

## Origin, Characteristics, and Management of the Soil Associations of Allen County

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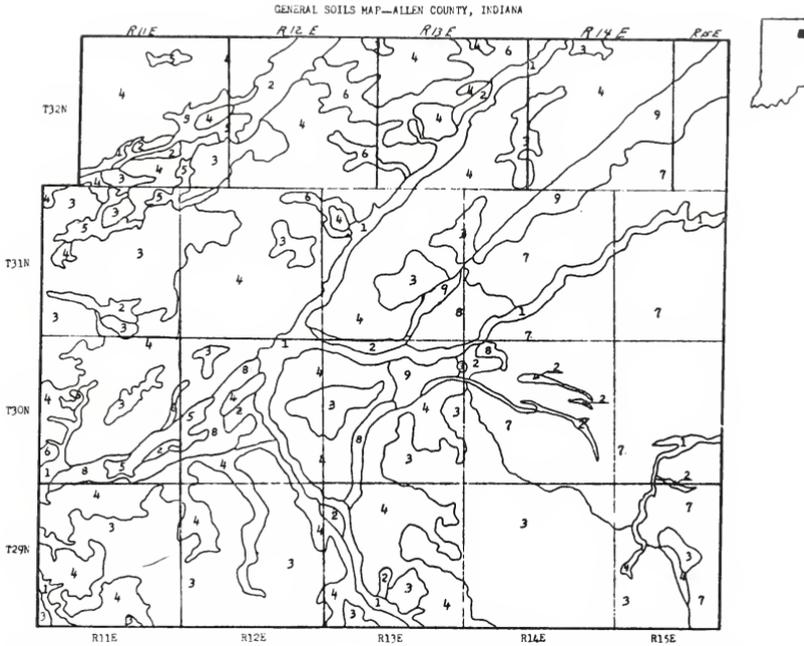
Allen County is located in the northeastern part of Indiana. Fort Wayne is the county seat. The county is bounded on the north by Noble and DeKalb counties; on the east by Paulding, Defiance and Van Wert counties, Ohio; on the south by Adams and Wells counties; and on the west by Huntington and Whitley counties. The county contains approximately 429,000 acres or 664 square miles of land area.

Pleistocene glacial deposits mantle the bedrock topography over the northern four-fifths of Indiana. The present surface features of Allen County are those characteristic of this glaciated region. They vary from low, level or depressed areas, remnants of old lakes, to rolling and hilly areas; the latter being the usual features of a morainic area. Glacial drift of the Cary substage of the Wisconsin age glaciation covers Allen County. The drift varies from 50 to 200 feet or more thick; consisting predominantly of clay-rich till and minor amounts of outwash sand and gravel, aeolian sands and lacustrine materials.

The soils of Allen County will be more easily understood if they are first studied as they occur in broad areas, or soil associations (Fig. 1). A soil association is a geographic pattern of defined and named kind of soils. The soils in an association may be much alike or entirely different, but the pattern in which the soils occur is fairly uniform. The soils in this county have been placed in nine soil associations. The associations are named for the major soils in them, but other soils may be present in any of the associations. Each soil association is separated on the basis of its soil characteristics. However, the nine associations closely correlate with the past geologic history of the county, and each association follows somewhat a particular physiographic feature.

The Salamonie, Wabash and Fort Wayne moraines and scattered extensive ground moraines underlying soil associations 3, 4 and 6 constitute the upland areas in the county. Association 3 occupies the level ground moraines and associations 4 and 6 are the sloping moraine areas in the county. The lake plain area in the eastern part of the county contains soil associations 7, 8 and 9. Highway 37 northeast and Highway 30 southeast from New Haven have been constructed on the beach ridges that border the lake plain region. Most of the soils in association 9 occur adjacent to the beach ridges.

Of the major streams in glacial times, only two carried large quantities of outwash. Soil association 2 and part of association 5 in T32N, R11 & 12E include the outwash from the Eel River sluiceway. The Wabash sluiceway in T30N, R11 & 12E was formed during the maximum discharge and deposition of the Maumee Torrent when glacial lake Maumee occupied the lake plain region in eastern Allen County. This sluiceway is locally referred to as the Little Wabash River Valley. Soil associations 2, 5 and 8 occur here. Soil association 1 of bottom-



1-Genesee, Eel, Martinsville—Well drained river bottoms and terraces (0-3%).  
 2-Martinsville, Ockley, Belmore, Fox, Spinks—Well to excessively drained outwash soils.  
 3-Blount, Pewamo—Somewhat poorly to very poorly drained upland soils (depressional to 3%).  
 4-Morely, Blount—Well to somewhat poorly drained moderately sloping upland soils (3-10%).  
 5-Carlisle, Willette—Depressional organic soils.

