Soils of Randolph County, Arkansas

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INTRODUCTION

Soil is one of the most important natural resources of Arkansas. Information on soil behavior is used in agriculture, engineering and environmental applications. Soil is a vital resource for sustaining two basic human needs, a quality food supply and a livable environment. Along with air and water, soil contributes essential processes to the natural order of global cycles.

Soil is the unconsolidated natural material on the earth's surface that supports plant growth, and it is a storage medium for water, gases, chemicals, and heat. An individual soil is a three-dimensional body with recognizable boundaries. The interface with the atmosphere is the soil's upper boundary, the depth to which biological, physical, and chemical weathering approximates the lower boundary. Internally, soil bodies differ in their physical, chemical, and biological properties. Soils are products of both inherited and acquired properties. Their current characteristics reflect an integration of original features and accumulated influences of subsequent environments. Soils in an area occur in patterns related to geology, landscape features, and native vegetation. Soils occupy definite positions on the landscape; therefore, individual soils can be mapped and named.

The development of digital databases of natural resources such as soils has greatly facilitated understanding of agricultural and environmental phenomena. Digital databases along with Geographic Information Systems (GIS) are useful in planning and providing spatial information to aid decision-making. They not only facilitate multiple uses including analysis and model simulation, but they are also relatively inexpensive and easy to update. Once developed, the digital database can be used to study numerous, complex real-world problems. Digital data from various sources such as satellite imagery, radar, air photographs, and global positioning systems can be easily added to an existing digital database to facilitate analysis, use, and modeling.

This report presents the spatial distribution of both primary and secondary attributes of the soils of Randolph County, Arkansas. Secondary attributes of the soils were derived from the primary attributes and are frequently more useful because they redefine the primary attributes into forms that have direct application to real-world situations. In addition, most of the simulation models used in environmental applications frequently use secondary attributes of soils.

OBJECTIVES

The main objectives of this report are to (i) present and summarize the spatial distribution of the soil resource in a digital format for Randolph County, and (ii) provide information to local, county, and governmental offices in order to aid management of soils. Both scanning and digitizing techniques were used to convert primary attributes of soils from hardcopy maps to the digital format. Secondary attributes of the soils are also available in a tabular format. Various manipulation techniques were used to convert tabular data of secondary attributes into digital format. This report does not eliminate the need for on-site soil evaluation for specific purposes. However, it provides a general guide-

line for macro/meso level management and policy formulation for soil-related issues.

LOCATION AND GENERAL DESCRIPTION OF RANDOLPH COUNTY

Randolph County is located in northeastern Arkansas, in the lower Mississippi Delta region (Figure 1). The county is bounded by Clay County on the east, Lawrence County on the south, Greene County on the Southeast, Sharp County on the west, and the Missouri State boundary on the north.

Randolph County is composed of 419,586 acres (169, 804 ha) and has 31 soil mapping units. The dominant soil mapping unit is the Gepp very cherty silt loam with 8–12% slope. In 1992, deciduous forest was the

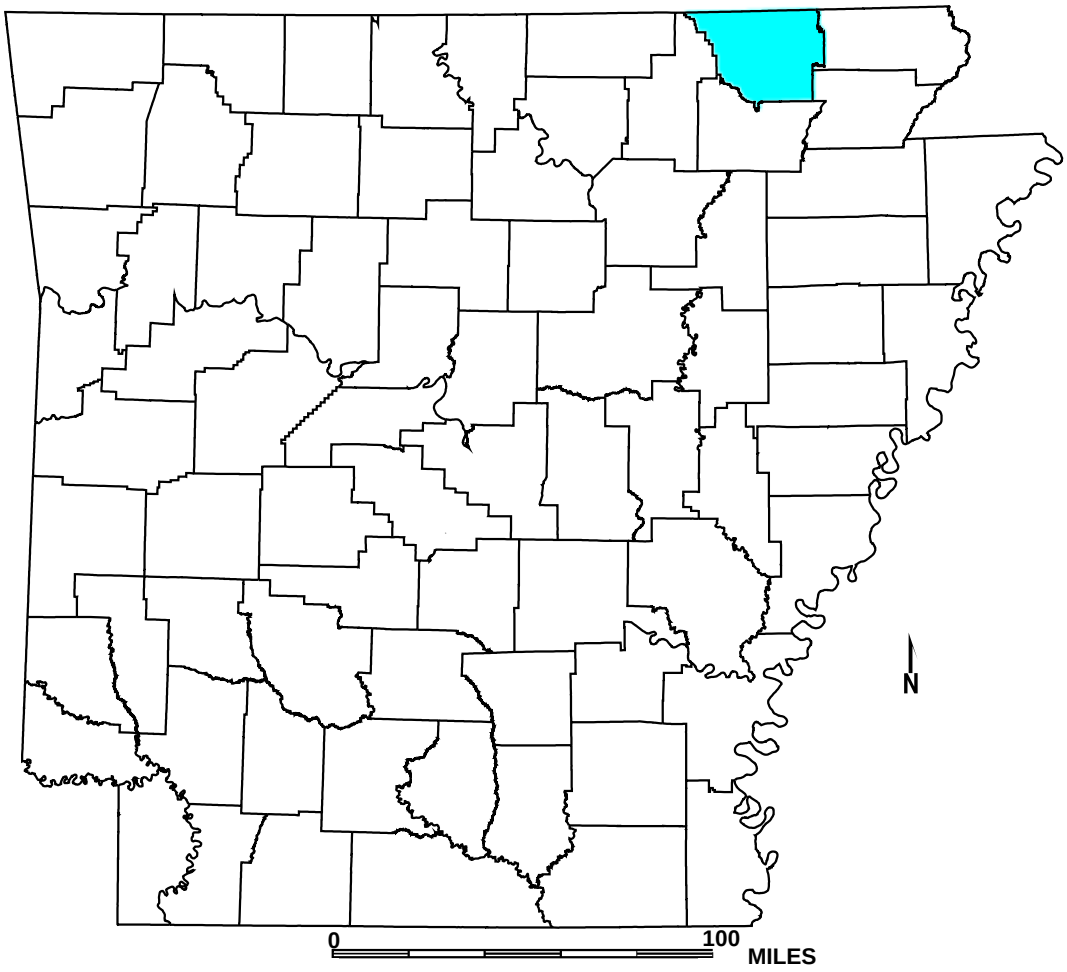

Figure 1. Location of Randolph County, Arkansas.

dominating landuse of this county and covered approximately 44% of the land area (Table 1) followed by pasture/prairie that comprises 25% of the county. The eastern part of Randolph County has agriculture as the predominant landuse, whereas the western part of the county is dominated by deciduous forests (Figure 2).

Table 1. Areal summary of landuse and landcover in Randolph County.

Landuse and landcover	Acres	Hectares	% Cover
No data	434	176	0.10
Evergreen forest	37,823	15,307	9.03
Decidous forest	183,042	74,076	43.66
Mixed forest	36	14	0.01
Pasture/prairie	104,587	42,326	24.94
Agriculture	87,215	35,295	20.77
Urban	1,257	509	0.30
Water	5,192	2,101	1.19
TOTAL	419,586	169,804	100.00

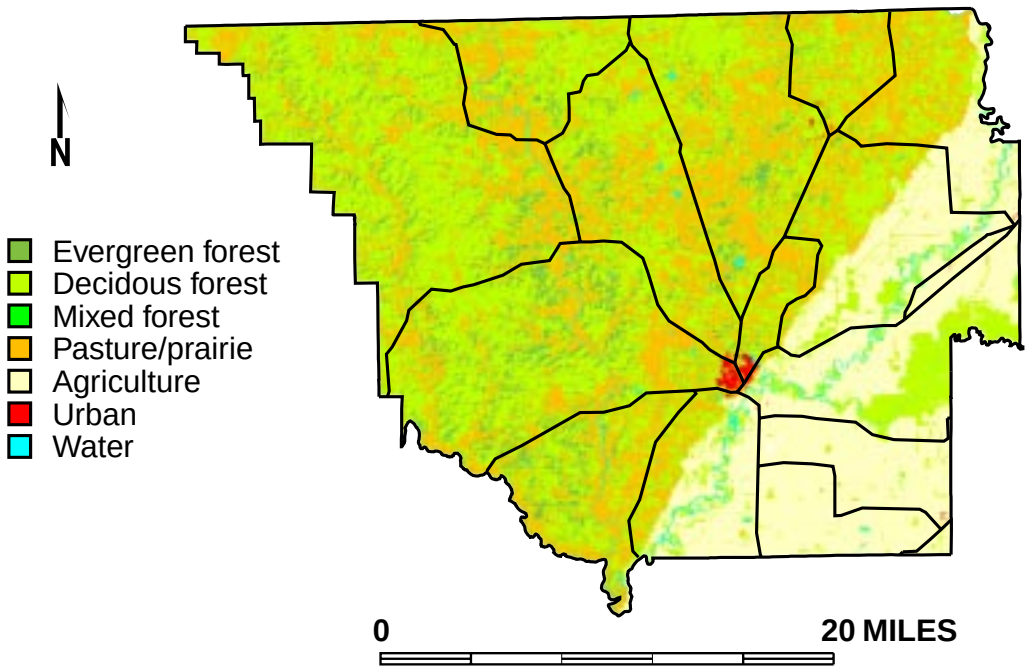

Figure 2. Areal distribution of landuse/landcover in Randolph County.

Primary and secondary roads of Randolph County and the spatial distribution of water bodies are shown in Figure 3.

In the1840s, the first data available, the population of the Randolph County was reported to be 2,196. The population increased until 1910, which peaked at

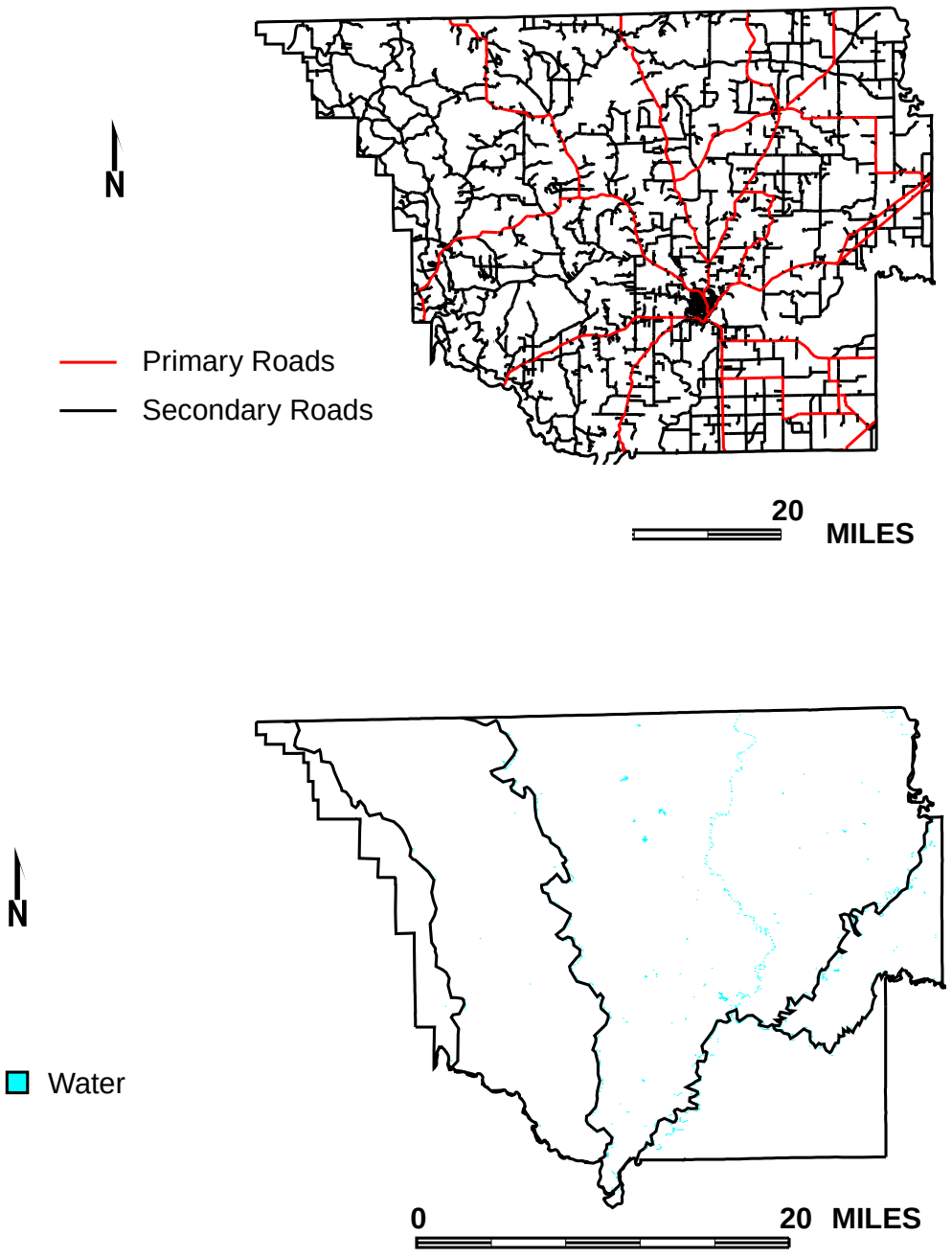

Figure 3. Primary and secondary roads (top) and the spatial distribution of water bodies (bottom) of Randolph County.

