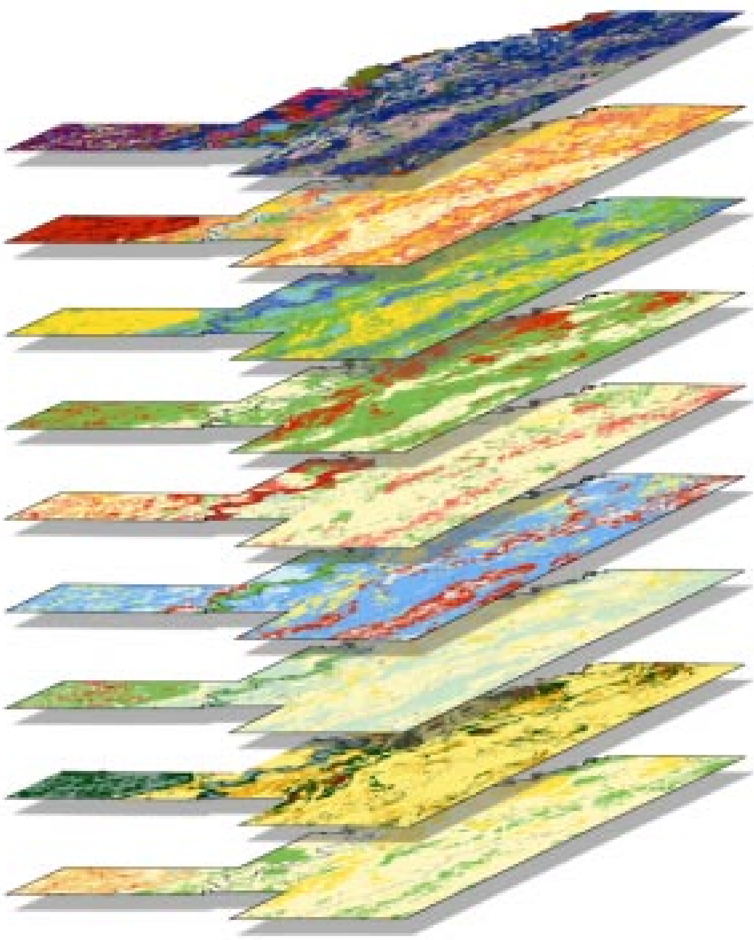
Soils of Jackson County, Arkansas



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Editing by Karen Eskew

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Soils of Jackson County, Arkansas

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CONTENTS

Soils of Jackson 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; quality food supply and a livable environment. Along with air and water, soil contributes essential processes to the natural order of global cycles. Soils are products of both inherited and acquired properties. Their characteristics reflect an integration of parent member properties with accumulated influences of subsequent environments.

Soil is unconsolidated natural material at the earth's surface that supports plant growth and a storage medium of 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 occurs approximates the lower boundary. Internally, soil bodies differ in their physical and chemical properties. Soils in an area occur in patterns related to geology, landscape features, climate, and native vegetation. Soils occupy definite positions on the landscape; therefore, individual soils can be mapped and named.

The development of digital databases for natural resources 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 processes. They not only facilitate multiple uses, including analysis and model simulation, but they are also relatively inexpensive and easy to update. Once developed, digital databases can be used to study numerous, complex real-world problems. Digital data from different sources such as satellite imagery, radar, air photographs, and global positioning systems can be easily added to an existing digital database to facilitate spatial analysis, landuse, and modeling.

This report presents the spatial distribution of both primary and secondary attributes of the soils of Jackson 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. 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 and nature of the soil resource in a digital format for Jackson 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 hard copy 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. The data contained in this report was derived from an Order II Soil Survey. Order II Soil Surveys have limitations such as the map units are not pure map units, they have inclusions and the smallest area of coverage is five acres. This report provides, however, a general guideline for macro/meso level management and policy formulation of soil related issues.

LOCATION AND DESCRIPTION OF JACKSON COUNTY

Jackson County is located in northeast Arkansas, in the upper Mississippi Delta region (Fig. 1). The county is bounded by Craighead, Poinsett, and Cross counties on the east, Independence County on the west, Lawrence County on the north, and Woodruff and White counties on the south.

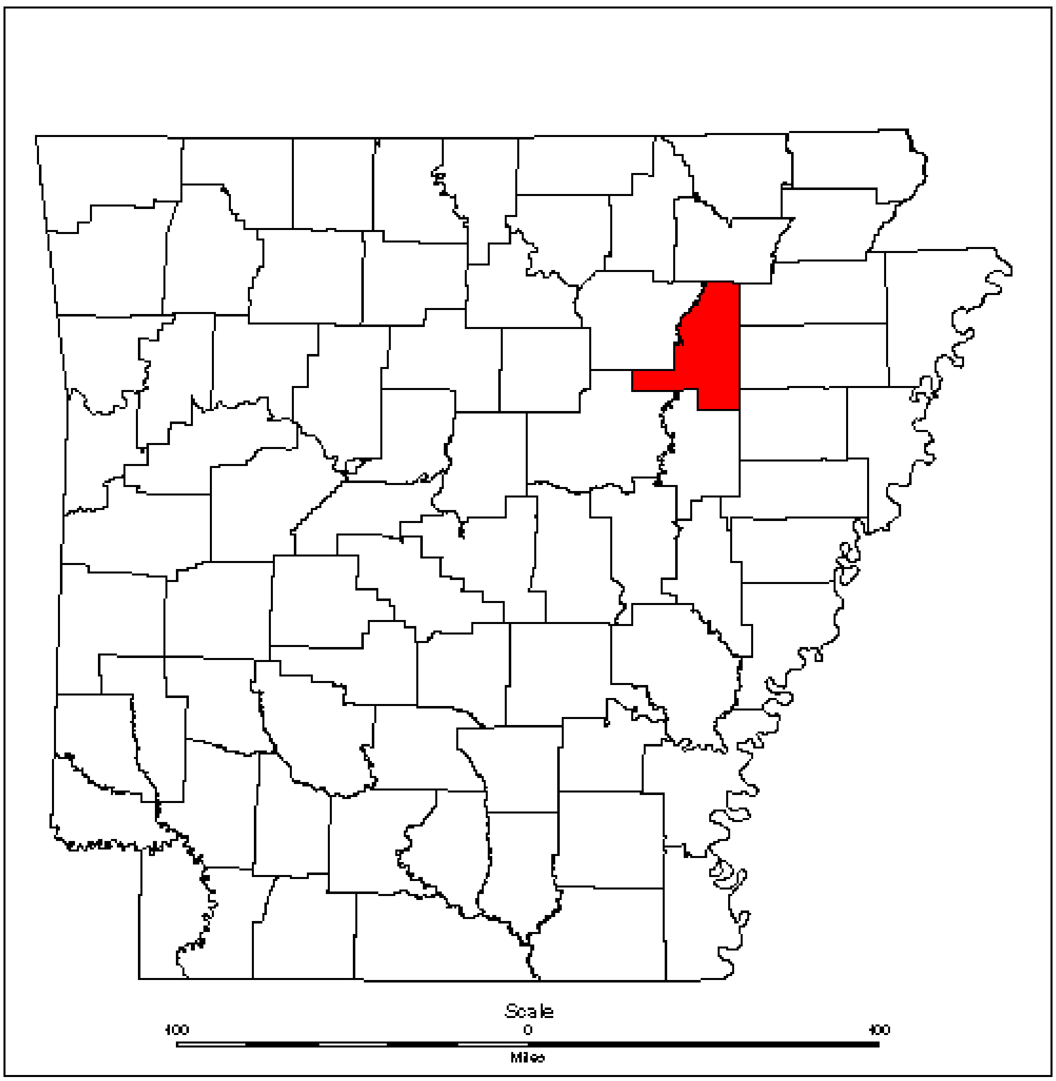

Fig. 1. Location of Jackson County, Arkansas.

Population Data

Jackson County, like many other counties in eastern Arkansas has experienced a decline in population in recent years (Fig. 2). Beginning in the 1830s, the first data available, the population was reported to be 333 souls. The population increased until 1860, which peaked at 10,493. In the following decade, Jackson County lost 3,225 people with a total population of 7,268. For the next 60 years, however, Jackson County grew every decade to its highest population of 27,943 in 1930.

After 1930, the population of Jackson County decreased with the exception of 1980 when the population rebounded from 20,452 people to 21,646. The average population decline of Jackson County from 1930 until 1990 was approximately 1,500 people per decade with the largest drop happening between 1950 and 1960 (3,069 people) (Appendix A, Table 1).

Newport, Jackson County's largest city and county seat, also experienced similar population trends (Fig. 3). In 1880, Newport had a population of 683. The town population increased until 1930 with a temporary peak of 4,547 persons. In the following decade, the population decreased to 4,301. Over the next 40 years, Newport's population grew every decade until the 1990s. The peak occurred in 1980 with a population of 8,339. The 1990 population of Newport was 7,459 persons (Appendix A, Table 2). The percentage of the total county population residing in Newport increased from about 6.3% in 1980 to about 39.4% in 1990 (Appendix A, Table 3).

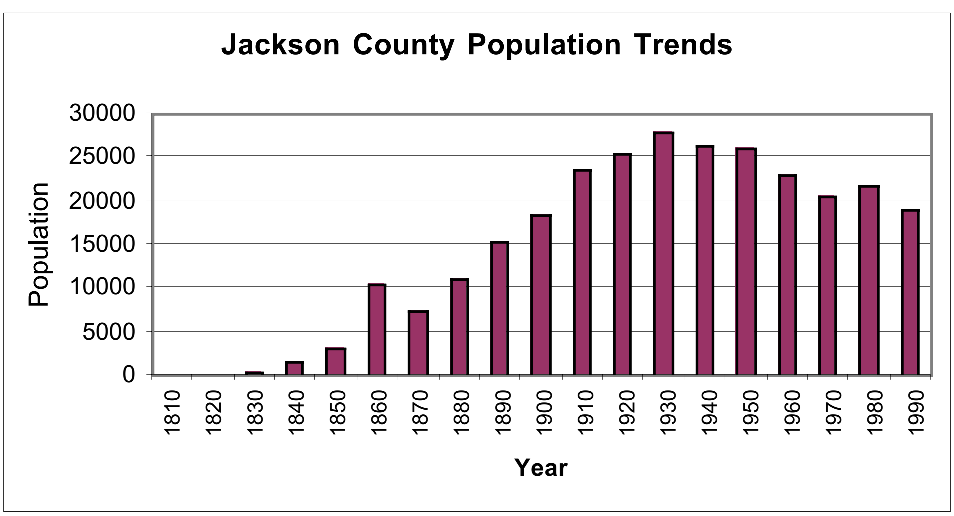

Fig. 2. Historical Population of Jackson County, Arkansas (U.S. Bureau of the Census).

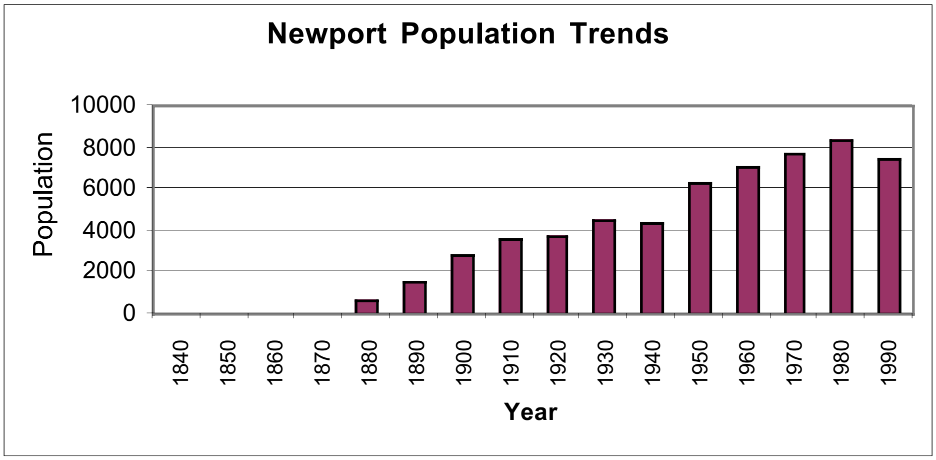

Fig. 3. Historical Population of Newport, Arkansas (U.S. Bureau of the Census).

General Data

Jackson County is comprised of about 410,768 acres (166,236 ha) and has 31 soil mapping units (USDA - NRCS 1995). The dominant soil mapping unit is the Foley-Calhoun complex, in the 0 to 1% slope class. In 1992, agriculture was the main economic activity of Jackson County and involved approximately 77% of the land area (Table 1). The east central part of the county has agriculture as the predominant landuse whereas the western panhandle of the county is dominated by evergreen forests, pastures, and prairie land (Fig. 4). The landuse/landcover data used in Fig. 4 were derived from a Thematic Mapper using a tassel cap transformation followed by an unsupervised isoclustering classification. These data were obtained from the Center for Advanced Spatial Technologies (CAST) at the University of Arkansas at Fayetteville. The primary and secondary roads of Jackson County are presented in Fig. 5, and the spatial distribution of water bodies is presented in Fig. 6.

Table 1. Areal distribution of landuse and landcover in Jackson County.

