ILLINOIS STATE GEOLOGICAL SURVEY

SOILS AND LANDFORMS ALONG THE MIDDLE ILLINOIS RIVER: EXAMPLES FROM THE SPRING BAY 7.5-MINUTE QUADRANGLE

Illinois Soil Classifiers Association Annual Field Tour,
Guidebook and Field Trip Road Log

September 10th, 2004

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Illinois Soil Classifiers Association 2004 Field Tour

General Itinerary

9:00 – 9:45 am	Reception at NRCS Eureka Field Office: Bagels and Refreshments
9:45 – 10:00 am	Jim housekeeping things; Andy and Pius provide overview of the ISGS geologic (parent material) mapping project in the Spring Bay quadrangle; Steve gives an update on the soil mapping in the area.
10:30 – 11:00 am	**Stop 1**: Ten Mile Creek Section
11:15 – 11:45 am	**Stop 2**: Zimmerman Road; viewing of shallow subsurface core
12:15 – 2:00 pm	**Lunch and Stop 3**: Forest Park Nature Center – catered lunch served, overview of the park's management and restoration activities by Mike Miller, and visit sites along bluff.
2:00 – 3:00 pm	**Stop 4**: Poppet Hollow Section
3:30 pm	Return to Eureka Field Office

INTRODUCTION

The purpose of this guidebook is to provide participants an overview of soils (parent materials) on a variety of landforms in the Peoria area. Four different stops were chosen to demonstrate the range of soils-parent materials found at land surface. From vertical exposures and drill core we will also show how these surface materials relate to, and contrast with, deposits in the subsurface.

The Spring Bay Quadrangle was chosen as a focus area for this tour. It is the first of four USGS 7.5-minute quadrangles in the area that geologic mapping has been completed by the Illinois State Geological Survey (ISGS), and where digital soils data was developed under cooperative agreement with the U.S. Department of Agriculture-Natural Resources Conservation Service (USDA-NRCS). The soils data and accompanying parent material classification provided the ISGS an initial understanding of the types of landforms and deposits at ground surface, which were further grouped into surficial geology mapping units following additional study from fieldwork, historical aerial photography and subsurface borings records.

A derivative map product, a Soils and Parent Material map (Stumpf and Weibel 2004), was developed by the ISGS with guidance from the NRCS to publish the soils data so that users could access this data until sometime in the future when county-wide surveys are completed. Because the soils data was digitized for the selected quadrangles within Peoria and Woodford Counties, no formal SURGO product would be published.

Background to the map:

The Soils-Parent Material map of the Spring Bay Quadrangle was developed from soils data supplied under agreement with the USDA-NRCS. The Rock Falls MRLA Project Office undertook the compilation and correlation of the soil surveys for the Peoria area specifically for the Illinois State Geological Survey (ISGS). Two separate cooperative agreements were signed in 1998 and 2000 to provide digital soil survey data for four USGS 7.5-minute quadrangles (Oakhill, Dunlap, Spring Bay, and Peoria East) (See figure 1) for use by the ISGS and NRCS. Data used in the compilation were from the soil surveys of Peoria County (Walker 1992), Woodford County (Teater 1999), and Tazewell County (Teater 1996).

Figure 1: Location of Spring Bay 7.5-minute Quadrangle in Illinois.

The methodology used to undertake the compilation and digitization included:

1) Transferring soil map unit boundaries (soil series) onto mylar overlays superimposed on 1:12,000-scale (quarter-quad) prints of the 1998/99 Digital Orthophoto Quadrangles and 1996 United States Geological Survey digital line graphics of the hypsography (contour lines).
2) The mylar-overlays with hand-drawn boundaries were then scanned.
3) The resulting raster image was translated into vector data using ARCINFO software at the ISGS. This process created a digital database to which various attributes of the soil series were added.

Prior to the release of NRCS soils data, correlation of Major Land Resource Areas (MLRA) in Peoria, Woodford, and Tazewell Counties was required. The updated MLRA legends were used to compile the map unit legend. At the ISGS, the soil series were organized by their parent material in

the map legend using a soil key provided by the NRCS office in Champaign. Because soil properties are closely related to the characteristics of their parent materials, we categorized the individual soil series within parent material classes using information from the USDA Soil Associations of Illinois (Fehrenbacher *et al.* 1984). Within each parent material class, the soil series were further organized based upon the thickness of a silty or loamy surface cover, vegetation type under which they formed, and USDA drainage class. The soil series or map unit is color-coded according to the soil association in which it belongs.

GEOLOGIC SETTING AND LANDFORMS

The Spring Bay Quadrangle comprises five unique geomorphic landscapes: (1) glaciated upland terrain — areas where an extensive cover of eolian (wind-blown) silt and sand lies over thick glacial deposits; (2) deeply dissected bluffs along the Illinois River — sloping land that stand up to 350 feet higher than the valley bottoms; (3) undulating and terraced floodplains in the Illinois River valley; (4) rolling and dissected uplands, lying east of the Illinois River near the town of Metamora; (5) Illinois River and Lake Peoria. Our geological mapping undertaken on the quadrangle identified two geomorphic surfaces. The lowermost surface is an undulating topography that developed on top of the bedrock, and formed over hundreds of thousands of years from erosion by drainage along the Ancient Mississippi River system (Horberg 1950; Weibel and Stumpf in review). The upper surface, the modern landscape, has been formed by successive glacial episodes and downcutting by postglacial drainage systems. Sediments were deposited on the bedrock surface in glacial and ice-marginal environments during the Wisconsin and Illinois Episodes glaciations. These sediments entirely mask the lowermost geomorphic surface. On the upland and bluff landscapes the sediments accumulated to a considerable thickness (up to 400 feet thick). In contrast, thinner deposits (typically 50–130 feet thick) are present in the Illinois River valley. Here, continued erosion by glacial and postglacial (including modern) drainage has removed much of older sediments.

A series of prominent north to south-trending ridges observed crossing the region (figure 2) mark the limit of advance of the Laurentide Ice Sheet from the Lake Michigan basin during the Wisconsin Episode. Glaciers reached this part of central Illinois by 25,000 years ago and remained active until before 15,000 years ago. The series of moraines Buda, Shelbyville, Leroy, Providence, Bloomington, and Eureka moraines) forming the Bloomington Morainic System (Willman and Frye 1970) mark the position of the ice sheet during glacier advances and standstills/recessions. Ice forming these moraines deposited till of the Tiskilwa Formation; a widespread surface deposit found through out the Peoria area. The Eureka Moraine lying to the east demarcates the readvance of Laurentide Ice that deposited the Batestown Till Member (Hansel and Johnson 1996).

The Illinois River valley, a north-south feature through central Illinois approximately delineates the course of the Ancient Mississippi River prior to the last glaciation. At that time the Mississippi River valley was much wider extending several miles further east than the present valley. The valley has subsequently been infilled by sediments of the Wisconsin episode glaciation. Since the end of the last glaciation, approximately 12,000 years ago, the configuration of the valley has been shaped by the actions of water and wind. Much of the sand and gravel deposits infilling the valley were likely deposited by meltwater flowing southward along the valley as glaciers in the upper part of the Illinois River melted back toward Lake Michigan. During several periods of catastrophic drainage (e.g., Kanakee Torrent), water draining from glacial lakes ponded up-valley has deeply eroded these sands and gravels. A series of well defined terraces along the Illinois River valley mark different base levels during the downcutting (Willman and Frye 1970; Moore 1981; Hajic 1990). The uppermost terraces are overlain by wind-transported (eolian) sand that was eroded from source surfaces in Illinois River valley. The sand forms extensive dunes, dune fields and sheet deposits. Wind-blown sediments are also found on the uplands above the Illinois River valley. Fine-grained sand and silt that blanket the land surface decreases in thickness with greater distance from valley.

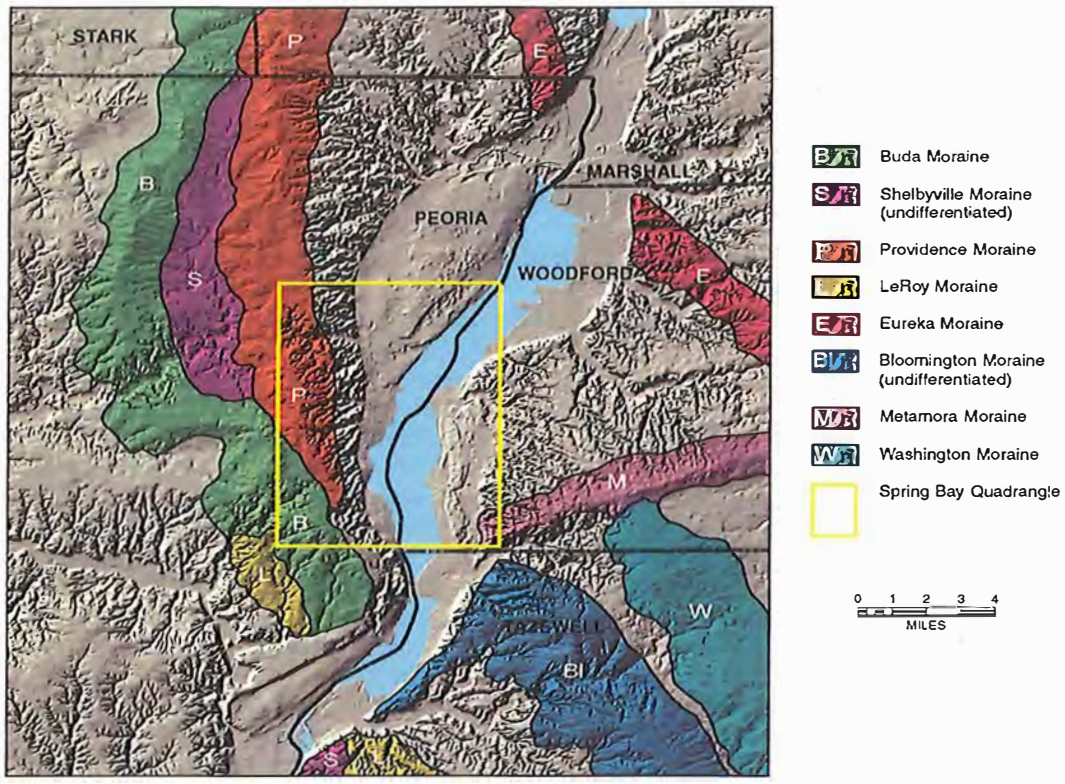

Figure 2: Surface topography in the Middle Illinois River valley (from Luman et al. 2003). Moraines deposited by Wisconsin Episode glaciers are labeled.