18,987 (Figure 4). In recent years, the population of Randolph County has grown steadily in this county with the exception of 1994 (Figure 5). Pocahontas, Randolph County's largest city, shows a rising trend in population between 1880 and 1990 with the exception of 1930 and 1960 (Figure 6). In 1930 the population remained the same as previous decade, whereas in 1960 the population decreased by 185 persons. In 1990 the population of Pocahontas was 16,558.

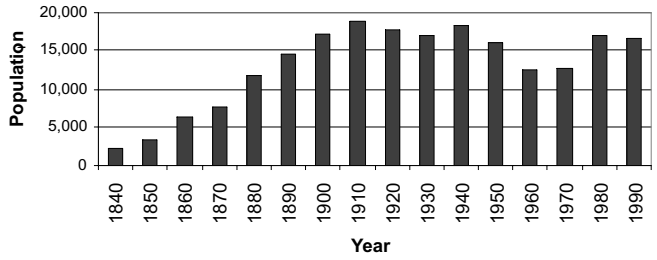

Figure 4. Historical population of Randolph County, 1840–1990.[1]

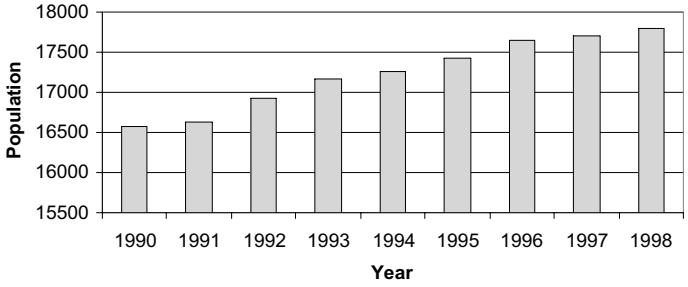

Figure 5. Recent Population of Randolph County.[2]

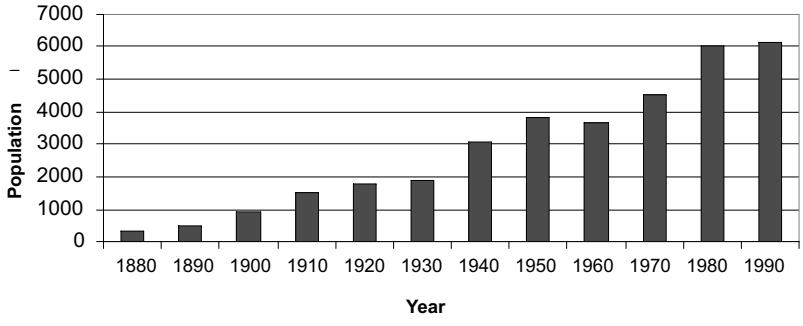

Figure 6. Historical population of Pochahontas.[3]

[1] http://www/aiea.ualr.edu/csdc/historical/PopYr1_1900.html
[2] http://www/aiea.ualr.edu/csdc/historical/PopYr2_1990.html
[3] http://www.aiea.ualr.edu/csdc/historical/City18401990.html

Randolph County has seven 8-digit watersheds as defined by the USGS classification scheme (Table 2). The major, or largest, of these watersheds is the Lower Black followed by Eleven Point, which cover about 41% and 27%, respectively, of the total land area in Randolph County. The Lower Black watershed extends from north to south in the central part of county, and the Eleven Point watershed extends from northwest to south in the western part of the county (Figure 7). The Current watershed is the third largest watershed in the county. This watershed covers 10% of the county and is found in the northeastern part of Randolph County.

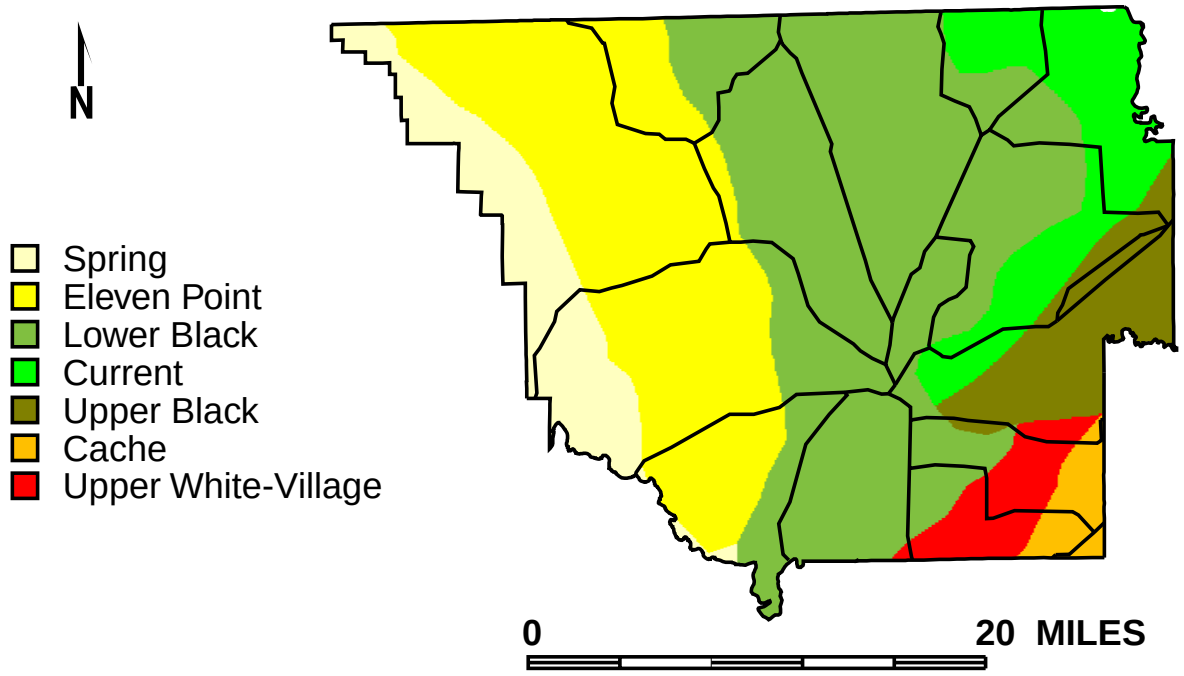

Figure 7. Areal distribution of 8-digit hydrologic units in Randolph County.

Table 2. Areal summary of 8-digit hydrologic units in Randolph County.

Hydrologic units	Acres	Hectares	% Cover
No data	184	75	0.02
Spring	38,231	15,472	9.10
Eleven Point	113,223	45,821	27.03
Lower Black	171,008	69,206	40.81
Current	42,349	17,138	10.08
Upper Black	30,951	12,526	7.36
Cache	8,482	3,438	2.00
Upper White-Village	15,158	6,128	3.60
TOTAL	419,586	169,804	100.00

The primary weather station of Randolph County is located in Pocahontas. The long-term average (1966–1996) rainfall and temperature data for this station are presented in Figure 8. The surficial geology of Randolph County is dominated by Tertiary and older formations that are found in the western part of the county and followed by Valley Train Early Wisconsin Glaciation, which is found in the eastern and northern part of the county. These two geological categories cover 48% and 18% of the total area, respectively (Table 3). The Alluvium covers about 16% of the land area and is found in the eastern part of the county. Loess, which extends in a northeast-to-southwest direction, is found in the central part of the county and covers about 11% of the land area in Randolph County (Figure 9).

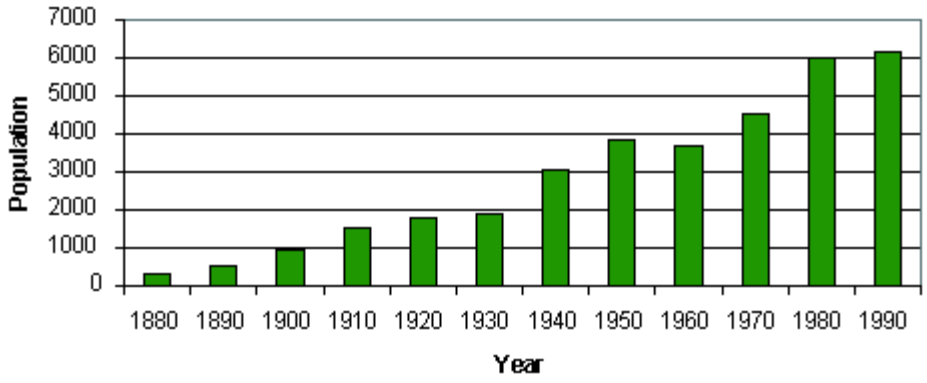

Figure 8. Long-term annual monthly average rainfall and air temperature (1966-1996).

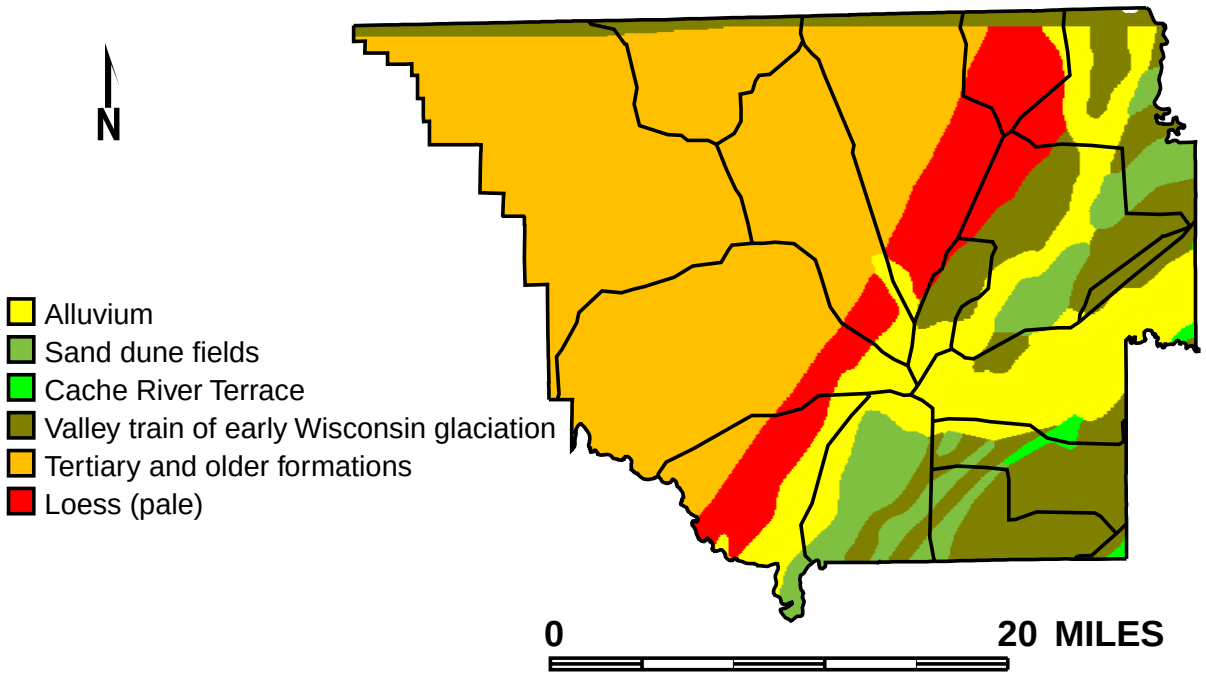

Figure 9. Areal distribution of quaternary geology in Randolph County.

Table 3. Areal summary of Quaternary geology in Randolph County.

Geological formation	Acres	Hectares	% Cover
Alluvium	65,568	26,535	15.63
Sand dune fields	29,869	12,088	7.12
Cache River Terrace	2,105	852	0.50
Valley train of early Wisconsin glaciation	76,315	30,885	18.09
Tertiary and older formations	200,100	80,979	47.77
Loess (pale)	45,629	18,465	10.89
TOTAL	419,586	169,804	100.00

METHODOLOGY

The methods used to develop the digital databases of the soils of Randolph County can be divided into three subcategories: (i) hardware and software used, (ii) data input techniques used to develop primary soil attribute layers, and (iii) manipulation techniques used to create the secondary soil attributes.

Hardware and Software

The hardware used in this project included Sun SPARC stations, a Context FSS8000 size E scanner and an Altek AC-30 digitizer. The computer software known as CAD/Scan was used for scanning the soil quadrangles. The software Line Trace Plus (LT4x) was used to edit, label, and develop the primary digital database of soils. The GIS software Geographical Resource Analysis Support System (GRASS 4.1) was used to manipulate the primary data layers into secondary data layers and to paint the maps.

