on low terrace); probable rock-cored meander equivalent terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-22 (0-.7) | Ap | very dark grayish brown(10YR3/2) silt loam; moderate, medium, platy; friable; noneffervescent; abrupt lower boundary; rootlets; compacted; very little organic matter. |
| 22-28 (.7-.9) | AE | brown (10YR5/3) silt loam; moderate, medium to coarse, platy; friable; noneffervescent; clear lower boundary; rootlets. |
| 28-68 (.9-2.2) | Bt1 | dark yellowish brown (10YR4/4) silty clay loam; mottles are common, fine, faint, strong brown (7.5YR5/6); strong, medium, angular blocky; clay coatings are thick, continuous, coat ped faces; silt coatings are thin, discontinuous, coat ped faces; firm to very firm; noneffervescent; gradual lower boundary; rootlets; structure coarsens near base. |
| 68-132 (2.2-4.3) | Bt2 | brown (10YR5/3) silty clay loam; mottles are common, medium, distinct, strong brown (7.5YR4/6); moderate, medium, prismatic parting to coarse angular blocky; clay coatings are thick, continuous, coat ped faces and line root voids; firm to very firm; noneffervescent; gradual lower boundary; very hard when dry; many root voids lined with very dark grayish brown (10YR3/2) clay coatings; many small rootlets/rootlet voids; patches of oxidation; 5 cm inferred (no recovery). |
| 132-175 (4.3-5.7) | BC | brown (10YR5/3) clay-rich silt loam; mottles are common, medium, distinct, strong brown (7.5YR4/6); weak, coarse, prismatic to massive; clay coatings are thin, discontinuous, very dark grayish brown (10YR3/2), coat ped faces; very slightly effervescent; clear lower boundary; omnidirectional rootlets; vertical roots; fractures along horizontal planes; patches of oxidation. |
| 175-229 (5.7-7.5) | C1 | grayish brown (10YR5/2) silt loam; mottles are many, medium, distinct, strong brown (7.5YR4/6) to dark yellowish brown (10YR 4/6); massive; friable; very slightly effervescent; gradual lower boundary; laminated; patches of oxidation; fractures along bedding planes; many root voids filled with dark brown sediment. |
| 229-440 (7.5-14.4) | C2 | light brownish gray to grayish brown (10YR6/2-5/2) silt loam; mottles are common, medium, planar, distinct, strong brown (10YR4/6) in lower 60 cm of unit; massive; friable; very slightly effervescent; abrupt lower boundary; laminated last 60 cm; bands of oxidation and a few thin (1-2 cm) sand lenses last 60 cm; very little oxidation in rest of unit; few concretions of oxides; 11 cm inferred (no recovery). |
| 440-451 (14.4-14.8) | C3 | pale brown (10YR6/3) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; sand lens; few small pebbles. |
| 451-466 (14.8-15.3) | C4 | grayish brown (2.5Y5/2) silt loam; mottles are common, fine, planar, distinct, strong brown (7.5YR4/6); massive; friable; slightly effervescent; abrupt lower boundary; laminated; bands of oxidation; hard band of dark brown (7.5YR3/2) oxides at base of horizon. |
| 466-500 (15.3-16.4) | 2C5 | pale brown (10YR6/3) fine sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); no recovery from 483-500 cm; refused on sand. |
| Auger Samples: | | |
| 507-642 (16.6-21.1) | | dark yellowish brown (10YR4/4) sandy loam to loamy sand and very dark gray (10YR3/1) silt loam; slightly effervescent; cannot tell whether the silt loam or the sandy loam/loamy sand is the actual unit augered through last - both may be present. |
| 742-877 (24.3-28.8) | | yellowish brown (10YR5/4-5/6) loamy sand; strongly effervescent; very dense, fine sand; oxidized. |

Core/Profile: HS-52

Location: Peterson - high terrace

Legal description: NE ¼ SE ¼ Sec. 28 T103N R7W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 760 feet

Topo. Map: Yucatan

Remarks: Peterson property; South Branch of Root River; boring taken on high terrace; approximately 20 feet higher in elevation than HS-53 and HS-54 (on low terrace); probable rock-cored meander equivalent terrace

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-27 (0-.9) | Ap | very dark grayish brown (10YR3/2) silt loam; moderate to strong, fine to medium, platy; friable; noneffervescent; abrupt lower boundary; not very organic; rootlets; few small pebbles. |
| 27-95 (.9-3.1) | Bt1 | dark yellowish brown (10YR4/4) silty clay loam; strong, medium, angular blocky; clay coatings are thick, continuous, coat ped faces; silt coatings are thin, discontinuous, coat ped faces; firm; noneffervescent; gradual lower boundary; rootlets; oxidized; worm burrows filled with sediment from above; silt coatings are very pale brown (10YR7/3). |
| 95-180 (3.1-5.9) | Bt2 | dark yellowish brown (10YR4/4) silty clay loam; moderate, medium, prismatic parting to medium angular blocky at top; clay coatings are thick, continuous, coat ped faces; silt coatings are thin, discontinuous, coat some ped faces; firm; noneffervescent; clear lower boundary; prismatic structure coarsens with depth; rootlets; oxidized; silt coatings are very pale brown (10YR7/3); 5 cm inferred (no recovery). |
| 180-260 (5.9-8.5) | C1 | dark yellowish brown (10YR3/4) silt loam; mottles are common, fine to medium, distinct, very dark brown (10YR2/2) and light brownish gray (10YR6/2); massive; very friable; very slightly effervescent; gradual lower boundary; finely laminated; oxidized; 5 cm inferred (no recovery). |
| 260-319 (8.5-10.5) | C2 | olive brown (2.5Y4/4) to yellowish brown (10YR5/4) silt loam; mottles are common, fine, distinct, very dark brown (10YR2/2) and common, medium, distinct, strong brown (7.5YR4/6); massive; friable; slightly to strongly effervescent; clear lower boundary; laminated; fractures along bedding planes. |
| 319-330 (10.5-10.8) | C3 | yellowish brown (10YR5/6) fine sand; single grain; loose; slightly to strongly effervescent; clear lower boundary; sand lens; clumps of laminated silt loam may be related to disturbance in coring. |
| 330-353 (10.8-11.6) | C4 | light olive brown (2.5Y5/4) silt loam; mottles are few, coarse, distinct, strong brown (7.5YR4/6) oxidized laminations; massive; friable; slightly to strongly effervescent; clear lower boundary; horizon disturbed in coring; crudely bedded. |
| 353-359 (11.6-11.8) | C5 | yellowish brown (10YR5/6) fine sand; single grain; loose; very slightly effervescent; clear lower boundary; sand lens; few clumps of laminated silt loam may be related to disturbances in coring. |
| 359-430 (11.8-14.1) | C6 | grayish brown (2.5Y5/2) and dark brown (7.5YR3/2-3/4) silt loam; mottles are few, fine, distinct, yellowish red (5YR4/6); massive; friable; slightly effervescent; abrupt lower boundary; finely laminated; fractures along bedding planes; beds alternate between oxidized and unoxidized; few sand lenses (□ 1 mm thick); 9 cm inferred (no recovery); gastropod shell fragments. |
| 430-458 (14.1-15.0) | C7 | yellowish brown (10YR5/4) fine sand; single grain; loose; slightly effervescent; clear lower boundary; sand lens; few clumps of laminated silt loam may be related to disturbance in coring. |
| 458-480 (15.0-15.8) | C8 | grayish brown (2.5Y5/2) and dark brown (7.5YR3/2) silt loam; mottles are few, coarse, distinct, strong brown (7.5YR4/6) bands of oxidation; massive; friable; slightly to strongly effervescent; clear lower boundary; finely laminated; fractures along bedding planes; beds alternate between oxidized and unoxidized. |
| 480-576 (15.8-18.9) | 2C9 | brownish yellow (10YR6/6) fine sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); few rounded pebbles; layer of silt loam □ 490 cm; 27 cm inferred (no recovery); refused on sand. |

Auger Sample:

678-813 (22.2-26.7)

dark yellowish brown (10YR4/4) loamy sand to fine sand; strongly effervescent; refused on hard, dense, dry sand.