Landuse and landcover class	Acres	Hectares	% Cover
Evergreen forest	2,162	875	0.53
Deciduous forest	50,307	20,359	12.25
Mixed forest	11,369	4,601	2.77
Pasture/prairie	17,476	7,072	4.25
Agriculture	319,149	129,158	77.70
Urban	952	385	0.23
Water	8,553	3,462	2.08
No Data	800	324	0.19
TOTAL	410,768	166,236	100.00

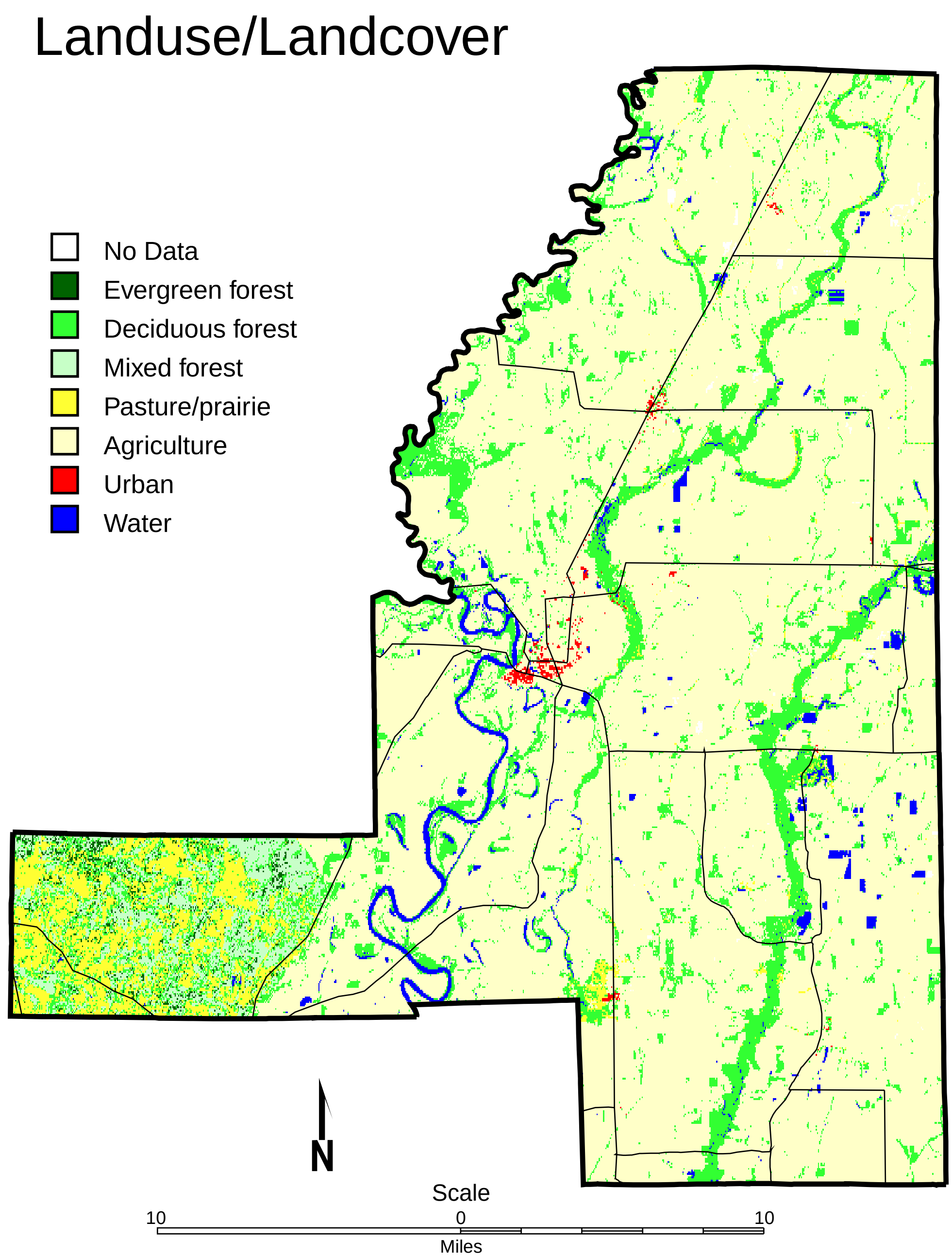

Fig. 4. Areal distribution of landuse and landcover.

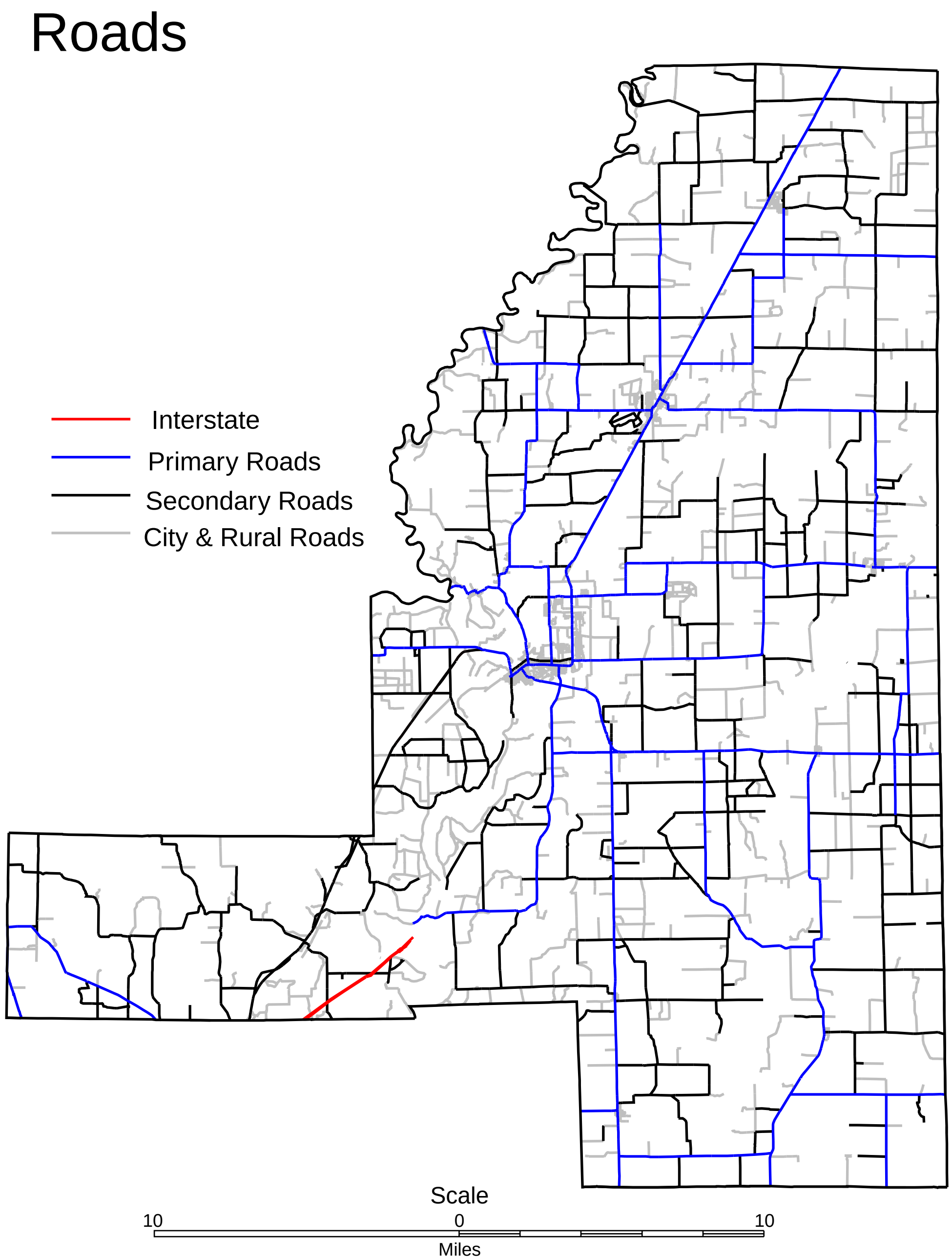

Fig. 5. Areal distribution of roads.

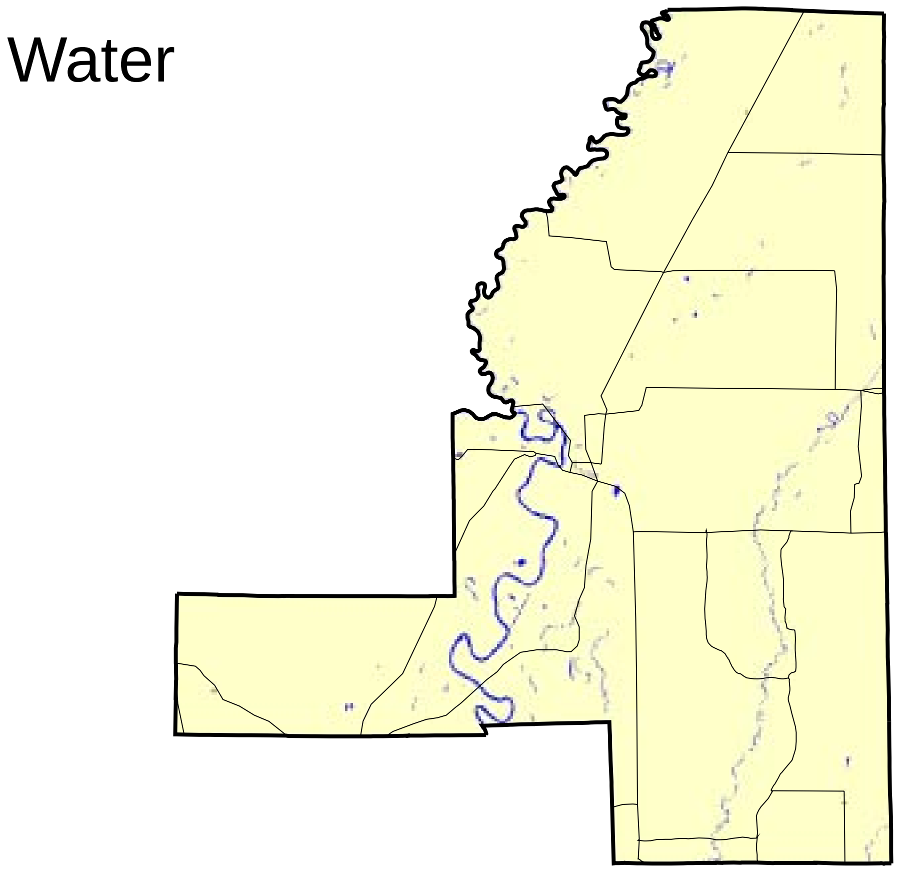

Fig. 6. Areal distribution of water bodies.

Climate of Newport

Newport, the county seat, also serves as a weather station for Arkansas. Detailed daily weather measurements have been collected over the years which provide a wealth of information on the climate of Jackson County.

Since 1966, the average yearly rainfall for Newport has been 49.5 inches. The annual standard deviation was 8.5 inches and the CV was 17.2%. The calculation of the long-term average of measured precipitation began in 1898. Over the last 99 years, the mean monthly precipitation was 4.1 inches with a standard deviation of 1.8 inches.

The driest year on record since 1966 was 34.3 inches recorded in 1971 (Figure 7). This rainfall amount was 15.4 inches below the long-term average of 49.7 inches. The wettest year on record was 1990, with 72.6 inches of rainfall.

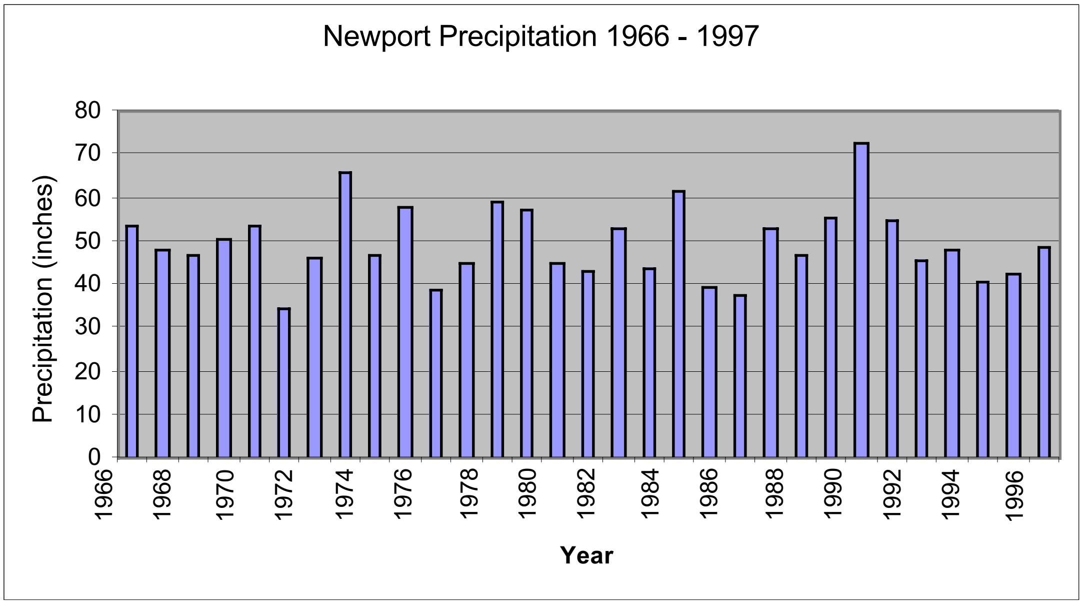

Fig. 7. Precipitation at Newport (in inches) 1966 to 1997 (U.S. Department of Commerce).

As an example of the monthly variation, Newport recorded an annual rainfall of 48.7 inches in 1997 which was 1.0 inch below the long-term average rainfall (Table 2). The wettest month was April with 7.9 inches, 3.2 inches above the long-term monthly mean rainfall for April. The driest month in 1997 was July with 1.2 inches, 2.3 inches below the long-term average monthly mean for July.

Table 2. Monthly precipitation in inches at Newport during 1997.

	Inches	Deviation from mean
January	2.96	-0.32
February	5.18	1.64
March	6.68	1.49
April	7.86	3.15
May	4.84	-0.13
June	3.49	-0.2
July	1.19	-2.32
August	3.79	0.06
September	2.7	-1.36
October	3.33	0.02
November	3.28	-1.6
December	3.43	-1.32
Mean	4.06	-0.07
Standard Deviation	1.82	1.55

Hydrology

Jackson County has five 8-digit Sub-Basins defined by the USDA – NRCS Hydrologic Unit Codes classification scheme (Table 3). The two largest watersheds cover over 99% of the county. The major, or largest, of these watersheds is the Cache, which covers about 50% of the total land area in Jackson County. The Cache watershed extends from north to south on the eastern part of the county and covers about 209,022 acres (Fig. 8).

The Upper White-Village watershed covers slightly over 48% of the county and covers 198,173 acres of Jackson County. The Upper White-Village watershed extends from north to south on the western part of the county.

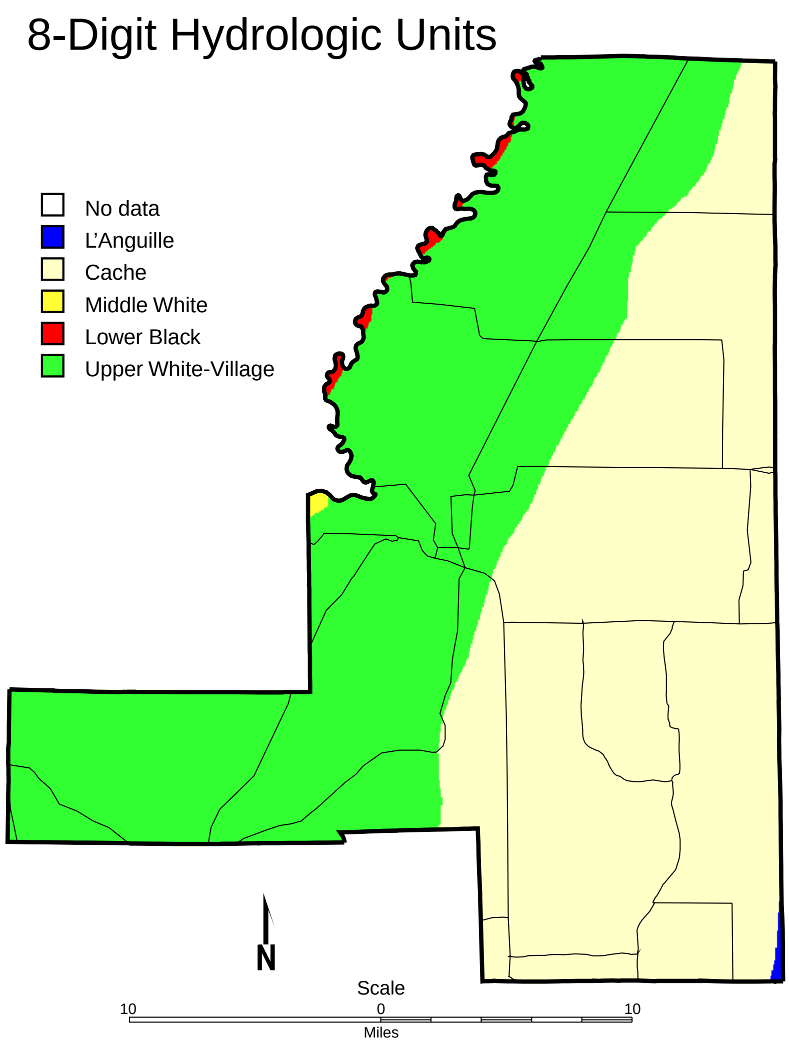

Fig. 8. Areal distribution of 8-digit hydrologic units.