The Illinois River valley (e.g., Upper Peoria Lake) is a major sink for sediment eroded from the bluffs and terraced floodplain. Small tributary streams in channels and gulleys carry slopewash material eroded from the steep bluff slopes. Human activity along the river has accelerated rates of erosion and increased sediment loads to these streams. Large alluvial fans have formed at the mouths of these tributaries and thick accumulations of fine-grained sediment infill the river channel.

Value of Geologic Maps

Geologic maps delineate the occurrence of geologic materials at land surface, and the accompanying cross sections and 3-D models portray their distribution in the subsurface. In the middle Illinois River valley these materials have a complex but mappable pattern of occurrence. They are the source of important earth and water resources and can present not only hazards to property owners, but to the construction and maintenance of transportation systems. In combination with other available geologic information (i.e., the subsurface distribution of various materials), this mapping is the key to identifying opportunities and limitations for future development as well as determining likely consequences of past and future land-use decisions.

The unique value of this geologic map arises from the wide variety of relevant interpretations that it supports for addressing both scientific and societal issues. Not only do the geologic materials delineated on the map have important implications for revealing the geologic history of an area, but also the mapping process leads inevitably to scientific discoveries. For example, geologic maps in conjunction with other geologic information, supports development of derivative maps for specific purposes, in this case the distribution of soil for specific project areas.

ROAD LOG AND STOP DESCRIPTIONS

Miles (T=total miles, I=interval mileage)

T	I	
13.0	13.0	Leave Eureka Field Office and head west on IL Route 24.
15.4	2.4	Turn (right) north on IL Route 116 (Ramp to Metamora) to Ten Mile Creek Road.
15.8	0.4	Turn (right) east to road cut (on left-hand side of road across from gated drive). **Stop 1 — Tem Mile Creek road cut** (figure 3). In this exposure, the Hennepin soil is developed in a dense, loamy reddish brown till (Tiskilwa Formation) on a steep (25-35%) slope. A thin soil profile is developed on till in the upper part of the section. The upper part of section has been affected by slopewash.

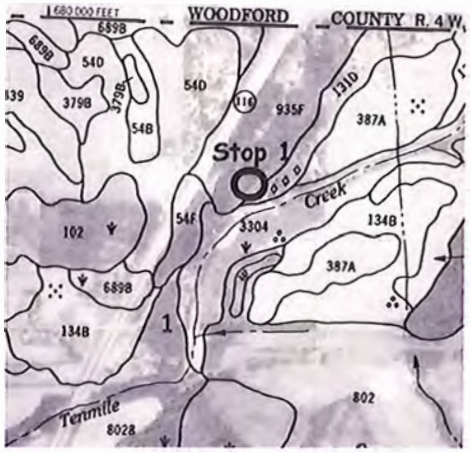

Figure 3: Location of Stop 1 – Tern Mile Creek Road, 7 miles south of Spring Bay, and 0.5 miles east of IL Route 116.

Approximately 15 feet of Tiskilwa till overlies carbonate cemented sands and gravels. The sand and gravel unit is correlated with either proglacial fluvial sediments deposited in front of Wisconsin Episode glaciers, or a remnant of the early Illinoian Episode Glaciation. We propose the carbonate cement was formed as carbonate-rich groundwater seeped out of the slope along this material contact, causing degassing and carbonate precipitation. The cemented sand and gravels resembles the local Pennsylvanian-age sandstone bedrock, but the presence of exotic mafic and granitic clasts suggests otherwise. These sediments have been observed at other sites in the Peoria area. In the Spring Bay quadrangle, these deposits are typically exposed at the base of the bluffs at approximately the same elevation.

16.2	0.4	Turn around and head west to IL Route 116.
17.6	1.4	Turn (left) south on IL Route 116 to IL Route 26.
24.8	7.2	Turn (left) north onto IL Route 26 to Spring Bay and Zimmerman Road.
25.5	0.7	Turn (right) east onto Zimmerman Road; follow road around S-bend past cell tower **Stop 2 — Zimmerman Road dune** (figure 4). At this site, a core through a sand dune was obtained to demonstrate the soil type present on the landform, and also the stratigraphy on the uplands below it. (FINISH ON TUESDAY AFTER I SEE THE CORE)
26.2	0.7	Turn around and head back (west) to IL Route 26.
33.4	7.2	Turn (left) south onto IL Route 26 to IL Route 116.
34.4	1.0	Turn (right) south onto IL Route 116 to IL Route 24.
36.0	1.6	Take ramp to Peoria (right) westbound, cross the Illinois River and exit (right) northbound onto IL Route 29.

Stop 1: HENNEPIN SERIES (935)

LOCATION – HENNEPIN, IL+IN OH WI; Established Series; Rev. JWS-KDH, 02/2000

The Hennepin series consists of very deep well drained soils formed in calcareous glacial till. These soils are on upland side slopes that border stream valleys and on moraines. Permeability is moderate or moderately slow. Slopes range from 10 to 70 percent. Mean annual temperature is about 52 degrees F, and mean annual precipitation is about 35 inches.

TAXONOMIC CLASS: Fine-loamy, mixed, active, mesic Typic Eutrudepts

TYPICAL PEDON: Hennepin loam - on a north-facing wooded valley slope of 56 percent on a dissected till plain. (Colors are for moist soil unless otherwise stated.)
A--0 to 4 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; friable; common fine roots; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary. (2 to 7 inches thick)
Bw1--4 to 9 inches; dark brown (10YR 4/3) loam; moderate fine subangular blocky structure; friable; common fine roots; common faint very dark grayish brown (10YR 3/2) organic coats on faces of peds; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary.
Bw2--9 to 16 inches; dark yellowish brown (10YR 4/4) loam; moderate fine subangular blocky structure; friable; few fine roots; common faint dark brown (10YR 4/3) clay films on vertical faces of peds; few pebbles; slight effervescence; slightly alkaline; clear smooth boundary. (Combined thickness of the Bw horizons is 3 to 16 inches.)
C--16 to 60 inches; dark brown (7.5YR 4/4) loam; massive; friable; few fine roots; few pebbles; violent effervescence; moderately alkaline.

TYPE LOCATION: Bureau County, Illinois; about 1/2 mile south of Tiskilwa; 880 feet south and 528 feet west of the northeast corner of sec. 13, T. 15 N., R. 8 E. USGS Wyanet quadrangle; elevation 594 feet; latitude 41 degrees, 17 minutes, 25 seconds N., longitude 89 degrees, 30 minutes, 39 seconds W.

RANGE IN CHARACTERISTICS: The solum is 10 to 20 inches in thickness. The control section commonly averages between 20 and 27 percent clay. The clay content ranges between 18 and 30 percent and the fine sand and coarser sand content ranges between 15 and 55 percent. The depth to free calcium carbonates is 0 to 15 inches.
The upper 1/3 of the control section (A horizon) has hue of 10YR or 7.5YR, value of 3 or 5, and chroma of 1 or 4. Eroded pedons have value of 3 to 5, and chroma of 2 to 4. An Ap or A horizon with value of 4 or 5 may be more than 7 inches in thickness. The A horizon typically is loam, but includes silt loam, sandy loam, gravelly sandy loam, or clay loam. It is slightly acid to moderately alkaline. Some pedons do not contain free calcium carbonates.
The middle 1/3 of the control section (Bw horizon) has hue of 10YR, or 7.5YR; value of 4 or 5; and chroma of 3 or 4. It is loam, sandy loam, silt loam, or clay loam, or the gravelly analogs of these textures. Some pedons do not contain coatings or clay films on the exteriors of peds. The Bw horizon is slightly acid to moderately alkaline. Some pedons do not contain free calcium carbonates.
The lower 1/3 of the control section (C horizon) has hue of 2.5Y, 10YR, or 7.5YR; value of 5 or 6; and chroma of 2 to 4. It is loam, sandy loam, silt loam, or clay loam, or the gravelly analogs of these textures. It is slightly alkaline or moderately alkaline.

COMPETING SERIES: There are no competing series. Series in closely related families are Chatsworth, Hickory, Salter, and Strawn. Chatsworth soils contain more than 30 percent clay in the lower 2/3 of the control section. Hickory and Strawn soils have argillic horizons. Salter soils are coarse-loamy.

GEOGRAPHIC SETTING: Hennepin soils are on upland slopes that border stream valleys and on moraines. Slope gradients range from 10 to 70 percent. These soils formed in calcareous glacial till. Mean annual temperature ranges from 45 to 54 degrees F, and mean annual precipitation varies from 30 to 40 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: Alexandria, Casco, Fox, Hickory, Hochheim, Miami, Miamian, Russell, Shoals, Strawn, and Vanmeter soils. All of these soils are intricately mixed with Hennepin soils on the landscape in some places. Alexandria and Miamian soils are upslope or on similar slopes nearby. Vanmeter soils are lower on the slopes and formed in residuum weathered from calcareous shale. Casco and Fox soils contain more than 90 percent sand in the lower 1/3 and 1/4 of the control section respectively, and gravel in the lower part of the control section. They are locally above Hennepin soils where glacio-fluvial sediments have covered the till. Hickory, Hochheim, Miami, Russell, and Strawn soils have argillic horizons and are upslope. In addition, Hochheim soils have a mollic epipedon, and Russell soils are fine-silty. Shoals soils formed in loamy alluvium on flood plains down slope from Hennepin soils.

DRAINAGE AND PERMEABILITY: Well drained. Surface runoff is rapid on the lesser slopes and very rapid on the steeper slopes. Permeability is moderate or moderately slow.

USE AND VEGETATION: Most areas are used for woodland or pastureland. Native vegetation is deciduous hardwood forest.

DISTRIBUTION AND EXTENT: Illinois, Indiana, Ohio, and Wisconsin. The Hennepin soils are of large extent.

MLRA OFFICE RESPONSIBLE: Indianapolis, Indiana

SERIES ESTABLISHED: Shelby County, Illinois, 1932.

REMARKS: Diagnostic horizons and features recognized in this pedon are: ochric epipedon - the zone from the surface of the soil to a depth of 4 inches (A horizon); cambic horizon - the zone from about 4 to 16 inches (Bw1, Bw2 horizons).

Stop 2: ALVIN SERIES (131)

LOCATION – ALVIN, IL+IN MI MN MO; Established Series; Rev. GVB-BGN-THE, 09/2002

The Alvin Series consists of very deep, well drained soils formed in wind or water-deposited loamy and sandy materials on dunes, hills, terraces, or high flood-plains steps. Permeability is moderately rapid. Slope ranges from 0-45%. Mean annual precipitation is about 39", and mean annual temp. is ~52°F.