Mn/Model March 30, 1999

Core/Profile: HS-53

Location: Peterson - low terrace

Legal description: NE ¼ SE ¼ Sec. 28 T103N R7W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 740 feet

Topo. Map: Yucatan

Remarks: Peterson property; South Branch of Root River; boring taken on low terrace; approximately 20 feet lower in elevation than HS-51 and HS-52 (on high terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-27 (0-.9) | Ap1 | very dark grayish brown (10YR3/2) silt loam; mottles are few, fine, faint, brown (10YR5/3); weak, medium, granular; friable; noneffervescent; abrupt lower boundary; rootlets; compacted to slightly platy near base; worm burrows filled with sediment. |
| 27-46 (.9-1.5) | Ap2 | black to very dark grayish brown (10YR2/4 3/2) silt loam; mottles are few, fine, faint, brown (10YR5/3); moderate, fine, platy; friable; noneffervescent; clear lower boundary; rootlets; compacted; slightly loamy. |
| 46-73 (1.5-2.4) | AC | black to very dark grayish brown (10YR2/4 3/2) silt loam; mottles are common, medium, faint, brown (10YR5/3); massive to weak, medium, platy; friable; noneffervescent; clear lower boundary; rootlets; crudely laminated; fairly recent sediments. |
| 73-183 (2.4-6.0) | 2Ab | black (10YR2/1) silt loam; moderate, fine to medium, granular; clay coatings are thin, moderately continuous, line root voids; friable; noneffervescent; clear lower boundary (textural change); rootlets; 5 cm inferred (no recovery). |
| 183-208 (6.0-6.8) | 2ABb | black (10YR2/1) silt loam to silty clay loam; moderate, medium, granular to fine subangular blocky; clay coatings are thick, continuous, line root voids; friable to firm; noneffervescent; gradual lower boundary; clay content increases with depth. |
| 208-264 (6.8-8.7) | 2Btb1 | black (10YR2/1) silty clay loam; mottles are few, fine, faint, pale brown (10YR6/3); moderate, medium to coarse, angular blocky; clay coatings are thick, black, discontinuous, coat ped faces; firm to very firm; noneffervescent; gradual lower boundary; horizon disturbed by coring; 5 cm inferred (no recovery). |
| 264-312 (8.7-10.2) | 2Btb2 | very dark grayish brown to black (10YR3/2 2/1) silty clay loam; mottles are few, fine, faint, pale brown (10YR6/3); moderate, medium, prismatic; clay coatings are thick, continuous, coat ped faces and line root voids; firm to very firm; noneffervescent; gradual lower boundary; some clay coatings are black (10YR2/1) few rootlets. |
| 312-408 (10.2-13.4) | 2C1 | very dark grayish brown (10YR3/2) silt loam; massive; clay coatings are thick, continuous, distinct, black, line root voids; friable to firm; noneffervescent; gradual lower boundary; few horizontal roots; more clay rich than 2C2; 5 cm inferred (no recovery). |
| 408-429 (13.4-14.1) | 2C2 | black (2.5Y2/0) silty clay loam; mottles are few, faint, medium, dark yellowish brown (10YR3/4); massive; friable; noneffervescent; unknown lower boundary (end of tubes); plant matter (grasses/leaves/stems) from 420-429 cm collected; crudely laminated; pisoliths; few rootlets; 6 cm inferred (no recovery); refused on sand and cobbles. |
| Auger Samples: | | |
| 429-455 (14.1-14.9) | | dark gray (10YR4/1) sandy loam to loamy sand; slightly effervescent; small pebbles common; refused on cobble. |

Core/Profile: HS-54

Location: Peterson - low terrace

Legal description: NE ¼ SE ¼ Sec. 28 T103N R7W

County: Houston

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 740 feet

Topo. Map: Yucatan

Remarks: Peterson property; South Branch of Root River; boring taken on low terrace; approximately 20 feet lower in elevation than HS-51 and HS-52 (on high terrace)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-25 (0-.8) | Ap | black (10YR2/1) loam; weak, medium, granular to fine subangular blocky; friable; noneffervescent; clear lower boundary; rootlets; compacted. |
| 25-48 (.8-1.6) | ACp | black (10YR2/1) sandy loam; weak, medium, platy; friable; noneffervescent; abrupt lower boundary (textural change); rootlets; many root voids; compacted; probably recent sediments. |
| 48-100 (1.6-3.3) | 2Ab | black (10YR2/1) loam; weak, medium, granular; clay coatings are thick, discontinuous, line root voids; friable; noneffervescent; unknown lower boundary (end of tubes); darker and loamier than ACp horizon; rootlets. |
| 100-127 (3.3-4.2) | | no recovery. |
| 127-174 (4.2-5.7) | 2Btb | dark brown (10YR3/3) clay loam; mottles are few, medium, distinct, pale brown (10YR6/3); moderate, medium, prismatic parting to medium subangular blocky; clay coatings are thick, continuous, coat ped faces; silt coatings are thin, discontinuous, coat some ped faces; firm; noneffervescent; clear lower boundary. |
| 174-264 (5.7-8.7) | 2C1 | dark brown (10YR3/3) loam; massive; friable to firm; noneffervescent; gradual lower boundary; lenses of sandy loam and sandy clay loam; slightly oxidized. |
| 264-368 (8.7-12.1) | 2C2 | dark brown (10YR3/3) sandy loam to loamy sand; mottles are common, coarse, faint, very dark grayish brown (10YR3/2) and dark yellowish brown (10YR4/4); massive to single grain; very friable to loose; noneffervescent; unknown lower boundary (end of tubes); lenses of loam; ends in fine sand; partly oxidized; some grasses in loamier lenses; loamy lenses are in dark grayish brown (10YR3/2). |
| 368-506 (12.1-16.6) | | no recovery; refused on sands. |
| Auger Samples: | | |
| 554-689 (18.2-22.6) | | dark yellowish brown (10YR4/4) fine to medium sand; noneffervescent; many small pebbles (coarse sand). |
| 729-864 (23.9-28.4) | | dark yellowish brown (10YR4/4) fine to medium sand; very slightly effervescent; many small pebbles/coarse sand; refused on cobble. |

Core/Profile: HS-55

Location: Minnesota Hwy. 76 - east side of road

Legal description: E ½ NE ¼ Sec. 4 T103N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 683 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 76; Root River; east side of road in ditch; approximately 630 meters south of Minnesota Hwy. 16

| Depth cm(ft) | Horizon or Zone | Description |
|----------------------|--------------------|--|
| 0-13 (0-.4) | Ap1 | black (10YR2/1) loam; weak, medium to coarse, granular to massive; friable; noneffervescent; clear lower boundary; very dense in bottom half of unit; rootlets. |
| 13-38 (.4-1.3) | Ap2 | black (10YR2/1) loam; moderate, medium, platy; friable; very slightly effervescent; clear lower boundary; rootlets; dense. |
| 38-63 (1.3-2.1) | A | very dark grayish brown (10YR3/2) loam; weak, coarse, platy to massive; friable; noneffervescent; clear lower boundary; rootlets; sandy; horizontal planes are slightly blacker than rest of soil; fairly dense. |
| 63-98 (2.1-3.2) | AC | very dark grayish brown to brown to dark brown (10YR3/2-4/3) sandy loam to loamy sand; massive; very friable; noneffervescent; clear lower boundary; sand is fine; loamier at top; ends in fine sand; color lightens with depth. |
| 98-135 (3.2-4.4) | 2C | brown (10YR5/3) fine sand; single grain; loose; noneffervescent; abrupt lower boundary; 5 cm inferred (no recovery). |
| 135-143 (4.4-4.7) | 3CA | dark brown (10YR3/3) sandy loam; massive; friable; slightly effervescent; clear lower boundary; weakly developed soil, but there is a definite increase in silts and clays and in organic carbon content. |
| 143-178 (4.7-5.8) | 3C1 | dark gray (10YR4/1) loamy sand to fine sand; mottles are few, fine to medium, faint, dark brown (7.5YR3/4); massive to single grain; very friable to loose; strongly effervescent; clear lower boundary; grayish brown (10YR5/2) carbonate accumulation at the top of the horizon; ends in fine sand. |
| 178-673 (5.8-22.1) | 3C2 | light brownish gray (10YR6/2) fine sand; mottles are few, distinct, coarse, dark gray (10YR4/1); single grain; loose; noneffervescent; unknown lower boundary (end of tubes); slightly oxidized top 15 to 20 cm - the rest is unoxidized; several pieces of wood collected throughout unit; the only pebble found was at the base of sample; less than half of this unit was actually recovered; for a 120-127 cm push, recoveries ranged from 32 cm to 73 cm; refused on sand; unidentified bark from 660-662 cm C-14 dated at 3,360±50 BP. |
| Auger Samples: | | |
| 683-818 (22.4-26.8) | | dark grayish brown (10YR4/2) fine to medium sand; very slightly effervescent. |
| 937-1072 (30.7-35.2) | | dark grayish brown to grayish brown (10YR4/2-5/2); fine to medium sand; slightly effervescent. |