6-Morley—Well drained steeply sloping uplands (10-20%+).  
 7-Hoytville, Nappanee—Very poorly to somewhat poorly drained level lake plain soils.  
 8-Lenawee, Toledo, Mahalassville—Very poorly drained depressional lacustrine and outwash soils.  
 9-Mahalassville, Whitaker—Very poorly to somewhat poorly drained outwash soils found on the lake plain (0-2%)

Figure 1. General Soils Map—Allen County, Indiana.

land and terrace soils occurs mostly along the major streams of the county. Following are more complete descriptions of each of the nine associations.

### Association 1

Eel-Genesee-Martinsville: Light colored river bottom and terrace soils.

This soil association consists of nearly level river bottoms and terrace soils. It occupies about 4 percent of the land area in the county.

The soils here occur mostly adjacent to the major streams within the county. Small acreages of these soils also occur adjacent to smaller streams but in too small extent to be shown separately on this map.

About one-half of the association consists of the alluvial river bottom soils. The moderately well-drained Eel is the predominant soil series and comprises about 45 percent of the area. The well-drained

Genesee series comprises about 10 percent of the total area. Silt loams and silty clay loams are the main types of these two series with loams and sandy loams the minor types.

These soils are brown to dark grayish brown in color, neutral to alkaline in reactions, and high in fertility. They are developing in alluvium washed from highly calcareous glacial drift of the uplands. The main hazard in farming these soils is flooding and row crops are the main crops grown.

About 45 percent of Soil Association 1 is composed of terrace soils; the Martinsville being the major series. The Martinsville soils are well-drained, medium to strongly acid, and medium in fertility. They developed in stratified silty and sandy materials, are more acid, have more profile development, and are less fertile than the Genesee and Eel soils. However, there is no hazard of overflow except during time of exceptionally high water and they are used for general farm crops.

### Association 2

Martinsville-Ockley-Fox-Belmore-Coloma: Well to excessively well-drained sandy and gravelly outwash soils.

Soils in this association developed on nearly level to strongly sloping outwash materials. They comprise about 3 percent of the land area of the county. The most extensive area is the gravelly outwash plain in T32N, R12E. Smaller areas occur throughout the county where glacial waters deposited the material many years ago.

The Martinsville soils are the major soils in this association and comprise about 40 percent of the area. They are well-drained, are developed in stratified silty and sandy materials, and occur throughout the area. Included are level areas of somewhat poorly drained Whitaker and flat or depressed very poorly drained dark colored Mahalasville soils described in Association 9.

The Ockley and Fox soils are well to excessively well-drained and are underlain by calcareous gravel and sand. The depth to gravel and sand ranges from 24 to 42 inches in the Fox soils and is greater than 42 inches in the Ockley soils. These soils are less extensive than the Martinsville and comprise about 15 percent of the association.

The Belmore soils occur on the beach ridges bordering the lake plain area of the county. They are well to excessively drained soils similar to the Fox and Ockley and are underlain by calcareous sandy and gravelly materials. State Highway 37 northeast and U. S. Highway 30 southeast of New Haven are built on these beach ridges which generally follow the lake plain border. Although Belmore soils comprise only a small area of this association, they make up a prominent land feature in the county.

The Coloma is also a minor soil in this association. They are excessively drained sands developed in wind blown or water-laid sand deposits which usually have a sand dune type topography.

Because the topography in this association ranges from nearly level to strongly sloping it has many different management problems. The coarser textured soils are droughty. The sloping soils are susceptible

to erosion and the poorly drained soils require artificial drainage. There is also a wide difference in the fertility of these soils.

Nearly all of the important sources of gravel in the county are in this association.

### Association 3

**Blount-Pewamo:** Nearly level, somewhat poorly and very poorly drained upland soils.

The soils in this association occupy about 26 percent of the county and consists of nearly level soils developed in till. This is the second largest association in the county.

The Blount and Pewamo soils comprise about 90 percent of Association 3. They occur throughout the upland areas but the largest areas are in the southern one-third of the county. These broad, level to gently sloping areas are associated with glacial ground moraines.