TAXONOMIC CLASS: Coarse-loamy, mixed, superactive, mesic Typic Hapludalfs

TYPICAL PEDON: Alvin fine sandy loam - on an east-facing slope of 3 percent in a cultivated field at an elevation of 660 feet.
Ap--0 to 8 inches; brown (10YR 4/3) fine sandy loam, light brownish gray (10YR 6/2) dry; weak fine granular structure; very friable; moderately acid.
BE--8 to 11 inches; dark yellowish brown (10YR 4/4) fine sandy loam; weak fine subangular blocky structure; very friable; few distinct grayish brown (10YR 5/2) silt coatings on faces of peds; moderately acid; clear smooth boundary. (0 to 10 inches thick)
Bt1--11 to 15 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate fine subangular blocky structure; friable; few distinct brown (10YR 4/3) clay films on faces of peds; moderately acid; clear smooth boundary.
Bt2--15 to 25 inches; dark yellowish brown (10YR 4/4) fine sandy loam; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary. (Combined thickness of the Bt horizon is 12 to 45 inches.)
E and Bt--25 to 74 inches; yellowish brown (10YR 5/4) loamy fine sand (E); weak medium subangular blocky structure; very friable; strongly acid; dark yellowish brown (10YR 4/6) fine sandy loam (Bt); 3 to 10 percent of volume; occurs as common to many thin lamellae; moderate medium subangular blocky structure; friable; common distinct brown (10YR 4/3) clay films on faces of peds; strongly acid; clear smooth boundary.
C--74 to 80 inches; 80 percent brown (10YR 4/3) and 20 percent yellowish brown (10YR 5/6) stratified fine sandy loam; massive; friable; moderately acid.

TYPE LOCATION: Vermilion County, Illinois; about 7 miles north of Danville; 2,320 ft S and 1,760 ft E of the NW corner of sec. 32, T. 21 N., R. 11 W.

RANGE IN CHARACTERISTICS: The depth to the base of the argillic horizon, including lamella, ranges from 40 to more than 80 inches. The upper part of the argillic horizon is continuous for 12 inches or more. Some pedons do not have an E and Bt horizon. The particle-size control section averages between 15-18% clay and between 45-70% sand. In the upper part of the series control section the total sand content averages from 55-70%. The fine sand plus very fine sand content averages between 35-60% (absolute) and between 60-85% of the sand fraction. The lower part of the control section averages from 65 to 85 percent sand. The sand fraction percentages are similar to the upper part of the control section.
- The upper part of the control section (Ap, A, E, EB, BE horizons) has properties as follows: Ap or A horizon has value of 3 or 4, and chroma of 1 to 4. It is very fine sandy loam, fine sandy loam, or sandy loam, and less commonly loamy sand or loamy fine sand.
- An E, EB, or BE horizon where present, has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 4. It is very fine sandy loam, fine sandy loam, sandy loam, or loamy fine sand. Reaction is very strongly acid to neutral, depending on liming history.
- The second part of the control section (Bt horizon) has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. Clay films have hue as red as 5YR. It is very fine sandy loam, loam, fine sandy loam, or sandy loam, and includes thin layers of sandy clay loam. Rock fragment content ranges from 0-5%. Reaction ranges from neutral to very strongly acid.
- The lower part of the control section (E and Bt; or Bt and E horizon) has properties as follows: The E part has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 2 to 6. It is sandy loam, loamy sand, or sand, and the fine or very fine analogs.
- The Bt part of the E and Bt horizon consists of bands or lamellae of variable thickness. It has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is sandy loam, loamy sand, or loam, or the fine or very fine analogs. Reaction in E and Bt horizon is strongly acid to neutral; rock fragment content <5%.
- The C or BC horizon, where present, has hue of 10YR or 7.5YR, value of 4 to 6, and chroma of 3 to 6. It is sandy loam, loamy sand or sand, or the fine and very fine analogs. In some pedons it is stratified both in colors and textures. Rock fragment content ranges from 0-5%, except the gravelly substratum phase ranges from 15-45%. Reaction ranges from strongly acid to moderately alkaline.

COMPETING SERIES: These are the, Burnsville, Council, Hillsdale, Lamont, Lapeer, Mecan, and Wyocena soils. The Burnsville, Lapeer, and Wyocena soils are <40" to the base of the argillic horizon. Council soils average >40% silt in the particle-size control section. Hillsdale, Mecan, and Wyocena soils have a fine sand plus very fine sand content in the lower part of the series control section that average <50% absolute and <60% of the sand fraction. Lamont soils average <15% clay in the particle-size control section.

GEOGRAPHIC SETTING: Alvin soils are on dunes, hills, stream terraces, and high flood plains. Slopes commonly are between 3-10% but range from 0-45%. These soils formed in wind or water-deposited loamy and sandy material of mixed mineralogy. Mean annual air temperature ranges from 43-57°F, mean annual precipitation ranges from 30-45", frost free period ranges from 140-210 days, and elevation ranges from 340-1,400 feet above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Ayrshire, Bloomfield, Camden, Chelsea, Lamont, Princeton, Uniontown, and Whitaker soils. The somewhat poorly drained Ayrshire soils are on interdunal areas. Bloomfield and Lamont soils are on similar parts of the landscape nearby and in some places are closely associated. Camden and Uniontown soils contain more clay and silt, and less sand in the sola and are on outwash plains or stream terraces nearby. Chelsea soils contain more sand in the series control section and have a Bt horizon that consists only of bands or lamella. They are on similar parts of the landscape nearby. The somewhat poorly drained Whitaker soils average more than 18 percent clay in the upper 20 inches of the argillic horizon. The somewhat poorly drained Whitaker soils are on lower lying swells of outwash plains and treads of stream terraces nearby.

DRAINAGE AND PERMEABILITY: Well drained. The potential for surface runoff is low or medium. Permeability is moderately rapid.

REMARKS: Diagnostic horizons and features recognized in this pedon are: ochric epipedon - the zone from the surface of the soil to a depth of 11 inches (Ap and BE horizons); argillic horizon - the zone from 11 to 25 inches (Bt1 and Bt2 horizons) and the Bt part of the E and Bt horizon from 25 to 60 inches. A gravelly substratum phase (IL0414) and a flooded phase (IL0422) of the Alvin series are recognized. These phases will be evaluated and may be proposed as new series. The correlated extent of this series into MLRA's 95B, 96, 104, 105, and 108 will be evaluated.

Figure 4: Location of Stop 2 – 1 miles east of Spring Bay on Zimmerman Road.

38.6	2.6	Proceed north on IL Route 29 to Gardner Lane (sign to Nature Center on right side of road before intersection).
39.1	0.5	Turn (left) west onto Gardner Lane until road turns into Forest Park Drive.
39.2	0.1	Keep left onto Forest Park Drive, Nature Center is on right-hand bend in road. **Lunch/Stop 3 — Forest Park Nature Center** (figure 5).

The Forest Park Nature Center is an educational and resource center operated by the Peoria Park District. Management practices at the park attempt to return the wooded bluffs and floodplains to their original character prior to development in the area. Measures have been taken to control bank erosion along streams and gulleys, and prescribed burns and tree-planting are used to reestablish the oak forest native to the Illinois River valley.

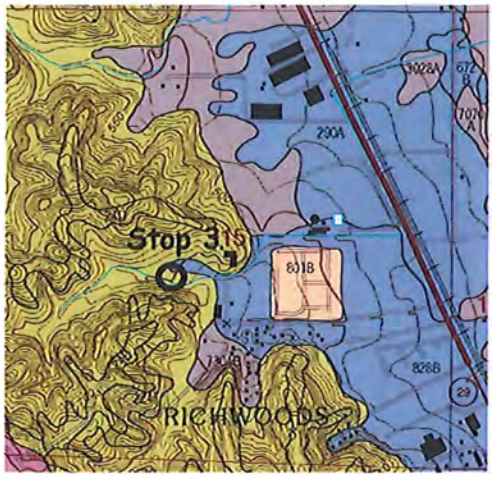

Figure 5: Location of Stop 3 – Forest Park Nature Center, 0.5 miles west of IL Route 29.

The sections we will visit along the bluff and on the floodplain at Stop 3 will expose the soils present on both landform positions. Slopewash on the steep, bluff slopes has removed much of the upper solum. The Tiskilwa till, the material forming the bluffs is exposed here at the surface, but in other area, especially at the base of slopes and along gulleys it is overlain by a variably thick cover of colluvium. On the floodplain, the colluvium has been reworked by water and mixed with sediment transported across the floodplain by streams (alluvium). Typically soils on the floodplain are thicker, except where eroded and have well developed horizons. The soils range from a loam to sandy loam in texture, but can have a greater amount of sand or silt locally.

Recent downcutting of the floodplain has occurred that incised through these deposits. Along some gulleys, the incision has eroded the alluvium/ colluvium and exposed the underlying till. The deepest incision (i.e., larger and faster flows) occurs in channels carrying drainage from subdivisions upslope, whereas much slower incision has occurred in watersheds completely in the park.

39.8	0.6	Turn around and head back to IL Route 29 via Forest Park Drive and Gardner Lane.
43.3	3.5	Turn (left) north onto IL Route 29 to Fairview Street.
43.8	0.5	Follow Fairview Street to Poppet Hollow Road.
44.5	0.7	Keep left onto Poppet Hollow Road and continue 0.3 miles to gated drive on left, at right hand bend in road before Scout Camp. Follow drive up hill and right to trailer. **Stop 4 — Poppet Hollow house excavation** (figure 6).

Figure 6: Location of Stop 4 – Poppet Hollow Road, 0.5 miles west of IL Route 29.

Here, approximately 8 feet of Tiskilwa Formation till is exposed in a cut through a ridge within the bluffs. The Dodge soil is developed in a loamy till under a deciduous forest. The Tiskilwa Formation in the area, which ranges in thickness from 200 to 250 feet, has in its upper part (generally the top 50 ft) numerous beds or lenses of sand, gravel, silt and clay, as seen here. This contrasts with the lower portion of the unit which is more homogenous. Many of interstratified beds have been truncated or deformed since being deposited. These features along with its coarser texture suggest that the till was probably deposited as the ice sheet began to melt and recede backward towards Lake Michigan. Meltwater flowing on and under the ice could have carried sorted material that was deposited in subglacial channels or conduits. Silts and clays were deposited where the drainage ponded.

45.7	1.2	Turn around and head back to Il Route 29 via Poppet Hollow Road and Fairview Street.
51.8	6.1	Turn (right) south onto IL Route 29 to IL Route 24. Exit on eastbound ramp (turn right after overpass), and cross the Illinois River.
66.4	14.6	Continue east on IL Route 24 to Eureka Field Office.