Core/Profile: HS-56

Location: Minnesota Hwy. 76 - east side of road

Legal description: E ½ NE ¼ Sec. 4 T103N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 683 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 76; Root River; east side of road in ditch approximately 480 meters south of Minnesota Hwy. 16

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-19 (0-.6) | Ap1 | black (10YR2/1) silt loam to loam; weak, coarse, granular; friable; noneffervescent; clear lower boundary; roots. |
| 19-51 (.6-1.7) | Ap2 | black (10YR2/1) silt loam to loam; moderate, medium, platy; friable; noneffervescent; clear lower boundary; very crudely laminated (slightly different shades of dark brown); few pale brown (10YR6/3) silt lenses; rootlets; may be ditch sediments; compacted. |
| 51-68 (1.7-2.2) | A | very dark gray (10YR3/1) silt loam to loam; massive to weak, medium, granular; friable; noneffervescent; gradual lower boundary; rootlets; dense; compacted. |
| 68-98 (2.2-3.2) | BC | very dark gray to very dark grayish brown (10YR3/1-3/2) loam; weak, medium, prismatic to massive; clay coatings are moderate, thick, continuous, coat ped faces and line root voids; friable; noneffervescent; gradual lower boundary; few rootlets. |
| 98-111 (3.2-3.6) | 2C1 | very dark grayish brown (10YR3/2) loamy sand; massive; friable to loose; noneffervescent; clear lower boundary; horizon disturbed in coring. |
| 111-159 (3.6-5.2) | 2C2 | very dark grayish brown (10YR3/2) sandy loam; mottles are few, fine, faint, dark brown (7.5YR3/4); massive; friable; noneffervescent; clear lower boundary; few rootlets; some patches of oxidation. |
| 159-179 (5.2-5.9) | 2C3 | dark grayish brown (10YR4/2) fine sand; mottles are common, medium, faint to distinct, dark yellowish brown (10YR3/4); single grain; loose; noneffervescent; clear lower boundary; bands of oxidation near base; few loamy lenses. |
| 179-191 (5.9-6.3) | 3C4 | very dark gray (10YR3/1) sandy loam; massive; friable; noneffervescent; abrupt lower boundary. |
| 191-271 (6.3-8.9) | 3C5 | grayish brown to light grayish brown (10YR5/2-6/2) fine to medium sand; single grain; loose; noneffervescent; unknown lower boundary (end of tubes); occasional lenses of finer or coarser sand); 36 cm inferred (no recovery). |
| 271-378 (8.9-12.4) | | no recovery; ended in sand. |
| Auger Samples: | | |
| 499-634 (16.4-20.8) | | very dark gray (10YR3/1) fine to medium sand; noneffervescent; few rounded pebbles; some fines. |
| 669-804 (22.0-26.4) | | dark grayish brown (2.5Y4/2) medium sand; slightly effervescent. |

Core/Profile: HS-57

Location: Minnesota Hwy. 76 - east side of road

Legal description: SW ¼ SW ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 683 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 76; Root River; east side of road in ditch approximately 300 meters south of Minnesota Hwy. 16

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------------------------|--------------------|--|
| 0-23 (0-.8) | Ap | black (10YR2/1) silt loam; moderate to strong, medium to coarse, granular; friable; noneffervescent; abrupt lower boundary; many rootlets; hard when dry. |
| 23-49 (.8-1.6) | A | black (10YR2/1) silt-rich loam; weak, medium, platy to weak granular; clay coatings are thin, discontinuous, line root voids; friable; noneffervescent; gradual lower boundary; omnidirectional rootlets; darker in color than Ap horizon. |
| 49-95 (1.6-3.1) | BA | black (10YR2/1) loam; weak, coarse, prismatic to weak, medium, subangular blocky; clay coatings are thin, moderate, continuous, coat ped faces and line root voids; sand coatings are thin to thick, coat some ped faces; friable; very slightly effervescent; clear lower boundary; sand coatings are thick on some faces and very thin on others (may be an artifact of coring disturbances?); rootlets. |
| 95-106 (3.1-3.5) | 2C1 | very dark brown (10YR2/2) sandy loam; mottles are few, fine, distinct, dark reddish brown (5YR3/4); massive; friable; very slightly effervescent; clear lower boundary; few omnidirectional rootlets; very crude subangular blocky structure near top in transition zone from BA horizon. |
| 106-116 (3.5-3.8) | 2C2 | brown to dark brown (10YR4/3) fine sand to loamy sand; mottles are few, fine, distinct, strong brown (7.5YR4/6); massive to single grain; very friable to loose; very slightly effervescent; clear lower boundary; lower horizon disturbed in coring; few omnidirectional rootlets; few patches of oxidation. |
| 116-143 (3.8-4.7) | 2C3 | dark gray (10YR4/1) fine sand to loamy sand; mottles are common, coarse, distinct, strong brown (7.5YR4/6); massive; very friable; noneffervescent; clear lower boundary; slightly loamy; many omnidirectional rootlets; may be top of a fining upwards sequence with 2C4; 5 cm inferred (no recovery). |
| 143-164 (4.7-5.4) | 2C4 | grayish brown (10YR5/2) fine to medium sand; single grain; loose; noneffervescent; abrupt lower boundary; may be part of a fining upwards sequence with 2C3. |
| 164-177 (5.4-5.8) | 3C5 | mottled very dark gray to gray (10YR3/1-5/1) loamy fine sand; massive; very friable; noneffervescent; clear lower boundary; few lenses are loamier than rest of the unit; some rootlets in loamier lens; may be top of a fining upwards sequence; darker at top of unit. |
| 177-379 (5.8-12.4) | 3C6 | grayish brown (10YR5/2) fine to medium sand; single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); rounded sand grains; less than half of actual depth was recovered due to running saturated sands. |
| Auger Sample: 433-568 (14.2-18.6) | | dark gray (10YR4/1) medium sand; slightly effervescent; very few small pebbles/coarse sand. |

Core/Profile: HS-58

Location: Minnesota Hwy. 76 - east side of road

Legal description: SW ¼ SW ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 683 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 76; Root River; east side of road in ditch approximately 26 meters south of Minnesota Hwy. 16

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-29 (0-1.0) | Ap | black (10YR2/1) silt loam; moderate, fine, subangular blocky to weak, medium, granular; friable; noneffervescent; clear lower boundary; roots. |
| 29-45 (1.0-1.5) | A | black (10YR2/1) clay-rich silt loam; weak, medium, granular to weak, fine, subangular blocky; clay coatings are thin, discontinuous, line root voids; friable; noneffervescent; gradual lower boundary; rootlets; some sand, but not enough for a loam. |
| 45-69 (1.5-2.3) | AB | black (10YR2/1) clay-rich silt loam; weak, fine, subangular blocky; clay coatings are thin, discontinuous, line root voids and coat few horizontal planes; friable; noneffervescent; gradual lower boundary; omnidirectional rootlets; granular structure in a few places; some sand, but not enough for a loam. |
| 69-101 (2.3-3.3) | BA | very dark gray (10YR3/1) silty clay loam to clay loam; moderate, coarse, subangular blocky parting to moderate, fine, angular blocky; clay coatings are thick, continuous, coat ped faces and line root voids; friable to firm; very slightly effervescent; clear lower boundary; sand coatings are discontinuous and coat few ped faces; omnidirectional rootlets; weak Bt at top. |
| 101-112 (3.3-3.7) | CB | very dark grayish brown (10YR3/2) silt-rich loam; weak to moderate, medium, prismatic; clay coatings are moderately thick, moderately continuous, coat ped faces; friable to firm; very slightly effervescent; clear lower boundary; sand coatings are more continuous than BA, but not fully continuous, coat ped faces; omnidirectional rootlets; few vertical roots. |
| 112-134 (3.7-4.4) | 2C1 | dark brown (10YR3/3) sandy loam to loamy sand; massive to single grain; few sand coatings on very weak prismatic peds at top of unit (dark yellowish brown [10YR4/4]); very friable to loose; very slightly effervescent; clear lower boundary; sandier with depth; few prismatic peds near top of horizon (transition from CB); possible fining upwards sequence with C2; 5 cm inferred (no recovery). |
| 134-174 (4.4-5.7) | 2C2 | dark yellowish brown (10YR4/4) fine sand to medium sand; mottles are few, coarse, faint, dark brown (10YR3/3); single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); sand coarsens with depth; few lenses of slightly loamy sand; oxidized; may be part of a fining upwards sequence with C1. |
| 174-241 (5.7-7.9) | | no recovery; refused on sand. |
| Auger Samples: | | |
| 397-532 (13.0-17.5) | | yellowish brown (10YR5/4) coarse sand; slightly effervescent; few very small pebbles. |
| 693-828 (22.7-27.2) | | dark yellowish brown (10YR4/4) medium sand; slightly effervescent. |