Table 3. Areal distribution of 8-digit hydrologic units in Jackson County.

Hydrologic units	Acres	Hectares	% Cover
No data	1014	410	0.25
L'Anguille	534	216	0.13
Cache	209,022	84,590	50.89
Middle White	415	168	0.10
Lower Black	1,610	652	0.39
Upper White-Village	198,173	80,200	48.24
TOTAL	410,768	166,236	100.00

The valley train of early Wisconsin glaciation dominates most of Jackson County, which is primarily an agricultural county. This geologic unit formed from early glaciation occurs primarily in the north and central part of the county (Fig. 9). The valley train of early Wisconsin glaciation 2 covers about 21% of the land area and Alluvium covers about 18% of the area in Jackson County (Table 4). The Alluvium geologic unit is clastic material deposited by rivers and streams and occurs in areas surrounding the White and Cache Rivers. The Loess geologic unit, the silt originating in glacial outwash plains, dominates the panhandle of Jackson County. The majority of the soils of Jackson County outside of the panhandle (65%) are about 12,000 to 14,000 years old. The soils that developed from the valley train of Wisconsin and along the White and Cache rivers are relatively young in geologic terms (Table 4).

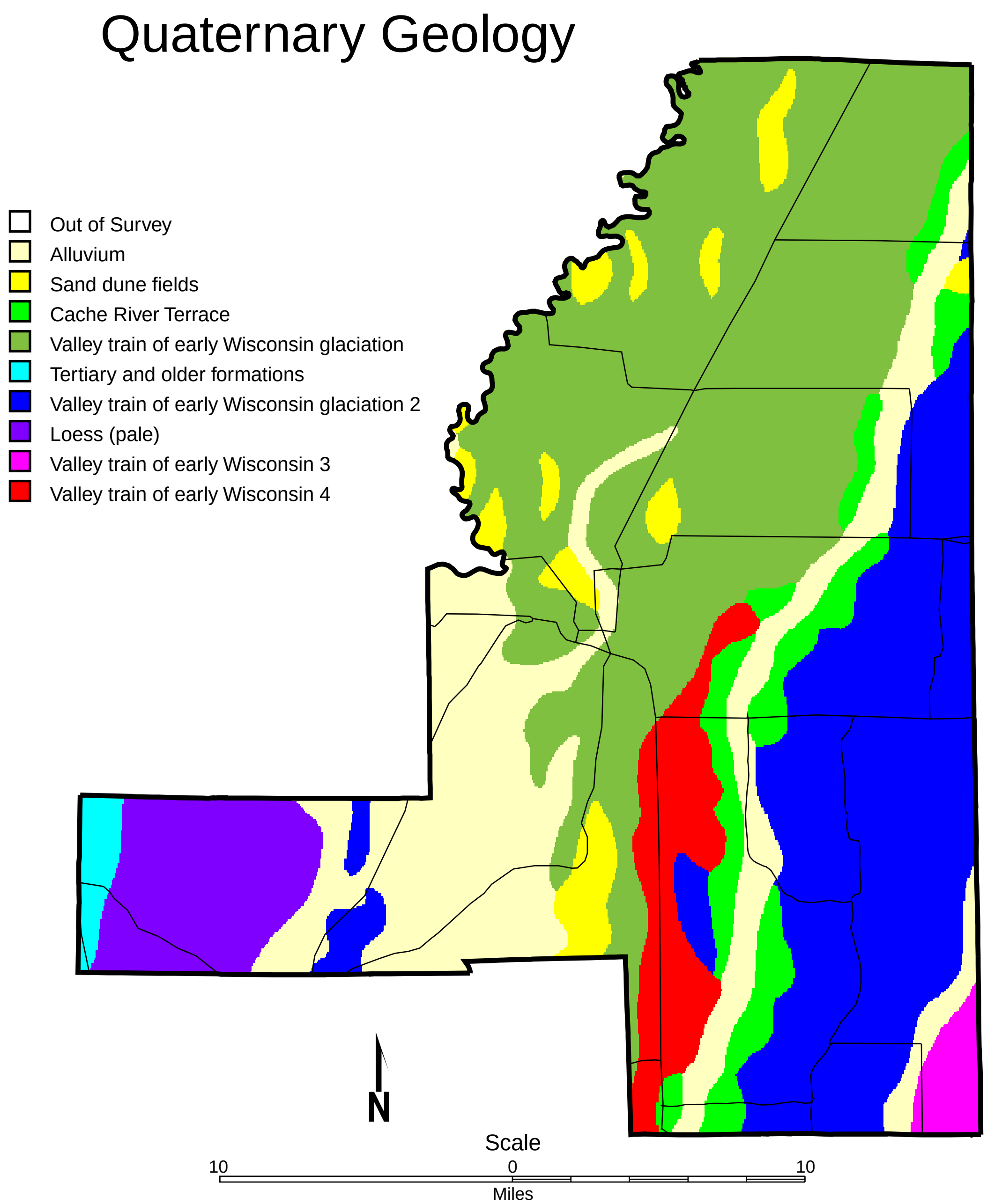

Fig. 9. Areal distribution of Quaternary geology.

Table 4. Areal distribution of Quaternary geology in Jackson County.

Geology	Acres	Hectares	% Cover
Alluvium	76,422	30,927	18.60
Sand dune fields	15,270	6,179	3.72
Cache River Terrace	23,664	9,577	5.76
Valley train of early Wisconsin glaciation	150,066	60,731	36.53
Tertiary and older formations	4,087	1,654	0.99
Valley train of early Wisconsin glaciation 2	89,802	36,342	21.86
Loess (pale)	24,670	9,984	6.01
Valley train of early Wisconsin 3	5,366	2,171	1.31
Valley train of early Wisconsin 4	20,409	8,259	4.97
No Data	1014	410	0.25
TOTAL	410,770	166,234	100.00

METHODOLOGY

The methods used to develop the digital databases of the soils of Jackson county can be divided into three categories: (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) in conjunction with ArcView3.0a 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 hard copy maps into a digital database: (i) scanning and (ii) digitizing. The soil boundary lines were drawn on Mylar by Natural Resource Conservation Service (NRCS) personnel 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 generally 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 line bleeding. The scanned boundaries contain multiple and variable pixel widths. Scanned images require 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 Jackson County were scanned. The county boundaries were digitized due to 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 the 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, since selective relevant features can be digitized. The county lines were digitized directly in a vector format. This step resulted in fewer errors induced by raster to vector conversion processes. There was no need for editing the images, which involves thinning the lines or fixing the problems related to intersection. Thus, considerable time for editing was saved.

After the soil quads were scanned and edited, they were converted into the vector format and labeled. Before labeling, the county boundaries were imported. Each soil polygon was labeled twice to avoid mislabeling due to human errors. After labeling was computed, the images were exported to GRASS in vector format.

The different sources of information used in this study have varying regional definition and masks, resulting in different total areal coverage between the maps. Landuse data were classified from Thematic Mapper (TM) satellite imagery by the Center for Advanced Spatial Technologies (CAST), and the hydrologic units were obtained from the U.S. Geological Survey, Water Resource Division.

Manipulation Techniques

Digital data of soil quads with primary attributes were imported into 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. The manipulation technique, such as reclassification, can be done either in vector or raster domain. Since almost all of the analyses were done in 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 soils of Jackson 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.

The primary attributes of the soil quads are soil mapping units from the Order II soil survey of Jackson County, published at a scale of 1:24000. The smallest mapped land area was no less than five 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 Jackson 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, reaction (pH), hydric soils, organic matter, depth to bedrock, major land resource areas (MLRAs), prime farmland, T factor, K factor, flood frequency, slope, and water were generated form the tabular data obtained from the SSURGO certified Digital Soil Survey published by the NRCS. Reclassifying their source material produced the secondary attributes such as Quaternary geology, 8-Digit hydrologic units, landuse/landcover (LULC), and vegetation cover.

SPATIAL DISTRIBUTION OF PRIMARY AND SECONDARY ATTRIBUTES OF SOIL

The primary attribute of soil is the soil mapping unit (Table 5). Soil mapping units can be reclassed to create maps of soil series (Table 6).This report also includes secondary attributes and classifications such as textural class, drainage class, reaction (pH), permeability, runoff, hydric soils, shrink-swell potential, annual flooding, flood duration, soil erodibility (K) factor, soil T factor, organic matter content, depth to bedrock, and soil slope.

Table 5. Areal distribution of soil mapping units in Jackson County (USDA – NRCS 1995).

Mapping units	Acres	Hectares	% Cover
Amagon and Forestdale silt loams	36,308	14,694	8.84
Beulah fine sandy loam, undulating	12,239	4,953	2.98
Bosket fine sandy loam, 0 to 1% slopes	10,310	4,173	2.51
Bosket fine sandy loam, undulating	29,290	11,854	7.13
Crowley silt loam	42,587	17,235	10.37
Crowley and Hillemann silt loams	4,457	1,801	1.08
Dexter silt loam, 0 to 1% slopes	3,311	1,340	0.81
Dexter silt loam, undulating	6,982	2,825	1.70
Dundee silt loam, 0 to 1% slopes	27,570	11,157	6.71
Dexter silt loam, undulating	30,892	12,502	7.52
Egam silt loam	11,061	4,476	2.69
Enders silt loam, 3 to 12% slopes	1,230	498	0.30
Enders stoney silt loam, 12 to 25% slopes	2,955	1,196	0.72
Foley-Calhoun complex	55,304	22,381	13.46
Foley-Calhoun-McCrory complex	29,007	11,739	7.06
Forestdale silty clay loam	11,431	4,626	2.78
Grubbs silt loam	3,957	1,601	0.96
Jackport silty clay loam	35,987	14,564	8.76
Lafe silt loam	1,145	463	0.28
Leadvale silt loam, 1 to 3% slopes	1,190	482	0.29
Leadvale silt loam, 3 to 8% slopes	11,740	4,751	2.86
Leadvale stoney silt loam, 3 to 12% slopes	5,731	2,319	1.40
Linker fine sandy loam, 3 to 8% slopes	1,454	588	0.35
Linker-Hector complex, 12 to 40% slopes	4,741	1,919	1.15
Mountainburg stony fine sandy loam, 3 to 12% slopes	6,444	2,608	1.57
Patterson fine sandy loam	7,211	2,918	1.76
Borrow Pit	62	25	0.02
Gravel Pit	63	25	0.02
Sequatchie loam	1,263	511	0.31
Sharkey silty clay loam	6,582	2,664	1.60
Staser silt loam	3,451	1,396	0.84
Water	4,817	1,949	1.17
TOTAL	410,772	166,236	100.00

Table 6. Scientific names of the major soil series found in Jackson County (USDA – NRCS web site).

Soil series	Scientific family name
Amagon	Fine-silty, mixed, active, thermic Typic Endoaqualfs
Forestdale	Fine, smectitic, thermic Typic Endoaqualfs
Beulah	Coarse-loamy, mixed, thermic Typic Dystrochrepts
Bosket	Fine-loamy, mixed, active, thermic Typic Hapludalfs
Crowley	Fine, smectitic, hyperthermic Typic Albaqualfs
Dexter	Fine-silty, mixed, thermic Ultic Hapludalfs
Dundee	Fine-silty, mixed, active, thermic Typic Endoaqualfs
Egam	Fine, mixed, active, thermic Cumulic Hapludolls
Enders	Clayey, mixed, thermic Typic Hapludults
Grubbs	Fine, mixed, active, thermic Albaquic Hapludalfs
Jackport	Fine, smectitic, thermic Chromic Epiaquerts
Lafe	Fine-silty, mixed, active, thermic Glossic Natrudalfs
Leadvale	Fine-silty, siliceous, thermic Typic Fragiudults
Linker	Fine-loamy, siliceous, thermic Typic Hapludults
Hector	Loamy, siliceous, thermic Lithic Dystrochrepts
Foley	Fine-silty, mixed, active, thermic Albic Glossic Natraqualfs
Calhoun	Fine-silty, mixed, active, thermic Typic Glossaqualfs
McCrory	Fine-loamy, mixed, active, thermic Albic Glossic Natraqualfs
Mountainburg	Loamy-skeletal, siliceous, thermic Lithic
Patterson	Fine-loamy, mixed, active, thermic Typic Endoaqualfs
Sequatchie	Fine-loamy, siliceous, semiactive, thermic Humic Hapludults
Sharkey	Very-fine, smectitic, thermic Chromic Epiaquerts
Staser	Fine-loamy, mixed, active, thermic Cumulic Hapludolls

* active – cation-exchange activity class (0.40 – 0.60 CEC % clay –1)

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 distribution of a single property such as texture, slope, permeability, shrink-swell potential or depth, alone or in limited combinations; maps that show the distribution of soil qualities such as productivity or erodibility; maps of soil forming factors, such as topography, vegetation, or geology (USDA, 1993).