Data Input Techniques

There are two ways to convert hardcopy maps into a digital database: (i) scanning and (ii) digitizing. The soil boundary lines were drawn on mylar by personnel with the Natural Resources Conservation Service (NRCS) in Little Rock and were scanned using Scan/CAD software in the University of Arkansas' Soil Physics laboratory. The county boundaries were digitized from topographic maps using an Altek digitizer. The resulting scanned images went through several processes of editing in order to be imported into a GIS database. The scanned image of soil boundaries is a raster image, unless the scanner is operating in vector mode. The scanned image appears to be rather crude when compared to the original soils map. This crudeness is the result of lines bleeding together. The scanned boundaries contained multiple and variable pixel widths. Scanned images required more editing than digitizing techniques. Although, digitizing involves less editing, the process of digitizing soil lines is time-consuming. Compared to digitizing, scanning—which sometimes involves extensive editing—is still considered a time-saving technique. Therefore, most of the soil quadrangles for Randolph County were scanned. The county boundaries were digitized because of the simplicity of the line work.

All soil boundaries were inspected before scanning. The errors or flaws in the source maps were corrected before scanning, which included matching polygon boundaries, e.g., soil boundaries between adjoining maps. Some soil boundary lines were not complete. Incomplete soil boundaries create open polygons. Open polygons cannot be used to build topology because they are not considered as a map type object. Also, thin or dim portions of soil boundary lines were identified. These types of lines may not scan successfully, causing yet more open polygons. The major corrections were done by NRCS personnel. Minor corrections such as editing a dim line were completed in the Soil Physics Laboratory of the Department of Crop, Soil, and Environmental Sciences.

The county boundaries were digitized from the 7.5-minute USGS topographic quadrangles. Digitizing was chosen over scanning because selective relevant features can be digitized. The county lines were digitized directly in a vector format. This step resulted in fewer errors induced by the raster-to-vector conversion processes. There was no need for editing the images, which involves thinning the lines or fixing the problems related to intersections. Thus, considerable time for editing was saved.

After the soil quads were scanned and edited, they were converted into the vector format for labeling. Before labeling, the county boundaries were imported. Each soil polygon was labeled twice to avoid

mislabeling. After labeling was computed, the images were exported to GRASS in vector format.

Manipulation Techniques

The primary attributes of the soil quads are soil mapping units from the Order II soil survey of Randolph County. This survey was published at a scale of 1:24,000. The smallest mapped land area was no less than 5 acres, with the exception of special features such as ponds, dams, or pits. Soil mapping units were reclassed to the soil series level, since some of the tabular data were available at this level. Tabular data for Randolph County were used to create secondary attributes from soil mapping units.

Secondary soil attributes such as textural class, drainage class, permeability, shrink-swell potential, runoff, and reaction (pH) were obtained from the *Soil Survey of Randolph County* (1967) published by the USDA Soil Conservation Service in cooperation with the Arkansas Agricultural Experiment Station. A map of the potential hydric soils was created by soil series, which was obtained from *Hydric Soils of The United States* (1991) published by the USDA Soil Conservation Service in cooperation with The National Technical Committee for hydric soils. Secondary attributes such as flood frequency, soil K factor, soil T factor, depth to bedrock, and soil slope were generated from tabular data associated with soil mapping units provided by NRCS. These data are of pre-SSURGO standards and are waiting to be certified.

Digital data of soil quads with primary attributes were imported to GRASS in vector format. The vector data were subsequently converted to raster format in GRASS. Since most environmental applications require raster analysis, conversion of the data from a vector format into the raster format is the first step. Manipulation techniques, such as reclassification, can be done either in vector or raster domain. Since almost all of the analyses are done in the raster domain, it is a common practice to convert vectors to a raster format, then use manipulation techniques to create secondary attribute layers for soils.

The manipulation technique used to create secondary attribute data for the soils of Randolph County was reclassification. The GRASS command r.reclass was used to create secondary attributes from primary soil attributes. The command r.reclass requires a set of rules that defines new classes from the old class.

SPATIAL DISTRIBUTION OF PRIMARY AND SECONDARY ATTRIBUTES

The primary attribute of soil is the mapping unit (Table 4). Soil mapping units can be reclassed to create maps of soil series (Table 5). This report also includes secondary attributes and classifications such as textural class, drainage class, reaction (pH), permeability, runoff, potential hydric soils, shrink-swell potential, flood frequency, soil erodibility (K) factor, soil T factor, organic matter content, depth to bedrock, and soil slope.

Soil Mapping Units

A soil mapping unit is a collection of pedons (smallest identifiable unit of a soil) defined and named the same in terms of their soil components or miscellaneous areas or both. Each map unit differs in some respect from all others in a survey area and is uniquely identified on a soil map. A delineation of a map unit generally contains the dominant components in the map unit name, but it may not always contain a representative of each kind of inclusion. The different kinds of soil used to name soil mapping units have sets of interrelated properties that are characteristic of soil as a natural body. However, the term soil mapping unit is intended to exclude maps showing the spatial distribution of a single property such as texture, slope, permeability, shrink-swell potential, or depth, alone or in limited combinations; maps that show the spatial distribution of soil qualities such as productivity or erodibility; maps of soil forming factors, such as topography, vegetation or geology (USDA, 1993).

Two mapping units combine to occupy almost 23% of the land area in Randolph County (Table 4). The most extensive soil mapping unit is Gepp very cherty silt loam, 8–12% slope. This mapping unit occupies almost 14% of the land area and is mostly found in the west-central part of the county (Figure 10). The Gepp soil is deep, well drained, with moderate permeability. These soils are found on hilltops, narrow ridges, and hillsides.

The Captina silt loam, with 3–8% slope, is the second most extensive mapping unit, comprising about 11% of the total area. This soil occurs primarily in the east-central part of Randolph County. The captina series consists of deep, moderately well drained, slowly permeable soils.

Gepp-Donipan, which occupies 8% of the land area, occurs primarily in the central part of Randolph County. Amagon silt loam occupies about 5% of the county and is found mainly in eastern part of the county. Amagon series consists of deep, poorly drained, and slowly permeable soils. Ashton silt loam occasionally flooded occupies 4% of the county. This soil is found mainly in the eastern part of the county and along the river valleys. Bosket fine Sandy loam also covers about 4% of the Randolph County and occurrs mainly in the eastern part of the county.

Table 4. Areal summary of soil mapping units in Randolph County.

Soil mapping units	Acres	Hectares	% Cover
Amagon silt loam	19,070	7,718	4.54
Arkana-rock outcrop complex 3 to 12% slope	4,453	1,802	1.06
Ashton silt loam, occasionally flooded	18,029	7,296	4.30
Bosket fine sandy loam, undulating	17,346	7,020	4.13
Brocket gravelly fine sandy loam, 3 to 8% slopes	3,874	1,568	0.92
Brocket gravelly fine sandy loam 8 to 12% slopes	9,764	3,951	2.33
Broseley loamy fine sand, undulating	5,468	2,213	1.30
Captina silt loam, 3 to 8% slopes	42,654	17,262	10.18
Captina silt loam, 8 to 12% slopes	6,719	2,719	1.60
Clarksville cherty silt loam, 8 to 12% slopes	2,084	843	0.50
Clarksville cherty silt loam, 12 to 20% slopes	3,817	1,545	0.91
Crowley silt loam	9,437	3,819	2.24
Doniphan cherty silt loam, 3 to 8% slopes	3,972	1,608	0.94
Doniphan cherty silt loam, 8 to 12% slopes	11,563	4,678	2.75
Doniphan-Gepp association, undulating	13,133	5,315	3.13
Dundee silt loam	12,998	5,260	3.10
Gepp very cherty silt loam, 8 to 12% slopes	56,327	22,795	13.45
Gepp very cherty silt loam, 12 to 20% slopes	12,177	4,928	2.91
Gepp-Doniphan association rolling	31,283	12,660	7.46
Gepp-Ventris association rolling	18,156	7,348	4.34
Gepp-Ventris association steep	9,529	3,856	2.28
Hontas silt loam, frequently flooded	14,218	5,754	3.39
Jackport silty clay loam	7,102	2,874	1.68
Kobel silty clay loam	13,040	5,277	3.10
Loring silt loam, 3 to 8% slopes	7,393	2,992	1.76
Loring silt loam, 8 to 12% slopes	9,697	3,925	2.31
McCrory fine sandy loam	10,959	4,437	2.61
Patterson fine sandy loam	4,117	1,666	0.98
Peridge silt loam, 3 to 8% slopes	13,176	5,332	3.15
Pits	478	194	0.11
Razort silt loam, frequently flooded	10,140	4,103	2.42
Ventris-Rock outcrop complex, 3 to 12% slopes	13,090	5,297	3.14
Dam	10	4	0.00
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

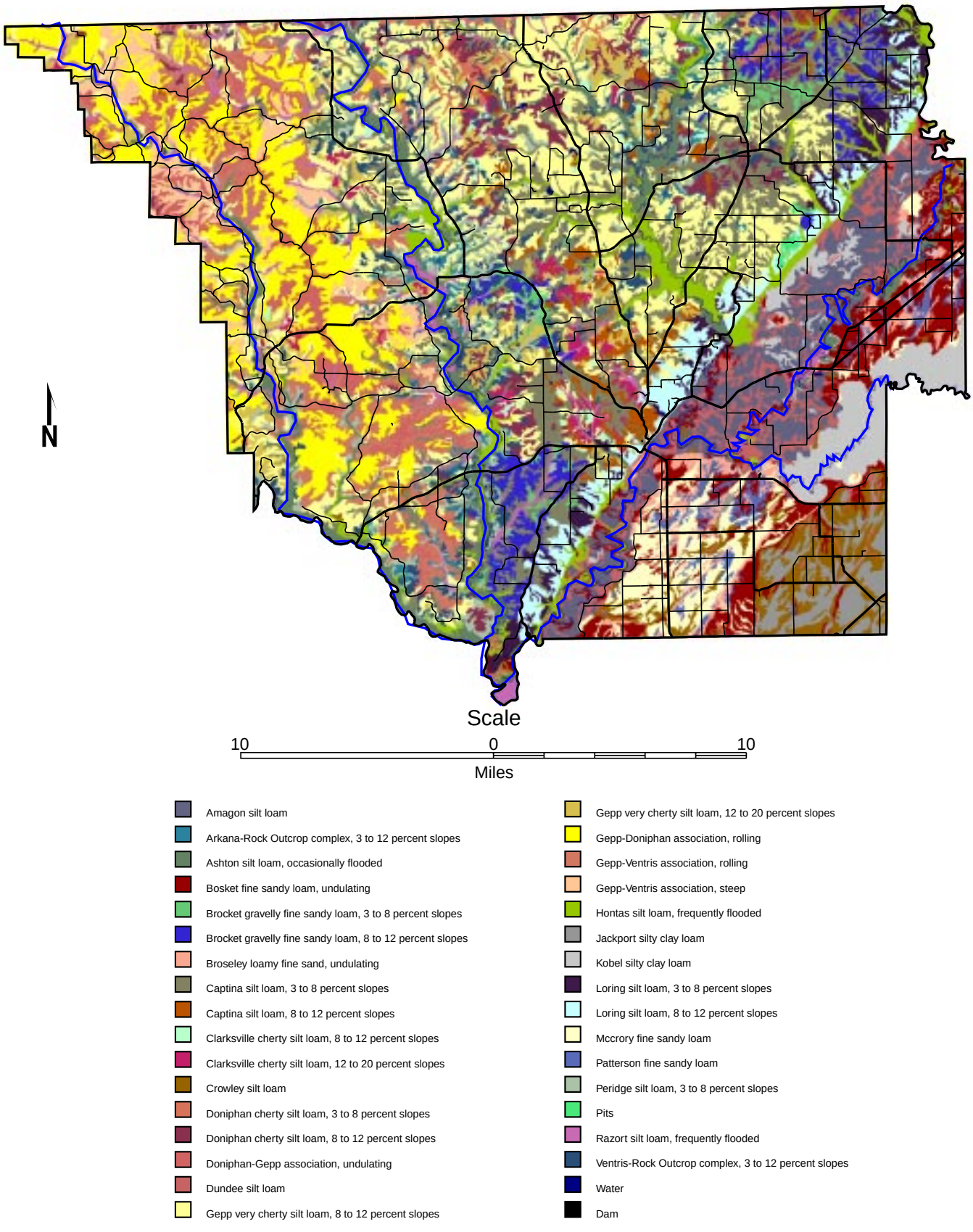

Figure 10. Areal distribution of soil mapping units in Randolph County.

Table 5. Scientific names of the major soil series found in Randolph County.