Core/Profile: HS-59

Location: Minnesota Hwy. 16 - south side of road

Legal description: SW ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: □ 680 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 16; Root River; south side of road in ditch; approximately 150 meters east of Minnesota Hwy. 76; in depression that runs under first bridge east of Minnesota Hwy. 76

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-20 (0-.7) | Ap | black (10YR2/1) loam; mottles are few, fine, distinct, brown (10YR5/3); weak, fine, granular at top to massive; friable; noneffervescent; clear lower boundary; few small to medium pebbles; rootlets; compacted; fractured into angular blocks; hard when dry. |
| 20-49 (.7-1.6) | C1 | black (10YR2/1) silty clay loam; mottles are few, medium, distinct, yellowish red (5YR5/8) and red (2.5YR4/8); massive structure (highly fractured); friable to firm; noneffervescent; clear lower boundary; very hard when dry; compacted; rootlets; few pebbles; some oxidation coatings on planar faces; highly fractured into angular blacks (not peds); few fractures are conchoidal. |
| 49-88 (1.6-2.9) | C2 | black (10YR2/1) silty clay loam; mottles are common, coarse, distinct, dusky red (10R3/4) patches of oxidation coating some fracture planes and lining root voids; massive; friable to firm; noneffervescent; clear lower boundary; hard when dry; rootlets; compacted; some oxidation coatings on planar faces. |
| 88-127 (2.9-4.2) | C3 | black (10YR2/1) loam; few, fine, distinct, dark reddish brown (5YR3/3) massive; friable; noneffervescent; unknown lower boundary (end of tube); sand coats bottom of core barrel (may be abrupt lower boundary; small sand lens near base; plant matter (stems/grasses/roots) top 10 cm; small amounts of plant matter rest of unit; few lenses of silt loam and sandy loam. |
| 127-137 (4.2-4.5) | 2C4 | dark gray (5Y4/1) medium sand; single grain; loose; noneffervescent; abrupt lower boundary; unoxidized. |
| 137-154 (4.5-5.1) | 2C5 | very dark gray to black (10YR3/4 2/1) sandy loam; single grain to massive; loose to very friable; noneffervescent; unknown lower boundary (end of tube); silt loam lens at base (150-154 cm); plant matter (stems/roots/grasses); unoxidized; few small pebbles. |
| 154-254 (5.1-8.3) | | no recovery. |
| 254-274 (8.3-9.0) | 2C6 | dark gray (5Y4/1) medium sand; mottles are few, coarse, faint, very dark gray (10YR3/1); single grain; loose; noneffervescent; unknown lower boundary (end of tubes); lens of loamy sand 264-266 cm; unoxidized; few rootlets. |
| 274-342 (9.0-11.2) | | no recovery; refused on sand; drillers notes: running sand. |
| Auger Sample: | | |
| 425-560 (13.9-18.4) | | dark yellowish brown (10YR4/4) coarse sand; very slightly effervescent; few, very small pebbles; oxidized. |

Core/Profile: HS-60

Location: Minnesota Hwy. 16 - south side of road

Legal description: SW ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 681 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 16; Root River; south side of road in ditch; approximately 330 meters east of Minnesota Hwy. 76

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-9 (0-.3) | Ap1 | black (10YR2/1) loam; weak, fine to medium, granular; friable; very slightly effervescent; abrupt lower boundary; few pebbles; many roots; gastropod shell; grasses. |
| 9-16 (.3-.5) | Ap2 | black (10YR2/1) silty clay loam to clay loam; mottles are few, medium, distinct, yellowish brown (10YR5/4) moderate, medium, platy; friable to firm; noneffervescent; clear lower boundary; compacted; roots. |
| 16-47 (.5-1.5) | C1 | very dark grayish brown (10YR3/2) silty clay; massive structure (highly fractured); very firm; noneffervescent; clear lower boundary; very hard when dry; rootlets; highly fractured into angular blocks; many fractures are conchoidal; resemble desiccation fractures. |
| 47-88 (1.5-2.9) | C2 | very dark gray (10YR3/1) silty clay loam; massive structure; friable to firm; noneffervescent; clear lower boundary; extremely hard at top when dry; few omnidirectional rootlets; may be developing weak, coarse, prismatic peds (clay coating on a vertical plane through core). |
| 88-108 (2.9-3.5) | 2C3 | very dark grayish brown (10YR3/2) sandy loam; massive; friable; noneffervescent; clear lower boundary; very few rootlets; sand is medium to coarse; few small pebbles; few patchy clay coats on vertical planes (start of prismatic peds?). |
| 108-132 (3.5-4.3) | 2C4 | dark brown to dark yellowish brown (10YR3/3-3/4) loamy sand to medium sand; massive to single grain; very friable to loose; noneffervescent; unknown lower boundary (end of tubes); loamier at top; sands at bottom; slightly oxidized near base; few rootlets; 14 cm inferred (no recovery). |
| 132-204 (4.3-6.7) | | no recovery; refused on sands. |
| Auger Samples: | | |
| 323-458 (10.6-15.0) | | dark yellowish brown (10YR4/4) coarse sand; very slightly effervescent; few small pebbles; oxidized. |
| 577-712 (18.9-23.4) | | brown to dark brown (10YR4/3) coarse sand; very slightly effervescent; few small pebbles. |

Core/Profile: HS-61

Location: Minnesota Hwy. 16 - south side of road

Legal description: SW ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: □ 680 feet

Topo. Map: Houston

Remarks: Minnesota Hwy. 16 right-of-way; Root River; south side of road in ditch; in line with the second bridge east of Minnesota Hwy. 76

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-11 (0-.4) | Ap | black (10YR2/1) silt loam; weak, fine to medium, granular; platy near base; friable; very slightly effervescent; abrupt lower boundary; roots. |
| 11-25 (.4-.8) | AC | black to very dark grayish brown (10YR2/4 3/2) silt loam; moderate, medium, platy; friable; noneffervescent; clear lower boundary; many omnidirectional rootlets; recent sediments; 5 cm inferred (no recovery). |
| 25-65 (.8-2.1) | C1 | brown (10YR5/3) silt loam; mottles are few, fine, distinct, strong brown (7.5YR5/6) to dark brown (7.5YR3/2); massive structure (fractured); friable; slightly effervescent; abrupt lower boundary; fractured into angular blocks (not peds); conchoidal fractures in finer mottles; few oxidized laminations; many omnidirectional rootlets; recent sediments; 10 cm inferred (no recovery). |
| 65-85 (2.1-2.8) | C2 | very dark gray and brown (10YR3/1 and 5/3) silty clay loam and silt loam; mottles are few, fine, distinct strong brown (7.5YR5/6) to dark brown (7.5YR3/2) patches of oxidation in silt loam; massive structure (fractures along bedding planes); friable; slightly effervescent; abrupt lower boundary; laminated very dark gray silty clays and brown silts; fractured into angular blocks and along bedding planes; few rootlets; recent sediments; 5 cm inferred (no recovery). |
| 85-106 (2.8-3.5) | 2ACb | black (10YR2/1) clay-rich loam; massive; firm; noneffervescent; clear lower boundary; 5 cm inferred (no recovery). |
| 106-130 (3.5-4.3) | 2CA | very dark grayish brown (10YR3/2) sandy loam to loamy sand; mottles are common, fine to coarse, faint, black (10YR2/1); massive; friable; noneffervescent; gradual lower boundary; several infilled worm burrows (filled with black sediment); 5 cm inferred (no recovery); CA not used to designate a depositional horizon. |
| 130-144 (4.3-4.7) | 2C | grayish brown (10YR5/2) fine sand; mottles are few, fine, faint, dark yellowish brown (10YR4/4-4/6); single grain; loose; noneffervescent; abrupt lower boundary; few slightly loamy lenses; few patches of oxidation. |
| 144-164 (4.7-5.4) | 3CA | very dark grayish brown (10YR3/2) sandy loam to loamy sand; mottles are few, fine, distinct, very pale brown (10YR7/3) and few, medium, faint, dark yellowish brown (10YR3/4) to dark brown (7.5YR3/4); massive; very friable; slightly effervescent; gradual lower boundary; many oxidized root voids; some carbonate accumulation. |
| 164-261 (5.4-8.6) | 4C1 | grayish brown (10YR5/2) fine sand; mottles are many, coarse, distinct, very dark gray (10YR3/1) bands; single grain; loose; slightly effervescent; clear lower boundary; interbedded lenses of loamy sand to sandy loam in fine sand unit; lenses are □ 1-6 cm thick and often contain roots; crudely laminated; unoxidized; 45 cm not recovered. |
| 261-411 (8.6-13.5) | 4C2 | light brownish gray to gray (10YR6/2-5/1) fine sand; mottles are common, coarse, faint to distinct, dark grayish brown (10YR4/2) to very dark gray (10YR3/1); single grain; loose; very slightly effervescent; unknown lower boundary (end of tubes); lens of very dark gray loam at 372-381 cm; wood collected from loamy lens; unoxidized; 38 cm not recovered; wood from 380-381 cm C-14 dated at 560±40 BP. |
| 411-478 (13.5-15.7) | | no recovery; refused on sand. |
| Auger Sample: | | |
| 597-732 (19.6-24.0) | | brown to dark brown (10YR4/3) medium sand; slightly effervescent; few small pebbles. |