Stop 3: STRAWN SERIES (857)

LOCATION -- STRAWN, IL+IN MI OH; Established Series; Rev. GRS-AAC, 06/2002

The Strawn series consists of very deep, well drained soils on end moraines and dissected ground moraines. They are moderately permeable in the solum and moderately or moderately slowly permeable in the substratum. Strawn soils formed in loamy, calcareous till. Slopes are 2 to 75 percent. Mean annual temperature is about 49 degrees F, and mean annual precipitation is about 34 inches.

TAXONOMIC CLASS: Fine-loamy, mixed, active, mesic Typic Hapludalfs

TYPICAL PEDON: Strawn loam - in a pasture with an 18 percent slope at an elevation of 630 feet. (Colors are for moist soil unless otherwise stated.)
Ap--0 to 7 inches; brown (10YR 4/3) and brown (10YR 5/3) loam, pale brown (10YR 6/3) and very pale brown (10YR 7/3) dry; weak fine and medium granular structure; friable; common fine roots; few pebbles; neutral; abrupt smooth boundary. (4 to 8 inches thick)
Bt1--7 to 11 inches; brown (10YR 4/3) clay loam; moderate fine subangular blocky structure; firm; few fine roots; many faint brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary.
Bt2--11 to 22 inches; brown (10YR 4/3) clay loam; moderate medium subangular blocky structure; firm; few fine roots; many faint brown (10YR 4/3) clay films on faces of peds; few pebbles; neutral; clear smooth boundary. (Combined thickness of the Bt horizons is 7 to 18 inches.)
C--22 to 60 inches; brown (10YR 5/3) loam; few fine prominent strong brown (7.5YR 5/8) masses of iron accumulation in the matrix; massive; firm; few pebbles; strongly effervescent; moderately alkaline.

TYPE LOCATION: Tazewell County, Illinois; about 2 miles northwest of Armington; 194 ft. N and 96 ft. W of the SE corner of sec. 17, T. 22 N., R. 2 W.

RANGE IN CHARACTERISTICS: The depth to the base of the argillic horizon is 16 to 24 inches. Depth to carbonates is 14 to 24 inches. The particle-size control section averages between 22 to 35 percent clay, 15 to 40 percent sand, and 25 and 63 percent silt.
- The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Pedons with value of 3 and chroma of 2 or 3 are less than 7 inches thick or have dry value of 6 or more. Texture is loam or silt loam and includes silty clay loam or clay loam where eroded. Rock fragment content ranges from 0 to 7 percent. Reaction is moderately acid to neutral.
- Some pedons have an E horizon as much as 6 inches in thickness. Where present it has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Texture is silt loam or loam. Rock fragment content ranges from 0-7%. Reaction is moderately acid to neutral. Some pedons have a BE horizon with textures and colors similar to the E horizon.
- The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6. It is clay loam, silty clay loam or loam. Clay content ranges from 24 to 35 percent. Sand content ranges from 10 to 35 percent. Rock fragment content ranges from 3 to 15 percent. Reaction is moderately acid to slightly alkaline. - -
- Some pedons have a BC horizon with textures and colors similar to the Bt horizon.
- The C horizon has hue of 7.5YR, 10YR, or 2.5Y, value of 5 or 6, and chroma of 2 to 6. It is loam, clay loam, silt loam or fine sandy loam. Clay content ranges from 15 to 30 percent. Sand content ranges from 15 to 45 percent. Rock fragment content ranges from 3 to 15 percent. Reaction is slightly alkaline or moderately alkaline and contains carbonates. Calcium carbonate equivalent ranges from 5 to 40 percent.

COMPETING SERIES: These are the Amanda, Belmont, Belmore, Chenault, Chili, Coggon, Conestoga, Crouse, Fredericktown (T), Gallman, Greybrook, Hebron, Hickory, High Gap, Hollinger, Kalamazoo, Kanawha, Kidder, Kosciusko, Leroy, Letort, Lumberton, Mandeville, Martinsville, Mifflin, Military, Nodine, Noliville (T), Ockley, Oglesbet (T), Owosso, Princeton, Relay, Richardville, Riddles, Senachwine, Sisson, Skelton, Theresa, Wawaka, Wawasee, Woodbine, and Wykoff series. All of these soils are differentiated by having sola thicker than 24 inches except Belmore, Hebron, Hollinger, Kidder, LeRoy, Mandeville, Military, and Relay. Belmore soils have more than 15 percent rock fragments in some layer in the middle or lower part of the series control section. Hebron soils have more than 35 percent clay in the middle part of the series control section. Hollinger soils do not have carbonates within a depth of 24 inches and have a higher content of mica in the series control section. Kidder soils contain more than 35 percent sand coarser than very fine sand in the argillic horizon. Leroy soils have a calcium carbonate equivalent of more than 40 percent in lower part of the series control section. Mandeville and Military soils have a lithic or paralithic contact within a depth of 60 inches. Relay soils have hues yellower than 10YR and contain magnesium-rich rock fragments dominated by gabbro, metagabbro or granodiorite.

GEOGRAPHIC SETTING: Strawn soils are on gently sloping to very steep positions on end moraines and dissected ground moraines. Slope gradients are 2-75%. Strawn soils formed in loamy calcareous till. Some pedons have a thin mantle of loess. Mean annual precipitation ranges from 29-40" inches, mean annual temperature ranges from 45-54°F., frost free period ranges from 160-180 days, and elevation ranges from 340-1,020 feet above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the well drained Chute, Hennepin, and Senachwine soils. Chute and Hennepin soils do not have argillic horizons, are on similar landforms or nearby slopes, and in places are intricately mixed with Strawn soils. Senachwine soils have thicker sola and are on similar positions.

DRAINAGE AND PERMEABILITY: Well drained. The potential for surface runoff ranges from low to high. Permeability is moderate in the solum, and is moderate or moderately slow in the substratum.

USE AND VEGETATION: Most areas are used for pasture or woodland. Some less sloping areas are used to grow corn or small grain. The native vegetation is deciduous forest.

DISTRIBUTION AND EXTENT: Northern and central Illinois and Indiana, southwestern Ohio and lower Michigan.

REMARKS: Diagnostic horizons recognized in this pedon are: ochric epipedon - the layer from the surface of the soil to a depth of 7 inches (Ap horizon); argillic horizon - the zone from approximately 7 to 22 inches (Bt1 and Bt2 horizons).
Moderately permeable (IL0227), moderately permeable, eroded (IL0337), moderately slowly permeable (IL0344), and moderately slowly permeable, eroded (IL0345) phases are recognized and some may become new series when the subset soil surveys in which they are in are updated.

Stop 3: DAKOTA SERIES (828)

LOCATION -- DAKOTA, WI+IL MN; Established Series; Rev. AJK-GWH, 03/2000

The Dakota series consists of very deep, well drained soils moderately deep to sandy outwash. They formed in loamy alluvium underlain by sandy outwash on glacial outwash plains, stream terraces, and valley trains. Permeability is moderate in the loamy alluvium and rapid or very rapid in the sandy outwash. Slopes range from 0 to 18 percent. Mean annual precipitation is about 31 inches, and mean annual temperature is about 46 °F.

TAXONOMIC CLASS: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, mesic Typic Argiudolls

TYPICAL PEDON: Dakota loam on a 1 percent slope with east aspect in a corn field at an elevation of about 835 feet.
Ap--0 to 9 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure parting to moderate fine granular; friable; many medium and fine roots; neutral; abrupt smooth boundary.
A--9 to 14 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate medium and coarse angular blocky structure parting to moderate fine granular; friable; many medium and fine roots; neutral; clear smooth boundary. (Combined thickness of the Ap and A horizon ranges from 10 to 18 inches.)
Bt1--14 to 20 inches; dark yellowish brown (10YR 4/4) loam; moderate medium subangular blocky structure; friable; few faint discontinuous dark brown (10YR 4/3) clay films on faces of peds and in pores; common medium and fine roots; about 1 percent pebbles by volume; neutral; clear smooth boundary.
Bt2--20 to 27 inches; brown (7.5YR 4/4) loam; moderate medium subangular blocky structure; friable; few faint patchy dark brown (7.5YR 4/4) clay films on faces of peds and in pores; common medium and fine roots; about 1 percent pebbles by volume; slightly acid; clear smooth boundary. (Combined thickness of the Bt1 and Bt2 horizons ranges from 10 to 18 inches.)
2Bt3--27 to 31 inches; brown (7.5YR 4/4) sandy loam; weak medium subangular blocky structure; friable; sand grains bridged by clay in many places; common fine roots; about 1 percent pebbles by volume; strongly acid; clear wavy boundary. (0 to 4 inches thick)
2BC--31 to 36 inches; brown (7.5YR 4/4) loamy sand; weak coarse subangular blocky structure; friable; few fine roots; about 5 percent pebbles by volume concentrated at top of horizon; strongly acid; gradual wavy boundary. (0 to 5 inches thick)
2C—36 to 60 inches; dark yellowish brown (10YR 4/6) sand; loose; few fine roots in upper part; about 1% pebbles by volume; strongly acid.

RANGE IN CHARACTERISTICS: Thickness of the loamy alluvium and the depth to sandy outwash ranges from 20-40". Thickness of the mollic epipedon ranges from 10-18". Depth to free carbonates typically is greater than 60". Volume of gravel ranges from 0-15% in the loamy alluvium. Volume of gravel averages from 0-35% in the sandy outwash but some horizons may range up to 60%. Volume of cobbles range from 0-5%.
- The Ap or A horizon has hue of 7.5YR or 10YR, value of 2 or 3, and chroma of 1 to 3. It is fine sandy loam, sandy loam, loam, or silt loam. Reaction typically ranges from strongly acid to slightly acid, but ranges to neutral where limed.
- Some pedons have an AB or BA horizon with hue of 7.5YR or 10YR, value of 3 or 4, and chroma of 2 or 3. It is loam, silt loam or sandy clay loam. - - Reaction typically ranges from strongly acid to slightly acid, but ranges to neutral where limed.
- The Bt horizon has hue of 7.5YR or 10YR, value of 4 or 5,and chroma of 3 or 4. It is dominantly loam, sandy clay loam, or clay loam but in some pedons there are subhorizons of sandy loam, silt loam, or silty clay loam.
- Some pedons have a 2Bt horizon with hue of 7.5YR or 10YR hue, value of 4 or 5, and chroma of 3 to 4. It is loamy sand, loamy coarse sand, sand or coarse sand, or the gravelly or very gravelly analogues of these textures. Reaction ranges from strongly acid to slightly acid.
- The 2BC horizon has color, texture, and reaction similar to the 2Bt horizon described above.
- The 2C horizon has hue of 7.5YR or 1OYR, value of 4 to 7, and chroma of 2 to 6. It is sand, coarse sand, or loamy sand, or the gravelly or very gravelly analogs. Reaction ranges from strongly acid to slightly acid.