Description of soil series	Scientific family name
Amagon	Fine silty, mixed, thermic Typic Ochraqualfs
Arkana	Very-fine, mixed mesic Mollic Hapludalfs
Ashton	Fine-silty, mixed, mesic Mollic Hapludalfs
Bosket	Fine loamy, mixed thermic Mollic Hapludalfs
Brocket	Fine-loamy, siliceous, mesic Typic Paleudults
Broseley	Loamy, mixed, thermic Arenic Hapludalfs
Captina	Fine-silty, siliceous, mesic Typic Fragiudults
Clarksville	Loamy-skeletal, siliceous, mesic Typic Paleudults
De Witt (Crowley)	Fine, montmorillonitic, thermic Typic Albaqualfs
Doniphan	Clayey, mixed, mesic Typic Paleudults
Dundee	Fine-silty, mixed, thermic Aeric Ochraqualfs
Gepp	Very-fine, mixed, mesic Typical Paleudalfs
Hontas	Fine-silty, mixed, mesic Fluvaquentic Eutrochrepts
Jackport	Very-fine, montmorillonitic, thermic Vertic Ochraqualfs
Kobel	Fine, montmorillonitic, nonacid, thermic Vertic Haplaquepts
Loring	Fine-silty, mixed, thermic Oxyaquic Fragiudalfs
McCrory	Fine-loamy, mixed, thermic albic Glossic Natraqualfs
Patterson	Coarse-loamy, mixed, thermic Aeric Ochraqualfs
Peridge	Fine-silty, mixed, mesic Typic Paleudalfs
Ventris	Very-fine, mixed, mesic albaquic hapludalfs

Table 6. Areal summary of surface textures in Randolph County.

Surface texture	Acres	Hectares	% Cover
Loamy fine sand	5,468	2,213	1.30
Gravelly fine sandy loam	13,639	5,519	3.25
Fine sandy loam	32,420	13,120	7.72
Cherty silt loam	105,687	42,771	25.23
Very cherty silt loam	69,444	28,103	16.57
Silt loam	163,533	66,183	38.99
Silty clay loam	24,594	9,953	5.84
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Surface Textures

Surface textural class indicates the relative proportion of sand, silt, and clay particles in a given mass of dry soil. Numerous properties and behaviors of soils are dependent on soil texture. The tabular data of soil texture were obtained from NRCS. The majority of the soils of Randolph County have silt loam texture at the surface, which comprises 39% of the total area of the county and is found in all areas of the county (Table 6 and Figure 11). Soils with a cherty silt loam texture in the surface occupy about 25% of the county and are found primarily in the western part of the county. Soil with very Cherty silt loam structure covers about 17% of the Randolph County and occupies mainly the western part of the county. Soils with silty clay loam texture in the surface are found mainly in the eastern part of the county, whereas soils with loamy textures are found in the east-central part of the county, which comprises only 6% of the area.

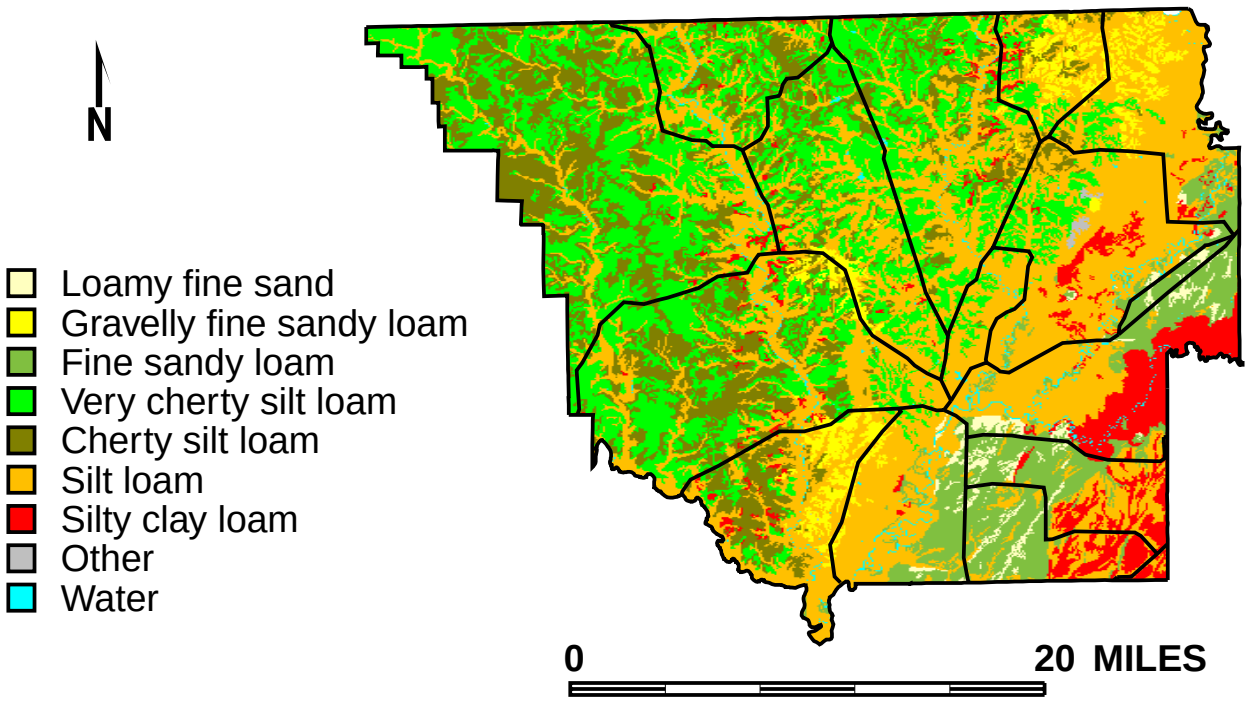

Figure 11. Areal distribution of surface texture, Randolph County.

Soil Drainage Classes

The drainage classes of the soils of Randolph County varies from poorly drained to well drained (Figure 12). Well drained soils occupy about 55% or 232,924 acres (94,263 ha) of the total area and are found mostly in the western half of the county (Table 7). Most of the soils that are classified as moderately well drained are found in the central part of the county. There is a relatively higher distribution of moderately well drained soils in the northern part of the county than in the southern part. Poorly drained soils account for 14% of the total area and are found in the southern part of the county. Somewhat poorly drained soils account for only 4% of the county and are found mainly in the eastern part of Randolph County. Somewhat excessively drained covers 3% and found mainly in central-eastern part of the county.

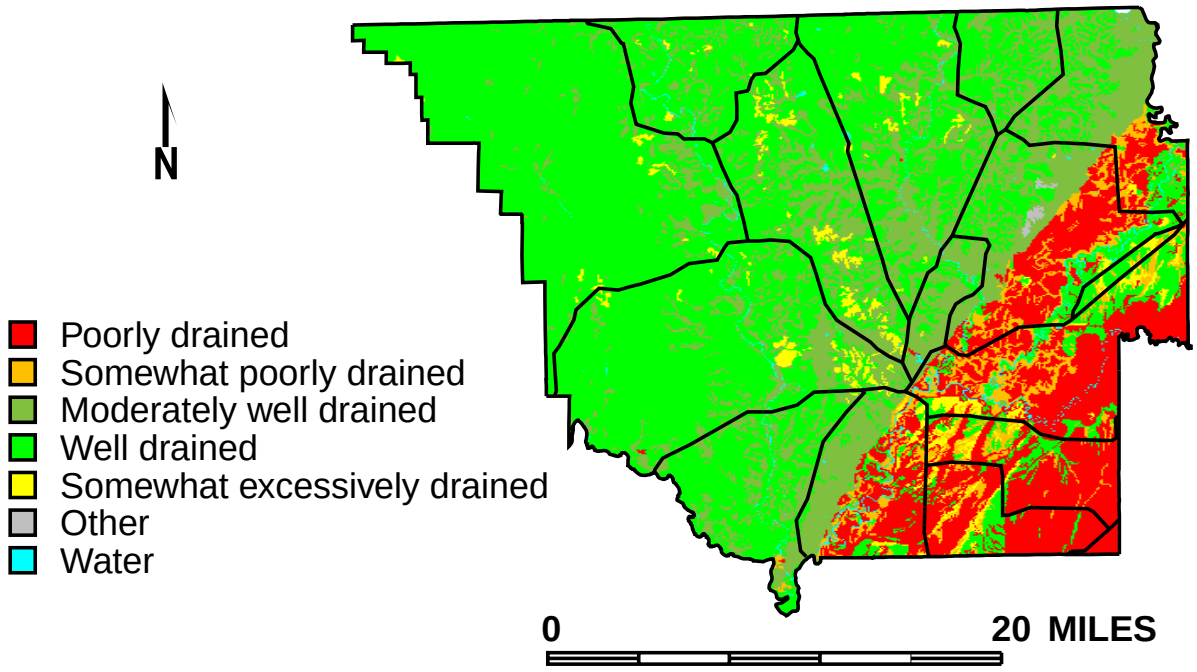

Figure 12. Areal distribution of soil drainage class.

Table 7. Areal summary of soil drainage classes in Randolph County.

Drainage class	Acres	Hectares	% Cover
Poorly drained	59,607	24,123	14.17
Somewhat poorly drained	17,115	6,926	4.08
Moderately well drained	93,771	37,949	22.38
Well drained	232,924	94,263	55.56
Somewhat excessively drained	11,368	4,601	2.71
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Reaction (pH)

Reaction is the degree of acidity or alkalinity of a soil, expressed as a pH value. The degree of acidity and alkalinity affects nutrient availability as well as crop yield. A soil pH value of less than 7.0 is classified as acidic, whereas soils with pH values greater than 7.0 are alkaline. The tabular data for soil reaction were obtained from the NRCS and represent the natural pH of the soil surface. Almost 5% of the soils in Randolph County have a neutral pH and are found mainly in the southern part of the county (Figure 13). Slightly acidic soils occur along the river channels of Randolph County but comprise only 18% of the land area within the county. Strongly acidic soils comprise only 3% of the area and are mainly found in the central part of the county (Table 8). Moderately acidic soils occupy 74% of the total area and found all over the county.

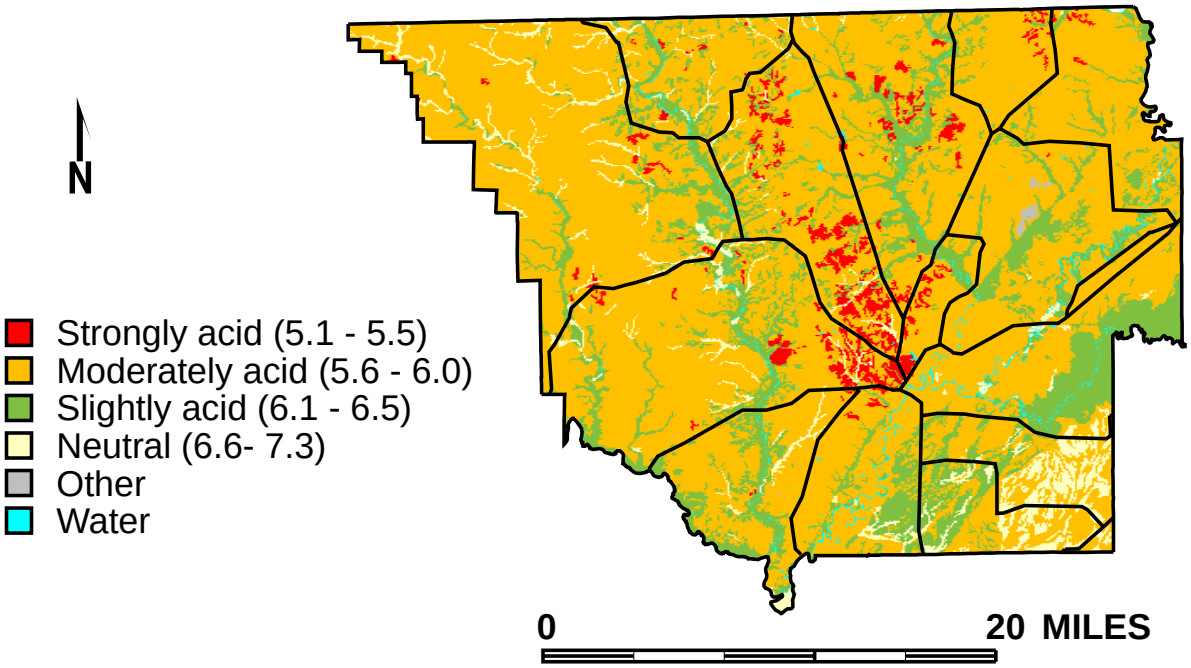

Figure 13. Areal distribution of reaction (pH) in Randolph County.

Table 8. Areal summary of reaction (pH) in Randolph County.

Soil reaction	Acres	Hectares	% Cover
Strongly acid, 5.1-5.5	12,620	5,107	3.01
Moderately acid, 5.6-6.0	308,803	124,971	73.64
Slightly acid, 6.1-6.5	73,785	29,861	17.60
Neutral, 6.6-7.3	19,577	7,923	4.65
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Soil Permeability

Soil permeability in this context refers only to the downward movement of water downward through undisturbed and uncompacted saturated soils. This does not include lateral seepage. The estimates of permeability are based on structure and porosity of the soils. Basically, soil permeability along with the slope and the hazard of flooding influence suitability of soils for use as rice fields, wetlands, ponds, sewage lagoons, etc.

Soils with the permeability class of 0.2–0.6 in./hr are found mostly in the southeastern part of Randolph County. Soils with moderately low permeability of 0.6–2.0 in./hr occur all over the county (Figure 14). About 77% of the total land area in Randolph County has permeability of 0.6–2 in./hr (Table 9). Small patches of soils with very high permeability (2–6 in./hr) are found all over the county but particularly in the eastern part. This category covers 13% of the land. Soils with 6–20 in./hr permeability are found mainly on alluvial ridges in the eastern part of the county (1.3% of the total land area).