Core/Profile: HS-62

Location: Minnesota Hwy. 16 - south side of road

Legal description: SW ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium/Lacustrine Sediments

Vegetation: Grasses

Slope: 0-2%

Elevation: □ 680 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 16; Root River; may be former ox-bow lake; south side of road in ditch; in depression by third bridge east of Minnesota Hwy. 76

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-18 (0-.6) | Ap | black (10YR2/1) silt loam to loam; mottles are common, fine to medium, distinct, very dusky red (2.5YR2.5/2); moderate, fine, granular; platy near base; friable; noneffervescent; clear lower boundary; roots; oxidized coatings on horizontal surfaces. |
| 18-35 (.6-1.2) | C1 | very dark grayish brown (10YR3/2) loam; mottles are common, fine to medium, distinct, strong brown (7.5YR 5/6-5/8); massive to medium platy; friable; noneffervescent; abrupt lower boundary; laminated; few small to large pebbles; rootlets; patches of oxidation; several infilled worm burrows; recent sediments (PSA). |
| 35-63 (1.2-2.1) | C2 | black (10YR2/1) clay-rich silty clay loam; mottles are common, fine to medium, distinct, strong brown (7.5YR4/6) and dark reddish brown (2.5YR2.5/4); massive; firm; noneffervescent; gradual lower boundary; highly fractured into angular blocks (along bedding planes); interbedded brown (10YR5/3) silt layers; few patches of oxidation; laminated; rootlets; worm burrows; recent sediments (PSA). |
| 63-119 (2.1-3.9) | C3 | black to very dark grayish brown (10YR2/4 3/2) silty clay loam; mottles are common, fine, faint, brown and dark brown (7.5YR4/4); massive; friable; noneffervescent; gradual lower boundary (change in carbon content); occasional silt laminations; few very thin (1-2 mm) sand lenses; rootlets. |
| 119-170 (3.9-5.6) | 2CA | black (10YR2/1) silt loam to silty clay loam; mottles are few, medium, distinct, dark reddish brown (2.5YR3/4) oxidation coating; massive; friable; slightly effervescent; clear lower boundary; few thin (<1 cm), grayish brown (10YR5/2) sand lenses; gastropod and a few mollusk shells; few silt laminations; some plant matter; wood near base; few oxidation coatings lining root voids. |
| 170-203 (5.6-6.7) | 3Oab | black (10YR2/1) sapric material; mottles are few, fine, distinct, yellowish red (5YR5/8); massive; friable; very slightly effervescent; gradual lower boundary; some plant matter (leaves/seeds/wood/roots); gastropod and mollusk shells; thin (< ½ cm) sand lens; large (4 cm diameter) piece of wood at top of horizon; muck. |
| 203-239 (6.7-7.8) | 3CA | very dark gray (10YR3/1) silt loam; massive; friable; slightly effervescent; abrupt lower boundary; unoxidized. |
| 239-279 (7.8-9.2) | 4C | dark gray (10YR4/1) medium to coarse sand; mottles are few, faint, coarse, very dark gray (10YR3/1); single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); occasional loamy lens (very dark gray [10YR3/1]); some rootlets in loamy lens; unoxidized; 13 cm inferred (no recovery). |
| 279-377 (9.2-12.4) | | no recovery; refused in sand. |
| Auger Sample: | | |
| 426-561 (14.0-18.4) | | very dark gray to dark gray (10YR3/1-4/1) medium to coarse sand; very slightly effervescent; few small pebbles. |

Core/Profile: HS-63

Location: Minnesota Hwy. 16 - south side of road

Legal description: SE ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: □ 681 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 16; Root River; south side of road in ditch; just west of South Fork of Root River

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-14 (0-.5) | Ap | very dark grayish brown (10YR3/2) loam; mottles are few, fine, faint, brown (10YR5/3); moderate, fine, granular; friable; noneffervescent; abrupt lower boundary; few small to medium pebbles; many roots. |
| 14-44 (.5-1.4) | C | black very dark gray (10YR2/1-3/1) clay rich silt loam; mottles are many, fine to medium, faint to distinct, yellowish brown (10YR5/4) to brown to dark brown (10YR4/3); massive structure (highly fractured); friable to firm; noneffervescent; clear lower boundary; highly fractured into angular blocks; compacted; worm burrows filled with sediment; rootlets; few small pebbles. |
| 44-119 (1.4-3.9) | 2ACb | black to very dark grayish brown (10YR2/4 3/2) silt loam; mottles are common, distinct, fine, grayish brown (10YR5/2) bands of silt; massive to weak, medium, granular; clay coatings are thin, discontinuous, coat weak ped faces in middle of unit and line root voids; friable to firm; noneffervescent; clear lower boundary; laminated, especially near base; very weak prismatic peds in middle of unit; middle of unit is also more clay-rich; few grayish brown (10YR5/2) silt lenses; rootlets. |
| 119-148 (3.9-4.9) | 3Ab | black (10YR2/1) silty clay loam; moderate, medium, granular to very weak, medium, prismatic near base; clay coatings are thick, discontinuous, coat weak prismatic peds and line some root voids; firm; noneffervescent; abrupt lower boundary; more clay-rich than surrounding units; rootlets; clay coatings are thick but patchy; closer to an AB horizon near base; 5 cm inferred (no recovery). |
| 148-159 (4.9-5.2) | 3ACb | very dark grayish brown to black (10YR3/2-2/1) loamy sand to sandy loam; massive; friable; noneffervescent; clear lower boundary; loamier in middle (□ 152-155 cm); fine sand lens at top of unit. |
| 159-187 (5.2-6.1) | 4C1 | brown to dark brown (10YR4/3) medium sand; single grain; loose; noneffervescent; clear lower boundary. |
| 187-196 (6.1-6.4) | 4C2 | dark grayish brown to very dark gray (10YR4/2-3/1) loamy sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tube); lens of loamy sand; few shell fragments. |
| 196-255 (6.4-8.4) | | no recovery. |
| 255-309 (8.4-10.1) | 4C3 | brown to dark brown to brown (10YR4/3-5/3) coarse sand; single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); few pebbles; loamy sand lens from 297-305 cm; lens is slightly darker in color and contains a few rootlets. |
| 309-382 (10.1-12.5) | | no recovery; refused on sand. |
| Auger Sample: | | |
| 501-636 (16.4-20.9) | | brown to dark brown (10YR4/3) medium to coarse sand; slightly effervescent; few small pebbles. |

Core/Profile: HS-64

Location: Minnesota Hwy. 16 - south side of road

Legal description: SE ¼ Sec. 34 T104N R6W

County: Houston

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: □ 679 feet

Topo. Map: Houston

Remarks: Right-of-way of Minnesota Hwy. 16; Root River; south side of road in ditch; east of South Fork of Root River