COMPETING SERIES: These are the Lorenzo, Nineveh, Trempealeau, and Warsaw series. Lorenzo soils have thinner sola. Ninevah and Warsaw soils have gravelly clay loam lower Bt horizons that tongue into the C horizon. Trempealeau soils have Bt horizons with redder hue.

GEOGRAPHIC SETTING: The Dakota soils are on outwash plains, stream terraces, and valley trains. Slope gradients range from 0-18%. Frost free period ranges from 135-160 days. Elevation ranges from 600-1000 feet. Mean annual temperature is 45-52 °F, and mean annual precip. is 28-33".

GEOGRAPHICALLY ASSOCIATED SOILS: Dakota soils are mainly associated with Burkhardt, Dickinson, Lawler, Pillot, and Sparta soils. Burkhardt soils are in nearby areas to Dakota soils where the loamy mantle is thinner. Nearby in sandier areas are the Dickinson and Sparta soils. In lower lying or somewhat wetter areas are the somewhat poorly Lawler soils which form a drainage sequence with the Dakota soils. In some places, where the upper mantle is siltier, the Pillot soils are nearby.

DRAINAGE AND PERMEABILITY: Well drained. Runoff is slow or medium. Permeability is moderate in the loamy alluvium and rapid or very rapid in the sandy outwash.

USE AND VEGETATION: Most areas of Dakota soils are used for cropland. Corn, soybeans, small grain, and hay are the principal crops. Some small areas remain in native vegetation and provide wildlife habitat and some areas are in urban use. Native vegetation was tall grass prairie with scattered oak groves.

DISTRIBUTION AND EXTENT: West-central and southwestern Wisconsin, southern Minnesota, northern Illinois, and possibly northeastern Iowa.

SERIES ESTABLISHED: Dakota County, Minnesota, 1941.

REMARKS: Diagnostic horizons and features recognized in this pedon are: Mollic epipedon - the zone from surface of soil to depth of 14 inches (Ap, A horizons). Argillic horizon - zone from approximately 14 to 31 inches (A, Bt1, Bt2, 2Bt3 horizons). Udic moisture regime. The base saturation in the sandy outwash has increased due to fertilization and liming.

Stop 4: DODGE SERIES (24)

LOCATION – DODGE, WI+IL; Established Series; Rev. AJK-GWH-HFG, 11/2000

The Dodge series consists of very deep well-drained soils formed in loess and in the underlying glacial till on ground moraines, end moraines, and drumlins. Permeability is moderate. Slopes range from 0-20%. Mean annual precipitation is about 30 inches. Mean annual air temperature is about 49°F.

TAXONOMIC CLASS: Fine-silty, mixed, superactive, mesic Typic Hapludalfs

TYPICAL PEDON: Dodge silt loam on a 2 percent slope in a cultivated field at an elevation of about 930 feet.
Ap1--0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine crumb structure; friable; many fine and very fine roots; moderately acid; abrupt smooth boundary.
Ap2--6 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; friable; many fine and very fine roots; slightly acid; abrupt smooth boundary. (Combined thickness of the Ap ranges from 6 to 9 inches)
Bt1--8 to 13 inches; brown (10YR 4/3) silty clay loam; weak medium platy structure parting to weak very fine angular blocky; friable; common fine and very fine roots; common faint clay films on faces of peds; clean silt grains coating faces of some peds; moderately acid; clear smooth boundary.
Bt2--13 to 19 inches; brown (10YR 4/3) silty clay loam; moderate very fine angular and subangular blocky structure; friable; common very fine and fine roots; common faint clay films on faces of peds; strongly acid; clear smooth boundary.
Bt3--19 to 23 inches; brown (10YR 4/3) silty clay loam; weak medium prismatic structure parting to moderate and strong fine angular and subangular blocky; firm; common very fine and fine roots; common faint clay films on faces of peds; strongly acid; clear smooth boundary.
Bt4--23 to 29 inches; dark yellowish brown (10YR 4/4) silty clay loam; weak medium prismatic structure parting to moderate medium angular and subangular; firm; common very fine and fine roots; common faint brown (10YR 4/3) clay films on faces of peds; few dark colored iron-manganese spots on faces of peds; strongly acid; clear smooth boundary. (Combined thickness of the Bt horizons ranges from 11 to 30 inches.)
2Bt5--29 to 35 inches; brown (7.5YR 4/4) sandy clay loam; weak coarse prismatic structure parting to moderate medium subangular blocky; firm; few very fine and fine roots; common faint brown (7.5YR 4/3) and distinct dark brown (7.5YR 3/2) clay films on faces of peds; few dark colored iron-manganese spots on faces of peds; about 8 percent gravel; slightly acid; gradual irregular boundary.
2Bt6--35 to 39 inches; dark brown (7.5YR 3/4) sandy loam; weak coarse subangular blocky structure; friable; few very fine and fine roots; common faint brown (7.5YR 4/3) and distinct dark brown (7.5YR 3/2) clay films on faces of peds and in channels; about 8 percent gravel; slightly effervescent; 14 percent calcium carbonate equivalent; slightly alkaline; gradual smooth boundary. (Combined thickness of the 2Bt horizon ranges from 4 to 20 inches)
2C1--39 to 48 inches; yellowish brown (10YR 5/4) sandy loam; massive breaking to weak thin plates; friable; about 12 percent gravel; strongly effervescent; 28 percent calcium carbonate equivalent; slightly alkaline; gradual smooth boundary. (0 to 20 inches thick)
2C2--48 to 60 inches; yellowish brown (10YR 5/4) sandy loam; massive breaking to thin plates; friable; about 12 percent gravel; strongly effervescent; 33 percent calcium carbonate equivalent; moderately alkaline; gradual smooth boundary. (0 to 20 inches thick)
2C3--60 to 84 inches; brown (10YR 5/3) and pale brown (10YR 6/3) gravelly sandy loam; massive breaking to weak thin plates; about 18 percent gravel; strongly effervescent; 36 percent calcium carbonate equivalent; moderately alkaline.

TYPE LOCATION: Dane County, Wisconsin; about 4 miles E and 5 miles N of Sun Prairie; 300 ft. S and 1375 ft. W of the NEc of sec. 13, T. 9 N., R. 11 E.

RANGE IN CHARACTERISTICS: Depth to the base of the argillic horizon ranges from 30-50". Depth to carbonates ranges from 30-40". The loess mantle is 24-39" thick. The series control section averages from 25-32% clay. Volume of gravel is 3-35% and volume of cobbles is 0-2% in the till.
- The Ap horizon has hue of 10YR, value of 3 to 5, and chroma of 2 to 4. Uncultivated pedons have an A horizon with hue of 10YR, value of 2 or 3, and chroma of 1 to 3. Reaction naturally ranges from strongly acid to slightly acid but ranges to neutral, where the soil is limed.
- Some pedons have an E horizon with hue of 10YR, value of 4 or 5, and chroma of 2 or 3. Texture is silt loam. Reaction is strongly acid to slightly acid.
- Some pedons have a BE horizon with hue of 10YR, value of 4 or 5, and chroma of 3 or 4. Texture is silt loam. Reaction is strongly acid to slightly acid.
- The Bt horizon has hue of 10YR, value of 3 to 5, and chroma of 3 to 6. Value and chroma of 3 do not occur together. Texture is silty clay loam or silt loam. Reaction naturally ranges from very strongly acid to slightly acid but ranges to neutral in the upper part in some pedons, where the soil is limed.
- The 2Bt horizon has hue of 7.5YR or 10YR, value of 3 to 5, and chroma of 4 to 6. A thin organic matter and clay-rich B horizon (Beta B) is present in some pedons just above the calcareous till and is identified by its low value (2 or 3) and chroma (1 to 3). Texture of the 2Bt is clay loam, sandy clay loam, loam, fine sandy loam, or sandy loam or the gravelly analogs. Carbonates are present in some pedons. Reaction ranges from mod. acid to slightly alkaline.
- Some pedons have a 2Btk or 2BCtk horizon with colors like the 2Bt horizon. Texture is sandy loam, fine sandy loam, or the gravelly analogs. These horizons contain identifiable secondary carbonates. Reaction is slightly or moderately alkaline.
- The 2C horizon typically has hue of 10YR but some pedons have hue of 7.5YR. Value is 5 or 6 and chroma is 3 or 4. Texture typically is sandy loam or fine sandy loam or gravelly analogs but some pedons have subhorizons of loam or loamy sand or their gravelly analogs. Sand content averages 55 percent or more in the 2C horizon but some pedons have subhorizons in the 2C with less than 55 percent sand. The 2C horizon contains carbonates.

COMPETING SERIES: These are the Baraboo, Bertrand, Blackhammer, Camden, Dubuque, Fayette, Flagg, Greenridge(T), Hackers, Jemerson, Knowles, La Farge, Lambeau(T), Lomira, Marseilles, Martinsburg, Menfro, Navlys, Palermo(T), Palsgrove, Pepin, Piscasaw, Ridgway, Rozetta, Ruma, Rush, Russell, Sandview, Seaton, St. Charles, Stookey, Sylvan, Westbend, Westmore, and Yellowriver series. Baraboo, Dubuque, and Knowles soils have a lithic contact at 20 to 40 inches. Bertrand, Fayette, Martinsburg, Menfro, Navlys, Palermo, Rozetta, Ruma, Seaton, St. Charles, Stookey, Sylvan, and Yellowriver soils have loess or other silty deposits more than 40 inches thick. Camden, Flagg, Greenridge, Hackers, Jemerson, Lambeau, and Ridgway soils do not have free carbonates within the series control section. La Farge and Marseilles soils have a paralithic contact at 20 to 40 inches. Rush soils are more than 40 inches deep to carbonates.

GEOGRAPHIC SETTING: Dodge soils are on ground moraines, end moraines, and drumlins. Slope gradients range from 0-20%. These soils formed in loess and in the underlying glacial till. Mean annual temperature ranges from 46-53°F. Mean annual precipitation is approximately 30 inches.

GEOGRAPHICALLY ASSOCIATED SOILS: These are Birkbeck, Lamartine, Mayville, Kidder, and St. Charles soils. Birkbeck and St. Charles soils are on similar slopes with loess thicker than 40 inches.

DRAINAGE AND PERMEABILITY: Well drained. Surface runoff potential is low to high. Permeability is moderate.