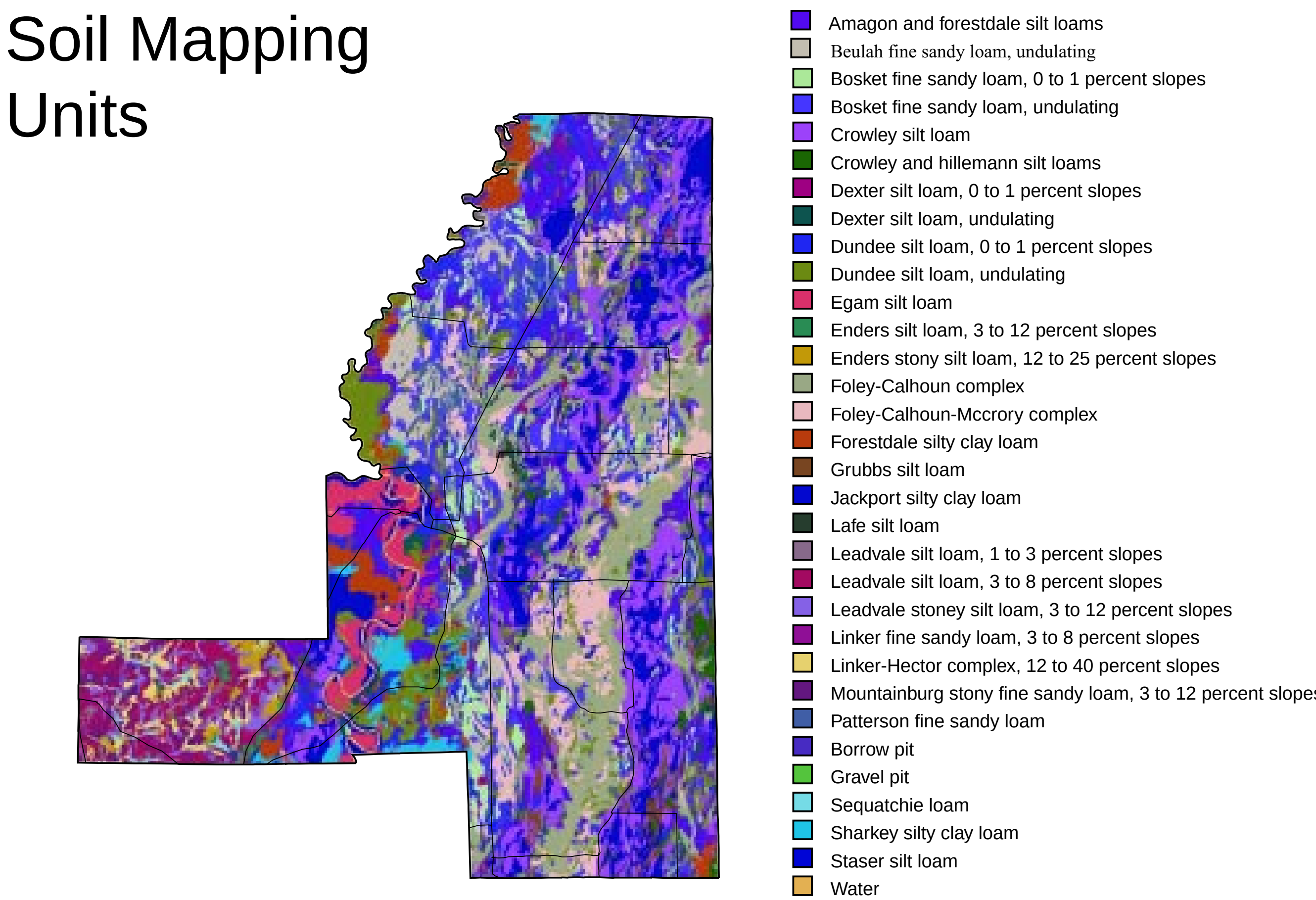

Fig. 10. Areal distribution of soil mapping units.

Five mapping units occupy almost 48% of the land area in Jackson County (Table 6). The most extensive soil mapping unit is the Foley-Calhoun complex with 0 to 1% slopes. This mapping unit occupies about 13.5% of the land area and is poorly drained. When dry, these soils contract and crack, and when wet, they expand and seal over. Runoff is slow and wetness is a severe hazard. Natural chemical fertility of these soils is considered to be high. These soils can be cultivated within a narrow range of water content and in areas not drained, farming operations are delayed for several days after rain. In addition, seedbed preparation is difficult and tilth is difficult to maintain.

Crowley silt loam is the second most extensive soil mapping unit followed by Amagon and Forestdale silt loams, Jackport silty clay loam, and the Dexter silt loam undulating, which complete the top five soil associations in Jackson County. The total land area covered by these four mapping units is almost 49% and they are rarely, if ever, flood prone.

Foley-Calhoun complex, which occupies 20.5% of the land area in Jackson County, occurs primarily along the Cache River and has a low shrink-swell potential. Egam silt loam, Forestdale silty clay loam, Jackport silty clay loam, and Sharkey silty clay loam have moderate shrink-swell potential and permeability is low to moderately low. The "panhandle" of Jackson County contains the only soil association, Sequatchie loam, that is subject to frequent flooding. The Sequatchie loam occupies only 0.3% of the county area and has a low shrink-swell potential. The Egam and Staser silt loams are subject to occasional flooding, have low to moderate shrink-swell potential, and cover about 3.5% of the county.

Surface Textures

Textural class indicates the relative proportion of sand, silt, and clay particles in a given mass of soil. Numerous properties and behavior of soils are dependent on soil texture. The tabular data of surface soil texture were obtained from NRCS. The majority of the soils of Jackson County have silt loam texture at the surface and comprise 65% of the total area of the county (Table 7 and Fig. 11). Soils with a fine sandy loam texture in the surface occupy about 14% of the county and are found primarily in the central part of the county. Soils with silt clay loam texture in the surface are found throughout the county and comprise about 13% of the area. The three textural classes, silty loam, fine sandy loam, and silt clay loam, comprise about 93.7% of Jackson County.

Table 7. Areal distribution of surface textures in Jackson County.

Texture	Acres	Hectares	% Cover
Silt loam	270,189	109,344	65.78
Fine sandy loam	60,504	24,486	14.73
Stony-silt loam	2,955	1,196	0.72
Silty clay loam	53,980	21,853	13.15
Stony-fine sandy loam	16,916	6,846	4.12
Loam	1,263	511	0.31
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,749	166,236	100.00

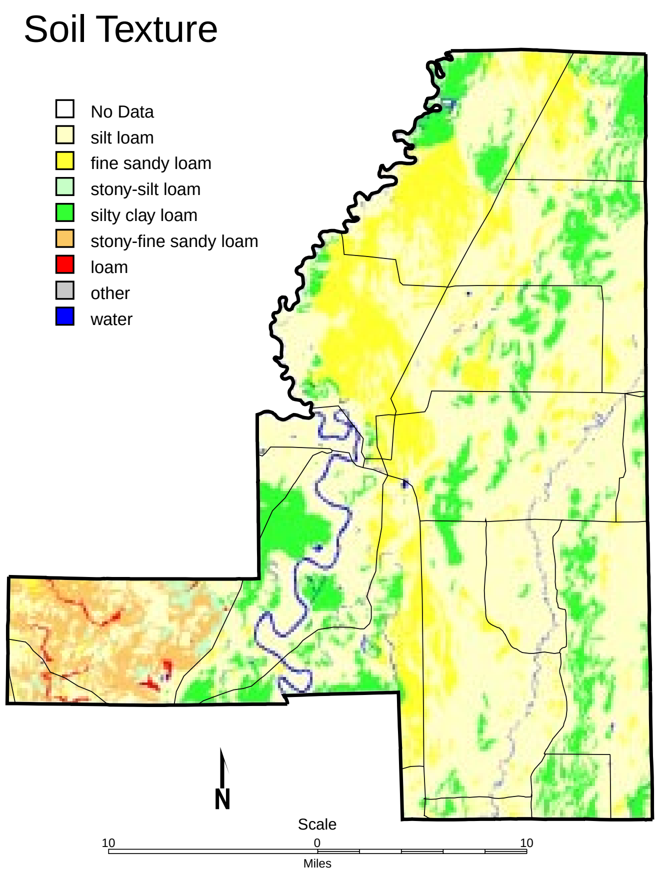

Fig. 11. Areal distribution of surface textures.

Soil Drainage Classes

The drainage classes of the soils of Jackson County vary from poorly drained to somewhat excessively drained (Fig. 12). Poorly drained soils occupy about 54% or 221,662 acres (89,705 ha) of the total area and are found all over the county except in the panhandle (Table 8). Most of the soils that are classified as well-drained are found in the panhandle of Jackson County. The well-drained soils account for 17% of the total area. Somewhat poorly drained soils account for 16% of the county and are found throughout Jackson County. The poorly drained soils are considered to be better suited for wet crop production, such as rice, whereas the well-drained soils are better suited for dry crop production such as soybeans. Patches of somewhat excessively drained soils are found mostly in the central part of the county and comprise only 3% of the total area.

Table 8. Areal distribution of soil drainage classes in Jackson County.

Drainage class	Acres	Hectares	% Cover
Poor	221,663	89,706	53.96
Somewhat excessive	12,239	4,953	2.98
Well drained	71,430	28,907	17.39
Somewhat poor	69,629	28,179	16.95
Moderately well	30,866	12,491	7.51
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,769	166,236	100.00

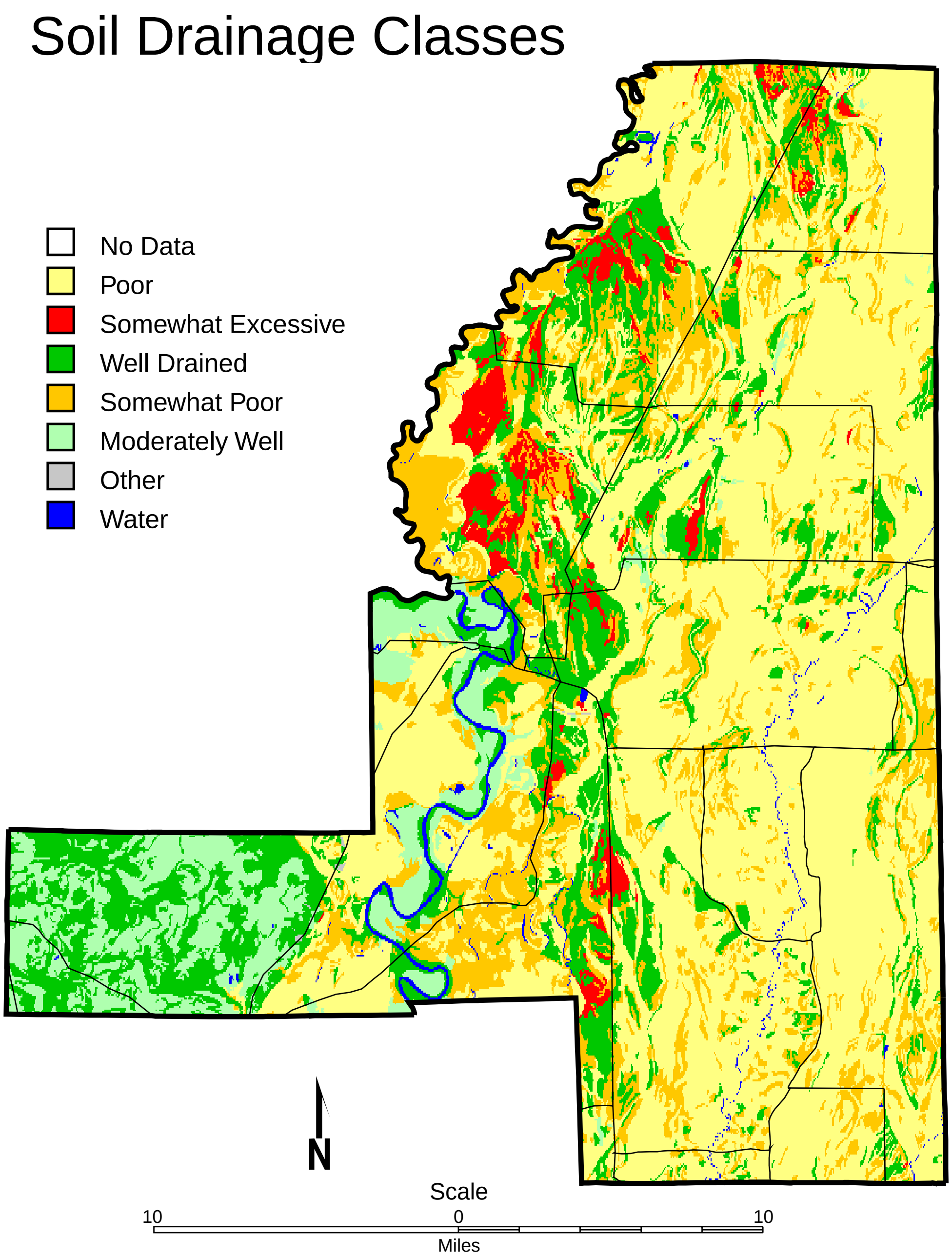

Fig. 12. Areal distribution of soil drainage classes.

Reaction (pH)

Reaction is the degree of acidity or alkalinity of a soil expressed as pH. Soil reaction affects nutrient availability as well as crop yield. A soil pH value of less than 7.0 is considered as acidic soil, whereas, pH values greater than 7.0 are alkaline soils. The tabular data for soil reaction were obtained from the NRCS and represent the natural pH of the surface horizon. Almost one-fourth of Jackson County has soils having moderate to strong acid pH. (Fig. 13). The most abundant soil reaction class is the moderate to strong acid. Soils with neutral pH comprises 24% of the county and typically borders the Cache River. Strong acid to neutral reaction covers approximately 21% of the county followed next by slightly to very strong acid reaction which covers 20% of the county. Soil reaction in the panhandle of Jackson County ranges from moderately to very strong and covers about 9% of the county. The remaining reaction classes consist of only 25.9% of Jackson County (Table 9).

Table 9. Areal distribution of reaction (pH) in Jackson County.

Soil reaction	Acres	Hectares	% Cover
Strong-very strong acid (4.5 - 5.5)	11,644	4,712	2.84
Moderately-very strong acid (4.5 - 6)	25,109	10,162	6.12
Slightly-very strong acid (4.5 - 6.5)	83,251	33,691	20.29
Moderately-strong acid (5.1 - 6)	99,609	40,311	24.27
Slightly-strong acid (5.1 - 6.5)	80,523	32,587	19.62
Strong acid-Neutral (5.1 – 7.3)	84,230	34,087	20.52
Neutral-moderately acid (5.6 - 7.3)	14,514	5,874	3.54
Moderately alkaline-moderately acid (5.1 - 8.4)	6,583	2,664	1.60
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,405	166,088	100.00

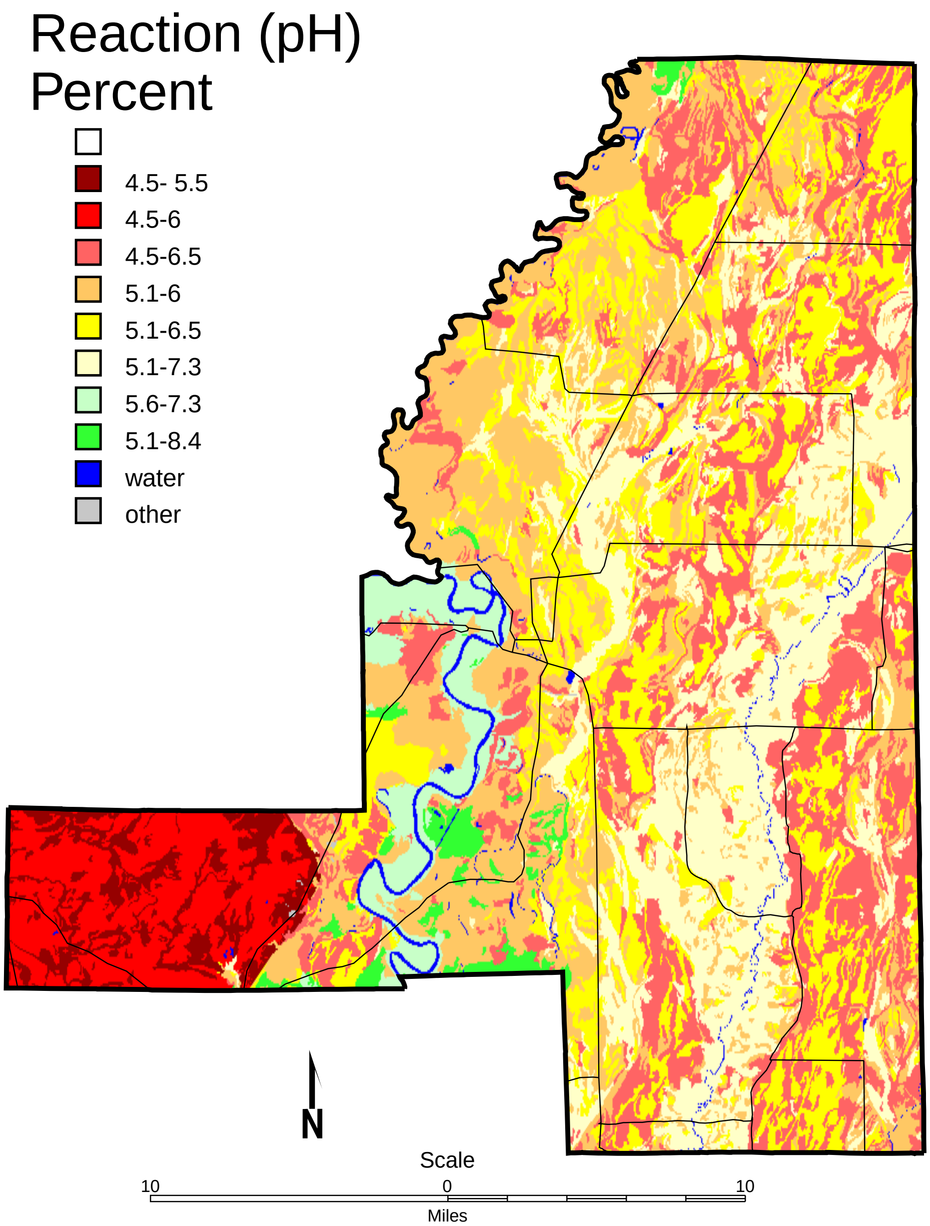

Fig. 13. Areal distribution of soil reaction (pH).