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-17 (0-.6) | Ap | black (10YR2/1) loam; moderate, medium, granular; friable; noneffervescent; abrupt lower boundary; roots; worms; few medium pebbles. |
| 17-47 (.6-1.5) | ACp | black (10YR2/1) silty clay loam; moderate, medium, platy to weak, medium to coarse, subangular blocky; friable to firm; noneffervescent; clear lower boundary; platier near top; compacted; omnidirectional rootlets; some apparent ped development, may be fracturing; 3 cm inferred (no recovery). |
| 47-111 (1.5-3.6) | AC | black (10YR2/1) silty clay loam; mottles are few, fine, distinct, dark reddish brown (2.5YR2.5/4); weak, medium, granular to massive; clay coatings are thin, discontinuous, coat few planar surfaces (weak, developing peds); friable to firm; noneffervescent; gradual lower boundary; omnidirectional rootlets; plant matter; some patches of oxidation, especially near base; lower half is more C than A; 2 cm inferred (no recovery). |
| 111-124 (3.6-4.1) | C | very dark gray (10YR3/1) silt loam; mottles are common, fine, faint, dark grayish brown (10YR4/2) and few, medium, faint, strong brown (3.5YR4/6); massive; friable; noneffervescent; abrupt lower boundary; few rootlets; unoxidized; 2 cm inferred (no recovery). |
| 124-175 (4.1-5.7) | 2OCb | black (10YR2/1) clay-poor loam; mottles in dark gray (10YR4/1) sand lenses are strong borwn (7.5YR4/6); massive; very friable; very slightly effervescent; gradual lower boundary; interbedded lenses of sand, oxidized and unoxidized; some plant matter (roots, wood, grasses) especially in top half of horizon; laminated in places. |
| 175-200 (5.7-6.6) | 3Oab | black (10YR2/1) sapric material; massive; very friable; very slightly effervescent; clear lower boundary; some plant matter (roots/leaves/wood/stems); few gastropod shells; muck. |
| 200-217 (6.6-7.1) | 3Cg1 | dark gray to dark greenish gray (5Y4/1-5GY4/1) sandy loam; mottles are many, coarse, distinct, black (10YR2/1); massive; friable; very slightly effervescent; clear lower boundary; unoxidized; few rootlets. |
| 217-232 (7.1-7.6) | 4Cg2 | grayish brown (2.5Y5/2) fine to medium sand; mottles are few, medium, faint, yellowish brown (10YR5/4); single grain; loose; slightly effervescent; unknown lower boundary (end of tubes); few lenses (□ 2-3 cm thick) of dark grayish brown (10YR4/2) loamy sand. |
| 232-384 (7.6-12.6) | | no recovery. |

Core/Profile: OL-1

Location: Burnap - northeastern end of transect

Legal description: SW ¼ Sec. 17 T105N R12W

County: Olmsted

Parent material: Alluvium or Colluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 1,022 feet

Topo. Map: Marion

Remarks: Burnap property; North Branch of Root River; boring farthest away from river (NE end of transect); highest in elevation

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-14 (0-.5) | Ap1 | black (10YR2/1) silt loam; weak, fine, subangular blocky to medium granular; friable; slightly effervescent; clear lower boundary; rootlets; worm burrows filled with sediment. |
| 14-44 (.5-1.4) | Ap2 | black (10YR2/1) silt loam; mottles are few, medium, faint, dark brown (10YR3/3) to pale brown (10YR6/3) silt lenses; moderate, fine, platy parting to moderate, fine, subangular blocky; very friable; slightly effervescent; clear lower boundary; highly fractured along horizontal planes; few laminated silt lenses; omnidirectional rootlets; many worm burrows filled with sediment; few small to medium pebbles. |
| 44-52 (1.4-1.7) | AC | black (10YR2/1) loam to silt loam; moderate, medium, granular to fine subangular blocky; friable; slightly effervescent; abrupt lower boundary; few angular pebbles; omnidirectional rootlets. |
| 52-153 (1.7-5.0) | C1 | very dark brown (10YR2/2) loam; massive; firm; strongly effervescent; abrupt lower boundary; dense; many mostly angular pebbles and cobbles; rocks concentrated 52-68 cm, 82-97 cm, 127-137 cm; 32 cm inferred (no recovery); alluvium and colluvium. |
| 153-175 (5.0-5.7) | 2C2 | very dark brown (10YR2/2) loam; massive structure; firm; violently effervescent; unknown lower boundary (end of tubes); more rock than matrix, many angular pebbles/cobbles embedded in a dense sediment matrix; dolostone/limestone rocks; dense; colluvium. |
| 175-224 (5.7-7.3) | | no recovery; refused on dolomite cobbles. |
| Auger Samples: | | |
| 243-378 (8.0-12.4) | | yellowish brown (10YR5/4) pebbly sandy loam; violently effervescent; oxidized; many pebbles, angular and rounded. |
| 429-564 (14.1-18.5) | | yellowish brown (10YR5/4) sandy clay loam diamicton; violently effervescent; oxidized; many small to medium pebbles, angular and rounded; clasts are embedded in fine matrix. |
| 585-720 (19.2-23.6) | | yellowish brown (10YR5/4) loamy coarse sand and dark brown (10YR3/3) sandy clay loam; strongly effervescent; yellowish brown sand was on inside of auger clumps, but majority of sediment was sandy clay loam; many small to medium pebbles. |

Core/Profile: OL-2

Location: Burnap - near northeast end of transect

Legal description: SW ¼ Sec. 17 T105N R12W

County: Olmsted

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 1,021 feet

Topo. Map: Marion

Remarks: Burnap property; North Branch of Root River; boring taken in pasture near northeast end of transect (river is to the southwest).

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-23 (0-.8) | Ap | black (10YR2/1) silt loam; mottles are few, fine, faint, pale brown (10YR6/3); massive to weak, coarse, platy; very friable; slightly effervescent; abrupt lower boundary; few rootlets; few worm burrows/root voids, some filled with sediment; compacted. |
| 23-76 (.8-2.5) | AC | black (10YR2/1) silt loam; mottles are common, fine to medium, faint, pale brown (10YR6/3); weak, fine, platy to moderate, fine, granular; clay coatings are thin, discontinuous, coat horizontal surfaces; very friable; slightly to strongly effervescent; clear lower boundary; many thin, pale brown (10YR6/3) silt lenses; few rootlets; partly laminated. |
| 76-136 (2.5-4.5) | 2Ab | black (10YR2/1) clay-rich silt loam; weak, medium, granular; very friable; very slightly effervescent; gradual lower boundary; 9 cm inferred (no recovery). |
| 136-254 (4.5-8.3) | 2ABb | black (10YR2/1) silt loam to silty clay loam; weak, fine to medium, subangular blocky; clay coatings are thick, moderately continuous, line root voids; friable; very slightly effervescent; gradual lower boundary; increasing clay content with depth; lower half of horizon disturbed in coring; 7 cm inferred (no recovery). |
| 254-284 (8.3-9.3) | 2Btb | very dark brown (10YR2/2) silty clay loam; weak to moderate, coarse, columnar; clay coatings are thick, continuous, coat ped faces and line root voids; firm; very slightly effervescent; gradual lower boundary. |
| 284-303 (9.3-9.9) | 2BCb | dark brown (10YR3/3) silty clay loam; mottles are few, faint, fine, dark yellowish brown (10YR4/4); weak, coarse, columnar to massive; clay coatings are moderately thick, discontinuous, very dark grayish brown (10YR3/2), coat ped(?) faces; very slightly effervescent; clear lower boundary; structure is weak, but clay accumulations and coatings still exist. |
| 303-333 (9.9-10.9) | 2C1 | brown to dark brown (10YR4/3) silty clay loam; mottles are few, faint, fine to medium, very dark brown (10YR2/2) and brown (10YR5/3); massive structure; friable; very slightly effervescent; clear lower boundary; slightly fractured at top (perpendicular fractures). |
| 333-356 (10.9-11.7) | 2C2 | grayish brown (10YR5/2) silt loam to loam; mottles are many, fine, faint, light gray (10YR7/2) and common, medium, faint, very pale brown (10YR7/4) and dark yellowish brown (10YR4/6); massive; friable; slightly effervescent; abrupt lower boundary; small gastropod shells; several small limestone pebbles; dense; patches of oxidation; few nodules of manganese (?) oxides. |
| 356-420 (11.7-13.8) | 3C3 | yellowish brown (10YR5/4) medium sand and gravel; single grain; loose; slightly to strongly effervescent; unknown lower boundary (end of tubes); sand is loamy near base; many small to large, rounded and angular pebbles; oxidized; 18 cm inferred (no recovery); refused on limestone gravel. |
| Auger Sample: | | |
| 424-559 (13.9-18.3) | | dark brown (10YR3/3) pebbly sandy loam; strongly effervescent; sticky, may have enough clay to be a sandy clay loam; lot of gravel; small to large pebbles, angular and rounded. |