Blount and Pewamo soils developed in highly calcareous silty clay loam or clay loam till with clay content ranging from about 28 to 38 percent. These soils occur in an intricate pattern and differ mostly in natural drainage characteristics.

About half of the association is the somewhat poorly drained Blount soils on the slight rises in the level till plain. Blount soils have a grayish brown silt loam surface soil, mottled yellowish-brown clay loam to clay subsoil and are medium to strongly acid. The average depth to calcareous clay loam or silty clay loam till is 28 inches.

The Pewamo soils on the flat to depressed areas make up about 40 percent of this association. They have a very dark gray silty clay loam surface soil that is moderately high in organic matter. The subsoil is mottled dark gray and yellowish-brown, slightly acid to neutral clay. The average depth to the calcareous till is 49 inches.

Approximately 10 percent of this soil association is composed of other soils, primarily the Morley soils. They also developed from clayey till but occur on the more sloping, better drained area.

Soils of this association are used for cropland. Because of the level topography and clayey subsoil, drainage is the major management problem. Blount soils will respond well to lime and fertilizers. Pewamo soils, somewhat more fertile than the Blount soils, usually do not need lime, but will respond to correct fertilization.

### Association 4

**Morley-Blount:** Well-drained and somewhat poorly drained level to moderately sloping upland soils.

The Morley-Blount is the major soil association and occupies about 37 percent of Allen County. It occurs throughout the upland areas with the major areas located in the northern two-thirds of the county. These gently sloping areas are associated with the glacial end or recessional moraines.

The Morley and Blount soils developed from highly calcareous silty clay loam or clay loam till. The Morley soils occur on the more sloping topography and the Blount soils occur on the level to gently sloping areas.

The Morley soils have a medium acid, grayish-brown silt loam surface soil up to 10 inches thick and a dark yellowish-brown clayey subsoil overlying the calcareous till at an average depth of 25 inches.

The Blount soils described in association 3 comprise about 35 percent of this association. Pewamo silty clay loam also described in association 3 occurs in depressions and drainage-ways of soil association 4. Scattered muck pockets in the lowest depressions are especially common in the northwestern part of the county. Alluvial soils along some of the small streams comprise a small proportion of this association and are of local importance to the farmers.

Soils in Association 4 are primarily used for general farm crops. The major management problems for soils in this association are erosion on the Morley soils and drainage on the Blount soils. They respond well to lime and fertilizer.

### **Association 5**

**Carlisle-Willette:** Depressional organic soils.

This association consists of muck soils. It comprises about 2 percent of the area of the county with the two largest areas in the northwestern part of the county and in the valley west of Ft. Wayne. These soils are formed in wet, depressional, ponded positions.

Carlisle and Willette soils developed in partially to well decomposed remains of a marshy vegetation: reeds, sedges, water-tolerant trees and grasses. The deep Carlisle soil consists of 12 to 18 inches of black, granular, medium to slightly acid mucky material overlying the less well decomposed organic material. The Willette soils are similar to the Carlisle but are underlain by silty clay loam to clay mineral material at depths from 12 to 42 inches.

The Carlisle soils make up approximately 65 percent of the area while Willette soils occupy about 15 percent and occur mainly in the valley west of Ft. Wayne. Other minor soils included in this association are very poorly drained mineral soils like the Toledo, Lenawee, and Pewamo soils.

When artificially drained, these soils are very productive. Special crops such as mint and vegetables and cultivated row crops, mainly corn, are commonly grown. Large areas of this association are not cultivated because of high water table and difficulty in establishing outlets for drainage systems.

### **Association 6**

**Morley:** Well-drained, strongly sloping uplands.

The Morley association occupies about 3 percent of the county. The soils in this association are well-drained upland soils developed from highly calcareous silty clay loam or clay loam till. They occur mostly on the strongly sloping areas. The Morley soils comprise approximately 60 percent of this association.

The major acreage occurs in the morainic area of T32N, R12 & 13E where much of the land ranges from 10-20 percent slopes and steeper.

The Morley soils, occurring also in Association 4, have a light colored, medium to strongly acid surface soil and a dark yellowish-brown clayey subsoil overlying the calcareous till.

Approximately 40 percent of this soil association is comprised of other soils, such as the Blount and Pewamo, that occur on nearly level to depressed, more poorly drained areas. Small muck pockets in the deep depressions are also present. Many of the depressions have lighter colored eroded materials from the surrounding Morley soils deposited on top of the dark colored soils.