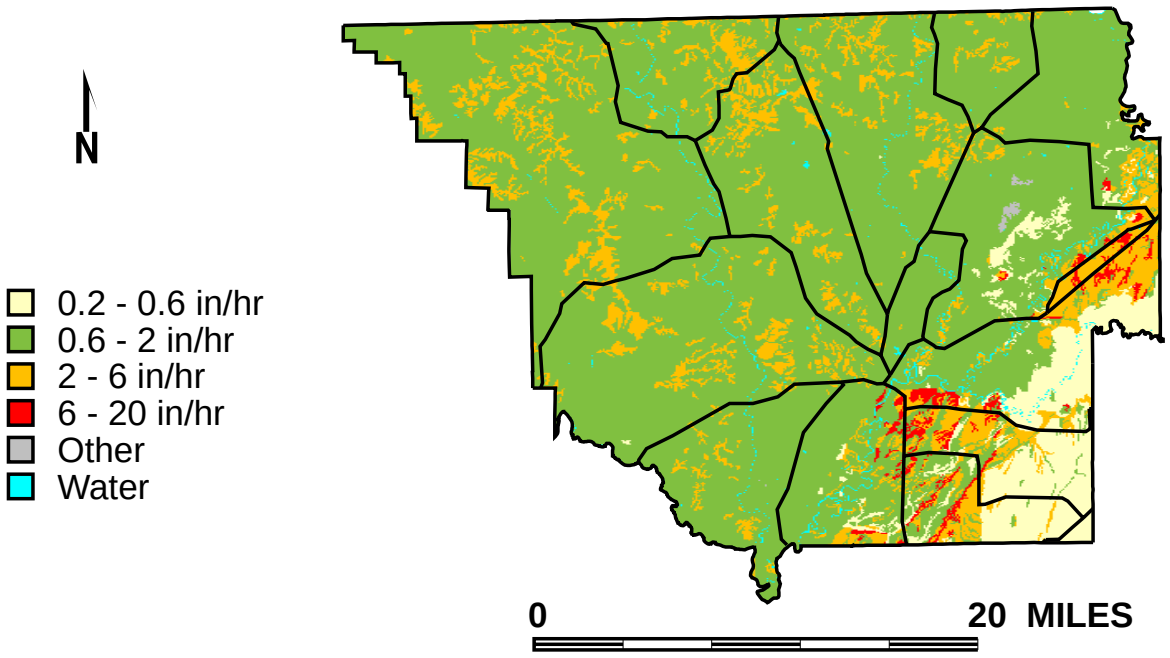

Figure 14. Areal distribution of soil permeability in Randolph County.

Table 9. Areal summary of soil permeability in Randolph County.

Permeability	Acres	Hectares	% Cover
0.2-0.6 in./hr	29,579	11,971	7.01
0.6-2 in./hr	323,706	131,002	77.25
2-6 in./hr	56,032	22,676	13.34
6-20 in./hr	5,468	2,213	1.30
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Soil Runoff Classes

Surface runoff is the loss of water from an area by flow over the land surface. Surface runoff differs from subsurface flow or interflow that results when infiltrated water encounters a zone with lower permeability than the soil above. Most of Randolph County has soils with rapid runoff, which accounts for about 42% of the total area (Table 10). Compared to the eastern part, the western part of the county has a higher distribution of soils in the rapid runoff category (Figure 15). The medium runoff category comprises only 28% of the total area and is found all over the area of Randolph County. Soils in the slow runoff category occupy about 24% of the land and are found mainly in the eastern part of the county and along the riverbeds. About 4% of the Randolph County is covered by very slow runoff and are found in eastern part of the county.

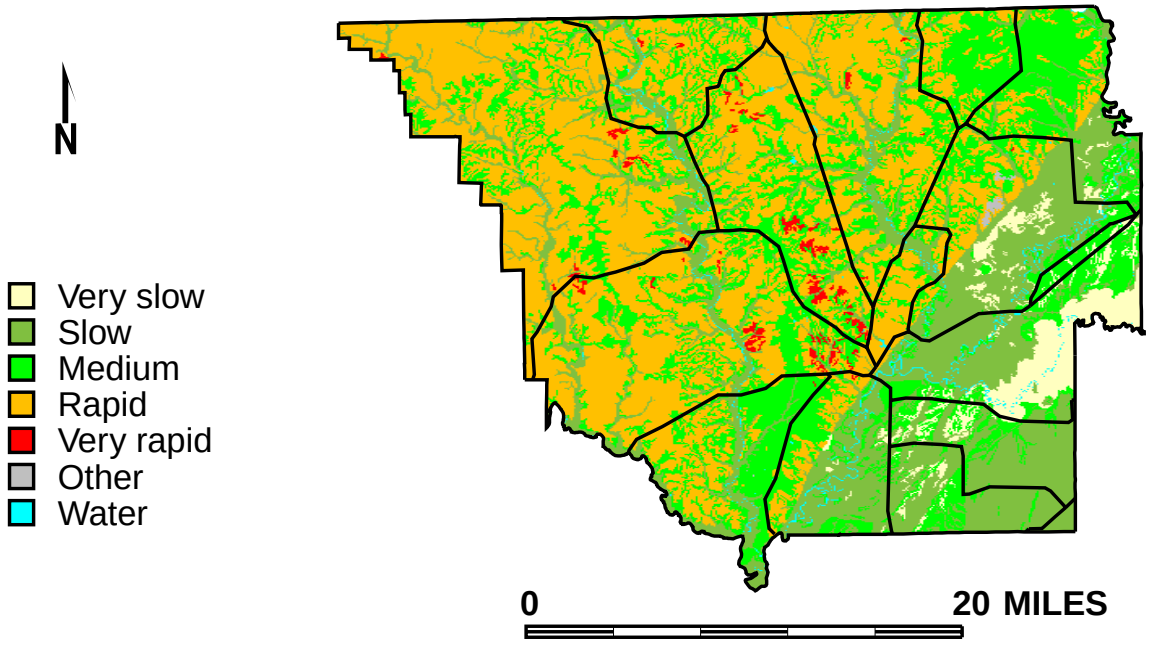

Figure 15. Areal distribution of soil runoff classes in Randolph County.

Table 10. Areal summary of soil runoff classes in Randolph County.

Soil runoff classes	Acres	Hectares	% Cover
Very slow	17,157	6,944	4.08
Slow	101,951	41,259	24.27
Medium	116,782	47,261	27.85
Rapid	175,078	70,853	41.79
Very rapid	3,817	1,545	0.91
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Potential Hydric Soils

A hydric soil is one that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the soil profile. Hydric soils are developed under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation.

The determination of hydric soils requires an on-site evaluation. Some hydric soils may occur within the indicated soil series. The percentage of the designated area that is hydric soils is undetermined. Identification of potential hydric soils helps landuse planning, conservation planning, and assessment of potential wildlife habitat. It is one of the criteria that define the location of wetlands. The soils of Randolph County that are in the potential hydric category (Table 11) occupy about 14% of the total area. Spatially, most of the southeastern part of Randolph County is covered with hydric soils (Figure 16).

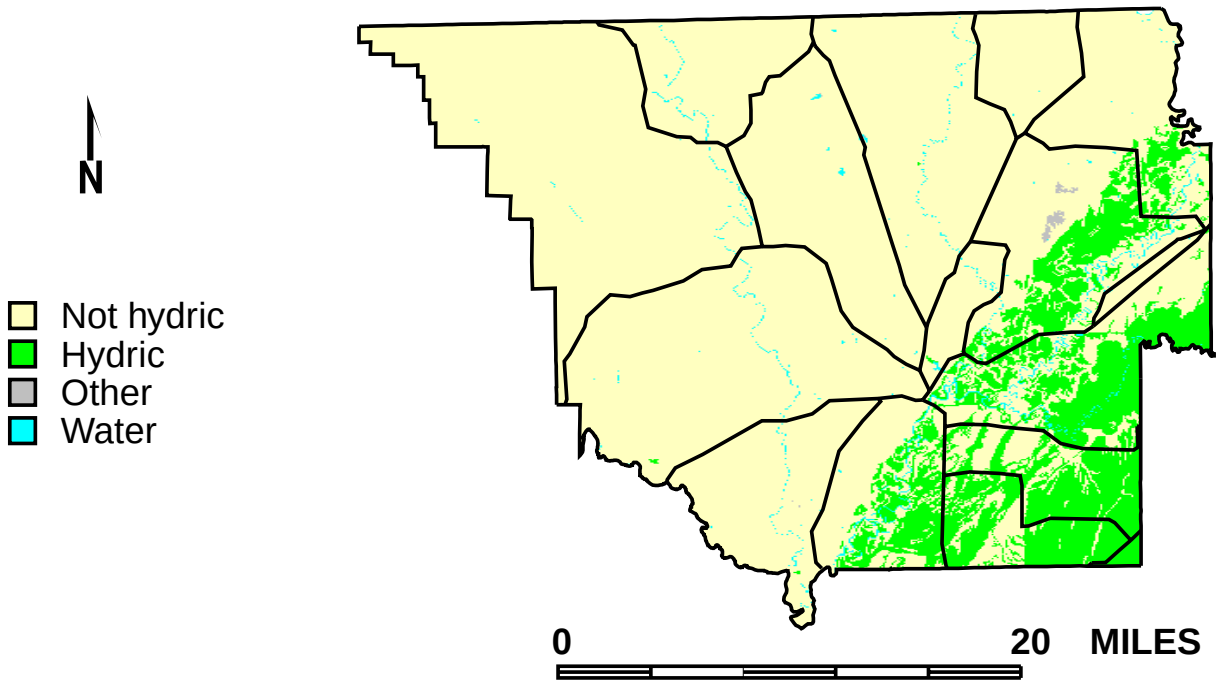

Figure 16. Areal distribution of potential hydric soils in Randolph County.

Table 11. Areal summary of potential hydric soils in Randolph County.

Category	Acres	Hectares	% Cover
Not hydric	355,179	143,739	84.65
Potential hydric	59,606	24,123	14.25
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100

Soil Shrink-Swell Potential

Soil shrink-swell potential is an indication of the volume change to be expected with changes in soil water content. This information is important for construction work and affects building foundations, roads, ponds, and other structures. The majority of Randolph County has low shrink-swell potential (Table 12). Soils with low shrink-swell potential cover 95% of the total area and are found all over the county (Figure 17). The soils with moderate shrink-swell potential are found in the eastern part of the county, which covers about 5% of the total county area.

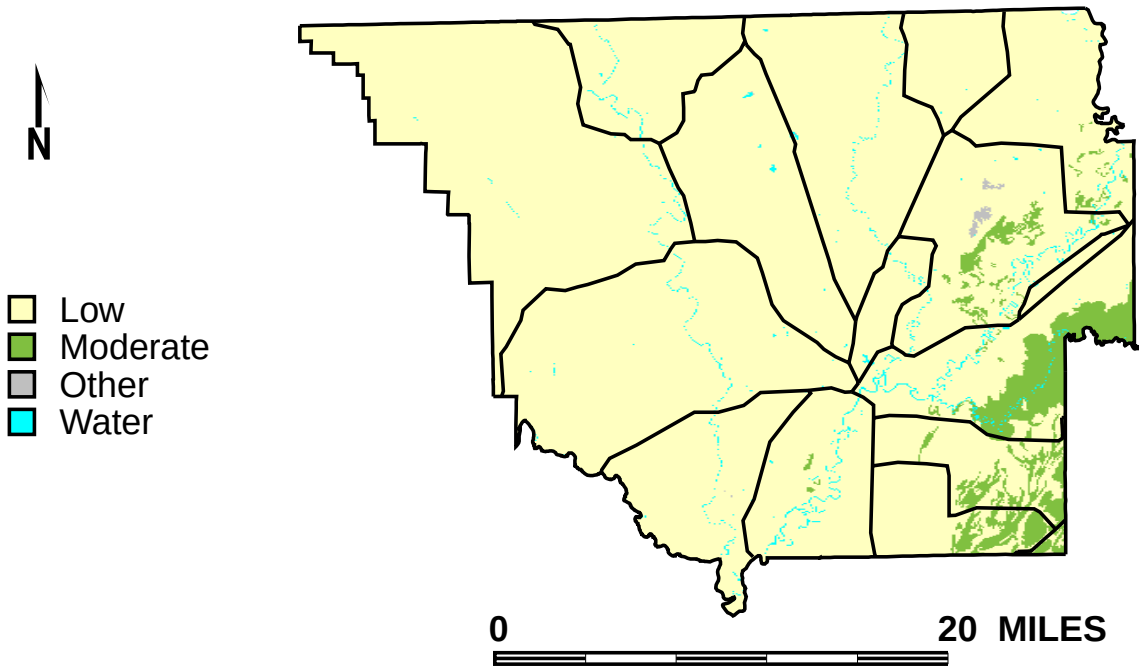

Figure 17. Areal distribution of shrink-swell potential in Randolph County.

Table 12. Areal summary soil shrink-swell potential in Randolph County.