Core/Profile: OL-3
 Location: Burnap - middle of transect
 Legal description: SW ¼ Sec. 17 T105N R12W
 County: Olmsted
 Parent material: Alluvium
 Vegetation: Pasture grasses
 Slope: 0-2%
 Elevation: 1,021 feet
 Topo. Map: Marion
 Remarks: Burnap property; North Branch of Root River; boring taken in middle of transect, gently sloping toward river (river is to the southwest)

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|--|
| 0-32 (0-1.1) | Ap | very dark grayish brown (10YR3/2) silt loam; weak, medium, granular at top to platy near base; very friable; slightly effervescent; clear lower boundary; many rootlets; very silt-rich. |
| 32-87 (1.1-2.9) | AC | very dark grayish brown (10YR3/2) silt loam; mottles are many, distinct, medium, pale brown (10YR6/3) silt lenses; moderate, fine, platy; very friable; strongly effervescent; clear lower boundary; laminated; few silt lenses near base; recent sediments. |
| 87-132 (2.9-4.3) | 2Ab | black (10YR2/1) silt loam; moderate, medium, granular; friable; very slightly effervescent; clear lower boundary; clay content increases with depth; rootlets; 6 cm inferred (no recovery). |
| 132-164 (4.3-5.4) | 2ABb | black (10YR2/1) silty clay loam; moderate to strong, fine, subangular blocky; clay coatings are thin, moderately continuous, coat ped faces and line root voids; friable; very slightly effervescent; abrupt lower boundary (change in texture); clay content increases with depth; rootlets. |
| 164-194 (5.4-6.4) | 2BAb | black (10YR2/1) silty clay loam to silty clay; massive to weak, coarse, subangular blocky; clay coatings are thin, discontinuous, coat ped faces; very firm; very slightly effervescent; clear lower boundary; dense; higher clay content than overlying horizons. |
| 194-221 (6.4-7.3) | 2Btb | very dark gray (10YR3/1) silty clay loam; moderate, medium, prismatic; clay coatings are thick, continuous, coat ped faces; firm; very slightly effervescent; gradual lower boundary; clay coats continue on ped faces into top of 2CBb horizon; 5 cm inferred (no recovery). |
| 221-262 (7.3-8.6) | 2CBb | brown to dark brown (10YR4/3) silty clay loam; mottles are few, fine, faint, dark yellowish brown (10YR4/6); massive; clay coatings are thin, discontinuous, line root voids and coat few vertical faces (weak peds); friable to firm; very slightly effervescent; clear lower boundary; prismatic structure extends into top part of horizon - weak and coarse; some angular fracturing; 5 cm inferred (no recovery). |
| 262-282 (8.6-9.3) | 2C1 | olive brown (2.5Y4/4) silty clay loam; mottles are few, fine, distinct, very dark brown (10YR2/2) and few, medium to coarse, distinct, dark yellowish brown (10YR4/6); massive; friable; slightly effervescent; clear lower boundary; few patches of oxidation; few small limestone pebbles. |
| 282-315 (9.3-10.3) | 2C2 | grayish brown (2.5Y5/2) clay-rich silt loam to loam; mottles are many, medium, distinct, dark yellowish brown (10YR4/6) and common, fine, distinct, very pale brown (10YR8/3); massive; friable; slightly to strongly effervescent; clear lower boundary; small gastropod shells - many well-preserved; sandier near base of unit; more clay-rich at top of unit; many small limestone/dolostone pebbles. |
| 315-337 (10.3-11.1) | 2C3 | grayish brown (2.5Y5/2) and yellowish brown (10YR5/4) sandy loam; massive; friable; slightly to strongly effervescent; unknown lower boundary (end of tubes); many gastropod shells; oxidized and unoxidized bands; sandier and loamier pockets. |
| 337-379 (11.1-12.4) | | no recovery. |
| 379-404 (12.4-13.3) | 3C4 | yellowish brown (10YR5/4) coarse sand and gravel; mottles are few, fine to medium, distinct, very pale brown (10YR7/3) and few, medium, distinct, dark brown (7.5YR3/4); single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); many small to medium pebbles; few lenses of loamy sand; oxidized; few lenses of carbonate-rich clays (mixed with sand); few shell fragments near top; refused on gravel. |
| Auger Sample: | | |
| 425-560 (13.9-18.4) | | dark yellowish brown (10YR4/4) medium sand and gravel; strongly to violently effervescent; many, small to medium pebbles, often rounded; slightly loamy. |

Core/Profile: OL-4
 Location: Burnap - middle of transect
 Legal description: SW ¼ Sec. 17 T105N R12W
 County: Olmsted
 Parent material: Alluvium
 Vegetation: Pasture grasses
 Slope: 0-2%
 Elevation: 1,020 feet
 Topo. Map: Marion
 Remarks: Burnap property; North Branch of Root River; boring taken in middle of transect; approximately 200 meters from channel

| Depth cm(ft) | Horizon or Zone | Description |
|---------------------|--------------------|---|
| 0-32 (0-1.1) | Ap | black to very dark grayish brown (10YR2/4 3/2) silt loam; moderate, fine, platy to medium granular; very friable; slightly to strongly effervescent; clear lower boundary; rootlets; recent sediment. |
| 32-51 (1.1-1.7) | AC | very dark grayish brown (10YR3/2) silt loam; moderate, fine, platy; very friable; slightly to strongly effervescent; clear lower boundary; many thin, very pale brown (10YR6/3) silt lenses; laminated; highly fractured; rootlets; recent sediment. |
| 51-94 (1.7-3.1) | 2Ab | black (10YR2/1) silt loam; moderate, fine, granular; friable; strongly effervescent; gradual lower boundary; omnidirectional rootlets. |
| 94-147 (3.1-4.8) | 2ABb | black (10YR2/1) clay-rich silt loam; moderate, medium, granular to weak, fine, subangular blocky; clay coatings are thin, discontinuous, coat weak prismatic peds near base and line root voids; friable; strongly to violently effervescent; diffuse lower boundary; horizon disturbed in coring; weakly prismatic near base. |
| 147-182 (4.8-6.0) | 2BAb | black (10YR2/1) silty clay loam; weak, medium, prismatic parting to fine to medium subangular blocky; clay coatings are thin, moderately continuous, coat ped faces and line root voids; friable to firm; strongly effervescent; gradual lower boundary; gastropod shells; borders on a weak Bt horizon; root voids filled with sediment. |
| 182-295 (6.0-9.7) | 2C | very dark gray (10YR3/1) silty clay loam; massive; friable; slightly effervescent; gradual lower boundary; gastropod shells; clay-rich; some plant matter (grasses/roots/stems); no recovery from 209-255 cm. |
| 295-356 (9.7-11.7) | 3Oab | black (10YR2/1) sapric material; massive; friable; slightly effervescent; abrupt lower boundary; some fibric material (stems, wood, rootlets, grasses, seeds); peaty muck; gastropod shells; not dense; half core collected at base for plant matter; cf. Lauraceae wood from 348-350 cm C-14 dated at 3,320±50 BP. |
| 356-365 (11.7-12.0) | 4C | dark brown (10YR3/3) sandy loam to loamy sand diamicton; mottles are common, coarse, distinct to faint, brown (10YR5/3) to dark yellowish brown (10YR3/6); massive; friable; strongly effervescent; unknown lower boundary (end of tubes); many small to medium pebbles; few cobbles; sand is coarse; patches of oxidation; seeds of Cyperaceae (Cyperus sp./Carex sp.), Najas sp., and wood from 359-365 cm C-14 dated at 3,360±60 BP. |
| 365-378 (12.0-12.4) | | no recovery; refused on sand and gravel. |

Core/Profile: OL-5

Location: Burnap - near ditch

Legal description: SW ¼ Sec. 17 T105N R12W

County: Olmsted

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 1,020 feet

Topo. Map: Marion

Remarks: Burnap property; North Branch of Root River; boring taken in pasture near ditch; middle of transect to river