Soil Permeability

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

About 56% of the total land area in Jackson county has moderately high permeability, i.e. 0.6 to 2 in/hour, and this permeability is found all over the county (Table 10). Soils with low permeability, 0.2 to 0.6 in/hour, cover 27% of the total area and are found in patches throughout the county as well (Fig. 14). Soils with moderately high permeability of 2 to 6 in/hour cover about 16% of the county and occur in the central area of Jackson County.

Table 10. Areal distribution of soil permeability in Jackson County.

Permeability (in/hour)	Acres	Hectares	% Cover
0.2 to 0.6	112,104	45,368	27.29
0.6 to 2	228,228	92,363	55.56
2 to 6	65,494	26,505	15.94
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,768	166,236	100.00

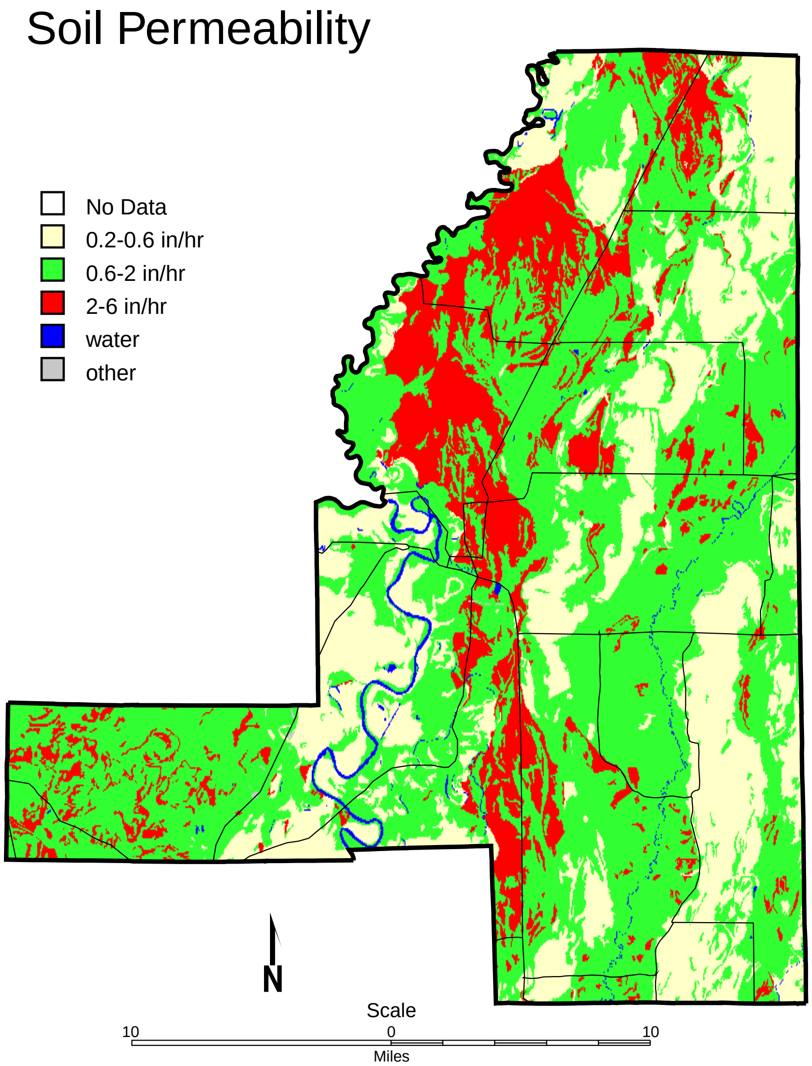

Fig. 14. Areal distribution of soil permeability.

Soil Runoff Classes

Surface runoff refers to the loss of water from an area by flow across 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 Jackson County has soils with low or negligible runoff, which account for approximately 40% and 42% of the total area, respectively (Table 11). Compared to the eastern part, the western part of the county has a higher distribution of soils in the medium to high runoff category that comprises almost 9.5% of the total area (Fig. 15).

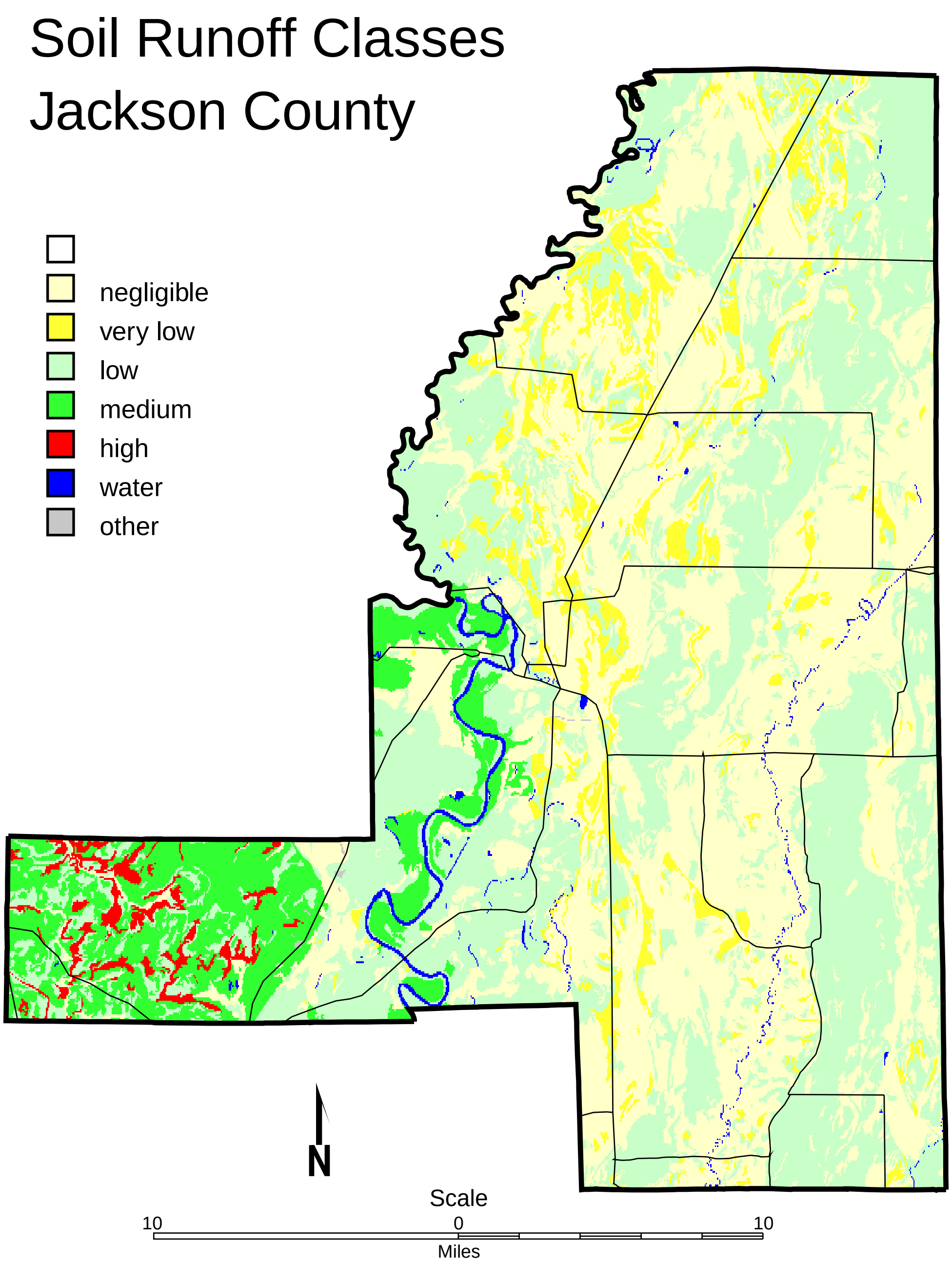

Fig. 15. Areal distribution of soil runoff classes.

Table 11. Areal distribution of soil runoff classes in Jackson County.

Runoff class	Acres	Hectares	% Cover
Negligible	175,385	70,977	42.70
Very low	29,290	11,854	7.13
Low	162,240	65,658	39.50
Medium	34,169	13,828	8.32
High	4,741	1,919	1.15
Water	4,817	1,949	1.17
Other	125	51	0.03
TOTAL	410,767	166,236	100.00

Potential Hydric Soils

A hydric soil is a soil that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part of the profile. Hydric soils develop under sufficiently wet conditions to support the growth and regeneration of hydrophytic vegetation.The determination of hydric soils require an on-site evaluation. Some hydric soils may occur within the indicated soil series.The percent 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 Jackson County that are in the potential hydric category (Table 12) occupy about 54% of the total area. Spatially, the eastern half of Jackson County is more densely covered with hydric soils than in the western half (Fig. 16).

Table 12. Areal distribution of potential hydric soils in Jackson County.

Category	Acres	Hectares	% Cover
Potential hydric soils	221,662	89,706	53.96
Not hydric	184,164	74,530	44.83
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,768	166,236	100.00

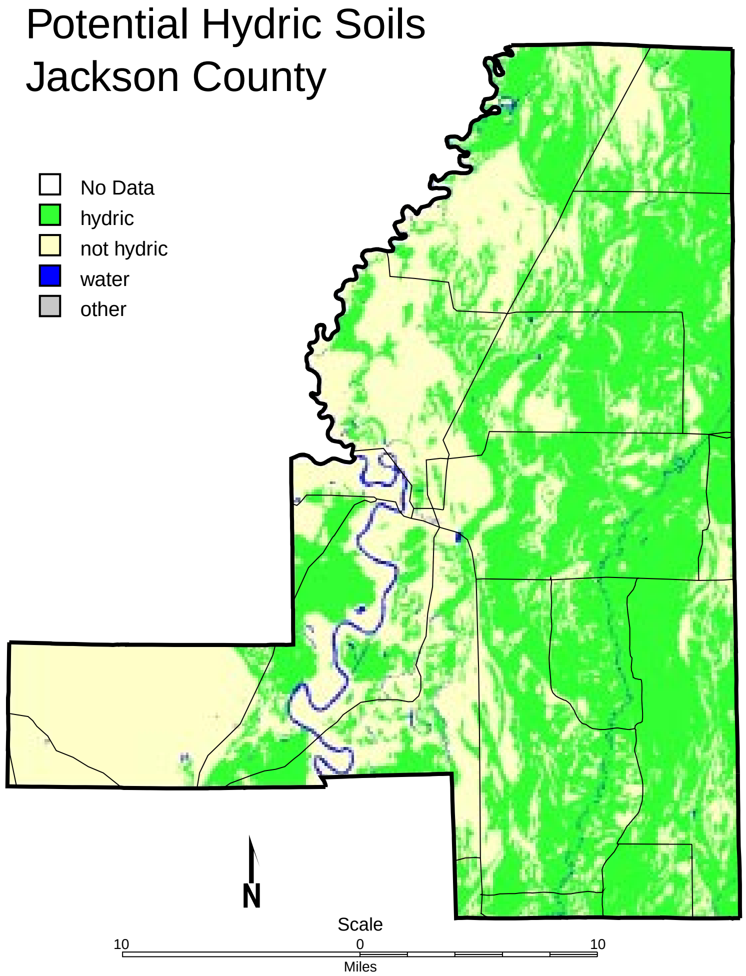

Fig. 16. Areal distribution of potential hydric soils.

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 Jackson County has low shrink-swell potential (Table 13). The soils with low shrink-swell potential are found throughout the county and cover about 83% of the total county area. Soils around the White River show moderate shrink-swell potential. The moderate shrink-swell potential soils cover about 16% of the total area in Jackson County (Fig. 17). No appreciable areas having high shrink-swell soils are found in this county.