Shrink-swell potential class	Acres	Hectares	% Cover
Low	394,643	159,710	94.13
Moderate	20,142	8,152	4.77
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Flood Frequency

Flooding refers to the temporary inundation by flowing water. The flood frequency of Randolph County can be classified into three categories: none (no reasonable possibility), rare (1–5 times in 100 years), occasional (5–50 times in 100 years), and frequent (> 50 times in 100 years). The eastern and southeastern part of Randolph County shows areas with a low possibility of flood, which comprises about 81% of the total area (Table 13). Occasionally, flooded soils are found mainly in the eastern part of the county and along the river channels and comprise 7% of the total land area. Frequently flooded soils are found along the river channels of the county, which cover about 6% of the total area (Figure 18).

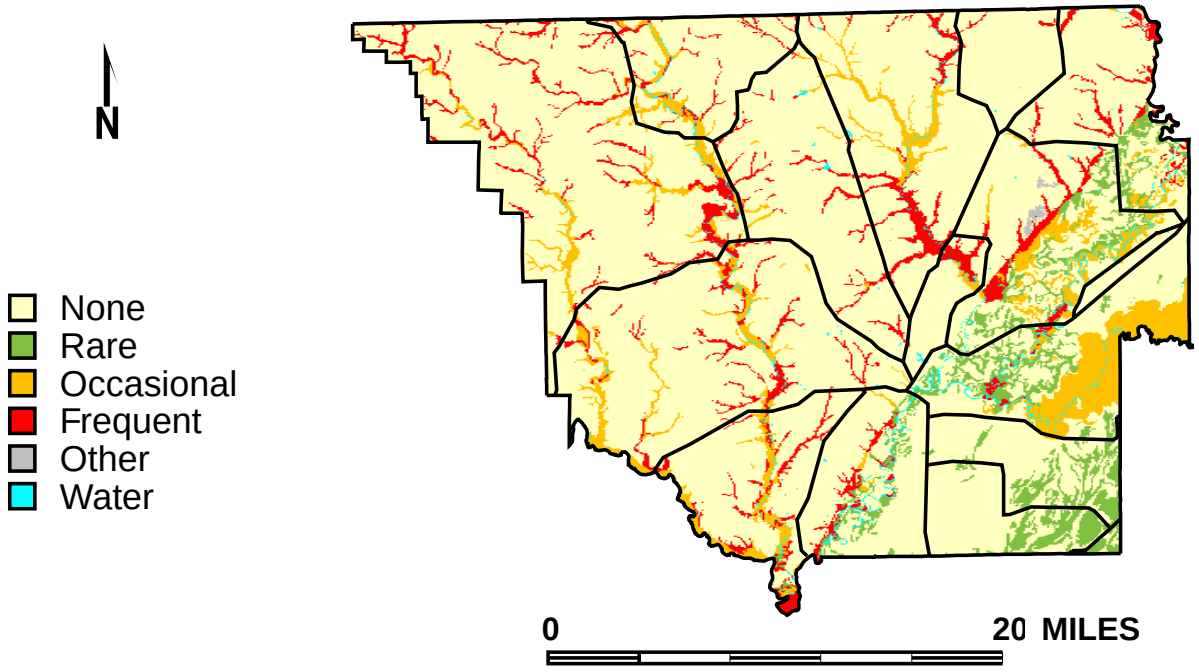

Figure 18. Areal distribution of flood frequency in Randolph County.

Table 13. Areal summary of flood frequency in Randolph County.

Flood frequency	Acres	Hectares	% Cover
None	339,259	137,296	80.93
Rare	20,100	8,134	4.77
Occasional	31,069	12,574	7.40
Frequent	24,357	9,858	5.80
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Soil Erodibilty (K) Factor

The soil K factor is used in the Universal Soil Loss Equation (USLE) as a relative index of susceptibility of bare, cultivated soil to particle detachment and transport by rainfall. This index is calculated on plots of standard dimensions, and erosion is adjusted to standard 9% slope. K factors are currently measured by simulated rainfall on freshly tilled plots. The higher the K factor, the greater the susceptibility of the soil to erosion. K may be computed from the composition of soil, saturated hydraulic conductivity, and structure. The tabular data by soil series were obtained from the NRCS. Small patches of soil with a K factor of 0.24 are found all over the county and occupy about 34% of the total area (Table 14). About 14% of Randolph County has soils with a K factor of 0.32 and such soils are found in the western part of the county. A high K factor of 0.49 covers 7% of the total area and these soils are found mainly in the east and southeastern part of the county (Figure 19). Soils in the southeastern part of the county tend to have a K value of 0.43, which covers 23% of the total area. Soils with a K value of 0.37 cover about 12% and found in the western part. This category of K value is also found in patches in the southeastern part of the county.

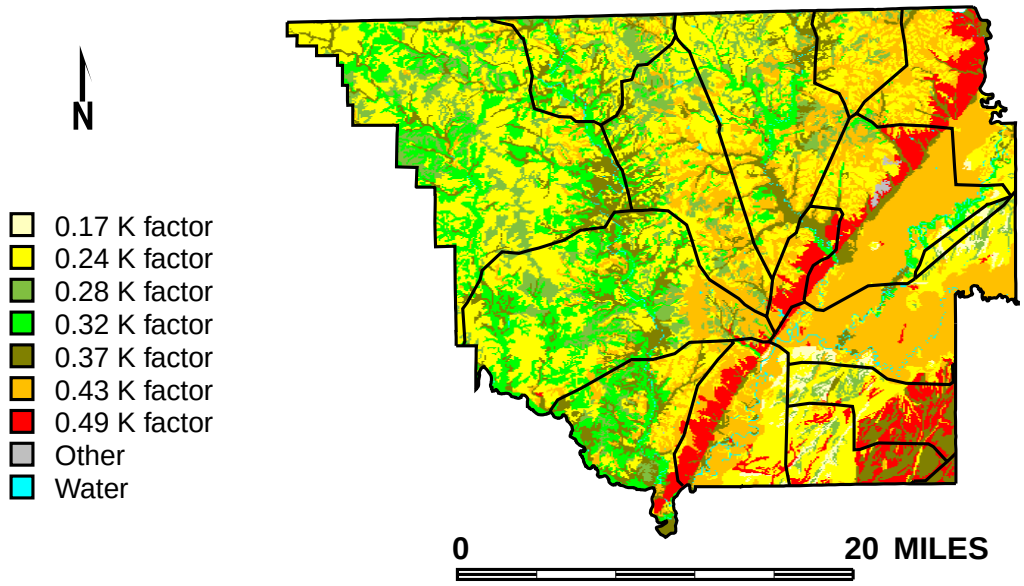

Figure 19. Areal distribution of soil K factor in Randolph County.

Table 14. Areal summary of soil K factors in Randolph County.

K factor	Acres	Hectares	% Cover
0.17	5,468	2,213	1.30
0.24	141,729	57,357	33.81
0.28	38,686	15,656	9.21
0.32	58,804	23,798	14.04
0.37	49,087	19,865	11.70
0.43	94,483	38,237	22.52
0.49	26,528	10,736	6.32
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Soil Tolerance (T) Factor

The soil loss tolerance (T factor) can also be used with the USLE model. The data for T factor by soil series were obtained from NRCS. Soil loss tolerance is defined as the maximum rate of annual soil erosion that will permit crop productivity to be sustained economically and indefinitely. The T factors are integer values ranging from 1 for shallow or fragile soils to 5 tons/acre/yr for deep soils and those least subject to damage by erosion. A T value of 5 tons/acre/yr covers almost all of Randolph County (Table15 and Figure 20). Soils with a T value of 4 tons/acre/yr cover 16% of the total county area and are found in the central-eastern part of the county. Soils with a T value of 2 tons/acre/yr are found in the north-central part of the county, which covers about 4% of the county.

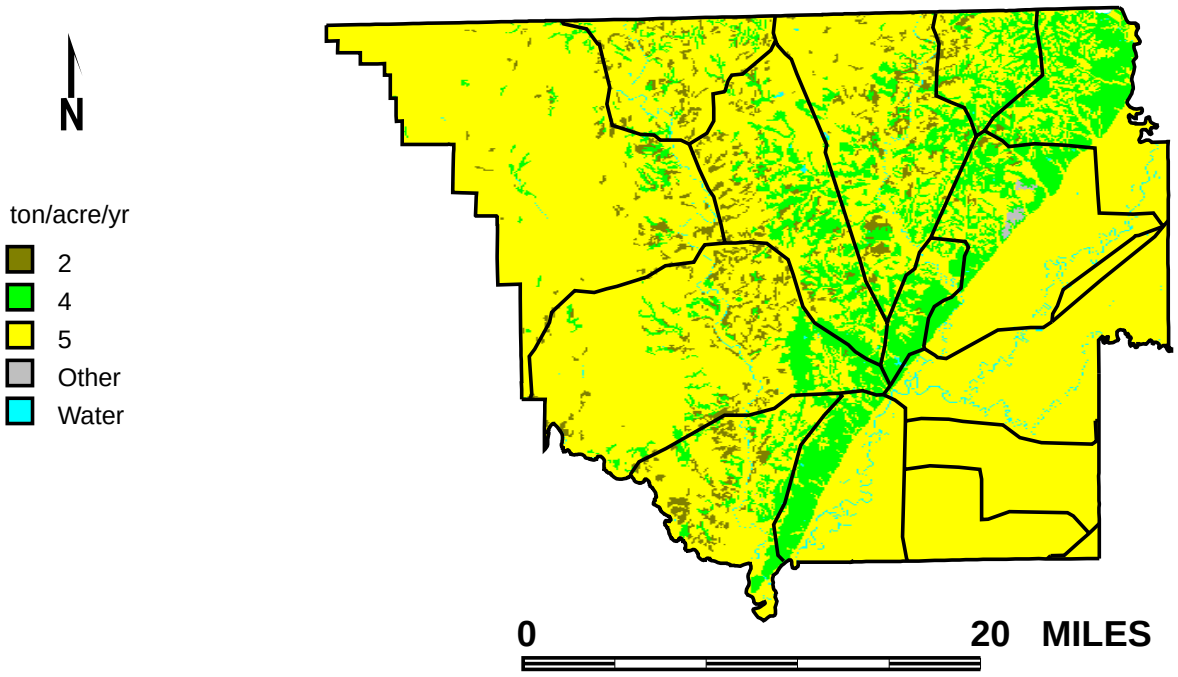

Figure 20. Areal distribution of soil T factor in Randolph County.

Table 15. Areal summary of soil T factors in Randolph County.

T factor	Acres	Hectares	% Cover
2	17,542	7,099	4.19
4	66,464	26,898	15.85
5	330,779	133,865	78.86
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Estimated Surface Soil Organic Matter (OM)

The presence of organic materials affects the structure and color of the soils as well as the retention of water, infiltration of water, and inorganic and organic molecules such as nutrients and pesticides. Increases of organic matter on the soil surface decrease runoff. The data were obtained from NRCS, where organic matter was calculated on the basis of percentage by dry weight. Surface organic matter contents in the range of 1–3% occur mainly in the western part of the county, and small patches are found in the eastern part of Randolph County. This category covers about 44% of the total area (Table 16). Soils with surface organic matter contents ranging between 0.5–2% are found in the eastern part of the county and occupy 38% of the total area. Approximately 6% of Randolph County has soils with organic matter contents between1.0–2.0% and small patchesof such soils are found in the central part of the county. (Figure 21). Surface organic matter contents in the range of 2–5% occur in small patches in the eastern part of Randolph County and occupy only 1% of the county.

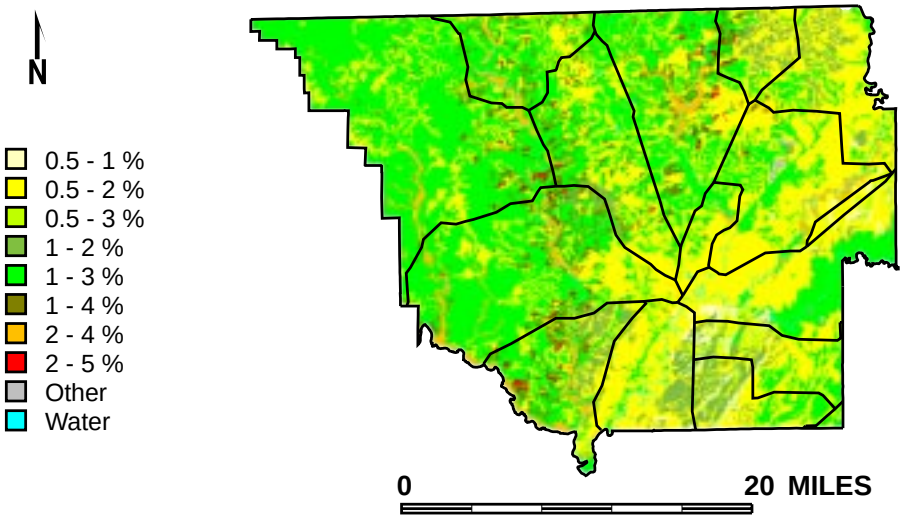

Figure 21. Areal distribution of surface soil OM.