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-28 (0-.9) | Ap | black (10YR2/1) loam; moderate, medium, granular; friable; strongly effervescent; abrupt lower boundary; rootlets; worm burrows; silt-rich. |
| 28-135 (.9-4.4) | C1 | very dark gray to very dark grayish brown (10YR3/1-3/2) silt loam and fine sand; mottles are common, fine, faint to distinct, dark reddish brown (5YR2.5/2) in silt loam; massive; friable; strongly effervescent; abrupt lower boundary; several sand lenses alternating with laminated silt loam; finely laminated; large sand lens (10 cm) at top of horizon; horizon disturbed in coring; omnidirectional rootlets; many small to medium pebbles, especially near base of horizon; no recovery 79-127 cm. |
| 135-204 (4.4-6.7) | 2C2 | very dark gray (10YR3/1) sandy loam; massive; friable; strongly effervescent; abrupt lower boundary; pockets of loamier and sandier sediments; many gastropod shells; small to medium, rounded pebbles common; few mollusk shells, unoxidized. |
| 204-230 (6.7-7.6) | 3C3 | dark brown to dark yellowish brown (10YR3/3-3/4) coarse sand and gravel; mottles are few, coarse, distinct, very dark gray (10YR3/1) loamier patches; single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); many pebbles, all sizes; gastropod and mollusk shells; few loamier patches; oxidized; 14 cm inferred (no recovery); refused on coarse gravel. |
| Auger Sample: | | |
| 230-363 (7.6-11.9) | | very dark grayish brown (10YR3/2) clay-rich pebbly sandy loam; violently effervescent; very poor recovery; drilling rough; many small to large pebbles/cobbles; dense. |

Core/Profile: OL-6

Location: Burnap - in slight depression

Legal description: SW ¼ Sec. 17 T105N R12W

County: Olmsted

Parent material: Alluvium

Vegetation: Pasture grasses

Slope: 0-2%

Elevation: 1,018 feet

Topo. Map: Marion

Remarks: Burnap property; North Branch of Root River; boring taken at confluence of two linear depressions; approximately 2 feet lower than the surrounding pasture

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|--|
| 0-11 (0-.4) | Ap1 | black (10YR2/1) silt loam; moderate, fine, platy; friable; slightly to strongly effervescent; clear lower boundary; rootlets. |
| 11-41 (.4-1.4) | Ap2 | black (10YR2/1) silt loam; moderate, fine, platy to moderate, fine, subangular blocky; friable; slightly effervescent; clear lower boundary; rootlets; lenses of dark brown (10YR3/3) silts. |
| 41-54 (1.4-1.8) | A | black (10YR2/1) clay-rich silt loam; mottles are few, faint, fine, dark brown (10YR3/3); moderate to strong, fine, subangular blocky; clay coatings are thin, discontinuous, line root voids; friable; slightly effervescent; gradual lower boundary; slightly platy at top; rootlets. |
| 54-111 (1.8-3.6) | BA | black (10YR2/1) clay-rich loam; weak, medium, prismatic parting to moderate, medium, subangular blocky; clay coatings are thin, discontinuous, coat ped faces and line root voids; friable; slightly effervescent; gradual lower boundary; rootlets; few gastropod shells; may be a weak Bt horizon. |
| 111-162 (3.6-5.3) | C1 | very dark grayish brown (10YR3/2) sandy loam; mottles are common, distinct, fine to medium, dark reddish brown (10YR3/4); massive; friable; slightly to strongly effervescent; abrupt lower boundary; many pebbles, often rounded; plant fibers and organic matter at base of horizon (last 10 cm); gastropod shells; 5 cm inferred (no recovery). |
| 162-190 (5.3-6.2) | 2C2 | dark grayish brown (10YR4/2) gravel and coarse sand; mottles are few, distinct, coarse, dark yellowish brown (10YR3/4) to very dark gray (10YR3/1); single grain; loose; strongly effervescent; unknown lower boundary (end of tubes); many pebbles and cobbles, rounded and angular; matrix is coarse sand, sometimes loamy; roots and plant fibers common in loamier lenses. |
| 190-214 (6.2-7.0) | | no recovery; refused on cobble or boulder. |

Core/Profile: OL-7

Location: Burnap - near channel

Legal description: SW ¼ Sec. 17 T105N R12W

County: Olmsted

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 1,020 feet

Topo. Map: Marion

Remarks: Burnap property; North Branch of Root River; boring taken near edge of cutoff channel; approximately 40 meters from OL-8 (in meander scar); 2 feet higher in elevation than OL-8

| Depth cm(ft) | Horizon or Zone | Description |
|--------------------|--------------------|---|
| 0-26 (0-.9) | Ap | black (10YR2/1) loam; moderate, medium, granular; weak, coarse, platy near base; friable; noneffervescent; clear lower boundary; rootlets. |
| 26-70 (.9-2.3) | A | black (10YR2/1) silt loam to loam; moderate, fine to medium, granular; very friable; noneffervescent; gradual lower boundary; rootlets; very few pebbles. |
| 70-136 (2.3-4.5) | BA | black (10YR2/1) silty clay loam; mottles are few, fine, distinct, dark brown (7.5YR3/4); weak, medium, subangular blocky; firm; slightly effervescent; clear lower boundary; more clay-rich than A horizon; dense near base; rootlets; 20 cm inferred (no recovery). |
| 136-172 (4.5-5.6) | BC | very dark grayish brown to very dark brown (10YR3/2-2/2) silty clay loam to clay loam; weak, medium, prismatic; clay coatings are moderately thick, continuous, coat ped faces and line root voids; firm; strongly effervescent; clear lower boundary; several roots; gastropod shells; may be a weak Bt horizon. |
| 172-264 (5.6-8.7) | C | very dark grayish brown (10YR3/2) clay-rich loam; mottles are common, faint, fine, dark brown (7.5YR3/4) to brown to dark brown (7.5YR4/4) and common, fine, distinct, light brownish gray (10YR6/2); massive; friable; strongly effervescent; unknown lower boundary (end of tubes); gastropod and mollusk shells; roots; patches of oxidation; small pebbles; no recovery from 183-254 cm (approximately 30 cm of slump was collected in this zone and was similar to actual core sample above and below it). |
| Auger Sample: | | |
| 264-389 (8.8-12.8) | | very dark grayish brown (10YR3/2) clay loam; strongly effervescent; very sticky; gastropod shells; small pebbles common; refused on cobbles. |

Core/Profile: OL-8

Location: Burnap - meander scar

Legal description: SW ¼ Sec. 17 T105N R12W

County: Olmsted

Parent material: Alluvium

Vegetation: Grasses

Slope: 0-2%

Elevation: 1,018 feet

Topo. Map: Marion

Remarks: Burnap property; North Branch of Root River; boring taken in meander scar approximately 17 meters from edge of cutoff channel; 2 feet lower in elevation than OL-7

| Depth cm(ft) | Horizon or Zone | Description |
|-------------------|--------------------|--|
| 0-16 (0-.5) | Ap | black (10YR2/1) silt loam; moderate, fine, subangular blocky to medium granular; friable; noneffervescent; clear lower boundary; rootlets; slightly platy throughout; several roots. |
| 16-78 (.5-2.6) | A | black (10YR2/1) silt loam to loam; moderate, fine to medium, subangular blocky to medium granular; friable; slightly effervescent; gradual lower boundary; rootlets; several roots; coarse platy structure in middle. |
| 78-116 (2.6-3.8) | AB | black (10YR2/1) silt loam to loam; moderate, medium, subangular blocky; clay coatings are thin, discontinuous, coat ped faces; firm; slightly effervescent; gradual lower boundary; roots; more clay-rich than overlying horizons; few gastropod shells. |
| 116-176 (3.8-5.8) | CA | black (10YR2/1) loam; moderate, medium, granular to massive; friable; slightly to strongly effervescent; clear lower boundary; wood common; charcoal; gastropod and mollusk shells; omnidirectional rootlets; resembles a C horizon with granular structure; CA is not used to designate depositional origin; 5 cm inferred (no recovery). |
| 176-216 (5.8-7.1) | C1 | very dark gray (10YR3/1) silt loam to loam; massive; friable; strongly effervescent; abrupt lower boundary; wood common; many roots; gastropods and mollusk shells; small pebbles common; fibric plant matter; more organic near base; wood collected from base of horizon; sandier near base; hardwood from 210-216 cm C-14 dated at 350±40 BP. |
| 216-222 (7.1-7.3) | 2C2 | very dark gray (10YR3/1) sandy loam and gravel; massive; friable; strongly to violently effervescent; unknown lower boundary (end of tubes); many small to large pebbles; sand is medium to coarse; wood. |
| 222-252 (7.3-8.3) | | no recovery; refused on cobbles. |