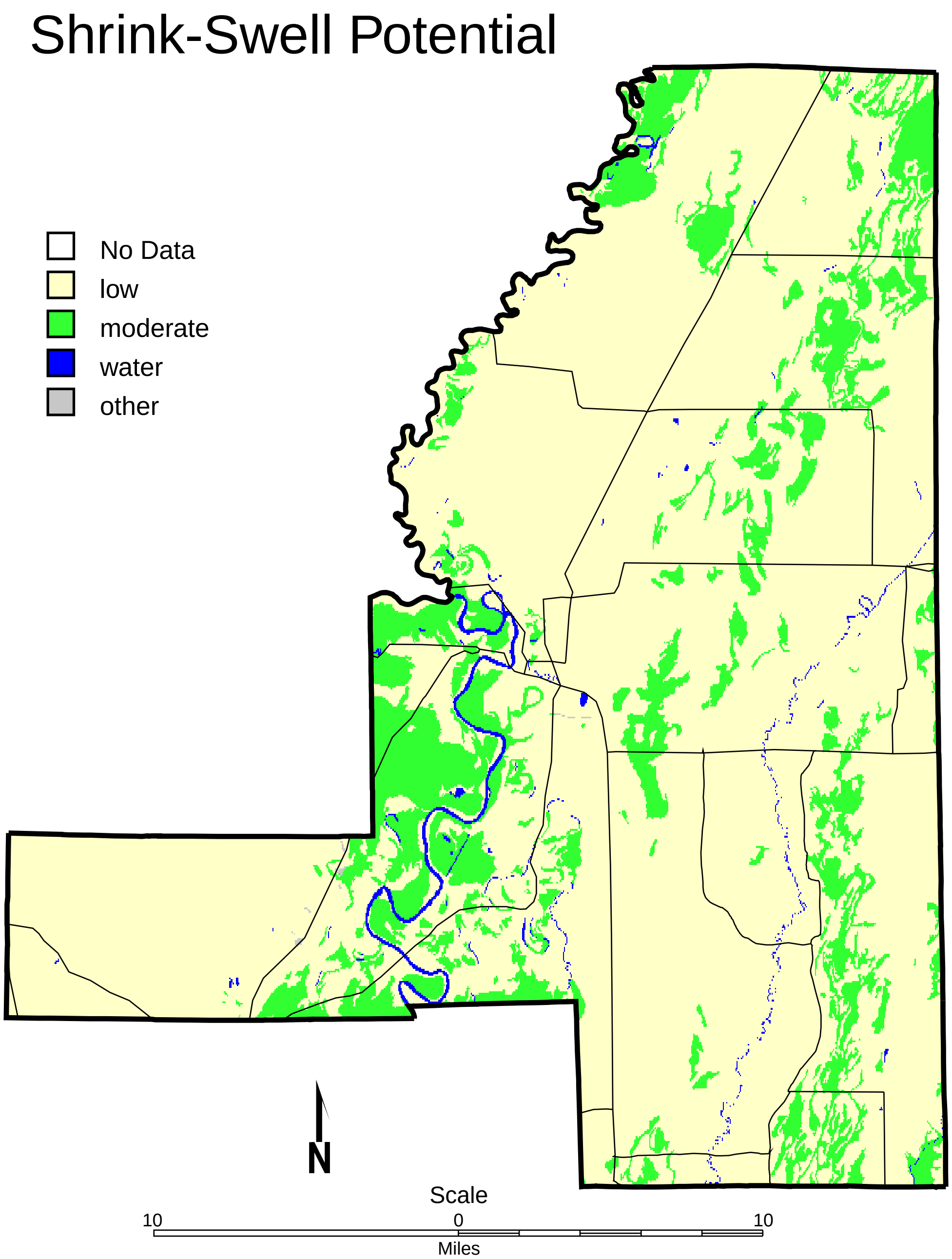

Fig. 17. Areal distribution of soil shrink-swell potential.

Table 13. Areal distribution of soil shrink-swell potential in Jackson County.

Shrink-swell potential	Acres	Hectares	% Cover
Low	340,766	137,906	82.96
Moderate	65,060	26,330	15.84
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,768	166,236	100.00

Flood Frequency

Flooding refers to the temporary inundation by flowing water. The flood frequency of Jackson County can be classified into four categories: none (no reasonable possibility), rare (0 to 5% chance of annual flooding), occasional (5 to 50%) and frequent (> 50%). A majority (83%) of Jackson County show no (none) possibility of flooding (Table 14). Rare flooding frequency occurs in 11% of the total area in small patches throughout the county. Occasional flooding is primarily restricted to the areas adjacent to the White River and its adjacent streams which occupy 3% of Jackson County. The only areas with frequent flooding (totaling only 0.31%) are restricted to the panhandle in areas of high relief and adjacent to streams (Fig. 18).

Table 14. Areal distribution of flood frequency in Jackson County.

Flood frequency	Acres	Hectares	% Cover
None	342,314	138,533	83.34
Rare	47,738	19,319	11.62
Occasional	14,511	5,873	3.53
Frequent	1,263	511	0.31
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,768	166,236	100.00

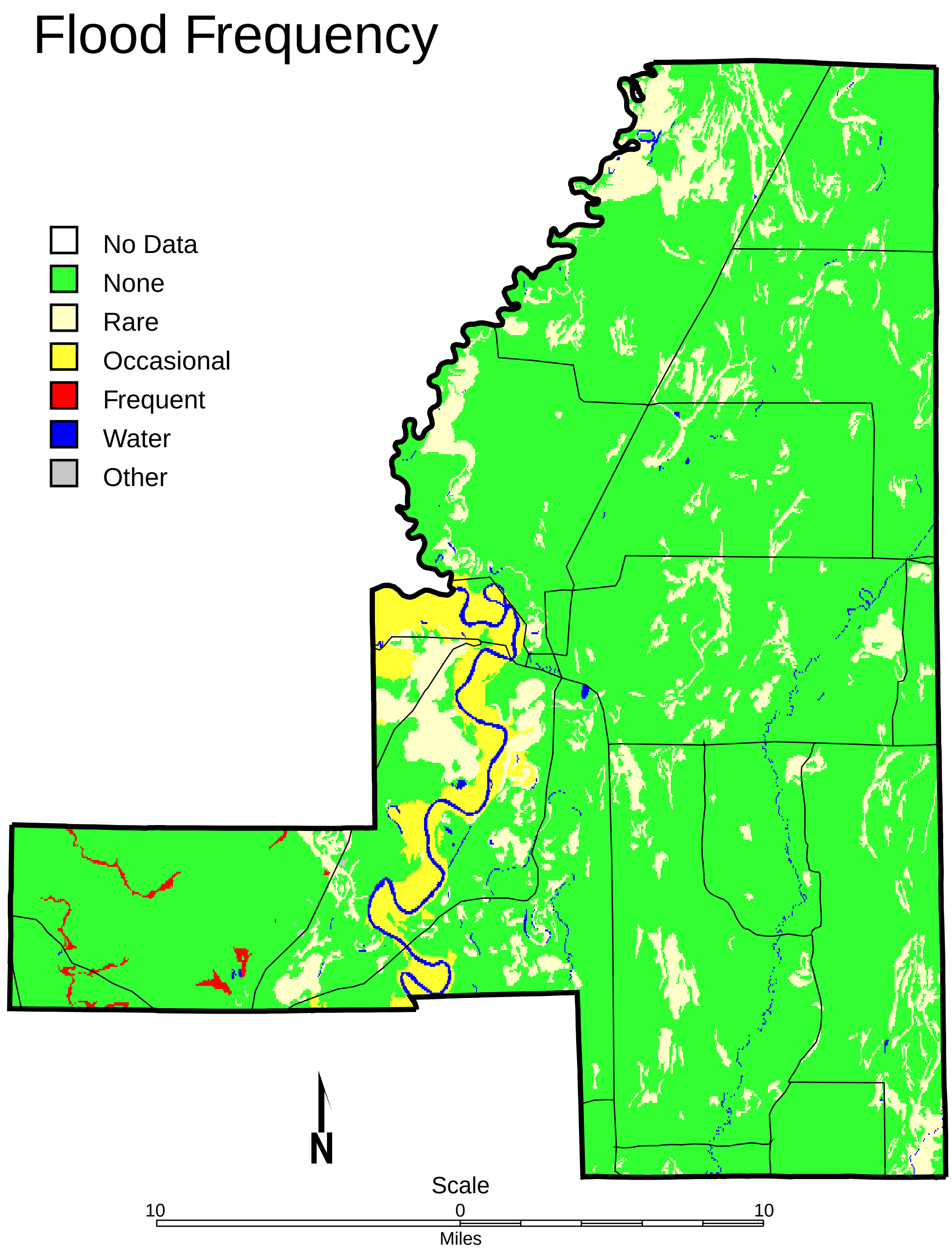

Fig. 18. Areal distribution of flood frequency.

Soil Erodibility (K) Factor

The soil K factor is used in the Universal Soil Loss Equation (USLE) as a relative index of the susceptibility of bare, cultivated soil to particle detachment and transport by rainfall. The higher the K factor, the greater the susceptibility of soil to erosion. The tabular data by soil series were obtained from NRCS. Small patches of soil with a low K factor of 0.20 are found in the northwestern part of the county and occupy only 3% of the total area (Table 15). About 51% of Jackson County has soils with a K factor of 0.43 and are uniformly distributed in the county. Soils in the White River area tend to have a K value of 0.32, which cover about 4% of the total area. Soils with the high K factor of 0.49 cover 12% of the total area and are found mainly in the eastern part of the county. Small patches of this highly erodible soil are also found at the eastern margin of the panhandle (Fig. 19).

Table 15. Areal distribution of soil K factor in Jackson County.

K Factor	Acres	Hectares	% Cover
0.20	12,239	4,953	2.98
0.24	39,601	16,026	9.64
0.28	19,850	8,033	4.83
0.32	15,774	6,384	3.84
0.37	58,185	23,547	14.16
0.43	208,033	84,190	50.64
0.49	52,146	21,103	12.69
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,770	166,236	100.00

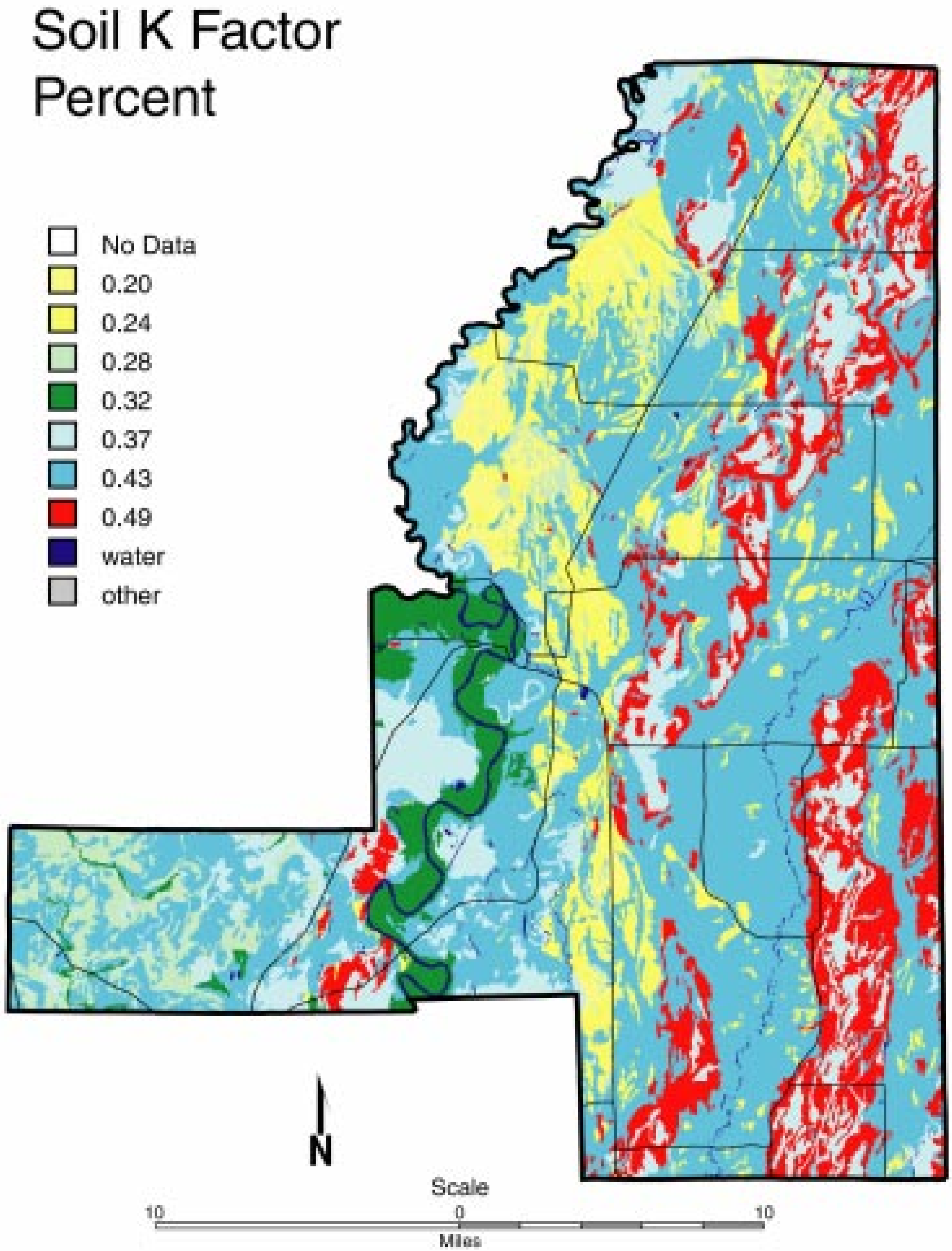

Fig. 19. Areal distribution of soil K factor.

Soil Tolerance (T) Factor

This is the soil loss tolerance factor, which can also be used with the USLE model. The data for the T factor by soil series were obtained from NRCS. It is defined as the maximum rate of annual soil erosion that will permit economically sustainable crop productivity. A T value of 5 ton/acres/year covers almost all of Jackson County with the exception of the panhandle area, which is out of the Mississippi River delta region (Table16 and Fig. 20).

Table 16. Areal distribution of soil T factor (tons/acre/year) in Jackson County.

Description	Acres	Hectares	% Cover
1 Tfact	6,444	2,608	1.57
2 Tfact	7,340	2,970	1.79
3 Tfact	22,845	9,245	5.56
5 Tfact	369,197	149,412	89.88
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,768	166,235	100.00

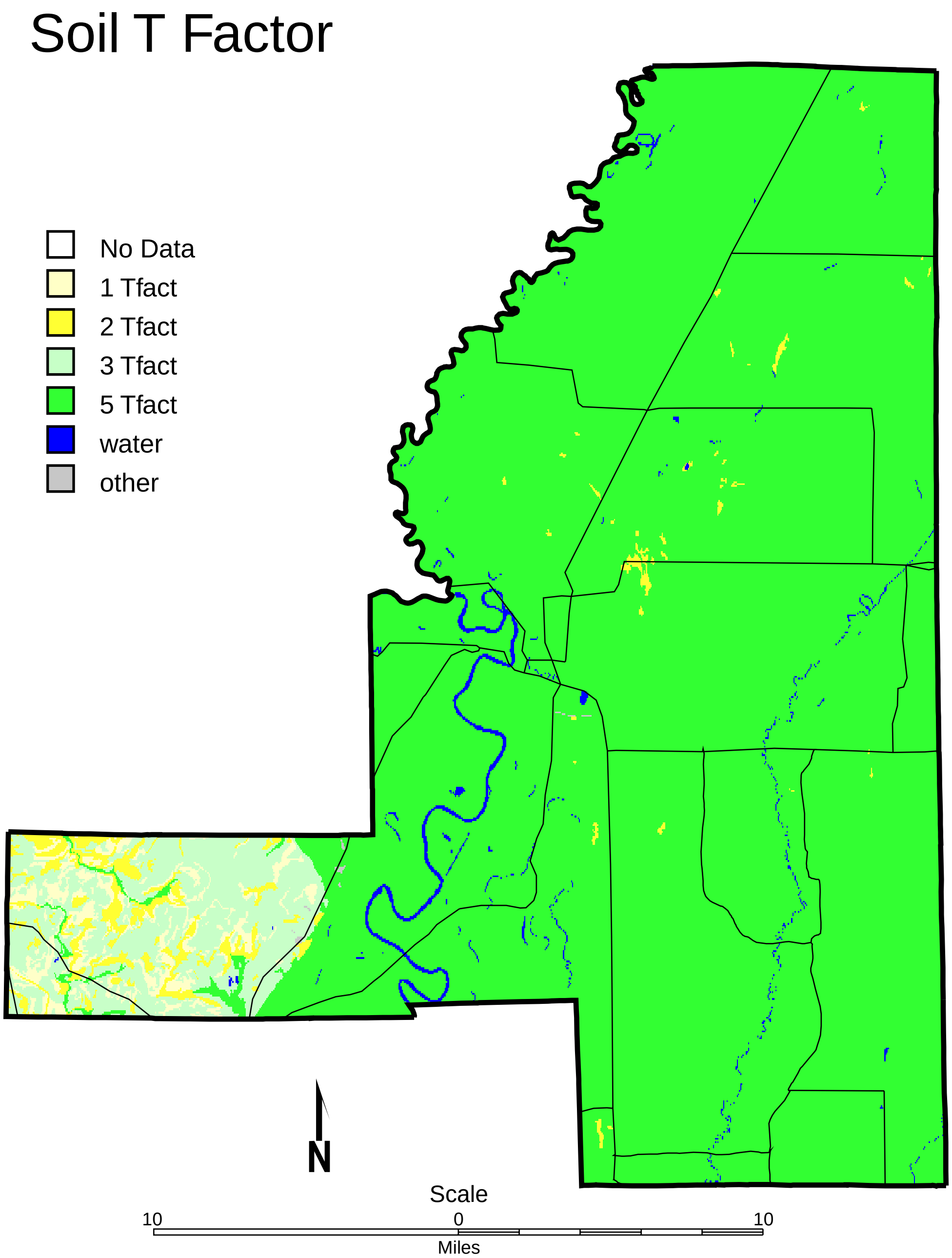

Fig. 20. Areal distribution of soil T factor.