Table 16. Areal summary of estimatedsurface soil organic matter (weight by %) in Randolph County.

Organic matter	Acres	Hectares	% Cover
0.5 – 1 %	5,468	2,213	1.30
0.5 – 2 %	159,886	64,705	38.09
0.5 – 3%	4,117	1,666	0.98
1 – 2 %	24,596	9,954	5.87
1 – 3 %	185,147	74,928	44.17
1 – 4 %	13,089	5,297	3.13
2 – 4 %	18,029	7,296	4.30
2 – 5 %	4,453	1,803	1.06
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Depth to Bedrock

Depth to bedrock refers to the depth from the surface of the soil to fixed rock (in-place hard). The data were obtained from NRCS. The majority of Randolph County is characterized by a depth to bedrock deeper than 60 in. (152 cm), which covers about 95% of the area (Table 17 and Figure 22). This is due to the extensive alluvial processes that were involved in the soil formation in this county. About 3% of the county is characterized by depth to bedrock between 24–60 in. and such soil is found in the central part of the county.

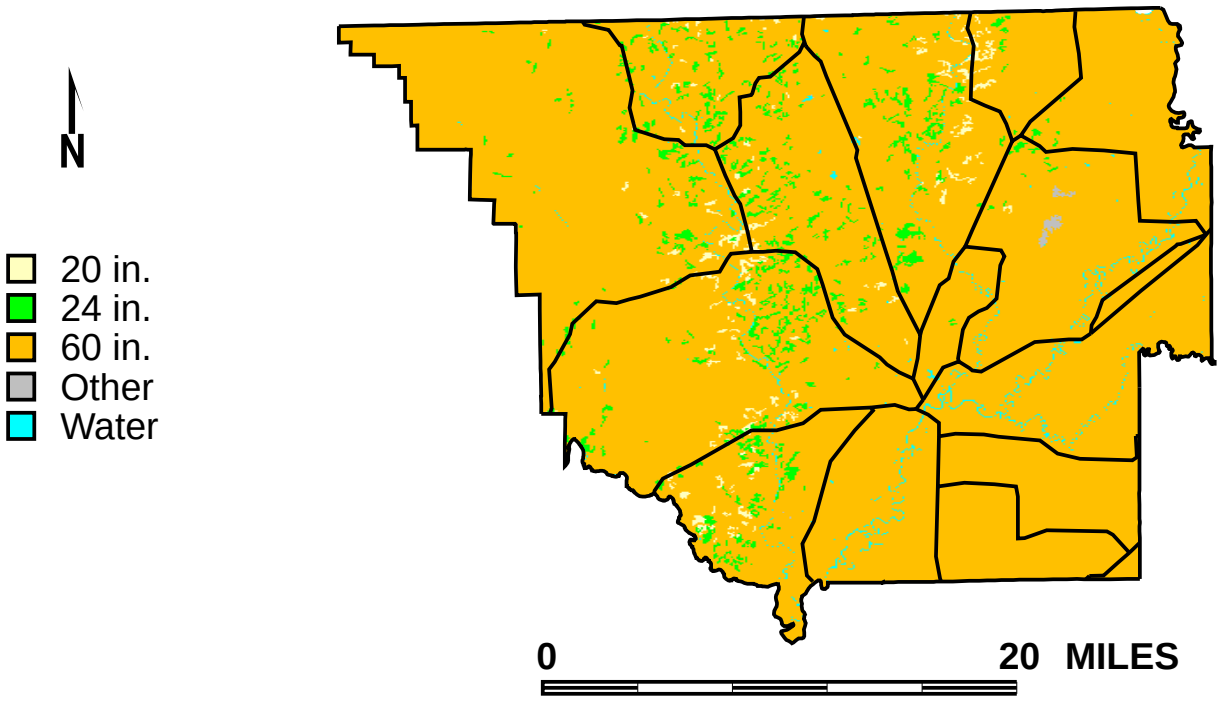

Figure 22. Areal distribution of depth to bedrock.

Table 17. Areal summary of depth to bedrock in Randolph County.

Depth to bedrock in inches	Acres	Hectares	% Cover
20	4,454	1,802	1.06
24	13,089	5,297	3.13
60	397,242	160,763	94.71
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Soil Slope

Land surface configuration includes soil slope. This indicates the slope of a soil component within a mapping unit. The slope data for each mapping unit were obtained from NRCS (Figure 23). The majority (23%) of Randolph County has a soil slope of 8–12 %, which is mainly found in north-central part of the county. Soils with slopes of 0–1% comprise almost 19% of Randolph County and are found mainly in the eastern part of the county (Table 18). Soil slopes between 0–2% are found in the eastern part of the county, which covers only 7% of the total land. The soil slope category of 0–3% covers 8% of the total area and is found in the eastern of the county. The slope category of 3–8% covers 17% of Randolph County and is found mainly in the eastern part of the county. About 7% of the total area of Randolph County shows soil slope of 3–12%, and this type of soil is found in the western part. About 16% of the total area of the county shows a soil slope of 12–20% and such soil is found in the western part of the county.

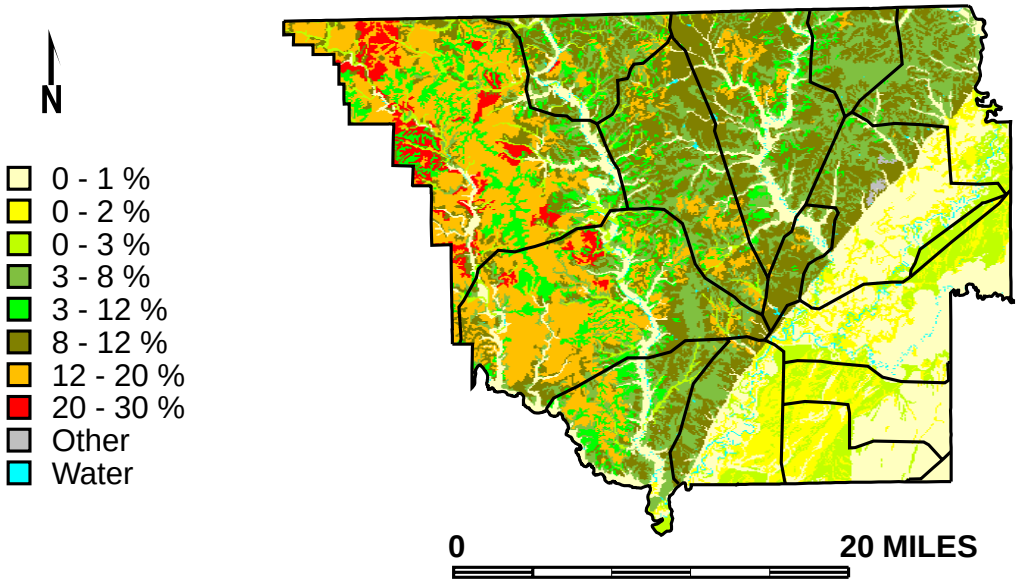

Figure 23. Areal distribution of soil slope in Randolph County.

Table 18. Areal summary of soil slope (in percent) in Randolph County.

Soil slope (%)	Acres	Hectares	% Cover
0 – 1	80,896	32,738	19.25
0 – 2	28,072	11,361	6.69
0 – 3	32,954	13,336	7.85
3 – 8	71,070	28,764	16.95
3 – 12	30,676	12,414	7.32
8 – 12	96,154	38,913	22.94
12 – 20	65,434	26,480	15.62
20 – 30	9,529	3,856	2.28
Other	488	197	0.12
Water	4,313	1,745	0.98
TOTAL	419,586	169,804	100.00

Prime Farmland

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. Prime farmland has the soil quality, growing season, and water supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods, including water management. In general, prime farmlands have an adequate and dependable water supply from rainfall or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding (USDA, 1967).

The areal summary of prime farmland in Randolph County is presented in Table 19. Most of the prime farmland is found in the eastern part of the county (Figure 24). Prime farmland with restriction 2 is found in patches in the eastern part of the county. About 3% of the county has prime farmland with restriction 5, i.e., only drained areas that are either protected from flooding or not frequently flooded during the growing season are prime farmland.

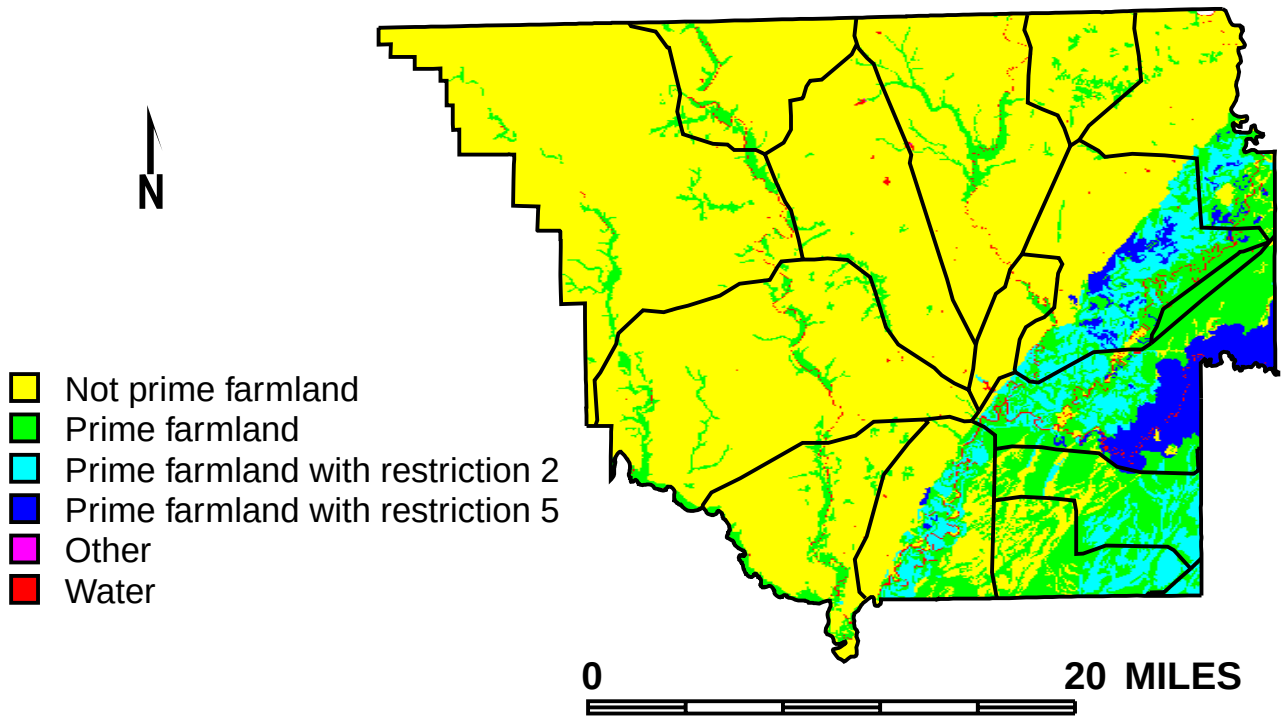

Figure 24. Areal distribution of prime farmland in Randolph County.

Table 19. Areal summary of prime farmland in Randolph County.

Prime farmland	Acres	Hectares	% Cover
Not prime farmland	304,780	123,343	72.62
Prime farmland	71,271	28,843	16.97
Prime farmland with restriction 2	26,172	10,592	6.21
Prime farmland with restriction 5	13,040	5,277	3.10
Other	10	4	0.12
Water	4,313	1,754	0.98
TOTAL	419,586	169,804	100.00

RELATIONSHIP BETWEEN CURRENT LANDUSE AND SOIL PROPERTIES

A coincidence report tabulates the mutual occurrence of categories for two map layers with respect to one another. Map outputs are stated in percentage of cover. The body of the report is arranged in panels. The map layer with the most categories is arranged in the vertical axis of the table; the other, along the horizontal axis. The last two columns reflect a cross total of each column for each row. The row at the bottom of each column represents the sum of all the rows in the column. Data for landuse were obtained from various sources. Thus, the definition of county boundaries from landuse data does not always match the soils data. This results in a category 0, which means no data. Therefore, coincidence tables with landuse information show a zero category. However, prime farmland and soils data have the same source; therefore, coincidence tables with prime farmland do not have a zero category.

Drainage and Landuse

The majority of the land in Randolph County used for agricultural production coincides with well-drained soils, followed by moderately well-drained and poorly drained soils. The majority of the deciduous forests grow on poorly drained soils, followed by well-drained soils (Table 20). About 127,360 acres of deciduous forests are with well-drained soils. Most of the urban areas also have moderately well-drained soils. Pasture/prairie consists of 59,765 acres of well-drained soils and 42,079 acres of moderately well-drained soils.

Table 20. Mutual occurrence of drainage categories and landuse in acres in Randolph County.