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STOP 1 – Sec. 1, T26N, R4W, Tazewell County, IL

LOCATION MIAMI IN+IL MI OH WI
Established Series
Rev. GRS-MLW-TJE
02/2003

MIAMI SERIES (935F) Fine-loamy, mixed, active, mesic Oxyaquic Hapludalfs

The Miami series consists of moderately well drained soils formed in as much as 18 inches of loess or silty material and in the underlying loamy till on till plains. They are very deep soils that are moderately deep to dense till. Permeability is moderate or moderately slow in the solum, and slow or very slow in the underlying dense till. Slope ranges from 0 to 60 percent. Mean annual precipitation is 40 inches, and mean annual temperature is 52 degrees F.

GEOGRAPHIC SETTING: Miami soils are on till plains. Slope gradients are dominantly 0 to 25 percent, but range to 60 percent. Miami soils formed in as much as 18 inches of loess or silty material and in the underlying loamy till. Mean annual precipitation ranges from 30 to 42 inches, mean annual temperature ranges from 46 to 54 degrees F., frost-free period is 140 to 180 days, and elevation ranges from 600 to 1200 feet above mean sea level.

STOP 1 & 3 – Sec. 1, T26N, R4W, Tazewell Co., IL; Sec. 15, T9N, R8E, Peoria Co.,IL

LOCATION HENNEPIN IL+IN OH WI
Established Series
Rev. JWS-KDH
02/2000

HENNEPIN SERIES (935F, 857G) Fine-loamy, mixed, active, mesic Typic Eutrudepts

The Hennepin series consists of very deep, well drained soils formed in calcareous glacial till. These soils are on upland side slopes that border stream valleys and on moraines. Permeability is moderate or moderately slow. Slopes range from 10 to 70 percent. Mean annual temperature is about 52 degrees F, and mean annual precipitation is about 35 inches.

GEOGRAPHIC SETTING: Hennepin soils are on upland slopes that border stream valleys and on moraines. Slope gradients range from 10 to 70 percent. These soils formed in calcareous glacial till. Mean annual temperature ranges from 45 to 54 degrees F, and mean annual precipitation varies from 30 to 40 inches.

STOP 2 – Sec. 6, T27N, R3W, Woodford Co., IL

LOCATION ALVIN IL+IN MI MN MO
Established Series
Rev. GVB-BGN-TJE
09/2002

ALVIN SERIES (131D) Coarse-loamy, mixed, superactive, mesic Typic Hapludalfs

The Alvin Series consists of very deep, well drained soils formed in wind or water-deposited loamy and sandy materials on dunes, hills, terraces, or high flood-plains steps. Permeability is moderately rapid. Slope ranges from 0 to 45 percent. Mean annual precipitation is about 39 inches, and mean annual temperature is about 52 degrees F.

GEOGRAPHIC SETTING: Alvin soils are on dunes, hills, stream terraces, and high flood plains. Slopes commonly are between 3 and 10 percent but range from 0 to 45 percent. These soils formed in wind or water-deposited loamy and sandy material of mixed mineralogy. Mean annual air temperature ranges from 43 to 57 degrees F, mean annual precipitation ranges from 30 to 45 inches, frost free period ranges from 140 to 210 days, and elevation ranges from 340 feet to 1,400 feet above sea level.

STOP 3 – Sec. 15, T9N, R8E, Peoria Co., IL

LOCATION STRAWN IL+IN MI OH
Established Series
Rev. GRS-AAC
06/2002

STRAWN SERIES (857G) Fine-loamy, mixed, active, mesic Typic Hapludalfs

The Strawn series consists of very deep, well drained soils on end moraines and dissected ground moraines. They are moderately permeable in the solum and moderately or moderately slowly permeable in the substratum. Strawn soils formed in loamy, calcareous till. Slopes are 2 to 75 percent. Mean annual temperature is about 49 degrees F, and mean annual precipitation is about 34 inches.

GEOGRAPHIC SETTING: Strawn soils are on gently sloping to very steep positions on end moraines and dissected ground moraines. Slope gradients are 2 to 75 percent. Strawn soils formed in loamy calcareous till. Some pedons have a thin mantle of loess. Mean annual precipitation ranges from 29 to 40 inches, mean annual temperature ranges from 45 to 54 degrees F., frost free period ranges from 160 to 180 days, and elevation ranges from 340 to 1,020 feet above sea level.

STOP 4 – Sec. 4, T9N, R8E, Peoria Co., IL

LOCATION DODGE WI+IL
Established Series
Rev. AJK-GWH-HFG
11/2000

DODGE SERIES (24D) Fine-silty, mixed, superactive, mesic Typic Hapludalfs

The Dodge series consists of very deep well-drained soils formed in loess and in the underlying glacial till on ground moraines, end moraines, and drumlins. Permeability is moderate. Slopes range from 0 to 20 percent. Mean annual precipitation is about 30 inches. Mean annual air temperature is about 49 degrees F.

GEOGRAPHIC SETTING: Dodge soils are on ground moraines, end moraines, and drumlins. Slope gradients range from 0 to 20 percent. These soils formed in loess and in the underlying glacial till. Mean annual temperature ranges from 46 to 53 degrees F. Mean annual precipitation is approximately 30 inches.

Recent Illinois MLRA Soil Survey Update Activity:
Miami Correlation to Senachwine, due to series concept change by Indiana

LOCATION SENACHWINE IL+IN
Established Series
Rev. SLE-BRP-TJE
02/2003

SENACHWINE SERIES Fine-loamy, mixed, active, mesic Typic Hapludalfs

The Senachwine series consists of very deep, well drained soils on till plains. They formed in as much as 18 inches of loess or other silty material and in the underlying calcareous loamy till. The permeability is moderately slow. Slope ranges from 2 to 60 percent. Mean annual precipitation is about 38 inches, and the mean annual air temperature is about 51 degrees F.

GEOGRAPHIC SETTING: Senachwine soils are on till plains. Slope ranges from 2 to 60 percent. Senachwine soils formed in as much as 18 inches of loess or other silty material and in the underlying calcareous loamy till. Illite is the dominant clay mineral in the till. Mean annual precipitation ranges from 35 to 42 inches, mean annual temperature ranges from 48 to 54 degrees F, frost free period ranges from 150 to 180 days, and elevation ranges from 600 to 1,200 feet above sea level.

LOCATION SENACHWINE IL+IN

Established Series
Rev. SLE-BRP-TJE
02/2003

SENACHWINE SERIES

The Senachwine series consists of very deep, well drained soils on till plains. They formed in as much as 18 inches of loess or other silty material and in the underlying calcareous loamy till. The permeability is moderately slow. Slope ranges from 2 to 60 percent. Mean annual precipitation is about 38 inches, and the mean annual air temperature is about 51 degrees F.

TAXONOMIC CLASS: Fine-loamy, mixed, active, mesic Typic Hapludalfs

TYPICAL PEDON: Senachwine silt loam - on an 11 percent convex slope in a cultivated field at an elevation of 856 feet. (Colors are for moist soil unless otherwise stated.)

Ap--0 to 6 inches; mixed brown (10YR 4/3) and yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; common fine roots; neutral; abrupt smooth boundary. (5 to 10 inches thick)

Bt1--6 to 15 inches; yellowish brown (10YR 5/4) silty clay loam; moderate fine subangular blocky structure; friable; few fine roots; common faint dark yellowish brown (10YR 4/4) clay films on faces of peds; moderately acid; clear smooth boundary.

2Bt2--15 to 28 inches; brown (7.5YR 5/4) clay loam; moderate medium subangular blocky structure; firm; few fine roots; many faint brown (7.5YR 4/4) clay films on faces of peds; few fine rounded black (N 2.5/0) weakly cemented iron and manganese oxide concretions throughout; neutral; clear smooth boundary.

2BCt--28 to 34 inches; brown (7.5YR 5/4) loam; weak coarse prismatic structure; firm; few fine roots; common faint brown (7.5YR 4/4) clay films on faces of peds; 5 percent gravel; slightly effervescent; slightly alkaline; clear smooth boundary. (The combined thickness of the Bt plus 2Bt horizons ranges from 19 to 35 inches)

2C--34 to 60 inches; brown (7.5YR 5/4) loam; massive; firm; 5 percent gravel; strongly effervescent; moderately alkaline.

TYPE LOCATION: Bureau County, Illinois, 2 1/4 miles west and 1 1/4 mile south of Tiskilwa; 1,040 feet west and 1,345 feet south of the northeast corner sec. 21, T. 15 N., R. 8 E.; USGS Wyanet topographic quadrangle; lat. 41 degrees 16 minutes 25.4 seconds N., and long. 89 degrees, 34 minutes, 18 seconds W.; UTM Zone 16T 0284602E 4572121N; NAD 27.

ANGE IN CHARACTERISTICS: The depth to the base of the argillic horizon ranges from 24 to 40 inches. The depth to carbonates is 20 to 40 inches. Thickness of the loess is less than 18 inches. The particle-size control section averages between 27 and 35 percent clay.

The Ap or A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 to 4. It is loam, silt loam, fine sandy loam, sandy loam, silty clay loam, or clay loam. It has 0 to 3 percent gravel. Reaction is moderately acid to neutral.

Some pedons have an E horizon with colors similar to the A horizon. Texture is silt loam. Reaction is moderately acid to neutral.

The Bt, 2Bt, BC, or 2BC horizon have hue of 10YR, 7.5YR, or 2.5Y; value of 4 to 6; and chroma of 3 to 6. The Bt horizons are silty clay loam or clay loam in the upper part and clay loam or loam in the lower part. Sand content ranges from 15 to 40 percent sand. It has 1 to 10 percent gravel. The Bt and 2Bt horizons range from slightly acid to strongly acid in the upper part and ranges to neutral in the lower part. The BC or 2BC horizon is neutral or slightly alkaline. The moist bulk density in the Bt or 2Bt horizon ranges from 1.4 to 1.7 g/cm3 and the moist bulk density in the BC or 2BC horizon ranges from 1.6 to 1.8 g/cm3.

The C or 2C horizon has hue of 10YR, 7.5YR, or 2.5Y; value of 5 or 6; and chroma of 3 or 4. It is clay loam or loam. Clay content ranges from 15 to 30 percent and sand content ranges from 20 to 55 percent. Gravel content ranges from 1 to 10 percent. Reaction is slightly alkaline or moderately alkaline. Calcium carbonate equivalent ranges from 20 to 40 percent. The moist bulk density ranges from 1.60 to 1.85 g/cm3.