Estimated Surface Soil Organic Matter

The presence of organic matter affects the structure and color of the soils as well as the retention of water, and inorganic and organic molecules such as nutrients and pesticides. These data were obtained from NRCS where organic matter was calculated on a weight percent basis. Organic matter contents in the range of 0.5 to 2% occur in Jackson County and cover about 70% of the total area (Table 17). Soils with surface organic matter contents ranging between 1 to 3% are found in vertical strips throughout the county and occupy about 11% of the total area. Approximately 2% of Jackson County has soils with surface organic matter contents between 0.5 to 4.0% and are found primarily on the western part of the county (Fig. 21).

Table 17. Areal distribution of estimated soil organic matter (weight by %) in Jackson County.

Organic matter	Acres	Hectares	% Cover
0.5 - 2.0	287,141	116,204	69.90
0.5 - 3.0	13,406	5,425	3.26
0.5 - 4.0	6,582	2,664	1.60
1.0 - 2.0	36,308	14,694	8.84
1.0 - 3.0	43,694	17,683	10.64
2.0 - 4.0	18,696	7,566	4.55
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,769	166,236	100.00

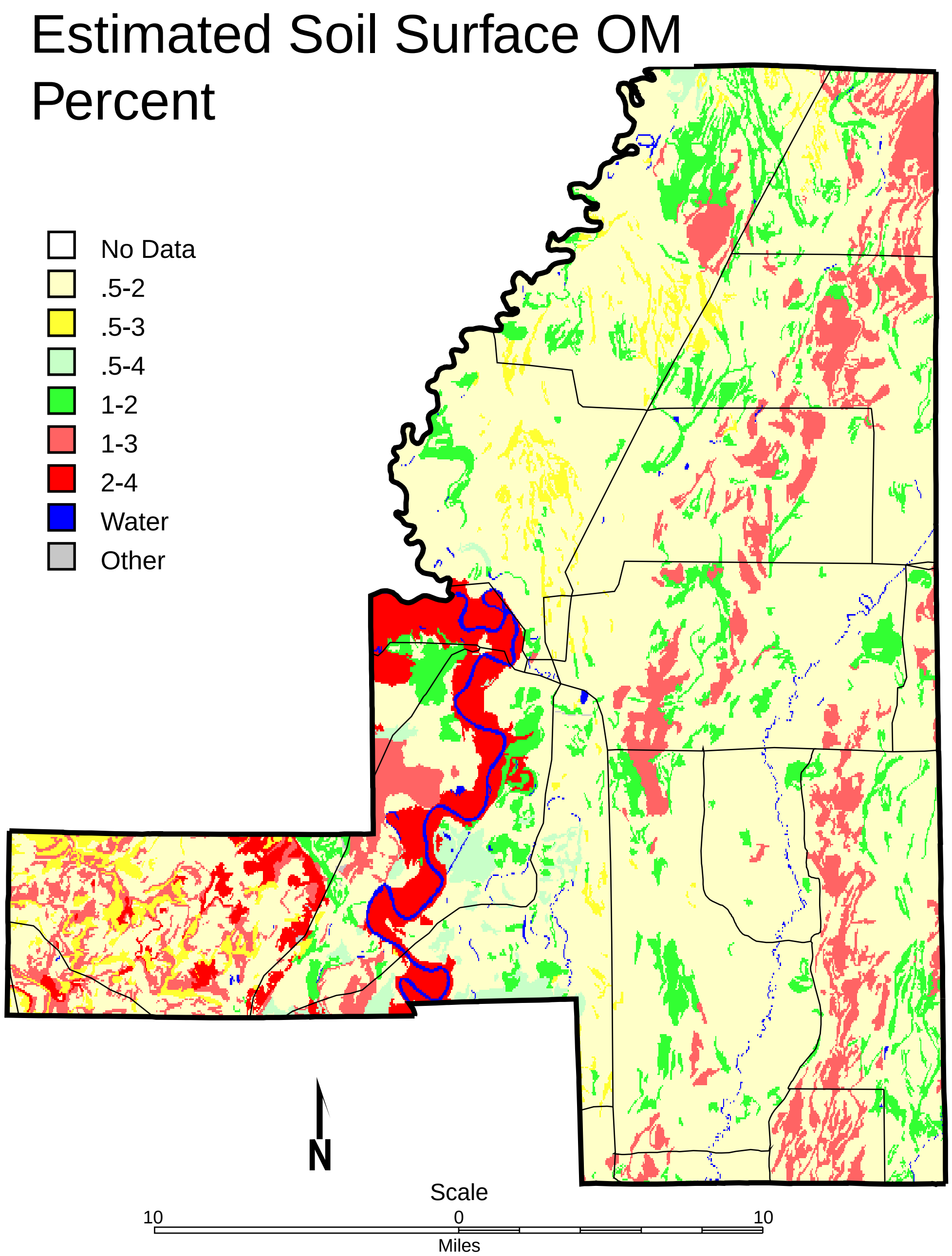

Fig. 21. Areal distribution of estimated surface soil organic matter.

Depth to Bedrock

This refers to the depth from the surface of the soil to bedrock (in-place hard). The data were obtained from NRCS. The majority of Jackson County is characterized by a depth to bedrock deeper then 60 inches (Table 18 and Fig. 22). This is mostly due to the extensive alluvial deposits that represent the past material in the soil formation of the delta region of the county. The panhandle region of the county, which is out of the Mississippi River delta, is characterized by a depth to bedrock that ranges from 10 to 48 inches. This is due to its location of the sandstone-capped Boston Mountains.

Table 18. Areal distribution of depth to bedrock in Jackson County.

Depth to bedrock, inches	Acres	Hectares	% Cover
10	4,741	1,919	1.15
12	6,444	2,608	1.57
20	7,184	2,907	1.75
40	4,185	1,694	1.02
48	12,930	5,233	3.15
60	370,342	149,875	90.16
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,768	166,236	100.00

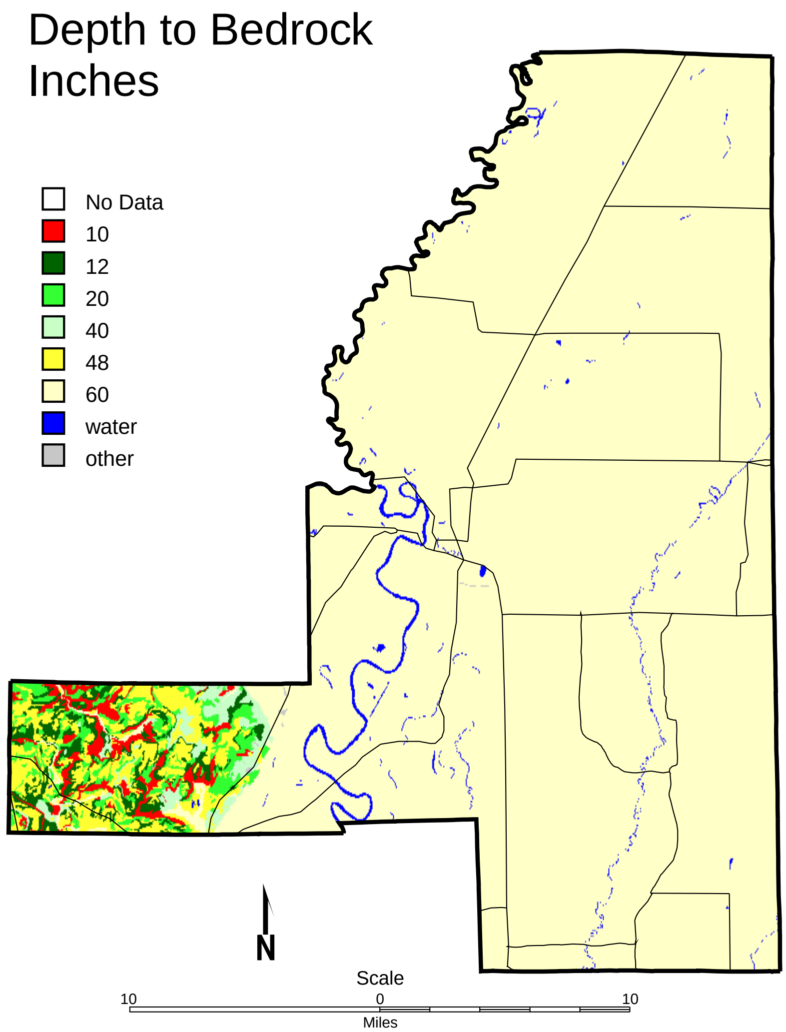

Fig. 22. Areal distribution of depth to bedrock.

Soil Slope

Land surface configuration includes slope. This indicates the surface slope of a soil component within a mapping unit. The slope data for each mapping unit were obtained from NRCS (Fig. 23). Soils with a slope of 0 to 1% comprise 67% of Jackson County and are found across the county with the exception of the western panhandle (Table 19). Soil slopes between 0 to 0.2% are found along the White River, which covers only 0.84% of the total land area. The land area along the White River has slopes of 0 to 3% and covers 19% of the total area.

The soil slope category of 3 to 8% covers 3.2% of the total area and is found in small patches in the panhandle. All of the soils with a slope greater than 1% occur in this region as well as covering about 10% of the total area.

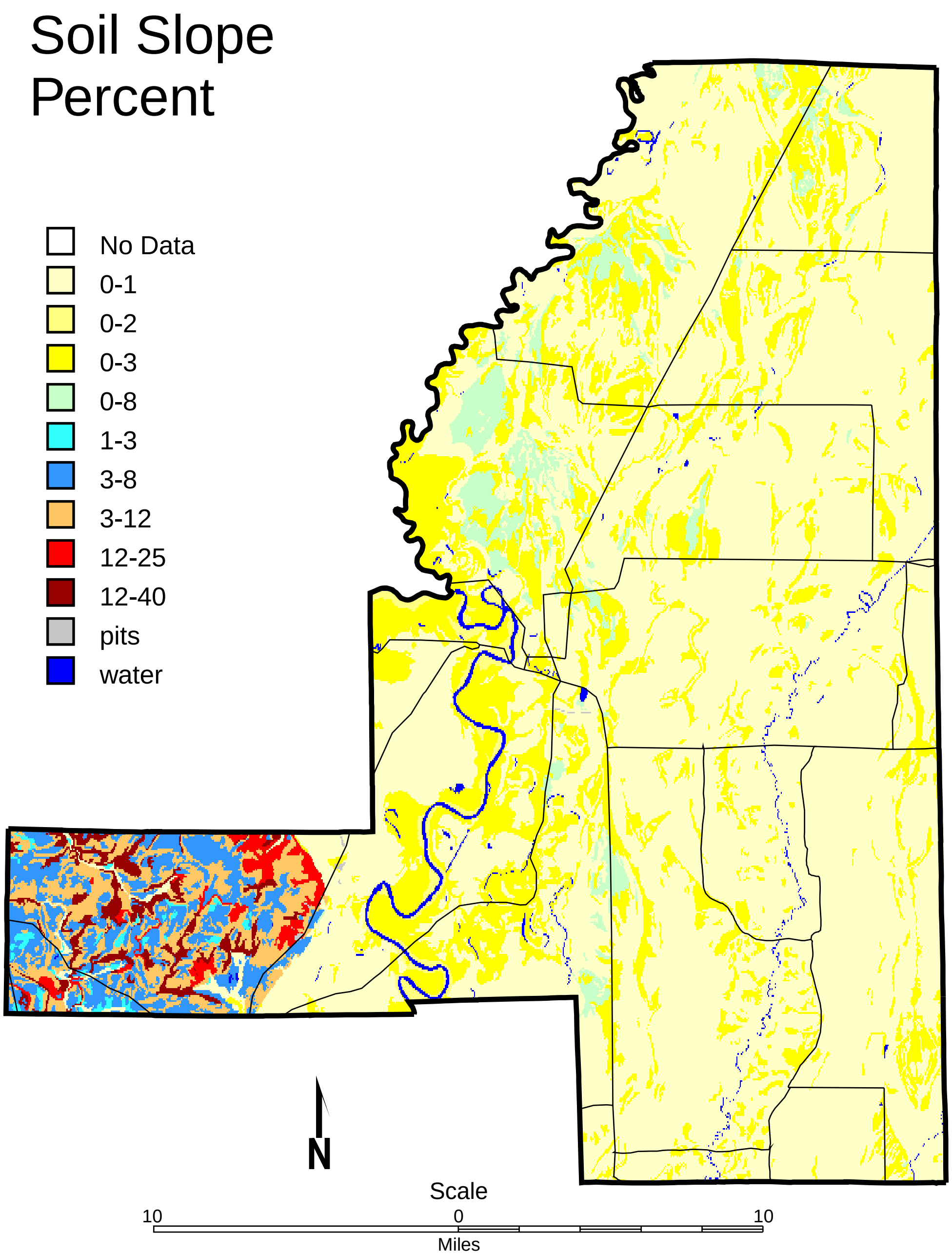

Fig. 23. Areal distribution of soil slope (in percent).

Table 19. Areal distribution of soil slope (in percent) in Jackson County.

Soil slope, %	Acres	Hectares	% Cover
0 to 1	276,075	111,726	67.27
0 to 2	3,451	1,397	0.84
0 to 3	78,214	31,653	19.06
0 to 8	12,233	4,951	2.98
1 to 3	1,190	482	0.29
3 to 8	13,196	5,340	3.22
3 to 12	13,407	5,426	3.27
12 to 25	2,955	1,196	0.72
12 to 40	4,742	1,919	1.16
Other	125	51	0.03
Water	4,817	1,949	1.17
TOTAL	410,405	166,090	100

Prime Farmland

This is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops. It must be available for these uses. Land considered as prime farmland has the unique combination of 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 long periods of time as they either do not flood frequently or are protected from flooding (USDA 1967).