	Drainage*							
Categories	1	2	3	4	5	6	7	TOTAL
1 Evergreen forest	19	4	9,540	27,118	711	13	417	37,823
2 Deciduous forest	13,542	1,506	35,470	127,360	3,932	362	870	183,042
3 Mixed forest	0	0	6	23	0	0	6	35
4 Pasture/prairie	700	387	42,079	59,765	1,289	95	273	104,587
5 Agriculture	44,694	14,894	4,854	17,301	5,269	15	188	87,215
6 Urban	51	3	988	146	65	0	5	1,257
7 Water	438	218	830	1,127	23	3	2,554	5,192
TOTAL	59,444	17,012	93,766	232,840	11,289	488	4,313	419,151

* 1: Poorly drained; 2: Somewhat poorly drained; 3: Moderately well drained; 4: Well drained; 5: Somewhat excessively drained; 6: Other; 7: Water.

Drainage and Prime Farmland

The majority of the prime farmlands havewell-drained soils, followed by somewhat poorly drained soils (Table 21). About 10,957 acres of prime farmland consist of poorly drained soils. Most of the non-prime farmlands consist of well-drained soils, followed by moderately well-drained soils. All of the prime farmland with restriction 2 and prime farmland with restriction 5 have poorly drained soils.

Runoff and Landuse

Most of the agricultural land is in the slow runoff category, followed by the moderate runoff category. About 815 acres of urban land consist of rapid runoff areas. The majority of the deciduous forests have rapid runoff, followed by medium and slow runoff. About 25,952 acres of evergreen forests are in the rapid runoff category (Table 22).

Table 21. Mutual occurrence of drainage categories and prime farmland in acres in Randolph County.

	Prime farmland*						
Categories#	1	2	3	4	5	6	TOTAL
1	10,957	9,437	26,172	13,040	0	0	59,607
2	0	17,115	0	0	0	0	17,115
3	93,771	0	0	0	0	0	93,771
4	193,673	39,251	0	0	0	0	232,924
5	5,900	5,468	0	0	0	0	11,369
6	488	0	0	0	10	0	488
7	0	0	0	0	0	4,312	4,313
TOTAL	304,789	71,271	26,172	13,040	10	4,312	419,586

* 1: Not prime farmland; 2: Prime farmland; 3: Prime farmland with restriction 2; 4: Prime farmland with restriction 5; 5: Other; 6: Water.

\# 1: Poorly drained; 2: Somewhat poorly drained; 3: Moderately well drained; 4: Well drained; 5: Somewhat excessively drained; 6: Other; 7: Water.

Table 22. Mutual occurrence of runoff categories and landuse in acres.

	Runoff*							
Categories	1	2	3	4	5	6	7	TOTAL
1 Evergreen forest	1	3,370	7,535	25,952	535	13	417	37,823
2 Deciduous forest	8,949	19,636	43,807	106,868	2,549	362	871	183,042
3 Mixed forest	0	24	6	0	0	0	6	36
4 Pasture/prairie	224	21,749	41,965	39,612	669	95	273	104,587
5 Agriculture	7,838	55,331	22,544	1,298	0	15	188	87,214
6 Urban	1	105	277	815	55	0	5	1,257
7 Water	85	1,527	488	527	9	3	2,554	5,192
TOTAL	17,098	101,742	116,622	175,071	3,817	488	4,313	419,151

* 1: very slow; 2: Slow; 3: Medium; 4: Rapid; 5: Very rapid; 6: Other; 7: Water.

Runoff and Prime Farmland

The majority of the prime farmlands consist of soils that have slow runoff, followed by those with slow runoff (Table 23). Most of the non-prime farmlands have soils with rapid runoff, followed by medium runoff. About 26,172 acres of prime farmland with restriction 2 have slow runoff, and 13,040 acres of prime farmland with restriction 5 are in the very slow runoff category.

Potential Hydric Soils and Landuse

Almost equal amounts of the agricultural land of Randolph County consist of potential non-hydric soils and hydric soils. About 168,267 acres of deciduous forests are potential non-hydric soils, and 13,542 acres consist of potential hydric soils (Table 24).

Most of the pastures are found in potential non-hydric soils About 37,374 acres of evergreen forests are potential non-hydric soils.

Table 23. Mutual occurrence of runoff categories and prime farmland in acres.

	Prime farmland*						
Categories	1	2	3	4	5	6	TOTAL
1 Very slow	0	4,117	0	13,040	0	0	17,157
2 Slow	35,314	40,465	26,172	0	0	0	101,951
3 Medium	90,093	26,689	0	0	0	0	116,782
4 Rapid	175,078	0	0	0	0	0	175,078
5 Very rapid	3,817	0	0	0	0	0	3,817
6 Other	478	0	0	0	10	0	488
7 Water	0	0	0	0	0	4,313	4,313
TOTAL	304,780	71,271	26,172	13,040	10	4,313	419,586

* 1: Not prime farmland; 2: Prime farmland; 3: Prime farmland with restriction 2; 4: Prime farmland with restriction 5; 5: Other; 6: Water.

Table 24. Mutual occurrence of potential hydric soils categories and landuse in acres.

	Potential hydric soils				
Categories	1 Not hydric	2 Hydric	3 Other	4 Water	TOTAL
1 Evergreen forest	37,374	19	13	417	37,823
2 Deciduous forest	168,267	13,542	362	871	183,042
3 Mixed forest	30	0	0	6	36
4 Pasture/prairie	103,520	700	95	273	104,587
5 Agriculture	42,317	44,694	15	188	87,214
6 Urban	1,201	51	0	5	1,257
7 Water	2,197	438	3	2,554	5,192
TOTAL	354,906	59,444	488	4,313	419,151

Potential Hydric Soils and Prime Farmland

The majority of the prime farmlands consist of potential non-hydric soils (Table 25). About 9,437 acres of prime farmland consist of hydric soils. Most of the non-prime farmland has non-hydric soils. About 10,957 acres of non-prime farmland consist of hydric soils. Prime farmlands with restriction 2 and restriction 5 consist of potential hydric soils.

Soil Permeability and Landuse

The majority of the soils with the permeability class of 0.2-0.6 in/hr are used for agriculture (Table 26). The majority of the deciduous forests consist of the permeability class of 0.6-2.0 in./hr, followed by the permeability class of 2-6 in./hr. Most of the pasture and evergreen forests are in the 0.6-2 in./hr permeability categories.

Table 25. Mutual occurrence of potential hydric soils and prime farmland in acres.

	Potential hydric				
Categories*	1 Not Hydric	2 Hydric	3 Other	4 Water	TOTAL
1	293,345	10,957	478	0	304,780
2	61,834	9,437	0	0	71,271
3	0	26,172	0	0	26,172
4	0	13,040	0	0	13,040
5	0	0	10	0	10
6	0	0	0	4,313	4,313
TOTAL	355,178	59,607	488	4,313	419,586

* 1: Not prime farmland; 2: Prime farmland; 3: Prime farmland with restriction 2; 4: Prime farmland with restriction 5; 5: Other; 6: Water.

Table 26. Mutual occurrence of soil permeability categories and landuse in acres.

	Permeability*						
Categories	1	2	3	4	5	6	TOTAL
1 Evergreen forest	8	34,417	2,968	0	13	417	37,823
2 Deciduous forest	9,388	146,927	25,411	83	362	871	183,042
3 Mixed forest	0	28	2	0	0	6	36
4 Pasture/prairie	332	96,731	7,143	13	95	273	104,587
5 Agriculture	19,677	41,949	20,116	5,269	15	188	87,214
6 Urban	35	1,112	95	10	0	5	1,257
7 Water	127	2,326	169	13	3	2,554	5,192
TOTAL	29,567	323,491	55,904	5,389	488	4,313	419,151

* 1: 0.2 – 0.6 in./hr; 2: 0.6 – 2 in./hr; 3: 2 – 6 in./hr; 4: 6 – 20 in./hr; 5: Other; 6: Water.

Soil Permeability and Prime Farmland

Most of the prime farmland is in the soil permeability class of 0.6- 2 in./hr, followed by the 2–6 in./hr soil permeability class (Table 27). The majority of the non-prime farmland is in the permeability category of 0.6–2 in./hr. About 34,569 acres of non-prime farmland are in the 0.2–0.6 in./hr class. Prime farmland with restriction 5 is in the 0.2–0.6 in./hr permeability class.

Major Crops and Surface Texture

Most of the soybeans (14,428 acres) are grown in soils with a silt loam surface texture followed by fine sandy loam (Table 28). About 2,927 acres of soybeans are grown on silty clay loam. The majority of the rice is grown on soils with silt loam texture (14,161 acres). About 4,943 acres of rice consist of a fine sandy loam surface texture.

Table 27. Mutual occurrence of soil permeability categories and prime farmland in acres.

	Prime farmland*						
Categories	1	2	3	4	5	6	TOTAL
1 0.2 – 0.6 in/hr	0	9,437	7,102	13,040	0	0	29,579
2 0.6 – 2 in/hr	269,733	34,903	19,070	0	0	0	323,706
3 2 – 6 in/hr	34,569	21,463	0	0	0	0	56,032
4 6 – 20 in/hr	0	5,468	0	0	0	0	5,468
5 Other	478	0	0	0	10	0	488
6 Water	0	0	0	0	0	4,313	4,313
TOTAL	304,780	71,271	26,172	13,040	10	4,313	419,586

* 1: Not prime farmland; 2: Prime farmland; 3: Prime farmland with restriction 2; 4: Prime farmland with restriction 5; 5: Other; 6: Water.

Table 28. Mutual occurrence of surface texture categories and major crops in acres.

	Major crops		
Categories	Soybeans	Rice	TOTAL
1 Loamy fine sand	1,584	636	2,220
2 Gravelly fine sandy loam	59	62	120
3 Fine sandy loam	10,139	4,943	15,082
4 Very cherty silt loam	1,624	410	2,033
5 Cherty silt loam	987	112	1,099
6 Silt loam	14,428	14,161	28,590
7 Silty clay loam	2,927	3,586	6,513
8 Other	0	8	8
9 Water	391	386	777
TOTAL without 0	32,138	24,303	56,442

Major Crops and Soil Drainage

Most of the soybeans (13,704 acres) are grown in poorly drained soils, followed by well-drained soils (Table 29). About 4,731 acres of soybeans are grown on somewhat poorly drained soils. Most of the rice is also grown on poorly drained soils (15,039 acres). About 3,613 acres of rice consist of somewhat poorly drained soils. About 2,765 acres of rice are grown on well-drained soils.

Major Crops and Soil Runoff

Most of the soybeans (17,948 acres) are grown on soil with slow runoff potential (Table 28). About 8,535 acres of soybeans are grown on soils with medium runoff. About 2,466 acres of soybeans are grown on soils with very slow runoff. Most of the rice is also grown on soils with slow runoff potential (18,442 acres). About 2,794 acres of rice consists of soils of medium runoff. About 1,810 acres of rice are grown on soil with very slow runoff.

Table 29. Mutual occurrence of soil drainage categories and major crops in acres.

	Major crops		
Categories	Soybeans	Rice	TOTAL
1 Poorly drained	13,704	15,039	28,743
2 Somewhat poorly drianed	4,731	3,613	8,344
3 Moderately well drained	2,310	1,818	4,129
4 Well drained	9,378	2,765	12,134
5 Somewhat excessively drained	1,623	683	2,307
6 Other	0	8	8
7 Water	391	386	777
TOTAL	32,138	24,303	56,442

Table 30. Mutual occurrence of soil runoff categories and major crops in acres.

	Major crops		
Categories	Soybeans	Rice	TOTAL
1 Very slow	2,466	1,810	4,277
2 Slow	17,948	18,442	36,390
3 Medium	8,535	2,794	11,329
4 Rapid	2,767	863	3,630
5 Very rapid	30	0	30
6 Other	0	8	8
7 Water	391	386	776
TOTAL	32,137	24,303	56,442

CONCLUDING REMARKS

This report has presented information on the amount and spatial distribution of soils in Randolph County. Hard copy maps of natural resources such as soil were digitized to create the primary soil layer. Tabular summaries and maps were presented of the primary soil mapping units and a number of secondary attributes of soil in the county. These maps and tables show that Randolph County has a wide range of soil attributes, which affect the behavior of soils and potential uses of the soils in this county. GIS was used to generate all the maps and tables. GIS facilitated the spatial analysis of natural resources parameter in this county. This report can assist in land management planning. However, use of this report does not eliminate the need for site-specific studies.

The spatial distribution of soils in this report are based on the intrinsic variability of soil properties. As a result of the activities and uses of soil by humans (extrinsic variability), an on-site evaluation of these soil properties may differ slightly from the data presented in this report. However, this report can help to analyze the relationship between landuse and soil properties. The majority of the agricultural land in Randolph County is associated with poorly drained soils, slow runoff, potential hydric soil, a K factor of 0.42, and soil slopes of 0–2% or 1-3%. Most of the prairie/pasture landuse consists of soil in the occasional flooding category. Coincidence tables provide detailed information on relationships between important soil parameters and landuse. Most of the potential hydric soils of the county consist of soil in the 0.6–2 in./hr permeability class that is poorly drained and is in a textural class of very cherty silt loam. The majority of the prime farmland consists of 0–1% soil slope. Most of the potential hydric soils are in the 0–1% and 0–2% soil slope categories. The majority of the soybeans and rice are growing on poorly drained soils with silt loam texture and slow runoff.

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