COMPETING SERIES: These are the Amanda, Belmont, Belmore, Chenault, Chili, Clifty Creek (T), Conestoga, Crouse, Gallman, Greybrook, Hebron, Hickory, High Gap, Hollinger, Kalamazoo, Kanawha, Kidder, Kosciusko, LeRoy, Letort, Lumberton, Mandeville, Martinsville, Mifflin, Military, Nodine, Nollville (T), Ockley, Owosso, Princeton, Relay, Richardville, Riddles, Sisson, Skelton, Strawn, Theresa, Wawaka, Wawasee, Woodbine, and Wykoff soils. Amanda, Conestoga, Hollinger, Letort, and Wykoff soils do not have carbonates within a depth of 40 inches. Belmont, Chenault, High Gap, Lumberton, Mandeville, Mifflin, Military, Nollville (T), and Woodbine soils have a lithic or paralithic contact within a depth of 60 inches. Belmore, Chili, Kosciusko, and Wawaka soils have more than 10 percent gravel in the lower half of the series control section. Clifty Creek (T) soils have more than 30 percent clay in the lower part of the series control section. Crouse, Gallman, Greybrook, Hickory, Kanawha, Martinsville, Nodine, Ockley, Richardville, Riddles, and Skelton soils are deeper than 40 inches to the base of the argillic horizon and to carbonates. Hebron and Sisson soils do not have gravel in the lower part of the series control section. Kalamazoo and Kidder soils have more than 55 percent sand in the lower part of the series control section. LeRoy and Strawn soils are less than 24 inches deep to the base of the argillic horizon and to carbonates. Owosso, Princeton, and Wawasee soils have less than 27 percent clay and more than 40 percent sand in the middle part of the series control section. Relay soils have hue of 5Y and rock fragments of gabbro, metagabbro, and granodiorite throughout the series control section. Theresa soils have a calcium carbonate equivalent of more than 40 percent in the lower part of the series control section.

GEOGRAPHIC SETTING: Senachwine soils are on till plains. Slope ranges from 2 to 60 percent. Senachwine soils formed in as much as 18 inches of loess or other silty material and in the underlying calcareous loamy till. Illite is the dominant clay mineral in the till. Mean annual precipitation ranges from 35 to 42 inches, mean annual temperature ranges from 48 to 54 degrees F, frost free period ranges from 150 to 180 days, and elevation ranges from 600 to 1,200 feet above sea level.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Birkbeck, Catlin, Hennepin, La Rose and Strawn soils. The moderately well drained Birkbeck and Catlin soils have thicker loess over the till and are on upslope positions. Hennepin soils have lower average clay content in the subsoil. La Rose soils have darker surface layers. Hennepin and La Rose soils are on similar positions.

DRAINAGE AND PERMEABILITY: Well drained. The potential for surface runoff is low to high. Permeability is moderately slow.

USE AND VEGETATION: A large part is under cultivation. The principal crops are corn, soybeans, small grain, and hay. Much of the more sloping part is in permanent pasture or forest.

DISTRIBUTION AND EXTENT: Central and northern Illinois and in west central Indiana. The soil is moderately extensive in MLRAs 95B, 108, 110 and 111.

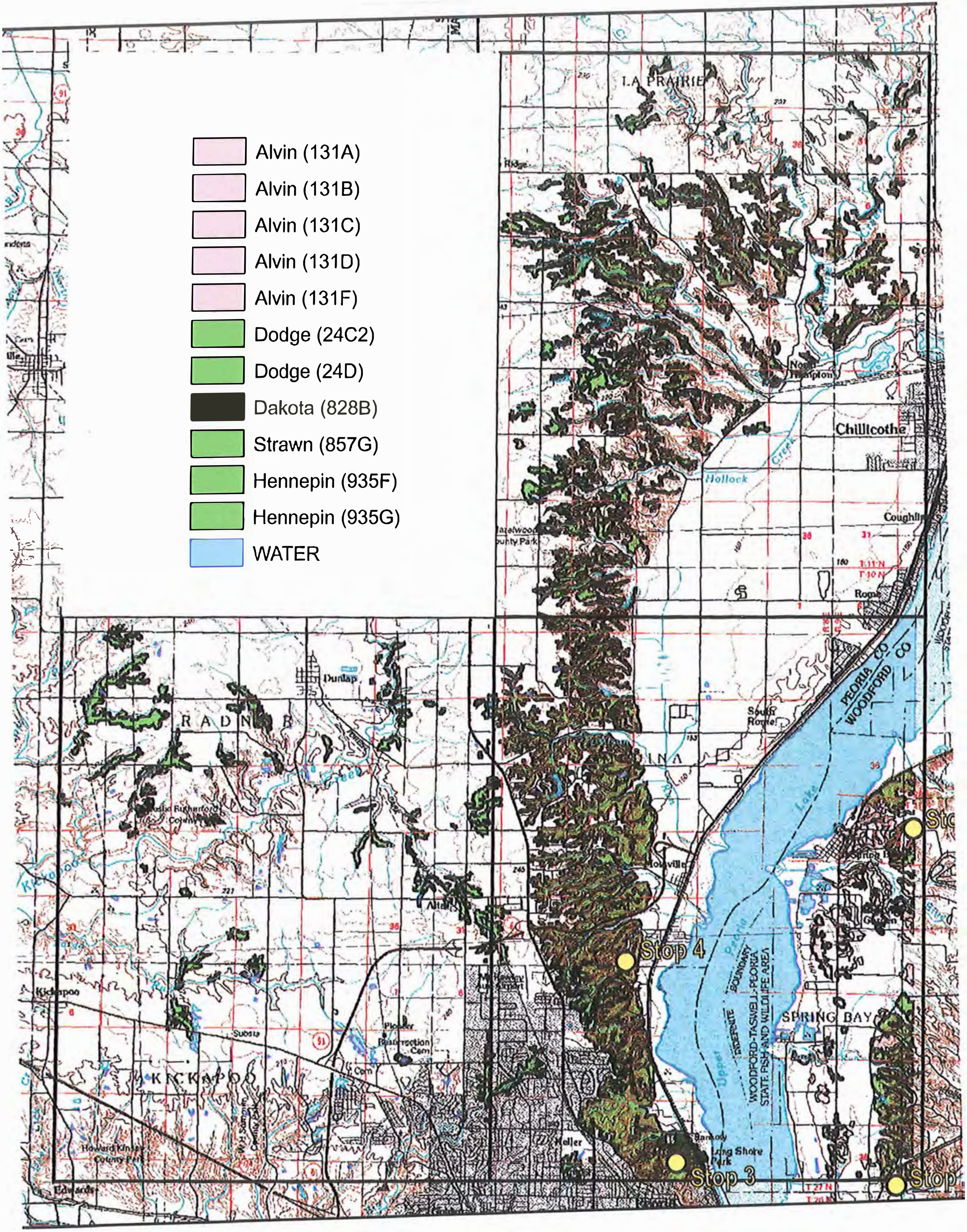
MLRA OFFICE RESPONSIBLE: Indianapolis, Indiana

SERIES ESTABLISHED: Bureau County, Illinois, 1996.

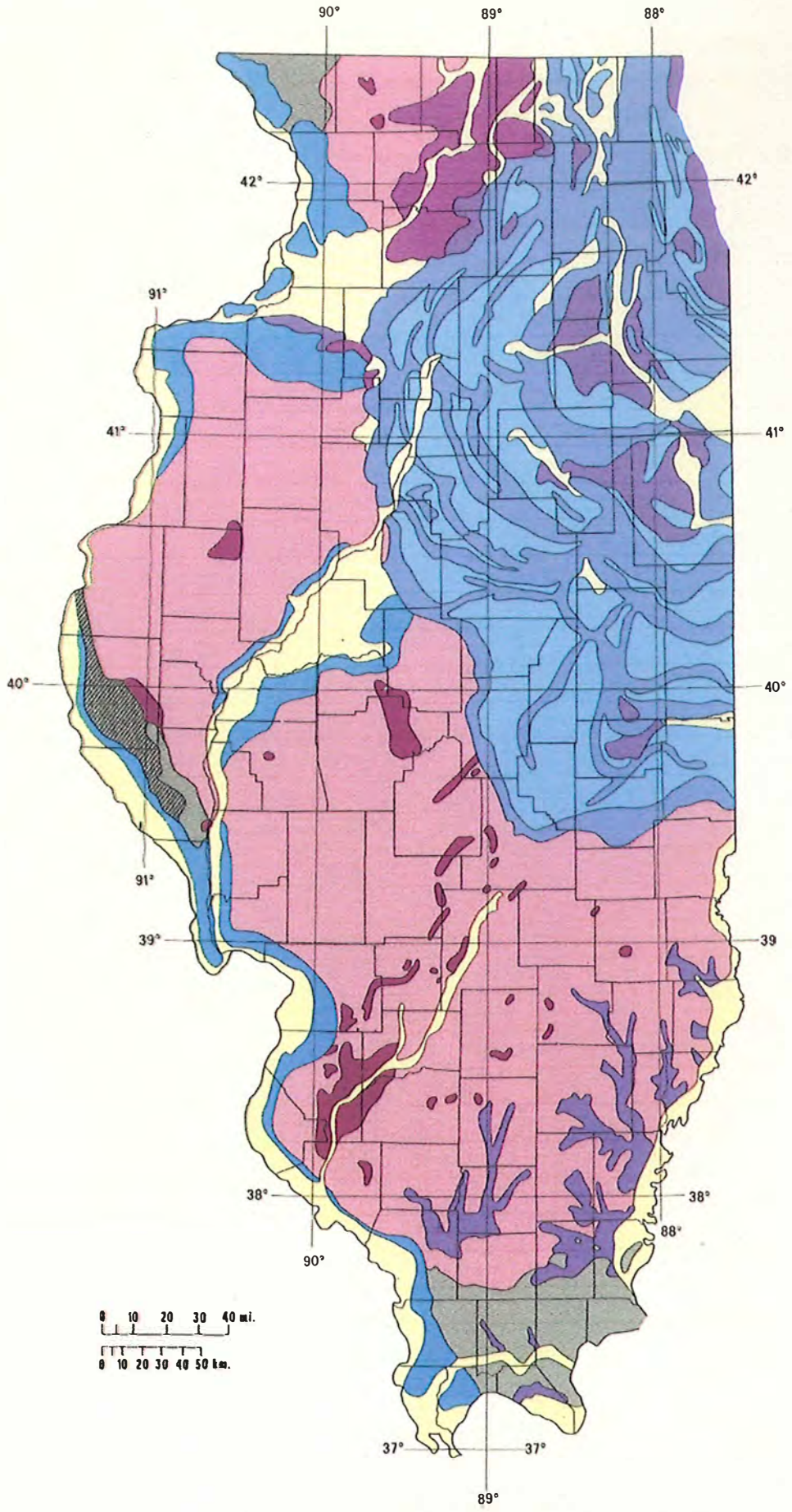
REMARKS: This series replaces the Miami series (Oxyaquic Hapludalfs) in many areas of MLRA 108 and 110 in Illinois.