The areal distribution of prime farmland in Jackson County is presented in Table 20. Most of the prime farmland is found in the Mississippi River Alluvial Plain region except along the Cache River (Fig. 24). Prime farmland with restriction 3 is found in patches throughout the delta region of Jackson County. Prime farmland with restriction 3 applies only to areas protected from flooding or not frequently flooded during the growing season. Prime farmland with restriction 2 only applies to areas where only the drained area is considered prime farmland. Approximately half of the county (44%) has prime farmland without any restrictions.

Table 20. Areal distribution of prime farmland in Jackson County.

Prime farmland	Acres	Hectares	% Cover
Not prime farmland	119,484.25	48,354.61	29.11
Prime farmland	181,289.33	73,366.79	44.17
Where drained with restriction 2	50,371.01	20,384.87	12.27
Where drained with restriction 3	54,318.38	21,982.35	13.24
Other	125.19	50.66	0.03
Water	4817.03	1949.42	1.17
TOTAL	410,405.19	166,088.70	100

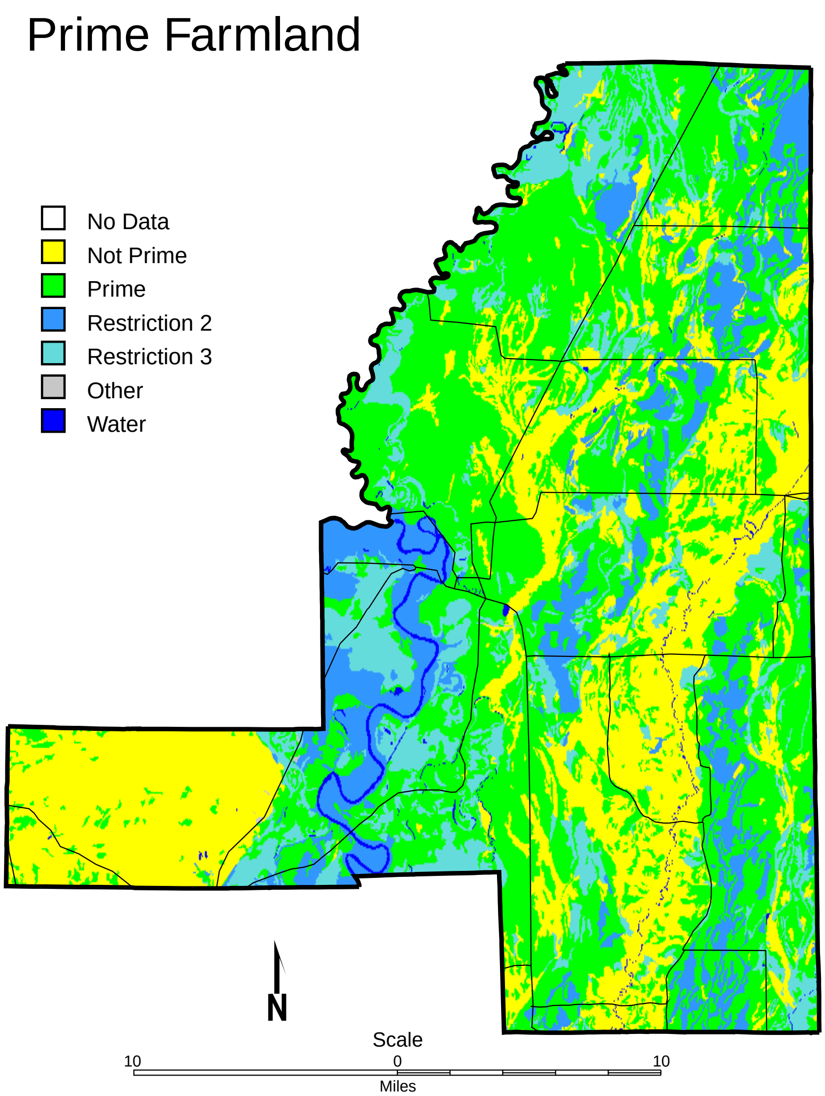

Fig. 24. Areal distribution of prime farmland.

RELATIONSHIP BETWEEN CURRENT LANDUSE AND SOIL PROPERTIES

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

Drainage and Landuse

The majority of the agricultural land in Jackson County coincides with poorly drained soils, followed by well-drained soils. About 30,514 acres of poorly drained soils coincides with the forests (Table 21). Most of the urban areas coincide with well-drained soils.

Table 21. Mutual occurrence of drainage categories and landuse in acres.

	Landuse categories*							
Drainage categories	0	1	2	3	4	5	Rows with 0	Rows without 0
Poor	664	30,514	2,105	184,651	148	3,273	221,354	220,690
Somewhat excessive	1	455	257	11,468	30	22	12,233	12,232
Well drained	58	16,170	4,681	49,521	390	603	71,422	71,364
Somewhat poor	65	5,571	279	62,745	375	548	69,582	69,517
Moderately well	12	10,322	10,087	10,082	0.44	369	30,872	30,860
Other	0.00	27	35	49	0.00	14	125	125
Water	0.00	752	32	302	10	3,721	4,817	4,817
Total without 0	800	63,811	17,476	318,817	953	8,549	410,405	409,605

* 0:No Data, 1:Forest, 2:Pasture/prairie, 3:Agriculture, 4:Urban, 5:Water

Drainage and Prime Farmland

The majority of prime farmlands coincide with somewhat poorly drained soils followed by well-drained soils (Table 22). Prime farmland with restriction 2 coincides with somewhat poorly drained soils. Most of the non-prime farmlands coincide with poorly drained soils. All of the prime farmlands with restriction 3 coincide with poorly drained soils. Restriction 3 implies that only areas that are either protected from flooding or not frequently flooded during the growing season are prime farmland.

Table 22. Mutual occurrence of drainage categories and prime farmland in acres.

	Drainage categories*							
Prime farmland categories	1	2	3	4	5	6	7	Rows without 0
Not Prime farmland	84,230	0.00	16,636	0.00	18,619	0.00	0.00	119,484
Prime	46,949	12,233	51,335	69,582	1,190	0.00	0.00	181,289
Prime with restriction 2	35,857	0.00	3,451	0.00	11,063	0.00	0.00	50,371
Prime with restriction 3	54,318	0.00	0.00	0.00	0.00	0.00	0.00	54,318
Other	0.00	0.00	0.00	0.00	0.00	125	0.00	125
Water	0.00	0.00	0.00	0.00	0.00	0.00	4,817	4,817
Total without 0	221,354	12,233	71,422	69,582	30,872	125	4,817	410,405

* 1: Poor, 2:Somewhat excessive, 3:Well drained, 4:Somewhat poor, 5:Moderately well, 6:Other, 7:Water

Runoff and Landuse

Most of the agricultural land coincides with negligible runoff followed by low runoff. The majority of urban land coincides with negligible runoff as well. The land in pasture/prairie coincides most strongly with medium runoff and covers 10,640 acres (Table 23).

Table 23. Mutual occurrence of runoff categories and landuse in acres.

	Runoff categories*						
Landuse categories	1	2	3	4	5	6	7
0: No data	481	41	279	0	0	0	0
1: Evergreen Forest	77	0.0	510	1,137	437	2	0
2:Deciduous Forest	25,546	935	15,194	6,517	1,316	748	22
3:Mixed Forest	364	0.0	2,527	6,234	2,240	1	4
4: Pasture/prairie	2,174	151	3,693	10,640	749	32	35
5: Agriculture	144,037	27,880	137,269	9,280	0	302	49
6: Urban	605	197	139	0	0	10	0
7: Water	1,968	74	2,404	367	0	3,721	14
Total with 0	175,252	29,280	162,018	34,179	4,747	4,822	131
Total without 0	174,771	29,239	161,739	34,179	4,747	4,822	131

* 1:Negligible, 2:Very low, 3:Low, 4:Medium, 5:High, 6:Water, 7:Other

Runoff and Prime Farmland

The majority of the prime farmland with restriction 2 coincide with soils that have low runoff followed by soils with a medium runoff (Table 24). Restriction 2 implies that only drained areas are prime farmland. Most of the prime farmland coincides with low runoff. The majority of the prime farmlands with restriction 3 coincide with negligible runoff category followed by low runoff category.

Table 24. Mutual occurrence of runoff categories and prime farmland in acres.

	Runoff categories*						
Prime farmland categories	1	2	3	4	5	6	7
1: Not Prime	86,638	0	6,445	21,659	4,742	0	0
2: Prime	52,313	29,279	98,244	1,454	0	0	0
3: Prime with restriction 2	0	0	39,309	11,063	0	0	0
4: Prime with restriction 3	36,302	0	18,016	0	0	0	0
5: Other	0	0	0	0	0	0	125
6: Water	0	0	0	0	0	4,817	0
Total	175,254	29,281	162,017	34,180	4,747	4,823	132

* 1:Negligible, 2:Very low, 3:Low, 4:Medium, 5:High, 6:Water, 7:Other

Potential Hydric Soils and Landuse

Most of the agricultural landuse of Jackson County coincides with the soils that are not hydric. Most of the pasture/prairie landuse are found with potential hydric soils. The majority of urban land, however, coincides with not hydric soils (Table 25).

Table 25. Mutual occurrence of potential hydric soils categories and landuse in acres.

	Potential hydric soils*				
Landuse categories	1	2	3	4	Rows without 0
0: No data	664	136	0.00	0.00	0.00
1: Forest	8	2,152	2	0.00	2,163
2: Pasture/prairie	30,462	19,044	748	22	50,277
3: Agriculture	43	11,322	1	4	11,371
4: Urban	2,105	15,304	32	35	17,476
5: Water	184,651	133,815	302	49	318,817
Total with 0	221,354	184,109	4,817	125	125
Total without 0	220,690	183,973	4,817	125	125

*1:Potential hydric, 2:Not hydric, 3:Water, 4:Other

Potential Hydric Soils and Prime Farmland

The majority of prime farmland coincide with the category not hydric soils (Table 26). The potential hydric soils that are prime farmland contain 46,949 acres. Prime farmland with restriction 3 coincide with potential hydric soils followed by prime farmland with restriction 2.

Table 26. Mutual occurrence of potential hydric soils categories and prime farmland in acres.

	Potential hydric soils				
Prime farmland categories	1	2	3	4	Rows without 0
1: Not Prime	84,230	35,255	0.00	0.00	119,484
2: Prime	46,949	134,341	0.00	0.00	181,289
3: Prime with restriction 2	35,857	14,514	0.00	0.00	50,371
4: Prime with restriction 3	54,318	0.00	0.00	0.00	54,318
5: Other	0.00	0.00	0.00	125	125
6: Water	0.00	0.00	4,817	125	4,817
Total without 0	221,354	184,109	4,817	125	410,405

* 1:Potential hydric, 2:Not hydric, 3:Water, 4:Other

Soil Permeability and Landuse

The majority of soils with a permeability of 0.2 to 0.6 in/hour coincide with agriculture followed by forest (Table 27). The majority of the soils with 2.0 to 6.0 in/hour permeability also coincide with agriculture.

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

	Landuse categories*							
Permeability categories	0	1	2	3	4	5	Rows with 0	Rows without 0
1: 0.2 - 0.6 in./hr	225	10,316	600	98,747	57	1,940	111,884	111,660
2: 0.6 - 2.0 in./hr	533	45,491	14,295	164,556	510	2,717	228,101	227,568
3: 2.0 - 6.0 in./hr	43	7,226	2,514	55,163	375	157	65,478	65,435
4: Water	0.00	752	32	302	10	3,721	4,817	4,817
5: Other	0.00	27	35	49	0.00	14	125	125
Total without 0	800	63,032	17,409	318,465	942	4,814	405,463	404,663

0:No data, 1:Forest, 2:Pasture/prairie, 3:Agriculture, 4:Urban, 5:Water

Soil Permeability and Prime Farmland

Most of the prime farmland coincides with soil permeability of 0.6 to 2.0 in/hour (Table 28). Almost all of the non-prime farmland coincides with the permeability category 0.6 to 2.0 in/hour. Most of the prime farmland with restriction 2 coincides with 0.2 to 0.6 in/hour followed by permeability of 0.6 to 2.0 in/hour. The majority of the prime farmland with restriction 3 coincides with permeability of 0.6 to 2.0 in/hour followed by 0.2 to 0.6 in/hour. About 36,302 acres of prime farmland with restriction 3 coincide with a 0.6 to 2.0 in/hour permeability.

Table 28. Mutual occurrence of soil permeability categories and prime farmland in acres.

	Prime farmland categories*						
Permeability categories	1	2	3	4	5	6	Rows without 0
1: 0.2 - 0.6 in/hour	0.00	46,949	46,920	18,016	0.00	0.00	111,884
2: 0.6 - 2.0 in/hour	113,039	75,308	3,451	36,302	0.00	0.00	228,101
3: 2.0 - 6.0 in/hour	6,445	59,033	0.00	0.00	0.00	0.00	65,478
4: Water	0.00	0.00	0.00	0.00	0.00	4,817	4,817
5: Other	0.00	0.00	0.00	0.00	125	0.00	125
Total without 0	119,484	181,289	50,371	54,318	125	4,817	410,405

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

CONCLUDING REMARKS

This report presents information on the native and spatial distribution of soils in Jackson County, Arkansas. 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 several secondary attributes of soil in the county. These maps and tables showed that Jackson County has a wide range of soil attributes which affect the behavior and potential uses of soils.

The spatial distribution of soils examined in this report reflect 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. This report can help, however, to analyze the relationship between landuse and soil properties, e.g. most of the evergreen forests occur in the western panhandle of Jackson County in areas with no flood frequency, low shrink-swell potential, acidic soils, medium to high runoff, low to high permeability and have a soil slope > 1%. A majority of the agricultural land in Jackson County is associated with low soil slopes and low shrink-swell potentials and on poorly drained soils.

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APPENDIX A

Table 1. Historical population of Jackson County, Arkansas (U.S. Bureau of the Census, 1998).

Year	1810	1820	1830	1840	1850	1860	1870	1880	1890	1900
Pop.	N/A	N/A	333	1,540	3,086	10,493	7,268	10,877	15,179	18,383

Year	1910	1920	1930	1940	1950	1960	1970	1980	1990
Pop.	23,501	25,446	27,943	26,427	25,912	22,843	20,452	21,646	18,944

Table 2. Historical population of Newport, Arkansas (U.S. Bureau of the Census, 1998).

Year	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
Pop.	683	1,571	2,866	3,557	3,771	4,547	4,301	6,254	7,007	7,725	8,339	7,459

Table 3. Proportion of historical Newport population in Jackson County.

Newport	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	1980	1990
County	.0628	.1035	.1559	.1514	.1482	.1627	.1628	.2414	.3067	.3777	.3852	.3937