This association is better suited to pasture or trees than to cultivated crops. In some areas that have been used for general farm crops, the soils are severely eroded. The short, very steep slopes along the stream breaks are best suited to woodland or wildlife areas.

#### Association 7

Hoytville-Nappanee: Poorly drained and somewhat poorly drained, clayey, lake plain soils.

This soil association occupies about 19 percent of the county and consists of level, very poorly to somewhat poorly drained clayey soils of the lake plain region. This association is composed of approximately 90 percent of Hoytville and Nappanee soils which are almost exclusively confined to the very level lake plain.

These soils developed in highly calcareous clayey till reworked and redeposited somewhat by the waters of glacial lake Maumee. The clay content of the limy parent material is greater than 38 percent. The Hoytville and Nappanee soils occur in close association and differ mostly in their natural drainage characteristics.

Approximately 70 percent of Association 7 is composed of the very poorly drained, dark colored Hoytville soils. The surface soil is a very dark gray clay that is medium-high in organic matter. The subsoil is a grayish clay overlying the high lime clayey till. The soil profile is slightly acid to neutral throughout.

The somewhat poorly drained Nappanee soils occupy about 20 percent of this association. They have a grayish brown silt loam or silty clay loam topsoil and a mottled yellowish-brown clay subsoil overlying the clayey till. The Nappanee soils require more fertilization than the Hoytville soils in order to produce comparable yields.

Minor soils in this association include the Pewamo and Blount soils. These soils are described in Soil Association 3.

The lake plain region is the best agricultural area of the county, and the land sells for as much as \$500 to \$700 per acre. The maintenance of adequate drainage systems and good soil tilth is of prime importance in management of these soils. They are generally devoted to a cash-grain system of farming and tile drainage is extensively used.

#### Association 8

Lenawee-Toledo-Mahalasville: Very poorly drained lake deposited soils.

This association consists of dark colored, very poorly drained clayey to silty soils of lake deposits or outwash soils occupying about 3 percent of the county.

These soils occur mainly in the Little Wabash River Valley west of Ft. Wayne and in the lake plain area northeast of New Haven. They also occur in a narrow, elongated area following Trier Ditch in T30N, R13E.

The most extensive soils, comprising about 80 percent of this association, are the Lenawee and Toledo soils. These soils are dark colored and very poorly drained but differ in clay content. The Lenawee soils developed from a silty clay loam lacustrine parent material; whereas, the Toledo soils developed from a silty clay or clay lacustrine parent material. Lenawee and Toledo respectively have similar textured parent material to the Pewamo and Hoytville soils but are developed on lake deposited material rather than glacial till deposits.

The Mahalasville soils are less extensive and comprise about 10 percent of the association. These soils are dark colored and very poorly drained. They developed from calcareous silty and sandy outwash materials.

The soils in this association are best suited to row crops and are productive when artificially drained. Maintaining good soil tilth is very important on these soils.

#### Association 9

Mahalasville-Whitaker: Poorly drained medium and coarse textured lake deposited soils.

This soil association makes up about 3 percent of the county. Most of it occurs in a narrow strip adjacent to and south of Road 37 from New Haven, northeast to the county line. Smaller areas are in the Ft. Wayne-New Haven vicinity.

The Mahalasville soils, which make up about 50 percent of the acreage, occupy the level to depressed areas. These soils are poorly drained, dark colored, and formed in stratified sands and silts. They have a very dark brown silty to loamy surface horizon that is usually neutral in reaction and moderately high in organic matter. They have good tilth and produce good crops when properly drained.

The Whitaker soils occur on the level to gently sloping area in an intricate pattern with the Mahalasville soils and comprise 35 percent of association 9. These soils are moderately deep and are somewhat poorly drained. They are formed from similar materials as the Mahalasville soils but have a less clayey surface soil, are lower in organic matter, and more acid in reaction. They are suited to most general crops grown in the area but in most cases have to be drained, limed, and fertilized in order to produce good yields.

Also in this association are Belmore soils that occupy the narrow inextensive northern beach ridges.

#### Summary

The soils of Allen County, Indiana, developed predominantly in clay-rich tills with minor soils developed in outwash sand and gravel, aeolian sands, and lacustrine sediments. Each soil association closely correlates with the past geologic history of the county; however, the

soils are classified in terms of soil properties. The high clay content and very poor natural drainage are two soil characteristics of great importance in defining the proper management of the soils in Allen County.

#### Literature Cited

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