Diagnostic horizons and features recognized in this pedon are:
ochric epipedon - the zone from the surface of the soil to a depth of approximately 6 inches (Ap horizon);
argillic horizon - the zone from approximately 6 to 34 inches (Bt1, 2Bt2, 2BCt horizons);
udic moisture regime.

National Cooperative Soil Survey
U.S.A.



Alvin (131A)
Alvin (131B)
Alvin (131C)
Alvin (131D)
Alvin (131F)
Dodge (24C2)
Dodge (24D)
Dakota (828B)
Strawn (857G)
Hennepin (935F)
Hennepin (935G)
WATER
LA PRAIRIE
Chillicothe
Hollock
Creek
Dunlap
RADNOR
KICKAPOO
Kickapoo
Edwards
Mossville
South Rome
Rome
PEORIA CO
WOODFORD CO
SPRING BAY
Stop 4
Stop 3
Long Shore Park
WOODFORD-TASWELL-PEORIA STATE FISH AND WILDLIFE AREA



QUATERNARY DEPOSITS*

AGE	UNIT
Recent and Wisconsinan (75,000 yrs. B.P.** to present)	River alluvium, wind blown sand, and sand and gravel outwash.
Wisconsinan (75,000 yrs. B.P. to 10,000 yrs. B.P.)	Windblown silt (loess) more than 6 meters (20 ft) thick.
	Glacial and slackwater lake deposits of silt, clay and sand.
	Glacial terminal moraine (Glacial till with some sand, gravel and silt).
	Glacial ground moraine (Glacial till with some sand, gravel and silt).
Wisconsinan and Illinoian (500,000 yrs. B.P. to 10,000 yrs. B.P.)	Glacial till with some sand, gravel and silt.
Illinoian (500,000 yrs. B.P. to 75,000 yrs. B.P.)	Glacial till with some sand, gravel and silt.
	Undifferentiated glacial lake silt and clay, and outwash sand, gravel and silt.
Pre-Illinoian (Prior to 500,000 yrs. B.P.)	Glacial till with gravel, sand and silt.
	Bedrock.

**B.P. = Before Present

*Modified from Quaternary Deposits of Illinois (1979) by Jerry A. Lineback, ISGS.

1992

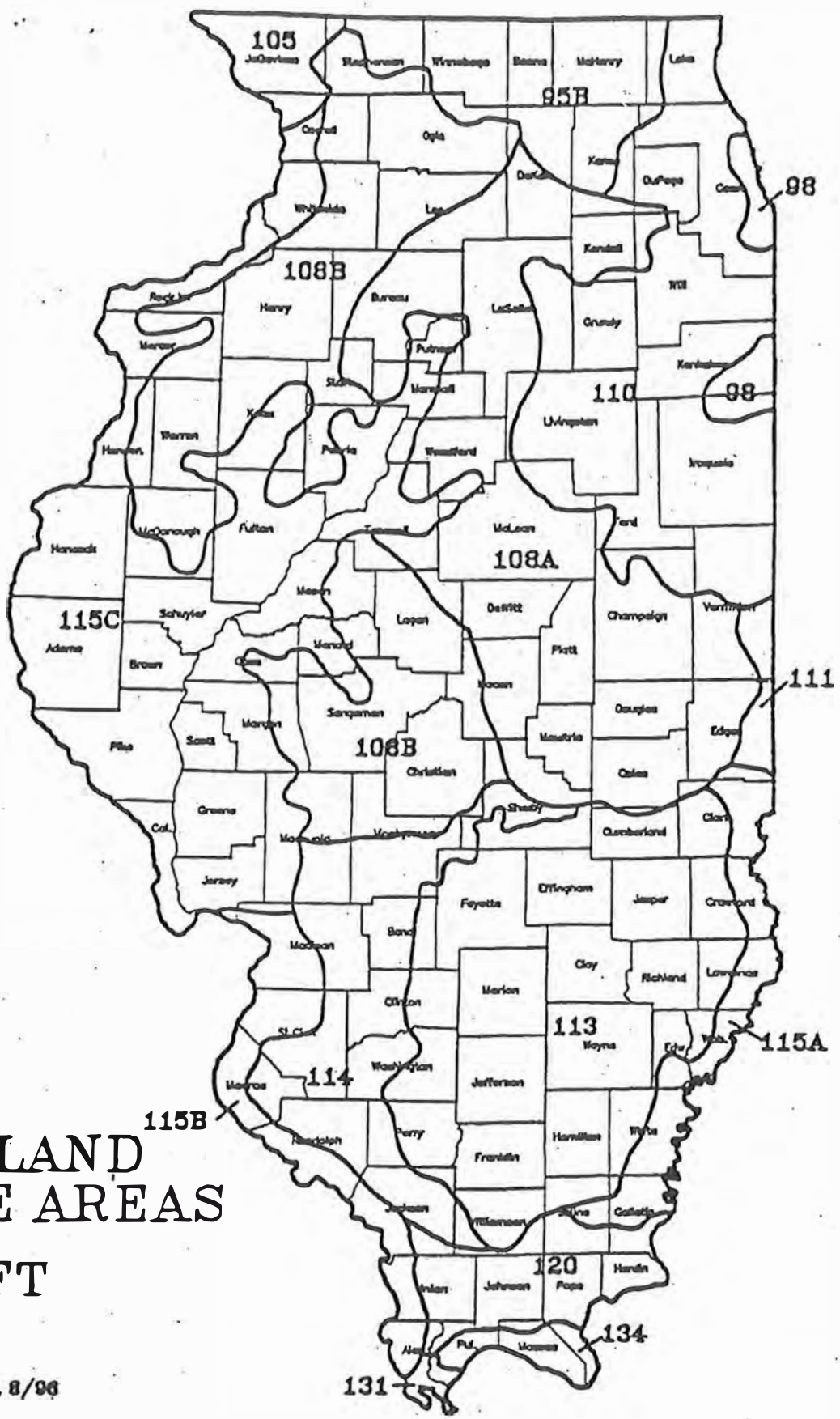
TABLE 19.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class	1997 Draft Correlation
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs	
*Assumption	Fine-silty, mixed, mesic Typic Argiudolls	
Beaucoup	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls	
Brenton	Fine-silty, mixed, mesic Aquic Argiudolls	
Camden	Fine-silty, mixed, mesic Typic Hapludalfs	
Catlin	Fine-silty, mixed, mesic Typic Argiudolls	Parkway 1/
Chute	Mixed, mesic Typic Udipsamments	
Clarksdale	Fine, montmorillonitic, mesic Udollic Ochraqualfs	
Denny	Fine, montmorillonitic, mesic Mollic Albaqualfs	
Dickinson	Coarse-loamy, mixed, mesic Typic Hapludolls	
Dodge	Fine-silty, mixed, mesic Typic Hapludalfs	
Dorchester	Fine-silty, mixed (calcareous), mesic Typic Udifluvents	
Downs	Fine-silty, mixed, mesic Mollic Hapludalfs	Greenbush
Drummer	Fine-silty, mixed, mesic Typic Haplaquolls	
Elburn	Fine-silty, mixed, mesic Aquic Argiudolls	
Elco	Fine-silty, mixed, mesic Typic Hapludalfs	
*Elkhart	Fine-silty, mixed, mesic Typic Argiudolls	
Fayette	Fine-silty, mixed, mesic Typic Hapludalfs	
Harpster	Fine-silty, mesic Typic Calciaquolls	
Harvard	Fine-silty, mixed, mesic Mollic Hapludalfs	
Hennepin	Fine-loamy, mixed, mesic Typic Eutrochrepts	
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs	
Huntsville	Fine-silty, mixed, mesic Cumulic Hapludolls	
Ipava	Fine, montmorillonitic, mesic Aquic Argiudolls	
Jasper	Fine-loamy, mixed, mesic Typic Argiudolls	Cresent
Jules	Coarse-silty, mixed (calcareous), mesic Typic Udifluvents	
Keomah	Fine, montmorillonitic, mesic Aeric Ochraqualfs	
Landes	Coarse-loamy, mixed, mesic Fluventic Hapludolls	
Lawson	Fine-silty, mixed, mesic Cumulic Hapludolls	
Lena	Euic, mesic Typic Medisaprists	
Lenzburg	Fine-loamy, mixed (calcareous), mesic Typic Udorthents	
Lisbon	Fine-silty, mixed, mesic Aquic Argiudolls	
Marseilles	Fine-silty, mixed, mesic Typic Hapludalfs	
Orion	Coarse-silty, mixed, nonacid, mesic Aquic Udifluvents	
Orthents	Loamy, mixed, mesic Udorthents	
Osceola	Fine, mixed, mesic, Udollic Ochraqualfs	
Paxico	Coarse-silty, mixed (calcareous), mesic Aeric Fluvaquents	
Peotone	Fine, montmorillonitic, mesic Cumulic Haplaquolls	
Plainfield	Mixed, mesic Typic Udipsamments	Coloma 2/
Plano	Fine-silty, mixed, mesic Typic Argiudolls	
Proctor	Fine-silty, mixed, mesic Typic Argiudolls	
Radford	Fine-silty, mixed, mesic Fluvaquentic Hapludolls	
Rapatee	Fine-silty, mixed, nonacid, mesic Typic Udorthents	
Rozetta	Fine-silty, mixed, mesic Typic Hapludalfs	
Rushville	Fine, montmorillonitic, mesic Typic Albaqualfs	
Sable	Fine-silty, mixed, mesic Typic Haplaquolls	
Sarpy	Mixed, mesic Typic Udipsamments	
Sawmill	Fine-silty, mixed, mesic Cumulic Haplaquolls	
*Saybrook	Fine-silty, mixed, mesic Typic Argiudolls	
St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs	
Starks	Fine-silty, mixed, mesic Aeric Ochraqualfs	
Strawn	Fine-loamy, mixed, mesic Typic Hapludalfs	
Sylvan	Fine-silty, mixed, mesic Typic Hapludalfs	
Tama	Fine-silty, mixed, mesic Typic Argiudolls	Osco
Titus	Fine, montmorillonitic, mesic Fluvaquentic Haplaquolls	
Virgil	Fine-silty, mixed, mesic Udollic Ochraqualfs	
Warsaw	Fine-loamy over sandy or sandy-skeletal, mixed, mesic Typic Argiudolls	
Worthen	Fine-silty, mixed, mesic Cumulic Hapludolls	

1/ Change on Illinoian till plain only

2/ Subsequent correlation on Mississippi River terrace



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DRAFT

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ISGS Guidebooks 19 + 20

Fig. Q-5—Areal distribution of the dominantly till formations and members of Ill